Prepared by: The Louis Berger Group, Inc.

DURHAM WALKS!

PEDESTRIAN PLAN

Prepared for: The City of Durham

With funding from: North Carolina Department of Transportation

November 2006

Acknowledgements.

We would like to extend a very special thank you to all of the citizens of Durham who participated in this project. From attending public meetings to providing comment on our hotline, the Plan would not be possible without you.

We would also like to thank the Durham City Council for their support and funding for this project, as well as the North Carolina Department of Transportation for the NCDOT Pedestrian Planning Grant.

Finally, we would like to thank the members of the Stakeholder Committee and City Staff for their time and on-going commitment to making Durham a more walkable city.

THIS PAGE LEFT INTENTIONALLY BLANK.

table of contents

THIS PAGE LEFT INTENTIONALLY BLANK.

Executive Summary.

Section 1. Introduction, Goals, and Objects.

The *DurhamWalks!* Pedestrian Plan ("Plan") was completed in 2006 by the City of Durham in order to assess the existing pedestrian environment and make recommendations for policy, program, and facility improvements. The Plan was partially funded by a grant from the North Carolina Department of Transportation Division of Bicycle and Pedestrian Transportation and Transportation Planning Branch, in addition to significant funding from the City of Durham's Public Works Department. The study area for this Plan is the City of Durham. The majority of the *DurhamWalks!* planning process was performed by City staff and consultants with the Louis Berger Group, Inc.

The *DurhamWalks!* Pedestrian Plan represents the first dedicated pedestrian plan created for the City in the modern era. Significant features of the Plan include a complete inventory of all sidewalks and hard-surface public trails and an extensive public outreach program conducted through the Partners Against Crime (PAC) District meetings, the Durham Public School System, and other venues such as the internet. The complete inventory includes information about the presence of curb ramps, sidewalk condition, width, and surface type.

As an integral part of the *DurhamWalks!* Pedestrian Plan process, a Stakeholder Committee was formed to help guide the Plan and related public outreach activities. This citizen and staff committee developed vision and mission statements for the Plan.

Vision Statement

Visitors to and residents of the City of Durham walk to their destinations often because Durham has a safe, accessible, convenient and comfortable network of sidewalks, trails, and other pedestrian facilities.

Mission Statement

The City of Durham is committed to creating and maintaining a safe, accessible network of pedestrian facilities for all residents, and implementing policies and programs to inform our citizens and enforce our laws.

Goals

1) Facility Quantity. To increase the number of pedestrian facilities: sidewalks, trails, crosswalks, pedestrian safety improvements at intersections, and other related amenities in the City of Durham.

2) Facility Quality. To improve the quality of both future and existing pedestrian facilities in Durham, especially in those areas that are suffering the worst from poor conditions.

3) Safety and Security. To enhance real and perceived pedestrian safety while increasing pedestrian activity.

4) Coordination. To guarantee that those people and agencies responsible for providing transportation and land use options assume pedestrian considerations in their everyday policies and practices.

Section 2. Evaluating Current Needs.

This section provides insight into Durham's population demographics and travel behavior as well as a brief overview of key themes generated through the survey and other public involvement efforts.

Key results of the demographic analysis found that:

- **Race:** Durham, population 187,183 (2000 US Census), is a very diverse city, with 46 percent of the population Caucasian, 44 percent African American, and 8 percent Hispanic.
- **Age:** Durham's median age is 31.0 years old, while the median age for both the state and nation is 35.3 years old. This lower median age may be attributed to the large student population associated with the universities and colleges in the city.
- **Education and Income:** Educational attainment levels and median income in Durham are higher than both the state and national averages, as is Durham's poverty rate.
- **Vehicle Ownership:** In terms of vehicle ownership, the city has higher than state and national averages in percent of households with no vehicles available and percent of households with only one vehicle available, and lower than state and national averages in percent households with 2 or more vehicles available.
- **Work Commute:** Reflecting vehicle ownership, 6.6 percent of Durham's workers take public transit or walk to work – higher than the state-wide rate of 2.8 percent.

This demographic information shows that Durham's population is full of pedestrians – from students without cars, to lower income populations that can't afford cars, to the elderly who no longer drive. Indeed, Durham's population already has pedestrian-oriented tendencies, reflected in the percent of workers who commute to work via transit or walking.

The Durham Pedestrian Plan process was accompanied by an intensive public involvement and outreach program. The major elements of this program included:

- Stakeholder Committee
- Public Workshops in July 2005 and February 2006
- Telephone Hotline
- Project Website
- Surveys
- Attendance at community meetings: PAC and INC
- Flyers on buses, at public libraries, and recreation centers
- Announcements in newspapers and on the radio
- Periodic newsletters

The survey received a total of 932 responses, 833 from online surveys and 99 from handwritten surveys. In general most survey responses lament the pedestrian un-friendliness of the city, but at the same time applaud the current pedestrian planning efforts. Most survey respondents would like to walk to take care of errands, shop, commute to work, go to school, or eat at a restaurant but many state that this is impossible due to the lack of sidewalks. Many responses provide reasons for making the City more pedestrian-friendly, all of which center around improving the quality of life. Some of the reasons respondents stated were: economic benefits, health benefits, environmental benefits, safety benefits, and attractiveness to newcomers. It is notable that none of the survey respondents cited "traffic benefits" as a reason to make Durham more walkable. It is important to note that the survey responses are not a statistically-correct random sampling of Durham's population and therefore the results of the survey may not reflect all of the needs of Durham's citizens. However, the survey is a useful tool for guidance in identifying major needs in the community.

Several major themes were generated from the public input. Some of these were:

1. Build more sidewalks.
2. Repair old sidewalks.
3. Connect existing sidewalks where there are gaps or "missing links."

In addition, survey results indicated that the top three improvements that would cause respondents to walk more were: 1. Better or more sidewalks, 2. Better or more access to places, and 3. Safer Intersections. Survey respondents also indicated that the top three items of most importance to them were: 1. Presence of sidewalks, 2. Personal Security, and 3. Sidewalk Condition. This input was used to help prioritize the construction of future projects and to identify areas of emphasis for the Plan.

Section 3. Existing Plans, Policies, and Programs.

In this section, a review was conducted of existing Durham plans, policies, and programs that relate to pedestrian facility development, education, and enforcement. The following items were reviewed:

- Durham Comprehensive Plan
- Unified Development Ordinance (UDO)
- Durham Trails and Greenways Master Plan
- Parks and Recreation Master Plan
- Design Guidelines Manual
- Subdivision Regulations
- Durham Code of Ordinances
- Durham Public Schools Site-Determination Policies

Recommendations were made for each of the above items.

This section also reviews Durham's policy for constructing new sidewalk, such as the payment-in-lieu fee and sidewalk petition process and compares it with those of other cities of similar size. Some recommendations for changes to Durham's policies include:

- **Capital Improvements Program:** It is recommended that Durham allocate a consistent level of funding out of their yearly Capital Improvements Program to construction of sidewalk and other pedestrian-related facilities. As can be seen in the review of other cities, many cities with successful pedestrian programs, including Charlotte and Winston-Salem, have allocated funding

in their budget each year to pedestrian-related activities. A consistent source of funding is necessary in order to plan for and prioritize pedestrian facilities, as well as reinforce the City's commitment to pedestrian-friendliness.

- **Sidewalk Payment-in-Lieu.** For new neighborhoods, sidewalks are currently required to be constructed as part of the approval of a development plan or site plan. Subject to the approval of the Development Review Board and only under specific circumstances, a fee can be paid rather than construct sidewalk along the Public Right of Way. The rate of Payment in Lieu for Sidewalk is set at $20.00 per linear foot, less the current sidewalk assessment rate which is $5.00 per linear foot. This yields a current Payment in Lieu rate for sidewalk of $15.00 per linear foot along the frontage of the subject lot. This plan proposes a change to the payment-in-lieu fee, whereby the fee is raised to $65 per linear foot in order to more accurately account for the real cost of installing sidewalk with curb and gutter. This money will go into a fund for future sidewalk construction.
- **Petition Process:** Advertise and promote the sidewalk petition process, so that Durham residents can be made more aware of the options available to them for requesting sidewalk. Develop an online request form and maintain a list of requested sidewalk projects online.

Section 4. Pedestrian System Plan.

This section describes the existing pedestrian system and its related facilities, and develops key projects. The section assesses the following existing conditions: major roads, existing sidewalk (Figure 1), sidewalk and trail condition (Figure 2), ADA accessibility (Figure 3), transit, schools, and land uses. Key highlights from this assessment include:

- **Sidewalk Mileage.** Durham has approximately 1,124 miles of road and 409 miles of sidewalks, which makes for a ratio of approximately one mile of sidewalk to 2.7 miles of road (.36:1 miles sidewalk to road). In an ideal situation, this ratio would be around 1.75 miles of sidewalk to 1 mile of road.
- **Sidewalk Condition.** Seventy-eight percent, or 320 miles, of the City's sidewalk is in "good" condition.
- **Accessibility.** For the purposes of this plan, ADA accessibility is defined as the presence of a curb ramp at both ends of the sidewalk segment. A non-compliant segment of sidewalk has either no curb ramps or a curb ramp at only one end.
- **Transit.** The transit system and the pedestrian system are critically dependent on each other to function well. Many of the people who use transit are also the main users of the

pedestrian system. Durham has two major transit providers: the Durham Area Transit Authority and the Triangle Transit Authority.

- **Schools.** Schools are a prime opportunity to promote walking, both for the students and for the employees who work there. In addition, schools are locations that are already the focal point of much car use and pedestrian activity. As part of the Plan, students from twenty elementary schools in Durham performed pedestrian audits of the neighborhoods near their schools.

Project development was broken into several types:

- 210 Corridor Projects
- 21 Schools Projects
- Over 274 Roads for Maintenance Projects
- 79 Intersection Projects
- 5 corridors and 9 intersections studies

These items are listed in entirety in Appendices 3 and 4 and prioritized in Section 5.

Figure 1. Map of existing sidewalk in Durham. For a larger version, please see www.durhamnc.gov/durhamwalks.

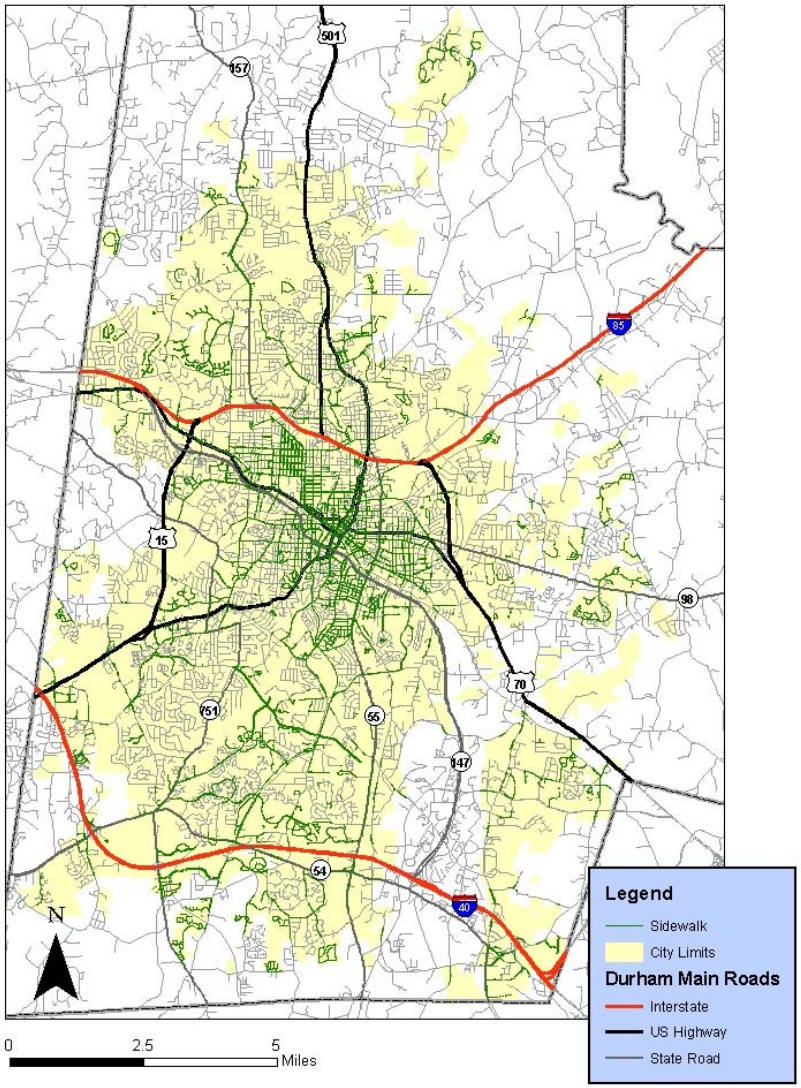


Figure 2. Sidewalk condition in Durham. For a larger version, please see www.durhamnc.gov/durhamwalks.

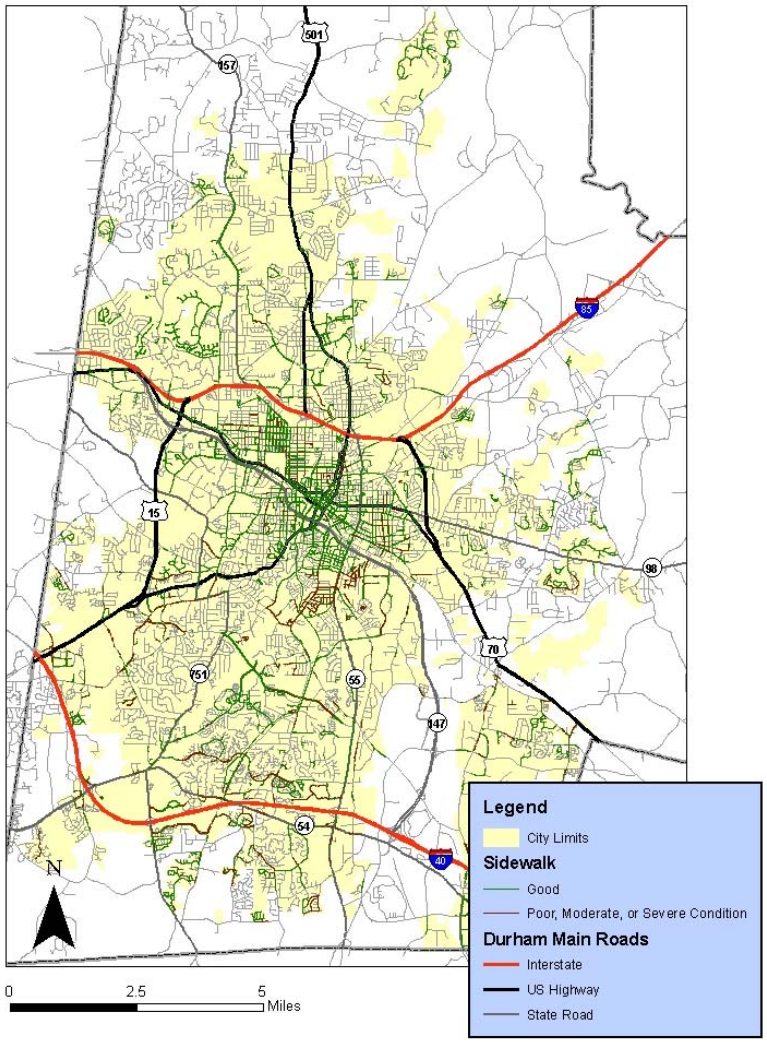
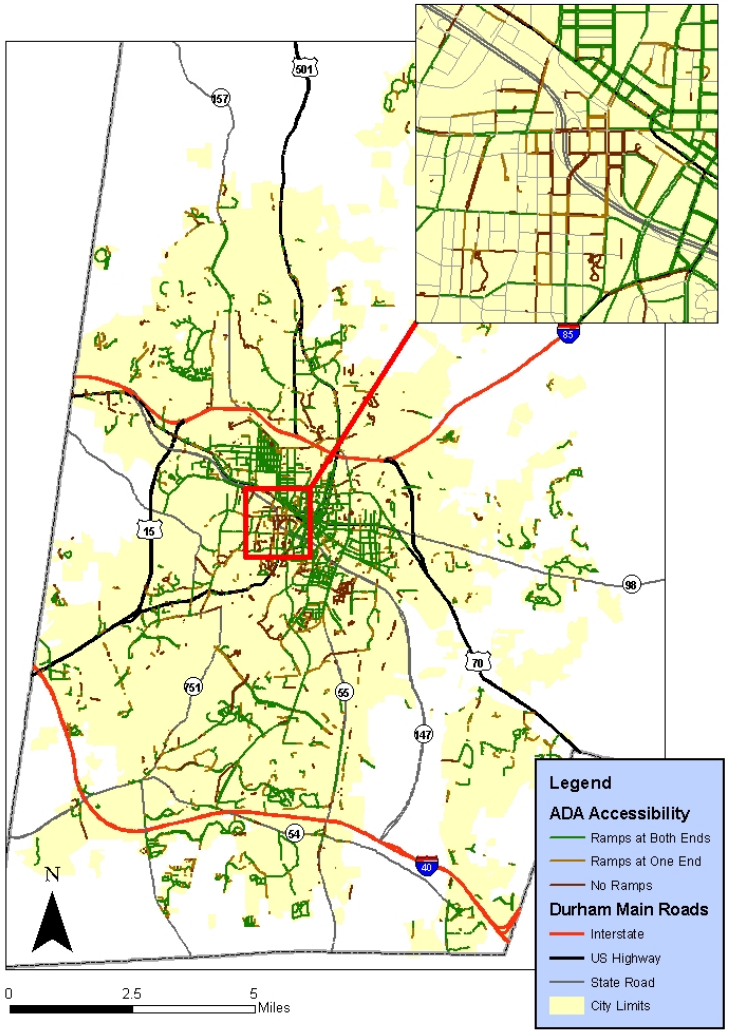


Figure 3. Locations of ADA-compliant sidewalk in Durham. For a larger version, please see www.durhamnc.gov/durhamwalks.



Section 5: Project Prioritization.

This section describes the project prioritization process and proposed implementation plan for project construction. Included in the chapter is a discussion of the project ranking method, and preliminary cost estimates.

Corridor Projects: Corridor projects were prioritized based on the following factors: project type, presence of transit, proximity to schools, safety need, road type, nearby compatible land uses, public comments, proximity to parks and recreation centers, and the presence of greenways. "A" rank projects are listed in Table 1.

Table 1. "A" Rank corridor projects and their extents.

Road Name	From	To
AlstonA6*	Carpenter Fletcher	Sedwick
Avondale	Roxboro	Geer
Cameron	Erwin	Duke University
Campus Walk	Moreene	LaSalle
CheekPW2	Geer	Hardee
Club1	Ruffin	Ambridge
CornwallisA1*	15-501	Roxboro
DearbornA1	Old Oxford	Ruth
FayettevilleA2	Woodcroft	MLK
GarrettA1	Hope Valley	Swarthmore
HillandaleA1	Peppertree	Carver
HillandaleA2*	Carver	I-85
Hope Valley A1	HWY 54	Swarthmore
Hope Valley A4	Archdale	15-501
LaSalleA1	Kangaroo	Erwin
Markham2	Washington	Avondale
Roxboro2	Pacific	Murray
Roxboro6	Enterprise	Cornwallis
University3	Old Chapel Hill	Hope Valley

**Portions of this project are part of a proposed incidental project in the 2006 – 2012 State TIP.*

PLEASE NOTE: The numbers and letters after road names have been added for the purposes of creating a unique identifier for each proposed project. This will allow projects that may occur on the same road but in different locations to be distinguished one from another.

Intersection Projects: The intersection project prioritization was based on the following factors: ADA compliance, safety, need, public comments, land use compatibility, the presence and condition of sidewalk, road type, and the presence of transit, schools, parks, or greenways. "A" rank intersection projects are listed in Table 2.

Table 2. "A" Rank intersection projects.

15-501 and Garrett*	Garrett and Trotter Ridge
Academy and Cranford	Glendale and Acadia
Broad and Main	Glendale and Club
Club and Guess	Hillandale and I-85*
Club and I-85	Hillsborough and Lasalle
Duke and I-85	HWY 54 and Fayetteville
Duke and Main	HWY 55 and HWY 54
Duke University and Chapel	Lasalle and Erwin
E Forest Hill and University	Mt. Sinai and Erwin
Fayetteville and Barbee	Roxboro and Club
Fayetteville Crossing for SW Elementary	Roxboro and I-85

**Intersection is part of a proposed project with pedestrian-related features in the 2006 – 2012 State TIP.*

Maintenance Projects. The sidewalk inventory provided the basis for identifying priority sidewalk maintenance projects. Sidewalks with severe deterioration are listed in Table 3. In addition to these sidewalks, several greenways displayed severe deterioration as well; their locations were: Southern Boundary Park, Sherwood Park, Lyon Park, and Ellerbee Creek Trail. These sidewalk locations will serve as the priority projects for the City.

Table 3. Priority maintenance projects.

Street Name	From	To	Length (Miles)
Angier	Alston	Holman	0.06
Concord	Lawson	Otis	0.09
Conyers	Wilkerson	End	0.02
Duke	Morehead	Proctor	0.07
Ellis	New Haven	Taylor Ridge	0.07
Farthing	Ellerbee	Club	0.01
Formosa	Otis	Concord	0.03
Garrett	15-501	University	0.05
Geer	Foster	North	0.19
Gregson	Minerva	Morgan	0.25
Gurley	Mallard	Primitive	0.02
Hillsborough	Hale	Carolina	0.05
Knox	Hale	Carolina	0.06
Lakewood	Fayetteville	Old Fayetteville	0.02
Martin Luther King Jr	Dixon	Hope Valley	0.01
Morehead	Vickers	Duke	0.12
Roxboro	Corporation	Dowd	0.06
Taylor	Hyde Park	Maple	0.06
Trinity	Shawnee	Rosetta	0.14
University	Cornwallis	Woodridge	0.04

Section 6. Standards and Guidelines.
The purpose of this section is to act as a stand-alone guidance document for the consideration, design, and construction of pedestrian facilities in Durham. The recommended guidance borrows heavily from pedestrian design guidelines published by the North Carolina Department of Transportation, American Association of State Highway and Transportation Officials, and the Federal Highway Administration of USDOT. Guidance is provided for on-road pedestrian facilities, off-road pedestrian facilities, mid-block crossings, and special features such as curb ramps, traffic calming, underpasses, and parking facilities.

Section 7. Programs and Policy Recommendations.
The "Three E's" of pedestrian activity – Education, Enforcement, and Encouragement – are important supports to capital improvements. This section describes those programs that are recommended for implementation and key policy recommendations to support the "Three E's". Programs discussed in this section are as follows:

- Walk-to-Work Day
- Safe Routes to School
- School-based Safety and Education Assembly
- Walk-to-School Day
- School Crossing Guard Training Program
- Walkable Communities Workshop
- Senior Safety Program
- Red Flag Crossing Program
- Walkability Training
- Sting Enforcement
- Passive Enforcement
- Spot Improvement Program
- School Strides
- Durham–focused Pedestrian Safety Brochure
- Pedestrian Awareness Task Force

Policy Recommendations include:

- Pedestrian and Transit-related recommendations:
  - Expand the marketing budget of DATA
  - Provide cursory review opportunities for any new/proposed development
  - Modify the current "checklist" of items that should be reviewed for each new/proposed development
  - Create a "Universal Access" Award
- Pedestrian Policy recommendations:

- Promote the existing sidewalk petition process in order to make residents more aware of it, and therefore more likely to use it. Currently, Durham residents can expedite sidewalk construction on neighborhood streets by providing the City with a petition for sidewalk signed by over 50 percent of the property owners along the length of the project, who also represent over 50 percent of the property along the project. Once the City has constructed the sidewalk, residents will then pay a $5 per foot assessment for the sidewalk and $20 per foot for any new curb and gutter.
- Increase the current payment-in-lieu fee to $65 per linear foot for new and redeveloped properties, as discussed in Section 3. This is the most realistic baseline cost for sidewalk construction based on recent city experience.
- Develop a sidewalk connectivity policy that requires new or improved developments to connect sidewalks from the development to the nearest corner or existing sidewalk/multi-use trail.

- Establish Pedestrian Activity Centers. There are several areas within Durham that, through field observation, presence of pedestrian facilities, accident records, and other information, can be identified as areas that already have high levels of pedestrians. These areas should be designated as Pedestrian Activity Centers, where their pedestrian-friendly nature will be protected and preserved, and may be targeted in the future for special pedestrian improvements.

Section 8. Implementing the Plan.

This section of the Plan discusses how to implement the recommendations made in the previous sections by recommending potential partners and funding sources. This section also provides recommendations for various benchmarks to be used in tracking the Plan's implementation.

Section 1. Introduction, Goals, and Objectives

Covered in Section 1...

- Why Create a Pedestrian Plan?
- Contents of the Plan
- Who to Contact for Information
- Plan Vision, Goals and Objectives

1.1 Introduction and Purpose of the *DurhamWalks!* Pedestrian Plan

Like many communities across the nation, Durham has recently come face to face with its dependence on petroleum resources. During the time of this work, fuel prices hovered near $3.00 per gallon of gas, and the City had temporarily curtailed non-essential trips by staff due to the fuel shortage prompted by a pair of hurricanes in the Gulf of Mexico that shut off a portion of the supply of gasoline to the eastern United States. News reports indicated that more people were avoiding trips made by private car, riding mass transit at higher rates, and using bicycling and walking at increased rates for transportation purposes. In addition, a continuing concern for the City had been the need to provide adequate facilities for walking as a means of transportation for those Durham residents who could not drive or could not afford to own a car. To bolster this concern, the Brookings Institute had recently released a policy brief stating that lower income households pay more for vehicle ownership and operation, even if they may pay the same percentage as other households on overall transportation costs (about 23 percent of total household income)[1].

Meanwhile, Durham was also enjoying a transformation in the downtown area. Downtown businesses were becoming more frequent, due in part to the additional residential development and redevelopment that was taking place in the former tobacco warehouse district of the city. In a more tragic sense, a number of pedestrian-related crashes involving children and teenagers urged an additional emphasis on pedestrian safety. At the same time, Durham became one of the first major cities in the Triangle region to maintain a bicycle and pedestrian coordinator staff position and standing Bicycle and Pedestrian Advisory Committee.

Durham, like most of its southeastern counterparts, can not be considered a very "walkable" city in many of its neighborhoods –traffic signal designs throughout most of the city are geared towards providing maximum throughput of cars, not people. Land uses are separated by distance and inadequate pedestrian facilities. Nevertheless, the City of Durham is rich in areas that have great potential to create bustling, pedestrian-friendly communities:

- *Downtown*, which is enjoying a resurgence of new and converted commercial and residential developments;

- *College campus settings*, such as Duke University and North Carolina Central University, that have high numbers of walking students and staff; and
- *Many residential communities*, some of which were constructed during periods of Durham's history when walking was a primary method of transportation, and some communities now characterized by high proportions of low-income households with limited access to automobiles.

The *DurhamWalks!* Pedestrian Plan ("Plan") represents the first dedicated pedestrian plan created for the City in the modern era. The Plan was completed in April, 2006, by the City of Durham and was partially funded by a grant from the North Carolina Department of Transportation (NCDOT) Division of Bicycle and Pedestrian Transportation and Transportation Planning Branch, in addition to significant funding from the City of Duhram's Pulibc Works Department. The study area for the Plan is the City of Durham and selected areas where the City may grow in the next few years. Significant features of the Plan include a complete inventory of all sidewalks and hard-surface public trails; and extensive public outreach conducted through the Partners Against Crime (PAC) District meetings, the Durham Public School System, and other venues including the internet. The complete inventory includes information about the presence of curb ramps, sidewalk condition, width, and material of construction. Thousands of pictures were taken at intersections to provide Durham with a pictorial inventory that could be referenced using geographic information system (GIS) software.

The sections of the Plan are as follows:

- Section 1: Introduction, Goals and Objectives
- Section 2: Evaluating Current Needs
- Section 3: Existing Plans, Programs, and Policies that Support Walking
- Section 4: Pedestrian System Plan
- Section 5: Project Prioritization
- Section 6: Standards and Guidelines
- Section 7: Programs and Policy Recommendations
- Section 8: Implementing the *DurhamWalks!* Plan

A Glossary at the end of the Plan has been created to provide explanations of common transportation- and pedestrian-related terminology. Appendices are also included to provide more detailed information about recommendations made in the main text of the document.

For More Information or Copies

Bicycle and Pedestrian Coordinator
City of Durham
101 City Hall Plaza
Durham, NC 27701

919.560.4366

1.2 Goals and Objectives

As an integral part of the *DurhamWalks!* Pedestrian Plan process, a Stakeholder Committee was formed to help guide the Plan and related public outreach activities. This citizen and staff committee developed vision and mission statements for the Plan. The Vision Statement, as the name implies, suggests a future vision for Durham and its residents, where walking is a much more accessible and integral part of everyday life. The Mission Statement describes the purpose of the planning process, and the charge inherent to the City of Durham to carry out the recommendations in this pedestrian plan. In addition, the Stakeholder Committee also developed specific goals, objectives and success benchmarks, critical to evaluating the status and progress of the Plan's implementation.

Vision Statement

Visitors to and residents of the City of Durham walk to their destinations often because Durham has a safe, accessible, convenient and comfortable network of sidewalks, trails, and other pedestrian facilities.

Mission Statement

The City of Durham is committed to creating and maintaining a safe, accessible network of pedestrian facilities for all residents, and implementing policies and programs to inform our citizens and enforce our laws.

Four goals, and accompanying objectives and benchmarks, further delineate the *DurhamWalks!* Pedestrian Plan to our citizens and business community. Goals, objectives, and success benchmarks should be grounded in realistic expectations of funding levels and other variables that may influence implementation, but also be aggressive enough to inspire confidence that the Vision and Mission of the Pedestrian Plan will be achieved.

Goal 1: Facility Quantity.
To increase the number of pedestrian facilities: sidewalks, trails, crosswalks, pedestrian safety improvements at intersections, and other related amenities in the City of Durham.

Objective #1: According to survey responses, the Durham residents consider new sidewalk construction as a top priority, and it should therefore be a top priority of the Plan. Construction demands are symptoms of a need to increase connectivity in the pedestrian system, and thus additional facilities such as pedestrian crossings, signals, crosswalk treatments, signage, street furniture, and streetscaping elements, should also be a top priority. In addition, barriers to pedestrian travel such as missing sidewalk to trail connections should also be eliminated where existing and avoided in new development.

Objective #2: Funding new pedestrian facilities is a capital intensive task, and needs to done as a coordinated effort between public and private sector actors, with the local government taking a strong lead role in both aggressively funding, providing matching funding, and undertaking policy initiatives to ensure a reasonable expectation for completing the projects and programs recommended in the *DurhamWalks!* Pedestrian Plan.

Success Benchmarks

- The Capital Improvement Program (CIP) or State Transportation Improvement Program (STIP) funded projects and programs for the City of Durham will include those recommendations shown within this plan.
- Reduce the sidewalk "gap" indicator variable (increase connectivity) inside the City by 25 percent in ten years (2015) and by 10 percent in five years (2010). See explanation of the sidewalk "gap" indicator at right.
- Establish a consistent prioritization scheme for new sidewalk construction by the end of 2006.
- Reduce the number of residential parcels in the City of Durham that do not have sidewalk on at least one adjacent street face by 25 percent in ten years (2015).
- Construct or implement 75 percent of the project recommendations in the *DurhamWalks!* Pedestrian Plan by 2015 and 30 percent by 2010.
- Increase city and state funding to pedestrian-related facilities.
- Reduce or mitigate existing barriers to pedestrian travel in order to increase connectivity and functionality of the pedestrian system.

Photo courtesy of Dan Burden. www.pedbikeimages.org

Sidewalk "Gap" Indictor

GI = SM / GBS

where:
GI=Gap Indicator
SM=Sidewalk (miles)
GBS=Gaps Between Sidewalks

Illustration of poor facility quality. *Photo courtesy of Dan Burden: www.pedbikeimages.org*

Illustration of high quality sidewalk facility. *Photo courtesy of Dan Burden: www.pedbikeimages.org*

Goal 2: Facility Quality.
To improve the quality of both future and existing pedestrian facilities in Durham, especially in those areas that are suffering the worst from poor conditions.

Objective #1: The City of Durham should adhere to a cohesive set of pedestrian facility design standards that respect levels of pedestrian activity, and enforce these standards in both public and private sector initiatives. These standards should promote connectivity within the pedestrian system and also between the pedestrian system and other forms of transportation, such as transit and cycling.

Objective #2: Maintenance is the second most important priority of our citizens and this plan. Sidewalks, multi-purpose trails, and other pedestrian amenities should be kept in a safe and accessible condition for all of Durham's citizens.

Objective #3: The Plan strongly encourages higher levels of pedestrian activity. Pedestrian activity is, in turn, strongly influenced by the quality of the pedestrian experience communicated through street-level design details and mixes of proximate land uses. The City of Durham, particularly in those areas with high pedestrian demand, should create and adhere to higher standards for streetscaping, pedestrian amenities, and public/private building construction to create pedestrian activity centers and corridors within the City.

Success Benchmarks

- The City of Durham will adopt design standards and guidelines in all plans that respect and enhance pedestrian activity centers, including the downtown core. (See also Goal 4.)
- The City of Durham will reduce the level of sidewalks meeting the "moderate" or "severe" rating in the pedestrian facility inventory by 25 percent in 2015.
- The City of Durham should conduct a survey every two years to determine the satisfaction level of its citizens on pedestrian facilities including sidewalks, greenways, trails, and amenities; this survey should also address issues of personal safety including vehicular traffic conflicts and lighting (see also Goal 3).
- An updated pedestrian facility inventory should be completed in 2015 to ensure that progress has been made towards the objective of higher maintenance standards. Updated inventories should be completed every two years to encompass new construction as a result of private development actions.

Goal 3: Safety and Security.
To enhance real and perceived pedestrian safety while increasing pedestrian activity.

Objective #1: Improve pedestrian facilities at schools and encourage pedestrian activity in children. Schools are one of the key locations for increasing pedestrian activity and encouraging a healthy and active lifestyle. At the same time, children are some of the most vulnerable populations in terms of pedestrian safety and security. Both physical and policy improvements can be made to encourage more pedestrian activity while at the same time improving pedestrian safety and security.

Objective #2: Develop and support an annual "Leave the Car at Home" week, during which transit, bicycle, and pedestrian travel are promoted at schools and workplaces. This is already being done in Durham, but would be more beneficial if additional technical and other support options were put into place to reward participating offices, retail centers, and schools.

Objective #3: Conduct periodic (recommend: six months) enforcement reviews with the Duke University, North Carolina Central University, and Durham police forces to assess bicycle/pedestrian accidents and develop/coordinate enforcement programs and engineering improvements to address problem locations. The City of Durham engineering staff should be present at these meetings to discuss engineering options.

Success Benchmarks

- Develop, in conjunction with the Durham Public School System and NCDOT, a class-based education module for pedestrian and bicycle safety for fourth- and fifth-grade students.
- Improve crossing treatments at schools so as to reduce pedestrian-related crashes at these locations by 50 percent by 2010.
- Pedestrian accidents should be reduced by 25 percent (from year 2000 records) by 2010 while pedestrian activity (measured by journey-to-work data compiled by the decennial census and recorded accident rates) should be increased by 25 percent inside the City of Durham.
- Conduct a bi-annual survey of Durham's citizens to ascertain their perception of personal safety and security about walking to/from school, home and work (see also Goal 2). This survey should see concerns diminish generally over time as the survey is conducted.
- Create traffic calming and speed reduction programs to reduce dangerous driver behavior.
- Implement pedestrian safety awareness and enforcement programs for both pedestrians and drivers in order to encourage safer travel behavior.

Goal 4: Coordination.
To guarantee that those people and agencies responsible for providing transportation and land use options assume pedestrian considerations in their everyday policies and practices.

Objective #1: The development of capital improvement programs – including the Durham CIP and Metropolitan TIP – should include coordinated pedestrian projects which optimize limited resources to maximize connectivity and safety benefits.

Objective #2: Every new sidewalk and maintenance upgrade of existing pedestrian facilities must include provisions for impaired citizens, including mobility, visual acuity, and aural acuity. An option for audible pedestrian signals should be made available on all new installations, as well as for retrofitting existing signal installations on a priority and citizen-based request system.

Objective #3: Land development and policy exercises should include pedestrian considerations as a core concern in every instance, including during preliminary project scoping and functional designs of roadway projects. Proximity of complimentary land uses should be encouraged by streamlining the development of multi-use properties and providing pedestrian connections between various land use types. New development should be required to provide sidewalk connections to the nearest continuous sidewalk segment, just as would be required for water, sewer, or street connectivity.

Objective #4: Priority should be given to pedestrian improvements within a quarter mile of existing schools, especially for those projects that create connections to the existing pedestrian and greenway system. The City should carefully consider the siting and design of new or expanded school proposals to ensure pedestrian connectivity and the safety of children arriving to school on foot.

Objective #5: Coordination should occur between pedestrian and transit facilities. The most frequent users of the pedestrian system are also transit riders, and therefore it is of utmost importance that the Durham Public Works Department works directly with Durham Area Transit Authority officials to create a smooth and accessible interface between the pedestrian and transit systems in Durham.

Success Benchmark

- The City of Durham should adopt an aesthetic guideline manual to accompany the Design Guidelines Manual that now exists. This manual should apply to areas of high pedestrian activity, as designated by the City, and apply to new construction or major renovations that occur in these

areas. Guidelines should speak to building massing, eliminating blank walls, provision of pedestrian furniture/amenities, and streetscaping to encourage pedestrian activity.

- Create linkages between trails and residential areas, as well as trails to trails to increase pedestrian system connectivity. This will require coordination between the Durham Public Works Department, Planning Department, and Parks and Recreation Department. By 2020, all trails should be connected to nearby neighborhoods, sidewalks, and other trails.

ENDNOTES:

[1] Margy Weller, "High Cost or High Opportunity Cost? Transportation and Family Economic Success." The Brookings Institution Center on Children and Families, December, 2005.

Covered in Section 2...

- What are the city's needs?
- Who uses the pedestrian facilities?
- Where are safety issues – Crash Analysis?
- What did the public involvement process identify as needs in the city?

Section 2. Evaluating Current Needs

The City of Durham, population 187,183 people (2000 US Census), is located in the central piedmont region of North Carolina, in Durham County. The City is a half hour driving distance northwest of Raleigh, and about an hour and a half northeast of Greensboro. Originally the hub of the tobacco industry in North Carolina, downtown Durham is dotted with large tobacco warehouses and crossed by several railroads. Nowadays, the City is known for its universities, including North Carolina Central and Duke Universities; its minor league baseball team, the Durham Bulls (made famous by the movie "Bull Durham"); and the Research Triangle Park.

Durham is a racially and economically diverse city. In 1949, the City's Parrish Street was featured in *Ebony* magazine as the "Negro Wall Street of America". During the 1950s and 1960s, the City was the scene of major events in the national civil rights movement, including the 1957 sit-in at Royal Ice Cream, which occurred three years before the famous Woolworth counter sit-ins in Greensboro.

After years of neglect, the City's downtown area has begun to rejuvenate with the rehabilitation of the American Tobacco Campus, West Village and the new Durham Bulls Stadium. Nearby inner city neighborhoods and first-ring suburbs have seen a boost in real estate interest, while the Southpointe Mall and Fayetteville Street areas have seen booms in construction. As of 2003, the North Carolina Department of Transportation, with assistance from the City of Durham, completed paving nearly eight miles of the Durham portion of the American Tobacco Trail, a 22-mile-long rails-to-trails project which connects Downtown Durham to Chatham and Wake Counties. Other urban trails like the Roxboro Rail-Trail, Rocky Creek Trail, and Erwin Road and Club Boulevard street trails have also been completed or are programmed for construction. These events, along with other changes, suggest that now, more than ever, is the time for Durham to invest in a pedestrian plan.

The following section describes Durham's residents in a demographic analysis; outlines some of the major needs identified through this project's public involvement process; and, provides a crash analysis of pedestrian-automobile crashes in Durham between 2001 and 2003.

2.1 Durham's Residents: Demographics

It is important to look at the demographic characteristics of who is living in the city in order to create a plan that appropriately addresses Durham's needs. The following discussion assesses Durham's

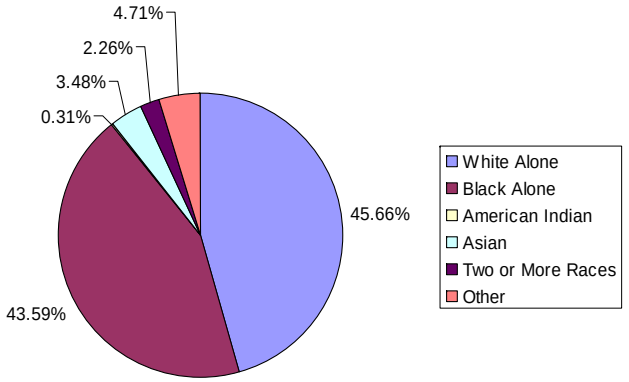
population in comparison to the state and nation. When working with pedestrian-related issues, it is particularly important that the discussion assess characteristics such as age, income, and commuting. Age and income will provide a picture of those people who walk because they need to, either because they are too young or too old to drive, or because they cannot afford a car. Commuting characteristics are useful because they show current travel behavior of residents in the area, and may indicate a propensity of the residents to walk because they chose to, even if they could drive or ride transit. Race, ethnicity, and educational attainment can also provide insight into the travel behaviors of Durham's residents.

Race. Durham has a racially diverse population with 46 percent of the population Caucasian, 44 percent of the population African American, and 8 percent of the population Hispanic. Table 2-1 shows Durham's demographic breakdown compared with those of North Carolina and the United States. As can be seen, Durham has a near even split between Caucasian and African American populations, while both the state and nation have majority Caucasian populations. In addition, Durham has a higher Hispanic population (8.5 percent) than the State (4.7 percent) but lower than the nation (12.6 percent).

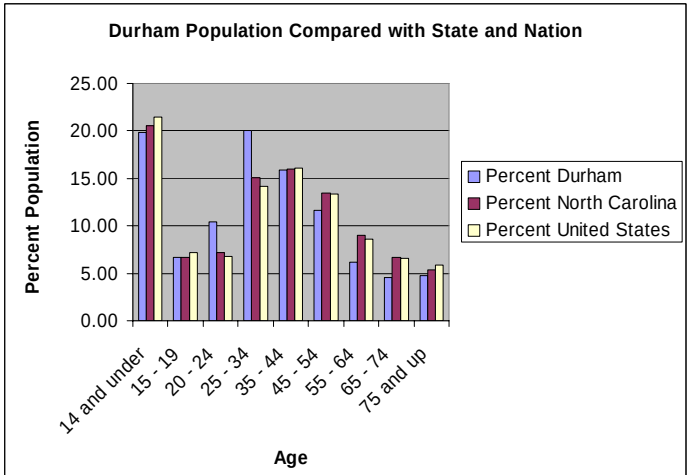
Table 2-1. Durham Population by race.
(Source: 2000 US Census, Summary File 1)

	Durham	North Carolina	United States
Total Population	**187,183**	**8,049,313**	**281,421,906**
Percent of Population:			
White Alone	45.7	72.1	75.1
Black Alone	43.6	21.6	12.3
American Indian	0.3	1.2	0.9
Asian	3.5	1.4	3.6
Two or More Races	2.3	1.3	2.4
Other	4.7	2.4	5.6
Hispanic*	8.5	4.7	12.6

**Note: Hispanic is an ethnicity. It is therefore a separate population analysis than race.*



Graph 2-1. Durham Population Demographics.



Graph 2-2. Graph of Durham population by age as compared to state and nation.
(Source: 2000 US Census, Summary Tape File 1)

Age. In general, Durham has a younger population than both the state and the nation. The median age in Durham is 31.0 years old, while the median age for both the state and nation is 35.3 years old. This youthful population can most likely be attributed to the preponderance of college and graduate students attending the various educational institutions in the city (Duke University, Durham Technical College, and North Carolina Central University), as well as students attending the North Carolina School of Science and Math, a statewide boarding school for students who excel in Science and Math.

Table 2-2 and Graph 2-2 show Durham's overall age distribution in comparison to the State and nation.

Table 2-2. Durham's population by age as compared to state and nation.
(Source: 2000 US Census, Summary File 1)

	Durham	North Carolina	United States
Total Population	**187,183**	**8,049,313**	**281,421,906**
Percent of Population:			
14 and under	19.80	20.54	21.41
15 - 19	6.71	6.71	7.18
20 - 24	10.39	7.17	6.74
25 - 34	20.05	15.07	14.18
35 - 44	15.85	15.99	16.04
45 - 54	11.68	13.48	13.39
55 - 64	6.17	8.99	8.63
65 - 74	4.57	6.63	6.54
75 and up	4.76	5.41	5.90

Education. Reflective of the City's emphasis on education, Durham's population has a higher level of educational attainment than either the state or nation. Over 40 percent of Durham's population over the age of 25 has a college degree or higher. This is nearly double the statewide and national averages of 22.5 and 24.4 percent, respectively.

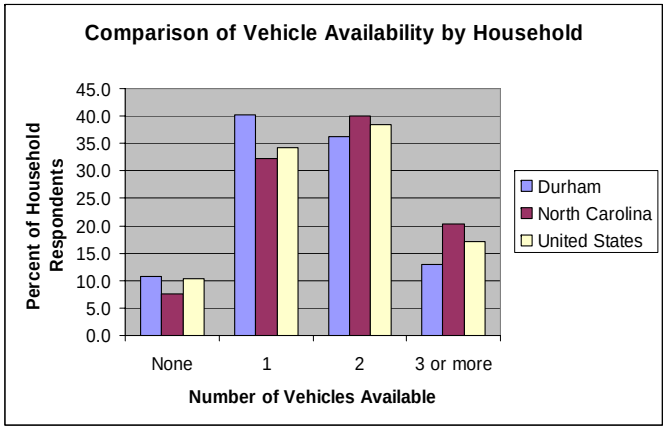
Table 2-3 shows a complete breakdown of the educational attainment for Durham's population over the age of 25 compared to that of the state and nation.

Table 2-3. Durham population by educational attainment
(source: 2000 US Census, Summary File 3)

	Durham	North Carolina	United States
Population 25 years and over	**118,100**	**5,282,994**	**182,211,639**
Less than 9th grade	6.76	7.83	7.55
9th to 12th grade, no diploma	10.64	14.03	12.05
High school graduate (includes equivalency)	17.61	28.45	28.63
Some college, no degree	17.71	20.45	21.05
Associate degree	5.54	6.78	6.32
Bachelor's degree	23.44	15.30	15.54
Graduate or professional degree	18.31	7.17	8.86

Income. Durham's income statistics reveal an economically diverse city. Both Durham's median household income and median family income ($41,160 and $51,162, respectively) are higher than the state's ($39,184 and $46,335) and comparable to the nation's ($41,994 and $50,046); however, the City also has a higher percent population living below the poverty line (14.2 percent) than both the state and the nation (11.9 percent and 12.0 percent, respectively) (see Table 2-4).

.



Graph 2-3. Vehicle Availability by Household: Durham, North Carolina, and the United States.

Table 2-4. Durham median household and family incomes, population living below poverty line in comparison to state and nation. (*Source: 2000 US Census, Summary File 3)*

Statistic	Durham	North Carolina	United States
Median Household Income	$41,160	$39,184	$41,994
Median Family Income	$51,162	$46,335	$50,046
Total Population	**187,183**	**8,049,313**	**281,421,906**
Population below Poverty Line	14.2	11.9	12.0
Percent Under Age 5	8.1	12.8	9.7
Percent Over Age 65	30.5	31.5	33.6

Vehicle Availability. Reflective of Durham's income statistics are the City's vehicle availability statistics. Table 2-5 shows the percent of Durham households by vehicle availability. As can be seen, 9.9 percent of Durham's households have no vehicles available and 37.3 percent have only one vehicle available. Both of these rates are higher than the state (6.7 percent no vehicles and 28.7 percent one vehicle) and the nation (9.4 percent no vehicles and 31.2 percent one vehicle). At the same time, Durham has similar rates of availability of two vehicles per household (33.5 percent) as those of the state and nation (35.5 percent and 34.9 percent, respectively).

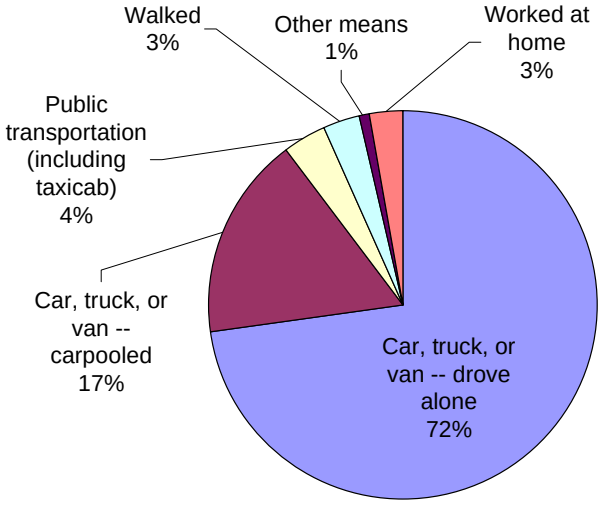
Table 2-5. Durham vehicle availability compared to state and nation.
(Source: 2000 US Census, Summary File 3)

	Durham	North Carolina	United States
Vehicles Available	*Percent Housing Units*		
None	9.9	6.7	9.4
1	37.3	28.7	31.2
2	33.5	35.5	34.9
3 or more	11.9	18.0	15.6

Work Commute. Durham's work commute for workers 16 years and over may be reflective of its vehicle ownership. As can be seen in Table 2-6, Durham has fewer percent workers 16 years and older that travel to work by car than both the state and nation. Especially important is the fact that a combined 6.6 percent of Durham's workers take public transit or walk to work – the two most pedestrian-intensive means of commuting. This is much higher than the state-wide rate of 2.8 percent transit and walking combined and comparable to the national rate of 7.7 percent.

Table 2-6. Commuter behavior for Durham as compared to state and nation.
(Source: 2000 US Census, Summary File 3.)

	Durham	North Carolina	United States
Total Workers 16 years and over	**93,057**	**3,837,773**	**128,279,228**
	Percent Workers 16 years and over		
Car, truck, or van -- drove alone	72.7	79.4	75.7
Car, truck, or van -- carpooled	17.0	14.0	12.2
Public transportation (including taxicab)	3.5	0.9	4.7
Walked	3.1	1.9	2.9
Other means	1.0	1.1	1.2
Worked at home	2.7	2.7	3.3



Graph 2-4. Durham commuter behavior.

Summary. In general, the demographic analysis of Durham shows a city ripe for increased pedestrian activity. Durham is both a working class and a college town, with a median income, educational levels, and poverty rates all above the state and national averages. This is a city of two populations – both of which will be well-served by improved pedestrian facilities and a pedestrian plan. The one population is the more educated and affluent, and may have the flexibility and increased interest in walking. The second is the population best identified by the vehicle ownership data, who have less access to vehicles and must instead use alternative forms of travel to get around. Already, Durham's population has pedestrian-oriented tendencies, as reflected by it's higher than the state and nation non-single occupancy vehicle commute rate. This demographic information shows that Durham's population is full of pedestrians. From college and high school students without cars, to lower income populations that can't afford cars, to the elderly who no longer drive – this plan will serve a great number of Durham's residents.

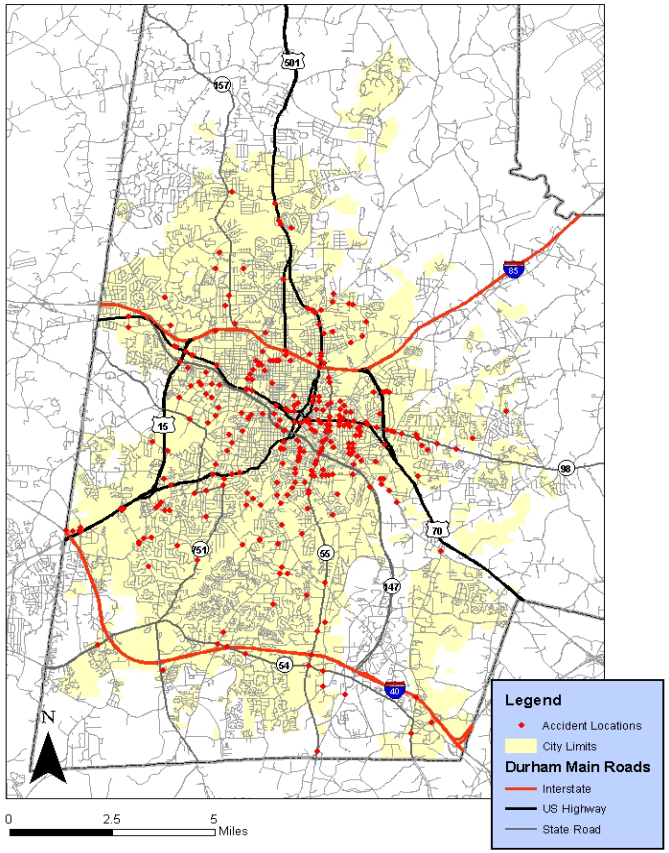


Figure 2-1. Map of bike/pedestrian crashes in the City of Durham between 2001 and 2003.
(Data courtesy the NCDOT Bike and Pedestrian Division, North Carolina Bicycle and Pedestrian Crashes Database, www.pedbikeinfo.org/pbcat)

2.2 Crash Analysis

Crash Analysis. Table 2-7 shows crash data for the City of Durham for the years 2001, 2002, and 2003. As can be seen, between 2001 and 2003, the City of Durham experienced 290 total pedestrian-related crashes, 13 of which were fatalities, 39 resulted in Type A (Disabling) injury, 106 resulted in Type B (Evident) injury, and 94 resulted in Type C (Possible) injury. Thirty-one crashes involved property damage only. Table 2-8 compares Durham's crash rates with other major cities throughout the state: Greensboro, Charlotte, Winston-Salem, Raleigh, Asheville, and Fayetteville. Figure 2-1 shows a map of all bicycle and pedestrian crashes between 2001 and 2003 for the City of Durham.

Table 2-7. Crash by type for the City of Durham, 2001 - 2003

	2001	2002	2003	Total
Fatality	5	5	3	13
Type A Injury (Disabling)	10	12	17	39
Type B Injury (Evident)	33	37	36	106
Type C Injury (Possible)	35	22	37	94
Property Damage Only	7	9	15	31
Unknown	2	2	3	7
Total	***92***	***87***	***111***	***290***

Table 2-8. Comparison of Durham crashes to other North Carolina cities.

	Population	Fatalities	Total Crashes	Fatalities per 100,000 people	Total Crashes per 100,000 people
Durham	*187,035*	13	290	6.95	155.05
Greensboro	*223,891*	14	375	6.25	167.49
Charlotte	*540,167*	34	1025	6.29	189.76
Winston-Salem	*185,776*	11	186	5.92	100.12
Raleigh	*276,034*	19	504	6.88	182.59
Asheville	*68,889*	6	142	8.71	206.13
Fayetteville	*121,015*	13	203	10.74	167.75

Between 2001 and 2003, Charlotte had the most total pedestrian crashes and Asheville had the least total pedestrian crashes, however, a comparison of per capita crashes during that time period finds that Asheville had the most crashes per 100,000 people and Winston-Salem had the least crashes per 100,000 people. Charlotte also had the most total pedestrian fatalities during the three year span and Asheville had the least, however, when compared per capita, Fayetteville had the most fatalities per 100,000 people and Winston-Salem had the least fatalities per 100,000 people.

Overall, Durham has a comparable or lower pedestrian crash rate than those of other comparable cities in North Carolina. However, there are many issues that affect crash data. One can be the underreporting of accidents, which may happen when the people involved in an accident may not wish to involve government officials. This is often the case with high populations of minorities or recent emigrants to the United States. In addition, many pedestrian related incidents are not reported because the resulting property damage cost is relatively low compared to vehicle on vehicle crashes, so the parties involved decide not to contact the authorities. While it is important to commend Durham on their relatively low crash statistics, it is also important to recognize that these may not be entirely accurate and that improvements to local pedestrian facilities are still critical and necessary.

2.3 Public Involvement and Pedestrian Needs

The Durham Pedestrian Plan process was accompanied by an intensive public involvement and outreach program. The public involvement and outreach process took a two-pronged approach. First, a Stakeholder Committee was established, which met seven times throughout the course of the project. The Stakeholder Committee was designed to provide an opportunity for input from existing agencies and departments that may have an interest in the planning process. Members of the Stakeholder Committee are shown below.

Stakeholder Committee

Comprised of representatives of schools, City staff, law enforcement, citizens and consulting staff, the Stakeholder Committee provided Goals & Objectives, key task reviews, and a valuable source of input throughout the planning process.

Name	Title/Affiliation	Agency/Organization
Diane Daniel / Judy Martell	Chair	Durham Bicycle & Pedestrian Advisory Commission
Alison Carpenter	Bicycle and Pedestrian Coordinator	Durham Transportation Division
Annette Montgomery	Member	Durham Open Space & Trails Commission
Barry Ragin	Member	Durham Inter-Neighborhood Council
Danny Blackwell	Chair	Mayor's Committee for Persons with Disabilities
Patrick McDonough	Transit Service Planner	Triangle Transit Authority
Willa Robinson	Health Promotion & Wellness Program Manager	Durham County Public Health
Debbie Roberson	Transportation Liaison	Durham Public Schools
Julie Woosley	Director	SmartCommute
Belinda Staten	Administrator (Member will serve)	Durham Recreation Advisory Commission
Christina Hendrick	Member	People for a Livable Urban Community
Sarah O'Brien	Citizen	
Ed Venable	Senior Street Engineer	Durham Engineering Department
Mark Ahrendsen	Director	Durham Transportation Division
David Cates	GIS Guru	Durham Engineering/GIS
Keith Luck	Planning Supervisor	Durham City/County Planning
Cherri Smith	Trails Planner	Durham Parks & Recreation
Ms. Chris Boyer	Division Superintendent	Durham Roadway Appearance
Cha'ssem Anderson	Transit Planner	Durham Area Transit Authority
Peter D'Orazio	Division Superintendent	Durham Street Maintenance
Lukas Strout	Victim Services	Durham Police Department
Geneva N. Ennett	Records Dept.	Durham Police Department
Mary Meletiou	Program Manager	NCDOT Division of Bicycle & Pedestrian Transportation

Second, the public outreach effort created a series of opportunities for the general public to learn more about the plan and to provide comment. The following is a listing of the opportunities for public comment:

- July 2005 Public Workshops:
  - Tuesday, July 12: 5 – 8 PM. Eastway Elementary, Cafeteria
  - Wednesday, July 13: 5 – 8 PM. Durham City Hall, Council Chambers
  - Thursday, July 14: 5 – 8 PM. E.K. Powe Elementary, Cafeteria
  - Wednesday, July 20: 5 – 8 PM. C.C. Spaulding Elementary, Cafeteria
  - Thursday, July 21: 5 – 8 PM. Southwest Elementary, Cafeteria
- February 28, 2006 Public Workshop at Durham City Hall
- Hotline: (919) 467 – 9081. Open throughout the course of the project
- Website: www.durhamwalks.org. Open throughout the course of the project.
- Survey: online at project website and distributed by hand at public workshops, PAC meetings, and by request. The survey period was open during the months of July and August, 2005.
- Attended January 24, 2006 Inter-Neighborhood Council Meeting to provide updates and announce the February 28, 2006 public workshop.

Other public outreach approaches that were used include attending meetings at all five PAC districts before and after each set of public workshops; posting flyers and announcements at public libraries, recreation centers, and on DATA buses as well as to neighborhood and community listserves; placing announcements in local newspapers; and distributing several newsletters. All copies of flyers, handouts, newsletters, and surveys have been included in Appendix 1.

The City of Durham also has an on-going Bike and Pedestrian Advisory Committee (BPAC) which meets in City Hall the third Tuesday of each month and is led by the City's staff Bicycle and Pedestrian Coordinator. Two representatives of the commission served as liaisons to the Stakeholder Committee for the Plan, and members of the project team attended several BPAC meetings throughout the Plan's process to provide news and updates.

Survey Responses. The survey for the Pedestrian Plan was designed to understand Durham's pedestrians: their personal characteristics and preferences, and their major needs. Paper surveys were distributed at all public workshops and meetings, and an online version was accessible July and August 2005 at the project website (www.durhamwalks.org). The following discussion highlights the major findings from the survey. It should be noted that due to distribution methods, the survey is

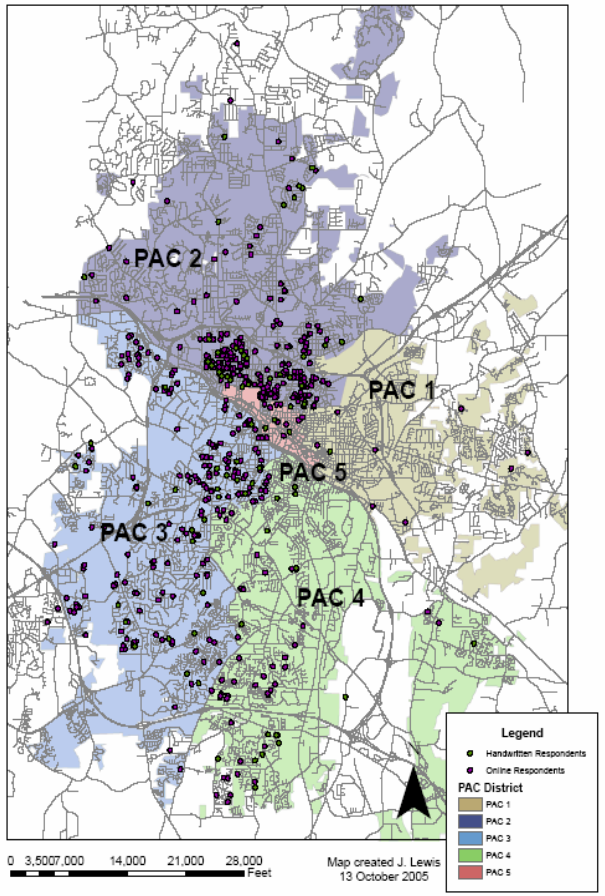
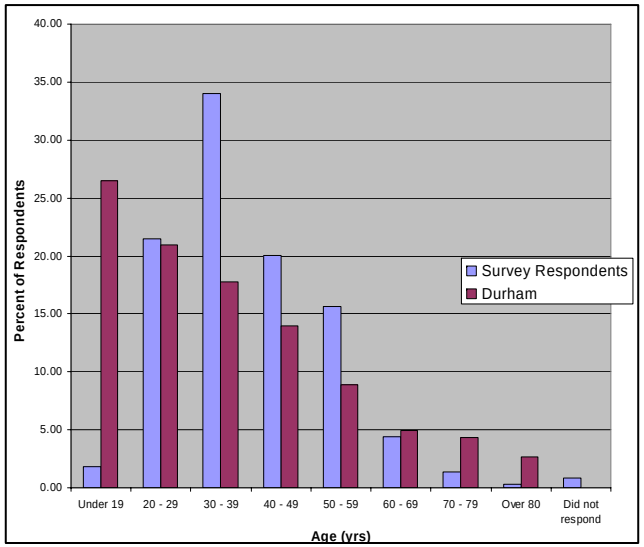
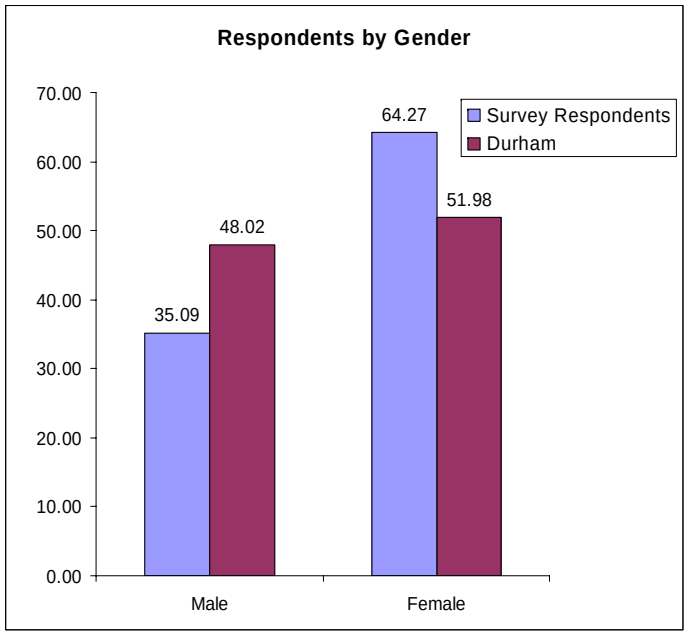


Figure 2-2. Map of respondent locations.



Graph 2-5. Age of survey respondents compared to total Durham population.



Graph 2-6. Survey respondents by gender compared to Durham population.

not a statistically-random sampling of Durham's population and results therefore may not accurately reflect the whole of the City's population. Figure 2-2 shows the distribution of the addresses respondents gave in their answers to the survey. This map is intended to provide an understanding of where survey respondents live and their geographical distribution in Durham. Out of 932 respondents, 582 indicated their address on the survey.

The survey received a total of 932 responses, 833 from online surveys and 99 from handwritten surveys. Graph 2-5 and Graph 2-6 show the overall survey respondent characteristics. As can be seen, most survey respondents were in the range of 30 – 39 years old and more females than males responded to the survey. Overall, more survey respondents indicated they walked in their neighborhoods than anywhere else, and the most survey respondents indicated that one of the reasons they walk is for health and recreation purposes. Most respondents indicated that they walk every day, at least once a day, and that they walk in good or bad weather.

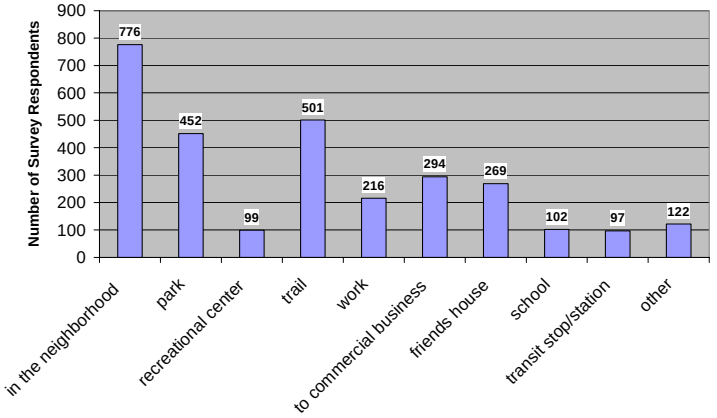
These results show that the majority of respondents walk the most frequently and the longest distance for recreation, health, and relaxation purposes, however, at least 30 percent of respondents walk between ½ mile and 2 miles to work, and 65 percent walk for the same distance for shopping or errands. Fifteen percent of respondents walk between a ½ mile and 2 miles to a transit stop. Over 75 percent of the respondents were over the age of 30, indicating that the survey does not have a strong representation for the young, potentially student, populations in Durham. In addition, less than seven percent of the respondents were over the age of 60, indicating that the survey also may not accurately represent Durham's elderly population.

Major Needs

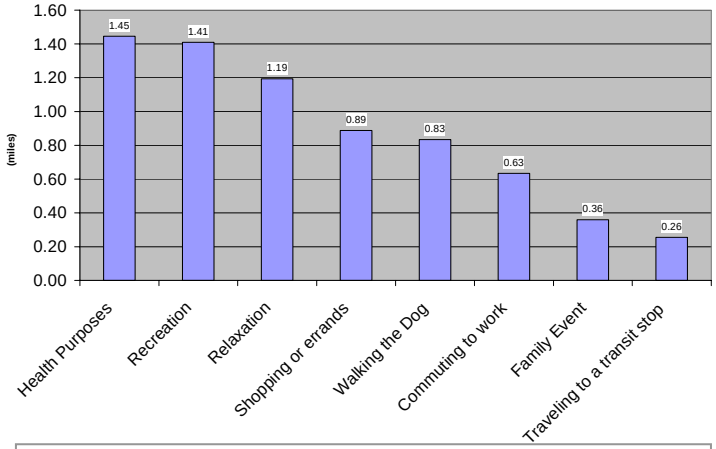
In general most survey responses lament the pedestrian un-friendliness of the city, but at the same time applaud the Pedestrian Plan's efforts. Most survey respondents would like to walk to take care of errands, shop, commute to work, go to school, or eat at a restaurant but many state that this is impossible due to the lack of sidewalks. Many responses provide reasons for making the City more pedestrian-friendly, all of which center around improving the quality of life. Some of the reasons respondents stated were: economic benefits, health benefits, environmental benefits, safety benefits, and attractiveness to newcomers.

Themes. The following are some of the major themes and needs that were stated throughout the survey comments. As a theme directly relates to a particular goal of the plan, the goal has been identified and provided in the text. Major themes were:

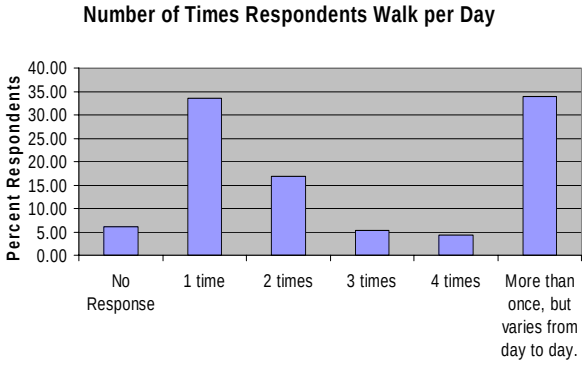
1. Build more sidewalks.*(Goal 1: Quantity)*
2. Repair old sidewalks. *(Goal 2: Quality)*
3. Connect existing sidewalks where there are gaps in the sidewalks. *(Goal 1: Quantity)*
4. Connect existing segments of sidewalk with better crosswalks and pedestrian signals and signage at intersections. *(Goal 1: Quantity, Goal 2: Quality)*
5. Create pedestrian access to schools.*(Goal 3: Safety and Security, Goal 4: Coordination)*
6. Create pedestrian access to transit. *(Goal 4: Coordination)*
7. Make it safer to walk in Durham: reduce speeding; increase police protection, especially for women; provide better lighting. *(Goal 3: Safety and Security)*
8. More pedestrian access to major shopping and work areas like *(Goal 1: Quantity)*:
   a. Duke University campus
   b. Streets at Southpointe
   c. Restaurants along Durham-Chapel Hill Boulevard at University Drive
   d. Northpointe Shopping Center
   e. Shops near the intersection of Garrett Road and 15-501
   f. Woodcroft Shopping Center
9. Create more recreational trails and provide better access to existing trails, especially the American Tobacco Trail, from residential neighborhoods. *(Goal 1: Quantity, Goal 2: Quality*)
10. Make Downtown more pedestrian-friendly by making roads two-way, providing more street furniture, repairing damaged sidewalk, and provide more crime prevention. *(Goal 1: Quantity, Goal 2: Quality, Goal 3: Safety and Security)*
11. Educate Durham drivers about pedestrian-friendly behavior. Many respondents feel one of the major problems in Durham is motorist's lack of respect for pedestrians. (*Goal 3: Safety and Security)*
12. Maintain existing sidewalks better: cut back overhanging trees and other vegetation (like poison ivy), pick up trash. *(Goal 2: Quality)*
13. Make Durham more pedestrian-friendly! *(All goals!)*



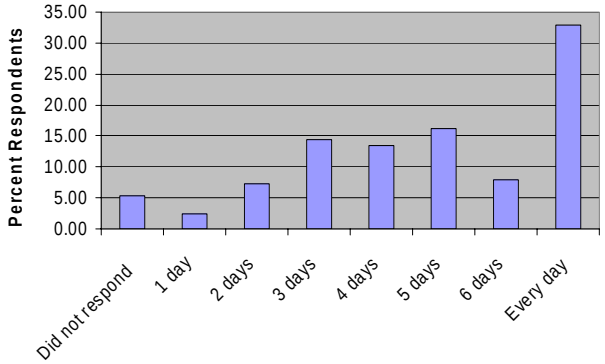
Graph 2-7. Locations where survey respondents walk.



Graph 2-8. Average distances walked for various activities.



Graph 2-9. Frequency of walking per day.



Graph 2-10. Frequency of walking per week.

Improvements and Priorities. Table 2-9 and Table 2-10 show results to the following two questions:

1. What improvements would make survey respondents walk more?
2. On a scale of 0 – 7, how important are each of the following pedestrian-related items to you?

As can been in Table 2-9, over 80 percent of respondents indicated "Better or More Sidewalks" as an improvement that would make them walk more. This was followed by "Better or More Access to Places", "Safer Intersections", "Traffic Calming", and "Better Lighting", which over 40 percent of respondents indicated would make them walk more. These results are mirrored in Table 2-10, where "presence of sidewalks" received an average importance rating of 6.63 by respondents, followed "personal security", "sidewalk condition". The results of these two survey questions formed the basis of our prioritization system described in Section 5: Project Development.

Table 2-9. What improvements would make survey respondents walk more?

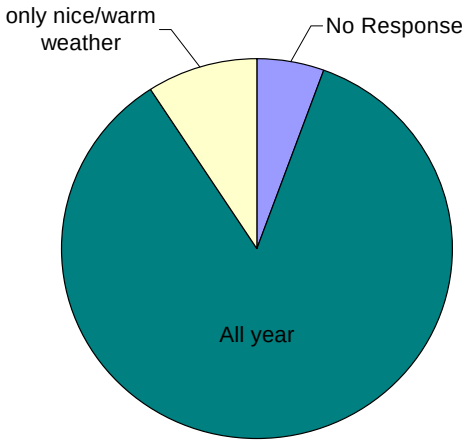
Improvements	Percent of All Responses
Better or More Sidewalks	80.58
Better or More Access to Places	45.71
Safer Intersections	44.74
Traffic Calming	43.56
Better Crossing Conditions	41.31
Better Lighting	40.45
Better or More Crosswalks	39.38
Crime Prevention	33.91
Slower Roadway Speeds	33.37
Better or More Places to Visit	32.83
Trees/Benches	32.19
Places Closer to Home or Work	31.12
Better or More Police Enforcement	26.61
Better or More Access to Public Transit	26.18
Better or More Curb Ramps	15.02
Better or More Animals on Leash Enforcement	10.41
Bus Shelters	9.76
Nothing	1.93
Other	16.95

Table 2-10. On a scale of 0 – 7, how important are the following pedestrian-related items to you?

Priority	Rating
Presence of Sidewalks	6.63
Personal Security	6.03
Sidewalk Condition	5.93
Presence of Pedestrian Crossing Signage	5.88
Reduce Pedestrian, Bicycle, and Automobile Crashes	5.88
Presence of Street Lighting	5.76
Better access to Trails	5.75
Presence of Crosswalks	5.70
Better Access to Major Destinations	5.68
Presence of Pedestrians	5.61
Safe Crossing Characteristics	5.47
Presence of Utilities/Objects Blocking Sidewalk	5.37
Presence of Pedestrian Signals at Street Crossings	5.36
Presence of Major Destinations	5.34
Better Traffic Signal Crossing Timing for Pedestrians	5.14
Crossing Distance at Intersections	4.91
Better Access to Transit Stops	4.86
Presence of Curb Ramps	4.85

These results show a more quantitative side of the survey, and indicate some of the wishes of the survey respondents, and hopefully reflect the overall needs of Durham's citizens. However, some populations tend to be under-represented in surveys, and especially on-line surveys. Therefore, when we see that "Better Access to Transit Stops" or "Presence of Curb Ramps" ranked relatively low, this may not reflect the true feelings of the primary user groups (i.e., transit patrons and mobility handicapped persons) that would be taking advantage of these provisions. The need for additional sidewalks stands out quite clearly as a higher-tier need regardless of how the question is asked.

Graph 2-11. Time of year respondents walk.



References

Durham Civil Rights Heritage Project Homepage. www.durhamcountylibrary.org/dcrhp.
Triangle Rails-to-Trails Conservancy Homepage. www.triangletrails.org.
US Census Bureau. www.census.gov
Wise, Jim. *Images of America: Durham County*. Arcadia Publishing: 2000.

THIS PAGE LEFT INTENTIONALLY BLANK.

Covered in Section 3...

- The importance of relating other plans and policies to the *DurhamWalks!* Pedestrian Plan
- Summary of plans, policies, and recommendations for improvements

Section 3. Existing Plans, Policies and Programs

This section reviews existing Durham plans, policies and programs that relate to pedestrian facility development, education and enforcement. The following items are reviewed:

- Durham Comprehensive Plan
- Unified Development Ordinance (UDO)
- Durham Trails and Greenways Master Plan
- Parks and Recreation Master Plan
- Design Guidelines Manual
- Subdivision Regulations
- Durham Code of Ordinances
- Durham Public Schools Site-Determination Policies

In addition, this section presents research on national and state policies concerning the retrofitting of sidewalks in existing neighborhoods. The purpose of this review is to identify pedestrian-related actions that are ingrained into the way that the City of Durham carries out public delivery of services, especially planning for new development, both private and public. By coordinating the actions across various policy and planning documents, numerous recommendations were generated to improve and strengthen the policies that ultimately translate into a better walking environment over time as new facilities, homes, and businesses are constructed.

The following information provides recommendations for making existing plans and policies in Durham more pedestrian-friendly. Some of these recommendations are being addressed in other parts of this Pedestrian Plan while others may be addressed through future revisions of the individual planning documents or policies that are referenced. Items that are addressed in the *DurhamWalks!* Comprehensive Pedestrian Plan are denoted by solid "bullets" (■) while the recommendations that should be addressed in other plans or policies are denoted by an empty "bullet" symbol (□).

3.1 Durham Planning Documents

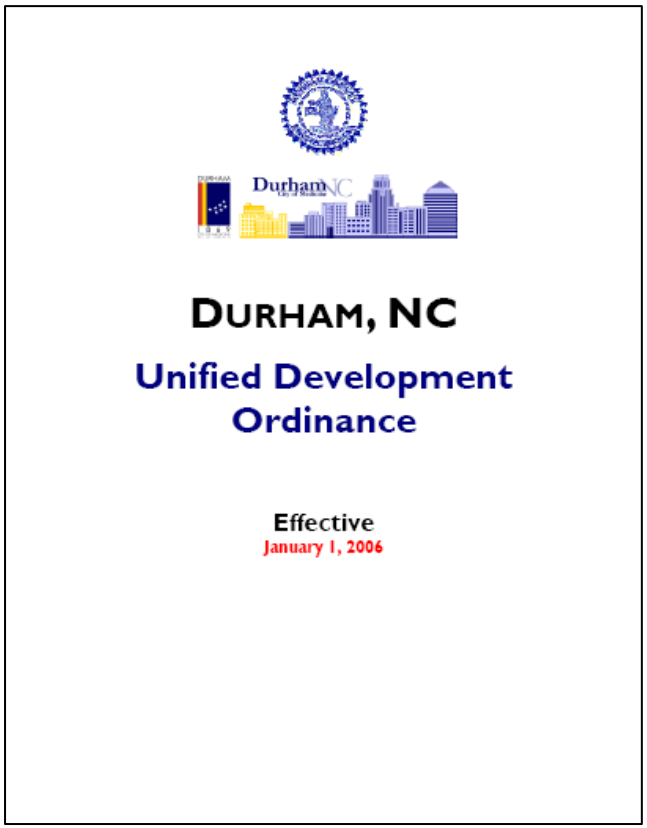
Durham Comprehensive Plan (DCP)

In general, the DCP does an excellent job of setting policy, including pedestrian access in new development, consistent with the concept of organizing land use in the City in a series of tiered development zones of increasing intensity and varied character. The DCP communicates pedestrian access policy more strongly in terms of the development tiers and the character of development in each tier than it does in terms of meeting basic walking trip purposes. A full version of the DCP can be found at the City of Durham website, www.durhamnc.gov.

Recommendations

- There are numerous references to creating a *pedestrian-oriented environment*. The plan would benefit from a detailed definition of the term.
- More specific discussion of sidewalk design within and around parking facilities and community institutions such as schools is needed.
- The DCP should address connectivity of sidewalks, trails, and transit in order to create a continuous system. Also, the DCP should include discussion of removing or mitigating existing barriers to pedestrian travel, and how to avoid creating new barriers.
- A Safe-Routes-To-School program should be explored, especially given the inclusion of funds in the 2005 federal transportation reauthorization bill (SAFETEA-LU) that has passed Congress, as well as some past work with schools conducted by the City of Durham Transportation Division and various local organizations.
- How sidewalks should be provided in specific relationship to infill or redevelopment within an existing developed neighborhood should be addressed.
- The DCP does not specifically address the issue of walking on road shoulders in suburban and rural settings and/or where no sidewalks are available.
- The policy for crosswalks and other in-road pedestrian safety features is expressed mostly indirectly in the DCP. Policy details for these elements might be beneficial.
- The DCP could be strengthened to place more emphasis on the recreational and physical fitness values of trails as community resources independent of their linkage to other land uses.

- Pedestrian amenities can be equally important where sidewalks are provided in suburban settings for respite along long stretches of sidewalk, or safety such as lighting for evening walking. Some provision for Suburban Tier pedestrian amenities is recommended.
- The way the DCP is phrased it seems to require sound pedestrian access for rail transit while not acknowledging a need for pedestrian facilities to complement bus routes and stops. This could be clarified to address bus stops of varying patronage levels.
- The DCP should include a map of existing pedestrian/bicycle infrastructure and/or a map of a desired future interconnected bicycle and pedestrian circulation system, including sidewalks, trails, and recommended roadway walking routes.



Unified Development Ordinance (UDO)

The UDO provides for pedestrian access both in the context of the individual development tiers as established through the DCP and in terms of pedestrian features as a distinct element of any site development plan, regardless of location. The following tables, taken from the UDO[1], show sidewalk requirements:

Street Type	Rural Tier	Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tiers
Freeways	None	None	None	None
Major/Minor Thoroughfare	None	Both Sides	Both Sides	Both Sides
Collectors	None	Both Sides	Both Sides	Both Sides
Nonresidential Street				
At least 2,000 daily trips (post development)	None	One Side	Both Sides	Both Sides
Less than 2,000 daily trips (post development)	None	One Side	One Side	Both Sides
Residential Street	None	One Side	One Side	Both Sides
Cul-de-Sac				
400 or more linear feet	None	One Side	One Side	Both Sides
Less than 400 linear feet	None	None	One Side	Both Sides

Standard	Rural Tier	Suburban Tier	Urban Tier	Compact Neighborhood/ Downtown Tiers
PEDESTRIAN FACILITIES				
Public sidewalk, 5 feet minimum, all roadways (see Sec. 12.4.2, Sidewalk Requirement)	No	Yes	Yes	Yes
Pedestrian crossing treatment at intersections (marked crosswalk, bulb-out, hot button etc.)	No	Yes	Yes	Yes
Pedestrian routes in parking areas protected from vehicular traffic	No	Yes	Yes	Yes
BICYCLE FACILITIES				
Bike lanes on all thoroughfares, either 4-foot minimum width striped outside gutter edge or 14-foot outside lanes, determined on a case-by-case basis	Yes	Yes	Yes	Yes

The UDO also has provisions for connectivity within the pedestrian system, requiring connections from on-site pedestrian facilities to any off-site existing and proposed pedestrian facilities, including greenways, for all development[2]. A full version of the UDO can be found at www.durhamnc.gov. Recommendations to clarify and strengthen the UDO for pedestrian access include:

Recommendations

- *Definitions:* The Definitions section of the regulations should include pedestrian-related terms.
- *Navigation:* Consideration could be given to putting all pedestrian facility requirements in one comprehensive section with cross references in other, related sections.
- *Applications and Permits*: Consideration should be given to including the overall connectivity and convenience of pedestrian circulation elements as an application review factor.
- *Establishment of zoning districts*: Safe, convenient pedestrian circulation facilities should be more comprehensively addressed within suburban tier zones (commercial developments) to reduce short vehicle trips and to acknowledge the need for safe roadway crossings where commercial nodes straddle major arterial roads.
- *District intensity standards*: The section emphasizes a continuous internal pedestrian system designed for ready access. It would strengthen these requirements to also place strong emphasis on connectivity outside a development boundary.

- *Design standards*: Additional pedestrian system standards (in addition to those for open space design and how trails may be included in required open space calculations should be referenced) are recommended.
- *Infrastructure and public improvements*: This section focuses on sidewalk design and might be strengthened by detailed requirements for other pedestrian circulation elements such as safe crosswalks, shade for sidewalks, and lighting. In addition, consideration should be given to linking sidewalk location and design requirements to the functional classification of streets which they border. In this way, the sidewalk design will be tailored to some extent to the intensity of vehicle activity on the adjoining streets.
- *Off-street parking requirements*: This section would benefit from much more detail on how pedestrian access must be incorporated into parking lot design.

Durham Trails and Greenways Master Plan

This comprehensive plan ("Trails and Greenways Plan") is an update and supplement to the 1988 *Durham Urban Trails and Greenways Master Plan*. The Trails and Greenways Plan recommends that five separate and distinct definitions for pedestrian facilities be standardized for use by the City and County in its planning and dealings with landowners and developers. From these definitions it can be understood that the Trails and Greenways plan addresses much of the pedestrian circulation system in Durham. The five definitions stated in the Trails and Greenways Plan are shown in the text box on the following page.

Recommendation

- It will be important to meld the goals, policies, and development priorities of the trails plan with those to be developed for the pedestrian circulation plan to achieve consistency of vision and approach for the overall pedestrian circulation system in Durham.

Parks and Recreation Master Plan, 2003-2013

This parks and recreation plan ("P&R plan") describes how the City of Durham will provide parks and recreation opportunities for a ten-year period. The plan works to merge long-established standards for "level of service" in recreation facilities and a newer practice of community standard-setting.

Trails and Greenway Definitions

Greenway: a system of trails in the City or County, which may be made up of trails, sidewalk trails, and/or recreation trails.

Trail: a 10 to 14 feet wide discrete section of hard-surfaced pathway, generally between major trailheads; a trail may or may not be included in a greenway system and may or may not include a section of sidewalk trail. Trails will be designed for the least possible environmental impact, especially in the County's Corridor System routes.

Sidewalk Trail Section: 8 to 10 foot wide paved section within or immediately adjacent to a roadway right-of-way; most sidewalk trails are included within a trail and thus do not have a separate name.

Street Trail: a designated connector between trails or greenways, consisting of a standard 5 foot wide sidewalk and a wide outside lane or bike lane on the roadway – trails in more rural areas may consist of a paved roadway shoulder only.

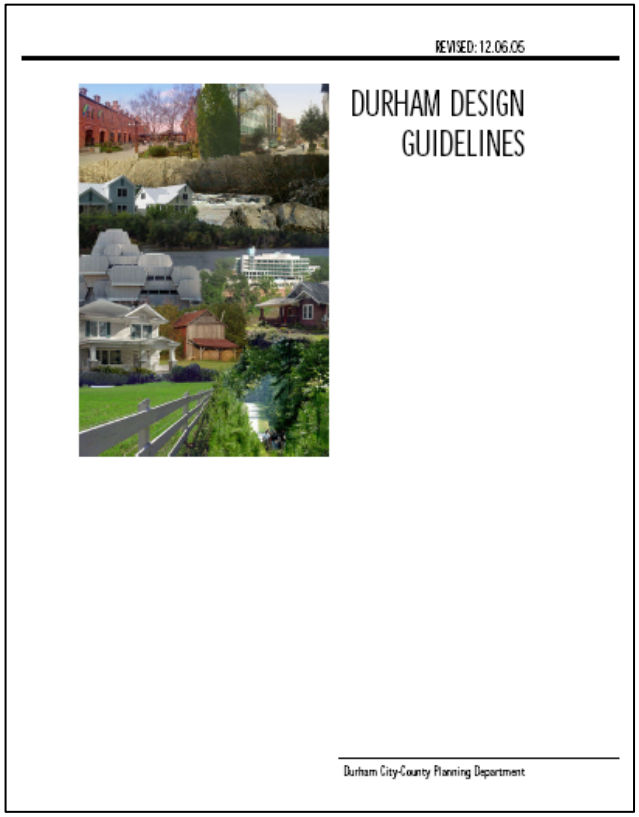
Recreation Trail: an unpaved trail, which may or may not be part of a greenway and can serve for hiking, equestrian use, or mountain biking; or a narrower paved trail contained within an urban park.

Recommendation

- The Level of Service Standards adopted in the parks and recreation plan, including those for trails and greenways, should be cross-referenced and/or incorporated into the UDO in sections where requirements for set-aside of open space are made.

Durham Design Guidelines Manual

The Durham Design Manual is a guide for developers, architects, landscape architects, planners, and property owners to facilitate the design approval process. It currently contains detailed information for the Downtown Design Overlay and the University-College zoning district. It includes design performance standards for pedestrian facilities. Design standards for other zones are not provided. A full version of the Durham Design Guidelines Manual can be found at the City's website: www.durhamnc.gov.



Recommendation

- The principles applied to the design of pedestrian facilities and access in this manual are largely applicable to any zone or district in Durham. As this manual has two sections reserved for future addition of information regarding other residential and non-residential development in Durham, it should, when fully developed, seek to provide a sound guide for pedestrian access for developments in all zones throughout the City and County. This should include specific design guidelines for suburban and rural areas both for sidewalks and where roadway shoulders may be used for walking. The Comprehensive Pedestrian Plan should lead the way in terms of establishing both on-street and off-street design standards, but it may be more convenient to have these included in the overall Design Guidelines Manual at some future point.

Subdivision Regulations

The Subdivision Regulations comply with the most current Durham zoning regulations (Section 2F). The UDO will absorb/replace the subdivision regulations once the current update is completed, including pedestrian provisions.

Recommendations

- *Section 2B - Exemptions*: The regulations could ask for an easement across new lots where a connection to any existing or future sidewalk or trails is desirable. Consideration should also be given to establishing some mechanism for tracking small subdivisions over time and planning for the City to provide connecting sidewalk or trail segments as needed within and between them.

- *Section 4A and B - Pre-application review conference*: The City should develop a subdivision site plan checklist (one that could include pedestrian facilities) to facilitate this process.
- *Section 4C and 4D – Preliminary and final plats*: Requirements for existing as well as proposed conditions information to be shown on plans should be expanded to include any sidewalk/trail elements contiguous with or near to the proposed development.
- *Section 5J – Design requirements*: Consideration should be given to making new sidewalks always required on both sides of any street.
- *Section 5M – Recreation lands*: The requirements for set-aside of recreation lands should be made consistent with the LOS standards developed for the Parks and Recreation Master Plan.
- *Section 5Q - Cluster Development*: This section should be expanded to include requirements for convenient and safe pedestrian connectivity between new set-asides of open space and residences as well as other existing open space.
- *Section 6G – Construction standards*: Similar to other comments, a single source of design standards should be referenced, rather than several possible sources.
- *Section 7D – Preliminary Plats*: The process for the referral of proposed developments to the correct agency, particularly for greenways and trails, would benefit from clarification.
- The City of Durham has a process by which a developer can pay a fee in lieu of construction of sidewalks in a development. The description of the circumstances under which this is permissible should be clarified.

Durham Code of Ordinances

The Durham Code of Ordinances codifies all of the regulations for the City of Durham. In addition to the subdivision and zoning regulations, the Code includes two other chapters or articles that refer to sidewalks and trails.

Recommendations

- *Article 18 – Streets and Sidewalks* – This ordinance seems to contradict, to some degree, the desire expressed in the zoning regulations for trees to provide shade over a sidewalk for pedestrians. It is recommended that the intent of this ordinance to prevent hazardous conditions be clarified and reconciled with the zoning regulations language relative to sidewalk shade.

- *Chapter 25 – Street, Parks, and Recreation and Open Space Land Impact Fees*: This ordinance could be strengthened to better provide funding for pedestrian access. Sidewalks and other pedestrian facilities that are not part of a trail or greenway should be included as items the fees will cover.

Durham Public Schools Site-Determination Policies

School location, design, and traffic zones are also critical policy decisions for pedestrians. In Durham, these policy decisions are made by the Durham Public Schools Board of Education. Currently, the Board of Education takes into account the following provisions when siting new school locations, but does not include any specific considerations for pedestrian access and safety:

1. The expanding and/or changing educational program of the district.
2. Relations with the total community and projected developments in those relationships over the years.
3. Change in demographics.
4. Community planning and zoning.
5. Financial ability of the school district.
6. Safety and welfare of the pupils.
7. Relationship between the projected new facilities and those already in existence.
8. True economy reflecting full value for each tax dollar expended.
9. Planting and site aesthetics as they affect the education of students and in keeping with city/county planning ordinances.
10. Input of site-based committees.

It is recommended that any new school placement be in a location near to residential areas and with well-marked, safe pedestrian access. Given the recent epidemic in childhood obesity, it is critical that children develop an active lifestyle at an early age. This can be encouraged by creating opportunities for utilitarian exercise through activities such as walking to school.

3.2 Policies

State and Federal Guidance

The Federal Highway Administration has released policy-level guidance concerning bicycle and pedestrian facility considerations (http://www.fhwa.dot.gov/environment/bikeped/design.htm#d14), last updated in 2003. Of particular value is the reference section, containing several valuable design references for both bicycle and pedestrian facilities. Although a general document, this guide does notably include the statement that safe and convenient bicycle/pedestrian facility considerations in future roadway improvements should be the norm, not the exception. In Durham, it is expected that all new roads – federal, state, city, or developer-funded – will have sidewalk on both sides of the street and will also include bicycle facilities.

The North Carolina Department of Transportation (NCDOT) has had an adopted policy on the provision of pedestrian facilities since 1993, and has provided accompanying guidance (http://www.ncdot.org/transit/ bicycle/laws/laws_pedpolicy.html). This guidance discusses incidental projects (those projects that are included as part of a roadway project). Notable features of the NCDOT policy include:

- A sliding funding scale for sidewalk construction (Durham, being over 100,000 in population, is required to match 50% of the construction costs).
- Requirement to have right-of-way in fee simple ownership or in easement if not already within the berm width of the roadway.
- Bridges of less than 200' in length scheduled to be built or replaced will have sidewalk on both sides funded by NCDOT; bridges over 200' will have sidewalk on at least one side of the structure. This is true only if curb-and-gutter is present on both approaches leading to the bridge.
- There is no funding cap on the project cost, although "betterment" costs (e.g., decorative pavers) will be borne by the municipality.

Recommendations

- Requiring municipalities to cost share on one type of transportation facility but not on another introduces artificial bias towards the "free" facility. While municipalities are required or are encouraged to share in certain aspects of highway construction such as utility relocation, right-of-way preservation, or on-site wetland mitigation, there is no direct cost to the municipality for

constructing a roadway. Hence, it may be less costly for a municipality to see an eight-lane, multi-million dollar freeway 10 miles long programmed in the State TIP than 2,000 feet of sidewalk. The recommendation is to include sidewalk facilities as the norm in roadway construction and widening unless an unsafe situation is introduced by including pedestrian facilities (and further discussion is warranted to determine the definition of "unsafe situation"). This would bring NCDOT in agreement with federal guidance on this point and potentially alleviate a considerable amount of unnecessary disagreements during the formulation of transportation improvement programs.

- The NCDOT has an adopted administrative process dating back to 1994. Updating this policy in light of the increased emphasis on context-sensitive solutions is one recommendation. In addition, clarification should be provided on the criteria for when NCDOT will include grade-separated crossings for future roadway development.
- Considerable work needs to be done to include rural, unincorporated areas into the pedestrian policy. Since counties are not generally allowed under existing North Carolina State Statute to hold road rights-of-way, they typically do not participate in any transportation construction or maintenance activities, including sidewalk maintenance. This issue needs to be cooperatively addressed between a collective agreement of municipal, county, and state officials to arrive at a satisfactory conclusion on issues such as construction specifications outside of municipal urban growth areas; and construction and maintenance of facilities in rural areas.
- The justifications for sidewalk construction on bridges should be clearly indicated, and some flexibility on the need for curb-and-guttering on bridge approaches should also be added and defined in the State's policy[3].
- Consolidating project selection criteria and TIP funding process documentation into a single source document would help people locate this information.
- The federal (USDOT) pedestrian guidance also warrants some additional clarification, such as what constitutes "convenience" to a pedestrian. While the guidance needs to respect the individuality of all state departments of transportation, it should also recognize the authority of metropolitan and rural planning organizations in the identification and local policies pertaining to pedestrian facility programming and development. When contacted, USDOT staff indicated that this as yet unnamed guidance would be updated as part of an overall effort related to the passage of the federal transportation reauthorization bill (SAFETEA-LU), but that it might be some time before the update occurs.

Durham: Sidewalk Construction and Repair Policies

There are several methods for sidewalk construction in Durham: new sidewalk through a bond package, new development and sidewalk payment in lieu fees, and the sidewalk petition process. Durham's Bicycle and Pedestrian Advisory Committee webpage maintains a complete and updated policy statement, which can be found at: www.dbpac.dchcmpo.org .

Bond Packages (the New Sidewalk Construction Program)
Durham has had two major sidewalk construction bond packages within the last ten years. The first, passed in 1996, established a New Sidewalk Construction Program to provide for construction of new sidewalk serving pedestrians using the public right-of-way. The program was originated by City Council, with an objective of constructing sidewalk on at least one side of all major and minor thoroughfares within the core area of the city. The total budget for the project was $3.5 million dollars, which was exhausted in 2005. A new bond package was approved in 2005 for $5 million dollars in sidewalk construction and repair - $2.1 million dollars in new sidewalk construction, $2.4 million for repair and $500,000 for construction of curb ramps and other items to bring Durham into compliance with the Americans with Disabilities Act.

New Development & Sidewalk Payment in Lieu
Sidewalks are required to be constructed as part of the approval of every new development plan or site plan submitted to the City. According to the City's Unified Development Ordinances, sidewalk must be constructed on both sides of major and minor thoroughfares within the "urban growth area" (UGA). For other roads within the UGA, sidewalk must be placed on at least one side of the road. Subject to the approval of the Development Review Board and only under specific circumstances, a fee can be paid rather than construct sidewalk along the public right-of-way. The current rate of Sidewalk Payment in Lieu is set at $20.00 per linear foot, less the sidewalk assessment rate which is $5.00 per linear foot. This yields a Payment in Lieu rate for sidewalk of $15.00 per linear foot along the frontage of the subject lot. Sidewalk Payment in Lieu fees are placed into a fund intended for sidewalk construction and maintenance.

Sidewalk Petition Process

The Sidewalk Petition Process is a method whereby citizens have the opportunity to request a sidewalk at any given location. The petition process is administered through the Engineering Division of the Public Works Department. The following is a description of the process:

- An individual requests a petition from the City. This individual will serve as the "petition sponsor". As a part of the request the sponsor outlines the limits of the area to be served. They indicate the starting point and ending point of the sidewalk and on which side of the street. Typically the sidewalk does not begin mid-block, but is begun and ended at street intersections and includes complete blocks. For example one set of limits could be "Markham Ave (north side) between Ninth Street and Broad Street." Once the limits have been determined, the City prepares a petition for the sponsor to circulate. The petition sponsor is responsible for securing signatures for the petition.
- The petition must be sufficient on two criteria, with "sufficient" being defined as signatures from more than 50 percent of the property owners within the project limits. First, the petition must be signed by a majority (50%+) of the property owners adjacent to the proposed improvement. Second, the signers' properties must represent the majority (50%+) of the road frontage involved in the requested project. Once completed, the petition is returned to the City's Engineering Division and researched to determine if it is sufficient.
- If the petition is sufficient, it is taken to City Council for action. A public hearing is held to consider the issue. Assuming Council approves the project, it is returned to Engineering for design and placement into a contract once it has been funded.
- When the project is complete, the adjacent property owners are assessed a portion of the project costs. The current assessment rate for sidewalks is $5.00 per linear foot. There may also be an additional $20 per linear foot assessment for curb and gutter in situations if curb and gutter installation is necessary. This assessment can be paid at the time it is levied or it can be paid out in annual installments over 5 years at 9% interest.

The City has very limited funding each year for sidewalk projects outside of a bond package. Once a project is ordered by Council it may still take several years before it is actually constructed.

Sidewalk Repair
Funding for sidewalk repair is requested annually as a part of the budget process. Historic funding levels have been approximately $100,000 per year. In addition, the 2005 bond package includes $2.4 million intended for sidewalk repair and replacement.

ADA Wheelchair Ramps
Funding for installing wheelchair ramps in sidewalk locations without ramps is requested annually as a part of the budget process. Historic funding levels have been approximately $100,000 per year. In addition, the 2005 bond package includes $500,000 for ADA compliancy-related construction.

Comparison with Similar Cities

This section presents examples of how other cities in the United States approach their sidewalk improvement programs, including how residents request new or replacement sidewalks and what percentage of the costs are passed along to the adjacent land owners. Cities were selected based on similar population sizes to Durham. To facilitate an easier comparison with Durham, basic demographic data are provided for each representative city in Table 3-1[4]. This comparison is intended to guide recommendations for changes to Durham's sidewalk construction and repair policies.

Table 3-1. Comparison of Various Municipal Sidewalk Installation Assessments.

City	State	Population (Year 2000)	Land Area (square miles)	Median Household Income (Year 2000)	Total Cost of Project Assessed to Property Owner
Durham	**NC**	**187,000**	**94.6**	**$41,000**	**<10%**
Asheville	NC	69,000	40.9	$36,000	0%
Baltimore	MD	651,000	80.8	$30,000	100%
Charlotte	NC	542,000	242.3	$47,000	0%
Chesapeake	VA	200,000	340.7	$51,000	0%
Dayton	OH	166,000	55.8	$27,000	100%
Fayetteville	NC	121,000	58.8	$36,000	>50%
Knoxville	TN	174,000	92.7	$27,000	100%
Madison	WI	208,000	68.7	$42,000	50%
Manchester	NH	107,000	33.0	$41,000	50%
Richmond	VA	198,000	60.1	$31,000	0%
Rochester	NY	219,000	36.0	$27,000	100%
Winston-Salem	NC	185,000	108.9	$37,000	Varies by project

Asheville, North Carolina

The Asheville Pedestrian Plan lists priority streets, based on a number of criteria, where sidewalks are most needed. Six criteria are listed: zoning jurisdiction; proximity to schools, parks and community

centers; proximity to transit stops; needed linkages to complete a pedestrian thoroughfare or address a safety concern; feasibility of construction; major thoroughfares and connectors. Although the City has a program to construct new sidewalk on existing streets when requested by citizens, it is almost never used.

All new development is required to have sidewalks adjacent to their development (e.g., on one side for new internal streets, and, if the development is 20 or more houses, on adjacent public streets as well). New apartment complexes with greater than 10 units are required to install sidewalks on adjacent streets. A consistent criticism is that there are significant gaps and "sidewalks to nowhere." If a site is being redeveloped, then new sidewalks are required only if the value of the renovation is greater than 50% of the existing property-plus-building value. The requirement for new sidewalk construction has only been in place since 1997, so gaps are only now getting connected to the system.

Fee-in-lieu of sidewalk construction is allowed, but only in certain circumstances, such as when the street is not on the pedestrian thoroughfare plan (City of Asheville Pedestrian Plan). The developer always has the option of building the sidewalk, but in the cases where the Pedestrian Plan has not designated a road as a pedestrian thoroughfare, then the developer has the option of fee-in-lieu. The fee-in-lieu program charges $20/linear foot for sidewalk, but will soon be updated, in part based upon a recommendation made in the Pedestrian Plan. If there is no curb-and-gutter in place, then the developer has to pay and/or install curb-and-gutter at $17.30/linear foot.

Baltimore Maryland

Sidewalk installation, repair and maintenance in residential areas are the responsibility of the Baltimore homeowner. The city will install new sidewalks or repair deficient sidewalks, and then bill the homeowner for 100% of the costs.

Responsibility for new sidewalk construction in commercial areas (e.g. downtown/harbor) is determined on a case-by-case basis. A site visit is required to determine whether new sidewalks will be installed by the City or by the property owner/developer.

Commercial areas are treated the same as residential areas with regards to sidewalk repair:

1. If the sidewalk is damaged due to tree roots or utilities, then the City will repair it at no cost to the property owner
2. If the sidewalk is damaged due to 'wear and tear', then the property owner is responsible

In cases of sidewalk repair: after a complaint is received, an inspection is made of the entire block. If warranted, a violation notice is issued to the property owner(s). On the violation notice, the property owner(s) is notified that they can contract to have the work done or the City can do the work (when funding permits) and then bill the owner.

Charlotte, North Carolina

Charlotte has a new sidewalk policy in effect, which includes a ranking system to help prioritize sidewalk installation projects. If traffic volume is under 3,000 vehicles per day, a two-step process includes a nomination and a petition. If the location is near a school or a park in this category, then neither is required (just a verbal request from the neighborhood is required to initiate the process). If it is not near a school or a park, then a nomination form and petition is required; 25 percent of the property owners for lots fronting the street on either side of the project must sign the petition in order for the City to process and then rank the nominated project. When the project reaches the top of the ranking list, meetings are then held in the community for the top 10 projects.

A second petition of 60 percent of the lots fronting the street is required to receive funding for the project (this is the same percentage that the City uses with their traffic calming program). The City has a $5 million budget for sidewalk projects: $2.5 million is allocated to thoroughfares and $2.5 million is allocated to residential streets. If the residents choose to fund the project themselves, then the petition requires 51% of the property owners abutting the street to sign. A public hearing is also required for approval. If approved, then ALL property owners are assessed on both sides of the streets. Curb-and-gutter is not required for retrofitted sidewalk construction, but instead is determined on a case-by-case basis. Assessments for retrofitting sidewalk typically fall into the $100-$200/linear foot, with the assessment determined on a case-by-case basis.

Chesapeake, Virginia

Requests for sidewalk repairs are handled through the public works department, and the city pays 100% of the repair costs. The City does not install new sidewalks; the homeowner or developer is fully responsible for any new sidewalk construction.

Dayton, Ohio

Homeowners in Dayton can get sidewalk improvements completed in two ways. First, they can hire a private contractor and pay for the work directly. In that case, the city's only involvement is issuing a permit and inspecting the forms before the concrete is poured. The other option is through the sidewalk repair program, which is part of the city's asphalt replacement program. Because property owners are responsible for sidewalks in front of their property, they will receive legal notices that the work will be completed by the city and they will be responsible for the bill (100% of costs are passed to the homeowner, except for costs related to adding ADA compliant wheelchair ramps). If the homeowner doesn't pay the bill within 12 months, the city's charter allows the charges to be assessed to the property tax bill.

Approximately 30% of city streets lack sidewalks and curbs and gutters. If all the homeowners on a block petition the city to add sidewalk and curb, the city will provide an estimate to the homeowners on their cost (100% assessable). In every case so far, the homeowners have dropped the idea after seeing how much the work would cost – approximately $7 per square foot ($35/linear foot) for sidewalks and an additional $25-30 per linear foot for curb and gutters, if required.

Fayetteville, North Carolina

Although property owners are only assessed $5/linear foot of sidewalk, no one has taken advantage of this program (which requires 51% of adjoining property owners to sign a petition) in the six years since it has been in effect. Payment-in-lieu fees are $22/linear foot, an option seldom chosen by developers since they feel that they can install the sidewalk more inexpensively during development themselves.

Knoxville, Tennessee

The City of Knoxville pays 100% of sidewalk installation and repair costs. Requests are prioritized, based on available budget. All projects exceeding $10,000 require a separate contract under the City's capital improvement project program.

Madison, Wisconsin

New sidewalks or curbs and gutters in Madison are 100% assessable to the homeowner. Homeowners desiring new sidewalks or curbs and gutters petition their alderperson, who then circulates a contract that must be signed by affected property owners. The construction job is then

awarded to the low bidder. Replacement sidewalks or curbs and gutters are petitioned in the same way, except the city rebates 50% of the cost (approximately $2-2.50 per square foot (or $10 - $12.50/linear foot) for sidewalks, $17-18 per linear foot for curb and gutters) at the completion of the job.

Manchester, New Hampshire

In Manchester, adjacent property owners must sign a petition requesting new sidewalks, and pay 50% of the costs through an assessment.

Richmond, Virginia

The City of Richmond bears the full costs of sidewalk installation, replacement, and repair – except in certain cases of planned unit developments, where the costs are borne by the developer. This has resulted in a backlog of several thousand requested sidewalk replacement projects, which far outstrip the city's sidewalk maintenance budget of approximately $1.5 million dollars per year. The city does have an additional capital allocation budget of approximately $200,000 that it can use to outsource sidewalk repair and replacement work. While these are funds for maintenance projects, there is currently no funding for constructing new sidewalks on existing roads in the city, though sidewalk sections may be installed as part of roadway realignment or neighborhood redevelopment projects.

Rochester, New York

In Rochester, the property owner pays 100% of the cost of sidewalk repair, except if a hazardous condition exists, in which case the city will pay for the work. In either case, the city performs the sidewalk repair or replacement. Additionally, all property owners pay an annual fee of $0.33 per linear foot of frontage as part of their property taxes to offset city maintenance costs.

Winston-Salem, NC

Residents pay a cost assessed on a case-by-case basis, although recent bond programs have allowed the City to construct sidewalks at no cost to the residents. Although there is no requirement for private developers to construct sidewalk as part of new development now, the City is working on making ordinance revisions to change that arrangement. Winston-Salem has raised the vehicle property tax rate by $10, half of which will be used to fund new pedestrian projects ($600,000 - $1,000,000 annually).

Recommendations

- Capital Improvements Program: It is recommended that Durham allocate a consistent level of funding out of their yearly Capital Improvements Program to construction of sidewalk and other pedestrian-related facilities. Currently, Durham must pass a bond in order to perform necessary sidewalk and pedestrian projects as well as address some routine maintenance needs. This makes it difficult to plan for future projects and provide consistent service to the City's citizens. As can be seen in the review of other cities, many cities with successful pedestrian programs, including Charlotte and Winston-Salem, have allocated funding in their budget each year to pedestrian-related activities. A consistent source of funding is necessary in order to plan for and prioritize pedestrian facilities, as well as reinforce the City's commitment to pedestrian-friendliness.

- Payment-in-Lieu: This Plan proposes a change to the payment-in-lieu fee, whereby $65 per linear foot is the new charge. The reason for this recommended cost increase is to incorporate the real cost of sidewalk with curb and gutters, as well as any other related construction improvements.

- Petition Process: Advertise and promote the sidewalk petition process, so that Durham residents can be made more aware of the options available to them for requesting sidewalk. Develop an online request form and maintain a list of requested sidewalk projects online.

---

[1] Durham, NC Unified Development Ordinance: Sections 12.4.2 and 12.4.5. Effective January 1, 2006.

[2] Durham, NC Unified Development Ordinance: Sections 12.4.4.a and b. Effective January 1, 2006.

[3] Department of Transportation Pedestrian Policy Guidelines. Item number 6. Effective October 1, 2006.

[4] Sources: (1) Memorandum by Fitzgerald & Halliday, Inc. dated 10.21.2005; and (2) independent research conducted by The Louis Berger Group, Inc., 2005.

THIS PAGE LEFT INTENTIONALLY BLANK.

Covered in Section 4...

Section 4 reviews the existing pedestrian system, context of land use and transit services that influence the existing and proposed pedestrian system; and the location of study corridors and intersections.

Section 4. Pedestrian System Plan

4.1 Existing System Overview

Durham's current pedestrian system is made up of sidewalks and trails. In order to understand the entire network, it is important to understand the major roads in the city, sidewalk location and condition, and other key factors in the pedestrian system, such as the location of transit routes and stops, schools, and land uses. The following section describes the existing pedestrian system and its related facilities, as well as the needs of the system.

Major Roads

Figure 4-1 shows major roads in the City of Durham. The City's major east-west corridors are I-40 in the south and I-85 in the north, University Drive, and Martin Luther King Jr. Blvd. US 15-501 (Chapel Hill Blvd.), Fayetteville Street, and Alston Ave (HWY 55) serve as major north-south connectors.

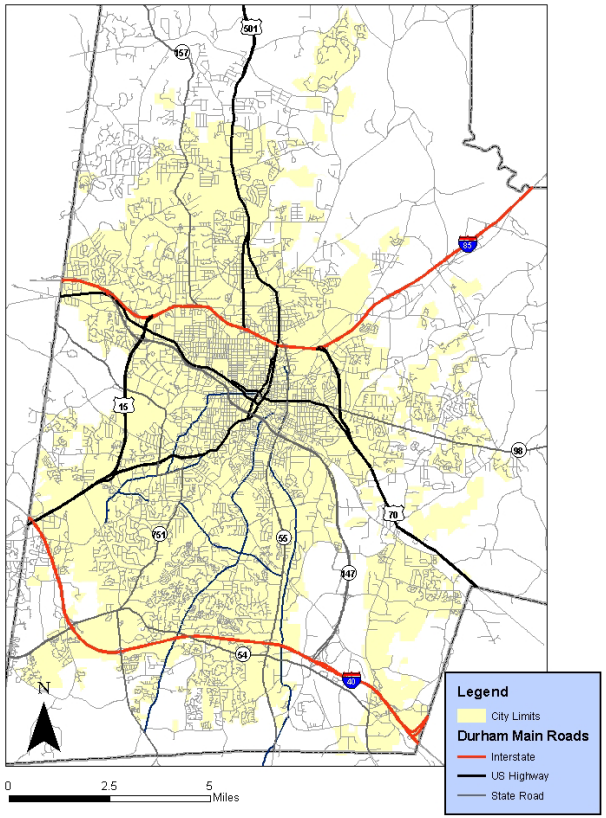


Figure 4-1. Map of major roads and highways in Durham. For larger map version, see http://www.durhamnc.gov/durhamwalks/.

Existing Sidewalk and Paved Trail Locations

Inventory. As discussed in Section 2, the current pedestrian system is made up of sidewalks and trails. As part of this Plan's preparation, an inventory was conducted from July 2005 to January 2006 of existing sidewalk and paved trails and their conditions in the City of Durham. Figure 4-2 shows the results of that inventory, and indicates the locations of current existing sidewalk and paved trails.

Sidewalk to Roads. Durham has approximately 1,124 miles of road and 409 miles of sidewalk and paved trails, which makes for a ratio of approximately one mile of sidewalk and paved trails to 2.7 miles of road (.36:1 miles sidewalk to road). In an ideal city, one might imagine that the ratio of miles of sidewalk and paved trails to miles of roadway should be 2:1 or even greater. This would be a scenario in which all city roads have sidewalk on both sides, plus additional off-road paved trails. However, this ratio is not feasible, or even necessary. Even in an ideal city, some roads are limited access, such as I-85, I-40, and parts of US 15-501 in Durham. At the same time, some low-trafficked neighborhood roads may not need sidewalk at all, or may not need it on both sides of the road. As a result, even an ideal city would probably not reach a ratio of 2:1, but instead something lower, like 1.75 miles of sidewalk to one mile of road.

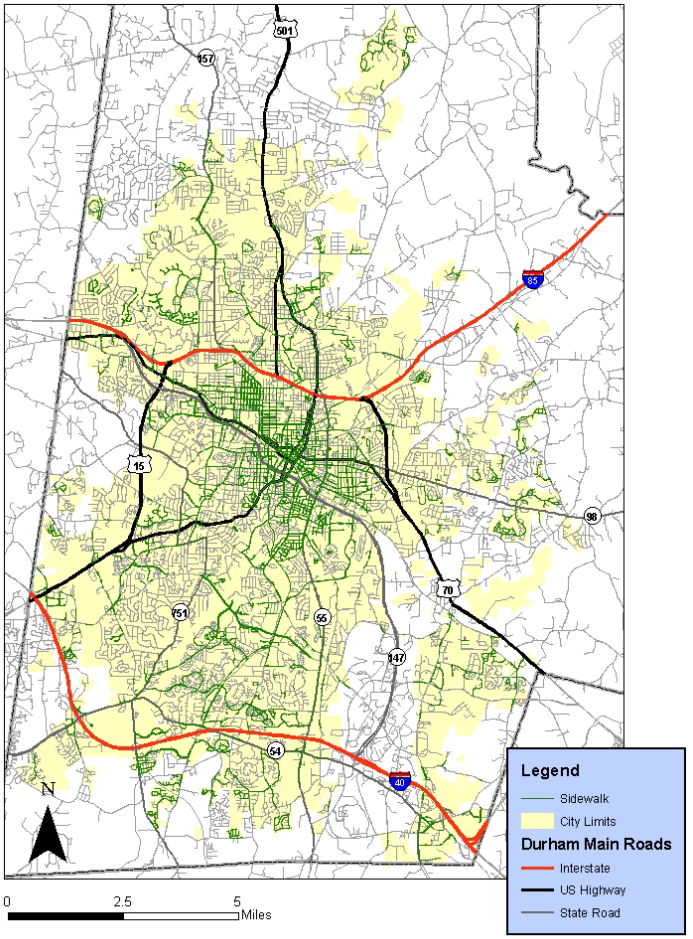


Figure 4-2. Map of existing sidewalk and paved trails in Durham, NC. For larger map version, see http://www.durhamnc.gov/durhamwalks/.

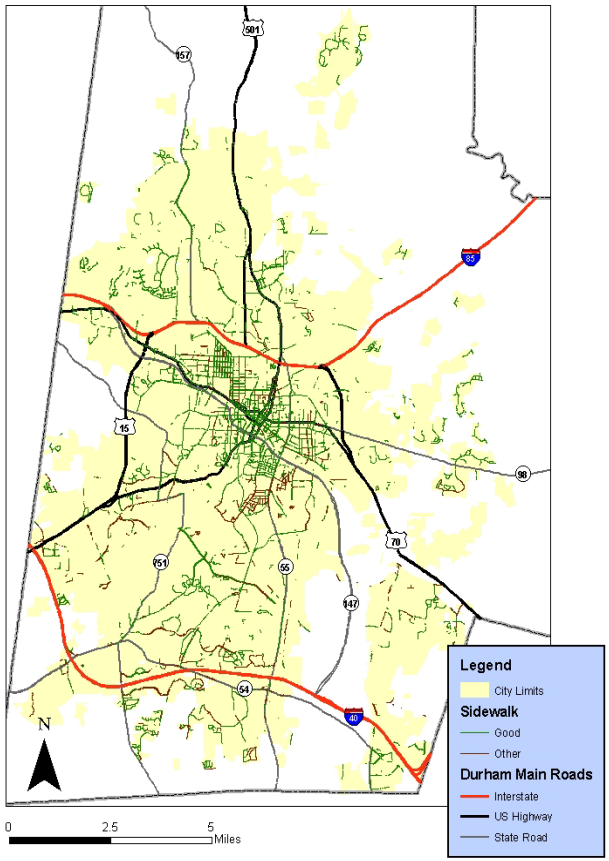


Figure 4-3. Sidewalk and paved trail condition in Durham, NC. For larger map version, see http://www.durhamnc.gov/durhamwalks/.

Sidewalk and Paved Trail Condition

Figure 4-3 shows the condition of sidewalk and paved trails in Durham as reported in the inventory conducted for this plan. Condition is characterized by the level of faulting, cracking, or wearing in a particular segment, as identified by a field technician during the course of the inventory process. A complete description of the inventory's attributes and how they were determined is contained in Appendix 5. Sidewalk or paved trail marked in "good" condition in Figure 4-3 has no signs of deterioration. Sidewalk or paved trail marked "other" shows signs of deterioration as evidenced by the presence of either faulting, cracking, or wearing, or any combination of the three. The city has approximately 320 miles of "good" condition sidewalk and paved trail, or 78 percent of its total sidewalk and paved trail miles.

Sidewalk and Paved Trail Interface

It is important to consider both sidewalks and paved trails in this plan because both types of facilities contribute to the pedestrian system in Durham. Many sidewalks are also considered paved trails by the Durham Parks and Recreation Department's *Trails and Greenways Plan*, and many paved trails, such as the American Tobacco Trail and Ellerbee Creek Trail, are used by citizens not only as a recreation facility but also as a transportation facility for much of their commuting to and from work or for access to shopping and other services. For this reason, the interface between sidewalks and paved trails should be carefully planned in order to increase connectivity and avoid situations of "stranding" pedestrians at the ends of trails or sidewalks which do not link to the rest of the pedestrian system.

ADA Accessibility

Figure 4-4 shows a map of ADA accessible sidewalk in Durham. ADA accessibility is defined as the presence of a curb ramp at both ends of the sidewalk segment. For the purposes of this analysis, a non-compliant segment of sidewalk has either no curb ramps or a curb ramp at only one end. In general, ADA requirements for pedestrian facilities are more than just curb ramps; they include items such as clear widths, level landings, and maximum slope restrictions. For a complete listing of ADA requirements, see the Department of Justice's ADA Standards for Accessible Design (28 CFR Part 6, revised of July 1, 1994).

For more information on the inventory shown in Figure 4-4 was conducted, please see Appendix 5.

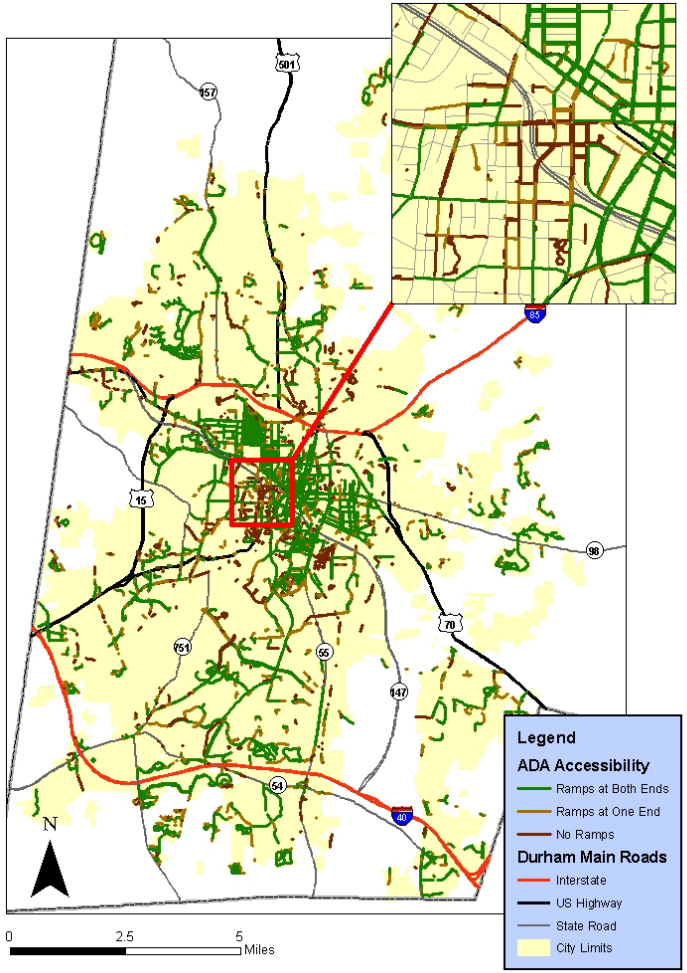


Figure 4-4. Locations of ADA-compliant sidewalk and paved trails in Durham. For larger map version, see http://www.durhamnc.gov/durhamwalks/.

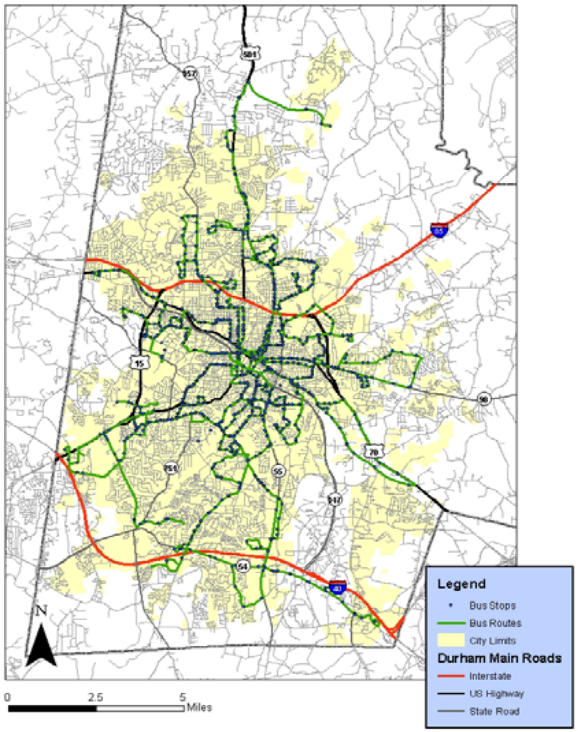


Figure 4-5. Transit in Durham.

Transit

The transit system and the pedestrian system are two pieces of Durham's transportation network that are critically dependent on each other to function well. Many of the people who use transit are also the main users of the pedestrian system. Good sidewalk and safe street crossings are often needed for walking to and from transit stops, and pedestrian amenities like benches and shade trees are useful for making the wait at a stop more pleasant. It is important to know where transit stops and routes are when identifying pedestrian needs so as to ensure that adequate facilities are present to support transit and make for a smooth exchange between the two systems. The following paragraphs provide a brief description of Durham's transit system, however, the most up-to-date information can be found online at www.durhamnc.gov and www.ridetta.org. In Section 5, proposed sidewalk projects are evaluated in relation to the existing transit facilities as part of project identification and prioritization.

Durham Area Transit Authority (DATA)

The City of Durham assumed the operation of the local fixed route bus system in 1991, naming it Durham Area Transit Authority (DATA). Fixed route buses serve all of the City's major destinations including universities, hospitals, schools, businesses, and shopping centers. The system involves 165 employees and 43 buses transporting 13,000 people daily on 19 different bus routes with headways that range from a half hour to an hour.

DATA provides service every day of the year except Christmas Day. Monday through Saturday, service is provided from 5:30 a.m. until 12:30 a.m. the next morning. On Sundays and Holidays, service is provided from 6:00 a.m. until 7:30 p.m. These Holidays are: New Years Day, Martin Luther King, Jr. Day, Memorial Day, July 4th, Labor Day, and Thanksgiving Day. Fares are as follows: $1.00 Regular single pass, $12.00 for a seven-day pass; and $36 for an unlimited 30-day pass. Transfers are not free, and every ride costs the full fare. Half-price discounts are given to disabled persons on regular and multi-day fares. Seniors 65 and older and children less than 12 years of age may ride for free. Students aged 17 or younger may ride DATA for $0.25 at any time if boarding at a school, and between 5:00 a.m. and 8:00 p.m. if boarding elsewhere. Children less than five years of age or 43 inches in height may ride for free. Bicycles are permitted on all DATA buses.

All of the DATA buses are wheelchair accessible and can hold up to two wheelchairs. Persons with a disability that prevents them from using the fixed route bus service may qualify for the DATA ACCESS van service. ACCESS is DATA's demand-responsive paratransit system; fares are currently $1.50 for a one-way trip. This system includes 43 vans and 57 employees transporting clients to various places within the City of Durham.

Triangle Transit Authority

The City of Durham is also served by the Triangle Transit Authority (TTA), which runs a regional bus service with a transfer station in Durham's Research Triangle Park (RTP). Other major stops in Durham include Duke Hospital, the Downtown Durham bus transfer center, the American Tobacco Campus, and Southpointe Mall. TTA runs 9 regular routes to Durham, which are shown in Table 1. Regular routes run from about 5 AM until 7 PM Monday through Friday with headways of an hour, and a half hour at peak service. Route 105 has an RTP to Raleigh Midday Express service and a Raleigh to RTP Evening Express service. Saturday routes to Durham are as shown in Table 2. Hours for Saturday service are generally from 7 AM to 7 PM with one-hour headways. TTA also runs an airport shuttle service, the routes for which are shown in Table 3.

Fares for TTA are $4 for a Regional Day Pass, and $5 for a Regional Express Day Pass. Discounts are provided for the elderly and disabled, students, and bundles of tickets. In addition to bus service, TTA provides an emergency ride home service, vanpools, carpools, and ridesharing program.

Table 4-1. Regular service TTA bus routes serving Durham.

Route Number	Destinations
105, 107	Raleigh to NC State to RTP
201	North Raleigh to RTP
248	Brier Creek/Alexander Dr/RTP
301	Raleigh to NC State to Cary Train Station to RTP
310	Apex/Cary/RTP
311	Apex/RTP
402, 412	RTP to Durham to Chapel Hill to RTP

Table 4-2. Saturday service TTA bus routes serving Durham.

Route Number	Destinations
101	Raleigh to RTP
401	RTP to Chapel Hill to Durham to RTP
747	RTP to Raleigh Durham Airport

Table 4-3. TTA Airport Shuttle Service serving Durham.

Route Number	Destinations
747	RTP to Raleigh Durham Airport
42	Northwest RTP (RTI/IBM) to Raleigh-Durham Airport
45	Southern RTP (EPA/NIEHS)
46	Northeast RTP (Marriott/IBM 500/Cree)

Future Light Rail. Durham will also have three stops on the TTA's Regional Rail Phase I project: Ninth Street, Downtown Durham, and Alston Avenue/NC Central. There is also a proposed stop in the future at the Duke Medical Center.

Transit Contact Information. Since fare structures, routes, and other policy options are subject to change, people are encouraged to contact the transit service agencies directly before taking their first trip.

DATA: www.durhamnc.gov/departments/works/data.cfm
(919.683.DATA or 919.688.1525 for ACCESS service)

TTA: www.ridetta.org (919.549.9999)

Schools

It is important to discuss the school system in the pedestrian plan because schools are a prime opportunity to promote walking, both for the students nearby and for the employees who work there. Across the nation, the Safe Routes to School movement (discussed in further detail in Section 7) is promoting walking to school for a variety of reasons, including the need to combat today's childhood obesity epidemic. In addition, schools are locations that are already the focal point of much car use and pedestrian activity – buses and parents in their own cars arrive dropping kids off and picking them up from school while other children from nearby neighborhoods walk there. Such a mesh of cars and pedestrians, all arriving at approximately the same time, demands well-designed pedestrian facilities that include adequate sidewalks and safe intersections and street crossings. The following paragraphs describe Durham's school system and how it relates to the existing pedestrian system.

The City of Durham is part of the Durham County Public School system, which (in 2006) encompasses 48 schools total: 28 elementary schools, eight middle schools, and seven high schools plus three year-round schools, the Durham School of the Arts, Lakeview Secondary School and one hospital school. With about 4,600 employees (2,300 teachers), the system averages 32,000 students enrolled each year and offers a variety of after-school programs, including after-school day-care and athletic programs. Bus service through the public schools is provided to approximately 18,000 students, 180 days a year, on 300 buses. At this time, the Durham County Public School system does not maintain a count of the number of students that walk to school. A school system may establish a walk zone, which is a distance around a school within which the school will not provide bus service to students and instead students are expected to walk. As of the publication of this Plan, the Durham County Public School System does not have any walk zones established.

As part of the Durham Pedestrian Plan, a school activity was conducted in which students from the elementary schools in the Durham Public Schools System were invited to perform pedestrian audits of the neighborhoods near their schools. Twenty schools participated in this program; these were:

- Fayetteville Street
- Mangum
- Eastway
- George Watts
- Morehead Montessori
- Hillandale
- Lakewood
- RN Harris
- Barton
- Southwest
- C. C. Spaulding
- W. G. Pearson
- Club Blvd Magnet
- Pearsontown
- Oak Grove
- Eno Valley
- Holt
- Parkwood
- Creekside
- Forest View

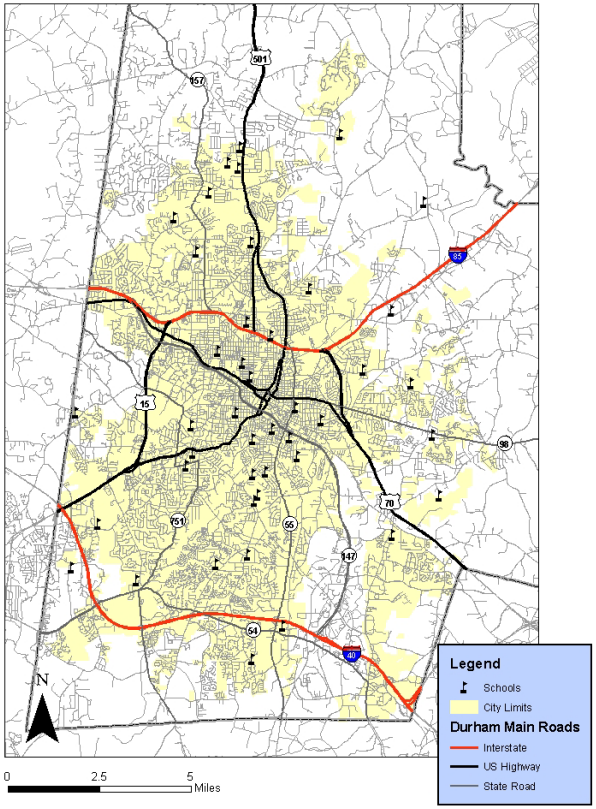


Figure 4-6. Schools in Durham.

Students' assessments of the area near their schools and photos of the schools were on display at City Hall during November 2005. Student's assessments found that many schools needed better pedestrian access, as well as more traffic calming near to the schools.

Land Uses

Durham's land uses can be divided into the following categories: residential, agricultural, vacant land, commercial, recreation, community/public service, industrial, and other. As can be seen in the map to the right, the majority of land uses within the City are residential. Durham's downtown center is still predominantly commercial and industrial, but some residential has begun to appear. Educational institutions such as Duke University and North Carolina Central University also make up a good portion of the land uses in the City.

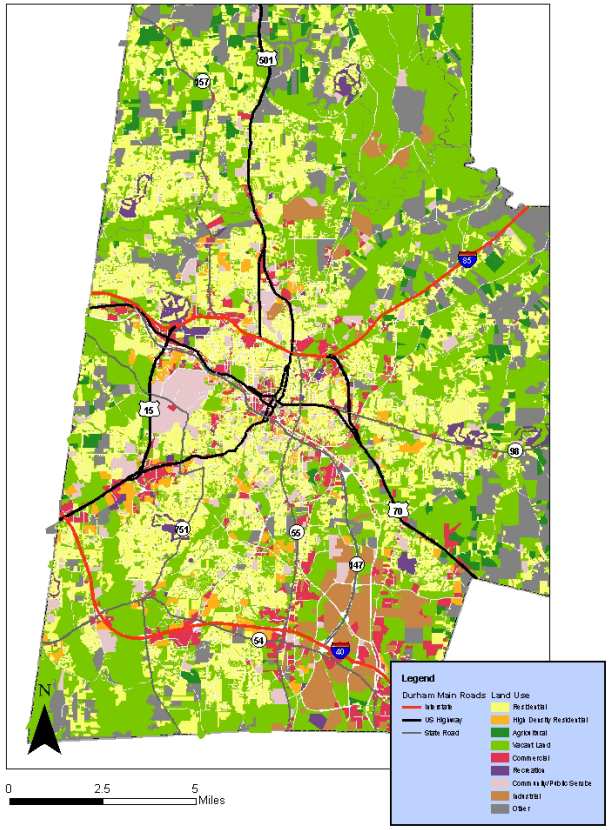
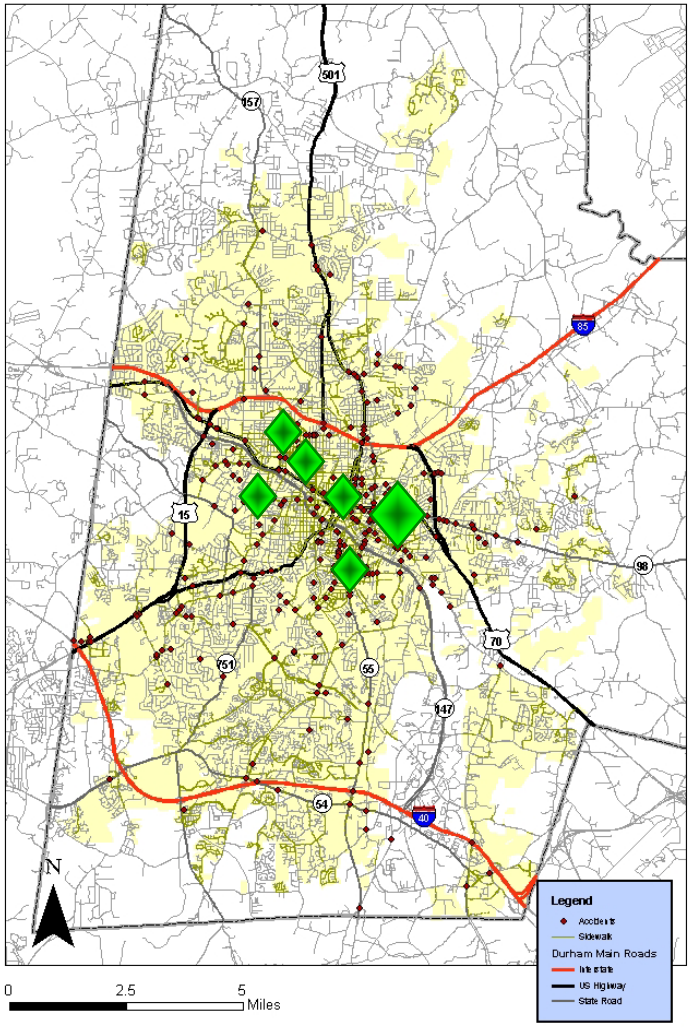


Figure 4-7. Land Uses in Durham.

Figure 7-1. Pedestrian Activity Centers.



Pedestrian Activity Centers

Ninth Street Commercial Area. This area is located in the western part of central Durham, next to Duke University's east campus. It is a popular shopping and eating destination for students and locals, and the surrounding business and residential development mimics Ninth Street's walkable nature. A future TTA light rail station is planned for Ninth Street.

Brightleaf District. The Brightleaf District consists of a cluster of former tobacco warehouses just east of Downtown Durham that have been converted into business, commercial, and residential space. This location is a popular dining location for both locals and university students from Duke and NCCU. The area experiences heavy pedestrian travel between shops, restaurants, businesses, and residences.

Downtown Durham. Like most central business districts, Downtown Durham has long been a pedestrian-oriented location. In addition to traditional development, the area is home to the popular Durham Bulls Stadium and adjacent new American Tobacco Campus, both of which have been designed with the pedestrian foremost in mind. Recently, former businesses and tobacco warehouses have been converted into livable apartments and condos, adding residential development to the existing business and commercial district, and creating a 24-hour pedestrian activity center bustling with business patrons during the day and restaurant and entertainment patrons at night. A future TTA light rail station is planned for downtown.

North Carolina Central University Area. Immediately south of the Downtown area between the Fayetteville Street and Alston Avenue corridors, is North Carolina Central University. NCCU is a historically black state college that has developed into a nationally recognized institution. Surrounding the university itself is pedestrian-oriented residential and commercial development that serves students, faculty, staff, and locals. The area currently experiences heavy pedestrian travel within and between the university and surrounding neighborhoods, and is well served by the local Durham Area Transit Authority bus service A future TTA light rail station is planned for Alston Ave, near NCCU and Durham Technical Community College, and will only increase the amount of pedestrian traffic to and from the area.

Chapel Hill Street Area.
Chapel Hill Street is an east-west corridor that connects downtown to the Burch Avenue, Lakewood and Forest Hills neighborhoods, Duke's west campus, and a plethora of local businesses in between. Chapel Hill Street is also home to the local Amtrak station and will soon house the new Durham

Multi-Modal Transportation Center, a hub for area DATA and TTA passengers. In addition to this future transit-intensive development, Chapel Hill Street provides a crucial link between many older Durham neighborhoods and the central business district.

Northeast Central Durham.
This area is a highly urbanized residential and commercial district east of Downtown Durham, which is currently experiencing a renaissance. From crash analysis, it can be seen that there is a high level of existing pedestrian travel in the area, given the concentration and numbers of pedestrian-related crashes that have occurred between January 2001 and December 2003. In addition, many corridors that run throughout Northeast Central Durham are gateways into the downtown, and as development occurs so too will even more increases in pedestrian traffic to/and from downtown. This location should be recognized as a pedestrian-dominated community and future street treatments should be designed appropriately to both improve pedestrian safety and enhance the pedestrian environment.

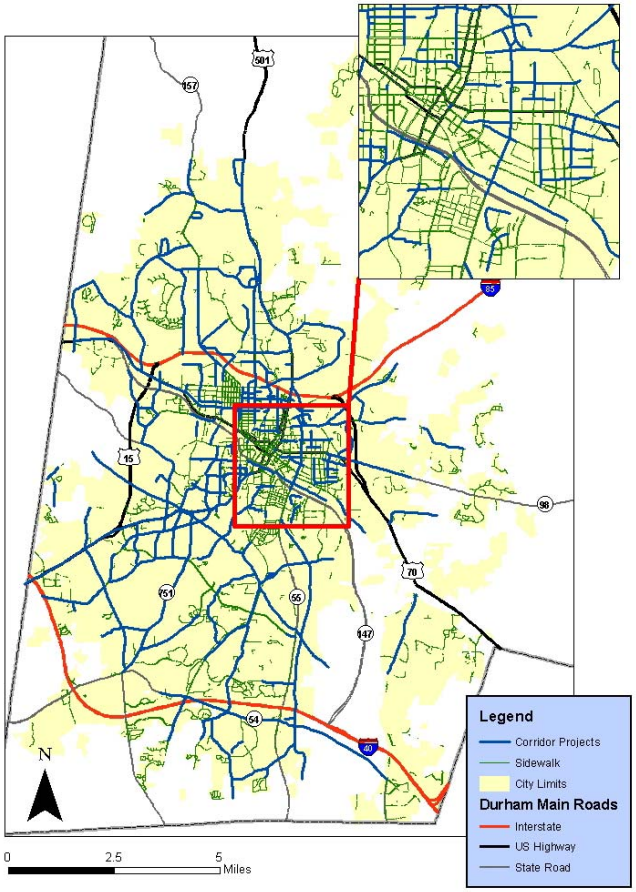


Figure 4-8. Proposed corridor projects in Durham. For larger map version, see http://www.durhamnc.gov/durhamwalks/.

4.2 Future System

Project Development

Projects were developed based on several factors: public comments, crash data and safety, maintenance needs, presence of transit routes, schools, future and existing greenways, and complimentary land uses. Following the public workshops, planning staff received approximately 460 comments (out of 833 total comments) on approximately 100 roads in the City of Durham. From these comments, a preliminary listing of projects were generated which were then added to as additional project needs were identified. Specific focus locations were projects near Durham Public Schools, transit routes, greenways, or parks. Projects were also broken into several different categories: sidewalk construction, maintenance, and intersections.

New Sidewalk Construction Projects

New sidewalk construction projects include projects for all new sidewalk construction on a road that did not previously have sidewalk, and projects for adding sidewalk to connect gaps or provide sidewalk on both sides of a road that may already have had some sidewalk. The result of our analysis is a list of 179 corridor projects, which are shown in Figure 4-8. A listing of all the projects by name and limits is available in Appendix 3.

Safe-Routes-to-School Project Opportunities
Some corridor projects were specially identified because they serve a particular need at a school. The list of schools-related projects is as follows:

Road Name	
Casa	Luther
Cheek	Main
Cook - Juliette	Mathison
Dixon	Miami
Fayetteville2	Milton
Freeman	Newby
Hart	Riddle
Holt School	Ridgeway
Jester	Tom Wilkinson
Latta	Valley
Lebanon	

PLEASE NOTE: The numbers and letters after road names have been added to for the purposes of creating a unique identifier for each proposed project. This will allow for projects that may occur on the same road but in different locations to be distinguished one from another.

Maintenance Projects
Any segment of sidewalk that showed signs of deterioration as evidenced by cracking, faulting, or wearing was identified as a candidate maintenance project. There were over 274 roads that showed signs of deterioration.

Intersection Projects
Intersection projects were generated primarily from public comment and staff input, and an analysis of frequent crash locations. Seventy-eight intersection projects were identified; they are displayed in Figure 4-9. A complete listing is available in Appendix 2.

Study Corridors and Intersections
Five corridors and nine intersections were selected by the City of Durham staff for further study and analysis. An analysis of each of these is found in Appendix 3. These corridors and intersections include:

Corridors	Intersections
Alston	Glendale/Washington
Fayetteville	Old Chapel Hill Road/Garrett
Holloway	Broad/Perry
Roxboro	Hillsborough/LaSalle
University	Club/Buchanan
	Alston/Lawson
	Cranford/Cameron
	Juniper/Hyde Park
	Roxboro/Knox

The following text briefly describes each corridor and intersection and the reasons they were selected for further study. A variety of factors were considered in selecting these locations, including safety needs, potential or existing pedestrian usage, traffic volumes, difficulty of analysis, and geographical equity.

Corridors
Alston Avenue
Alston Avenue is a major north-south corridor for both vehicular and pedestrian travel in Durham. It connects Downtown Durham with the North Carolina Central University (NCCU) and Durham Technical Community College campuses, as well as to surrounding residential neighborhoods to the south. The northern portion of Alston Avenue – the "Golden Belt District" is recognized as a gateway into downtown and is currently experiencing an explosion of transit-oriented residential development, which will eventually be linked to the future light rail station sited in the area. This near-downtown neighborhood is connected to the historic Hayti neighborhood to the south by a pedestrian bridge, which is under the process of reconstruction. Further south, the corridor provides access to more residential neighborhoods and the Campus Hills Recreation Center. Existing pedestrian use along the corridor includes both students and professionals traveling between NCCU and Durham Tech, and between residential neighborhoods, downtown, and the local recreation

center. In addition, the area is easily accessed by a trail network that links pedestrians to the American Tobacco and Riddle Road trails. Alston Avenue is also a major transit route and well-served by local DATA buses

Fayetteville Street

Fayetteville Street is another major north-south corridor with residential, commercial, and industrial development. The road parallels Alston Avenue, running from Downtown Durham and the Durham Freeway (NC 147), past the west side of the NCCU campus to Southpoint, a major commercial and residential activity center in the south of Durham along I-40. Fayetteville Street connects several major residential neighborhoods, including Woodcroft and Hope Valley Farms to the south and Hayti to the north, with a number of local schools including Hillside High School, Southwest Elementary, Fayetteville Street Lab Elementary and Pearsontown. In addition, the corridor is paralleled by the popular shared-use American Tobacco Trail, and is served heavily by local DATA buses. Near downtown and NCCU, the corridor has high levels of existing pedestrian travel between the schools, downtown, residential neighborhoods and commercial areas. Further south, the corridor has the potential for increased pedestrian travel as pedestrian facilities are improved. Pedestrian travel along this corridor can range from trips to and from the schools, major commercial centers, and recreation areas, as well as through-travelers or transit riders headed south to Research Triangle Park.

Holloway Street

Holloway Street is a major east-west route in East Durham that currently experiences heavy vehicle and pedestrian traffic between commercial and residential uses. Beginning near the City's Main Public Library, the street provides a connection for residential neighborhoods in Northeast Central Durham west into the downtown and east to US 70, before becoming NC 98 near the city-county line. Holloway Street provides important access as a gateway into downtown, and acts as a major connector between residential neighborhoods and local businesses in and near downtown. Holloway also serves a number of local parks and schools in the area, and is well-served by local DATA buses. In addition, the intersection of Holloway Street and Miami Boulevard is a major commercial activity center, which provides services to many of the residents nearby and has a high pedestrian rate, but few sidewalks or other pedestrian facilities.

Roxboro Street

Another major north-south route, Roxboro Street serves as one of the few direct connections between North Durham, Downtown Durham, and South Durham. Beginning in North Durham, the

street heads south past several major activity centers, including the Oxford Commons strip mall, Durham Regional Hospital, and the Old North Durham neighborhood, into Downtown. South of downtown, Roxboro Street connects to residential neighborhoods near University Drive and Lakewood Avenue, passes beneath the American Tobacco Trail and intersects with Cornwallis Road, a major access route to the Research Triangle Park area. Major pedestrian activity occurs near the activity centers in North Durham, within Downtown, and in the residential areas south of Downtown.

University Drive

University Drive serves as a major east-west route, connecting West Durham into downtown. Beginning at the intersection with Garrett Road, University passes many major commercial and residential activity centers, including the Southsquare Mall area, Hope Valley Elementary, the commercial development on Business US 15-501 and University Drive, through the Forest Hills neighborhood and into the Lakewood area. This street runs through diverse types of neighborhoods, ranging from low-income to high-income areas, and was one of the original roads from Downtown Durham to Chapel Hill. Heavy levels of pedestrian travel currently exist from the Forest Hills neighborhood towards downtown and west to the restaurants along Business US 15-501, as well as from the neighborhoods along Hope Valley Road to commercial business along University Drive. There is the potential along University Dr for more pedestrian traffic with improved facilities.

Intersections

Glendale/Washington

This intersection is located in a residential area of North Durham, just north of I-85. Although the intersection is in a neighborhood, both Washington and Glendale are major connector streets from North Durham into Downtown. The intersection was recently re-designed as a traffic circle. Current issues include maintaining the residential nature of the area, creating a safe environment for pedestrians walking in the neighborhood, and traffic calming to reduce dangerous vehicular traffic.

Old Chapel Hill-University/Garrett

This is a major signalized intersection with both roads being four lanes in both directions. Old Chapel Hill Road connects Durham to Chapel Hill. Just west of the intersection on Old Chapel Hill Road is Githens Middle School. East of the intersection, Old Chapel Hill Road becomes University Drive, which then connects to commercial development at the Southsquare commercial activity area and developing residential neighborhoods. Garrett Road is a north-south route which connects to US

15-501 several miles north of the intersection, and to Hope Valley Road and Jordan High School approximately ten miles south of the intersection. Land uses surrounding the intersection are primarily commercial, however the area is slowly being built out with townhomes and apartments that may generate a higher level of pedestrian demand. Given the size of the intersecting roads, crossing distances at the intersection are especially large, and changes in signal timing may need to be considered. In addition, DATA buses service the intersection and the interface between the transit and pedestrian system should be strongly considered.

Broad/Perry

This three-legged unsignalized intersection is located at the perimeter of Duke University's East Campus near the Ninth Street commercial activity center, and has some of the highest volumes of pedestrian travel in the City of Durham. Broad Street is a major thoroughfare for vehicular traffic, which pedestrians must cross to access the Bull City Market shopping center and Perry Street and to connect to Ninth Street. This intersection already has pedestrian signage and a crosswalk, however, a persistent problem remains of vehicle failure to yield to pedestrians.

Hillsborough/LaSalle

Hillsborough Road is a five-lane roadway, which carries vehicular traffic from the Ninth Street/Downtown Durham area west to the Durham Freeway/I-85. LaSalle Street is a lower (vehicular) volume road which is part of a greater connecting route from the neighborhoods north of the intersection south to the Duke University campus. Although this intersection is signalized, pedestrians still experience problems with vehicular failure to yield and high levels of discomfort when crossing the street due to perceived danger. In addition, the crash analysis indicated two pedestrian-related crashes were reported at this intersection between 2001 and 2003.

Club/Buchanan

This intersection is located between Durham's Walltown neighborhood, located west and south of the intersection, and the Northgate Mall commercial area, located north and east of the intersection. Both Club and Buchanan Boulevards are major thoroughfares through central Durham, and therefore the intersection has heavy vehicular traffic in all four directions. At the same time, pedestrian traffic is generated from the surrounding neighborhood to Northgate Mall, from the Mall to other nearby commercial development, and to and from the heavily used transit stops around the mall. Although the intersection is signalized, there are several nearby driveway entrances that compound pedestrian hazards at the intersection. This intersection was selected for further study to

identify improvements to make it safer and more pedestrian-accessible while also maintaining vehicular capacity on all four roads.

Alston/Lawson

This signalized intersection is located at the northeastern corner of the NCCU campus. Alston Avenue is a four-lane roadway with heavy traffic and relatively high speeds, which serves as a connection between Downtown Durham and the Durham Freeway south through residential neighborhoods to NCCU and further south to I-40 and Research Triangle Park. The cross-street, Lawson Street, is an east-west connector that runs through the NCCU and Durham Tech campuses, and between many surrounding residential neighborhoods. This intersection has a high level of pedestrian travel, especially from students and employees traveling from the NCCU campus to the surrounding residential neighborhoods. Major issues include creating a safer, more comfortable pedestrian environment and better crossing conditions for travelers crossing Alston Avenue while maintaining roadway vehicular capacity.

Cranford/Cameron

This is a three-legged unsignalized intersection where most pedestrian travel is generated from the neighborhood on the east leg of the intersection (Cranford Road) which crosses over Cameron Boulevard to access the popular Duke Forest Trail to the west, or to Duke University's West Campus via Cameron Blvd. There is a wide shoulder on Cameron that is used for both pedestrian and bicycle travel. Cameron Boulevard serves as a major connection to Duke University, which is located north of the intersection, and to US 15-501, which is located south of the intersection. Although the intersection already has a caution light, it was selected due to continued failure-to-yield by vehicles and a perceived safety issue. It also has particularly difficult geometry as a result of being located both on a hill and a curve. Any improvements should create a better, safer pedestrian crossing environment while also maintaining capacity on Cameron Boulevard and remaining sensitive to major old-growth trees within the area.

Juniper/Hyde Park

Juniper Street and Hyde Park Street are both small two-lane roads located in an urban section of Northeast Central Durham. Although there should be a moderate level of vehicle travel on both streets, there is also an expected high level of pedestrian travel, particularly as a result of the church in the southeastern quadrant of the intersection and its accompanying parking lot in the northeastern quadrant. There is poor sight distance on Juniper Street, where there is a dip in the road west of the

intersection. This intersection was selected due to safety concerns raised by the community and a crash analysis; two pedestrian-related crashes occurred at this location between 2001 and 2003. Although the intersection is currently signalized, it has neither crosswalks nor pedestrian signal heads. Improvement considerations should include installing crosswalks, pedestrian signal heads, and additional sidewalk, as well as warning signs on Juniper Street.

Roxboro/Knox

At this intersection, Roxboro Street intersects Knox Street just north of Downtown and just south of I-85, in the Duke Park neighborhood. As a result, there is heavy vehicular traffic on Roxboro Street headed south into Downtown and north to I-85. In the northwestern quadrant of the intersection is the neighborhood namesake, Duke Park, which is a major attractor for pedestrian trips from surrounding residences. This intersection was selected because, in spite of existing crosswalks and pedestrian crossing signs, there continues to be a problem with safety and vehicle failure-to-yield. Improvements will need to consider how to provide pedestrian access while also maintaining roadway capacity on Roxboro.

Covered in Section 5...

Section 5 discusses how pedestrian projects were collected and analyzed to produce a prioritized list of future projects. Corridor and intersection projects are also a part of this assessment.

Section 5. Project Prioritization

This section describes the project prioritization process and proposed implementation plan for project construction. Included in the chapter is a discussion of the project ranking method and preliminary project cost estimates.

Projects were prioritized using a scoring system that was based on a variety of factors, including project characteristics and identified needs as reflected in the results of the Durham Pedestrian Plan Survey conducted as part of the public involvement effort for this Plan (see Section 2). High-scoring projects had many factors deemed necessary to make a top priority project. Projects were also divided into three types: corridors, intersections, and maintenance. Each project type had a slightly different prioritization system depending on public comments, survey results, and staff input. As discussed in Section 2, survey results indicated that the most important priority for survey respondents was the construction of new sidewalk, followed by connecting gaps in the existing system and maintenance. Respondents also indicated safety, the need for access to more and better destinations, schools, and transit as priorities. The following is a description of the prioritization method for each type of project and a ranking of projects.

5.1 Corridor Projects

Corridor projects were prioritized based on the following factors: project type, presence of transit, proximity to schools, safety need, road type, nearby compatible land uses, public comments, proximity to parks and recreation centers, and the presence of greenways. Based on survey results, staff input, and public comment, factors were placed into tiers of importance. Project type was placed in the top tier, based on survey results that indicated that new sidewalk construction should be the top priority above all else. Presence of transit, proximity to schools, safety need, and road type were placed in the second tier of factors, receiving slightly less importance than project type. Factors for public comments, nearby compatible land uses, proximity to parks and recreation centers, and the presence of greenways were placed in the third tier. Each project was given a score based on how well it met these characteristics, and the scores were then weighted according to the tier of the factor. Factors in the first tier received three times as much weight as those in the third tier and factors in the second tier received twice as much weight. The following describes each factor and the scoring associated with it.

<u>Top Tier</u>

Project Type: Project type was broken down into three different categories: gap construction, new construction, and construction on one side only. A "gap construction" project is one which constructs the sidewalk on a road that may have sidewalk, but it is not continuous. A "new construction" project is one in which some portion of the roadway had no sidewalk on either side.

This type of project includes projects to construct all new sidewalk on locations where none previously existed, and projects to connect gaps in the sidewalk on a road that may have sidewalk, but it is not continuous. A "one side only" project is a project in which there is continuous sidewalk on one side of the road, but not on the other. This type of project proposes to put new sidewalk on both sides of the road. Project scoring is as follows:

Gap Construction: 1
New Construction: ½
One Side Only: 0

Second Tier

Presence of Transit: If there was a transit route (bus or proposed rail) along any length of the project, the project received a score of 1, otherwise it received a 0.

Safety Need: Safety need was defined by the number of reported pedestrian-vehicle crashes that occurred along the length of the project over a three-year period between January 2001 and December 2003. Projects received a score for this factor as follows:

10 – 7 crashes: 1
6 – 5 crashes: ¾
4 – 3 crashes: ½
2 – 1 crashes: ¼
0 crashes: 0

Schools: If a school was located along the length of a project or near to it, the project received a score of 1 for this factor, otherwise it received a 0. Schools included Durham Public Schools, universities, colleges, and private schools.

Road Type: It was important to identify the type of road in order to approximate the overall benefit of the project to the community. A major road, one with a high volume of either pedestrian or vehicle traffic, received a score of 1. A collector road, one with lesser volume traffic, received a score of ½. A neighborhood road, defined as a road with low traffic volume, frequently in a subdivision or a cul-de-sac, received a score of 0.

Third Tier

Compatible Land Use: It is important to characterize land uses near projects because land uses suggest the current sidewalk use, and the potential for future sidewalk use (also known as the latent demand for sidewalk). Examples of compatible land uses include residential and commercial, commercial and

office, or office and residential. A project received a score of 1 if it had very compatible land uses along the length of it, and a score of 0 if it only had some compatible land uses.

Comments: Like land use compatibility, public comments also indicate both the existing demand for sidewalk, and also potential sidewalk use. The factor for public comment was broken down into the following:

10 – 6 comments: 1
5 – 4 comments: ¾
3 – 2 comments: ½
1 comment: ¼
0 comments: 0

Parks: If there was a park or community recreation facility along the length of the project or nearby, the project received a score of 1, otherwise it received a score of 0 for this factor.

Greenways: If an existing or proposed greenway either ran along the length of a project or intersected the project at any point, the project received a score of 1 for this factor, otherwise it received a score of 0.

Example Ranking of Projects

Based on the above-described scoring method, an ideal project would receive a score of 15. This project would be a gap construction project on a heavily trafficked (major) road with transit, schools, parks, greenways, and compatible land uses along the length of it. In addition, the road would have had between 7 to 10 pedestrian-vehicle crashes on it and received between 6 and 10 comments from the public about it.

Using the above-described scoring method, the following is an example scoring approach for a "one side only" construction project on a collector road with a school, a transit route, and very compatible land uses on it. It also received 3 comments and has had no accidents.

Final Score = 3*(Project Type) + 2*(Safety Need + Schools + Transit + Road Type) + 1*(Compatible Land Use + Comments + Parks + Greenways)

Final Score = 3*(Project Type = one side only = 0) + 2*(Safety Need = No Crashes = 0 + Schools = Yes = 1 + Transit Route = Yes = 1 + Road Type = Collector = ½) + (Compatible Land Use = very = 1 + Comments = 3 comments = ½ + Parks = No = 0 + Greenways = No = 0)

Final Score = 3*0 + 2*(0 + 1 + 1 + ½) + (1 + ½ + 0 + 0) = 6 ½

Table 5- 1. An example image of the spreadsheet used to calculate the ranking of each project.

Project Name	Data									Scores									Overall Score
										X 3	X 2				X 1				
	Project Type	Safety Need (Crashes)	Schools	Transit	Road Type	Compatible Land Use	Comments	Parks	Greenways	Project Type	Safety Need (Crashes)	Schools	Transit	Road Type	Compatible Land Use	Comments	Parks	Greenways	
Hope Valley A1	Connectivity	0	Yes	Yes	Major	Very	15	Yes	Planned	1	0	1	1	1	1	1	1	1	**13**
Alston A3	Connectivity	1	No	Yes	Major	Some	0	Yes	Planned	1	.25	0	1	1	0	0	1	1	**9.5**
Chapel Hill4	New Const.	0	No	Yes	Collector	Very	1	No	No	.5	0	0	1	.5	1	.25	0	0	**5.75**

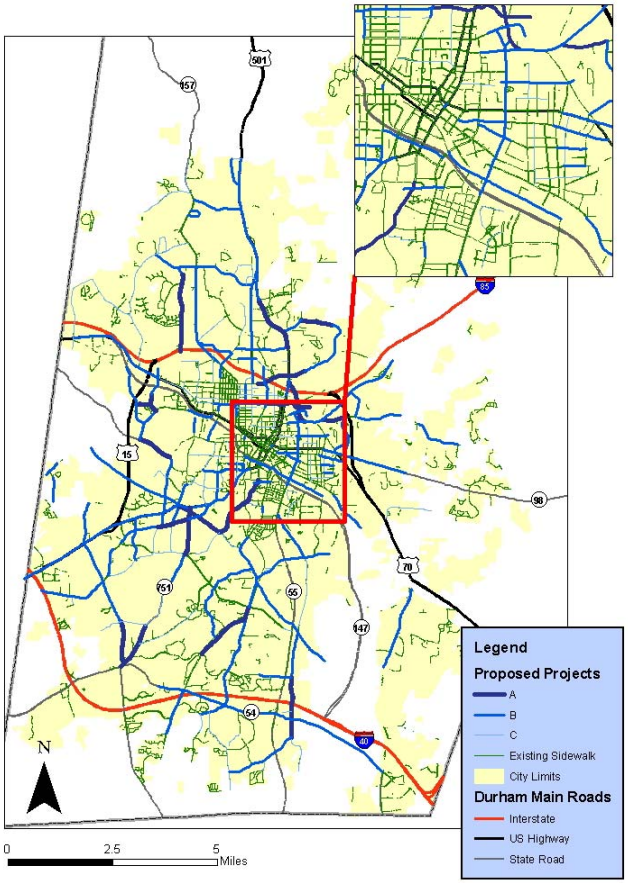


Figure 5-1. Map of proposed projects by ranking.

Projects by Ranking.

Once projects received a score, they were then ranked. Those projects that received a score of 10 or above received a rank of "A" – these projects should have top priority. Projects with scores between 6 and 10 received a rank of "B". Projects with a score less than 6 received a rank of "C". Figure 5-1 shows all of the projects by rank, and Table 5-2 shows the "A" rank projects and their limits. A listing of all projects by rank is available in Appendix 5.

Table 5-2. "A" Rank sidewalk construction projects and their limits.

Road Name	From	To	State/City Maintained
AlstonA6*	Carpenter Fletcher	Sedwick	State
Avondale	Roxboro	Geer	State
Cameron	Erwin	Duke University	State
Campus Walk	Morrene	LaSalle	City
CheekPW2	Geer	Hardee	State
Club1	Ruffin	Ambridge	City & State
CornwallisA1*	15-501	Roxboro	State
DearbornA1	Old Oxford	Ruth	State
FayettevilleA2	Woodcroft	MLK	State
GarrettA1	Hope Valley	Swarthmore	State
HillandaleA1	Peppertree	Carver	State
HillandaleA2*	Carver	I-85	*State*
Hope Valley A1	HWY 54	Swarthmore	State
Hope Valley A4	Archdale	15-501	City & State
LaSalleA1	Kangaroo	Erwin	City
Markham2	Washington	Avondale	City & State
Roxboro2	Pacific	Murray	State
Roxboro6	Enterprise	Cornwallis	City & State
University3	Old Chapel Hill	Hope Valley	State

**Portions of this project are part of a proposed incidental project in the 2006 – 2012 State TIP.*

PLEASE NOTE: The numbers and letters after road names have been added to for the purposes of creating a unique identifier for each proposed project. This will allow for projects that may occur on the same road but in different locations to be distinguished one from another.

5.2 Intersections

Similar to the method for prioritizing corridor projects, the method for prioritizing intersection improvement projects was also based on a variety of tiered factors. These factors were: ADA compliance, safety need, public comments, land use compatibility, the presence and condition of sidewalk, road type, and the presence of transit, schools, parks, or greenways. Since safety and ADA compliance were identified by the public and staff as of the utmost importance at intersections, these factors made up the first tier of factors. The presence of schools, parks, or greenways, and comments were placed in the second tier. In the third tier was placed transit, compatible land uses, presence and condition of sidewalk, and road type. Each project was given a score based on how well it met these characteristics, and the scores were then weighted according to the tier of the factor. Factors in the first tier received three times as much weight as those in the third tier and factors in the second tier received twice as much weight. The following describes each of the factors and their scoring.

First Tier

ADA Compliance: For the purposes of this project, an intersection project received a 0 for ADA compliance if all of the corners of the intersection had ADA compliant curb ramps. If some or all of the corners of the intersection did not have ADA compliant curb ramps then the project received a score of 1 (this includes those projects that did not have ADA compliant curb ramps because they did not have sidewalks at some or all of the corners of the intersection). In general, ADA requirements for pedestrian facilities are more than just curb ramps; they include items such as clear widths, level landings, and maximum slope restrictions. For a complete listing of ADA requirements, see the Department of Justice's ADA Standards for Accessible Design (28 CFR Part 6, revised of July 1, 1994).

Safety Need: Safety need was defined by the number of reported pedestrian-vehicle crashes over a three year period from January 2001 to December 2003 that occurred at the intersection. Intersections received a score for this factor as follows:

3 or more crashes: 1
1 – 2 crashes: 1/2
No crashes: 0

Second Tier

Schools: If a school was located near to the intersection, the project received a score of 1 for this factor, otherwise it received a 0. Schools included Durham Public Schools, universities, colleges, and private schools.

Parks: If there was a park or community recreation facility near to the intersection, the project received a score of 1, otherwise it received a score of 0 for this factor.

Greenways: If there was an existing or proposed greenway near the intersection, the project received a score of 1 for this factor, otherwise it received a score of 0.

Comments: Public comments were a primary driving force for the identification of needed intersection improvement projects. The factor for public comment was broken down into the following:

3 – 6 comments: 1
1 or 2 comments: ½
No comments: 0

Third Tier

Presence of Transit: If there was a transit route (bus or proposed rail) near the intersection, the project received a score of 1, otherwise it received a 0.

Compatible Land Use: As discussed with the corridor projects, it is important to characterize land uses near projects because land uses suggest the current sidewalk use, and the potential for future sidewalk use (also known as the latent demand for sidewalk). Examples of compatible land uses include residential and commercial, commercial and office, or office and residential. An intersection received a score of 1 if it had very compatible land uses near it, and a score of 0 if it only had some compatible land uses.

Presence of Sidewalk: Due to the emphasis on new sidewalk construction for this plan, intersections where all four of the legs have no sidewalk had the highest priority and therefore received a score of 1. Intersections where there is sidewalk on some of the legs of the intersection received a score of 1/2 and intersections with sidewalk on all four legs received a score of 0.

Sidewalk Condition: Sidewalk condition was determined based on the results of the sidewalk inventory. Sidewalk condition is important at intersections because it can have an effect on the accessibility of the sidewalk. Intersections received a score of 1 if there was moderate or severe deterioration of any sort at any of the four legs of the intersection. Intersections received a ½ for only light deterioration of any sort at the intersection and a 0 for no deterioration.

Road Type: As described with corridor projects, it is important to identify the type of road in order to approximate the overall benefit of the project to the community. Intersections with a major road, one with a high volume of either pedestrian or vehicle traffic, received a score of 1. Intersections

with two collector roads or a collector and a neighborhood road received a score of ½. Intersections with only neighborhood roads received a score of 0.

Example Ranking of Projects

Based on the above-described scoring method, an ideal intersection project would receive a score of 19. This project would be at an intersection which had no sidewalk (and therefore was also not ADA accessible), had experienced three or more accidents in a three-year period between January 2001 and December 2003, was near to compatible land uses, a school, park, a greenway, and a transit route. The intersection would also have received between 3 and 6 comments about it through the public participation process, and had at least one major road as one of the legs.

Using the above-described scoring method, the following is an example scoring approach for an intersection with sidewalk on all four of its legs, but one of its legs has no curb ramps, and another one has lightly deteriorated sidewalk. It is on a road classified as collector, received four public comments, and is across from a school. It has had one accident.

Final Score = 3*(ADA Compliance + Safety Need) + 2*(Schools + Parks + Greenways + Comments) + 1*(Transit + Sidewalk + Sidewalk Condition + Road Type)

Final Score = 3*(ADA Compliance = No = 1 + Safety Need = 1 Crash = 1/2) + 2*(Schools = Yes = 1 + Parks = No = 0 + Greenways = No = 0 + Comments = 4 Comments = 1) + 1*(Transit = No = 0 + Sidewalk = Yes = 0 + Sidewalk Condition = ½ + Road Type = Collector = ½)

Final Score = 3*(1 + 1 + ½) + 2*(1 + 0 + 0 + 1) + 1*(0 + 0 + ½ + ½) = 12.5

Table 5-3. An example image of the spreadsheet used to calculate the ranking of each intersection.

Intersection Name	Data										Scores										Overall Score
											X 3		X 2				X 1				
	ADA Compliant	Safety (Crashes)	Schools	Parks	Greenways	Comments	Comp. Land Use	Sidewalk	Sidewalk Condition	Road Type	ADA Compliant	Safety (Crashes)	Schools	Parks	Greenways	Comments	Comp. Land Use	Sidewalk	Sidewalk Condition	Road Type	
Broad & Green	No	0	Yes	No	No	1	Very	Some	Good	Coll.	1	0	1	0	0	.5	1	.5	0	.5	**9**
Club & Oakland	Yes	0	No	Yes	Yes	2	Very	Yes	Good	Coll.	0	0	0	1	1	.5	1	0	0	.5	**6.5**

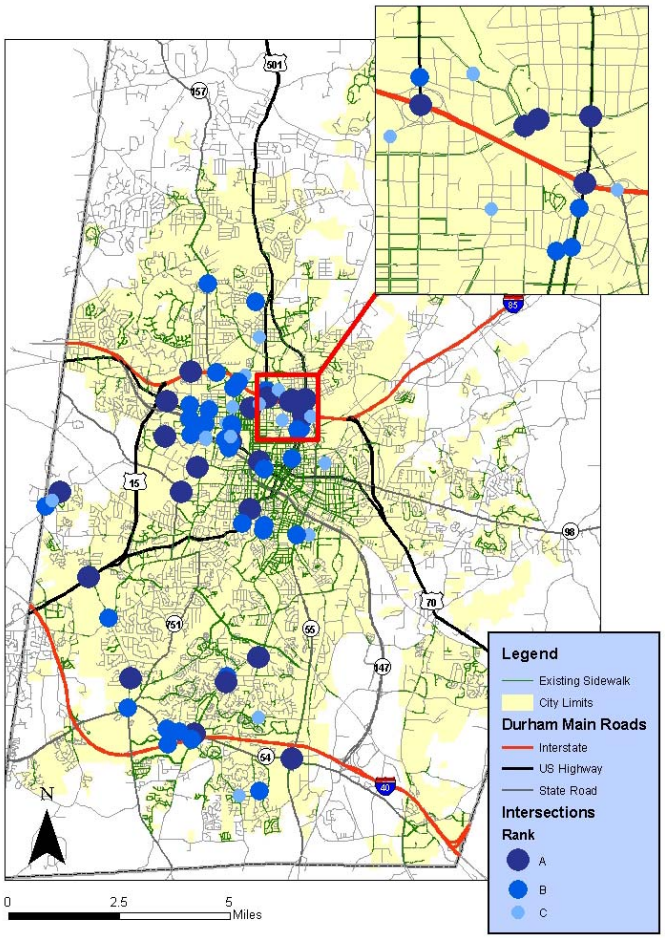


Figure 5-2. Map of proposed intersection projects by ranking.

Projects by Ranking.

Once projects received a score, they were then ranked. Those projects that received a score of 11 or above received a rank of "A" – these projects should have top priority. Projects with scores between 8 and 10 received a rank of "B". Projects with a score less than 8 received a rank of "C". Figure 5-2 shows all of the projects by rank, and Table 5-3 shows the "A" rank projects. A listing of all projects by rank is available in Appendix 4.

Table 5-3. Listing of intersection projects by ranking.

"A"	"B"		"C"
15-501 and Garrett*	Alston and Lawson	I-85 and Guess	Anderson and I-85
Academy and Cranford	ATT at I-40	I-85 on ramp and Ruby	Avondale and I-85
Broad and Main	ATT Crossing at Cook Rd	Mangum and Markham	Broad and Club
Club and Guess	Broad and Green	Ninth and Main	Broad and Perry
Duke and I-85	Broad and Guess	Oval and Oakland/Woodrow	Clermont and Grandale
Duke and Main	Broad and I-85	Revere and Clermont	Club and Oakland
Duke University and Chapel	Broad and Markham	Rollingwood and HWY 54	Erwin and Anderson
E Forest Hill and University	Broad and Pettigrew	Roxboro and Erie	Erwin and Randolph
Fayetteville and Barbee	Chalk Level and Horton	Roxboro and Knox	Glendale and Washington
Fayetteville Crossing for SW Elementary	Chapel Hill and Pettigrew	Roxboro and Lawson	Great Jones and Main
Garrett and Trotter Ridge	Dowd and Cleveland	Roxboro and Markham	Juniper and Hyde Park
Glendale and Acadia	Durham Freeway and Swift	Trent and Hillsborough	Kenan and Carver
Glendale and Club	Erwin and Blue Bottle (ped only crossing)	W Forest Hills and University	Ninth and Green
Hillandale and I-85*	Erwin between Fulton and Kent (hospital crossing)		North Pointe and Broad
Hillsborough and Lasalle	Fayetteville and I-40		Ridgeway and Wabash
HWY 54 and Fayetteville	Fulton and Durham Freeway		Washington and Glendale
HWY 55 and HWY 54	Garrett and Old Chapel Hill		Washington and Knox
Lasalle and Erwin	Guess and Horton*		Woodcroft and Copper Creek
Mt. Sinai and Erwin	Highgate and HWY 54		
Roxboro and Club	Hillandale and Club*		
Roxboro and I-85	Hope Valley and HWY 54		

**Intersection is part of a proposed project with pedestrian-related features in the 2006 – 2012 State TIP.*

5.3 Maintenance Projects

As stated in Section 4, any segment of sidewalk that showed signs of deterioration as evidenced by cracking, faulting, or surface wear was identified as a candidate maintenance project. For information on each of these maintenance categories, see Appendix 5. Sidewalks with severe deterioration in all categories are listed in Table 5-4. In addition to these sidewalks, several greenways also displayed severe deterioration; their locations were: Southern Boundary Park, Sherwood Park, Lyon Park, and Ellerbee Creek Trail.

The sidewalk and trail locations in Table 5-4 will serve as priority maintenance projects for the City, in addition to others identified by Public Works from the Geographic Information System (GIS) sidewalk inventory data, which is available for public review through the City's GIS office. The condition rating included in the GIS sidewalk inventory was based on an objective visual assessment of all sidewalks inventoried in the City of Durham, and did not take into account factors such as sidewalk usage, pedestrian crash rates, or pedestrian generators. These additional factors should be considered as each segment of sidewalk with a "poor" condition rating receives an engineering assessment by the City and project selections are made for future maintenance work.

Table 5-4. Priority Maintenance Projects.

Street Name	From	To	Length (Miles)	Street Name	From	To	Length (Miles)
Angier	Alston	Holman	0.06	Lakewood	Fayetteville	Old Fayetteville	0.02
Concord	Lawson	Otis	0.09	Lyon Park Trail			0.18
Conyers	Wilkerson	End	0.02	Martin Luther King Jr	Dixon	Hope Valley	0.01
Duke	Morehead	Proctor	0.07	Morehead	Vickers	Duke	0.12
Ellerbee Creek Trail			0.74	Roxboro	Corporation	Dowd	0.06
Ellis	New Haven	Taylor Ridge	0.07	Sherwood Park Trail			0.24
Farthing	Ellerbee	Club	0.01	Southern Boundary Park Trail			0.61
Formosa	Otis	Concord	0.03	Taylor	Hyde Park	Maple	0.06
Garrett	15-501	University	0.05	Trinity	Shawnee	Rosetta	0.14
Geer	Foster	North	0.19	University	Cornwallis	Woodridge	0.04
Gregson	Minerva	Morgan	0.25				
Gurley	Mallard	Primitive	0.02				
Hillsborough	Hale	Carolina	0.05				
Knox	Hale	Carolina	0.06				

5.4 Preliminary Cost Estimates for Corridor Projects

This section presents rough cost estimates for "Tier A" projects and describes how the estimates were created. These estimates should be used as an indicator of the "constructability" of each project, rather than for exact pricing. Constructability in this case refers to an estimate of the cost of installing the sidewalk or other pedestrian facility.

Cost Estimation Method

In order to determine the constructability of each of the top tier projects, a basic charge per linear foot of pedestrian path (sidewalk or trail) was provided by the City of Durham. This basic cost was then increased with the presence of one or more of the following factors along each segment of sidewalk: trees, no curb and gutter, sidewalk, structures, ditching, and utilities. Cost estimates were based on observations made from 2005 aerial orthophotography provided by the City of Durham. Costs were produced for each side of the roadway, since it was not known which side of the street might be the preferred side on which to construct sidewalk.

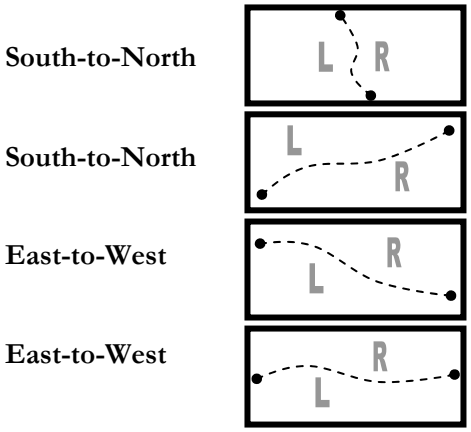
The equation to calculate the cost of each project is as follows (assuming sidewalks were installed behind the ditchline for the left side of the street, in this example):

Proposed Sidewalk Cost = ([ProjLength]*(1-[LSidewalk]/100)*40) +
([ProjLength]*([LDitching]/100)*25) + ([ProjLength]*([LStructure]/100)*50) +
([ProjLength]*([LTrees]/100)*40) + ([ProjLength]*([LUtility]/100)*15)

Note that "ProjLength" is the length of the proposed sidewalk in feet. This formula is in a format that allows it to be copied and pasted directly into ArcView's structured query language (SQL) formula calculator in order to update this information, as needed. The only adjustment needed is if the sidewalk is to be placed behind the ditchline ($25/linear foot) or behind curb-and-gutter that does not currently exist ($85/linear foot).

Directionality

Each side of the roadway was assessed independently (left and right side) to determine sidewalk costs. In order to determine which was the left and right sides, a decision to keep south-to-north and east-to-west as cardinal directions was assumed. The diagrams that follow indicate how the directionality rule was applied for roadways of different orientations. Note that if the project "rises" from left-to-right it is assumed to have south-to-north directionality; if it "falls" from left-to-right then the project is assumed to have east-to-west directionality.



Suburban Neighborhood: Trees Interfering with Sidewalk Construction (Markham Av).

Evidence of Drainage Ditch Interfering with Sidewalk Construction (Dearborn Av.).

Cost Factors

For each sidewalk project and individual segment, cost factors would increase the per foot cost of constructing sidewalk by the amount shown inside the parentheses. Sidewalk material was not considered a factor due to the relative similarity in costs for concrete and asphalt. The basic, linear cost of a foot of sidewalk is assumed to be valued at $40 per linear foot (source: City of Durham Public Works Department). A percentage of each segment (0% to 100%) was applied to determine the lineal extent of each cost factor for each segment.

1. Sidewalk. If sidewalk was already present, then this length of sidewalk segment was subtracted from the total, proposed segment cost. For example, if 40% of the segment had sidewalk, then only 60% of the sidewalk cost was reported. Note that for the project Fayetteville A2, the American Tobacco Trail runs parallel alongside (within 100') of several segments and that these segments were reported as having sidewalk on one side.
2. No Curb-and-Gutter ($85). If curb-and-gutter is present, then sidewalk can typically be installed closer to the curbline. The cost factor here indicates the percentage of each sidewalk that does NOT have curb-and-gutter. It should be noted that the lack of curb-and-gutter does not necessarily mean that the area is less fit for sidewalk construction. There are several sections of roadway such as on the Hope Valley A1 project, for example, where sidewalk has been constructed without curb-and-gutter and placed across a wide swale to help prevent undercutting the sidewalk through erosion. However, a determination of whether this treatment was possible was not factored into the constructability index. The final cost approximation assumed most sidewalks would need curb-and-gutter, based on the direction of Durham staff.
3. Structure ($50). Indicated the presence of a bridge overpass/wing wall, building, or other structure potentially in the path of the proposed facility. Generally, these costs were not considered, but serve as a "flag" for further consideration.
4. Trees ($40). Since the aerial photography could not resolve if the tree bases would be in the typical track of a new sidewalk installation, this factor was applied only if the tree canopy extended to the centerline of the roadway (or striped lane marker for streets that were more than two lanes across). A conservative approach was applied for this factor – individual trees would not be noted as a cost element, for example, unless they would clearly pose a significant problem.
5. Ditching ($25). Some roadways have drainage ditches near the edge of pavement of the roadway, which would either force piping the ditch or moving the sidewalk further from the roadway and encroaching more on private right-of-way. In either case, the costs were assumed to increase as a result. In some cases, such as the Dearborn A1 project, erosion and ditching combined to increase the percentage of roadway segment with this cost constraint.
6. Utility ($15). The presence of utility poles potentially in the path of a proposed sidewalk. As with trees, the sidewalk can be installed "behind" the utility poles, but again would increase the potential for right-of-way conflicts.

In essence, the base cost of constructing the sidewalk was calculated for those segments of street that did not already have sidewalk on them, and then individual cost factors were added to that base cost. This exercise was repeated for each side of the roadway, left and right.

Preliminary Cost Estimates

Table 4 describes the general constructability of each "Tier A" sidewalk project. The City of Durham would like to have sidewalks (or equivalent off-road trail) constructed on one side of priority roadways first before moving on to installing sidewalk on the other side as well. Also, Table 4 implies that some roadways in "Tier A" already have sidewalk for a significant portion of the project's length (e.g., Hillandale2). Therefore, the total cost of these projects should be estimated at approximately $6 million.

Table 5-5. Preliminary cost estimates for "Tier A" projects.

Project Name	Left Side Cost	Left Side Project Length (feet)	Right Side Cost	Right Side Project Length (feet)
AlstonA6	$291,000	7,200	$311,000	7,600
Avondale	$355,000	5,100	$124,000	2,800
Cameron	$326,000	5,700	$286,000	5,700
Campus Walk	$72,000	1,800	$58,000	1,400
CheekPW2	$281,160	2,556	$281,160	2,556
Club1	$13,000	300	$263,000	5,000
CornwallisA1	$695,000	5,700	$769,000	6,200
DearbornA1	$532,000	3,800	$547,000	4,000
FayettevilleA2	$876,000	7,400	$756,000	6,700
GarrettA1	$522,000	4,700	$581,000	4,600
HillandaleA1	$255,000	6,400	$255,000	6,400
HillandaleA2	$137,000	3,400	$137,000	3,400
Hope Valley A1	$312,000	3,300	$459,000	4,900
Hope Valley A4	$586,000	5,700	$619,000	5,700
LasalleA1	$56,000	1,400	$18,000	400
Markham2	$341,000	5,300	$335,000	5,600
Roxboro2	$297,000	7,400	$297,000	7,400
University3	$231,000	2,500	$189,000	2,000
Totals	**$6,178,160**	**76,900**	**$6,285,160**	**79,800**

Covered in Section 6...

Section 6 identifies guidance supplementing the preferred design and considerations for various pedestrian construction elements. On-road and off-road pedestrian facilities are covered in this Section, as are mid-block crossings and provisions for special situations like parking lots and underpasses.

Downtown Durham pedestrian plaza.

Section 6. Standards and Guidelines

This section of the ***DurhamWalks!*** Pedestrian Plan acts as a stand-alone guidance document for the consideration, design, and construction of pedestrian facilities in the City of Durham, North Carolina. This is to be considered as recommended practice only; best practice in the design of pedestrian facilities must obviously be tempered by sound engineering practice that recognizes the site-specific physical constraints of various landscapes as well as cultural and community context.

Guidance on the design of pedestrian facilities has been published by NCDOT (draft, 1997); American Association of State Highway and Transportation Officials (AASHTO, 2004); and the Federal Highway Administration (FHWA, 2002). The recommended guidance herein borrows heavily from these sources and others, and users are encouraged to refer to them for additional information[1, 2, 3]. The City of Durham has produced design guidance on wheelchair ramps and street specifications that are updated and considered the dominant reference inside the City authority.

Essential Guidance

- New or reconstructed sidewalks shall adhere to all current local, state, and federal standards, *including the provision of ADA-compliant curb ramps* such as those shown in this Guidance.
- The standard sidewalk width outside of a Pedestrian Activity Center is a 5' minimum concrete structure unless otherwise approved by the City of Durham. Sidewalks and pedestrian facilities within a Pedestrian Activity Center will comply with the standards shown herein unless they conflict with adjacent facilities.
- Downtown Design Overlay District standards have special allowances for parking requirements, signage, and streetscaping; these can be found in Durham's zoning ordinances and at: http://www.durhamnc.gov/departments/ planning/zoneord/section5/54.cfm.
- All new developments and expanded developments shall have sidewalk on at least one face of the abutting edge of the property to intersect with the nearest existing sidewalk or be directly across the street from the nearest existing sidewalk.
- During temporary closures of sidewalk, construction detours will be identified by signs placed at a location closest to the nearest intersecting sidewalk or pedestrian facility in both directions of travel according to the City of Durham and the latest edition Manual on Uniform Traffic Control Devices (MUTCD) as well as ADAAG requirements for temporary pedestrian access. Refer to http://mutcd.fhwa.dot.gov/ to access the MUTCD.

6.1 On-Road Pedestrian Facilities Design Guidance

Sidewalk Width.
The width of sidewalks should accommodate two persons walking past one another, a width generally perceived to be five feet, at a minimum. In areas of high pedestrian activity, where the sidewalk immediately abuts the street curb, or a more diverse use of the sidewalk, additional width and different paving and streetscaping options should be considered and may be required.

The minimum width of a sidewalk and planting strip shall be as follows:

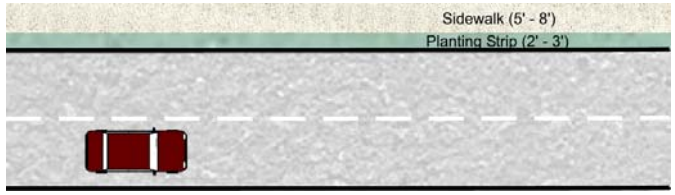
Table 6-1. Minimum Dimensions (feet)

Land Use – Street Type	Sidewalk	Buffer
Central Business District or Pedestrian Activity Center	8	variable
Commercial/Industrial	5	3
Residential – Arterials and Collector Streets	5	3
Residential – Local Streets	5	3

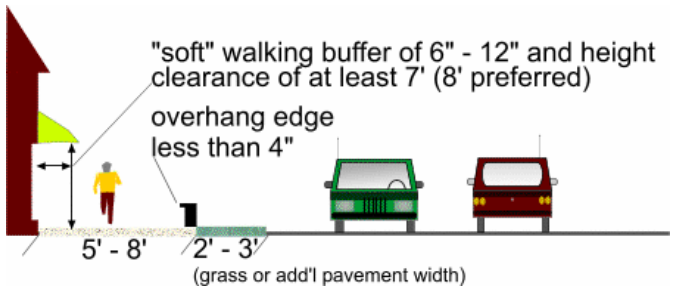
Other circumstances that may require additional sidewalk width are to accommodate the overhang of parked vehicles from off-street or angled on-street parking areas, additional buffer from traffic when a planting strip cannot be installed, and on roadways with transit stops that provide seating or shelter for patrons.

Additional design considerations for on-street sidewalk facilities include the following:

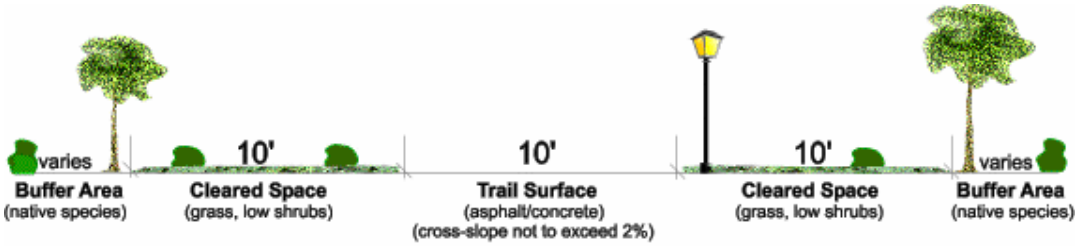
- Eliminating both high and low contact points with tree branches, mast-arm signs, overhanging edges of amenities or furniture, and
- The provision of clear space between walls [on one side of the walkway] and amenities, parking overhang, or plantings on the curb side of the walkway (see diagram at right indicating the relationships between pedestrian features, building faces, and roadway).

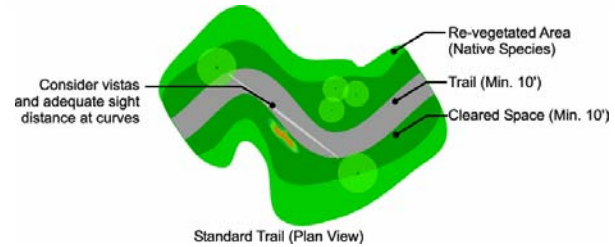


Plan View of Sidewalk, Buffer, Street.

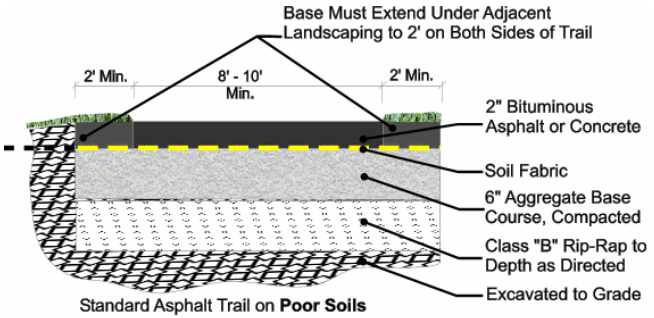


Profile View of Sidewalk, Buffer, Street.

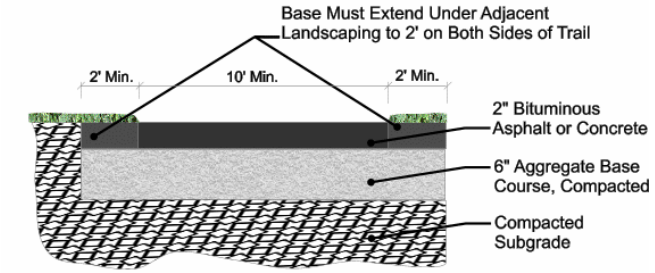




Standard Trail (Plan View)



Standard Asphalt Trail on **Poor Soils**



Standard Asphalt Trail

6.2 Off-Road Pedestrian Facilities Guidance

The City of Durham has adopted a Trails and Greenways Master Plan[4] (www.ci.durham.nc.us/departments/planning/pdf/ plan_greenway.pdf) that includes a number of design standards. The trail types and general dimensions are described below; additional recommendations are made in the Trails and Greenways Master Plan for off-road vehicle trails and "blueways," a term used to describe canoe or kayaking runs or paddle trails. While some design standards are provided, the diagrams shown on this and the following page are intended to supplement the descriptions found in the Trails and Greenways Master Plan, and are in full agreement with it. Those wishing to know more about trail and greenway designs are encouraged to review the Trails and Greenways Master Plan carefully.

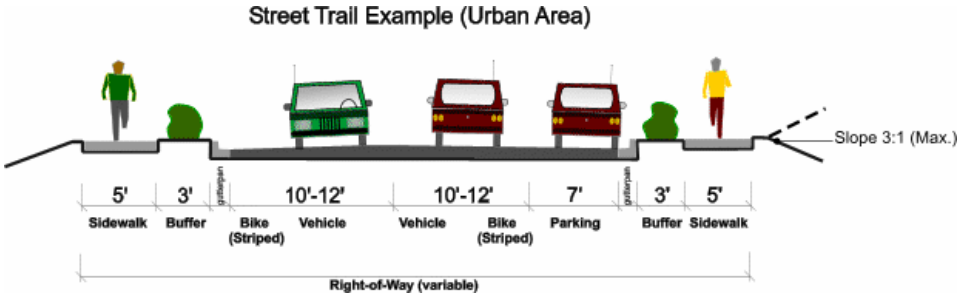
Greenway: a system of trails in the City or County, which may be made u p of trails, sidewalk trails, and/or recreation trails – example, the North/South Greenway.

Trail: a discrete section of hard-surfaced pathway, generally between major trailheads; a trail may or may not be included in a greenway system and may or may not include a section of sidewalk trail – example, the Third Fork Creek Trail of the North/South Greenway. Trails will be designed for the least possible environmental impact, especially in the County's Corridor System routes. Refer also to diagrams at left.

Sidewalk Trail Section: 8-to-10 foot wide paved section within or immediately adjacent to a roadway right-of-way; most sidewalk trails are included within a trail and thus do not have a separate name – example, the sidewalk section along Club Boulevard that is part of the South Ellerbee Creek Trail.

Street Trail: a designated connector between trails or greenways, consisting of a standard 5 foot-wide sidewalk and a wide outside lane or bike lane on the roadway – example, Martin Luther King Jr. Parkway between the American Tobacco Trail (ATT) and the Third Fork Creek Trail. Street trails in rural areas may consist of a paved roadway shoulder only without sidewalk or off-road trail section. Generally, street trails are a less-preferred option due to potential conflicts with vehicular traffic on adjacent and crossing streets.

Recreation Trail: an unpaved trail, which may or may not be part of a greenway and can serve for hiking, equestrian use, or mountain biking (example, the New Hope Creek Trail); or a smaller paved trail contained within an urban park.



Street trails are designated pedestrian on-road facilities. The diagram at right is a conceptual drawing indicating key elements of a street trail. Generally, meandering paths are not desirable even where there is sufficient right-of-way to accommodate them, as pedestrians will want to take the shortest path unless they are in a recreational setting.

Recreation Trails by their nature may have limited accessibility to mobility impaired users; other trail types should provide surfaces, grades, and dimensions to make them fully accessible to a wide range of user groups. Cross-slopes should nevertheless not exceed 2% (preferred maximum: 1.5%) to avoid problems with drainage and undercutting of the pavement through erosion. Grade in the direction of travel should not exceed 8.3% according to ADA guidelines (preferred maximum: 5%).

Trail Amenities and Accessibility

Trail amenities should be just as accessible as the trails themselves. Periodic rest areas off to the side of accessible trails are important features as well, and should be level and placed after a long ascent.

Street furniture, lighting, and other amenities can create accessibility problems for those with impaired vision. Overhang should be limited to less than four inches when objects are post- or wall-mounted in the walking space of pedestrians. Special attention should be paid to not locate seating, plantings, or other enhancements in the unloading space that may interfere with the operations of a lift-equipped vehicle. This is also true for opening car doors.

Nevertheless, Durham encourages the inclusion of well-designed streetscaping in its plans. Street trees with deeper rootstock to prevent sidewalk damage; public art; casual – and movable – seating arrangements; textured and colored paving treatments; and ADA-accessible tables are important parts of the design of the street and pedestrian area.

In situations along roadways where wider clear spaces are needed (consult the AASHTO *Roadside Design Guide*, for example), buffer widths and street tree locations will be affected. Care should be

taken, however, to balance the needs of automobiles and drivers alongside those of pedestrians, particularly in areas of high pedestrian activity. Sending a strong message to drivers in these areas that pedestrians have equal access to the street and crossing locations can be achieved by narrowing the roadway, introducing horizontal curvature in the alignment of the street, constructing refuge islands, lowering speed limits, and creating pedestrian-scale lighting, streetscaping, and amenities at the edge of the roadway.

New accessible curb ramp installed on Guess Road.

6.3 Mid-Block Crossings

Mid-block crossings pose special problems for many state and local departments of transportation, since pedestrians will often choose to cross at the location that is the most convenient for them to do so, not necessarily where it is the safest. The Charlotte Department of Transportation has created important research and guidance for assessing alternative treatments at mid-block crossings. This guidance is based, in part, upon the work of FHWA and Charles Zegeer[5] in examining a number of unmarked and marked mid-block crossings. Zegeer noted that a simple marked crosswalk by itself is often insufficient to provide a good cue to motorists that a pedestrian crossing is in front of them, particularly on roadways exceeding 12,000 – 15,000 vehicles per day (vpd). This is especially true in poor lighting conditions, short sight distance situations, multi-lane crossings, and higher-volume streets. The City of Durham also assumes that pedestrians will be using every street and making crossings, so the question becomes how best to safely accommodate pedestrians in a crossing situation. Figure 6-1 below shows the "solution space" for the four warrants that the Charlotte DOT considers when evaluating a mid-block crossing treatment: traffic volumes, proximity to the nearest signalized crossing, vehicle speeds, and vehicular/pedestrian volumes. When a roadway crossing has all of these factors falling into the ranges suggested by the shaded box in the diagram, then it may meet the criteria for one or more mid-block crossing treatments. Other factors like roadway width

Pedestrian Crossing. *An example of a mid-block crossing in Carrboro, NC.*

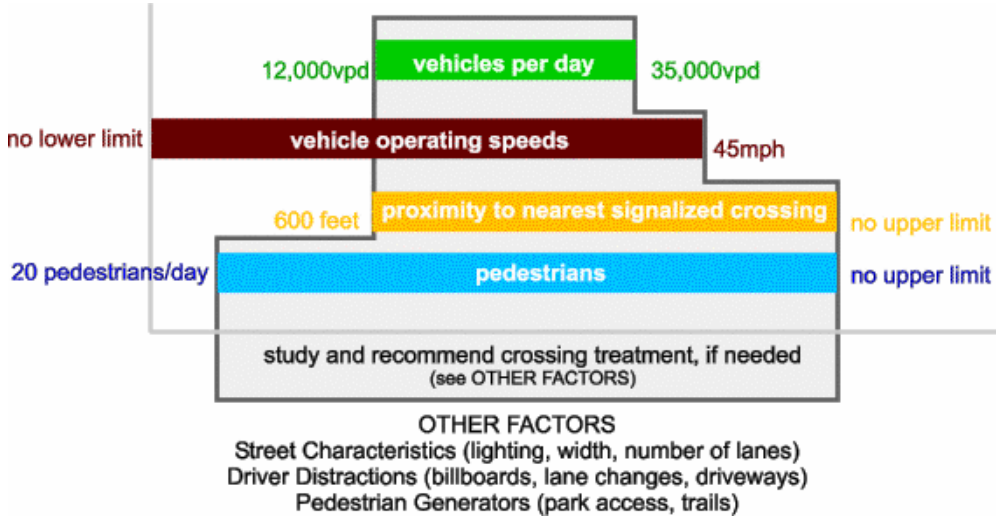


Figure 6-1. Solution space for considering when to apply signalized mid-block pedestrian crossings.

N.C. Pedestrian Crossing Laws

Sections 20-172 through 20-175.2 of the N.C. General Statutes provide important legal considerations when designing and enforcing pedestrian crossing treatments:

- Drivers must yield to pedestrians (or cyclists) crossing a driveway, alley exit, or parking garage exit on a sidewalk. (§20-173)
- Pedestrians crossing any roadway other than at a marked crosswalk must yield to vehicles.
- Pedestrians should cross at street intersections or in marked crosswalks.
- If there are sidewalks, pedestrians are not to walk in the roadway. Where sidewalks are not provided, any pedestrian walking along the roadway will walk to the extreme left, facing in the direction of approaching traffic.
- Every driver must consider pedestrians at all times, especially exercising care in the presence of children or incapacitated persons on the roadway. (§20-174)
- Special emphasis on leaving adequate crossing room at intersections is noted for visually handicapped persons. (§20-175.2)

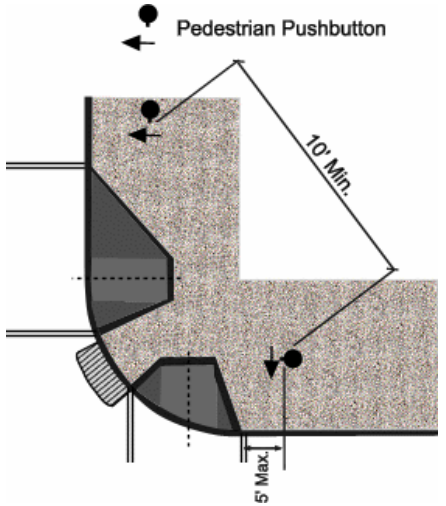
and presence of a high number of pedestrians will also influence the decision to locate a mid-block crossing and the type of treatment needed to help ensure safe pedestrian crossings. The treatments that Charlotte identified are in Table 6-2, along with costs and operating parameters.

Table 6-2. Mid-Block Crossing Treatment Design Criteria (*Charlotte DOT, 2005*).
**Note: MUTCD recommends pedestrian volumes of at least 400 for a four-hour period. **A HAWK (High-Intensity Activated Crosswalk) signal is a pedestrian-activated system used for high-volume crossings found to be useful in increasing the rate of driver responses to pedestrian crossings, especially in Tucson, AZ where they have been utilized extensively.*[6]

Pedestrian Mid-block Crossing Treatment	AADT	Operating Speed	Approx. Cost
Signs	5,000 – 35,000	Less than 45 mph	$250 - 350
High-Visibility Markings	5,000 – 12,000	Less than 35 mph	$500 – 1,500
Colored and Textured Markings	5,000 – 12,000	Less than 35 mph	$5,000+
Curb Extensions	5,000 – 12,000	Less than 35 mph	$5,000 – 25,000
Raised Crosswalks	5,000 – 15,000	Less than 30 mph	$2,000 – 15,000
Refuge Island	12,000 – 30,000	Less than 40 mph	$10,000 – 40,000
Median	15,000 – 35,000	35 - 45 mph	Varies greatly
In-Pavement Illumination	5,000 – 15,000	Less than 35 mph	$40,000
Pedestrian-Only Signal*	15,000 – 35,000	35 – 45 mph	$40,000 – 75,000
HAWK Signal**	15,000 – 35,000	35 – 45 mph	$35,000 – 60,000

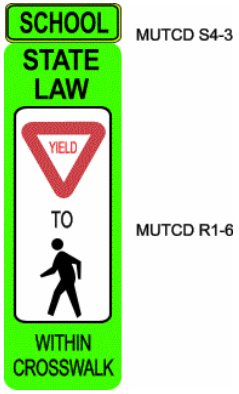
Every mid-block crossing treatment will require a specific investigation by the City of Durham Transportation and Engineering Divisions prior to initiating design and construction. Mid-block treatments can be useful in improving safety in areas with fairly high pedestrian crossings and low numbers of vehicles and vehicle speeds, if located and designed properly.

Pedestrian Crossings and School Zone Treatments



Durham uses national standards to determine crossing treatments, signage, and warrant information, which can be found in the Manual on Uniform Traffic Control Devices (MUTCD). The diagram on this page indicates the appropriate placement and offsets for pedestrian pushbuttons (MUTCD, Figure 4E-2). Two-stage pedestrian crossings of roadways with medians are permitted, and recommended to have a second pedestrian pushbutton in the median, the surface of which should be level or ramped to allow handicapped access through the median. Passive pedestrian detection equipment is becoming more common, and can be recommended in high-volume locations where many pedestrians are crossing a five-lane (or greater) street cross-section. Audible pedestrian signals should be carefully placed to ensure that false readings of the signal are not presented where there is a free-right or "slip" lane, in the presence of complex signal phasing, or other conditions where background noise can interfere with the audible signal.

Section 7 of the MUTCD is entirely devoted to "Traffic Controls for School Areas" and is the dominant guidance available to Durham for installing signs and markings in school zones, and is not repeated here. However, this section provides valuable additional guidance for school crossing treatments that can be utilized for the planning and design of schools that should be considered when making safety improvements. This section, for example, provides a sample School Route Plan Map (Figure 7A-1), which is recommended as a preliminary assessment tool in those areas where there have been numerous complaints and/or pedestrian accidents related to a school. Such a plan would indicate the locations of crossing guards, marked crosswalks, student crossing warning signage (see figure below, right), pedestrian pushbutton activated signals, traffic volumes/speeds, and signal control at all intersections within ¼- to ½-mile of the school. In addition, standards for additional warning signage (see figure below, left) to warn drivers in advance of the upcoming school zone.

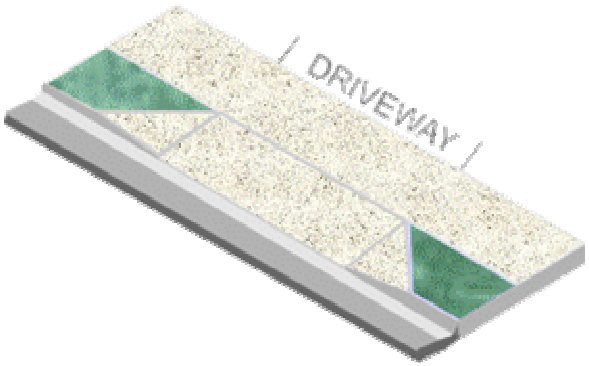


MUTCD S4-3

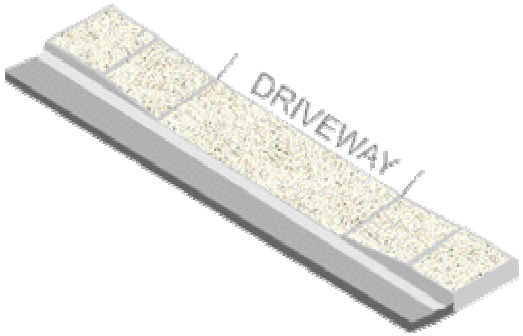
MUTCD R1-6

MUTCD S1-1

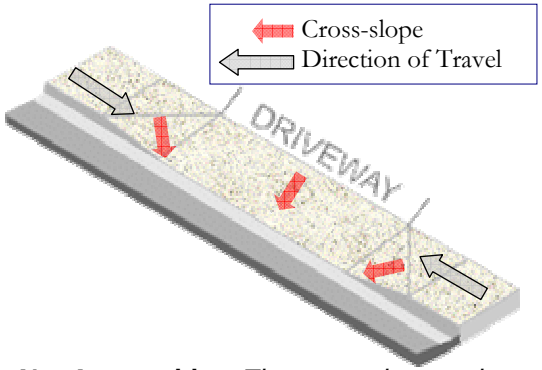
MUTCD W16-9p



Preferred – *The sidewalk is set behind the driveway apron and planting strip.*



Conditionally Acceptable – *The "dip" at the driveway apron allows for safer passage with no cross-slope.*



Not Acceptable – *The cross-slope at the driveway apron provides a difficult challenge for a person using a wheelchair or cane.*

6.4 Special Features

This section of the Durham pedestrian design guidance provides design criteria considerations on a variety of pedestrian treatments, including the following:

- Americans with Disabilities Act (ADA) compliance, including grade, cross-slope at driveways, and design specifications for curb ramps.
- Underpasses for pedestrian trails.
- Traffic calming that works in conjunction with pedestrian mobility.
- Parking area design for pedestrians.
- Mid-block pedestrian signal installations.

Mobility Impaired Design (Americans with Disabilities Act)

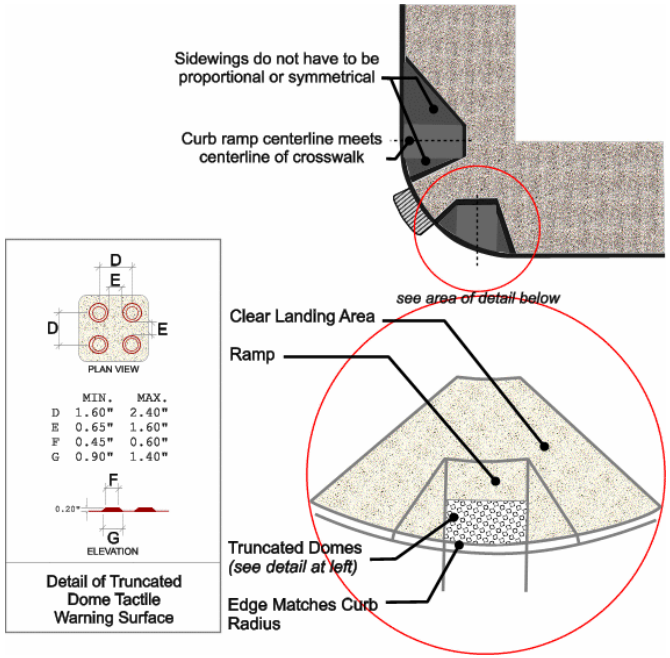
The City of Durham strives to maintain a pedestrian system that is fully accessible to all of its citizens, regardless of individual mobility limitations, and in accordance with the Americans with Disabilities Act of 1990. This is accomplished through design sufficiency as well as recognizing appropriate details that make designs user-friendly. The following is not a comprehensive guide, but offers guidance on a number of critical design details that should be considered when developing portions of the pedestrian system.

ADA: Dealing with Cross-Slope from Driveways

The figures at right indicate the preferred (top), conditionally acceptable (middle), and unacceptable (bottom) design solutions for new driveways as they interface with sidewalks. The intent is to make wheelchair travel safe along the sidewalk without directing the user into traffic through angled (cross) slope designs. Cross-slope on sidewalks should not exceed 2%, preferably not 1.5% where possible.

ADA: Typical Curb Ramp Design

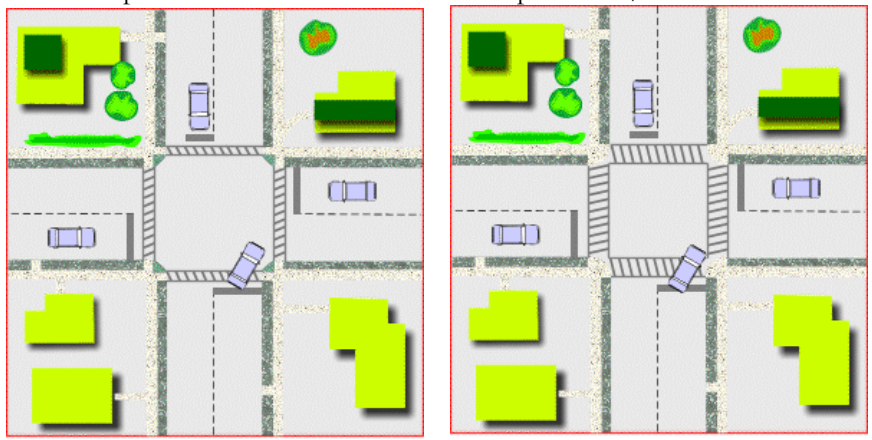
Curb ramps are a significant and required feature of accessible pedestrian transportation systems, and must be designed carefully to fulfill their function and the requirements of the Americans with Disabilities Act. Curb ramps should not have a slope greater than 1:12, meaning that for every foot of travel, the slope should not rise more than one inch. To provide a tactile warning to the visually impaired, raised truncated domes with a color contrast to the background material (typically concrete) should be used, with measurements shown in figure at left.[7]



The *ADA Accessibility Guidelines for Buildings and Facilities* (http://www.access-board.gov/adaag/html/adaag.htm#A4.29.2) has an easy-to-use format for locating specific design criteria related to curb ramps, rise/run restrictions on ramps, and figures illustrating basic concepts.[8]

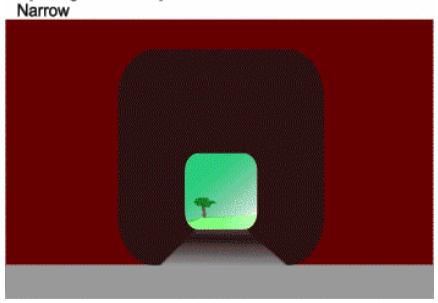
ADA: Placement of Curb Ramps

Curb ramps will be placed entirely within the area of the marked crosswalk, so that a pedestrian can enter the ramp space at an angle perpendicular to the direction of travel. The Durham standard is to have separate curb ramps on each corner; if a shared (sometimes called corner or diagonal) curb ramp is constructed, then the width and radius should accommodate the user so that entry onto the ramp is parallel to the direction of travel. The figures below provide examples of the acceptable relationship between crosswalk and curb ramp location/widths.

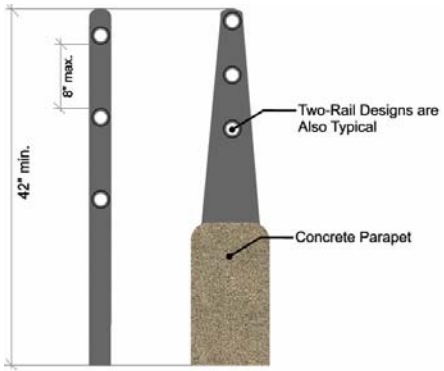


Dual curb ramps (left diagram, preferred) and diagonal ramps. In both cases, the centerline of the pedestrian crosswalk should line up with the curb ramp.

Uninviting Pedestrian Underpass
No Lighting
Openings Should Open Outward
Narrow



Better Pedestrian Underpass
Lighting
Wider Openings/Shorter Traverse



Typical Handrail Specifications On Bridge (Where Sidewalks Exist)

Pedestrian Underpasses

It is often desirable to provide a separated-grade crossing of a major street, sometimes in conjunction with a stream crossing at the same location. Pedestrians are sensitive to uninviting interiors of such crossings, and will not use them if they perceive them to be threatening due to especially long traverses in poorly lit conditions. If the roadway is not elevated, then the openings of the underpass should be flared out to provide clear lines of sight. Minimum widths are 10'-12' for traverses less than 60' in length. Wider widths are suggested for urban areas or longer traverses. Vertical clearances should be a minimum of 8', but 10' is more desirable, particularly if the trail permits equestrian use.

AASHTO provides guidance for lighting in underpasses in their *Roadway Lighting Design Guide*[9]. Providing below-grade crossings must also be dependent on the proximity to floodways: pedestrians should not be put into a situation where they are at risk from rapidly rising flood waters.

Pedestrian Overpasses and Bridges

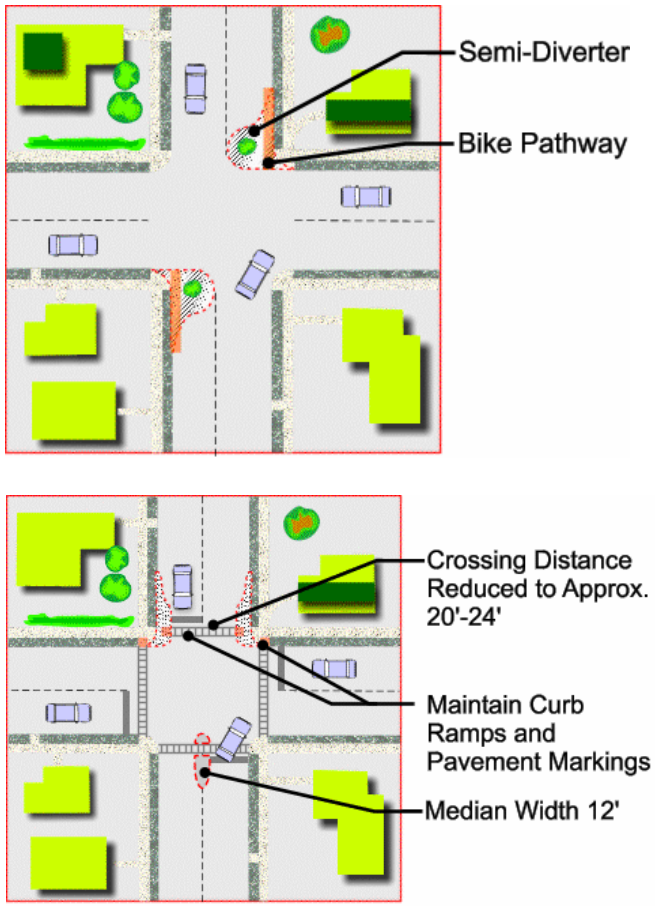
Sidewalks on bridges may be constructed where the approaching roadway has curb-and-gutter. Sidewalk width is a minimum 5'- 6" (see figure, below) and may not necessarily be constructed on both sides of the facility. Minimum handrail height where there are sidewalk present is 42" although safe cycling height is a minimum of 48" to 54" on downhill slopes (see figure this page).

CURB AND GUTTER APPROACH (from: *NCDOT Highway Design Branch Bridge Policy*)

Using Traffic Calming Wisely to Promote Pedestrian Mobility and Safety

The City of Durham has a proactive policy to provide safe, on-street environments for vehicular, pedestrian, and bicycle travel. The City conducts and implements several traffic calming studies each year that analyze and recommend appropriate treatments to slow vehicles and discourage high "cut-through" traffic volumes of cars and trucks. Although a complete treatment of traffic calming principles and guidance is beyond the scope of this document, there are a number of principals that should be emphasized during the evaluation, design, and implementation of traffic calming devices:

- The City's traffic calming policy and program should be clear and strictly adhered to in order to prevent disregard for standard or traffic calming signs, signals, roadway design elements, speed limits, and other features.
- The installation of some traffic calming devices, if inappropriately designed, can impede the safe movement of cyclists, mobility-impaired pedestrians, emergency response vehicles, and some vehicle types such as combination truck-trailers or motorcycles.
- Communities in the area where traffic calming measures are being considered should be consulted and be in near-total agreement on the planning and siting of any traffic calming devices. The shortcomings of the most common and visible traffic calming devices, such as speed humps, street closures, and unwarranted stop controls at intersections (not all of which are used in Durham), need to be carefully documented and considered during the planning and design process. These may include diversion of traffic to other locations, slower emergency vehicle response times, noise level increases, community inconveniences, claims of vehicular damage, disregard of devices in the longer-term, and even speed increases in localized areas.



Sited and designed properly, traffic calming can successfully enhance pedestrian environments. The example at left is a semi-diverter (adapted from FHWA's *Traffic Calming: State of the Practice*, 1999, page 26) that also restricts cycling on the through street if the new semi-diverters (traffic calming devices in these diagrams are always shown in red line work) are put into place to restrict vehicle movements. Other factors such as the presence of on-street parking, traffic and truck volumes, and drainage returns may strongly influence the appropriateness, effectiveness, location and design of traffic calming devices. Table 6-3 on the following page illustrates the effects of various traffic calming techniques on different user groups.[10,11]

Table 6-3. Traffic Calming Treatments and Potential for Poor Design to Influence Different Groups.

Device/Treatment	Description	B	P	MI	VI
Curb extensions "pinch points"	Curb extensions, planters, or centerline traffic islands that narrow traffic lanes to control traffic and reduce pedestrian crossing distances. Also called "chokers."	●	·	•	•
Speed tables, raised crosswalks	Ramped surface above roadway, 2 – 3 inches high, 10 – 20 feet long.	•		•	·
Mini-circles	Small traffic circles at intersections.	·	·	·	·
Median island	Raised island in the road center (median) narrows lanes and provides pedestrian with a safe place to stop.			•	·
Channelization islands	A raised island that forces traffic in a particular direction, such as right-turn-only.	·	•	•	•
Tighter corner radii	The radius of street corners affects traffic turning speeds. A tighter radius forces drivers to reduce speed. It is particularly helpful for intersections with numerous pedestrians.	·			
Speed humps	Curved, 2 – 3 inches high, 10 – 20 feet long hump.	•		·	
Rumble Strips	Low bumps across road that make noise when driven over.	•			·
Chicanes	Curb bulges or planters (usually 3) on alternating sides, forcing motorists to slow down.	●			
Roundabouts	Medium to large circles at intersections (Kittelson, 2000).	·	●	•	•
Pavement treatments	Special pavement textures (textured concrete or asphalt) and markings to designate special areas.	•		•	•
Bike lanes	Marking bike lanes narrows traffic lanes.	·			
"Road diets"	Reducing the number and width of traffic lanes, particularly on arterials.	•			
Horizontal shifts	Lane centerline that curves or shifts.	•			·
2-lanes narrow to 1-lane	Curb bulge or center island narrows two-lane road down to one lane, forcing traffic for each direction to take turns.	·			
Semi-diverters, partial closures	Restrict entry/exit to/from neighborhood. Limit traffic flow at intersections.	·			
Street closures	Closing off streets to through vehicle traffic at intersections or mid-block	·			
Stop signs	Additional stop signs, such as 4-way-stop intersections.	·	·	·	·
"Neotraditional" street design	Streets with narrower lanes, shorter blocks, T-intersections, and other design features to control traffic speed and volumes.	·		·	
Perceptual Design Features	Patterns painted or stamped into road surfaces and other perceptual design features that encourage drivers to reduce their speeds.				•
Street Trees	Planting trees along a street to create a sense of enclosure and improve the pedestrian environment.			·	
Woonerf	Streets with mixed vehicle and pedestrian traffic, where motorists are required to drive at very low speeds.	·	•	•	·
Speed Reductions	Traffic speed reduction programs. Increased enforcement of speeding violations.				

B=Cyclist; **P**=Pedestrian; **MI**=Mobility Impaired Person; **VI**=Visually Impaired Person

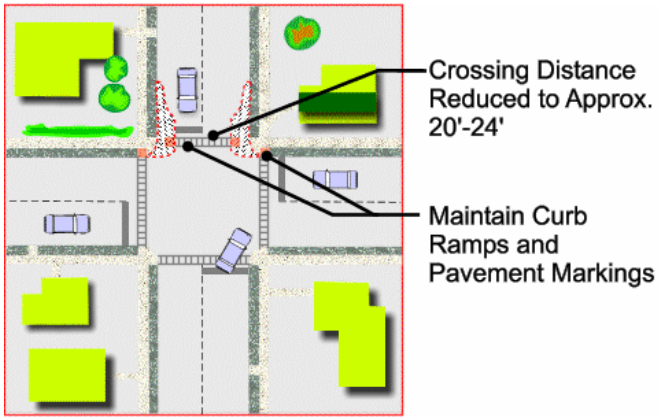
Traffic Calming Devices and Impacts to Different Design Groups

If poorly designed and/or located, traffic calming measures can have the opposite of the intended effects on the walking environment and potentially the safety of pedestrians.

Key to Symbols in Table:

No Impact to Pedestrians
· Light Potential Impact
• Moderate Potential Impact
● Serious Potential Impact

Curb Extensions (Bulb-Outs) and Curb Radii

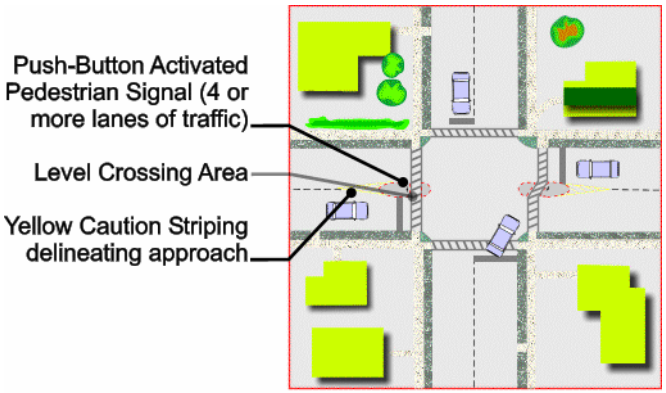


The primary purpose of bulb-outs is to shorten the distance that pedestrians must travel to cross a street. In addition, they may encourage motorists to drive slower by narrowing the travel lane and reducing vehicular speeds during turning movements at intersections. Motorists will travel more slowly around corners with smaller curb radii even without the use of curb extensions. Table 6-4 illustrates the relationship between posted speeds and the curb (often called "corner") radius[12]. Landscaping and other aesthetic treatments such as special paving textures should be carefully designed to avoid hazards to drivers and visually-impaired citizens, as well as meet the City's expectations of controlling long-term roadway maintenance costs.

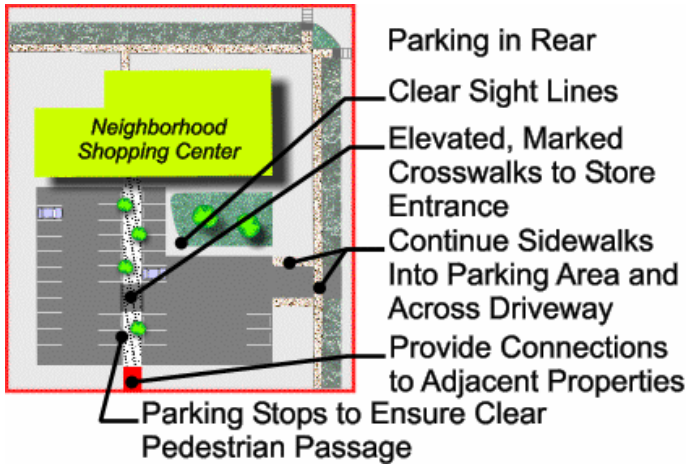
Table 6-4. Maximum Desired Speed and Curb Radii.

Posted Speed Limit (mph)	Minimum Curb Radius (feet)
Residential Street, 10	10
Residential Street, 15-20	20
Residential Street, 25-30	20-25
Collector Street, 30	30

Medians and Refuge Islands



The graphic at left indicates the design and markings associated with refuge islands. Note that pavement markings delineate the approach to the islands; that the islands are "split" to allow for a level platform for wheelchair use; and that in cases where there are wide roads and high traffic volumes, a push-button pedestrian signal may be mounted in the refuge area to allow pedestrian to split their trip into two halves as they cross the street. Note that the crosswalk on the right side of the diagram is configured at a skewed angle as it crosses the median. This allows pedestrians to have a better angle of sight as they approach and cross each side of the street. In all cases, a minimum 10-foot travel lane is maintained. Sensitivity to large vehicles (buses, trucks and fire equipment) dictates some elements of the median design, curb style, and placement. Median-controlled roadways reduce the number of turning conflicts and are generally preferred for both pedestrians and cyclists over a two-way, left-turn lane (TWLTL) roadway.



Parking Facilities

Everyone becomes a pedestrian once they park their car, but there are many examples of poor parking lot design. The most common design issue is that the primary carriageway for vehicles in the parking lot happens to coincide with where the greatest number of pedestrians is crossing, directly in front of the main entrance. Other issues include poor sight lines to spot pedestrians, bad transition areas from the public domain (e.g., streets) to the private parking area, and inconvenient pedestrian access between parking areas, shops, and adjacent communities. A preferred set of suggestions to overcome these common problems is indicated in the diagram at left. Obviously, as the numbers of cars and pedestrians potentially coming into conflict increases, the more important becomes the issue of treating pedestrian movements carefully. Some suggested treatments:

1. Provide continuous transitions from the street into a safe "landing" area in the parking lot; don't simply "dump" pedestrians into the throat of a driveway.
2. Maintain good sight lines at major turning points inside the parking area.
3. Whenever possible, provide perpendicular pedestrian access into the front of a high volume land use such as major retail uses. The final crossing to the store entrance(s) should be well-marked, preferably with a raised crosswalk and/or colored demarcations to provide good visual cues to the driver. Moving the main parking aisle away from the principal entrance is another option.
4. Adequate lighting is often perceived as a personal security issue in many large parking areas, and should be provided while avoiding disability glare (looking into a direct light source and being partially blinded) or causing light pollution to adjoining properties. The following table is the recommended horizontal illumination requirements for high-, medium-, and low-level land uses, and should be considered a basic guide based on a majority of lighting policies reviewed.

Intensity of Pedestrian-Oriented Land Use	Average Luminosity (foot-candles)	Minimum Luminosity (foot-candes)
High *Civic Centers, Regional Shopping, Fast Food*	3.6	0.9
Medium *Community Shopping, Office Parks, Hospitals, Apartment Complexes*	2.4	0.6
Low *Neighborhood Shopping, Churches, Industrial Employee Parking*	0.8	0.2

Construction Zones: Providing Adequate Temporary Pedestrian Access

The construction or expansion of roadways, utilities, or private development sometimes requires that sidewalks or trails be temporarily closed to allow for the movement of construction vehicles on and around the site. When pedestrian facilities are closed temporarily, the entity responsible for the construction is also responsible for providing adequate access through or around the site as well as signage that provides advance warning to pedestrians and motorists of the closure. Both the MUTCD (Manual on Uniform Traffic Control Devices)[13], NCDOT Draft Planning and Designing Local Pedestrian Facilities[14], and the ADA (Americans with Disabilities Act)[15] stipulate that safe passage should be maintained throughout a temporary closure unless it occurs during an extreme situation such as a natural or man-made emergency. During private construction within City limits, it is the responsibility of the City of Durham to ensure compliance with these rules by regular (recommended: daily in high pedestrian areas) monitoring and by the posting of a call-in telephone number to be placed on-site to report potential problems or non-compliance.

The following must be considered by the City, State, or private/public construction agents whenever a sidewalk or trail will be closed temporarily:

- *Accessibility for Mobility Impaired Citizens.* At least one accessible route should be provided to transportation or transit facilities; accessible parking areas/spaces; public streets/sidewalks; and public parking areas to an accessible entrance of the building. This route(s) will comply with all other accessibility provisions contained in the ADA regardless of whether they are temporary or permanent. A barrier shall be placed across the full width of the sidewalk or trail to be detectable by a visually impaired person using a cane. An audible information device may be needed in cases where there are especially high traffic volumes challenging a visually impaired person making a street crossing.
- *Temporary Obstructions.* Parked construction equipment, erosion control fencing, storage of materials/construction debris, and other potential obstructions should be kept away from roadside pedestrian access and pedestrian or multi-use trails so as to keep a permanent passageway open for pedestrians crossing the site. Signs and other devices should not protrude more than 4" into the pedestrian passageway and 7' or less above a sidewalk (8' min. preferred).
- *Advance Warning and Signage.* Advance warning may consist of a single sign to a flashing strobe, depending on the nature of the construction or context (such as vehicular volumes) of the work area. Advance signage should be placed so that pedestrians have an opportunity to read the sign

Poor site access and crossing conditions. *Photo from The Louis Berger Group, Inc. (Cary, NC)*

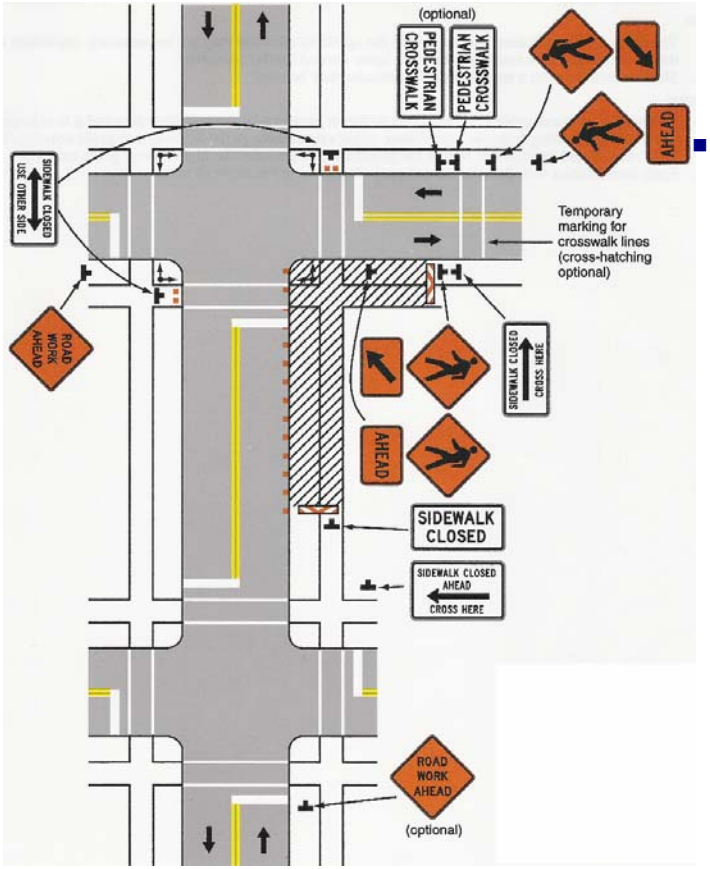


Figure 6-2. Adapted from Sample Signage Plan for Temporary Pedestrian Crossing Closure (MUTCD, Figure 6H-29).

and make a safe crossing at a street intersection to the opposite side of the roadway. (See also Figure 6-2 for additional guidance on signage and placement.) Smaller, mid-block closures will require fewer treatments, but will still retain the "Sidewalk Closed Ahead Cross Street" advance warning at an appropriate and safe crossing point in advance of the closure, at a minimum.

Route Design. Temporary traffic barriers like jersey barriers (although not intermittent short sections) and breakaway bollards should be considered as tools to help delineate a buffer from moving vehicles in areas with high pedestrian traffic volumes and/or to help ensure worker safety. Routes should be smooth and level and maintain the 60" standard width where possible; if not possible, then passing zones measuring a minimum of 60" x 60" will be provided every 200 linear feet. Rumble strips and other warning devices may be considered with professional engineering judgment.

Endnotes

[1] NCDOT, "Planning and Designing Local Pedestrian Facilities (Draft)." North Carolina Department of Transportation Office of Bicycle and Pedestrian Transportation, February, 1997.

[2] AASHTO, "Guide for the Planning, Design, and Operation of Pedestrian Facilities." American Association of State Highway and Transportation Officials, July, 2004.

[3] FHWA, "Pedestrian Facilities Users Guide-Providing Safety and Mobility." Federal Highway Administration, USDOT, Publication No. FHWA-RD-01-102, March, 2002.

[4] Durham City-County Planning Department, Trails and Greenways Master Plan, September, 2001. (www.ci.durham.nc.us/departments/ planning/pdf/plan_greenway.pdf)

[5] Charles Zegeer, et al, "Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations: Executive Summary and Recommended Guidelines." (FHWA-RD-01-075) Federal Highway Administration, February, 2002.

[6] James W. Glock, Letter Correspondence to Regina McElroy, Director, FHWA Office of Transportation Operations, January 11, 2006.

[7] Vanguard Company, accessed November, 2005 (http://www.vanguardonline.com/downloads.asp)

[8] United States Access Board, ADA Accessibility Guidelines Homepage, accessed November, 2005. (http://www.access-board.gov/adaag/html/adaag.htm#A4.29.2)

[9] AASHTO, "Roadway Lighting Design Guide." American Association of State Highway Officials, 2005.

[10] Victoria Transportation Policy Institute, "TDM Encyclopedia" Figure 1 Traffic Calming Strategies and Devices, and The Louis Berger Group, Inc. (http://www.vtpi.org/tdm/tdm4.htm)

[11] Walkable Communities, Inc. (http://www.walkable.org/index.htm). Note: This site contains a large number of photographic representations of various applications of traffic calming treatments.

[12] City of Durham Public Works "Reference Guide for Development," Table of Minimum Design Requirements for Public and Private Residential Streets. Rev. October, 2003. Page 154. (http://www.ci.durham.nc.us/departments/works/handbook/reference_guide.pdf)

[13] *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2003 Edition. Federal Highway Administration, 2003. Especially Sections 6B-1, 6D, 7, and Figures 6H-28, 6H-29, 7A-1, and 7B-4.

[14] *Planning and Designing Local Pedestrian Facilities*, North Carolina Department of Transportation Office of Bicycle and Pedestrian Transportation. February, 1997, Chapter 10.

[15] Americans with Disabilities Act, US Code 28 CFR Part 36: ADA Standards for Accessible Design. Page 496 (www.usdoj.gov/crt/ada/adastd94.pdf).

THIS PAGE LEFT INTENTIONALLY BLANK.

Covered in Section 7…

Recommended policies and programs developed during the Pedestrian Plan Update process through focus groups and national research.

7.0 Program and Policy Recommendations

Achieving the goal of creating a coordinated and safe walking environment cannot be obtained without informing and enforcing pedestrian activities. The "Three E's" of pedestrian activity – Education, Enforcement, and Encouragement – are important supports to capital improvements. A number of support activities were considered during the *DurhamWalks!* planning process. The descriptions in this section are of those programs that were selected for implementation and refined through the use of Focus Groups, made up of transit, elderly, and enforcement community representatives. The section also presents a schools initiative, Schools Strides, based on the Safe Routes to School model. In addition to working with the Focus Groups, consultants for the *DurhamWalks!* Pedestrian Plan reviewed nine other exemplary pedestrian plans from all over the country. Each exemplary plan was assessed based on a number of characteristics, including graphics, format, education, financing, implementation and public involvement. The *DurhamWalks!* Pedestrian Plan borrows many "state-of-the-art" program ideas from these other plans.

During the course of the development of the *DurhamWalks!* Pedestrian Plan, an emphasis was maintained on realizing the importance of educating people about safe walking habits, enforcing laws for both pedestrian and driver, and encouraging walking as a "transparent" alternative – in other words, making the option to walk an obvious one. Staff met with transit, law enforcement and senior representatives in order to focus explicitly on these issues. A number of viable programs were considered and the top selections are developed in the following sections. Key policy recommendations are provided in Section 7.2. The implementation and phasing of all programs and policy changes in this section is based on a tentative five-year schedule, gauged on existing and anticipated revenues.

Walk to Work Promotion: *International Car-Free Day, September 2004*

7.1 Programs to Educate, Enforce, and Encourage Pedestrians

A number of programs were discussed during the development of the DurhamWalks! Pedestrian Plan. The following is a partial list of those considered:

Walk-to-Work Day	Encouragement – *These programs will get people to look more closely at walking as an option, not only for work, but shopping, school, etc. Asheville's annual "Strive Not to Drive" program promotes transit, walk and bike modes, one day for each throughout the course of a single week. The San Antonio MPO launched a "Walk and Roll" challenge that allows people to log their off-mode miles using an on-line pledge form (www.walkandrollchallenge.com/).*
Safe Routes to School	Encouragement and Safety – *This category of program is similar to a Walk-to-Work program, but targeting the school system, children, and parents. A Safe Routes to School program is an on-going school-wide effort to encourage walking or bicycling to school by instituting education and outreach programs and also designing a more pedestrian and bicycle friendly environment around schools. Safe Routes to School is often paired with other activities, like walk to school days.*
School-Based Safety and Education Assembly	Safety and Education – *Different variations of this program exist to provide a walkability audit of public schools; instructional modules in classrooms; and flyers targeted at parents. Generally a briefer, more focused effort than the other school-based programs listed here.*
Walk-to-School Day	Safety and Encouragement – *This program encourages parents and children to walk to school. It is structured so that parents and children walk to school together, giving the parents an opportunity to discuss potentially unsafe situations with their children.*
School Crossing Guard Training Program	Safety and Education –*Volunteer adults are trained as School crossing guards. During the training, they learn about the proper way to handle specific situations.*
Walkable Communities Workshop	Encouragement – *Workshops are conducted by the City to engage staff, residents, and businesses in a discussion of specific improvements to corridors or neighborhoods that will make their communities and neighborhoods more pedestrian friendly.*
Senior Safety Program	Safety – *This would "piggy-back" on the existing "Remember When" Durham program for seniors. The new program would include information about crossing precautions and pedestrian safety.*
Red Flag Crossing Program	Safety – *Used in Chapel Hill and other communities, the Red Flag program consists simply of installing bins with red flags at selected intersections. Pedestrians then carry a flag with them as they cross the street to increase driver awareness of their presence.*
Walkability Training	Education – *Pairs of city employees (e.g., police, public works, parks/rec) go out into neighborhoods where one is required to use a wheelchair for the duration of the trip. This provides an important perspective for those enforcing pedestrian safety laws, constructing facilities, and planning.*
Sting Enforcement	Enforcement – *A rotating program targeting intersections or crossings for intense enforcement of speeding and stop signs for one or more days.*
Passive Enforcement	Enforcement – *Consists of (1) educational flyers passed out to those persons caught jaywalking or disobeying traffic laws; or (2) a citizen-created list of driver's licenses of those engaging in unsafe behavior, which are then linked to the addresses of the drivers. Drivers are then sent a warning with information on their observed infraction and awareness material. Tried in Miami Beach, Florida with positive effect, and may be done cooperatively with the existing Citizen Observer program in Durham.*
Spot Improvement Program	Safety and Encouragement – *This is a capital improvement program item that targets short, missing segments of sidewalk; pedestrian crossing aids; signage; and other low-cost improvements costing less than a fixed amount. Maximum return of limited dollars is the goal of the program.*

The programs detailed below have been selected for immediate implementation. These activities were selected from the list of recommendations as priorities, and ease of implementation will be based upon resource/staffing requirements, organizational structure, effectiveness, and availability of other resources (e.g., the School Crossing Guard Program is already provided by NCDOT). Below is a select list of programs to implement immediately; other resources can also be found at NCDOT's website, specifically: www.ncdot.org/transit/bicycle/safety/safety_programs.html.

Posters from *DurhamWalks!* outreach on display at City Hall.

Education: School Strides. The School Strides Program is based on the Safe Routes to School Program, a federally-funded program that provides money to state governments which in turn select candidate programs for funding. Eligible funding activities include capital (e.g., sidewalks, bicycle parking) and non-capital (e.g., program) items. This section of the *DurhamWalks!* Pedestrian Plan encapsulates the recommended School Strides program for Durham.

Prior Actions. The City of Durham worked with Durham Public Schools and NCDOT in April 2005 to host a Safe Routes to School training course at Fayetteville Street Elementary School. An "Action Plan" was created for Fayetteville Elementary, which included many recommendations that could apply to all local elementary and middle schools. Many of the recommended actions listed below resulted from the community input from the April 2005 Safe Routes to School course. In addition to the 2005 Safe Routes to School training course, many local schools have participated in International Walk to School Day and other related activities. In 2004, the Durham Fitness & Nutrition Council, Durham Public Schools, Durham SAFEKIDS Coalition, and the Durham Healthy Kids Healthy Communities Program sponsored a Walk to School Day at several local elementary schools. Southwest and Fayetteville Street Elementary Schools also participated in a Walk to School Day program in 2004 and 2005. Many other Durham schools have taken advantage of similar program opportunities in the past, demonstrating a strong interest throughout the community for increased "walkability" to and around schools, as well as better options for physical activity for Durham's youth.

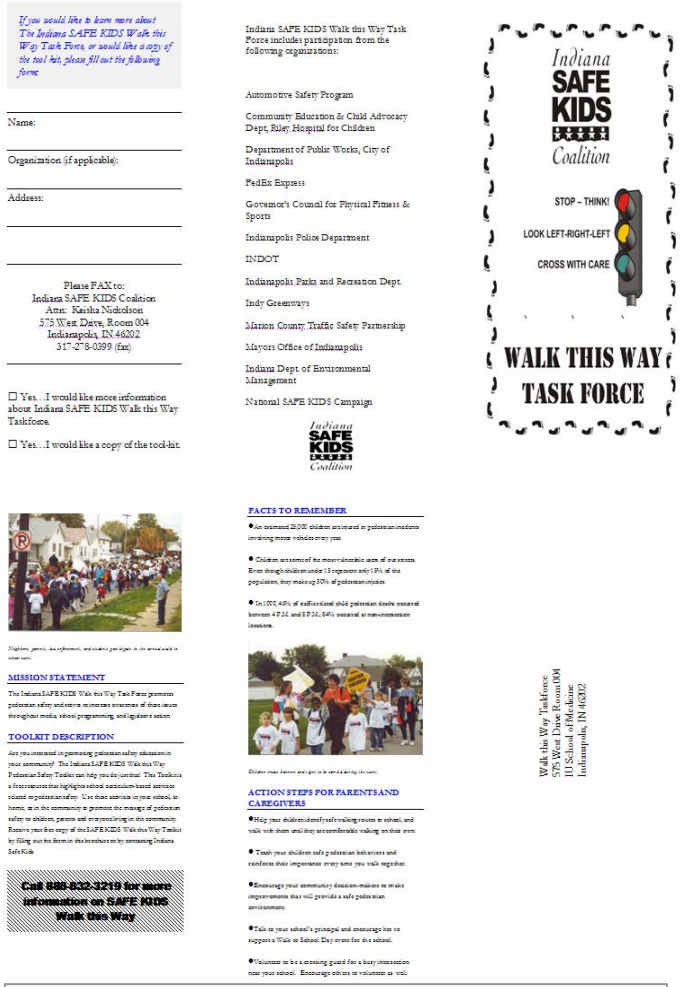
As part of the *DurhamWalks!* Pedestrian Plan outreach, twelve local elementary schools participated in a walkability program through their respective art departments. Each participating school received disposable cameras, a map of the school site, and instructions on how to complete a walking audit of their school's surroundings. Students gave insights into the positive and negative features of their school's walking environment, and the maps, pictures, and surveys that were returned told a tremendous story of the conditions at each school and the problems the children saw around them: broken sidewalk sections, litter, speeding traffic, and other issues. All of the results were displayed

for several weeks on posters in Durham City Hall. Some of the recommendations below are generated from this program.

Recommended Actions. The Durham Public School System is supportive of its students who would like to walk or ride their bicycles to school. This support provides an opportunity for schools to develop ongoing programs to educate their students on safe walking habits. The following recommendations are suggested to build the School Strides Program in Durham, taking advantage of local and state funding sources:

- *Create a "Walk Across North Carolina" program* throughout the school system, where children participate in a reward program based on physical activity, particularly walking to and from school or at school.
- *Create individual school-based "Frequent Walker" program*s where kids who walk to school can earn stamps that can be redeemed for prizes, or let classes compete against each other to earn a pizza party.
- Establish a funding program to install trail connections, sidewalks, and bicycle parking racks at local schools. Emphasis is placed on pedestrian facility construction within ¼-mile radius of all elementary and middle schools.
- Train personnel at the Durham Police Department and Durham Public Schools in one-day NCDOT School Crossing Guard Training Course, and ensure that school crossing guards are trained regularly throughout the City.
- Create a week-long, interdisciplinary education and enrichment program (possibly during "Leave Your Car at Home" week), using the following elements:
  - Hold a local Street Art contest on sidewalks in and around the school using sidewalk chalk to improve aesthetics and walking environment.
  - Promote a Walk-to-School Day for Durham area public schools.
  - Incorporate a Walking School Bus exercise throughout the Durham school system for elementary schools (K-5).
  - Create a health-based class lecture and accompanying materials on the benefits of walking, including air quality, physical health, fuel cost savings, appreciation of outdoors, and mental well-being.
  - Initiate a campus clean-up day where parents come to school and help edge sidewalks, trim/prune bushes and trees, and pick up litter.

Walk to School Day. *Durham has participated in many school-based education activities over the years.*



If you would like to learn more about The Indiana SAFE KIDS Walk this Way Task Force, or would like a copy of the tool kit, please fill out the following form:

Name:

Organization (if applicable):

Address:

Please FAX to:
Indiana SAFE KIDS Coalition
Attn: Keisha Nickolson
572 West Davis, Room 004
Indianapolis, IN 46202
317-278-0399 (fax)

☐ Yes…I would like more information about Indiana SAFE KIDS Walk this Way Taskforce.

☐ Yes…I would like a copy of the tool-kit.

Neighbors, parents, law enforcement, and students participate in the annual walk to school event.

MISSION STATEMENT

The Indiana SAFE KIDS Walk this Way Task Force promotes pedestrian safety and raises awareness of these issues throughout media, school programming, and legislative action.

TOOLKIT DESCRIPTION

Are you interested in promoting pedestrian safety education in your community? The Indiana SAFE KIDS Walk this Way Pedestrian Safety Toolkit can help you do just that! This Toolkit is a free resource that highlights school curriculum-based activities related to pedestrian safety. Use these activities in your school, at home, or in the community to promote the messages of pedestrian safety to children, parents and everyone living in the community. Receive your free copy of the SAFE KIDS Walk this Way Toolkit by filling out the form in this brochure or by contacting Indiana Safe Kids.

Call 888-822-3219 for more information on SAFE KIDS Walk this Way

Indiana SAFE KIDS Walk this Way Task Force includes participation from the following organizations:

Automotive Safety Program

Community Education & Child Advocacy Dept, Riley Hospital for Children

Department of Public Works, City of Indianapolis

FedEx Express

Governor's Council for Physical Fitness & Sports

Indianapolis Police Department

INDOT

Indianapolis Parks and Recreation Dept.

Indy Greenways

Marion County Traffic Safety Partnership

Mayors Office of Indianapolis

Indiana Dept. of Environmental Management

National SAFE KIDS Campaign

Indiana SAFE KIDS Coalition

STOP – THINK!
LOOK LEFT-RIGHT-LEFT
CROSS WITH CARE

WALK THIS WAY TASK FORCE

FACTS TO REMEMBER

- An estimated 20,000 children are injured in pedestrian incidents involving motor vehicles every year.
- Children are some of the most vulnerable users of our streets. Even though children under 15 represent only 18% of the population, they make up 30% of pedestrian injuries.
- In 1999, 44% of traffic-related child pedestrian deaths occurred between 4 P.M. and 8 P.M., 84% occurred at non-intersection locations.

Children create banners and signs to be carried during the walk.

ACTION STEPS FOR PARENTS AND CAREGIVERS

- Help your children identify safe walking routes to school, and walk with them until they are comfortable walking on their own.
- Teach your children safe pedestrian behaviors and reinforce their importance every time you walk together.
- Encourage your community decision-makers to make improvements that will provide a safe pedestrian environment.
- Talk to your school's principal and encourage her to support a Walk to School Day event for the school.
- Volunteer to be a crossing guard for a busy intersection near your school. Encourage others to volunteer as well.

Walk this Way Taskforce
572 West Davis, Room 004
IUSchool of Medicine
Indianapolis, IN 46202

Indiana State Kids Coalition Pedestrian Safety Brochure *(Top: Outside)*

Implementation. The City's Bicycle and Pedestrian Coordinator staffs a standing Bicycle and Pedestrian Advisory Commission that could help with the development of this program as one of their annual tasks. The Commission could designate members to a special Task Force in order to coordinate with the Durham Public School System, and perhaps launch a pilot program in a willing school. The Task Force should also include representative from the health community, which is eager to encourage more physical activity in children.

Education: Durham-Focused Pedestrian Safety Brochure. This recommendation is to have a simple, easily reproducible brochure that is focused on Durham's pedestrian and traffic issues. The brochure should contain graphics and text that make it easy to understand for a broad audience, and outline what Durham is doing to promote pedestrian safety; who to contact for specific issues; and how to access the *DurhamWalks!* Pedestrian Plan. The brochures should go to schools, health care facilities, senior centers, college campuses, and transit companies.

Enforcement: Create a Pedestrian Awareness Task Force. Durham's engineering staff and police officers are charged with many responsibilities for keeping Durham's citizens safe, as well as participating in various community-based programs like the local Partners Against Crime organizations. The creation of the Pedestrian Awareness Task Force would offer the opportunity for police officers, transportation staff, and engineering staff to identify and treat pedestrian problem zones in the City of Durham. In addition, officers and engineers are not often directly confronted with the special needs of visually and mobility impaired persons; this program would allow them that exposure.

Prior Actions. Transportation staff has met with Durham police and engineering staff routinely during the development of the pedestrian plan. Over the course of these meetings, it has become apparent that there could be improved contact between the various partners, in order to address existing pedestrian problem areas and to prevent new ones from arising. Accidents and complaints, while they are being addressed, are often received in one department but not coordinated with other, external staff in another department or division of the City. Complaints are not cataloged in a consistent manner.

Recommended Actions. The principal action to be taken is to have representatives of the police, engineering, and transportation staff meet quarterly to discuss recent accidents, fatalities, and complaints; and recommend courses of action to be taken. Specifically, each meeting should have the following data available for review:

- Compile a list of complaints from the previous three months about pedestrian behavior, driver behavior towards pedestrians, and the pedestrian environment (e.g., "Signal timing is too short to cross the street") to share with the other representatives present. The source of complaints should be from transportation, engineering, and police, and compiled using a consistent form: name (if available), date received, location, and complaint or issue.
- A list and a map of all reported pedestrian crashes that have occurred in the past three months, as well as the last three years. This data can be obtained from the Durham Police Department or NCDOT Department of Motor Vehicles. This list should reside in the Durham Transportation Division with the Bicycle and Pedestrian Coordinator.
- At every other meeting (twice per year), the Task Force representatives should organize a field visit to assess one or more problem locations, and be accompanied by a visually or mobility impaired person (and/or simulation aides) to learn more about the problem intersection or street segment. These field visits should target "problem" areas that repeatedly have complaints and crash histories.
- The result of each meeting should be that (1) officers and city staff arrive at a better understanding of the pedestrian problems in their communities and how to avoid them in new construction; (2) persistent problem locations are dealt with holistically; and (3) emerging problem locations can be addressed earlier. A range of treatments, from "sting" enforcement operations to crossing treatments to signage/markings should be available to address each problem location.

Implementation. The three City divisions/departments represented – Engineering, Transportation, and Police – will need to designate consistent representatives to be a part of the quarterly meetings. The Police Department will have an enlarged role, first by recording and cataloging complaints received about pedestrian violations, and second by developing a list of pedestrian-related accidents that have occurred over the past three months and three years. The Transportation and Engineering staff can assist with mapping these locations. The Mayor's Committee for Person's with Disabilities should be a key participant in every other meeting to ensure that the perspective of mobility and visually impaired people is brought to the attention of the Task Force. *It is important that the representatives attending these quarterly meetings have the authority to undertake action from their respective departments.*

7.2 Policy Recommendations

A number of policy changes are highlighted in Section 3.0 along with the plans and policy documents where the changes are recommended to be made. A summary of major recommendations for policy changes are identified in the bullets below, along with additional recommendations to existing City policies not covered in earlier sections.

Pedestrians and Transit. Making the connection between pedestrians and transit use is a critical endeavor: without safe and consistent pedestrian access to transit stops, transit users often find themselves walking through muddy ground or in busy streets. Both existing and future transit provisions are important to consider, since many future transit provisions are provided on a piecemeal basis as new private development accesses adjoining street and pedestrian systems.

Expand the marketing budget of DATA (Durham Area Transit Authority) to allow an expansion of an existing outreach program targeted towards children and senior centers. Currently, DATA will provide an overview of the Durham transit system upon request of individual schools. The recommendation here is to expand this program to senior centers and college students, and to more aggressively market the program to these groups.

Provide cursory review opportunities for any new/proposed development (or an expansion worth 50% of the value of the existing property) that is located adjacent to any existing or proposed transit service line (DATA or TTA). Currently, review opportunities are provided for most such developments if they are located near a proposed TTA rail station, and other Durham staff also handles some reviews for DATA staff.

Modify the current "checklist" of items that should be reviewed for each new/proposed development or expansion of 50% of the value of an existing property that cover pedestrian, cycling, and transit provisions. Internal sidewalks, transit connections to the property, mobility-handicapped provisions, and street furniture should adhere to existing minimum standards. (See Table 7-1 for a comprehensive pedestrian-transit checklist.)

Promote pedestrian-oriented transit development, especially near future TTA rail transit stations. Additional discussion of development near regional rail stations can be found in "Station Area Development Guidelines for the Regional Transit Stations" (December 1997).

Table 7-1. Pedestrian-Transit Connectivity Checklist[1]

Landscaping and Amenities

- ☐ Shelters should be well-lit and constructed of materials that do not obstruct views out of or into the shelter.
- ☐ Provide a minimum four-foot wide clearance zone from the curb so that opening bus doors are not blocked by street furnishings, sign posts, landscaping, or other obstructions.
- ☐ Sidewalks should be provided within designated bus zones with a landing area for wheelchair access to transit services.
- ☐ Provide open sight lines and avoid placing shelters, furnishings, and vegetation that may obstruct driver and waiting passenger views.
- ☐ When there is a planting strip adjacent to the curb, provide a sidewalk slab that extends from the existing sidewalk to the curb so that passengers do not have to cross wet grass or mud during inclement weather.

Traffic and Stop Design Considerations

- ☐ Bus pullout locations are often warranted where there are heavy traffic conditions. When pullouts are to be located near intersections, a far-side location is preferred. The needs of the passengers boarding and exiting the bus should not conflict with the needs of pedestrians and bicyclists moving through the area. Curb bulbouts at the nearby intersection help pedestrian crossing movements, prevent motorists from entering the bus pullout area, and reduce conflicts with bicyclists traveling through. Pullouts should be designed to meet roadway conditions and bus characteristics. Configurations of pullouts should allow buses to pull up directly adjacent to the curb.
- ☐ Curb heights should never be higher than the height of the bus step to prevent falls during passenger boarding and departing. Older buses tend to have a bottom step that is 14 to 18 inches above the roadway. Newer buses can have bottom steps as low as 11 inches above the roadway.
- ☐ On streets with parallel parking, near-side bus stops can benefit from elongated curb extensions that provide passengers adequate area to board or exit the bus without having to step into the street or the stream of pedestrian travel on the adjacent sidewalk.
- ☐ Transit riders need to be able to cross the road safely at transit stops. On a typical two-way street, with residences and development on both sides, half the riders will need to cross the road when boarding or exiting the bus. Mid-block crossing facilities should be provided at mid-block bus stop locations.

Bus Stop Location and Placement

- ☐ Provide nine feet of clearance from the curb for wheelchair lift operation; four feet for the lift to extend and 5 feet for the wheelchair to maneuver beyond the lift. The ADA requires a minimum width of three feet for accessible paths of travel but generally, path widths adjacent to transit should be wider to accommodate groups of pedestrians as well as wheelchair users. Six-foot minimum sidewalk width is suggested for paths next to transit. In high-use urban areas, 10 feet minimum is recommended. Design bus stops to accommodate wheelchair lifts. Only as a last resort should a zone or stop be inaccessible.
- ☐ Bus stop design should avoid conflicts with other types of uses. For example, bus stops should not interrupt bike lanes, and waiting areas and shelters should be provided to the side of the walkway so that pedestrians can pass passengers waiting to board.
- ☐ Avoid locating bus stops where there are curbs of varying heights.
- ☐ All transit stops should be easy to reach by walkways. Transit stops should include sheltered, visible, and comfortable seating areas and waiting spaces, set back from the walkway.
- ☐ Strategically locate bus stops to minimize crosswalk movements of transferring passengers if transfer movements between bus routes are heavy. For example, locate bus stops on the same corner of an intersection so users are not required to cross the street.
- ☐ Bus stops should provide shelters for protection from weather and a secure waiting place for transit riders based on boarding/alighting counts.

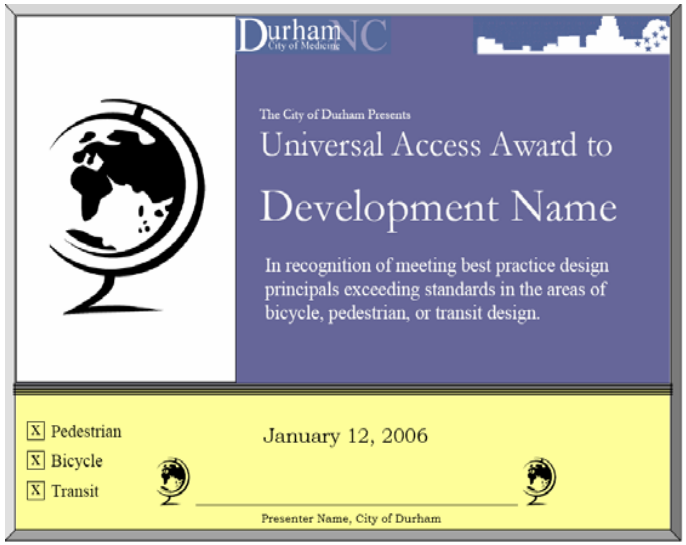
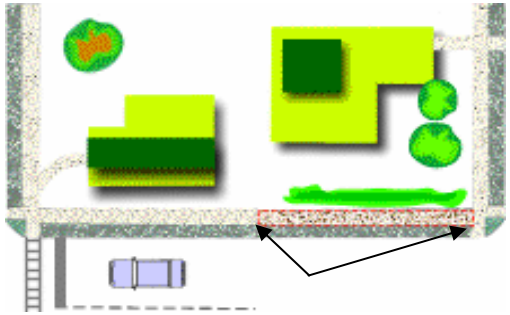


Figure 7-1. Sample Universal Access Award.



Completing sidewalk to nearest corner, or existing sidewalk.

Create a "Universal Access Award" (see Figure 7-1) for developers that exceed minimum standards in the areas of pedestrian, cycling, and transit design. Developers like to acknowledge the merits of their projects during Planning Board and Council reviews, and may be convinced to "go the extra mile" to receive such a commendation. Exceeding requirements is interpreted as adhering to the best practice guidelines in Section 6, as well as the transit checklist provided in this section. The determination of the certificate award will be made by the majority of staff conducting reviews during the circulation of the site plan.

Pedestrian Policies. Creating a supportive policy environment in the City of Durham will lead to incremental improvements not only as new private sector developments enter the site plan review process, but as concern for walkability develops among staff and developers as an "institutionalized" doctrine.

Make the following modifications to the City's sidewalk ordinances and policies:

1. Establish a method for prioritizing future sidewalk projects that balances simplicity with thoroughness, and is easy to interpret and quick to apply. The City will maintain a prioritized list of any new sidewalk projects, which will utilize the same factors as those described in this plan to prioritize projects; namely, proximity to schools, transit facilities, connectivity, and proximate land uses that generate walking trips. Specifically, the following point system will be used:
   - Elementary or middle school within ¼-mile of sidewalk project = 2 points, any school within ½-mile of sidewalk project = 1 point
   - Proposed project substantially addresses project need identified in *DurhamWalks!* Pedestrian Plan = 2 points
   - Park, regular transit service[1], or pedestrian generator within ¼-mile of sidewalk project = 1 point
   - Project will help alleviate a documented accident location (one or more pedestrian-related accidents within past three years) = 1 point
   - High Demand Area = no more than 60% of the parcels within ¼-mile of sidewalk project belonging to residential, commercial, institutional, office, or recreational/open space uses[2] = 1 point

[1] Note: Should the TTA Regional Rail Service become active, proposed projects within ¼-mile of rail stops should receive one additional point.
[2] Note: This score may also be awarded based upon field observation if more than 100 pedestrians are counted in any contiguous four-hour period on an average day.

2. Promote the existing sidewalk petition process in order to make residents more aware of it, and therefore more likely to use it. Currently, Durham residents can expedite sidewalk construction on neighborhood streets by providing the City with a petition for sidewalk signed by over 50 percent of the property owners along the length of the project, who also represent over 50 percent of the property along the project. Once the City has constructed the sidewalk, residents will then pay a $5 per foot assessment for the sidewalk and $20 per foot for any new curb and gutter.
3. Increase the amount of the current payment-in-lieu fee for sidewalk construction for new and redeveloped properties to $65 per foot of property frontage, as discussed in Section 3. This is the most realistic baseline cost for sidewalk construction based on recent City experience.
4. Develop a sidewalk connectivity policy that requires new private developments (or expanded developments increasing the value of the property by 50% or more) to connect sidewalks from the development to the nearest corner or existing sidewalk/multi-use trail, including ADA-accessible ramps. This should only apply in instances where the private development is a retail or general office use in excess of 100,000 square feet of gross leasable floor area or residential complex in excess of 100 units. Under certain circumstances, the developer could opt for a payment-in-lieu fee to be assessed using the same $65 per linear foot fee structure cited earlier, or the proposed sidewalk connection was not on publicly controlled right-of-way. In any circumstance, the maximum value of the sidewalk should not exceed two percent of the total construction value of the project. Lee County, Florida possesses a similar requirement, with the only difference being that the value of the sidewalk construction can offset other impact fees.
5. Require sidewalk considerations to be included in all development plans. This would include requiring all development plans, site plans and subdivision plans to clearly identify existing and planned bike, pedestrian, trail, school, transit routes and stops, and park facilities within ½ mile on all sides of the development. In addition, site plans and subdivision plans should graphically designate a comprehensive pedestrian and bicycle system that not only connects all elements within the development, but also connects the development to adjacent and nearby (to the extent possible) developments, bicycle and pedestrian systems, trail, greenways, open space and transit stops; be it further

Establishment of Pedestrian Activity Centers. As discussed in Section 4, there are several areas within Durham that, through field observation, pedestrian facilities, accident records, and other information, already show high levels of pedestrian activities. The City should designate these areas as Pedestrian

Activity Centers, where their pedestrian-friendly nature will be protected and preserved, and may be targeted in the future for special pedestrian improvements.

THIS PAGE LEFT INTENTIONALLY BLANK.

Covered in Section 8…

Consolidates previous recommendations, and identifies the roles and responsibilities of various agencies for implementing the pedestrian plan recommendations. Includes additional information about potential implementation resources.

Section 8. Implementing the *DurhamWalks!* Pedestrian Plan

The previous sections of the *DurhamWalks!* Pedestrian Plan have discussed the existing conditions and proposed changes that need to take place to achieve the Plan's Goals and Objectives. This section of the Plan discusses how to implement those recommendations, the responsible party (-ies), and a way of charting the progress of Durham and its partners in making the change from Durham as it exists today into the Vision of a fully walkable City described in the first chapter.

8.1 Building Support for Walking

At a glance, it would seem obvious that living in a place where walking is easy and safe is a goal shared by everyone. However, it is important to recognize that implementing the recommendations contained in this Plan will be achieved by relatively few agencies, and funded through a limited number of sources. Because of these limitations, it is critical to expand the circle of implementing partners to include non-traditional agencies and groups. The following partners need to be recognized and linkages created between the City of Durham staff, particularly the Transportation Division, to implement the recommendations contained in the *DurhamWalks!* Pedestrian Plan. In addition, stronger communication should be encouraged between citizen advisory committees, such as the Bicycle and Pedestrian Advisory Commission, the Durham Open Space and Trails Commission, and the Planning Commission.

Bicycle and Pedestrian Advisory Commission. The BPAC is a 15-member group that meets monthly at 7:00 PM on third Tuesdays, and is charged with advising the City Council of Durham concerning matters of bicycle and pedestrian planning and coordination issues. The group, six of whose members are appointed by City Council, is staffed by the City of Durham Transportation Division. The BPAC has created a discussion forum (http://groups.yahoo.com/ group/durhambikeandped) and a website (www.bikewalkdurham.org), and taken on special activities related to its mission, serving as a communication "hub" for bicycle and pedestrian activities. In the past, the BPAC has tended to be more focused on cycling issues, in part due to the fact that pedestrians are a very diverse set of users that do not have strong ties to each other. The importance of the BPAC is that it has a motivated membership that has connections to business interests, college campuses, and other key, non-traditional implementers of pedestrian projects and programs. The BPAC can effectively extend the "reach" of the government staff which serves as the primary support for this group. The BPAC should be made very familiar with the goals/objectives of the *DurhamWalks!* Plan and its

recommendations, and serve as an advocacy agency to help keep a long-term focus on achieving these recommendations. Second, the BPAC can help communicate the recommendations from the Plan to other stakeholders that its members come into contact with on a regular or irregular basis.

Public Health Agencies. Increasing attention is being paid to the importance of walking as a means of confronting obesity, improving cardiovascular health, and maintaining a positive mental outlook. The Centers for Disease Control and Prevention has suggested that everyone can benefit from walking, or increasing the intensity or duration of their walking if they are already doing so.[1] Therefore, it is not surprising to find that health agencies and public health advocacy groups have become more interested in promoting walking in their service areas. The following agencies should receive summaries of the *DurhamWalks!* Pedestrian Plan and/or brochures on the benefits of walking:

- Student Health Centers at college and university campuses;
- Public Hospitals, one copy for each waiting area;
- Public School nursing stations; and
- General medical practitioners and other medical facilities for placement in waiting rooms.

Working with Durham County and Inside the Urban Growth Area. The Urban Growth Area is where Durham expects to extend city services over the next 20 to 30 years. The City and County of Durham have had a joint zoning ordinance since 1993, which allows for the smooth transition between suburban and rural uses. The Unified Development Ordinance (UDO) has been created in the recent past to replace the 1993 zoning ordinance. The UDO accommodates more *urban* land uses within the Urban Growth Boundary and more variety in land use types, which can be expected to promote more walk trips. Durham requires new sidewalk to be constructed on both sides of major and minor thoroughfare roadways within the Urban Growth Area (including the city limits and a variable distance beyond them). All other roadways are required to have sidewalk only on one side of the roadway, unless the City of Durham Transportation Department requires sidewalk on both sides in areas where there are heavy commercial or retail uses that are expected to generate more walk trips. This is the same protocol used within the City limits; however, the primary difference is that with NCDOT roadway construction, sidewalks are often not a part of the design in unincorporated areas. Problems exist due to the inability of counties to pay the matching funds, and most do not have any resources set aside for maintenance. Since the UGA boundary is typically less than a mile

[1] Center for Disease Control and Prevention, U.S. Department of Human Health (website: http://www.cdc.gov/nccdphp/dnpa/physical/recommendations/adults.htm#Top) accessed 2.9.2006.

away from the City limits in many places, the City can expect to inherit sub-standard streets when annexations take place. Often, developers will want to construct in the UGA to have access to public water and sewer services, thereby limiting the amount of new development that takes place in the rural areas of Durham County. Nevertheless, coordination between the City and County policies, as well as NCDOT, should continue to attempt to address the problems inherent in building incidental sidewalk construction outside of the municipal and UGA limits.

Building Better Relationships between Government Agencies. There is perhaps no more critical set of linkages needed to implement pedestrian projects than those that exist between the various operating departments and divisions in the City of Durham, Durham County, North Carolina Department of Transportation (especially Roadway Design, Division and District offices, Division of Bicycle and Pedestrian Transportation, Transportation Planning Branch, and Project Development and Environmental Analysis), and the Metropolitan Planning Organization. An exhaustive review of how each of these agencies work and relate is not particularly relevant, and the relationships themselves change over time. However, it is critical that regular communication occurs between the City and State transportation staff to carry out their mutual missions of providing transportation services and facilities in the City of Durham. The Pedestrian Awareness Task Force creates an opportunity for Durham's police, transportation, and engineering professionals to collaborate regularly on solutions to emerging safety concerns throughout the City. Collaborating with local, regional, health-based, and campus transit companies can help to ensure future access to transit by walking. The City should consider hosting an annual transportation summit to review progress made in implementing this Plan. The summit should include breakout sessions on walking, cycling, auto travel, and public transportation/rail. Participants should include change agents from all levels of government and in various functional roles, and each should come away with a clear, preferably one-page summary of what each agency needs to do to reach the goals of the *DurhamWalks!* Pedestrian Plan.

Many people use the pedestrian system in Durham, but some enjoy it more than others….

Special Mobility Groups. Senior citizens; mobility impaired people; elementary and middle school children; and people who do not have reliable access to their own automobile are particularly reliant upon the pedestrian system to perform everyday tasks such as shopping, going to school, and getting to work. The *DurhamWalks!* Pedestrian Plan has focused on selecting projects and programs that particularly affect these groups: maintenance, new construction, encouraging participation by mobility and visually impaired residents in the formation of solutions to pedestrian problems, areas near schools, and special attention to transit access played a strong role in the recommendations of Durham's Pedestrian Plan. Continued networking with senior centers, low income community

organizations, transit companies, the Durham Public School System, and other outlets is strongly encouraged. Transportation and the BPAC members should regularly try to attend meetings and unofficial gatherings to establish a broad, informal network of partners that can help provide direction and resources to support the recommendations of *DurhamWalks!*

General Public Participation. The general public should not be "left out" of the implementation of this Plan. They serve an important role as the eyes of the City staff, informing the City of safety problems, maintenance issues, and identifying potential needs that should be prioritized alongside those described in this Plan. It is this communication that makes regular updates of the Pedestrian Plan so essential to its relevance and maintaining energy to create positive changes in the walking environment. This Plan has recommended that complaints and accidents be recorded, reviewed, and acted upon in a systematic manner by multiple implementing and enforcement agencies. One of the areas that could be improved is gaining access to Durham's low-income and minority communities: further efforts should be made to establish partnerships with community leaders to establish a broad base of support for implementing the recommendations of *DurhamWalks!* that would help these communities establish better, safer walking routes to places of shopping, employment, and schools. Increasing the level of feedback to communicate the goals and resources available to fund new trails, sidewalks, safety improvements and other pedestrian projects is more important than increasing the frequency of communication.

8.2 Project Implementation

The *DurhamWalks!* Pedestrian Plan lists over 200 individual projects for constructing sidewalks, extending trail facilities, and improving the safety features at intersections and around schools.

Local Funding Sources. Local funding sources include general revenue expenditures and the proceeds from bond programs initiated by the City. These funds are relatively flexible, and can be readily obligated to the top priority projects in the Pedestrian Plan pending approval by the Durham City Council based on recommendations from staff. Local funds should not be used to fund projects on major State routes where a State-funded roadway widening (incidental) project is already programmed, unless it is needed to meet the matching fund requirement adopted by NCDOT. Local funding can also include retroactive sidewalk projects discussed in the recommended policies section of this Plan.

State and Federal Funding Sources. Unlike local funds, State funds are not as flexible and harder to forecast in advance. Durham has received some "earmarks" in federal funding for important pedestrian projects, such as the continuation of the American Tobacco Trail. In addition, there are a number of state projects that are listed as "incidental" to roadway widening construction. Again, these projects are not driven by pedestrian priorities *per se*, but instead are dictated by the vehicle capacity and safety needs of individual segments of roadways. However, this does not indicate a lack of need for additional coordination on state and federal-funded projects. Municipalities, including Durham, have often encountered friction when requesting sidewalk, off-road trail, and pedestrian crossing facilities to be included in state construction projects. It is therefore critical to (a) ensure that important pedestrian crossings are indicated in this Plan and/or the Trails and Greenways Master Plan; and (b) to coordinate on pedestrian-related issues related to capital construction within the Urban Growth Area of the City to ensure a coordinated vision of the pedestrian system is implemented.

The following bullets list potential sources and a brief description of State funding which may be used to target specific projects in Durham.

- **Transportation Enhancement Program** - Transportation enhancements are transportation-related activities that are designed to strengthen the cultural, aesthetic, and environmental aspects of transportation systems. The transportation enhancements program provides for the implementation of non-roadway capacity improvement projects, including bike and pedestrian facilities; landscaping; and similar aesthetic improvements. Sidewalks, greenways, on-road improvements, safety actions, and educational programs are eligible for funding.

- **Powell Funds –** This funding is provided by NCDOT to municipalities for various maintenance projects, including sidewalk maintenance, for state-maintained roads. Funds are allocated based on a municipality's population and miles of state-maintained roads. Since the mid-1990's, Powell Funds have been used on sidewalk and have been approved for anything that is not intended to increase roadway capacity.

- **Small Urban Funds** - Each NCDOT Highway Division has $2 million of small urban funds available annually. Local requests for small bicycle and pedestrian projects can be directed to

the NCDOT Highway Division office for funding through this source. A written request should be submitted to the Division Engineer providing technical information such as location, improvements being requested, timing, etc. for thorough review.

- **Hazard Elimination Program** - Bicycle and pedestrian projects are eligible for this program. This program focuses on projects intended for locations that should have a documented history of previous crashes. As of this writing, each NCDOT Division receives $100,000 annually for hazard elimination and another $200,000 is allocated to the Division of Bicycle and Pedestrian Transportation for statewide projects such as training workshops, pedestrian safety and research projects.

- **Spot Improvement Program** - The NCDOT Bicycle and Pedestrian Transportation Division budgets $500,000 per year for "spot" safety improvements throughout the State. These improvements might include installation of a short segment of sidewalk, sidewalk maintenance, crossing treatments, and other small-scale improvements. Proposals should be submitted directly to the Bicycle & Pedestrian Transportation Division.

- **Governor's Highway Safety Program (GHSP)** – Proposed projects must show the potential for a substantial reduction in crashes, injuries and fatalities as a condition of receiving funding through this program. All funding is considered to be "seed money" to get programs started – the grantee is expected to provide a portion of the project costs and to continue the program after GHSP funding ends. Projects are only approved for one full or partial federal fiscal year at a time; however, projects may be funded for up to three consecutive years. Amounts of GHSP funds vary from year to year, according to the specific amounts requested.

- **Statewide Discretionary Funding** - The Statewide Discretionary Fund consists of $10 million and is administered by the Secretary of the Department of Transportation. This fund can be used on any project at any location within the State. Primary, urban, secondary, industrial access, and spot safety projects are eligible for this funding. To request funding, an agency must submit a written request to the NCDOT Highway Division office (or Board of Transportation representative for Durham), providing a clear description of the project and project justification.

- **State Transportation Improvement Program** - Bicycle and pedestrian projects are broadly eligible for funding from most of the major federal-aid transportation sources. One of the most cost-effective ways of accommodating bicycle and pedestrian accommodations is to incorporate them as part of larger reconstruction, new construction and some repaving projects. Generally, the same source of funding can be used for the bicycle and pedestrian accommodation as is used for the larger highway improvement, if the bike/ped accommodation is "incidental" in scope and cost to the overall project. Overall, most bicycle and pedestrian accommodations within the state are made as incidental improvements. The other type of specific bicycle project is termed "independent" for the simple reason that it is not connected to a specific roadway improvement funded by NCDOT, which sets aside $6 million annually through the Bicycle & Pedestrian Transportation Division for the construction of bicycle improvements across the State. Eighty percent of these funds are from STP-Enhancement funds, while state funds provide the remaining 20 percent. A local 20 percent match is required for most projects.

- **Safe-Routes-to-School Program** - The Safe-Routes-to-School program just began in 2006 as a result of the passage of the federal SAFETEA-LU Act. Once formalized, it will provide grants and technical assistance for the establishment of Safe-Routes-to-School programs throughout the state. Safe-Routes-to-School programs will establish programs and activities to encourage children to walk or bike to school, and will also include assessments of the pedestrian and bicycle facilities in and around participating schools.

Proposed programs may also draw from several other funding sources, including general matching grants from NCDOT for specific local initiatives and non-transportation related funding sources. For more information about NCDOT funding, please see:

http://www.ncdot.org/transit/bicycle/funding/funding_intro.html

Private Sector Participation. The private sector, principally in the form of property development agents and their engineering contractors, play a very important role in the completion of the pedestrian system in Durham. Although required now, there were many subdivisions constructed in the past without any sidewalk internally or along adjacent major arterials. It is these residential areas without sidewalk that now create the extensive area of need in Durham. Requiring new sidewalk or a payment-in-lieu of constructing the sidewalk is therefore seen as a necessary and important part of the overall implementation process. The City of Durham has enjoyed very good success in holding to the policy of constructing sidewalk on at least one side of the roadway for new or expanded

subdivisions. This Plan suggests that connections to existing sidewalk/off-road trail systems; transit accessibility; and connectivity – even off-site in cases where there will be a high potential demand for walking trips – are also critical elements of the pedestrian implementation program.

Grant and Programmatic Funding Sources. The Governor's Highway Safety Program, Block Development Grants, fitness and health grant sources, Congestion Mitigation and Air Quality (CMAQ), and the federal/state Safe Routes to School program all represent potential sources of funding for pedestrian projects. However, in order to capitalize on these funds, the City must have a staffing component that is well-versed in preparing grants and tracking the grant cycles that occur. These funds are often hotly competitive, and being prepared for an upcoming grant cycle is critical to the applicant's success. Optimally, the City of Durham would have a Grants Coordinator, perhaps located in the Budget and Management Services Division, who can reach out to the appropriate City staff to gather information needed in the preparation of grant-type applications, not only for pedestrian projects, but for other needs as well. The City's Police Department does have such a position; but it does not extend to pedestrian planning or other functions within the City.

A large number of public and quasi-public resources exist to help implement landscaping, greenway, trail, and sidewalk construction beyond the major state, federal, and local sources cited in Section 5:

- National Park Service (Land and Water Conservation Fund Grants);
- North Carolina State Government, including Parks and Recreation; Wildlife Resources Commission; Division of Water Resources; Division of Community Assistance (facilitation);
- Volunteer Programs, such as gardening clubs (see text box at right), can be used to infill urban spaces with herb gardens, flower planters, and so forth;
- Conservation trusts, such as the NC Conservation Trust Fund or Triangle Land Conservancy, for off-road trails, should be coordinated with on a six-month cycle to keep informed of funding and other right-of-way acquisition mechanisms and opportunities; and
- Fitness and health-based initiatives are becoming more frequent, such as the Fit Together program and Fit Community grants. In June 2006, Durham was awarded a "Fit Community" designation, making it eligible for up to $60,000 in grant funding to further community efforts in the healthy lifestyles area The "Fit Community" honor recognizes North Carolina municipalities that have exhibited a commitment to supporting healthy lifestyles in the areas of physical activity, healthy eating, and youth tobacco use prevention.

North Carolina Gardening Club

For more information about garden clubs, including the Durham Council of Garden Clubs, use the following contact information or go to the NC Garden Club website at: www.gardenclubofnc.org

The Garden Club of North Carolina, Inc.
PO Box 33520
Raleigh NC 27636-3520
Tel 919-834-0686, Fax 919-834-4571
Office hours: M-Th 9:00a.m.-4:00p.m
Email: theGCofNC1@aol.com

The principle obstacle to acquiring these grants is not necessarily the competitive nature of the grant environment, but making and maintaining the personal contacts to and with the grant coordinators to keep apprised of upcoming opportunities. A dedicated grants coordinator would be invaluable in this effort, but until then, it is recommended that administrative assistants in the Transportation Division be charged with checking a list of known sources every six months to prepare notices of upcoming opportunities for the rest of the transportation staff.

8.3 Program and Policy Implementation

The *DurhamWalks!* Pedestrian Plan has identified several programs and a large number of policies that are recommended to further strengthen, educate, and enforce pedestrian issues in the City. Listed below are those program and policy areas, along with the personnel that will be needed to take action to implement the programs and policies.

Pedestrian Awareness Task Force. This Task Force is a multi-division attempt to get pedestrian-related issues, particularly safety issues, addressed early by the agencies in the best position to do something about them (law enforcement, transportation planning, and engineering). This small group should be led by the Public Works Department Transportation Division and the Bicycle and Planning Coordinator, who will require some assistance from the Durham Police Department to produce accident mapping for three-month and three-year periods.

School Strides. Emulating the Safe Routes to School programs across the country, School Stride is the name attached to the recommended Durham program of educating and encouraging elementary, middle, and high school children to walk to school, and do so safely. This Plan has detailed some of the activities for School Strides, but close coordination between the Transportation Division and Durham Public School System (DPS) will be required. Funding for this effort should come in part from the City, perhaps from the DPS, and in part from anticipated grant opportunities from the federal/state Safe Routes to School program.

Existing Program Modifications. The *DurhamWalks!* Pedestrian Plan has suggested minor functional changes, such as applying some additional funding for expanding transit outreach programs, changing the review process for new or expanded development reviews by transit companies, and implementing an Access Award Certification Program. The specific agency or agencies are identified where those suggestions are made (generally, Section 7). However, this full policy listing should be

referenced when preparing the annual benchmarking report discussed in Section 8.4 to ensure that appropriate progress and attention is being paid to these recommendations.

Changing Policies and Plans. Section 3 of this Plan identifies a large number of mostly small policy and planning changes to existing documents. It is assumed that the majority of these will be accommodated during the updates of those plans, but this should be carefully reviewed when those plans are being updated, when the *DurhamWalks!* Pedestrian Plan is updated, and during the annual benchmarking exercise described in Section 8.4. Hence, the responsibility of making those changes rests with the individual agency or division re-writing the particular plan, but coordinating those changes is the responsibility of the Transportation Division's Bicycle and Pedestrian Coordinator and appropriate planning department staff.

8.4 Tracking Progress

Every planning document and process envisions changes and progress being made as a result of all the efforts of its participants. And, while the process of creating the Plan has been successful already in increasing the awareness of pedestrian needs, it is even more important to its ultimate success to continue tracking and updating it's contents to remain relevant. Two additional suggestions about updating components of this Plan and tracking its progress are therefore provided to help Durham's staff and citizens keep the *DurhamWalks!* Pedestrian Plan dynamic and meaningful.

Plan Update Cycles. During the development of the pedestrian plan, concerns were expressed about how to incorporate comments from the public, new information, and revised funding and cost profiles. To accommodate these changes, the following update cycle is recommended:

- The overall Pedestrian Plan should be reviewed and updated every five years. This regular schedule, beginning in 2011, will allow Durham to program ahead to allocate funds and resources for future updates.
- The project listing – especially Section 4.0 – should be reviewed and updated every year to ensure that new comments and project changes are included. This will require maintaining a good list of project changes by the Transportation and Engineering Division staff throughout the calendar year in order to quickly make modifications to the Plan. These modifications should be discussed internally with the implementation staff, NCDOT, and other stakeholders to ensure that priorities and projects are scoped correctly.

A great pedestrian space – with no pedestrians present. *How much better would this space be with…*
…movable furniture?
…planters with herbs and flowers?
…artwork?
…awnings over the shops?

Benchmarking DurhamWalks! Even when the Plan or portions of the Plan are not being reviewed and updated, it is still important to maintain an annual accounting of the progress of the Plan's implementation. Just as important, the successes in the areas of pedestrian planning should be celebrated and communicated at this point – policies adopted, plans completed, projects finished, and miles of trails and sidewalks under construction. This will require some reporting to a central location or data acquisition by the Transportation and Engineering Division staff and particularly the Bicycle and Pedestrian Coordinator to create a simple summary report every January to mark the progress of the Plan.

The term that is chosen for gauging the progress of implementing the pedestrian program is "benchmarking." Benchmarking is a critical piece of quality control and management, and helps present a clear picture of the status and progress towards meeting important goals. Benchmarks can be almost anything that describes the progress on specific aspects of a program in action: number of herons observed to estimate the health of an estuary; increases in vehicle occupancies to measure travel demand management improvements; and the number of new jobs created to gauge the strength of a local or national economy are all examples of benchmarks. To be a good benchmark, the data that defines the benchmark should be readily available or at least easy to create and the benchmark should have a clear connection to the thing it is measuring.

For the *DurhamWalks!* Pedestrian Plan, we are establishing a schedule of actions for the first two, five, and ten years of the Plan's future. In addition, we suggest an annual survey of conditions to assess the progress towards meeting the Plan's goals. Details on the benchmarks are described for each Goal in Section 1.2; this Section provides a sample report that Transportation staff can produce to chart the progress of meeting the recommendations of the Pedestrian Plan (see following page). These benchmarks should change, and obviously be updated when the Plan is updated every five years.

Finally, this benchmark report should be incorporated into the same schedule as the *Comprehensive Annual Report* that Durham produces to chart its progress in many different functional areas each year. Although this report deals primarily with the financial obligations of the City, marrying a summary to this report or at least working the pedestrian benchmarking exercise into the same schedule (each June) may generate a greater audience for the progress summary.

The purpose of this Progress Report is to identify the Goals and Objectives of the Pedestrian Plan and to mark the progress being made towards making Durham a walkable City as outlined in the *DurhamWalks!* Pedestrian Plan. Please contact the Durham Bicycle and Pedestrian Coordinator at 919.560.4366 for additional information.

Goal 1: Facility Quantity: To increase the number of pedestrian facilities: sidewalks, trails, crosswalks, pedestrian safety improvements at intersections, and other related amenities in the City of Durham.

BENCHMARKS	STATUS
B1.1 Construct 30% of recommended projects from Top "Tier" by 2010.	
B1.2 Reduce sidewalk "gaps" by 10% by 2010.	
B.1.3 Establish prioritization scheme by 2006.	
B1.4 Reduce residential streets without sidewalk by 25% by 2015.	

Goal 2: Facility Quality: To improve the quality of both future and existing pedestrian facilities in Durham, especially in those areas that are suffering the worst from poor conditions.

BENCHMARKS	STATUS
B2.1 Adopt pedestrian design standards in all planning documents.	
B2.2 Reduce sidewalks meeting the "moderate" or "severe" rating in the pedestrian facility inventory by 25% by 2015.	
B2.3 Conduct a survey every two years to determine satisfaction with pedestrian accommodations.	
B2.4 Complete an update of the pedestrian facility inventory in 2015.	

Goal 3: Safety and Security: To enhance real and perceived pedestrian safety while increasing pedestrian activity.

BENCHMARKS	STATUS
B3.1 Pedestrian accidents should be reduced by 25% (from year 2000 records) by 2010.	
B3.2 Pedestrian activity should increase by 25% by 2010. Measure using surveys and decennial census.	
B3.3 Conduct a bi-annual survey to ascertain the perception of safety about walking to/from school, home and work.	

Goal 4: Coordination: To guarantee that those people and agencies responsible for providing transportation and land use options assume pedestrian considerations in their everyday policies and practices.

BENCHMARKS	STATUS
B4.1 Update the Landscape and Design Guidelines Manuals to address pedestrian issues.	
B4.2 Adopt policy recommendations on fees, connectivity, and others (refer to Section 7).	
B4.3 Form Pedestrian Awareness Task Force and meet four times/year.	

Additional Progress and Upcoming/Current Work Items: _____

_____

glossary

capital improvement program (CIP)	a multi-year listing of the upcoming major public sector expenditures in Durham, produced every year
constructability	an estimate of the cost of installing sidewalk or other pedestrian facilities
curb extensions or bulb-outs	a protruding section of sidewalk and curb-and-gutter to reduce pedestrian crossing widths and slow vehicular traffic
curb radii	the arc described by a street corner at an intersection
fee-in-lieu, payment-in-lieu	The government practice of accepting monetary compensation from private developers instead of constructing or dedicating public facilities
fixed route	a bus route that uses the same path for every bus: any route deviations are scheduled for specific time periods
headway	the amount of time measured from one bus passing a point to the next bus passing the same point
incidental project	a pedestrian or bicycle project that is funded as a part of a roadway construction or widening projects
independent project	a pedestrian or bicycle project that is funded as a part of a roadway construction or widening project
median	a barrier, either painted or constructed of concrete, asphalt, and/or containing grass or landscaping that separates two directions of traffic

mid-block crossing	a location on a roadway that is marked for pedestrians to cross the street away from an intersecting street
paratransit	a flexible form of transit using vans, taxis, or other vehicles dedicated to serving persons with disabilities who are unable to use other transit services
pedestrian activity center	a location, at least one block long, where pedestrians use the street space to the same or greater degree than drivers; often special design features or amenities are included in this space
refuge (refuge island)	a level or raised structure separating two directions of traffic on a street, constructed to help ease pedestrian crossings
retrofit, retrofitting	the practice of changing existing infrastructure (e.g., streets) to include standard elements like sidewalks or curb-and-gutter
state transportation improvement plan (STIP)	a multi-year listing of upcoming transportation projects funded by state and federal agencies produced every two years
zoning	public regulation of land and building use to control the character of a place, municipality, or county

Appendix 1. Public Involvement.

Appendix 1 contains the following items:

1. Public Workshops Flyer for July Workshops

2. Public Workshop Handout distributed at July Workshops

3. Survey distributed at July Workshops

4. Fall Newsletter

5. Public Workshop Flyer for February Workshop

6. Spring Newsletter

THIS PAGE LEFT INTENTIONALLY BLANK.

PEDESTRIAN PLAN

CITY OF DURHAM

Help us make your place a better place to walk around!

PUBLIC WORKSHOPS

- **Tuesday, July 12: 5-8pm**
  Eastway Elementary, Cafeteria (PAC District 1)
- **Wednesday, July 13: 5-8pm**
  Durham City Hall, Council Chambers (Central PAC District)
- **Thursday, July 14: 5-8pm**
  E.K. Powe Elementary, Cafeteria (PAC District 2)
- **Wednesday, July 20: 5-8pm**
  C.C. Spalding Elementary, Cafeteria (PAC District 4)
- **Thursday, July 21: 5-8pm**
  Southwest Elementary, Cafeteria (PAC District 3)

Citizens are invited to attend to learn about the Plan, take surveys on local walking conditions and give feedback on Durham's pedestrian-related policies and infrastructure. Presentations will be given at the top of each hour (i.e. 5pm, 6pm, 7pm). Each workshop will provide the same information, so you can attend any one that you choose in any PAC district.

Can't make it to one of the workshops?

Then visit www.durhamwalks.org or contact the Ped Plan hotline at 467-9081.

DurhamWalks! But We Can Do Better with Your Help...

THIS PAGE LEFT INTENTIONALLY BLANK.

Why Does Durham Need a Pedestrian Plan?

Over the next year, the City of Durham will be preparing your pedestrian plan - a guide to the City's approach to making it better, easier, and safer for you to walk. The plan will create a 100% inventory of current walkways, develop new policies to encourage more consideration of pedestrians in development practices, identify major issues and needs, and serve to direct the City's limited resources towards the places that need them the most now and in the future. The plan will help Durham implement safe, high-quality improvements to our walking environment - and that's good for our children, mobility-impaired citizens, business, and our air quality.

So What Will Be In the Pedestrian Plan?

Your pedestrian plan will have three parts:

Part I: Inventory. Right now, there is not an accurate map that shows the Durham sidewalks, hard-surfaced trails, handicap ramps, and the shape they are in...but that is changing. Look for surveyors in the coming months that are helping to create this map.

Part II: Gathering Input. We will be reviewing the existing policies, programs, and ordinances that guide how Durham 'does walking,' as well as ways of improving things. We'll also be looking at how to fund these improvements through existing sources, making our plan cost-effective to carry out. **Most importantly, we are going to be hearing from you about...**

... specific issues in your neighborhood,
... city-wide issues - everything from schools to accessibility to repairs,
... your priorities - what needs to get done first!

Part III. Making the Plan. Your pedestrian plan will include how to overcome major issues and make the most of our opportunities, how to make the plan happen, and recommendations for additional projects and programs. We also plan to make a 'walking map' that you can access over the Internet - no more wondering where to find sidewalks to reach your destination.

We need your ideas on how to make all of this work for you - you are here helping us to create your pedestrian plan!

HOW CAN I GET INVOLVED?

COME TO A PUBLIC WORKSHOP! *Durham is hosting two series of public workshops, one set in July, 2005 and one set in January, 2006. If you can, try to attend to listen to the presentations, offer your opinions, and answer questions that will help us create your pedestrian plan.*

WHAT IF I CAN'T MAKE IT TO A PUBLIC WORKSHOP? *Feel free to go to our website, call our free hotline, or send us an email.*

Website: www.durhamwalks.org
Telephone Hotline: 467-9081
Email: Alison.Carpenter@durhamnc.gov

If you can find a few minutes to help us understand your concerns about walking around Durham, we'll be happy to listen to your ideas.

DURHAM WALKS!

DurhamWalks! But We Can Do Better with Your Help...

THIS PAGE LEFT INTENTIONALLY BLANK.

A Comprehensive Pedestrian Plan

Building Healthy Communities One Step At A Time!

WELCOME!

And thank you for your interest in the Durham Comprehensive Pedestrian Plan Project. This is the first newsletter in a series of newsletters printed by the City of Durham to help keep citizens informed on the Plan and its progress. In this issue, you will find information on the Pedestrian Plan and its purpose, preliminary results from the first public workshops, updates on our on-going existing conditions inventory, and information on up-coming events.

The Plan

The Pedestrian Plan is a guide to making it better, easier, and safer for you to walk in your City. The Plan will help the City of Durham identify major pedestrian needs now and plan for pedestrian needs in the future. In order to put together a complete plan, the process will have many steps, including inventory of all of Durham's sidewalks and intersections; analyzing the City's policies, ordinances, and regulations pertaining to pedestrian-related facilities; conducting an in-depth public involvement program to identify and address major Issues and needs, as well as funding resources and strategies.

Currently, the City of Durham does not have a Pedestrian Plan. A Pedestrian Plan is an invaluable document providing the essential framework to improve conditions for pedestrians. With a pedestrian plan, the City will have a clear understanding of how to budget for future pedestrian facilities and projects, as well as how to coordinate its pedestrian-related efforts.

What are the Benefits of Walking?

❖**Safety.** Continuous sidewalks and safe crossings are critical to making safe a pedestrian-friendly City.

❖**Health.** Walkable cities promote healthy citizens. Health professionals recommend walking as a form of physical activity to help prevent a host of diseases including obesity, heart disease, and some forms of cancer.

❖**Economy.** Improved pedestrian facilities and pedestrian access create vibrant streets by promoting commercial and social exchange.

❖**Environment.** Better pedestrian facilities promote walking which is a zero emissions form of transportation.

Project Status

The Project began in July 2005 and since then the following has been accomplished:

❖Created and met with the Stakeholder Committee which will provide project over sight.

❖Continued inventory of the City's existing sidewalk network, intersections, and conditions, including photographing every intersection.

❖Began the implementation of an extensive Public Involvement Program.

❖Evaluated the City's regulations, policies and codes regarding pedestrians.

Public Involvement

An integral component to this project is the Public Involvement Program, which outlines the project's public outreach and participation efforts. To date, the following has occurred:

❖Created a web site with project information (see www.durhamwalks.org).

❖Developed a paper and web-based survey seeking input on pedestrian conditions in the City.

❖Conducted a public workshop in each of the 5 PAC districts. Workshops were conducted the week of July 11 and July 18. These meetings were announced through flyers placed on DATA buses, other public facilities, and through advertisements in the local newspapers.

❖Established a hotline number (919.467.9081) for comments.

There will be on-going opportunities for public input throughout the Plan's development. Another set of workshops will be held in February to present a draft version of the plan for comment. Citizens are also welcome to attend the Durham Bike and Pedestrian Advisory Committee meetings, held the third Thursday each month in City Hall. Anyone who wishes to be notified of meetings should call 467-9081.

Students discussing issues at one of the five public workshops.

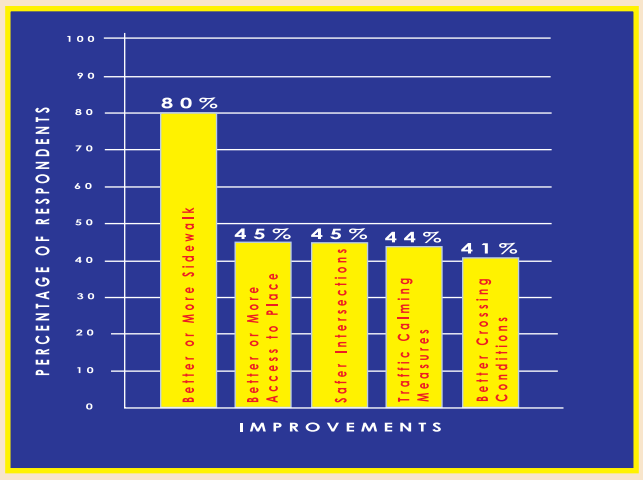
Survey Results Snap Shot

- *878 total number of respondents.*
- *34% male; 65% female*
- *The greatest percentage of respondents (35%) were between the ages of 30-39.*
- *The most number of representatives (34%) indicated that they walked at least 1 time per day.*
- *33% of the respondents walked every day of the week.*
- *Average walking distance for the top three walking activities:*
  - *1.5 miles for health purposes*
  - *1.4 miles for recreation*
  - *1.2 miles for relaxation*
- *83% of the respondents walked in their neighborhood.*

Survey Results

During the first part of the Public Involvement Program, paper and web-based surveys were creat-

Walkability Survey Results:
Top Five Improvements That Would Make Respondents Walk More.

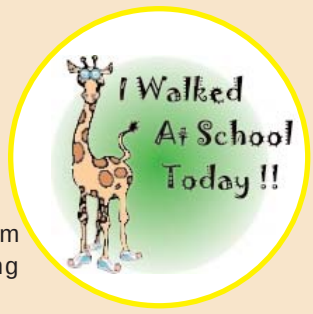


Inventory

Another on-going part of our project is the inventory. As of the end of August, survey crews have inventoried over 25 percent of the City's existing sidewalk and intersections. This inventory will help clarify where the City has sidewalk, and where it needs more. In addition, it will help the city to monitor the state of its sidewalk network for years to come.

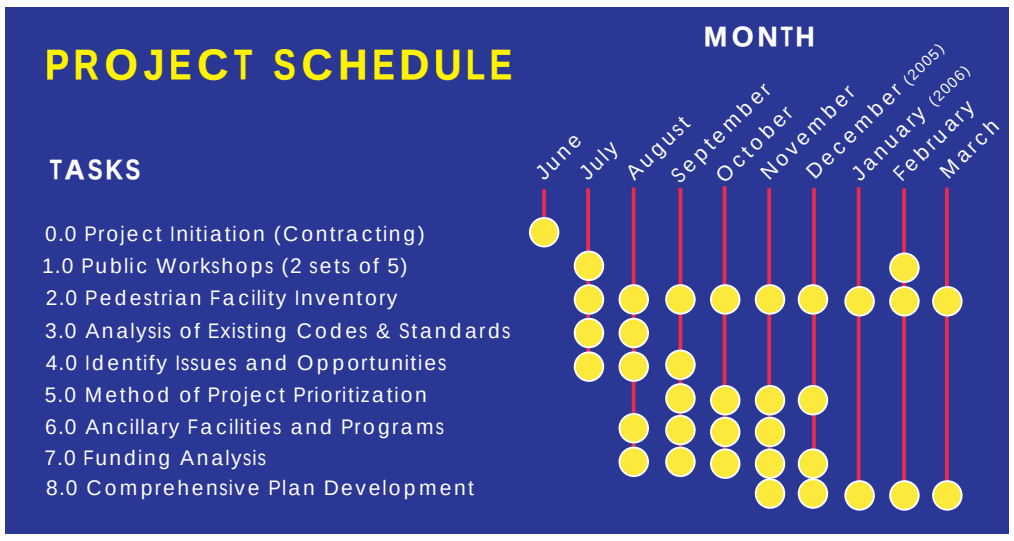
A sample of the existing sidewalk conditions inventory and mapping that is currently being conducted.

Safe Routes to School



At the time of the writing of this newsletter, many Durham Public Schools ares preparing for the October 5 Annual International Walk to School Day. We support this invaluable effort, and a component of this Pedestrian Plan is to help develop safe routes to schools. As a part of this, students are currently conducting walking audits and preparing maps of routes to school.

PROJECT SCHEDULE



In the News.....

Sidewalk Connections to New Orleans

Recently, while the Project Team was inventorying sidewalks in Durham, the crew became acquainted with Mr. Donald Wittke, Jr., a survey specialist, who was an evacuee and recent transplant to the area from the City of New Orleans, ravaged by Hurricane Katrina. Geotek Mapping, which is performing the pedestrian sidewalk inventory for *DurhamWalks!,* has hired Mr. Wittke as a professional surveyor.

Contact the Project Team!

If you have any questions, comments, or concerns, feel free to contact:

Alison Carpenter
Bicycle & Pedestrian Coordinator
City of Durham/DCHC MPO
101 City Hall Plaza
Durham, NC 27701
560.4366
alison.carpenter@durhamnc.gov

Scott Lane and Jennifer Lewis
The **Louis Berger Group**, Inc.
1513 Walnut Street, Suite 250
Cary, NC 27511
467.3885 (T) 467.9458 (F)
slane@louisberger.com

Visit our Webpage at:
www.durhamwalks.org

Call our project Hotline at:
919.467.9081

Address

Place Postage Stamp Here

DURHAM WALKS!

The Comprehensive Pedestrian Plan

City of Durham

NEWSLETTER

Volume One
Fall 2005

The **Louis Berger Group**, Inc.

Announcing the Durham Pedestrian Plan Public Workshop!

DURHAM WALKS!

When:
Tuesday, February 28, 2006
4— 8 PM, Drop-in

Where:
Durham City Hall,
Council Chambers

Why:
To present the Draft Plan, take comments, and answer questions.

We all walk,
Come and Be Heard!

For more information, check out:
www.durhamwalks.org
Call the Hotline at (919) 467—9081
Or contact Alison Carpenter
Bicycle & Pedestrian Coordinator
919-560-4366
alison.carpenter@durhamnc.gov

THIS PAGE LEFT INTENTIONALLY BLANK.

Walkability Survey

City of Durham

A **Comprehensive Pedestrian Plan** is being prepared by the City of Durham, funded by the City and the North Carolina Department of Transportation, to improve access, circulation and safety for pedestrians throughout the City. Your input is greatly appreciated.

THANK YOU FOR YOUR PARTICIPATION!

This survey is intended to obtain **general information** about you as a pedestrian, the **walking conditions** of your neighborhood, as well as **recommendations** that you may have to improve walking conditions in the City. If you have children this would be a good exercise for the family.

Deadline

PLEASE SUBMIT THIS SURVEY BY **JULY 29, 2005**

General Information

Would you like to receive newsletters and project updates/notices: ☐ Yes ☐ No

PLEASE PRINT CLEARLY

1) Zip Code: _____ **Email:**_____

2) Name: _____

3) Address:_____

4) Are you:

☐ Male ☐ Female

5) What is your age?

☐ Under 19 ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ 60-69 ☐ 70-79 ☐ Over 80

Pedestrian Information

6) Do you walk as part of an activity (going to the store):

☐ Yes ☐ No

a) If NO, why: (Answer Question then SKIP TO QUESTION 13)

☐ Not interested ☐ Pedestrian facilities missing
☐ Unsafe conditions ☐ Other_____

7) Indicate how many miles a week you walk for all that apply:

Shopping or errands	0	0-1/2	1/2-1 Mile	1-2 Miles	3+ Miles
Commuting to work	0	0-1/2	1/2-1 Mile	1-2 Miles	3+ Miles
Traveling to a Transit Stop	0	0-1/2	1/2-1 Mile	1-2 Miles	3+ Miles
Health purposes	0	0-1/2	1/2-1 Mile	1-2 Miles	3+ Miles
Recreation	0	0-1/2	1/2-1 Mile	1-2 Miles	3+ Miles
Relaxation	0	0-1/2	1/2-1 Mile	1-2 Miles	3+ Miles
Family event	0	0-1/2	1/2-1 Mile	1-2 Miles	3+ Miles
Walking the dog	0	0-1/2	1/2-1 Mile	1-2 Miles	3+ Miles
Other _____	0	0-1/2	1/2-1 Mile	1-2 Miles	3+ Miles

8) During the week how many days do you walk:

☐ Every day ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 days

9) How often during a day do you walk (round trip):

☐ More than once but varies from day to day ☐ 1 ☐ 2 ☐ 3 ☐ 4 times

10) When you walk where do you go (check the place most visited):

☐ In the neighborhood
☐ Park
☐ Recreational center
☐ Trail
☐ Work
☐ To commercial businesses
☐ Friend's house
☐ School
☐ Transit station/stop
☐ Other _____

11) When do you usually walk:

☐ Both weekdays and weekends
☐ Weekdays only
☐ Weekends only

12) Do you walk all year round or only in nice/warm weather:

☐ All year
☐ Nice/warm weather

Neighborhood Walking Conditions

Please answer the following questions about your neighborhood.

13) Sidewalks exist

☐ Yes ☐ Partially ☐ No ☐ N/A (Not Applicable)

a) Sidewalks are well maintained

☐ Yes ☐ Partially ☐ No ☐ N/A

b) Sidewalk widths are wide enough to walk

☐ Yes ☐ Partially ☐ No ☐ N/A

c) Sidewalks are located away from the street

☐ Yes ☐ Partially ☐ No ☐ N/A

d) Sidewalks/corners are obstructed by utility poles, signs, or trees

☐ Yes ☐ Partially ☐ No ☐ N/A

14) Intersections are safe to cross

☐ Yes ☐ Partially ☐ No ☐ N/A

a) There are sufficient traffic signals or stop signs

☐ Yes ☐ Partially ☐ No ☐ N/A

b) Traffic signals provide enough time to cross the street

☐ Yes ☐ Partially ☐ No ☐ N/A

c) Pedestrian crossings are clearly marked

☐ Yes ☐ Partially ☐ No ☐ N/A

d) Curb ramps exist at intersections or pedestrian crossing locations

☐ Yes ☐ Partially ☐ No ☐ N/A

e) There is sufficient lighting at intersections and along the roadway

☐ Yes ☐ Partially ☐ No ☐ N/A

15) Drivers drive at safe speeds

☐ Yes ☐ Partially ☐ No ☐ N/A

a) Drivers respect/yield to pedestrians

☐ Yes ☐ Partially ☐ No ☐ N/A

16) Based upon your experience, how comfortable is it to walk in your neighborhood?

Not Comfortable		Moderately Comfortable		Very Comfortable
☐	☐	☐	☐	☐

Recommendations

17) From the list below, what would make you walk more (check all that apply).

☐ Better/more sidewalks
☐ Better/more crosswalks
☐ Better/more curb ramps
☐ Safer intersections
☐ Better crossing conditions
☐ Better lighting
☐ Better/more access to places
☐ Better/more access to public transit
☐ Slower roadway speeds
☐ Better/more police enforcement
☐ Crime prevention
☐ Better/more places to visit
☐ Places closer to home/work
☐ Better/more animals on leash enforcement
☐ Bus shelters
☐ Trees/benches
☐ Traffic calming
☐ Nothing
☐ Other (1)_____
_____
☐ Other (2)_____
_____

The **Louis Berger Group**, Inc.

Problematic Pedestrian Locations Survey

This survey is intended to identify conditions along a walking route in your neighborhood that could be improved. In the space below, please identify those locations, such as roadways or intersections that lack a sidewalk, crosswalks, curb ramps, traffic signals with pedestrian signal heads, pedestrian crossing signage, or could generally use improvement or maintenance.

Potential Pedestrian Locations for Improvements

(revised 7/12/05)

Street Name	Street Starts at or Intersecting Street	Street Ends at the Intersection of	Problems/Issues
EXAMPLE: *Old Chapel Road*	*Windsor Way*	*University Drive*	*Missing section of sidewalk, dangerous intersection, no curb ramps*

Survey to Evaluate Items for Prioritizing Pedestrian Projects

In order to determine how to proceed with future projects, we want to know what you feel should be the key items for selecting a pedestrian project. Please indicate the level of importance you would give to the following items. Using a scale from "1" (low level of importance) to "5" (high level of importance), please circle the number which best indicates the level of importance you would give each item.

DURHAM
1 8 6 9
CITY OF MEDICINE

Evaluation Items and Level of Importance

Items	Level of Importance Low				High
Presence of Sidewalks	1	2	3	4	5
Sidewalk Condition	1	2	3	4	5
Presence of Utilities/Objects Blocking Sidewalk	1	2	3	4	5
Presence of Street Lighting	1	2	3	4	5
Presence of Curb Ramps	1	2	3	4	5
Presence of Crosswalks	1	2	3	4	5
Presence of Pedestrian Signals at Street Crossings	1	2	3	4	5
Crossing Distance at Intersection	1	2	3	4	5
Better Traffic Signal Crossing Timing for Pedestrians	1	2	3	4	5
Safe Crossing Characteristics	1	2	3	4	5
Presence of Pedestrian Crossing Signage	1	2	3	4	5
Reduce Pedestrian, Bicycle & Automobile Crashes	1	2	3	4	5
Reduce Speed of Vehicles on the Roadway	1	2	3	4	5
Presence of Pedestrians	1	2	3	4	5
Presence of Major Destination (schools, parks, playgrounds)	1	2	3	4	5
Better Access to Major Destinations	1	2	3	4	5
Better access to Trails	1	2	3	4	5
Better access to Transit Stops	1	2	3	4	5
Personal Security	1	2	3	4	5
Other (please specify)_____	1	2	3	4	5

For More Information

To register your comments or questions **call** toll free ***(919) 467-9081,*** or by **fax** at **(919) 467-9458.**

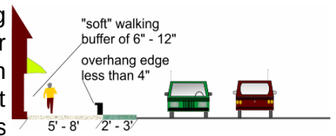
Please visit the project **web site** at ***www.durhamwalks.org***

Return Address

The Louis Berger Group, Inc.
1513 Walnut Street, Suite 250
Cary, North Carolina 27511
Attn: Scott Lane

The **Louis Berger Group**, Inc.

PROGRAMS AND POLICIES. In addition to specific projects, the *DurhamWalks!* Plan recommends a number of specific changes to the City's policies that direct how and when pedestrian facilities are constructed. The Plan speaks to traffic calming issues, sidewalk request procedures for existing neighborhoods, sidewalk construction as a part of new development, new "best practice" guidance for connecting communities and different land uses by walking, and new education and enforcement programs, some of which are described in more detail below.

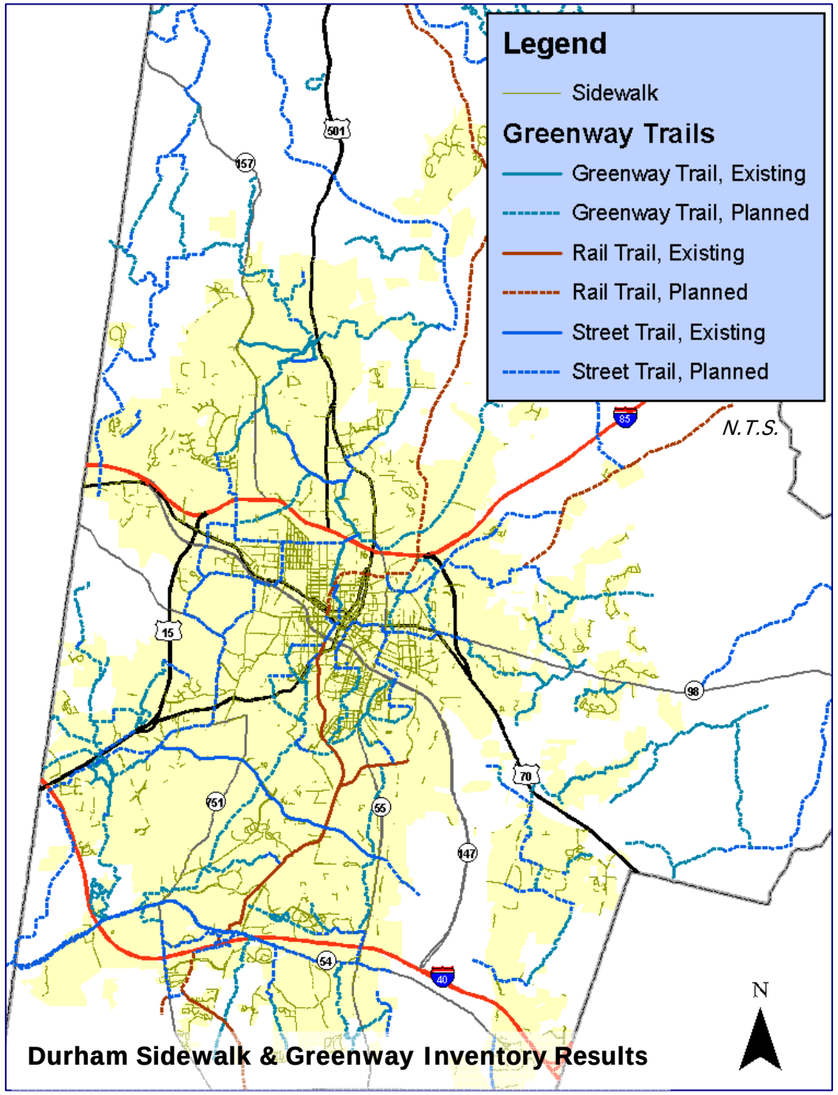


Safe Routes to School. Named after a federal program, SR2S works to achieve awareness on the part of students in elementary and middle schools about safe walking habits, and links the needs of schools with resources at local, state, and federal levels. Some of the activities suggested are:

- Sidewalk Art Contest
- Walking School Bus
- Walk-to-School Day with Parents
- Health Lesson on the Benefits of Walking
- Campus Clean-Up Day

Pedestrian Awareness Task Force. The City will begin working internally with law enforcement, engineering, and transportation staff to continually monitor and address pedestrian safety issues before they become serious. Representatives will meet quarterly to review accident data and discuss engineering, awareness, and enforcement solutions to pedestrian problems; meet with mobility handicapped persons; and develop a log-in system for recording complaints.

Other Actions. The City is recommended to increase its marketing budget for transit-related outreach activities to seniors and students; revise its current assessment policies for both private and public installation of sidewalks; and develop a certification program for new developments that exceed the standard for pedestrian, cycling, and transit accessibility.



For More Information, Please Contact Us....

Alison Carpenter, Bicycle & Pedestrian Coordinator
City of Durham Transportation Division
101 City Hall Plaza
Durham, NC 27701
919.560.4366 x284
Alison.Carpenter@durhamnc.gov
www.durhamwalks.org

Durhamwalks!

Pedestrian Plan:
Draft Summary

City of Durham, North Carolina

Durham Walks! Pedestrian Plan

Where We've Been, and What's Next

- June, 2005 — Stakeholder Committee Formed
- June — Sidewalk Inventory Starts
- July — First Set of Public Workshops
- September — Corridor and Intersection Fieldwork Completed
- October-November — Focus Group Meetings
- December — First Set of Draft Report Sections Submitted
- January, 2006 — Sidewalk Inventory Completed
- February — Project List Drafted
- February 28, 4-8pm Durham City Hall — Public Meeting
- March 27 — Public Comment Period Closed
- April 17 OR May 1 — Plan Goes to City Council

... How You Can Comment...

- Contact Us (See reverse side)
- Call Us – Plan Hotline (919.467.9081)
- Come to our **Public Meeting**

February 28, 2006
4:00pm – 8:00pm
Durham City Hall
City Council Chambers (1st Floor)
101 City Hall Plaza
Durham, NC 27701

INTRODUCTION. The City of Durham began creating its first pedestrian plan, *DurhamWalks!* ("Plan") in mid-2005. The Plan included the formation of a Stakeholder Committee that had representatives of several areas of Durham's city services, Durham Public School System, law enforcement, the North Carolina Department of Transportation (NCDOT), and others. The Stakeholder Committee met every 1-2 months to discuss various aspects of the planning process, such as creating realistic goals for the Plan, discussing public involvement strategies, how to prioritize projects, and reviewing sections of the Draft Plan as they became available.

Vision Statement

Visitors to and residents of the City walk to their destinations often because Durham has a safe, accessible, convenient and comfortable network of sidewalks, trails, and other pedestrian facilities.

Mission Statement

The City of Durham is committed to creating and maintaining a safe, accessible network of pedestrian facilities for all residents, and implementing policies and programs to inform our citizens and enforce our laws.

PUBLIC OUTREACH. During the development of *DurhamWalks!* City and consulting staff undertook a number of efforts to reach out to the public and gather information used in the Plan:

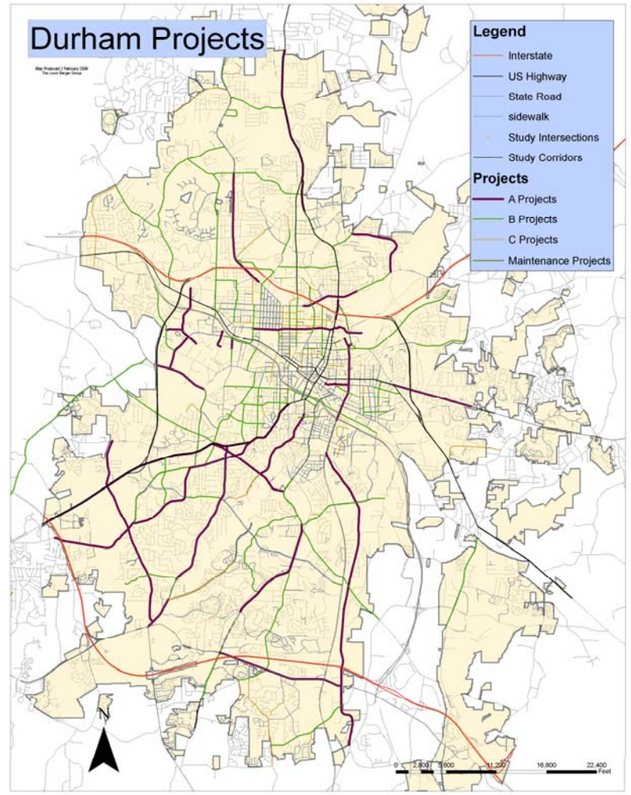
- Presented information at Partners Against Crime (PAC) Meetings
- Undertook public workshops throughout the City
- Helped 14 public schools conduct walking audits
- Established a telephone "hotline"
- Created on-line (Internet) and paper surveys
- Created a project website, **DurhamWalks.org**
- Conducted transit and law enforcement focus groups

FINANCING AND IMPLEMENTATION. During the development of the Plan (November, 2005), the City of Durham's voters passed a $3 million bond for improving and creating sidewalks around the City, reaffirming Durham's commitment to realizing the Vision of *DurhamWalks!* Durham also allocates or receives funding from general revenues, state roadway projects where pedestrian facilities are incidental to the roadway construction, and occasional earmarks for high priority projects at the federal level. Nevertheless, prioritizing projects remains a necessary part of deciding where to allocate scarce funds for future improvements.

PROJECTS. The draft *DurhamWalks!* Pedestrian Plan contains the following sections:

- *Current Conditions*
- *Existing Plans & Policies*
- *New Project Development*
- *Standards and Guidelines*
- *New Programs and Polices*
- *Implementing the Plan*

The Plan identifies a number of projects that include new sidewalks, sidewalk repairs, and intersection/safety improvements. These are indicated in the map, below.



Public comments, compatible land uses, accident histories, sidewalk condition, and proximity to schools and transit played a role in arriving at this recommended list of projects.

Appendix 2. Complete Listing of Corridor Projects and Intersection Projects, in Alphabetical Order.

PLEASE NOTE: The numbers and letters after road names have been added to for the purposes of creating a unique identifier for each proposed project. This will allow for projects that may occur on the same road but in different locations to be distinguished one from another.

Table 1. Corridor Projects and limits.

Road Name	From	To
Academy1	Duke University	Cornwallis
Academy2	Cornwallis	University
Acadia	Knox	Markham
Albany	Sprunt	Indian
AlstonA1	Trinity	Holloway
AlstonA2	Holloway	NC 147
AlstonA3	Cecil	Riddle
AlstonA4	Riddle	Cornwallis
AlstonA5	Cornwallis	Carpenter Fletcher
AlstonA6	Carpenter Fletcher	Sedwick
AlstonA7	Sedwick	TW Alexander
Ancroft	Delray	Riddle
Ancroft2	Ancroft	ATT
Anderson2	Lewis	Campus
AndersonA1	Lewis	Yearby
AngierPW	Hoover	Midway
Archdale1	Old Chapel Hill	Hope Valley
Archdale2	Alpine	Oak Ridge
Avondale	Roxboro	Geer
Barbee	Fayetteville	Herndon
Briggs	Holloway	Main
Broad1	Durham Freeway	F Street
Broad2	F Street	North Pointe
Broad3	Eatondale	Carver

Road Name	From	To
Buchanan1	Old Chapel Hill	Butler
Buchanan2	Yancey	Main
Buchanan3	Trinity	Club
Cameron	Erwin	Duke University
Campus Walk	Morrene	LaSalle
Canal	Roxboro	Gearwood
Carpenter Fletcher	E Woodcroft Pkwy	Alston
Casa	Valley	Horton
Chapel Hill1	Kent	Carroll
Chapel Hill2	Maplewood	Lakewood
Chapel Hill3	Prince	Huron
Chapel Hill4	Huron	Anderson
Chapel Hill5	Vesson	University
Cheek	Hoover	Junction
CheekPW2	Geer	Hardee
Club1	Ruffin	Ambridge
Club2	Ambridge	Dearborn
Cobb	Carroll	Duke
Cole Mill	Sparger	Hillsborough
Cook - Juliette	Fayetteville	Fayetteville
Cornwallis1	Erwin	Chapel Hill
Cornwallis3	Fayetteville	TW Alexander
CornwallisA1	15-501	Roxboro
CornwallisA2	Roxboro	Fayetteville
Corporation1	Duke	Rigsbee
Corporation2	Rigsbee	Mangum
Dacian	Buchanan	Watts
DearbornA1	Old Oxford	Ruth
DearbornA2	Ruth	Club
Dixon	University	Archdale
Duke Homestead	Carver	Guess

Road Name	From	To
Duke2	Leon	Club
Duke3	Club	Minerva
Duke4	Peabody	Memorial
Duke6	Cobb	Lakewood
DukeA1	Roxboro	Carver
DukeA2	Carver	Murray
Durham - Chapel HillA1	I-40	15-501
Durham - Chapel HillA2	15-501	Cornwallis
Durham - Chapel HillA3	Cornwallis	University
Englewood	Watts	Ruffin
Erwin1B	Kerley	Mt. Sinai
Erwin2	Cameron	LaSalle
Erwin3	Flowers	Pettigrew
Everett	Arbor	Edgevale
FayettevilleA1	Massey Chapel	Crooked Creek
FayettevilleA2	Woodcroft	MLK
FayettevilleA3	MLK	Buxton
FayettevilleA4	Buxton	Pilot
FayettevilleA5	Nelson	Pekoe
Fern	Calvin	Driver
Forestview	Forest Hills	Lakewood
Formosa	Pekoe	Concord
Foster	Hunt	Monmouth
Freeman	Clayton	Valmet
GarrettA1	Hope Valley	Swarthmore
GarrettA2	Swarthmore	Old Chapel Hill
GarrettA3	Old Chapel Hill	15-501
GarrettA4	15-501	Pickett
Geer1	Washington	Foster

Road Name	From	To
Geer3	Elizabeth	Miami
Geer4	Miami	Club
Georgia	Hillsborough	Club
Gibson	Lynn	Mineral Springs
Glendale1	Leon	Lavender
Glendale2	I-85	Corporation
Grandale	Barbee	Scott King
Green1	Oakland	Carolina
Green2	Carolina	Ninth
Green3	Ninth	Broad
Green4	Watts	Glendale
Gregson1	Duke	Club
Gregson2	Club	Markham
Guess1	Bramble	Redmond
GuessA1	Hillcrest	Carver
GuessA2	Carver	Horton
Hammond	Farthing	Roxboro
HardeePW	Holloway	Cheek
Hart	Maple	Harvard
Herndon	Barbee	Ainsley
Hillandale1	Rose of Sharon	Peppertree
Hillandale3	I-85	Fulton
HillandaleA1	Peppertree	Carver
HillandaleA2	Carver	I-85
Hillsborough1	Sparger	LaSalle
Hillsborough2	LaSalle	Ninth
HollowayA1	Guthrie	Miami
HollowayA2	Miami	Junction
HollowayA3	Junction	Chandler
Holt School	Valley	Duke
Hope Valley A1	HWY 54	Swarthmore

Road Name	From	To
Hope Valley A2	Swarthmore	Surrey
Hope Valley A3	Surrey	Archdale
Hope Valley A4	Archdale	15-501
HortonA1	Hillandale	Stadium
HortonA2	Stadium	Roxboro
HWY 54 PW2	Alston	Miami
HWY 54 PW3	Highgate	Fayetteville
HWY 54A1	Fayetteville	Barbee
HWY 54A2	Barbee	NC55
HWY 54A3	NC 55	Alston
Hyde Park	Fern	Drew
Indian	Hillandale	Albany
James	Lakewood	University
Jester	Alston	end
Juniper	Hanover	Miami
Kenan	Duke Homestead	Carver
Kent1	Morehead	Lakewood
Kent2	Lakewood	University
Knox1	Watts	Vista
Lakewood1	Chapel Hill	University
Lakewood2	University	Blackwell
LaSalleA1	Kangaroo	Erwin
LaSalleA2	Sprunt	Kangaroo
Latta	Guess	Roxboro
Lebanon	Guess	Guess
Leon	Duke	Glendale
Liberty1	Dillard	Alston
Liberty2	Park	Miami
Luther	Rose of Sharon	Rose of Sharon
Lynn	Gibson	Miami
Main	Briggs	Gary

Road Name	From	To
Maple1	Liberty	Taylor
Maple2	Taylor	Angier
Markham1	Ninth	Washington
Markham2	Washington	Avondale
Martin Luther King	Yorktown	HWY 55
Maryland	Guess	Club
Masondale	Roxboro	Formosa
Mathison	Ridgeway	End
Merrimac	Morehead	House
Miami	Angier	Stirrup Creek
MidlandPW	Cheek	Geer
Milton	Tom Wilkinson	Roxboro
Morehead1	Anderson	Shepherd
Morehead3	Duke	Roxboro
Morreene1	Neal	Campus Walk
Morreene2	Campus Walk	Erwin
Murray	Broad	Roxboro
Newby	Horton	Holt School
Ninth	Club	Pettigrew
North Bend	Carpenter Fletcher	Meridian
North Pointe	Woodmont	Broad
Oakland	Sprunt	Green
Old Chapel Hill A1	Pope	Garrett
Old Chapel Hill A2	University	Archdale
Old Chapel Hill A3	Archdale	University
Old Oxford	Roxboro	Dearborn
Pettigrew	Fayetteville	Briggs
Pinecrest	Academy	Marion
Randolph	Solterra Way	Pickett
RaynorPW	Miami	Hardee
RiddleA1	Fayetteville	HWY 55

Road Name	From	To
RiddleA2	HWY 55	Ellis
Ridgeway	Mathison	Lakeland
Rose of Sharon	Cole Mill	Guess
Roxboro2	Pacific	Murray
Roxboro3	Davidson	Knox
Roxboro5	Holloway	Liberty
Roxboro6	Enterprise	Cornwallis
Roxboro7	Cornwallis	Oak Ridge
Roxboro8	Juliette	Hope Valley
RoxboroA1	Pacific	Monk
RoxboroA2	Monk	Infinity
RoxboroA3	Infinity	Tom Wilkinson
Seaton	Revere	Wenonah
Sedwick	Grandale	Alston
Shannon	Durham-Chapel Hill	Old Chapel Hill
Shoreham	University	Stuart
Solitude	Whisperwood	Sedwick
Sparger	Cole Mill	Stafford
Swarthmore	end	Hope Valley
Swift	Duke University	Durham Freeway
Taylor1	Elizabeth	Alston
Taylor3	Guthrie	Gary
Tom Wilkinson	Milton	Roxboro
Trinity2	Rosetta	Edgar
Umstead1	Scout	Merrick
Umstead2	Riverdale	Guess
University1	Old Chapel Hill	Ivy Creek
University2	Martin Luther King	Old Chapel Hill
University3	Old Chapel Hill	Hope Valley
University4	Hope Valley	Forest Hills
University5	Forest Hills	Lakewood

Road Name	From	To
Urban	Buchanan	Washington
Valley	Casa	Holt School
Vickers	Proctor	University
Wabash	end	Plum
Ward	Chapel Hill	Forest Hills
Washington	Glendale	Urban
Watts	Green	Englewood

Table 2. List of Intersection Projects in Alphabetical Order.

Intersection Name
15-501 and Garrett
Academy and Cranford
Alston and Lawson
Anderson and I-85
ATT at I-40
ATT Crossing at Cook Rd
Avondale and I-85
Broad and Club
Broad and Green
Broad and Guess
Broad and I-85
Broad and Main
Broad and Markham
Broad and Perry
Broad and Pettigrew
Chalk Level and Horton
Chapel Hill and Pettigrew
Clermont and Grandale
Club and Gregson
Club and Guess
Club and Oakland

Intersection Name
Dowd and Cleveland
Duke and I-85
Duke and Main
Duke University and Chapel
Durham Freeway and Swift
E Forest Hill and University
Erwin and Anderson
Erwin and Blue Bottle
Erwin and Randolph
Erwin between Fulton and Kent (hospital crossing)
Fayetteville and Barbee
Fayetteville and I-40
Fayetteville Crossing for SW Elementary
Fulton and Durham Freeway
Garrett and Old Chapel Hill
Garrett and Trotter Ridge
Glendale and Acadia
Glendale and Club
Glendale and Washington
Great Jones and Main
Gregson Mid-block crossing
Guess and Horton
Highgate and HWY 54
Hillandale and Club
Hillandale and I-85
Hillsborough and Lasalle
Hope Valley and HWY 54
HWY 54 and Fayetteville
HWY 55 and Carpenter Fletcher
HWY 55 and HWY 54
I-85 and Guess

Intersection Name
I-85 on ramp and Ruby
Juniper and Hyde Park
Kenan and Carver
Lasalle and Erwin
Mangum and Markham
Mt. Sinai and Erwin
Mt. Sinai and Kerley
Ninth and Green
Ninth and Main
North Pointe and Broad
Oval and Oakland/Woodrow
Randolph and Pickett
Revere and Clermont
Ridgeway and Wabash
Rollingwood and HWY 54
Roxboro and Club
Roxboro and Erie
Roxboro and I-85
Roxboro and Knox
Roxboro and Lawson
Roxboro and Markham
Trent and Hillsborough
W Forest Hills and University
Washington and Glendale
Washington and Knox
Woodcroft and Copper Creek

Please note: Two intersections that received comment during the planning period but were not within the city limits were the intersection of Stagville and Bahama and the intersection of Mt. Sinai and Kerley.

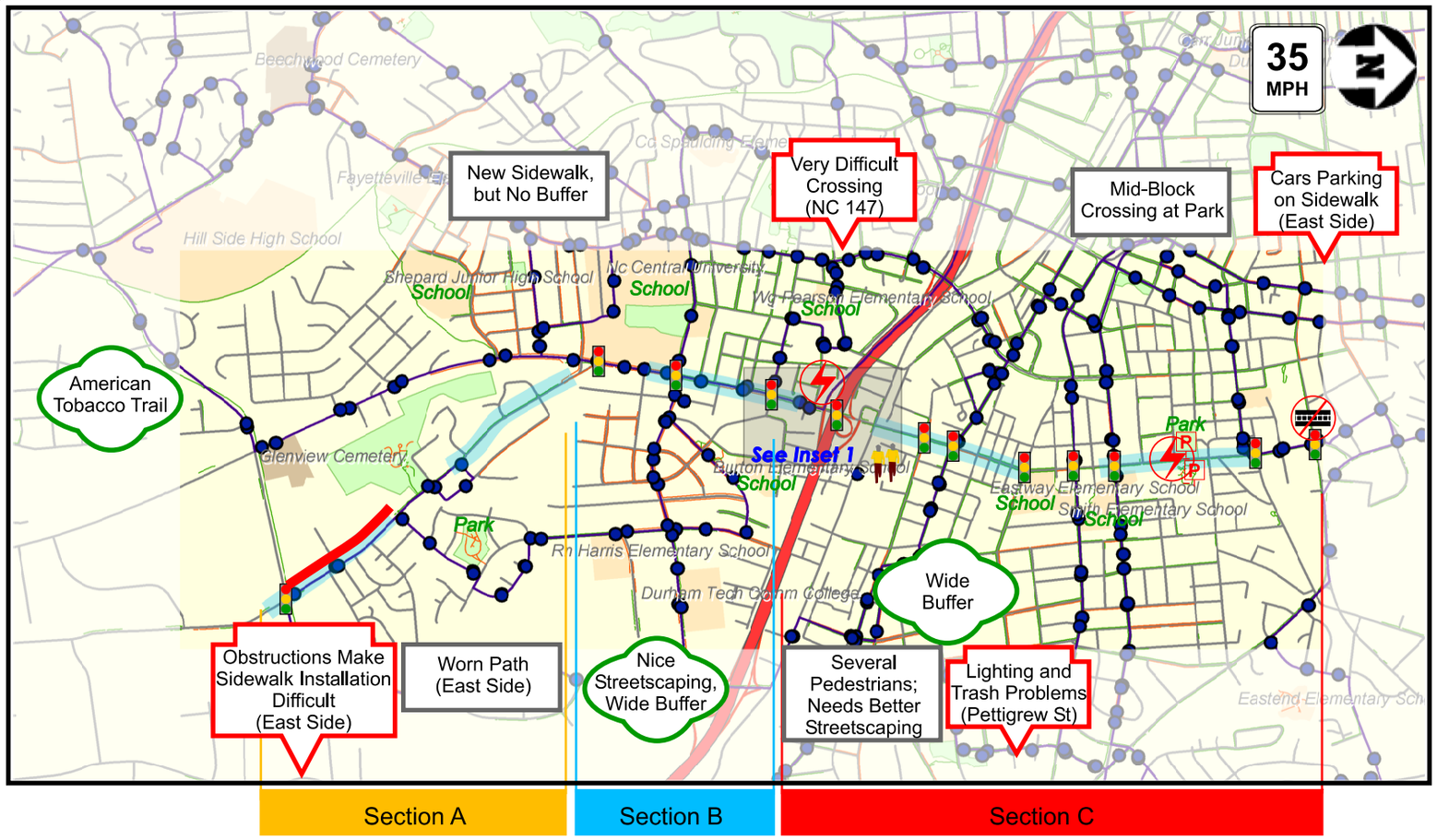
THIS PAGE LEFT INTENTIONALLY BLANK.

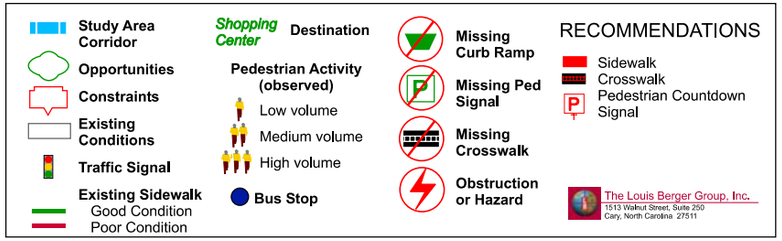
Appendix 3. Study Corridors and Intersections.

The following "Opportunities and Constraints" Maps show assessments of selected study corridors and intersections from Section 4 of the Plan. These maps identify existing pedestrian-related features as well as issues that currently inhibit pedestrian travel and constraints that may be present to restrict future improvements. Finally, the maps also provide recommended treatments and proposed future areas of study.

THIS PAGE LEFT INTENTIONALLY BLANK.

Alston Avenue



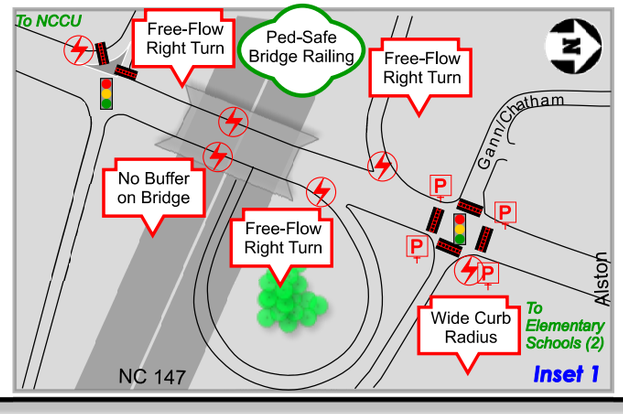


COMMENTS

Section A. Connecting with the American Tobacco Trail on the south end, this section is recommended for a sidewalk connection from the ATT to existing, new sidewalk on the west side of the street. The new sidewalk does not have a buffer between pedestrians and traffic. Much of the rest of this corridor has sidewalk, although in varying condition.

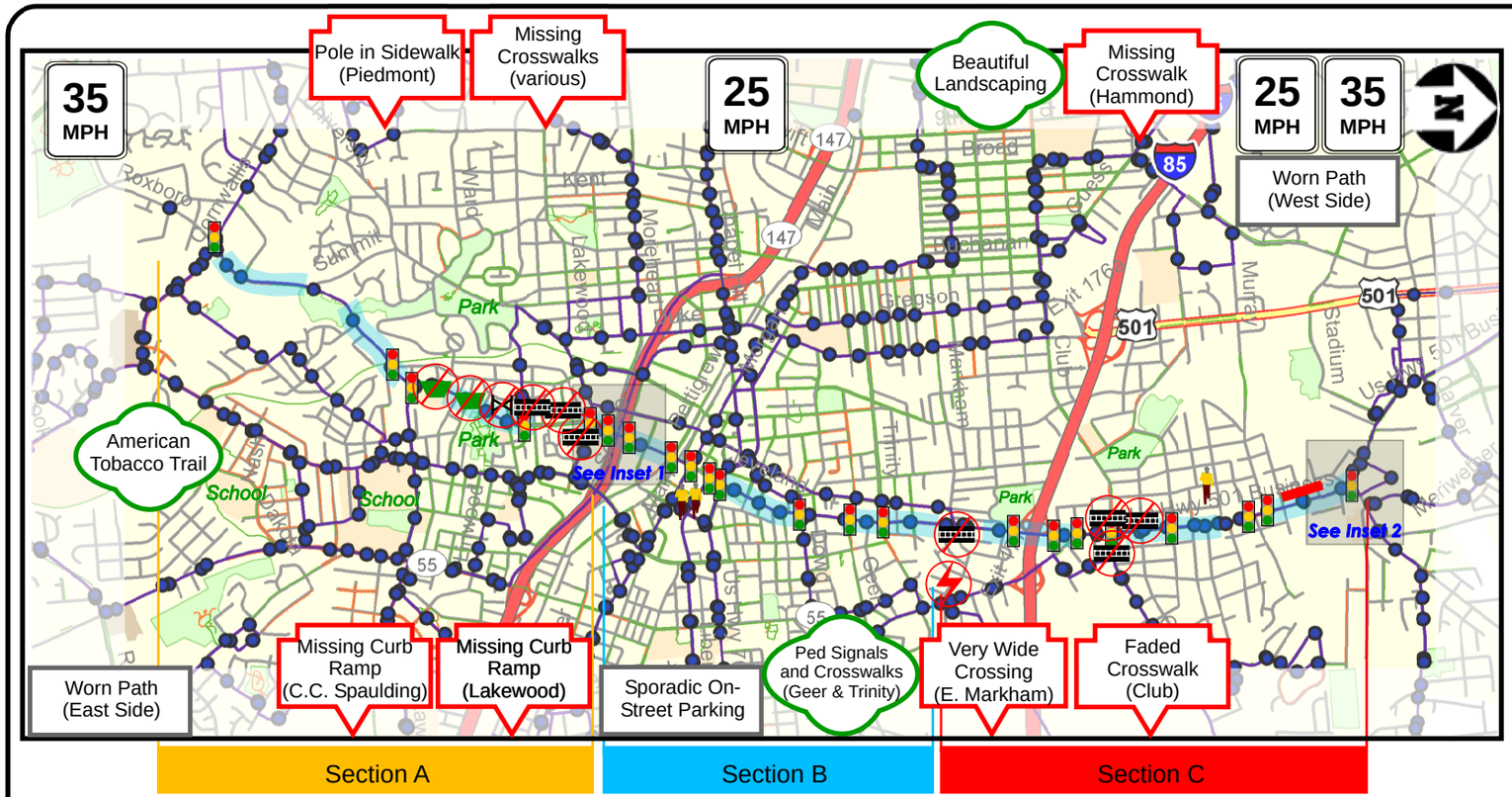
Section B. This section includes N.C. Central University. In sharp contrast to the Fayetteville Street corridor, Alston Avenue is wide and not dominated by pedestrians, nor does it include the amenities (trees, pedestrian-scale lighting, furniture) that characterize Fayetteville Street. However, numerous schools close to this section make it an important consideration for maintenance and reducing some curb radii of cross-streets.

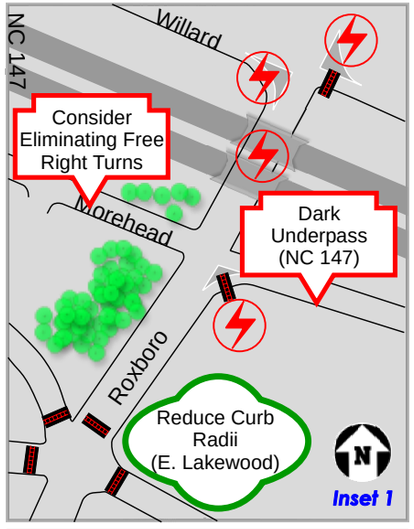
Section C. Extending from NC 147 to Main Street, this long section is punctuated by parks and elementary schools (Eastway and South). An existing mid-block crossing connecting two sides of a park would benefit from a pedestrian signal. As with the Fayetteville Street corridor, the NC 147 interchange area presents a major barrier to north-south foot traffic. Installing crosswalks, tightening corner radii, raising the pedestrian island, and providing pedestrian signals may improve this area (see Inset 1). Interchange areas pose particular problems balancing high through and turning vehicular traffic volumes with the needs of pedestrians. Better, consistent streetscaping could help send a message to pedestrians and motorists alike that this area also belongs to both kinds of traveler.

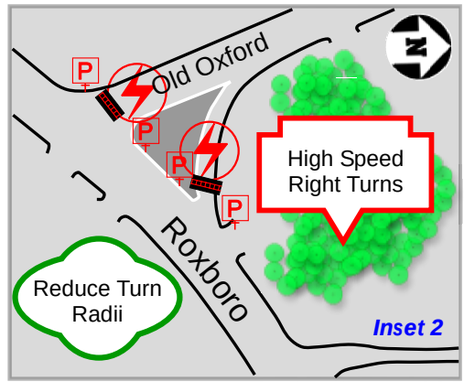


THIS PAGE LEFT INTENTIONALLY BLANK.

Roxboro Street





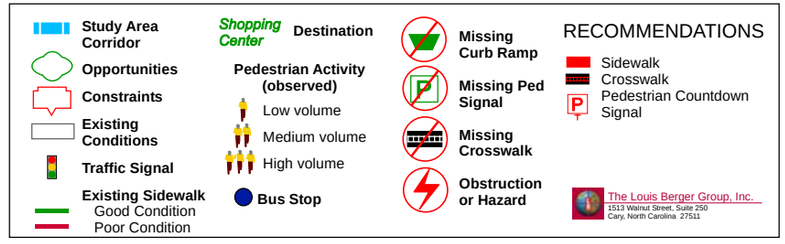


COMMENTS

Section A. Several streets south of Lawson have skewed angles, missing crosswalks, and wide curb return radii, making walking difficult.

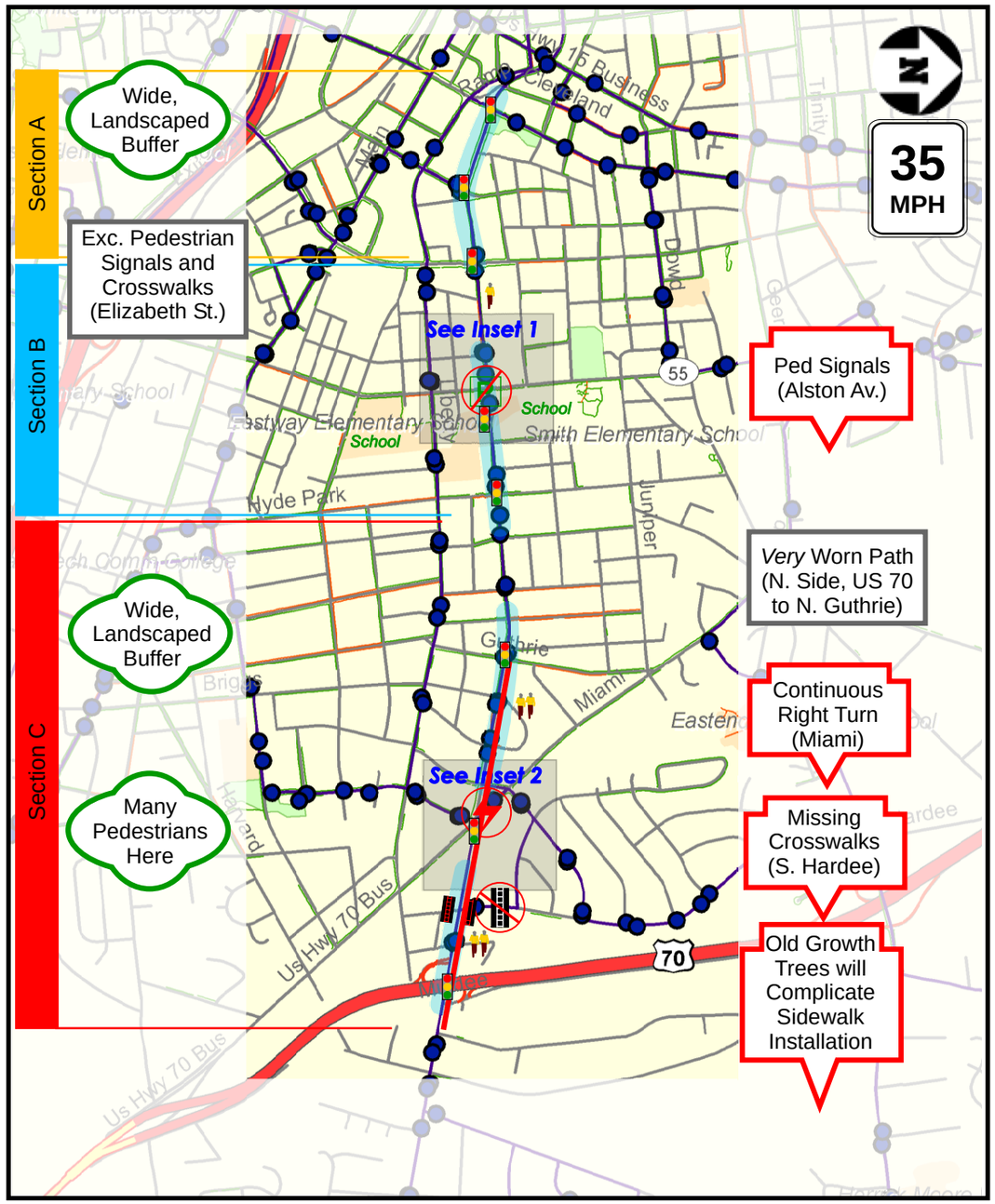
Section B. This one-way section of Roxboro Street also encompasses the traditional downtown area of Durham. Several cross-streets should be considered for curb radii reductions, which seem overly large for the downtown area where traffic should be moving slowly. Pedestrians present in abundance in the downtown "loop" indicate a need for continuing to focus on streetscaping treatments to aid small businesses and promote walking.

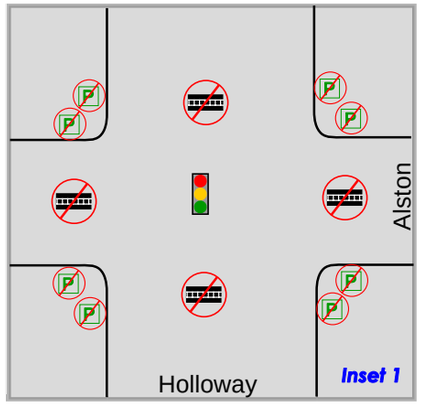
Section C. Sporadic sidewalk is present on north end of this segment, as well as a deeply worn path north of Channing Street. The design of the existing sidewalk is obviously older, with single curb ramps in most locations and small or non-existent buffers between pedestrians and traffic on the predominantly four-lane roadway. Crosswalks are missing on Ellerbee, Lavender, Hammond, and Club (all near Northgate Park), and many of the curb radii seem too wide for the predominant land use (residential and small businesses) and number of people walking. South of Knox Street, older-growth trees shade the street and quickly provide a remarkable change of visual pace from the I-85 interchange area.

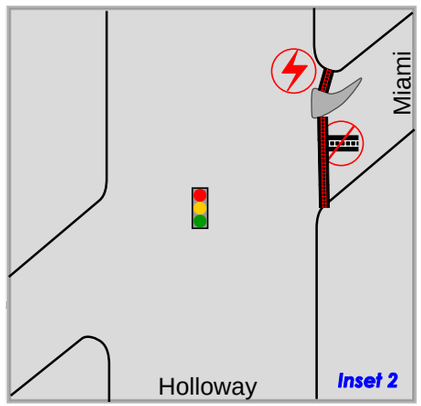


THIS PAGE LEFT INTENTIONALLY BLANK.

Holloway Street







COMMENTS

Section A. The west end of Holloway Street is a scenic gateway into the city core, with wide, nicely landscaped buffers facing standard 5' sidewalk. Large shade trees help provide a good comfort level on this stretch of the roadway, although fewer pedestrians were noted here than on the south end of the corridor. Some commercial and institutional uses are in place along this section.

Section B. Anchored by two elementary schools (Eastway on the south side and Smith on the north) and a neighborhood park, this section is important to many children in nearby neighborhoods. Special attention needs to be paid to the intersection of Alston Avenue and Holloway Street, which lacks pedestrian signals and crosswalk on all four approaches. Residential and some commercial uses are found on the street, with residential neighborhoods further back.

Section C. The most pedestrians in this corridor are to be found in this section, many of whom are young adults, not children. Commercial properties help draw people from the adjacent neighborhoods. However, the lack of sidewalk facilities, particularly on the north side of Holloway Street, makes this a more treacherous environment for pedestrians although the presence of some large trees may make sidewalk construction problematic. Wide turning radii at Miami and the NC 147 on/off ramps contribute to less-than-desirable conditions at these locations; raising the channel island and installing crosswalks may help, but shortening the right-turn angle to slow cars from Miami Blvd. is also desirable.

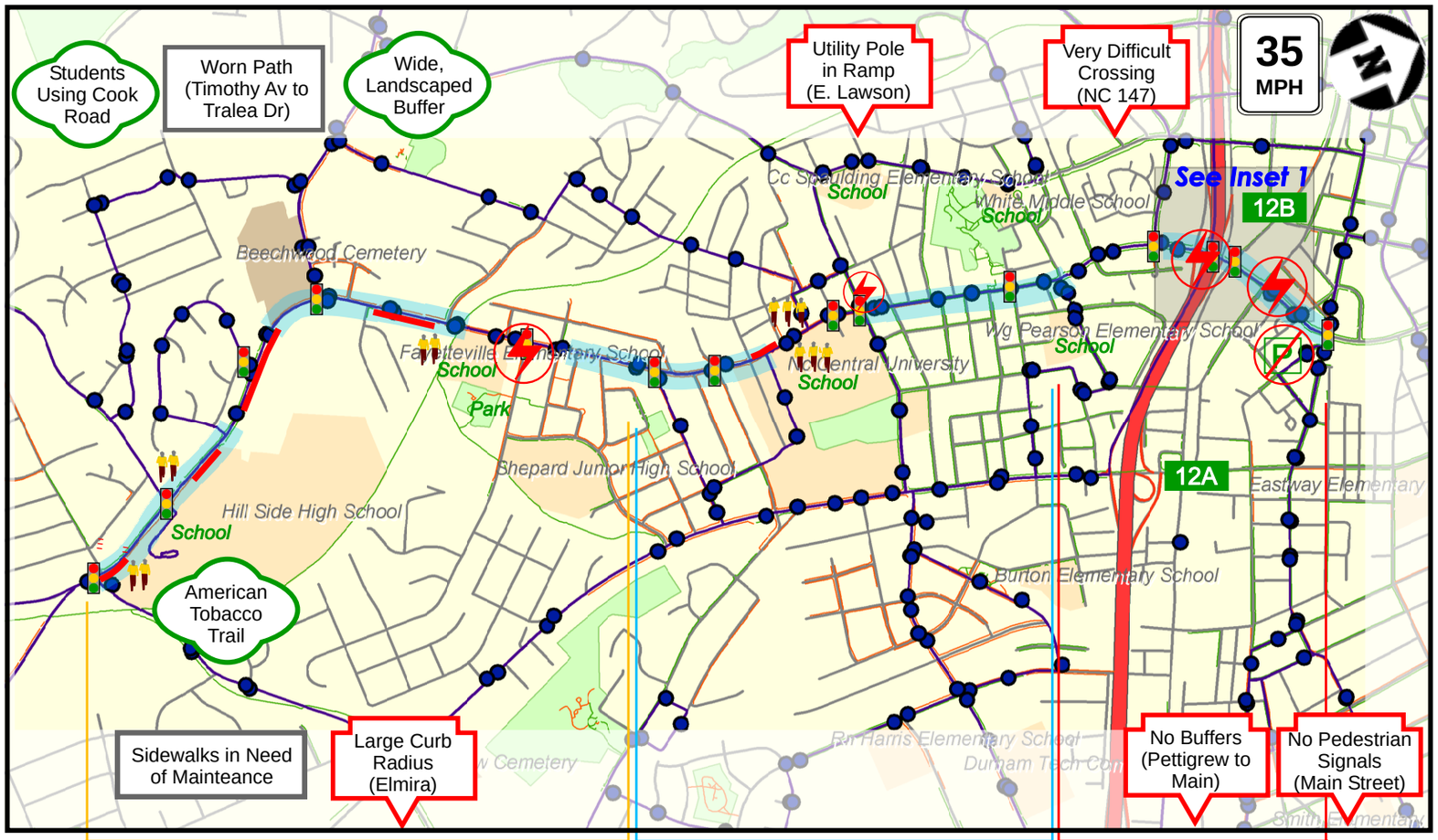
- Study Area Corridor
- Opportunities
- Constraints
- Existing Conditions
- Traffic Signal
- Existing Sidewalk — Good Condition / Poor Condition
- *Shopping Center* Destination
- Pedestrian Activity (observed): Low volume, Medium volume, High volume
- Bus Stop
- Missing Curb Ramp
- Missing Ped Signal
- Missing Crosswalk
- Obstruction or Hazard

RECOMMENDATIONS
- Sidewalk
- Crosswalk
- Pedestrian Countdown Signal

The Louis Berger Group, Inc.
1513 Walnut Street, Suite 250
Cary, North Carolina 27511

THIS PAGE LEFT INTENTIONALLY BLANK.

Fayetteville Street



Study Area Corridor
Opportunities
Constraints
Existing Conditions
Traffic Signal
Existing Sidewalk
Good Condition
Poor Condition
Shopping Center Destination
Pedestrian Activity (observed)
Low volume
Medium volume
High volume
Bus Stop
Missing Curb Ramp
Missing Ped Signal
Missing Crosswalk
Obstruction or Hazard

RECOMMENDATIONS
Sidewalk
Crosswalk
Pedestrian Countdown Signal

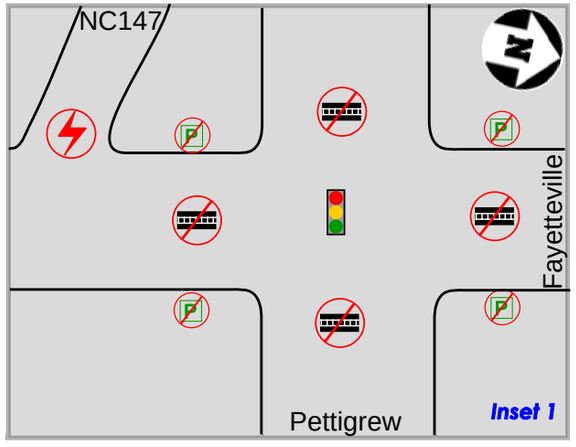
The Louis Berger Group, Inc.
1513 Walnut Street, Suite 250
Cary, North Carolina 27511

COMMENTS

Section A. Notably, this section includes Hill Side High School and connects with the American Tobacco Trail near Riddle Road. Numerous small groups of pedestrians were observed at the south end of this section and frequently use Cook Road (no sidewalk). Unfortunately, this section exhibited some of the worst sidewalk maintenance in any of the studied corridors, including side streets in the residential neighborhoods. Some stretches had nicely landscaped, wide buffer areas between pedestrians and motor vehicles.

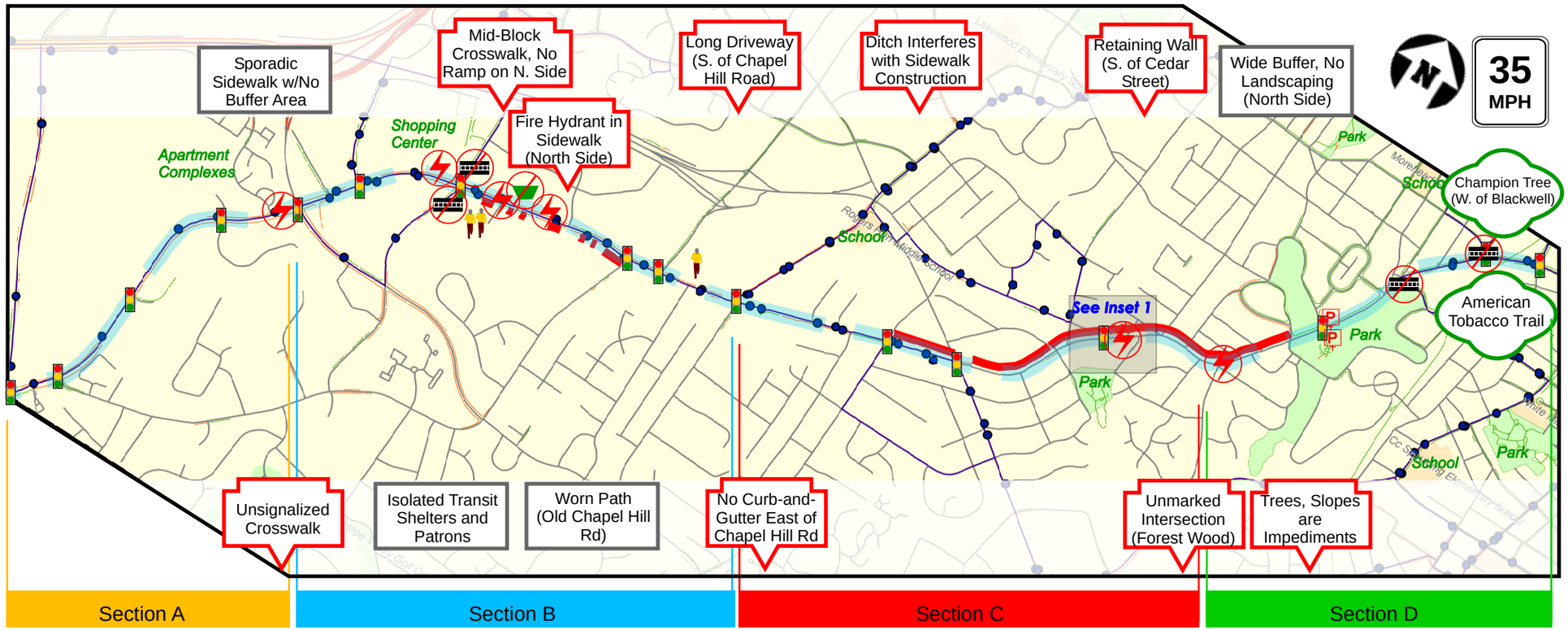
Section B. This section includes N.C. Central University, and the area in front of NCCU exhibited the most pedestrians of any area surveyed. Street furniture (garbage receptacles, benches), wide sidewalks and buffers between traffic and people, and pedestrian-scale lighting send the message that this area is great for walking - and it is used accordingly. The condition of the sidewalk on both sides is in need of some repair.

Section C. This section centers on the interchange area of NC 147. Like the Alston Corridor, the interchange off-ramps entering Fayetteville Street impede safe pedestrian travel due to high-speed right turning movements. Pedestrian signals at Pettigrew crossing Fayetteville Street are recommended (see Inset 1, below).



THIS PAGE LEFT INTENTIONALLY BLANK.

University Drive



Study Area Corridor
Opportunities
Constraints
Existing Conditions
Traffic Signal
Existing Sidewalk
Good Condition
Poor Condition

Shopping Center Destination

Pedestrian Activity (observed)
Low volume
Medium volume
High volume

Bus Stop

Missing Curb Ramp
Missing Ped Signal
Missing Crosswalk
Obstruction or Hazard

RECOMMENDATIONS
Sidewalk
Crosswalk
Pedestrian Countdown Signal

The Louis Berger Group, Inc.
1513 Walnut Street, Suite 250
Cary, North Carolina 27511

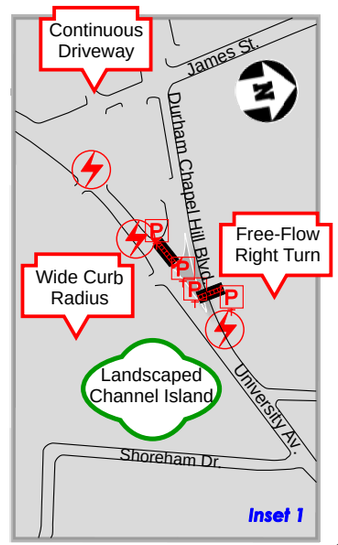
COMMENTS

Section A. The west end of the corridor is notable for a number of apartment complexes walking distance of South Square. Areas with no pedestrian buffer east of Ivey Creek, plus a 150' break in the sidewalk (easily constructed) south of Shannon Road could be targeted to improve access. While most of Sections A and B are five-lane (center turn lane) cross-sections, the west end of this section has a landscaped median for a portion of its length. This section generally has the best intersection treatments.

Section B. This section encompasses the South Square Mall area. Crosswalks on Shannon Road; signalizing a mid-block crossing and adding curb ramps; adding buffers to sidewalks (north side of street), and removing various obstructions to pedestrians would be beneficial to increasing pedestrian activity to the major retail generator. MLK, Jr. Boulevard is remarkable for its complete crosswalks, full-circle pedestrian signals, and dual curb ramps on every approach.

Section C. With fewer pedestrian generators nearby, this section has fewer traffic signals than section B and less potential for foot traffic. Nevertheless, a middle school and park are located within walking distance. Ditching close to the curb line between Hope Valley Rd. and W. Cornwallis Rd. will make sidewalk installation difficult in this area (north side of street). See Inset 1 for issues regarding Durham Chapel Hill Blvd.

Section D. Anchored by Forest Hills Park, this northernmost section also eventually "underpasses" NC 147 to reach the Durham Bulls Athletic Park and downtown. West Forest Hills (especially) and Forest Hills Blvd. have large, sweeping curb radii, making high-speed right turns possible and pedestrian crossings hazardous at these locations. Trees and steep slopes make sidewalk installation on the east side of the section problematic and will make a continuous path to section C east of W. Cornwallis Road difficult.



THIS PAGE LEFT INTENTIONALLY BLANK.

OPPORTUNITIES & CONSTRAINTS

No pedestrian-related crashes reported within the past three years.

The posted speed limits are 35mph on Alston Avenue and 35 mph on Lawson Street.

Discontinuous sidewalk.

Worn footpath from pedestrian use.

Truck traffic.

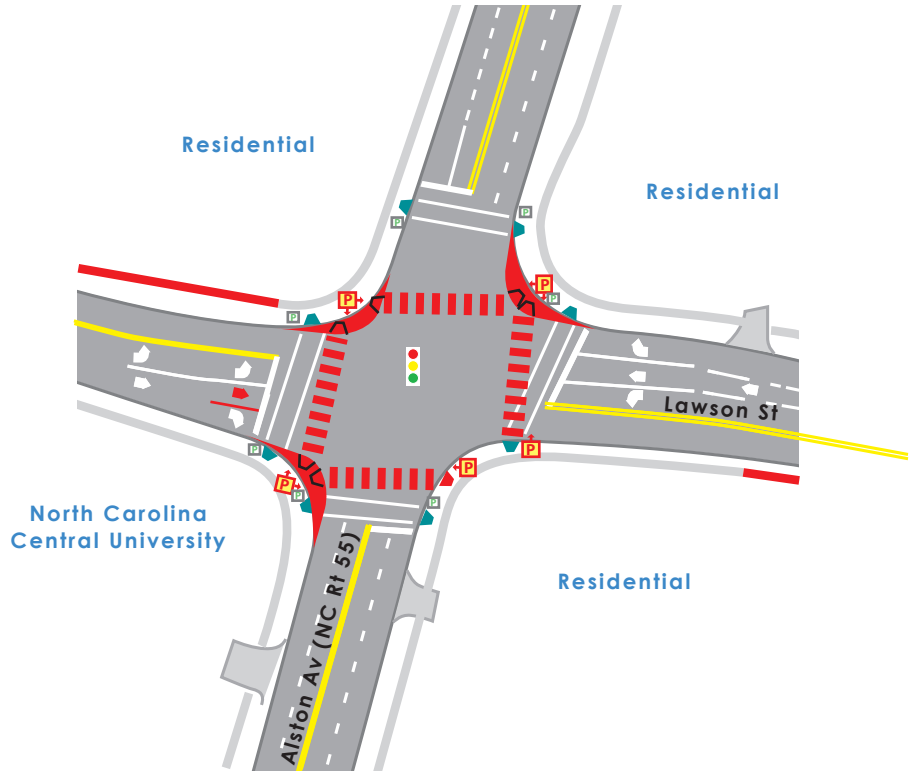
Motorists speed.

Large radii on all corners encourages motorists to speed around the corner.

Discontinuous sidewalks.

University students travel through the intersection.

RECOMMENDATIONS



RECOMMENDATIONS:

- Construct sidewalks: on the north side of the western leg of Lawson Street and on the south side of the eastern leg.
- Install: curb extensions on the northeast, northwest and southwest corners; curb ramps on all corners; pedestrian countdown signals on all corners; and high visibility crosswalks across each leg of the intersection.
- On Lawson Street in the eastbound direction, install a white strip delineating the thru movement, including straight arrow.

LEGEND

- Opportunities
- Constraints
- Existing Conditions
- Sidewalk
- Crosswalk
- Curb Ramp
- Traffic Signal
- Pedestrian Signalhead

RECOMMENDATIONS

- Sidewalk
- High Visibility Crosswalk
- Curb Ramp
- Median Island/Curb Extension
- Pedestrian Countdown Signalhead

Map Source/Age: City of Durham/2005

DURHAM 1869 CITY OF MEDICINE

DATE: February 2006

City of Durham
Comprehensive Pedestrian Plan

OPPORTUNITIES & CONSTRAINTS and RECOMMENDATIONS MAP

Alston Avenue & Lawson Street Intersection

The Louis Berger Group, Inc.

FIGURE I-1

THIS PAGE LEFT INTENTIONALLY BLANK.

OPPORTUNITIES & CONSTRAINTS

No pedestrian related crashes reported at this intersection within the past 3 years.

The posted speed limits are 35 mph on Broad Street and 25 mph on Perry Street.

Pedestrian corridor due to the shopping center and the 9th Street commercial area located to the west.

Large diameter street trees create sight line issues.

No sidewalk.

Mature trees and stone wall run parallel to Broad Street.

Campus path is heavily used by students.

Wide existing shoulder.

Bull City Shopping Center.

No stop bar.

Existing pedestrian crossing sign should be relocated to the crosswalk.

Map Source/Age: City of Durham/2005

RECOMMENDATIONS

RECOMMENDATIONS:

- Due to the environmental constraints on the west side of Broad Street, further evaluate the for the construction of a sidewalk is warranted.
- Relocate the existing pedestrian crossing sign to the crosswalk.
- Extend the curb approximately 8 feet on the east side of the intersection to reduce the pedestrian crossing distance. An additional option includes:
  (1) Install a concrete median with a pedestrian refuge area on the northern leg of Broad Street including a high visibility crosswalk.
  (2) Realign the travel lanes by removing the shoulder strip and installing a concrete median island with pedestrian refuge area. (NOT SHOWN)
  (3) In the event a bicycle lane or route is implemented along Broad Street the curb extension design should be reconsidered.
- Install a stop bar on Perry Street, including a 50-foot long double yellow strip median.

LEGEND

Opportunities
Constraints
Existing Conditions
Sidewalk
Crosswalk
Curb Ramp
Traffic Signal
S Stop Sign
P Pedestrian Crossing Sign

RECOMMENDATIONS
Sidewalk
Sidewalk (environmental evaluation required)
High Visibility Crosswalk
Curb Ramp
Median Island/Curb Extension
Stop Bar
No Parking (25 feet from intersection)
Double yellow striped median

DURHAM 1869 CITY OF MEDICINE

DATE: February 2006

City of Durham
Comprehensive Pedestrian Plan

OPPORTUNITIES & CONSTRAINTS and RECOMMENDATIONS MAP

Broad Street & Perry Street Intersection

The Louis Berger Group, Inc.

FIGURE I-2

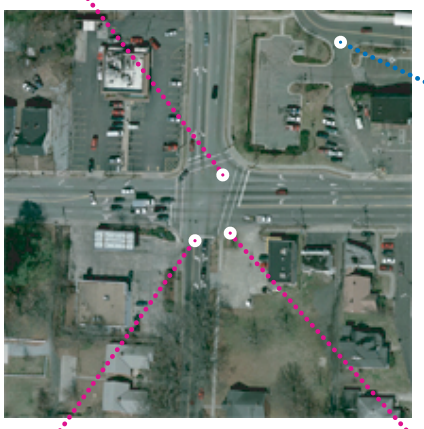
THIS PAGE LEFT INTENTIONALLY BLANK.

OPPORTUNITIES & CONSTRAINTS

One pedestrian-related crash reported at the intersection within the past 3-years.

The posted speed limits are 35 mph for West Club Road and 35 mph for North Buchanan Blvd.

Large radii at each corner encourages motorists to speed around the corner.

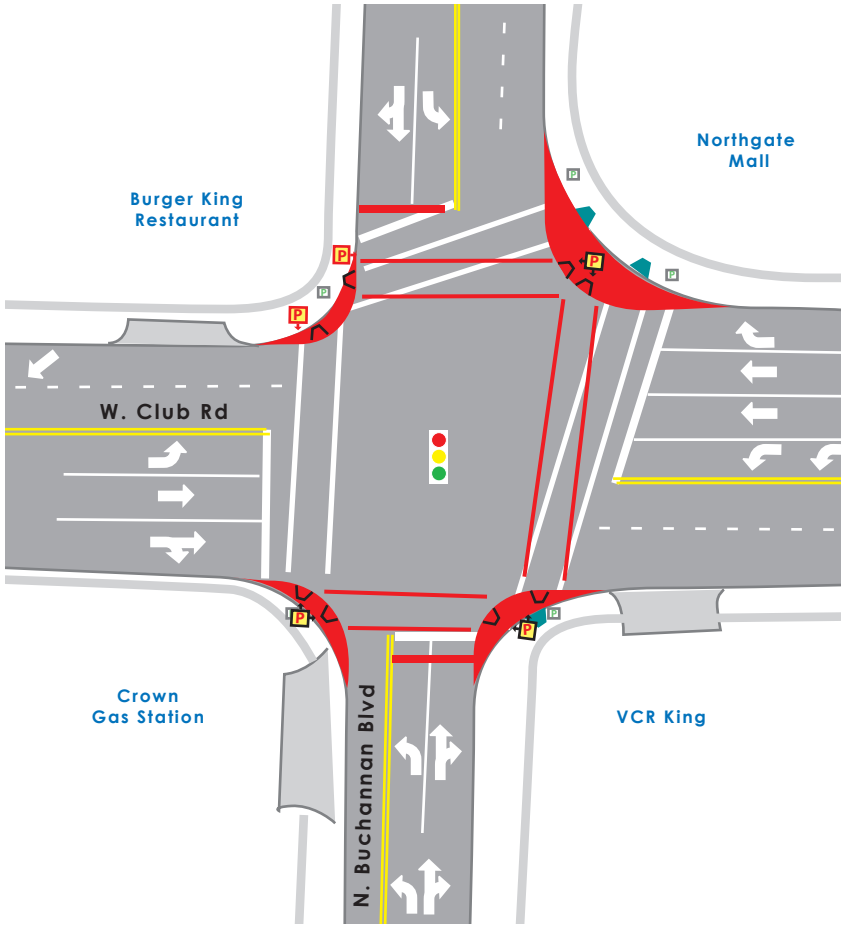


People walk to Northgate Mall from surrounding residential communities such as Walltown.

No crosswalk.

No curb ramp.

RECOMMENDATIONS



RECOMMENDATIONS:

- Install curb extensions on all corners including a curb ramps and pedestrian countdown signals.
- LONG TERM: Consolidate or relocate driveways away from the intersection.

Map Source/Age: City of Durham/2005

LEGEND

- Opportunities
- Constraints
- Existing Conditions
- Sidewalk
- Crosswalk
- Curb Ramp
- Traffic Signal
- Pedestrian Signalhead

RECOMMENDATIONS

- Crosswalk
- Curb Ramp
- Median Island/Curb Extension
- Pedestrian Countdown Signalhead
- Stop Bar

DURHAM 1869 CITY OF MEDICINE

DATE: February 2006

City of Durham
Comprehensive Pedestrian Plan

OPPORTUNITIES & CONSTRAINTS and RECOMMENDATIONS MAP

West Club Road & North Buchanan Boulevard Intersection

The Louis Berger Group, Inc.

FIGURE I-3

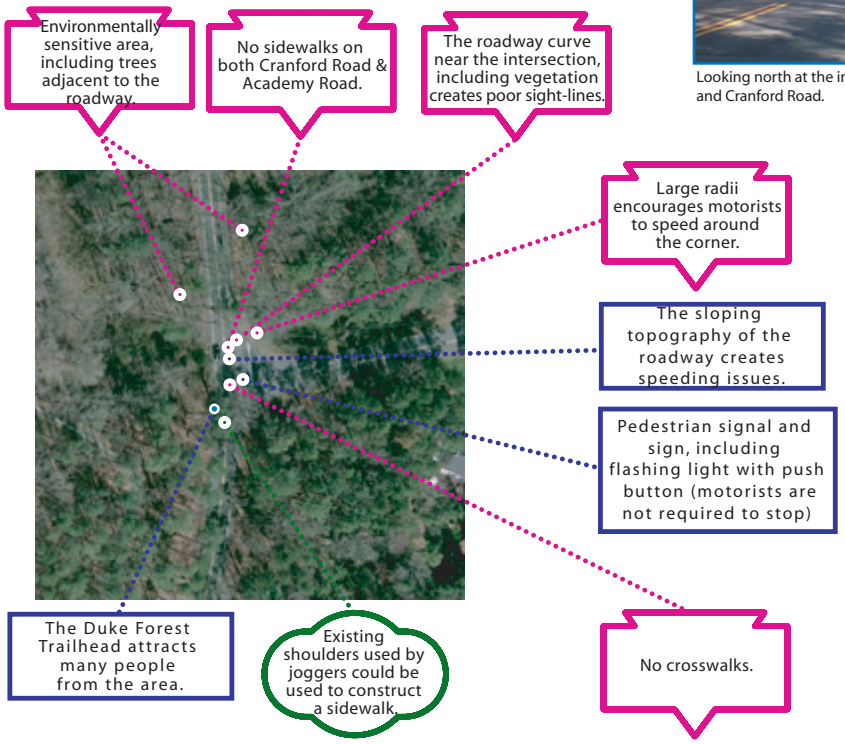
THIS PAGE LEFT INTENTIONALLY BLANK.

OPPORTUNITIES & CONSTRAINTS

No pedestrian-related crashes were reported at this intersection within the past 3-years.

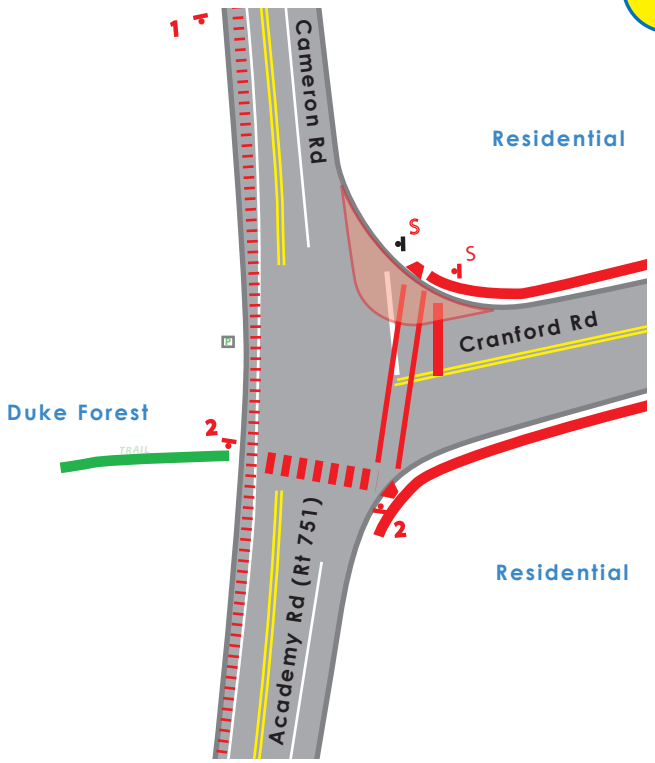
The posted speed limit for Academy Rd/Cameron Rd is 35 mph.

Looking north at the intersection of Cameron Road and Cranford Road.



Map Source/Age: City of Durham/2005

RECOMMENDATIONS



RECOMMENDATIONS:

- Install sidewalks on both sides of Cranford Road.
- Install a high visibility crosswalk across the southern leg of Academy Road due to the poor sight lines for southbound traveling motorists.
- Install a crosswalk across Cranford Road, which will require the relocation of the stop sign and stop bar.
- Install pedestrian crossing signs at and in advance of the proposed crosswalk across Academy Road.
- Evaluate reducing the corner radii with a physical or painted curb extension.
- Evaluate the feasibility of constructing a sidewalk on the westside of Academy Road/Cameron Road within the shoulder lane while taking into account the environmental sensitivity of the area; this may require the realignment of the roadway lanes to accommodate a new sidewalk.
- A pedestrian refuge island may be constructed to improve the safety of pedestrians crossing Academy Road/Cameron Road. However, roadway alignments would have to be investigated further to ensure safe roadway design.
- Install an overhanging pedestrian crossing sign over the roadway for better visibility of the crossing.

LEGEND

Opportunities
Constraints
Existing Conditions
Sidewalk
Crosswalk
Curb Ramp

S Stop Sign
1 Pedestrian X-ing Warning Sign
2 Pedestrian X-ing Sign

RECOMMENDATIONS

Sidewalk
Sidewalk (environmental evaluation required)
Crosswalk
High Visibility Crosswalk
Curb Ramp
Physical or painted curb extension (to be determined)

DURHAM 1869 CITY OF MEDICINE

DATE: February 2006

City of Durham
Comprehensive Pedestrian Plan

OPPORTUNITIES &CONSTRAINTS and RECOMMENDATIONS MAP

Cranford Road and Cameron Rd/Academy Rd Intersection

The Louis Berger Group, Inc.

FIGURE I-4

THIS PAGE LEFT INTENTIONALLY BLANK.

OPPORTUNITIES & CONSTRAINTS

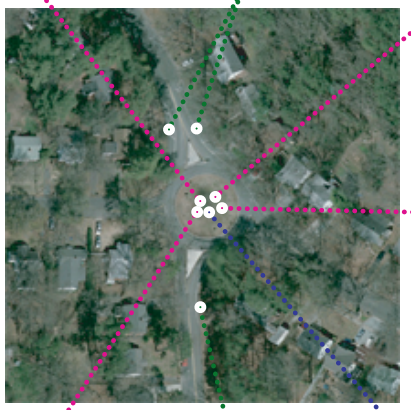
No pedestrian-related crashes were reported at this intersection within the past 3-years.

The posted speed limits are 35 mph on Colgate Avenue, 35 mph on Washington Street, and 35 mph on Glendale Avenue.

No sidewalks on both sides all roadways.

Existing shoulder area.

The roundabout was constructed without pedestrian amenities.



No crosswalks across all roadways.

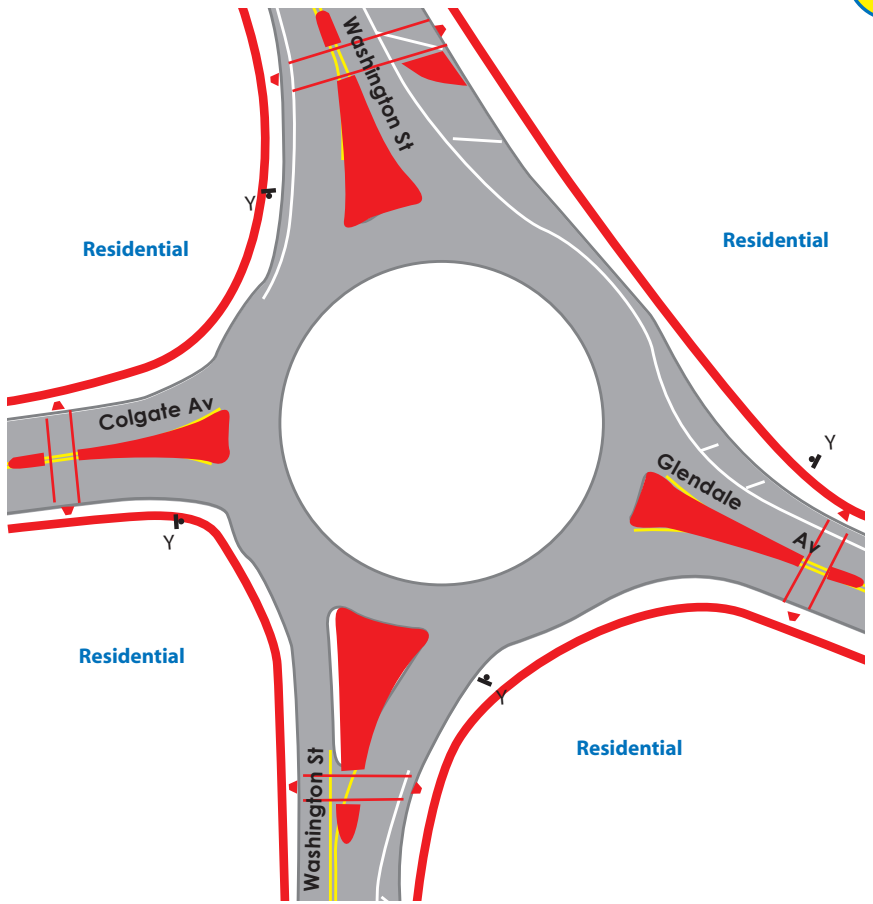
No curb ramps on all corners.

Existing shoulder area.

Pedestrians travel through the intersection, some pushing baby strollers.

Map Source/Age: City of Durham/2005

RECOMMENDATIONS



RECOMMENDATIONS:

- Construct sidewalks along both sides of Washington Street, Colgate Avenue and Glendale Avenue.
- Install curb ramps at each corner.
- Redesign the concrete splinter islands on all approaches to the roundabout, including pedestrian crossing with refuge areas. On Washington Street realign the shoulder to accomodate the travel lane.
- Install a curb extension on the northern leg of Washington Street within the shoulder area to provide a pedestrian refuge area.
- The redesign of this intersection should include the potential for a future bicycle lanes.

LEGEND

- Opportunities
- Constraints
- Existing Conditions
- Sidewalk
- Crosswalk
- Curb Ramp
- Traffic Signal
- Y Yield Sign

RECOMMENDATIONS

- Sidewalk
- Crosswalk
- Curb Ramp
- Median Island/Curb Extension

DURHAM 1869 CITY OF MEDICINE

DATE: February 2006

City of Durham
Comprehensive Pedestrian Plan

EXISTING CONDITIONS, OPPORTUNITIES & CONSTRAINTS, and RECOMMENDATIONS MAP

Glendale Av & Washington St & Colgate Av Intersection

The Louis Berger Group, Inc.

FIGURE I-5

THIS PAGE LEFT INTENTIONALLY BLANK.

OPPORTUNITIES & CONSTRAINTS

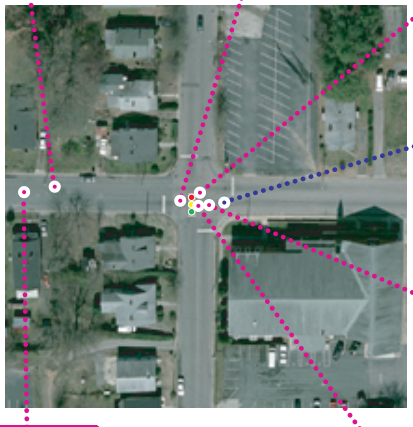
Two pedestrian-related crashes were reported within the past 3 years.

The posted speed limits are 35 mph on North Hyde Park Street and 35 mph on Juniper Street.

Motorist speed along the roadway.

Discontinuous or no sidewalks on both sides of each roadway.

No crosswalks across each roadway.



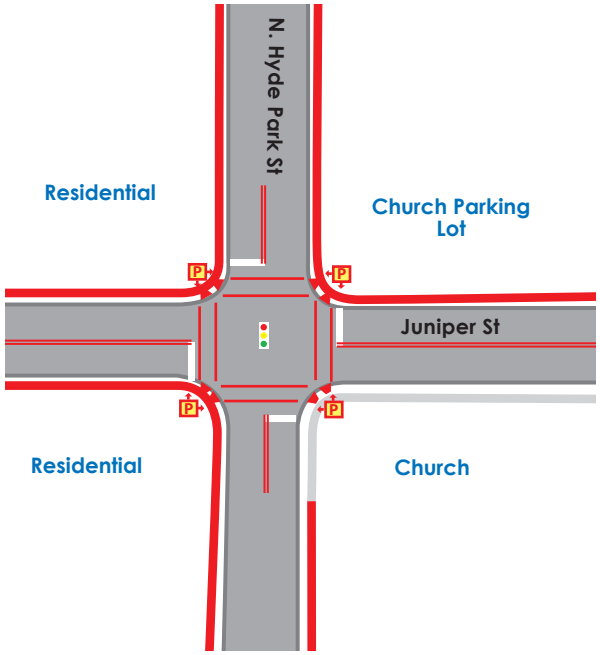
On Sunday pedestrian volume crossing the roadway from the parking lot is high.

No curb ramps on all four corners.

Dip in the roadway may create poor sight lines.

No pedestrian signalheads to indicate when a pedestrain should cross the street

RECOMMENDATIONS



RECOMMENDATIONS:

- Install sidewalks: on both sides of the northern and southern legs of North Hyde Park Street; and both sides of the western leg of Juniper Street and on the north side of the eastern leg.
- Install a high visibility crosswalk across the eastern and western leg of Juniper Street.
- Install crosswalks across all roadway legs.
- Install pedestrian countdown signalheads.
- Install double yellow pavement marking median .

Map Source/Age: City of Durham/2005

LEGEND

- Constraints
- Existing Conditions
- Sidewalk
- Traffic Signal

RECOMMENDATIONS

- Sidewalk
- Crosswalk
- Curb Ramp
- Median Island/Curb Extension
- Pedestrian Countdown Signalhead
- Double yellow pavement marking median

DURHAM 1869 CITY OF MEDICINE

DATE: February 2006

City of Durham
Comprehensive Pedestrian Plan

OPPORTUNITIES & CONSTRAINTS and RECOMMENDATIONS MAP

North Hyde Park Street & Juniper Street Intersection

The Louis Berger Group, Inc.

FIGURE I-6

THIS PAGE LEFT INTENTIONALLY BLANK.

OPPORTUNITIES & CONSTRAINTS

No pedestrian-related crashes were reported at this intersection with the past 3-years.

The posted speed limit for Roxboro Street is 35 mph.

Duke Park has active recreation facilities.

Worn path created by pedesrains travelling along the roadway.

Due to heavy vehicular volume pedestrians have difficult crossing safely.

Pedestrians walk from the residential neighborhood to Duke Park.

No sidewalks on both sides of the roadway.

No stop bars and double yellow striped median on both legs of Knox Street.

No crosswalks.

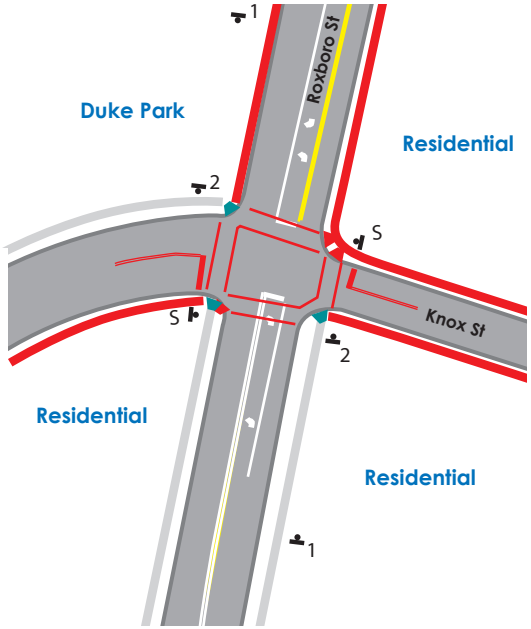
No curb ramp.

Roxoboro Street is a connector to I-185 and therefore traffic volume is heavy.

Street trees near intersection create poor sight lines.

Map Source/Age: City of Durham/2005

RECOMMENDATIONS



RECOMMENDATIONS:

- Install crosswalks across each leg of the intersection; stop bars on Roxboro Street will have to be setback, as a result.
- Construct sidewalks on both sides of the eastern leg of Knox Street and on the south side of the western leg; and on both sides of the northern leg of Roxboro Street.
- Install pedestrian crossing and warning signs at and in advance of the crosswalk on Roxboro Street.
- Install stop bar on both the western and eastern legs of Knox Street.
- Install double yellow striped pavement marking median on both the western and eastern legs of Knox Street.
- Realign existing curb ramp on the south west corner to accomomodate both directions of pedestrian travel.
- Evaluate the need to conduct a signal warrant analysis for the intersection

LEGEND

- Constraints
- Existing Conditions
- Sidewalk
- Curb Ramp
- S Stop Sign
- 1 Pedestrian X-ing Warning Sign
- 2 Pedestrian X-ing Sign

RECOMMENDATIONS

- Sidewalk
- Crosswalk
- Curb Ramp
- Double yellow pavement marking median
- Stop Bar

DURHAM 1869 CITY OF MEDICINE

DATE: February 2006

City of Durham
Comprehensive Pedestrian Plan

OPPORTUNITIES & CONSTRAINTS and RECOMMENDATIONS MAP

Knox Street & Roxboro Street Intersection

The Louis Berger Group, Inc.

FIGURE I-7

THIS PAGE LEFT INTENTIONALLY BLANK.

OPPORTUNITIES & CONSTRAINTS

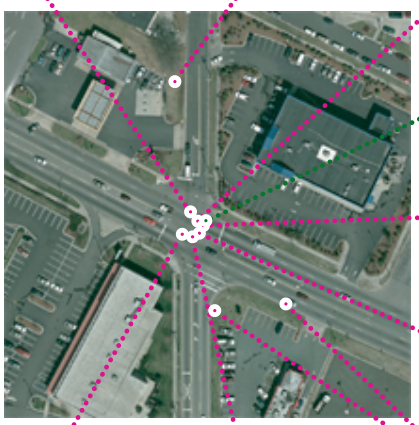
Two pedestrian-related crashes were reported at the intersection within the past 3-years.

The posted speed limits are 35 mph for North LaSalle Street and 35 mph for Hillsborough Street

Large radii at all corners encourages motorists to speed around the corner.

No sidewalk.

No opportunity for pedesrtians to cross Hillsborough St.



The geometry of the intersection would permit the construction of pedestrian islands.

No pedestrian signalheads to alert pedestrians when to cross.

No curb ramps on most corners.

No crosswalks across three of the intersecting roadways.

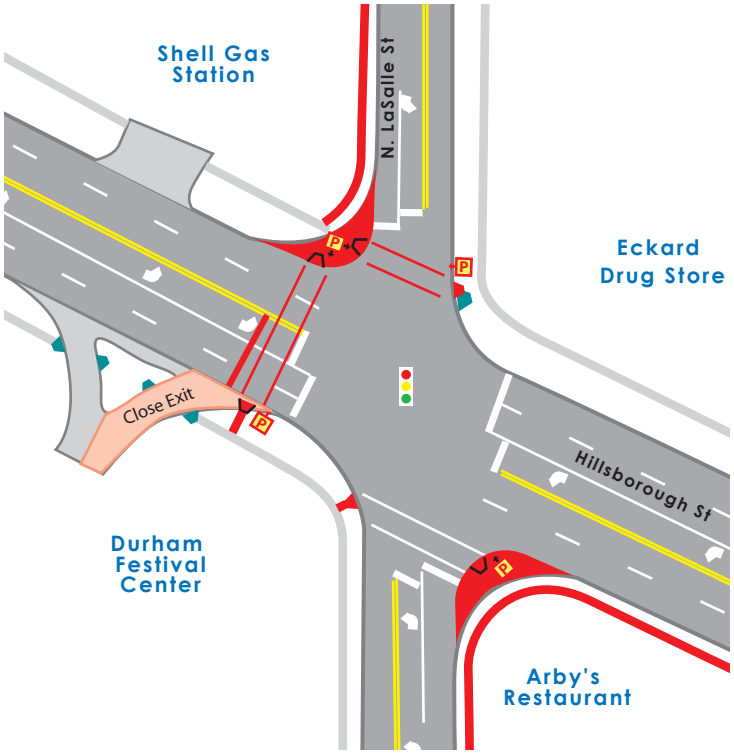
Long travel distance for pedestrians.

No sidewalk.

Commercial shops in the area could generate pedestrian traffic.

Map Source/Age: City of Durham/2005

RECOMMENDATIONS



RECOMMENDATIONS:

- Install sidewalks on North LaSalle Street on the west side of the northern leg and on the east side of the southern leg; and on the south side of the eastern leg of Hillsborough Street.
- Install curb ramps on the northwest, southeast and southwest corners.
- Install a crosswalk across the northern leg of North LaSalle Street and the western leg of Hillsborough Street.
- Install curb extenstions on the northwest and southeast corners.
- Install pedestrian countdown signalheads with sufficient pedestrian crossing time.
- Close the exit lane by the southwest corner of Hillsborough Street to establish the pedestrian crossing and improve vehicular circulation at the intersection.

LEGEND

Opportunities
Constraints
Existing Conditions
Sidewalk
Crosswalk
Curb Ramp
Traffic Signal
S Yield Sign

RECOMMENDATIONS
Sidewalk
Crosswalk
Curb Ramp
Curb Extension
Pedestrian Countdown Signalhead
Stop Bar

DURHAM
1 8 6 9
CITY OF MEDICINE

DATE: February 2006

City of Durham
Comprehensive Pedestrian Plan

OPPORTUNITIES & CONSTRAINTS and RECOMMENDATIONS MAP

North LaSalle Street & Hillsborough Street Intersection

The Louis Berger Group, Inc.

FIGURE I-8

THIS PAGE LEFT INTENTIONALLY BLANK.

OPPORTUNITIES & CONSTRAINTS

Two pedestrian-related crashes at the intersection within the past 3-years.

The posted speed limits are 40 mph for Old Chapel Hill Road/University Road and 40 mph for Garret Road.

Large radii permits motorist to speed around the corner.

Pedestrian crossing signal timing is too short to walk across the roadway safely.

Crosswalks are askew increasing the crossing distance for pedestrians.

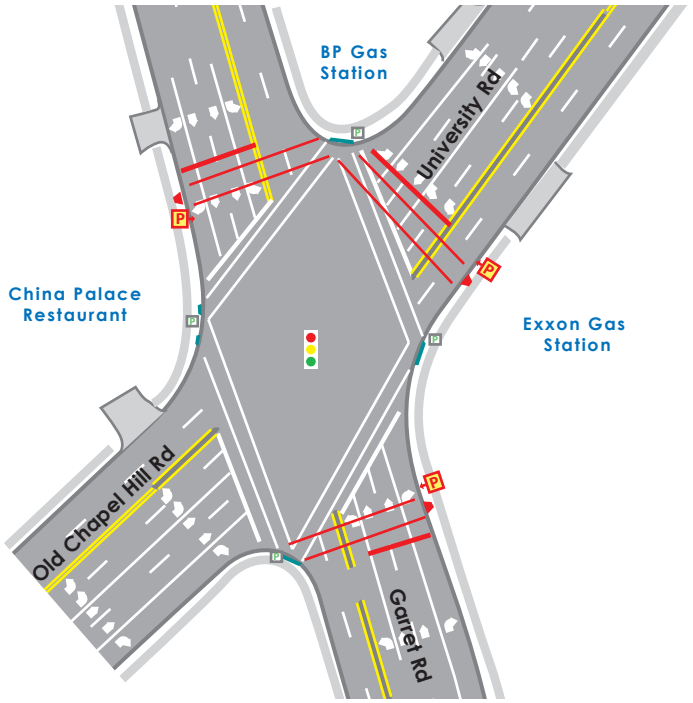
Intersection was recently reconstructed.

Bus routes travel along both roadways.

Within the vicinity of the intersection is Githens Middle School and residential buildings.

Map Source/Age: City of Durham/2005

RECOMMENDATIONS



RECOMMENDATIONS:

- Realign crosswalks across University Road and both legs of Garret Road to reduce the pedestrian crossing distance; install curb ramps to link with the realigned crosswalks. The realignment of the crosswalks will require vehicular travel lanes to be setback on all three legs, except Old Chapel Hill Road.
- Increase the traffic signal's pedestrian walk time.
- Install pedestrian countdown signalheads for all crossings.

NOTE: Due to the recent reconstruction of the intersection, and unless there is significant pedestrian safety issues, these recommendations are long term.

LEGEND

- Opportunities
- Constraints
- Existing Conditions
- Sidewalk
- Crosswalk
- Curb Ramp
- Traffic Signal
- Pedestrian Signalhead

RECOMMENDATIONS

- Sidewalk
- Crosswalk
- Curb Ramp
- Pedestrian Countdown Signalhead
- Stop Bar

DURHAM 1869 CITY OF MEDICINE

DATE: February 2006

City of Durham
Comprehensive Pedestrian Plan

OPPORTUNITIES & CONSTRAINTS and RECOMMENDATIONS MAP

Old Chapel Hill Rd/University Rd & Garret Rd Intersection

The Louis Berger Group, Inc.

FIGURE I-9

THIS PAGE LEFT INTENTIONALLY BLANK.

Appendix 4. Corridor by Rank.

Corridor Projects

PLEASE NOTE: The numbers and letters after road names have been added to for the purposes of creating a unique identifier for each proposed project. This will allow for projects that may occur on the same road but in different locations to be distinguished one from another.

Table 1. "A" Rank Projects in alphabetical order.

Road Name	From	To
AlstonA6	Carpenter Fletcher	Sedwick
Avondale	Roxboro	Geer
Cameron	Erwin	Duke University
Campus Walk	Morrene	LaSalle
CheekPW2	Geer	Hardee
Club1	Ruffin	Ambridge
CornwallisA1	15-501	Roxboro
DearbornA1	Old Oxford	Ruth
FayettevilleA2	Woodcroft	MLK
GarrettA1	Hope Valley	Swarthmore
HillandaleA1	Peppertree	Carver
HillandaleA2	Carver	I-85
Hope Valley A1	HWY 54	Swarthmore
Hope Valley A4	Archdale	15-501
LaSalleA1	Kangaroo	Erwin
Markham2	Washington	Avondale
Roxboro2	Pacific	Murray
Roxboro6	Enterprise	Cornwallis
University3	Old Chapel Hill	Hope Valley

Table 2. "B" Rank Projects in alphabetical order.

Road Name	From	To
Academy1	Duke University	Cornwallis
Academy2	Cornwallis	University

Road Name	From	To
AlstonA1	Trinity	Holloway
AlstonA2	Holloway	NC 147
AlstonA3	Cecil	Riddle
AlstonA5	Cornwallis	Carpenter Fletcher
Anderson2	Lewis	Campus
AndersonA1	Lewis	Yearby
AngierPW	Hoover	Midway
Barbee	Fayetteville	Herndon
Broad1	Durham Freeway	F Street
Broad2	F Street	North Pointe
Buchanan3	Trinity	Club
Carpenter Fletcher	E Woodcroft Pkwy	Alston
Chapel Hill5	Vesson	University
Cheek	Hoover	Junction
Club2	Ambridge	Dearborn
Cobb	Carroll	Duke
Cook - Juliette	Fayetteville	Fayetteville
Cornwallis1	Erwin	Chapel Hill
Cornwallis3	Fayetteville	TW Alexander
DearbornA2	Ruth	Club
Duke2	Leon	Club
Duke4	Peabody	Memorial
Duke6	Cobb	Lakewood
DukeA1	Roxboro	Carver
DukeA2	Carver	Murray
Durham - Chapel HillA1	I-40	15-501
Durham - Chapel HillA2	15-501	Cornwallis
Durham - Chapel HillA3	Cornwallis	University
Erwin1B	Kerley	Mt. Sinai
Erwin2	Cameron	LaSalle
Erwin3	Flowers	Pettigrew

Road Name	From	To
FayettevilleA1	Massey Chapel	Crooked Creek
FayettevilleA3	MLK	Buxton
FayettevilleA4	Buxton	Pilot
FayettevilleA5	Nelson	Pekoe
Freeman	Clayton	Valmet
GarrettA2	Swarthmore	Old Chapel Hill
GarrettA3	Old Chapel Hill	15-501
GarrettA4	15-501	Pickett
Geer3	Elizabeth	Miami
Geer4	Miami	Club
Gregson2	Club	Markham
GuessA1	Hillcrest	Carver
GuessA2	Carver	Horton
HardeePW	Holloway	Cheek
Hillandale1	Rose of Sharon	Peppertree
Hillandale3	I-85	Fulton
Hillsborough1	Sparger	LaSalle
HollowayA1	Guthrie	Miami
HollowayA2	Miami	Junction
HollowayA3	Junction	Chandler
Hope Valley A3	Surrey	Archdale
HortonA1	Hillandale	Stadium
HortonA2	Stadium	Roxboro
HWY 54 PW2	Alston	Miami
HWY 54 PW3	Highgate	Fayetteville
HWY 54A1	Fayetteville	Barbee
HWY 54A2	Barbee	NC55
HWY 54A3	NC 55	Alston
Juniper	Hanover	Miami
Kent2	Lakewood	University
Lakewood1	Chapel Hill	University

Road Name	From	To
Lakewood2	University	Blackwell
LaSalleA2	Sprunt	Kangaroo
Latta	Guess	Roxboro
Lebanon	Guess	Guess
Leon	Duke	Glendale
Liberty1	Dillard	Alston
Liberty2	Park	Miami
Main	Briggs	Gary
Markham1	Ninth	Washington
Miami	Angier	Stirrup Creek
MidlandPW	Cheek	Geer
Milton	Tom Wilkinson	Roxboro
Morehead3	Duke	Roxboro
Morreene1	Neal	Campus Walk
Morreene2	Campus Walk	Erwin
Murray	Broad	Roxboro
North Pointe	Woodmont	Broad
Old Chapel Hill A1	Pope	Garrett
Old Oxford	Roxboro	Dearborn
Pettigrew	Fayetteville	Briggs
Randolph	Solterra Way	Pickett
RaynorPW	Miami	Hardee
RiddleA1	Fayetteville	HWY 55
RiddleA2	HWY 55	Ellis
Roxboro3	Davidson	Knox
Roxboro5	Holloway	Liberty
RoxboroA1	Pacific	Monk
RoxboroA2	Monk	Infinity
RoxboroA3	Infinity	Tom Wilkinson
Sedwick	Grandale	Alston
Shannon	Durham-Chapel Hill	Old Chapel Hill

Road Name	From	To
Swift	Duke University	Durham Freeway
Taylor1	Elizabeth	Alston
Taylor3	Guthrie	Gary
Trinity2	Rosetta	Edgar
Umstead1	Scout	Merrick
University1	Old Chapel Hill	Ivy Creek
University2	Martin Luther King	Old Chapel Hill
University4	Hope Valley	Forest Hills
University5	Forest Hills	Lakewood
Washington	Glendale	Urban

Table 3. "C" Rank Projects by alphabetical order.

Road Name	Extent From	Extent To
Acadia	Knox	Markham
Albany	Sprunt	Indian
AlstonA4	Riddle	Cornwallis
AlstonA7	Sedwick	TW Alexander
Ancroft	Delray	Riddle
Ancroft2	Ancroft	ATT
Archdale1	Old Chapel Hill	Hope Valley
Archdale2	Alpine	Oak Ridge
Briggs	Holloway	Main
Broad3	Eatondale	Carver
Buchanan1	Old Chapel Hill	Butler
Buchanan2	Yancey	Main
Canal	Roxboro	Gearwood
Casa	Valley	Horton
Chapel Hill1	Kent	Carroll
Chapel Hill2	Maplewood	Lakewood
Chapel Hill3	Prince	Huron
Chapel Hill4	Huron	Anderson

Road Name	Extent From	Extent To
Cole Mill	Sparger	Hillsborough
CornwallisA2	Roxboro	Fayetteville
Corporation1	Duke	Rigsbee
Corporation2	Rigsbee	Mangum
Dacian	Buchanan	Watts
Dixon	University	Archdale
Duke Homestead	Carver	Guess
Duke3	Club	Minerva
Englewood	Watts	Ruffin
Everett	Arbor	Edgevale
Fern	Calvin	Driver
Forestview	Forest Hills	Lakewood
Formosa	Pekoe	Concord
Foster	Hunt	Monmouth
Geer1	Washington	Foster
Georgia	Hillsborough	Club
Gibson	Lynn	Mineral Springs
Glendale1	Leon	Lavender
Glendale2	I-85	Corporation
Grandale	Barbee	Scott King
Green1	Oakland	Carolina
Green2	Carolina	Ninth
Green3	Ninth	Broad
Green4	Watts	Glendale
Gregson1	Duke	Club
Guess1	Bramble	Redmond
Hammond	Farthing	Roxboro
Hart	Maple	Harvard
Herndon	Barbee	Ainsley
Hillsborough2	LaSalle	Ninth
Holt School	Valley	Duke

Road Name	Extent From	Extent To
Hope Valley A2	Swarthmore	Surrey
Hyde Park	Fern	Drew
Indian	Hillandale	Albany
James	Lakewood	University
Jester	Alston	end
Kenan	Duke Homestead	Carver
Kent1	Morehead	Lakewood
Knox1	Watts	Vista
Luther	Rose of Sharon	Rose of Sharon
Lynn	Gibson	Miami
Maple1	Liberty	Taylor
Maple2	Taylor	Angier
Martin Luther King	Yorktown	HWY 55
Maryland	Guess	Club
Masondale	Roxboro	Formosa
Mathison	Ridgeway	End
Merrimac	Morehead	House
Morehead1	Anderson	Shepherd
Newby	Horton	Holt School
Ninth	Club	Pettigrew
North Bend	Carpenter Fletcher	Meridian
Oakland	Sprunt	Green
Old Chapel Hill A2	University	Archdale
Old Chapel Hill A3	Archdale	University
Pinecrest	Academy	Marion
Ridgeway	Mathison	Lakeland
Rose of Sharon	Cole Mill	Guess
Roxboro7	Cornwallis	Oak Ridge
Roxboro8	Juliette	Hope Valley
Seaton	Revere	Wenonah
Shoreham	University	Stuart

Road Name	Extent From	Extent To
Solitude	Whisperwood	Sedwick
Sparger	Cole Mill	Stafford
Swarthmore	end	Hope Valley
Tom Wilkinson	Milton	Roxboro
Umstead2	Riverdale	Guess
Urban	Buchanan	Washington
Valley	Casa	Holt School
Vickers	Proctor	University
Wabash	end	Plum
Ward	Chapel Hill	Forest Hills
Watts	Green	Englewood

THIS PAGE LEFT INTENTIONALLY BLANK.

Appendix 5. Durham Pedestrian Path Inventory Field Guide

The Pedestrian Inventory was completed during the period from August, 2005 to January, 2006. Each and every hard-surface sidewalk and pedestrian trail (on-road and off-road) was inventoried to sub-meter accuracy using Global Positioning System technology in the field. Geotek Mapping, a private surveying firm, performed this task.

For each line segment recorded by the survey parties, attributes were assigned that described the condition and characteristics of the pedestrian pathway. The following is a description of each attribute that is contained in the geographic information system (GIS) databases. In addition to this dataset, photographic records were taken at each intersection in the City of Durham and geolocated to specific points on a digital map that can be used by staff to examine actual conditions during reassessments.

Sidewalk Codes

Curb – This indicates the presence of curb and gutter adjacent to the walkway.

Width – This is an indicator as to the width of the walking path. This measurement is rounded to then nearest foot. If the width is generally uniform but meanders a bit then you should use the typical average width for that line segment. If the walk has a varying width then you should choose "variable as the width.

Material – This indicates the material that composes the walking path.

General Condition – This is an indicator as to the condition of the path. There are only two options. 1. Good 2. Other.

This is an indicator as to the presence of Cracking, Faulting or Surface wear. "Good" indicates that none of these attributes are present.

If the feature has the General Condition identified as "Other" then either Cracking, Faulting or Surface wear will be present on the line segment.

Cracking – This is a general indicator as to the presence of cracks in the walkway. This is NOT an exact measurement determined scientifically by measuring the details of the walkway, but is rather a field technician's judgment call based on a brief visual inspection.

This judgment is determined by estimating the density and amount of cracks, in a given line segment. It is NOT a determination of the size or magnitude of any individual sidewalk crack. This evaluation is reported by indicating None, Light, Moderate and Severe.

None – Indicates the absence of visible cracking on the surface of the walkway.

Light – Indicates the presence of light cracking. More specifically, this attribute description ranges from a single crack in the walkway segment to forty-five percent of the segment being covered in cracks.

Moderate - Indicates the presence of moderate cracking. More specifically, this attribute description ranges from forty-five percent to eighty percent of the walkway being covered with cracks.

Severe - Indicates the presence of severe cracking. More specifically, this attribute description ranges from eighty percent to one hundred percent of the walkway being covered with cracks.

Faulting – This is a general indicator as to the presence of ground faulting in the walkway. A fault can be described as a depression in the ground or ground settle underneath a walkway. This is NOT an exact measurement determined by counting the number of faults in the walkway, but is rather a field technician's judgment call based on a brief visual inspection.

This judgment is determined by estimating the density and amount of ground faults, in a given line segment. It is NOT a determination of the size or magnitude of any individual sidewalk ground fault. This evaluation is reported by indicating None, Light, Moderate and Severe.

None – Indicates the absence of visible faulting of the walkway.

Light – Indicates the presence of light faulting. More specifically, this attribute description ranges from a single fault in the walkway segment to forty-five percent of the segment being covered in ground faults.

Moderate - Indicates the presence of moderate ground fault. More specifically, this attribute description ranges from forty-five percent to eighty percent of the walkway being covered with ground faults.

Severe - Indicates the presence of severe ground faulting. More specifically, this attribute description ranges from eighty percent to one hundred percent of the walkway being covered with ground faults.

Surface Wear – This is a general indicator as to the presence of surface wear in the walkway. This is NOT an exact measurement determined scientifically by measuring the details of the walkway, but is rather a field technician's judgment call based on a brief visual inspection.

This judgment is determined by estimating the density and amount of surface wear, in a given line segment. It is NOT a determination of the size or magnitude of any individual area of surface wear. This evaluation is reported by indicating None, Light, Moderate and Severe.

None – Indicates the absence of visible surface wear on the surface of the walkway.

Light – Indicates the presence of light surface wear. More specifically, this attribute description ranges from a single area of surface wear on the walkway segment to forty-five percent of the segment being covered in cracks.

Moderate - Indicates the presence of moderate surface wear. More specifically, this attribute description ranges from forty-five percent to eighty percent of the walkway being covered with areas of surface wear.

Severe - Indicates the presence of severe surface wear. More specifically, this attribute description ranges from eighty percent to one hundred percent of the walkway being covered with areas of surface wear.

Traffic Volume – This is an indicator as to the traffic volume of the roadway closest to the walkway, as observed and estimated by the field technician at the time of the data collection.

Handicap Ramp – This attribute indicates the presence or absence of a handicap ramp on the end of the walkway line segment.

This is accomplished through a marriage of the street addresses and a set of four codes. The codes are based on the direction of the street addresses. The beginning and end of the pathway line segment is determined by moving forward and going UP with the addresses.

In the case where a segment is not parallel with a public road, such as park trails, the "beginning" is the far east end and the "end" is the far west.

Code One – A ramp exist on both ends
Code Two – A ramp exist on the beginning but not on the end
Code Three – A ramp exist on the end but not the beginning
Code Four – No ramp exist on either end

Handicap Access – In many cases a particular line code might indicate the absence of a handicap ramp on one end or the other or even both.

These segments might still be handicap accessible. The purpose of this attribute is to identify of the handicap accessibility of any given segment, regardless of the handicap ramp codes.

If even one single end of the walkway is handicap accessible then the segment should be attributed as "Yes" Handicap Accessible.

If neither end of the pathway line segment is handicap accessible then it should be attributed as "No" Handicap Accessible.

Obstructions Codes

Obstruction – This indicates the presence of any permanent obstruction blocking or partially blocking the walkway.

The obstruction is recorded as a point feature. The attribute is the "type" of obstruction.

Safety Hazard Codes

Safety Hazard – This indicates the presence of a safety hazard within the walkway.

This safety hazard is recorded as a point feature. The attribute is the "type" of safety hazard (e.g., tree, utility feature, etc.).

FAULTING

CRACKING

SURFACE WEAR

OBSTRUCTION

SAFETY HAZARD

CITY OF DURHAM. NORTH CAROLINA

GPS/GIS SIDEWALK INVENTORY

EXAMPLES OF VARIOUS SIDEWALK CONDITION RATINGS

GEOTEK MAPPING

MARCH 18, 2006