

# Comprehensive Pedestrian Plan



CITY OF MOUNT AIRY, NC



Prepared by:



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## Acknowledgements

The Mount Airy Comprehensive Pedestrian Plan was made possible through the joint efforts of City Staff, the Project Advisory Committee, and the North Carolina Department of Transportation (NCDOT). The plan highlights Mount Airy's commitment to improving walkability and mobility throughout town.

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*Every trip begins and ends with a walking trip...*



*The City of Mount Airy Comprehensive Pedestrian Plan has been established in an effort to enhance Mount Airy as a walking community by identifying actions, projects, and programs to improve pedestrian safety while equitably augmenting the vibrancy and health of Mount Airy. Therefore, it will serve as a blueprint to improve walkability for many years to come. As pedestrian facilities are put in place it will be necessary for Staff to evaluate the width of any proposed pedestrian improvement prior to construction. Width may vary based on location, topography, budget, etc. Staff may also reevaluate pedestrian improvements as projects are proposed to determine their applicability at time of implementation.*





## Introduction

The City of Mount Airy received a grant from NCDOT to develop a comprehensive pedestrian plan. Participants in the process included local planners, project advisory committee members, and the general public. Through a series of activities a vision statement for the plan emerged:

*"Our vision is a community where walking is a reasonable choice for short trips; a place where our citizens encounter a safe and inviting pedestrian network that connects to places of interest; a place where walking contributes to a healthy lifestyle; and a place where families can thrive and visitors can enjoy all that Mount Airy has to offer."*

## Benefits of Walking

Participants discussed the many benefits of walking and how it can contribute to the community. A brief summary of these benefits includes:

- Health benefits – Walking is a form of physical activity that can be accomplished by most citizens. Regular physical activity helps prevent or reduce the risk of heart disease, obesity, high blood pressure, type 2 diabetes, osteoporosis, and mental health problems such as depression.
- Transportation benefits – Walking can help to reduce roadway congestion. Many streets and highways carry more traffic than they were designed to handle, resulting in gridlock, wasted time and energy, pollution, and driver frustration. Many of the trips that Americans make every day are short enough to be accomplished on foot or via wheelchair. The 1995 National Personal Transportation Survey (NPTS) found that approximately 40 percent of all trips are less than

two miles in length—which represents a 30-minute walk.

- Environmental/Energy benefits - Motor vehicles create a substantial amount of air pollution. In fact, according to the EPA, transportation is responsible for nearly 80 percent of carbon monoxide and 55 percent of nitrogen oxide emissions in the U.S.
- Economic benefits – Walking is an affordable form of transportation. Car ownership is expensive, and consumes a major portion of many family incomes. When safe facilities are provided for pedestrians, people can walk more and spend less on transportation, meaning they have more money to save or spend on other things. Walking is free!
- Quality of life benefits – The walkability of a community is an indicator of its livability. This factor has a profound impact on attracting businesses and workers as well as tourism. In cities and towns where people can regularly be seen out walking, there is a sense that these are safe and friendly places to live and visit. By providing appropriate pedestrian facilities and amenities, communities enable the interaction between neighbors and other citizens that can strengthen relationships and contribute to a healthy sense of identity and sense of place.
- Social justice - Perhaps the most important factor in walking and social justice is choice. When providing pedestrian facilities such as sidewalks and crosswalks, communities allow people to choose how they want to travel. For those who do not have the option to drive, such as adolescents, elderly, those unable to afford a car, and people with certain disabilities, this lack of choice in transportation creates an inconvenient and socially unjust barrier to mobility.







## Project Purpose

The purpose of the Comprehensive Pedestrian Plan is to identify and develop safe amenities that encourage a walkable and pedestrian friendly community. This includes a comprehensive assessment of existing facilities, policies, and procedures that relate to “walkability,” a review of planned facilities, identification of pedestrian needs and deficiencies, a review of transportation priorities, safety considerations, barriers to walkability, special population needs and development of short and long term project recommendations, associated cost estimates, and viable funding sources.

## Pedestrian Master Plan Goals

- Encourage and develop a walkable and pedestrian friendly Mount Airy
- Access existing facilities, policies, and guidelines for pedestrian facilities
- Develop a pedestrian system that is accessible by all users
- Develop greenway and other pedestrian facilities that are environmentally sensitive
- Improve connectivity throughout the community through the development of and integrated pedestrian facilities.
- Identification of barriers, both physical and guidelines, that limit walkability

## Public Involvement

**Project Advisory Committee:** The Consultant Team worked with City Staff and NCDOT to establish a Project Advisory Committee (PAC). The PAC met regularly to provide direct oversight and counsel to the planning process.

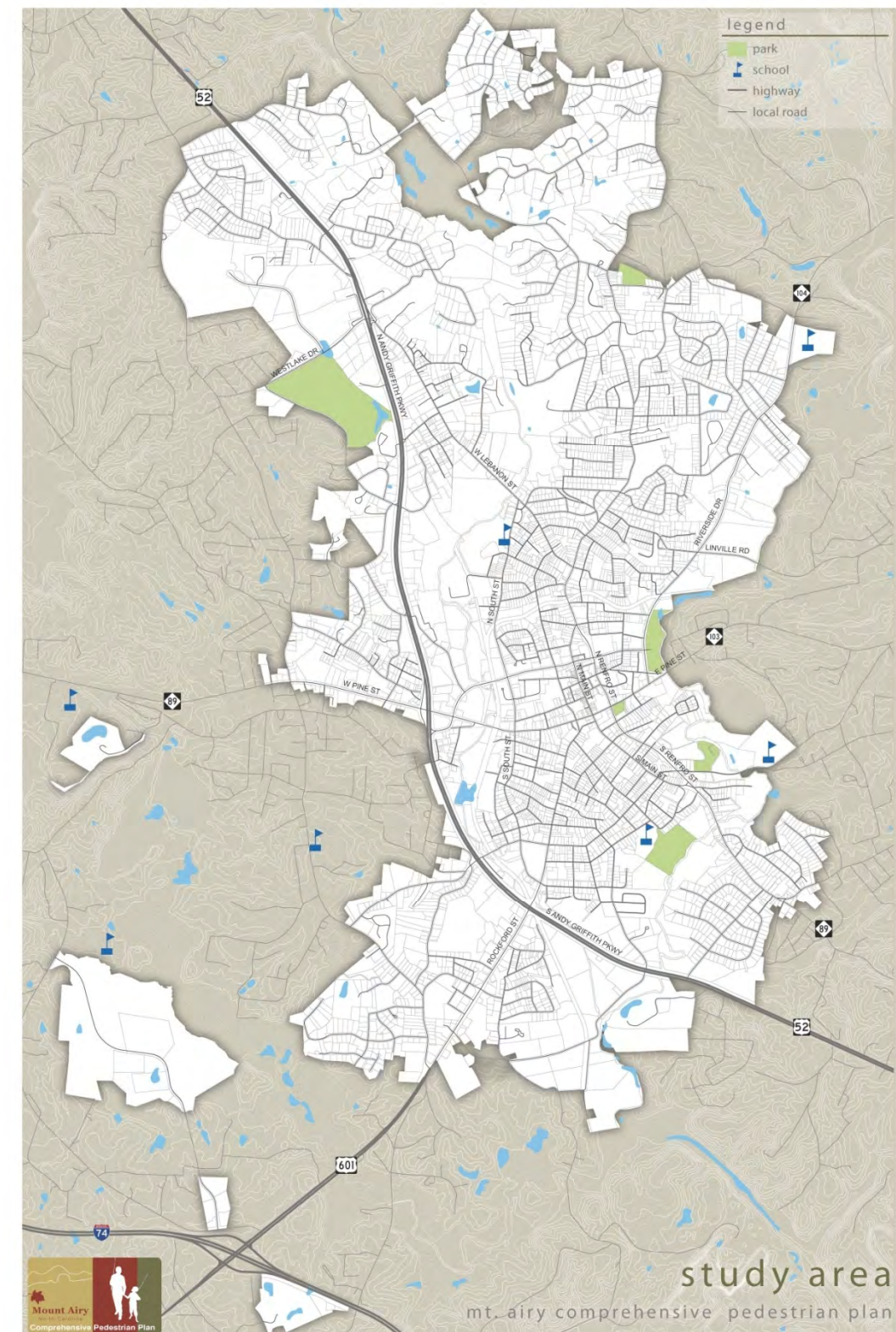
**Public Questionnaire:** An informal questionnaire was created and filled out by all members of the PAC to obtain feedback on specific issues related to walkability. The questionnaire was also made available to the general public on the City’s website and during public workshops. In addition, the questionnaire was distributed in the local schools to students, faculty, and parents. A total of 519 completed questionnaires were collected. The responses were incorporated into the recommendations detailed later in the plan.

**Public Workshops:** Two public workshops were held during the course of the planning process. The first public workshop was held November 27, 2012 at Reeves Community Center. The purpose of this workshop was to increase awareness of the planning process, help with the identification of barriers, safety concerns, pedestrian attractions, gaps in the existing network and review preliminary recommendations.

A second public workshop was held February 25, 2013 at Town Hall. Participants were offered an opportunity to review and comment on draft recommendations.

## Study Area

The study area for the Comprehensive Pedestrian Plan includes all land within the corporate limits.





## Existing Conditions

Early in the process an effort was made to observe, identify, and inventory existing conditions. The project team focused on information relevant to walkability with an emphasis on demographics, physical features, pedestrian attractions, and barriers. Existing conditions are summarized on the following pages.



*Like water, pedestrians take the path of least resistance.*



40 percent of all trips are less than two miles in length which represents a 30-minute walk...





# COMPREHENSIVE PEDESTRIAN PLAN

## City of Mount Airy

### Demographics at a Glance

**Population:** The certified population estimate for Mount Airy in 2012 was 10,388 according to the North Carolina Office of State Budget and Management (OSBM). Since 2000, the population of Mount Airy has increased by 22.8%.

**The median age for residents of the City of Mount Airy is 45 years, and the average age of City residents is 44. The median age for Surry County is 41 years. The median age for the city is slightly higher than that of the county and North Carolina as a whole.**

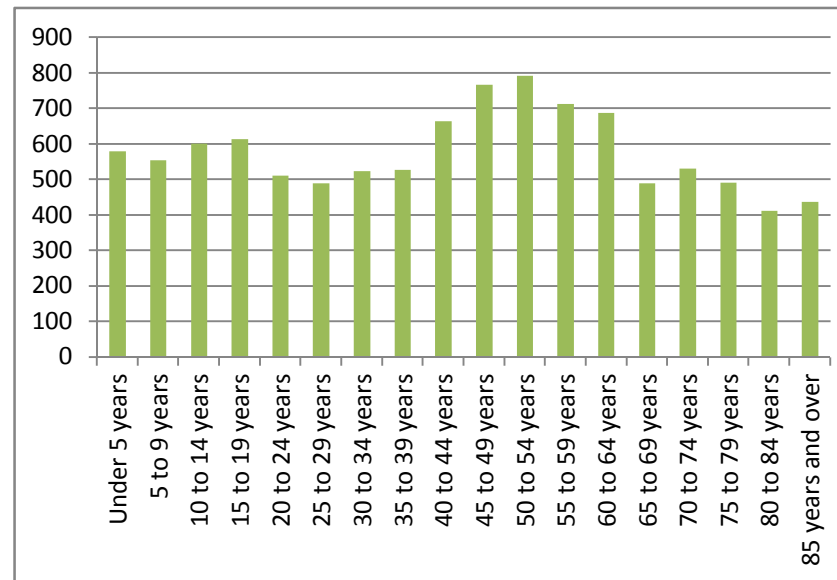
**Income:** The median household income in the Mount Airy is nearly \$35,000, which is under the state median of \$46,291, and the Surry County median income of \$36,424.

**Education:** Income levels are often a bellwether statistic related to educational attainment. Less than three-fourths of the population of Mount Airy has a college degree. By contrast, about one third of North Carolina residents possess a degree from an institution of higher learning while 18% have received no high school diploma.

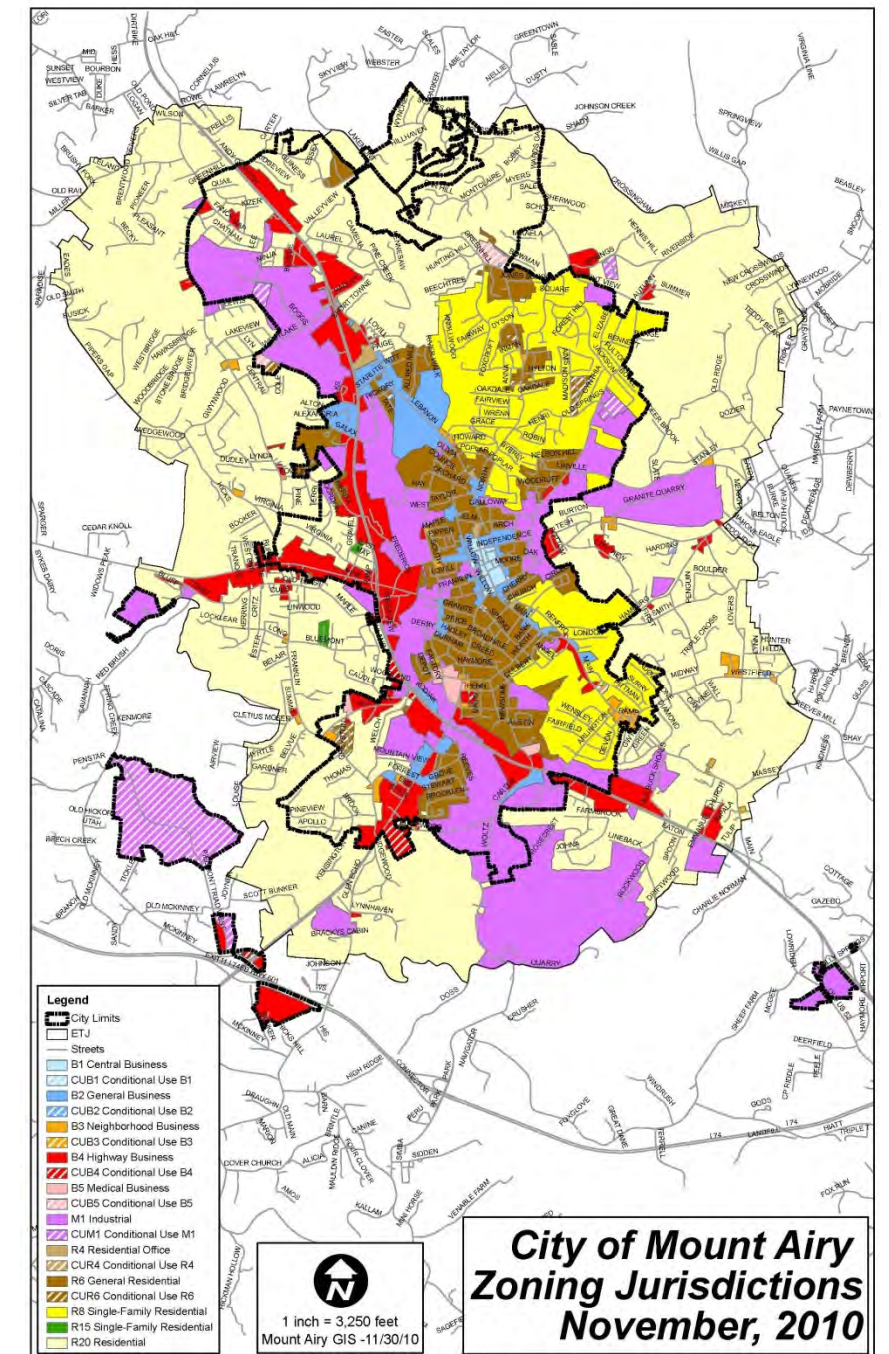
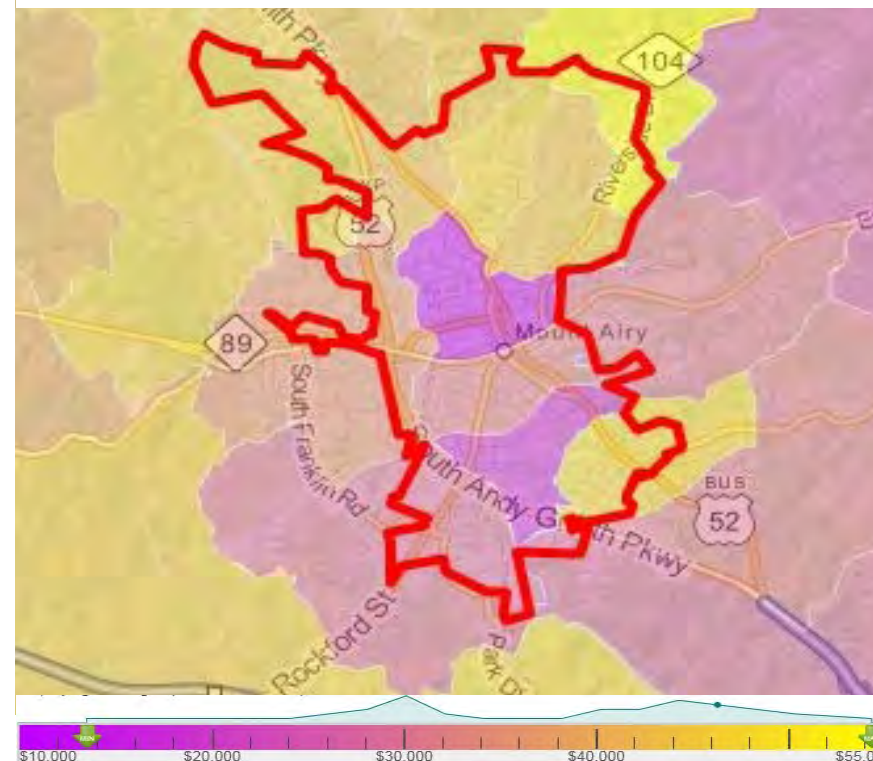
**Land Use:** Mount Airy's street landscape continues to change as the City grows. As new development and redevelopment occurs this provides an opportunity for the street land use to evolve and accommodate additional pedestrian amenities as well as a new influx of pedestrians. The City of Mount Airy Vision Plan contains supporting statements about making Mount Airy a walkable community.

## Chapter 2: Existing Conditions

### City of Mount Airy Age Distribution



### City of Mount Airy Income Distribution



Map courtesy of the City of Mount Airy



## Physical Features

Effectively planning for Mount Airy's future pedestrian network requires a thorough understanding of current conditions.

**Sidewalk Network:** There are approximately 30 miles of sidewalk currently constructed in Mount Airy. These sidewalks are predominately found in the traditional urban core of Mount Airy and within the residential subdivisions. On those streets with sidewalks, there is roughly an even distribution between streets with sidewalks on one side of the street versus those with sidewalk on both sides of the street. The typical sidewalk averages between four and five feet wide and constructed of concrete; however, along Main Street, sidewalks are closer to 10 feet in width. The sidewalk network along many of the City's major streets including Main Street, Pine Street, Renfro Street, Rockford Street and South Street are fragmented with gaps between sections. Most of the sidewalks are in fairly good condition with the exception of the oldest facilities located in early neighborhoods. Some cracking and lifting has resulted from large specimen trees located adjacent to the sidewalk. The map on page 2.8 shows the network of existing sidewalks in Mount Airy.

**Greenways Network:** Mount Airy is blessed with two fantastic greenways; the Emily B. Taylor and Ararat River greenways. Both greenways are positioned on either side of downtown Mount Airy.

The Ararat River greenway is 2.5 miles in length and connects Riverside Park to Tharrington Elementary School to the south. Along the way, connections to the H B Rowe Environmental Park and Mount Airy Middle School are also provided. The greenway will eventually be connected with the Emily B. Taylor Greenway via a planned 2.2 mile greenway connector.

The Emily B. Taylor greenway is a 2.38 mile greenway that runs from West Lebanon Street to the north to Worth Street to the south paralleling Lovills Creek. The greenway provides connections to Veterans Park, Mount Airy High

School to the north and commercial destinations such as Creekside Cinemas and New Market Crossing.



*The collage of images depicts a varying array of sidewalk typical sections throughout the City.*





# COMPREHENSIVE PEDESTRIAN PLAN

## City of Mount Airy

Intersections: Within the City of Mount Airy there are 37 signalized intersections. Of the signalized intersections only seven have pedestrian signals present and of the seven only four have them on all approaches. Similarly, 15 of the 37 intersections have crosswalks with the highest concentration occurring along Main Street and Renfro Street. Over time crosswalks can become faded or chipped. Several in the City are starting to show wear and are in need or remarking.

The table to the right provides a summary of the signalized intersection locations within the City of Mount Airy.



The collage of images depicts a varying array of crosswalks throughout the City.

## Chapter 2: Existing Conditions

Signalized Intersection Locations				
Project ID	Intersection	Traffic Control	Ped Signal	Crosswalks
1	Arlington Street at S. Andy Griffith Parkway	Signal	No	No
2	Newsome Street at S. Andy Griffith Parkway	Signal	No	No
3	Rockford Street at S. Andy Griffith Parkway	Signal	No	No
4	Snowhill Drive/Worth Street at S. Andy Griffith Parkway	Signal	No	No
5	Frederick Street at N. Andy Griffith Parkway	Signal	No	No
6	Hickory Street/Galax Trail at N. Andy Griffith Parkway	Signal	No	No
7	Westlake Drive/West Lebanon Street at N. Andy Griffith Parkway	Signal	No	No
8	Worth Street at S. South Street	Signal	No	No
9	Durham Street at S. South Street	Signal	No	No
10	W. Pine Street at S. South Street	Signal	No	No
11	Franklin Street at S. South Street	Signal	No	No
12	W. Independence Boulevard at S. South Street	Signal	No	Yes - Paint
13	Stewart Drive at Rockford Street	Signal	No	No
14	Worth Street at Rockford Street	Signal	No	No
15	Spring Street at Rockford Street	Signal	No	Yes - Paint
16	E. Pine Street at Graves Street	Signal	No	No
17	Virginia Street at Willow Street	Signal	No	Yes - Paint
18	W. Independence Boulevard at Willow Street	Signal	No	Yes - Paint
19	Worth Street at Newsome Street	Signal	No	No
20	Arlington Street at S. Main Street	Signal	No	No
21	Worth Street/Hamburg Street at S. Main Street	Signal	No	Yes - Paint
22	W. Pine Street at S. Main Street	Signal	Yes	Yes - Paint
23	Franklin Street at N. Main Street	Signal	Yes (3 sides)	Yes - Paint
24	Moore Avenue and N. Main Street	Signal	Yes (3 sides)	Yes - Paint
25	E. Oak Street at N. Main Street	Signal	Yes (4 sides)	Yes - Paint
26	W. Independence Boulevard at N. Main Street	Signal	Yes (4 sides)	Yes - Paint
27	Lebanon Street at N. Main Street	Signal	Yes (4 sides)	Yes - Paint
28	Hamburg Street at S. Renfro Street	Signal	No	No
29	Cherry Street at S. Renfro Street	Signal	No	Yes - Paint
30	E. Pine Street at S. Renfro Street	Signal	No	Yes - Paint
31	E. Oak Street at N. Renfro Street	Signal	No	Yes - Paint
32	E. Independence Boulevard at N. Renfro Street	Signal	Yes (2 sides)	Yes - Paint
33	E. Pine Street at Riverside Drive	Signal	No	No
34	Linville Road at Riverside Drive	Signal	No	No
35	W. Pine Street at W. Independence Boulevard	Signal	No	No
36	Frederick Street at W. Independence Boulevard	Signal	No	No
37	Grace Street at W. Lebanon Street	Signal	No	No



### Destinations

One of the primary goals of the pedestrian plan is to connect people with significant places of activity. The Destinations Map on page 2.8 depicts important community locations. Generally these destinations fall into the following categories:

**Schools:** There are currently four schools within the corporate limits of Mount Airy: Mount Airy High School, Mount Airy Middle School, Jones Intermediate School, and B H Tharrington Elementary.

**Parks:** The City of Mount Airy has over 140 acres of developed parkland across seven facilities and an additional 100 acres of undeveloped open space. Developed City facilities include: H. B. Rowe Environmental Park, Tharrington Park, Riverside Park, Veterans Riverside Park, Graham Field, Westwood Park, and Skate Park

**Reeves Community Center:** The largest recreation center in Surry County, Reeves Community Center built in the 1950's serves as the community's center for recreation and fitness. The center offers a variety of educational, fitness, and recreational programs for all members of the community.

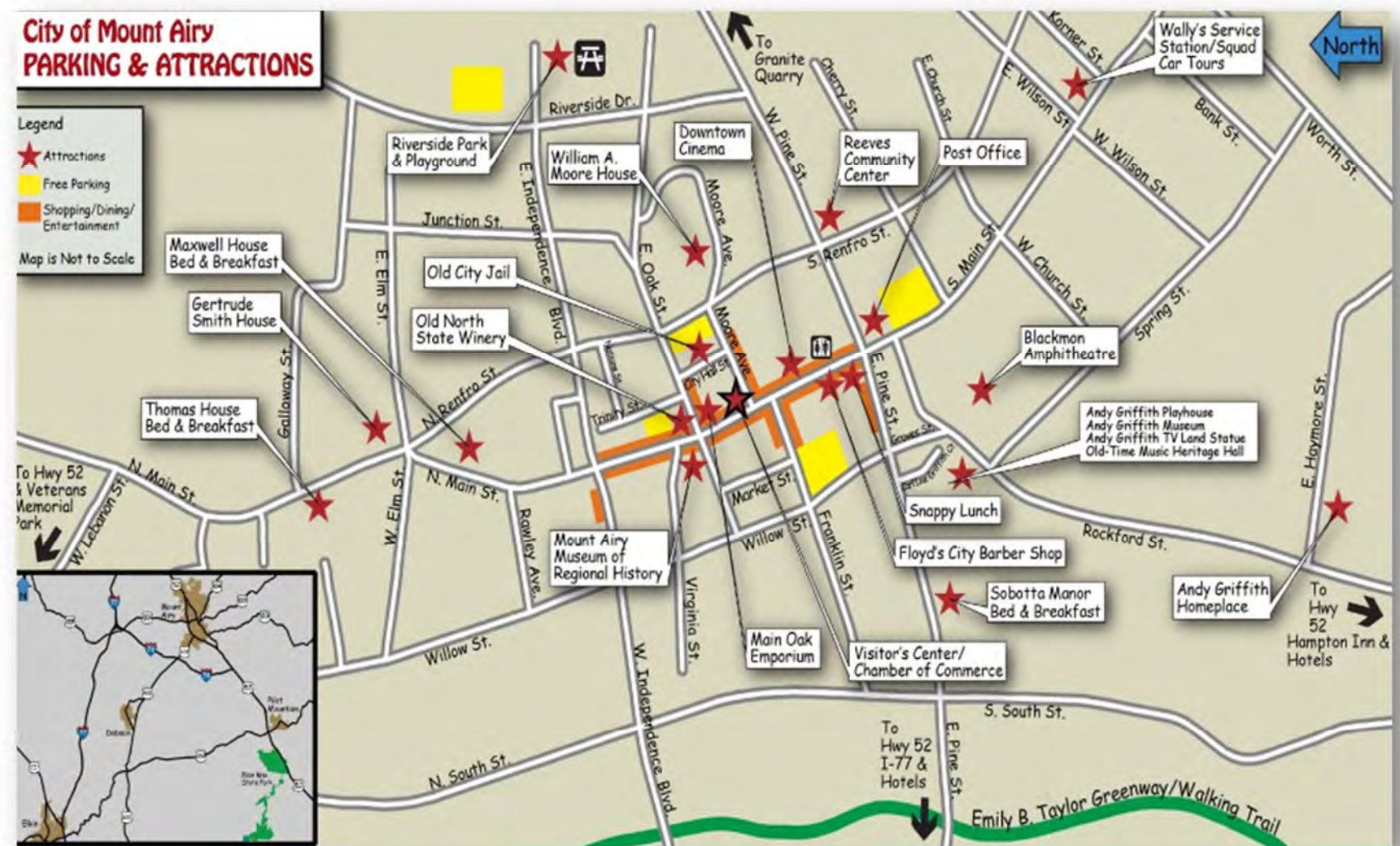
**The Civic Block:** This block houses the Mount Airy Public Library, Post Office, Amphitheater, Municipal Building, and the Police Department are located along Rockford Street and Main Street.

**Tourism:** Mount Airy touts its self as being home to a more simpler times. Home of actor Andy Griffith, Mount Airy's Main Street takes you back in time to the Town of Mayberry and the familiar sights and sounds of the hit TV show. Popular destinations include the Andy Griffith Museum and Playhouse, the iconic TV Land statue, Floyds Barbershop, Wally's service Station, Mayberry Courthouse, and the Andy Griffith home place.

**Activity Centers:** Activity centers can be locations where a mix of activities occur and are often destination shopping centers where commercial and service related activities

occur. They also can be places where community gatherings occur and local government service occur. The best example of this can be found along Main Street which contains the core business district, local shops, and government services include City Hall and the Post Office. On West Independence Boulevard, New Market Crossing is a shopping center where you can find amenities such as a grocery store, restaurants, and a bank. Across from New Market Center is the Creekside Movie Theater. Along the periphery of the community, Rockford Street provides regional shopping and the Northern Hospital of Surry

County. One local and regional destination is the Mayberry Mall. The Mall is located on US 52 at the intersection with Fredrick Street.



Map courtesy of the City of Mount Airy



## Barriers and Field Inventory

**Barriers:** Several man-made barriers impact walkability in Mount Airy, the most significant of which is US 52. Not only is the road a formidable physical barrier, but the highway is also a psychological barrier that can deter citizens from walking altogether. There are few, if any, pedestrian-friendly roadway crossings of US 52 and the shoulders are extremely hazardous to pedestrians.

Mount Airy has a mix of development patterns; traditional and suburban. As with most suburban development patterns, access is designed to primarily accommodate the automobile. Large parking lots, setbacks, and limited connectivity severely reduce the opportunities for walking to and from these destinations.

However, Mount Airy also has a traditional urban core that, unlike the suburban development, does accommodate both the automobile but also pedestrian and bicycle modes. These neighborhoods have higher densities and a range of complimentary uses, with diverse housing types and are anchored or positioned around a central public space or civic activity area. These elements are typically found in Mount Airy's urban core:

- Parks, schools, civic buildings and commercial establishments within walking distances;
- Residences with narrow front setbacks, front porches, and detached rear garages;
- Network of streets and paths suitable for pedestrians;
- Vehicles at slower speed;
- Interconnected street network;
- Narrower streets with crosswalks, streetscaping and other traffic-calming measures;
- In-scale development that fits the local context
- Buildings oriented to the street with parking on street or behind.

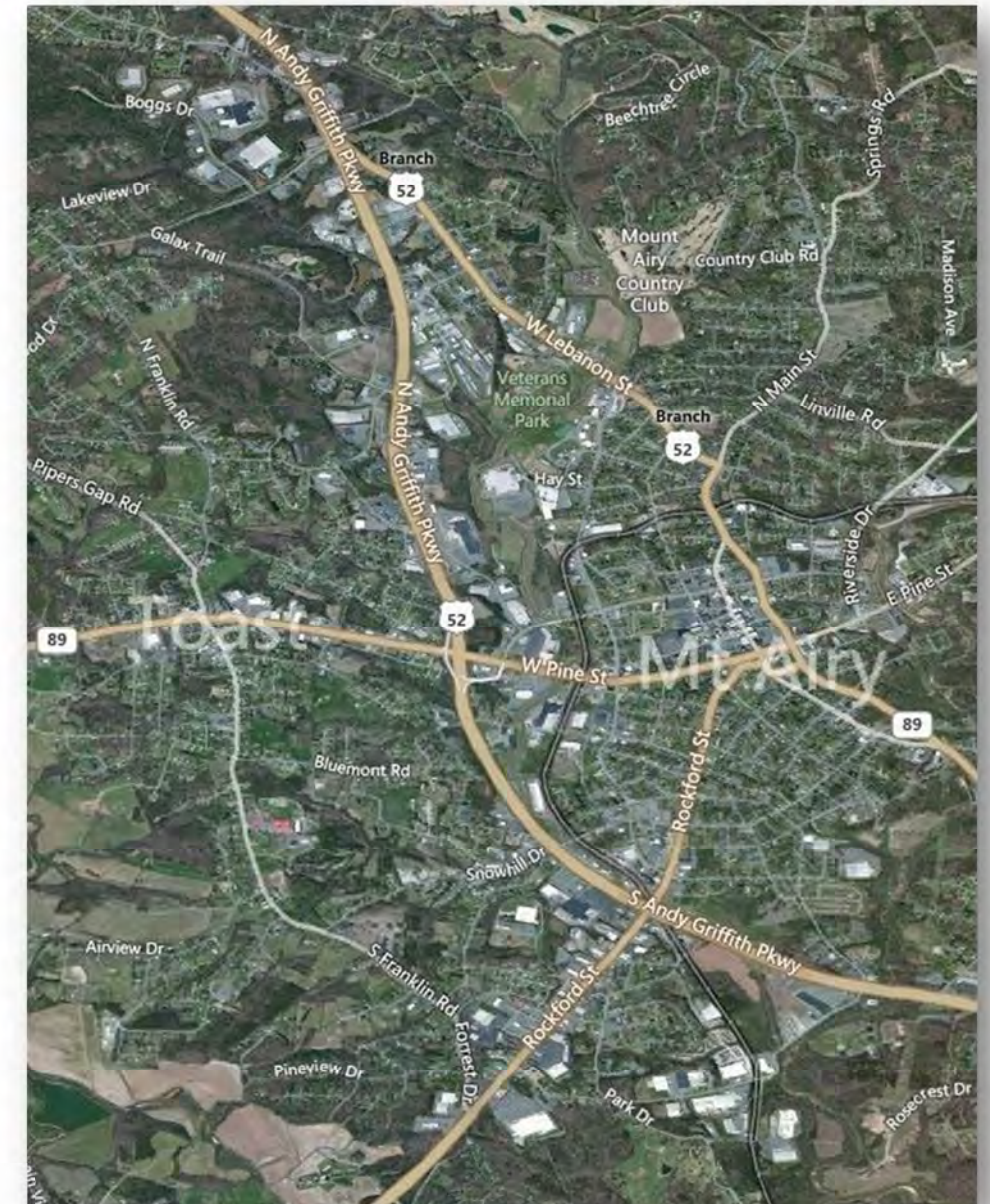
Many of Mount Airy's neighborhoods outside of the urban core have limited connectivity reflective of the subdivision designs of most post war neighborhoods. Still others are limited by geographic features.



*The intersection of US 52 and Rockford Street was identified as a major barrier for pedestrians moving from downtown to the commercial development along Rockford Street.*

The railroad tracks in Mount Airy create another type of barrier. They are owned by Norfolk Southern, and utilized by Yadkin Valley Railway. The tracks themselves can be an obstacle for disabled or elderly citizens. They also restrict or complicate future off-road pedestrian connections (Emily B. Taylor Greenway extension) because of the expense, liability, and other limitations associated with crossing the tracks.

*Pedestrian walking along Worth Street towards downtown Mount Airy.*



*US 52 acts as a barrier, bifurcating the community separating downtown to the east from the regional retail corridor (Rockford) to the west.*



A review of existing and historic average daily traffic volumes reveal changing traffic volumes along streets within the City. Average daily traffic volumes represent the total number of vehicles traveling along a roadway segment on an average day.

The map to the far right highlights the recorded 2010 ADT volumes as provided by NCDOT.

### Safety

The NCDOT Bicycle and Pedestrian Division collects many statistics on bicycle and pedestrian crashes including crash numbers, severity, cause, time of day and other vital pieces of information.

In looking at the recorded crashes for the City of Mount Airy, as provided by NCDOT, there were 85 pedestrian related crashes between 1990 and 2012. The highest frequency of the crashes occurred in Public Vehiclr areas (parking lots). It is improtant to note that the second highest concerntration occurred along local streets.

### Transit

The Piedmont Authority for Regional Transportation (PART) provides express bus service for Mount Airy and Surry County. The City of Mount Airy is serviced by PART with the express route service from Mount Airy to Winston-Salem via Route 6 – Surry County Express.

The Surry County Express begins service to Winston-Salem at 5:45 am with a second run starting at 7:00 am. The returning afternoon trip arrives in Mount Airy at 5:36 pm and 6:00 pm. The route operates Monday-Friday with a one way fee of \$3.00.

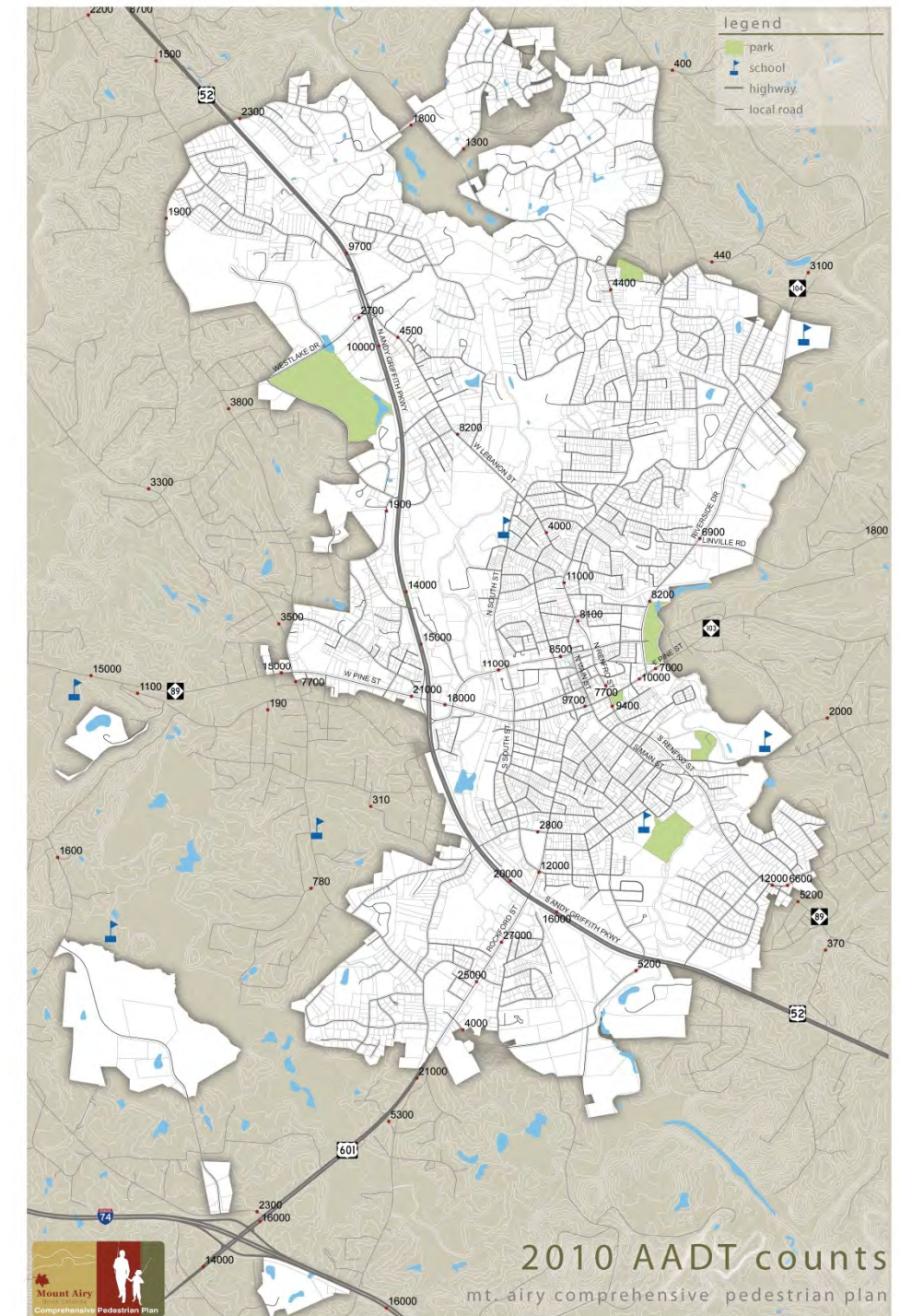
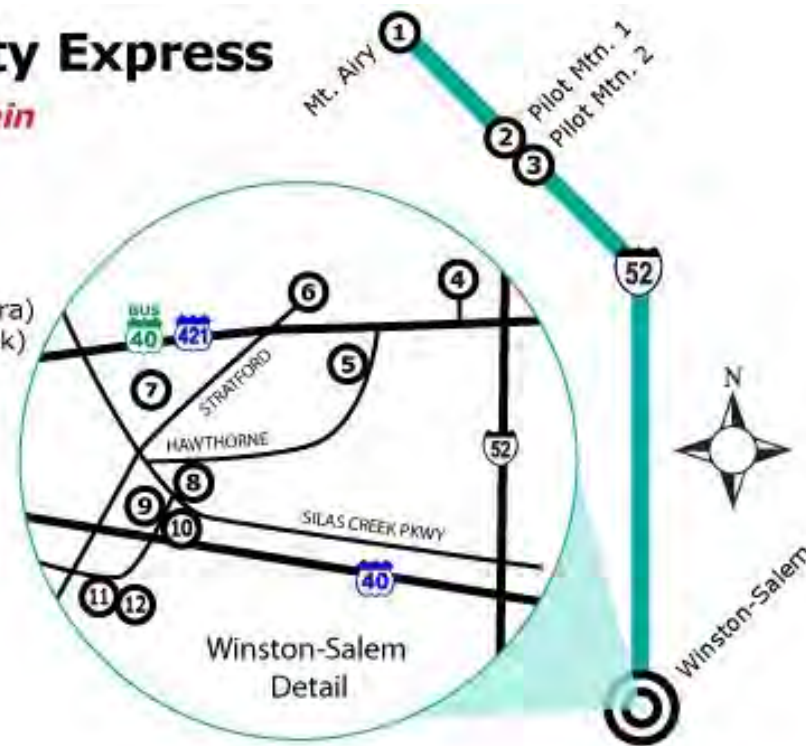
PART also provides park-and-ride lots throughout the region. A number of park-and-ride lots are located within Surry County. Within the City of Mount Airy the terminal station/stop of Route 6 is the park-and-ride-lot located near the intersection of Carter Street and US 52.

### Route 6 - Surry County Express

*Ride from Mt. Airy or Pilot Mountain to nine popular destinations in Winston-Salem.*

#### STOP # AND LOCATION

1. Mt. Airy (Mt. Airy Plaza behind Shell)
2. Pilot Mt. Park & Ride #1 (behind RBC Centura)
3. Pilot Mt. Park & Ride #2 (beside Surrey Bank)
4. W-S Transportation Center
5. WFU Baptist Medical Ctr. (MRI Building)
6. Five Points
7. Stratford Executive Park
8. Forsyth Medical Center (main entrance)
9. Hanes Mall (outer loop by McDonalds)
10. Truliant
11. Novant (Frontis Blvd.)
12. Kimel Park (Veterans Administration)



2010 Average Daily Traffic Volumes within the Study Area.





### Past and Going On Efforts

The City of Mount Airy has taken and continues to take proactive steps towards planning for future development and growth. Table 2.2 to the right highlights those efforts by the City of Mount Airy as well as other regional planning agencies.

Table 2.2 Current Planning Efforts in Mount Airy

Agency	Plans/Policies/Ordinances	Date Completed	Plan Purpose
City of Mount Airy	Ararat River Greenway Master Plan	2007	The Ararat River Greenway Comprehensive Recreational Master Plan provides recommendations to improve recreational opportunities along the 2.5 mile long greenway adjacent to the Ararat River.
	Parks and Recreation Master Plan	2012	The parks and recreation Master Plan defines a vision for parks and recreation through documentation of their existing facilities, unmet needs and the establishment of a framework for improvement and expansion to meet needs of the citizens of Mount Airy.
	Code of Ordinances	2012	The code of Ordinances establishes regulations to the development and use of all land and structures within the study area.
NCDOT	Surry County Transportation Plan	2012	The transportation plan contains recommendations for streets, greenways, bicycle and pedestrian facilities in the planning area through 2040.
PART	PART Regional Transit Development Plan	2010	To develop a strategy for transit within the 10 county service area for PART. This plan recommends fixed route service for Mount Airy.
Surry County	Surry County Greenway Master Plan	2004	The purpose of this plan is to guide the planning and implementation of an interconnecting system of greenways and bikeways throughout Surry County

### Panned Roadway Projects

Table 2.3 depicts the regionally significant roadway projects that will be constructed by 2023 in the vicinity of Mount Airy.

Table 2.3 NCDOT STIP Funded Projects in Mount Airy and the immediate vicinity

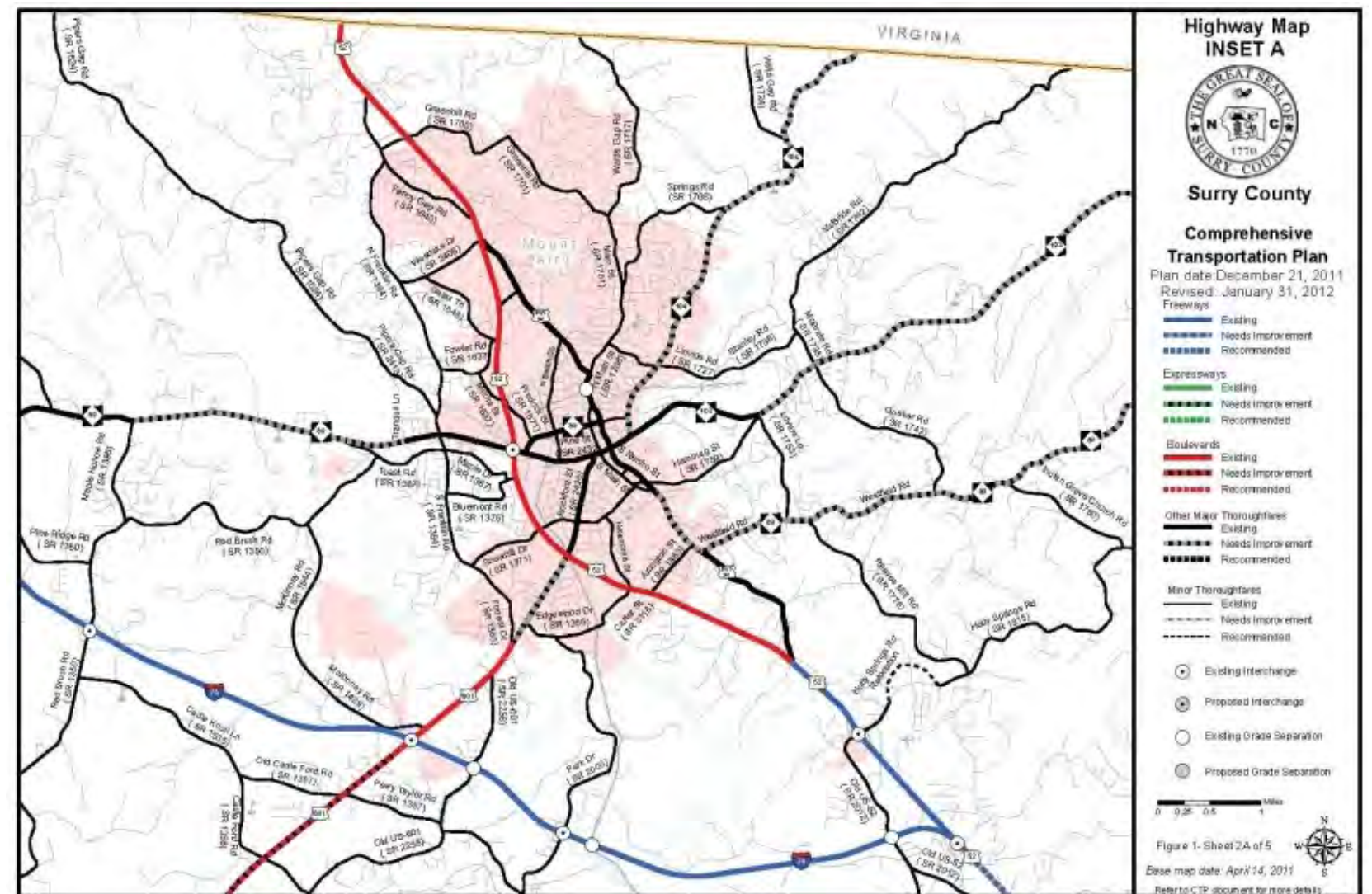
NCDOT STIP #	Project Name	Project Description/ Limits	Timeframe	Existing Facilities	Length (miles)
R-5309	SR 1627 (Holly Springs Road)	Relocate roadway for Mount Airy/Surry County airport runway extension	n/a	n/a	1.2
B-5839	SR 1727 (Linville Road)	Replace bridge over Ararat River	2022-2023	2- lane bridge, no sidewalks	n/a
B-5841	SR 1350 (Red Brush Road)	Replace bridge over Stewarts Creek	2022-2023	2- lane bridge, no sidewalks	n/a
EB-5014	Mt Airy Greenway Loop	Greenway connector from Emily B. Taylor Greenway to Ararat River Greenway	2013-2015	n/a	2.2



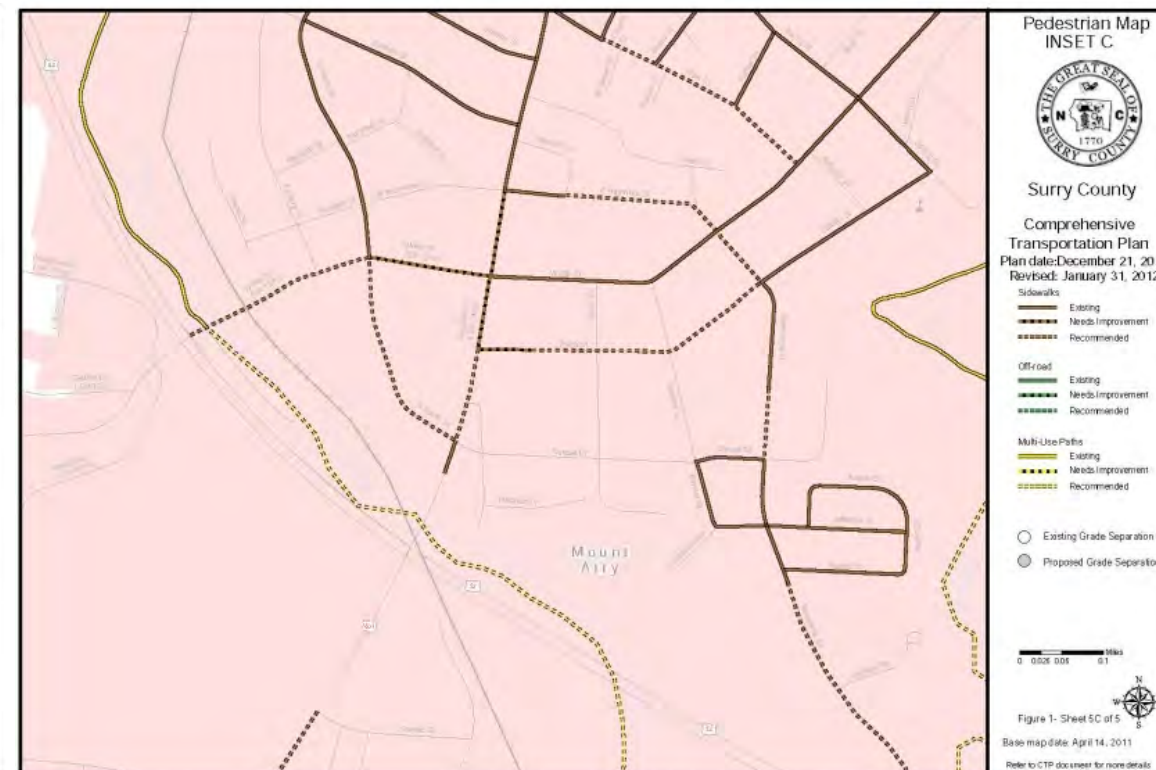
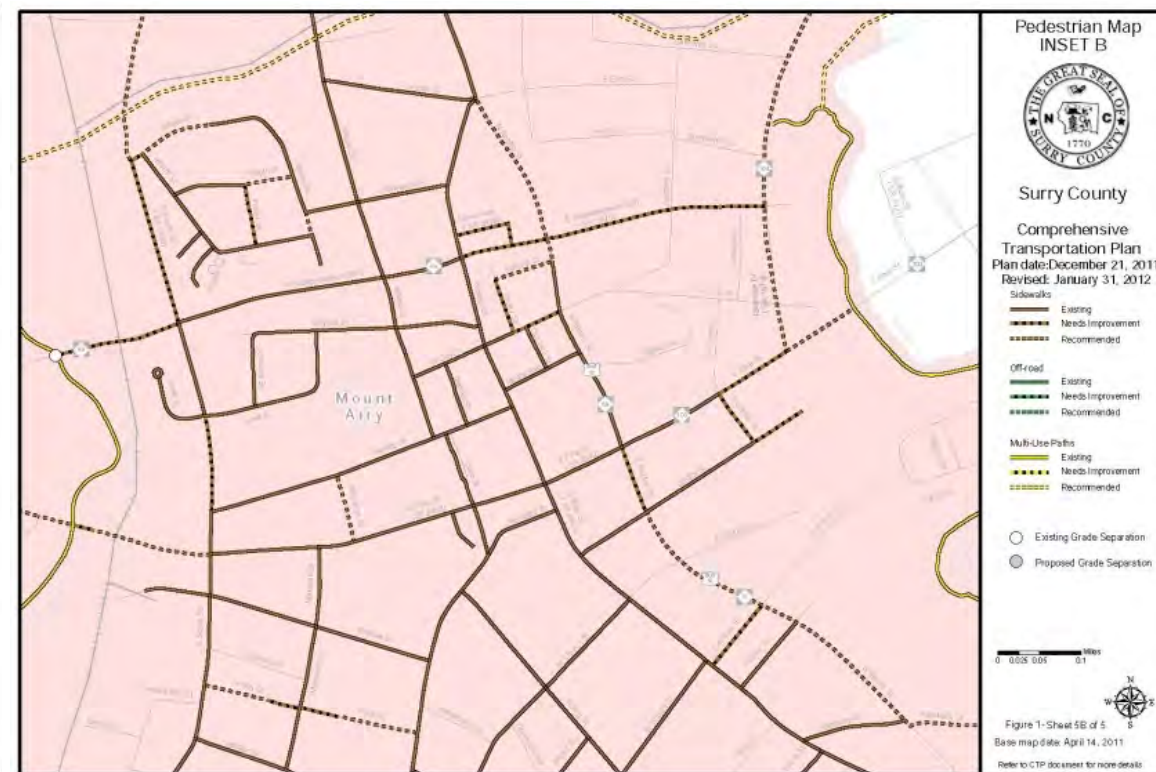
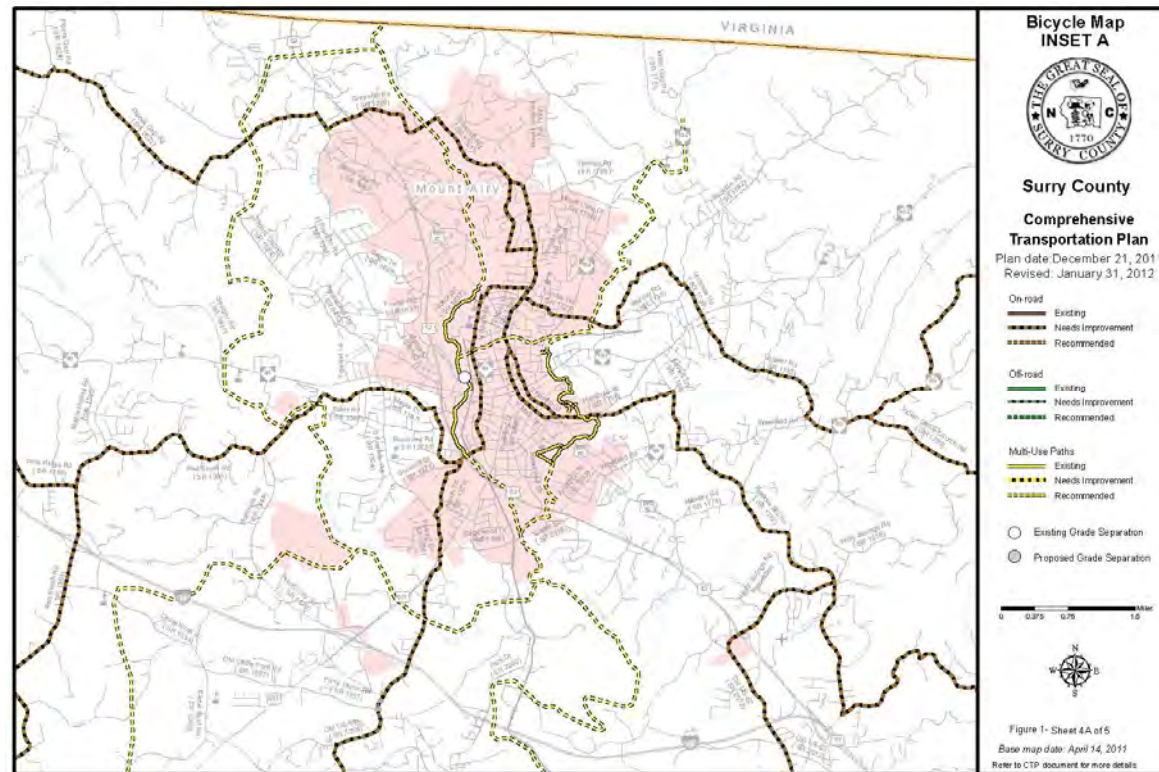
## Surry County Comprehensive Transportation Plan

In April of 2012 the NCDOT published the Comprehensive Transportation Plan (CTP) for Surry County. The goal of the plan is to, through all modes of transportation, help shape the area's economic health and quality of life.

Through cooperation of the municipalities within Surry County, which included Mount Airy, a series of recommendations was developed which will aid in the growth of the area through 2040. Recommendations for roadway, bike, transit and pedestrian modes of transportation are included. A summary of the recommendations from the CTP are provided on the following pages.









## Required Work on the Ground

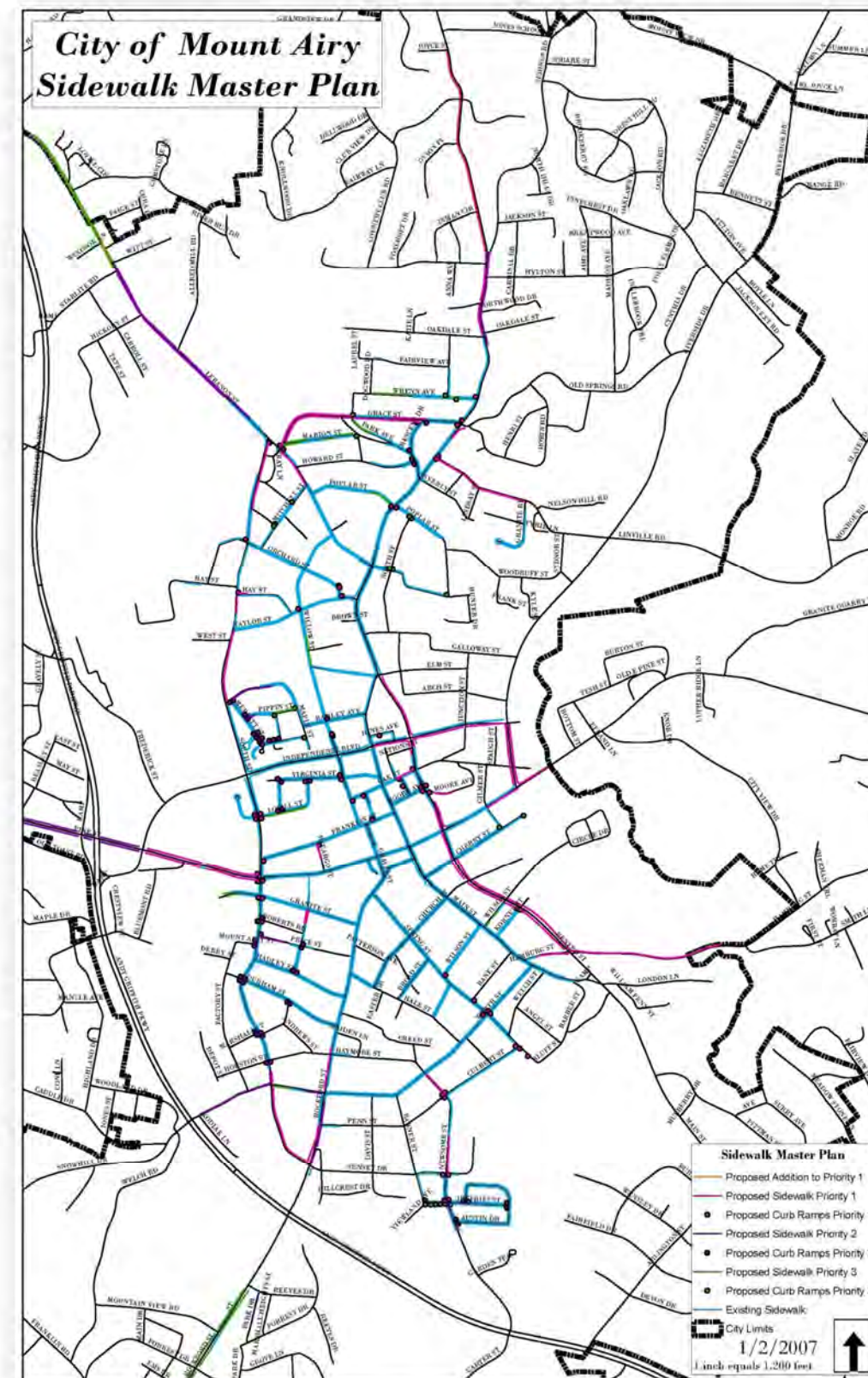
New sidewalks are typically built when new development projects are approved or as the town implements their current Sidewalk Master Plan as shown in the image to the right. The Code of Ordinances currently requires that for new construction or major expansions/revisions on properties where the sidewalk masterplan calls for a future sidewalk to be constructed, it is the responsibility of the subject property to construct or improve that section of sidewalk across their frontage.

All sidewalks are to be constructed of concrete or similar material. Concrete sidewalks are to be a minimum of 4 inches in depth and a standard width of 5 feet.

Planting strips, where present, are typically located between the curb and sidewalk and parallel to the street. Within the commercial areas in City and other location with high pedestrian volumes, grated tree wells may be used in lieu of planting strips. The planting strip varies in width from 2 to 6 feet in width.

The City is currently using Powell Bill funds as well as money from the City's general fund (as funds are available) to fill in gaps in the existing sidewalk network. These funds are also used in the repair of existing facilities, which limits the funding available for new sidewalk construction.

Projects are currently being prioritized based on need, cost, and availability of funds.



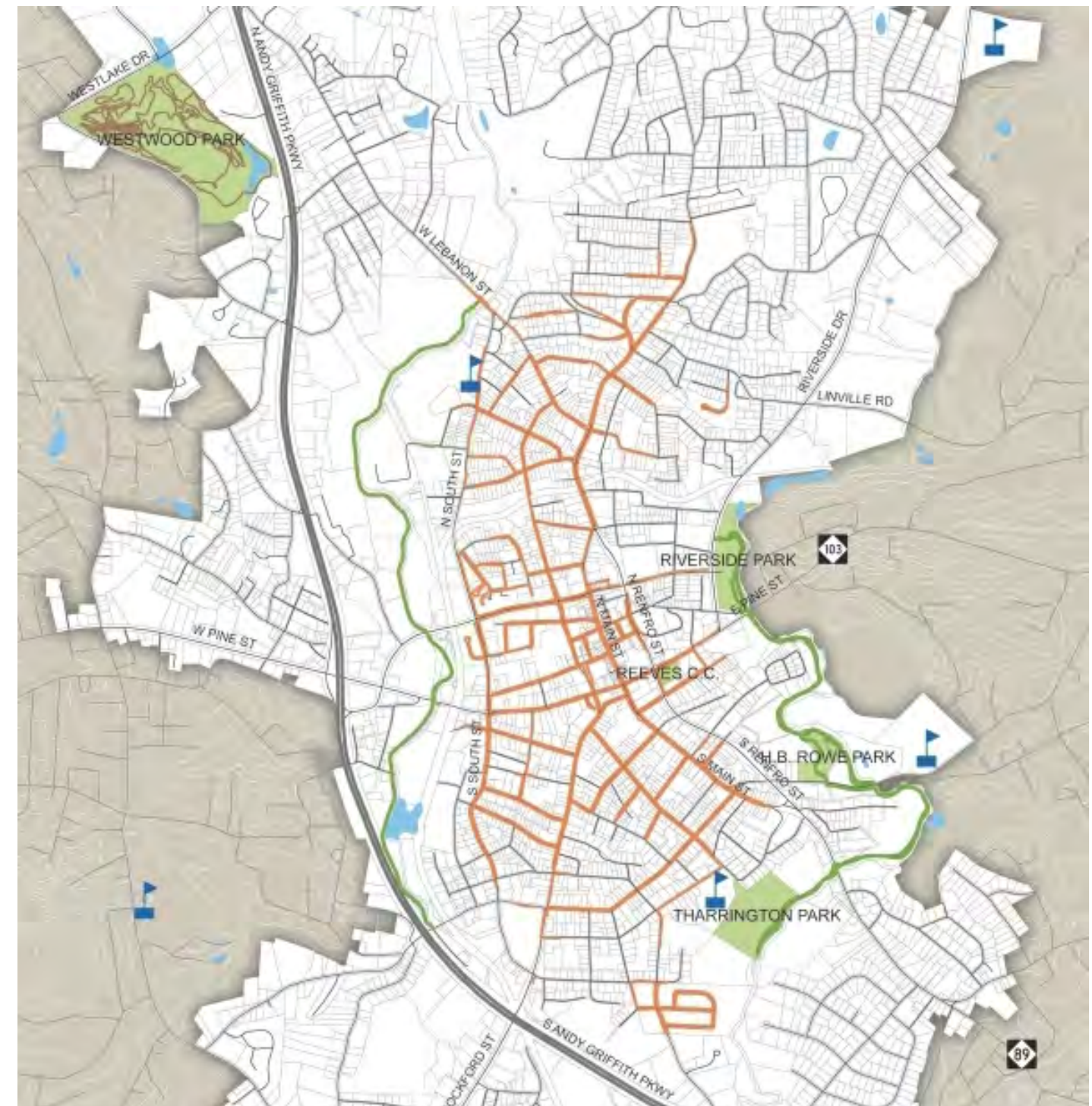
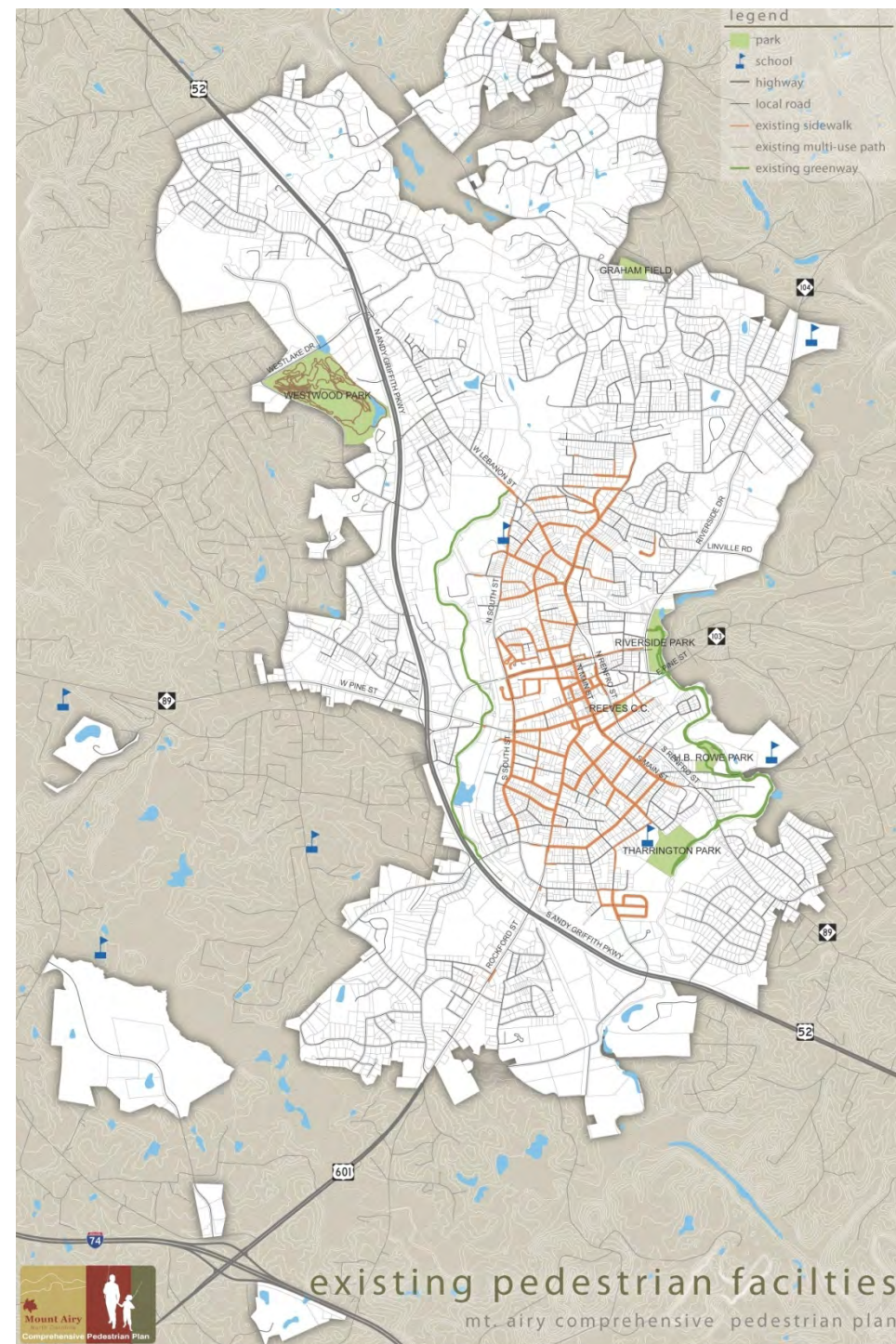




# COMPREHENSIVE PEDESTRIAN PLAN

## City of Mount Airy

*The map to the right depicts the existing sidewalk facilities within the corporate limits of Mount Airy. The map to the far right is an enlarged section highlighting the core of Mount Airy*







## Developing a Vision

The impetus for the pedestrian plan came from the initiatives that began during the development of the City's Vision plan in 1998, the development of the Ararat River Conservation Plan and the construction of the two existing greenways. Seeing the direct community benefits from being a walkable community, the City of Mount Airy Commissioners instructed town staff to begin the process for the development of a pedestrian master plan.

The following initiatives and organizations contributed to the development of a vision for the pedestrian plan:

- Mount Airy Board of Commissioners
- Mount Airy Planning Board
- Mount Airy City Staff
- Mount Airy Public Schools
- Tourism Development Authority
- Surry County Economic Development Partnership
- Chamber of Commerce
- Downtown Mount Airy Inc.
- Cascade Highlands Tourism Organization
- Surry Arts Council
- Citizens of Mount Airy

## Pedestrian Plan Questionnaire

An informal questionnaire was developed specifically for the comprehensive pedestrian plan. It was offered to all plan participants online, during regular meetings as well as public outreach activities. In addition, the City sent copies attached to every customers water bill. There were a total of 519 completed questionnaires resulting in a representative cross-section of the community. The questionnaire allowed the City to better understand attitudes regarding existing walkability, why and where people choose to walk, what deters people from walking, community priorities and the relative importance of improving community walkability. A summary of the questionnaire can be found to the right.

## Public Workshops

Two public workshops were conducted during the pedestrian plan development. They were conducted on November 27<sup>th</sup>, 2012 and February 25<sup>th</sup>, 2013. These workshops were used to communicate the plan objectives, gather input on critical locations, and collect feedback on plan recommendations.

## Project Advisory Committee (PAC)

The PAC met regularly throughout the development of the plan and was responsible for establishing and refining the plan's visions. They considered the previously determined objectives, results of the questionnaire, and input received during the two public workshops. The result was the following vision statement:

*"Our Vision is a community where walking is a reasonable choice for short trips; a place where our citizens encounter a safe and inviting pedestrian network that connects to places of interest; a place where walking contributes to a healthy lifestyle; and a place where families can thrive and visitors can enjoy all that Mount Airy has to offer."*

## Pedestrian Master Plan Questionnaire Summary

- A majority of respondents have lived in Mount Airy more than 10 years
- Majority of respondents were 65 years of age or older, the second and third largest cohort groups included the 45-54 and 55-64 age groups (these three groups combined to represent 71.6% of the 519 respondents).
- Top two reasons for walking (1) Fitness/recreation (2) shopping
- Biggest factor discouraging walking – lack of sidewalks/trails
- Top destination for walking was trails and greenways with shopping being a close second
- Filling in the gaps in the existing sidewalk network is the highest priority for improvements





## Moving Forward

A well rounded transportation system can reap many benefits to the host community. From reduced traffic congestion, improved quality of life and improved community health of individuals. Economic benefits are realized to the individual and community through reduced health costs and reduced dependency on auto ownership, including maintenance and insurance costs. There are other economic benefits that are more difficult to measure such as the increased economic vitality of communities that have emphasized pedestrian mobility. As a result the positive consequences of walking as a healthy mode of transportation, or as a purely recreational activity, span across many aspects of our lives.

In order to achieve a well-rounded pedestrian system, it is important to evaluate the performance of infrastructure, guidance, and supporting facilities and programs. The needs of pedestrians are best served when all of these elements complement each other. The recommendations for the City of Mount Airy Comprehensive Pedestrian Plan seek to achieve this balance.

This chapter includes a discussion of physical improvement projects, including on and off-road facilities as well as intersection-level improvements. Policies and guidelines currently in place have been reevaluated in an effort to strengthen demand. Education, encouragement, and enforcement measures are also discussed.

The City of Mount Airy Comprehensive Pedestrian Plan was developed based on feedback from the Project Advisory Committee, City Staff, NCDOT, and the public. Draft recommendations were formed and presented at two public workshops on November 27<sup>th</sup> 2012 and February 25<sup>th</sup>, 2013 where participants were asked for their feedback and comments related to the draft project recommendations, guidelines, and policy measures. The recommendations discussed in this chapter represent the culmination of these outreach efforts.



*Pedestrian walking along Pine Street over Lovills Creek.*



## Pedestrian Facility Recommendations

Pedestrian facility recommendations were developed based on field review, collaboration with existing planning efforts, public input, and validation by City Staff, PAC, and NCDOT. The vision for the plan was referenced throughout this process, serving as a backbone for establishing these recommendations.

Facility recommendations have been developed for the following areas: sidewalks, shared use paths, greenways, and intersection improvements (more information on these facility types can be found in Chapter 2). Areas warranting further study were also identified. It is important for these recommendations to function as a cohesive system. The map on page 4-5 documents all of the pedestrian facility recommendations. This map clearly indicates how the different recommendation types will interface with each other. Conceptual cross-section treatments with sidewalks, shared use paths, and greenway facilities are also included on this map to provide a reference for future treatments. This map also includes an inventory of the major attractors and destination points within the City in an effort to demonstrate how recommended pedestrian facilities would serve these locations.

The following sections consider the four major recommendation types independently.

- Greenway
- Sidewalks
- Multi-Use Paths
- Intersections

This process allows for clear communication of priorities within each project type, important for when funding opportunities are identified for a certain improvement type. Each improvement type discussion includes a map noting the proposed project locations, as well as a table providing more details on the recommendations and the priority projects.

## Priority Projects

Identifying facility needs and improvement types is only one part of the recommendations development process. Given the existing and anticipated funding sources available for pedestrian projects in the region, there is a possibility that all of the projects recommended here may not be built within the next 30 years.

In order to produce a set of projects that best reflect the potential for funding within the life of this plan, a subset of the highest-priority projects has been identified for each facility type. Priority recommendations for each facility type are listed separately, in an effort to produce a range of projects that could make the best use of a range of funding sources and maximize our effectiveness in allocating limited resources.

A range of criteria were considered to identify the priority projects. Members of the PAC were consulted in the development of this methodology for determining high priority locations. These criteria included:

- Making connections to recreational facilities and other pedestrian generators. Emphasis was placed on connecting households to their desired activity nodes such as recreational facilities, bus stops, greenways and civic and community facilities.
- Represent community equity. In order to ensure the biggest needs in different sections of town were addressed, priority projects were identified throughout the community
- Emphasize east-west connections. Since US 52 serves as a barrier to pedestrian travel between the eastern and western portions of Mount Airy, a priority was placed on projects that could span this barrier.

The priority projects are highlighted in the tables that follow later in this chapter.



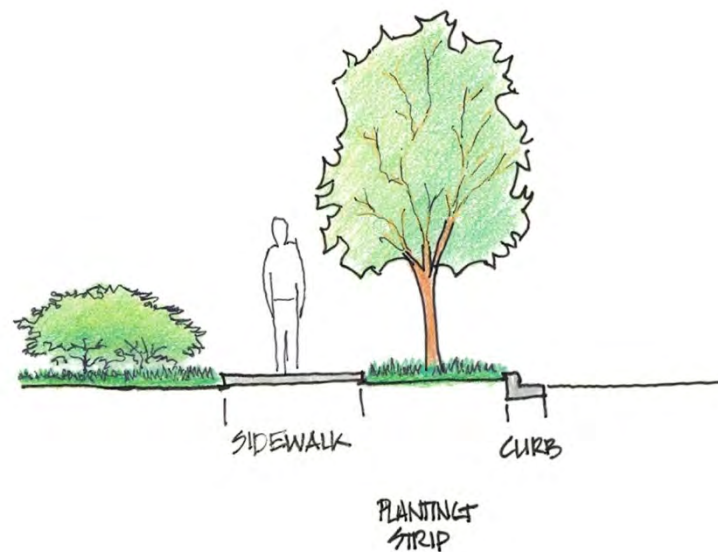
*Worth Street at Lovills Creek at the terminus of the Emily B Taylor Greenway.*



## Sidewalks

The sidewalk inventory performed for this study is detailed in Chapter 2. This inventory provided a clear picture of the existing facilities, as well as whether facilities are available on both sides of the roadway. Based on this assessment, a list of infill recommendations was prepared. The purpose of these sidewalk recommendations is to create a more cohesive network through infill. Generally, it is recommended to construct sidewalks on both sides of the street if possible. However, infill projects should be constructed to maintain consistency with the existing facilities they connect.

Construction costs of sidewalks are estimated at \$70/LF. With a 5' sidewalk width and sidewalks on both sides of the road, this equates to \$369,600 per mile. Additional right-of-way, utilities, and environmental mitigation costs yield an overall estimated cost of \$33/LF, or \$195,000 per mile.



Sidewalks						
Project ID	Project Location	From	To	Length (ft)	Improvements Needed	Estimated Cost
1	Greenhill Road	US 52	Lakemont Trail	6,300	New sidewalk	\$441,000
2	Parker Road	City Limits	Lakemont Trail	4,800	New sidewalk	\$336,000
3	Lakemont Trail	City Limits	Country Club Lane	10,550	New sidewalk	\$738,500
4	Fancy Gap Road	US 52	US 52	5,550	New sidewalk	\$388,500
5	Wards Gap Road	W. Oakdale Street	City Limits	11,275	New sidewalk	\$789,250
6	Westlake Drive	N. Franklin Road	US 52	4,700	New sidewalk - connection to Westlake Park	\$329,000
7	Hadley Road	US 52	Laurel Lane	2,480	New Sidewalk	\$173,600
8	W. Lebanon Street	US 52	Emily B. Taylor Greenway	5,722	New sidewalk - network extension	\$400,540
9	Country Club Road	Wards Gap Road	Greenhill Road	1,275	New sidewalk	\$89,250
10	Springs Road	Jones School Road	W. Oakdale Street	3,575	New sidewalk - network extension	\$250,250
11	Jackson Road	Springs Road	Riverside Drive	4,600	New sidewalk	\$322,000
12	Riverside Drive	E. Pine Street	City Limits	6,000	New sidewalk - connection to Jones Intermediate School	\$420,000
13	Galax Trail	Westlake Drive	US 52	5,300	New sidewalk - connection to Westlake Park	\$371,000
14	Hickory Street	US 52	W. Lebanon Street	5,800	New sidewalk	\$406,000
15	W. Oakdale Street	Five Oaks Trail	N. Main Street	500	New sidewalk - network extension	\$35,000
16	Old Springs Road	N. Main Street	Riverside Drive	3,850	New sidewalk	\$269,500
17	Wrenn Avenue	Grace Street	Existing sidewalk	1,550	New sidewalk - gap connection	\$108,500
18	Grace Street	W. Lebanon Street	Existing sidewalk	1,300	New sidewalk - gap connection	\$91,000
19	Howard Street	W. Lebanon Street	Charles Street	150	New sidewalk	\$10,500
20	High School Connector	Orchard Street	Emily B. Taylor Greenway	1,000	School Connector	\$70,000
21	Orchard Street	N. South Street	-	1,050	New sidewalk - gap connection	\$73,500
22	Fredrick Street	US 52	Independence Boulevard	2,700	New sidewalk - mall connector	\$189,000
23	W. Pine Street	S. Franklin Road	S. South Street	6,000	New sidewalk	\$420,000
24	Independence Boulevard	W. Pine Street	N. South Street	2,000	New sidewalk - Emily B. Taylor greenway connector	\$140,000
25	E. Bleumont Street	W. Pine Street	Parrish Lane	3,000	New sidewalk	\$210,000
26	Snowhill Drive	S. Franklin Road	Rockford Street	4,100	New sidewalk	\$287,000
27	Welch Road	S. Franklin Road	Snowhill Drive	4,000	New sidewalk	\$280,000
28	Carter Street	Rockford Street	US 52	6,700	New sidewalk - commercial connector to greenway extension	\$469,000
29	Arlington Street	US 52	S. Renfro Street	3,200	New sidewalk	\$224,000
30	Newsome Street	US 52	Austin Drive	1,650	New sidewalk - neighborhood connector	\$115,500
31	Sunset Drive	Rockford Street	Banner Street	1,550	New sidewalk - neighborhood infill	\$108,500
32	S. South Street	Worth Street	Rockford Street	1,520	New sidewalk - neighborhood infill	\$106,400
33	E. Raymore Street	S. South Street	Penn Street	2,400	New sidewalk - neighborhood infill	\$168,000
34	Newsome Street	Sunset Drive	-	500	New sidewalk - neighborhood infill	\$35,000
35	Penn Street	Davis Street	Newsome Street	1,950	New sidewalk - neighborhood infill	\$136,500
36	Rockford Street	Penn Street	US 52	1,500	New sidewalk - neighborhood infill	\$105,000
37	Hale Street	W. Church Street	Worth Street	1,450	New sidewalk - neighborhood infill	\$101,500
38	Westfield Road	S. Renfro Street	City Limits	1,264	New sidewalk	\$88,480
39	S. Renfro Street	Cherry Street	City Limits	8,900	New sidewalk	\$623,000
40	Hamburg Street	S. Main Street	Mt. Airy Middle School	2,500	New sidewalk - school connector	\$175,000
41	Middle School/Greenway Connector	Hamburg Street	School	250	New sidewalk - school connector	\$17,500
42	N. Renfro Street	Independence Blvd	Elm Street	950	New sidewalk - neighborhood infill	\$66,500
43	Galloway Street	N. Renfro Street	Riverside Drive	2,325	New sidewalk - neighborhood connector	\$162,750
44	E. Poplar Street	E. Lebanon Street	Woodruff Street	800	New sidewalk - neighborhood infill	\$56,000
45	Woodruff Street	E. Poplar Street	Linville Road	2,400	New sidewalk - neighborhood infill	\$168,000
46	Linville Road	N. Renfro Street	City Limits/Ararat River	4,600	New sidewalk - greenway connector	\$322,000
47	Five Oaks Trail	W. Oakdale Street	Fairview Avenue	500	New sidewalk - neighborhood infill	\$35,000
48	Jones School Road	Wards Gap Road	Springs Road	1,600	New sidewalk - connection to Graham Park	\$112,000
49	E. Pine Street	Riverside Drive	Ararat River	500	New sidewalk - greenway connector	\$35,000
Total (ft)				158,136	Total	\$11,069,520





Shared Use Paths

Shared use paths provide a wide, inviting facility that can be used by both pedestrians and cyclists. They easily facilitate connections to desired activity nodes by using existing roadway corridors. While the current network of shared use paths is limited in the City of Mount Airy, this facility type is highly desired. Recommended shared use paths are slightly longer, varying between fractions of a mile to a couple miles each in length. Shared use paths are only recommended along one side of a roadway, but can be complemented with a sidewalk on the opposing side of the road if desired.

Construction costs of shared use paths are estimated at \$740,000 per mile. With consideration for right-of-way, utilities, and environmental mitigation, total costs are estimated at \$1,000,000 per mile.

Greenways

While exhibiting many of the same design characteristics of shared use paths, greenways are more often located along natural features, utilities, or their own unique path. Eastern and western Mount Airy already benefit from the presence of an existing greenway. The recommended greenways build off of existing easements, serve existing neighborhoods, or forge their own paths. With this flexibility comes the opportunity to efficiently link recreational facilities together. The proposed projects also cover a geographically diverse area of the City, and provide opportunities for greenway connections to neighboring communities.

Construction costs of greenways are estimated at \$650,000 per mile. With consideration for easements, and environmental mitigation, total costs are estimated at \$500,000 per mile.

Shared Use Paths						
Project ID	Project Location	From	To	Length (ft)	Improvements Needed	Estimated Cost
1	US 52 (Andy Griffith Pkwy)	W. Pine Street	N. Franklin Road	20,607	Connect Mt. Airy along US 52 utilizing the existing right-of-way	\$2,536,847
2	N. Franklin Road	US 52	US 601	31,265	Proposed shared use path along the western boundary of Mt. Airy.	\$3,848,911
3	W. Pine Street	N. Franklin Road	Gentry Middle School	6,600	Connect Gentry Middle School to the N. Franklin Connector	\$812,500
4	US 601	US 52	I-74	12,028	Connect the commercial corridor to Emily B. Taylor Greenway	\$1,480,720
Total (ft)				70,500	Total	\$8,678,977



Greenways						
Project ID	Project Location	From	To	Length (ft)	Improvements Needed	Estimated Cost
1		Emily B. Taylor Greenway	Ararat River Greenway	6,134	New Greenway Connection via rail spur	\$1,161,742
2	Ararat River Greenway Extension	Riverside Park	Riverside Drive (NC 104)	16,181	New Greenway Connection	\$3,064,583
3	Jones Intermediate School Connector	Ararat River Greenway Extension	Jones Intermediate School	1550	New Greenway Connection	\$293,561
4	Southern Greenway Connector	Emily B. Taylor Greenway	Ararat River Greenway	12,224	New Greenway Connection	\$2,315,152
5	Greenway Connector	Arlington Street	Southern Greenway Connector	642	Connector Arlington Street to the Southern Greenway Connector	\$121,591
Total (ft)				36,731		\$6,956,629





Working with members of the PAC, staff and appointed and elected officials, the following are the identified priority projects and areas for sidewalks and crosswalks within the City of Mount Airy.

## Sidewalk priorities:

1. Renfro Street from Independence Blvd. to First Baptist Church
2. Grace Street and Lebanon Street intersection improvements.
3. Sidewalk from Oakdale Cemetery to Central Methodist Church
4. N. South Street on same side as Mount Airy High School going South
5. Worth Street from Emily B. Taylor Greenway to Northern Hospital of Surry County.
6. Renfro Street from Northern Hospital of Surry County down to US 52.
7. Newsome Street and Carter Street at Highway 52
8. South Main Street from the Subway Restaurant down to the bridge
9. North Main Street to Ridgecrest Retirement Home
10. West Lebanon (to Food Lion Shopping Center)
11. West Pine Street-to bridge at City of Mount Airy Public Works Department
12. Sidewalks along school areas
13. West Pine Street to South Franklin Road
14. Old Springs Road from North Main Street to Riverside Drive
15. Grace Street from Lebanon Street to North Main Street (Fill in gaps)

## Crosswalk priorities:

1. Move crosswalk at First Baptist Church (North Main Street) to entrance of church sanctuary (not the vehicular driveway entrance)
2. Intersection at Renfro/East Pine Street (At Reeves Community Center)
3. Cherry Street Lot and Crosswalk to Reeves Community Center
4. Highway 52 and Snowhill Drive/Worth Street
5. Highway 52/Highway 601 (pedestrian crossing)





## Intersection Improvements

The City of Mount Airy has worked with NCDOT to provide intersection crossing amenities for pedestrians at signalized intersections throughout the City limits. Crosswalks currently exist at almost every major intersection in town. However, many of these facilities were put in place at a time when design standards were not as rigorous as they are now. Many of the markings have worn over time and are in need of replacement. Consideration for replacement of the worn crosswalks with high visibility markings is recommended.

Potential pedestrian facility upgrades at these intersections may include improvements such as high-visibility crosswalks, pedestrian-level lighting and signage, push button pedestrian signal heads and ADA curb ramps with textured pavement. Thermoplastic high-visibility crosswalks

are the preferred treatment. More information regarding recommended design details can be found in Appendix B of this report.

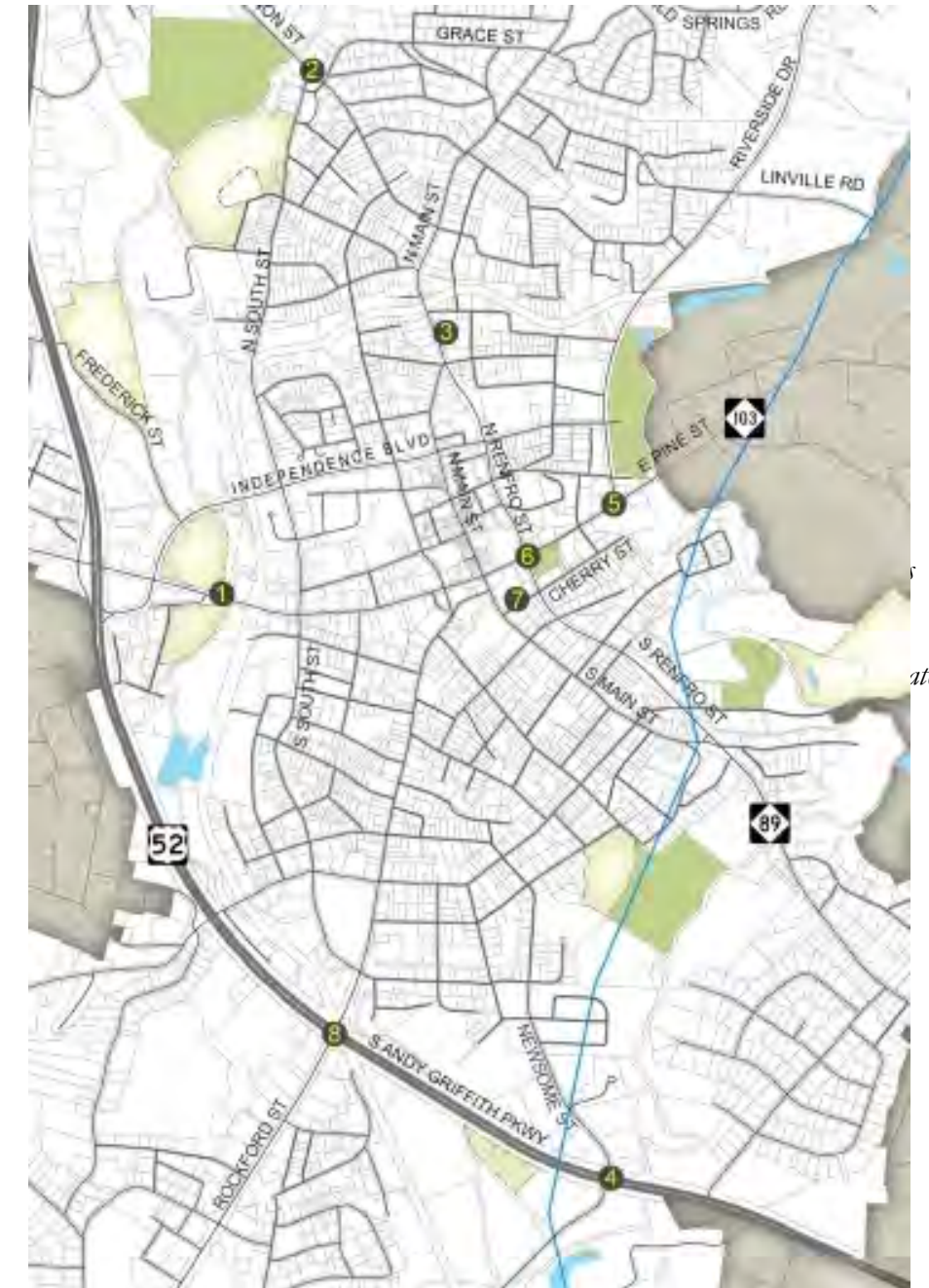
## More than Brainstorming

The PAC played an integral part of the planning process. Their local knowledge and professional experience offered a collective insight that if overlooked would have minimized the success of the study. Their efforts went beyond the creation of the Vision Statement.

After the creation of the Vision Statement, the Project Advisory Committee collaborated with the project consultant on the evaluation of seven specific intersections and corridors in need of improvement. The following pages highlight of each intersection of the recommendations. The image to the right depicts the geographic diversity of the projects.



*No City should be too large for a man to walk out of in a morning.*  
~ Cyril Connolly





## Pine Street at Emily B Taylor Greenway

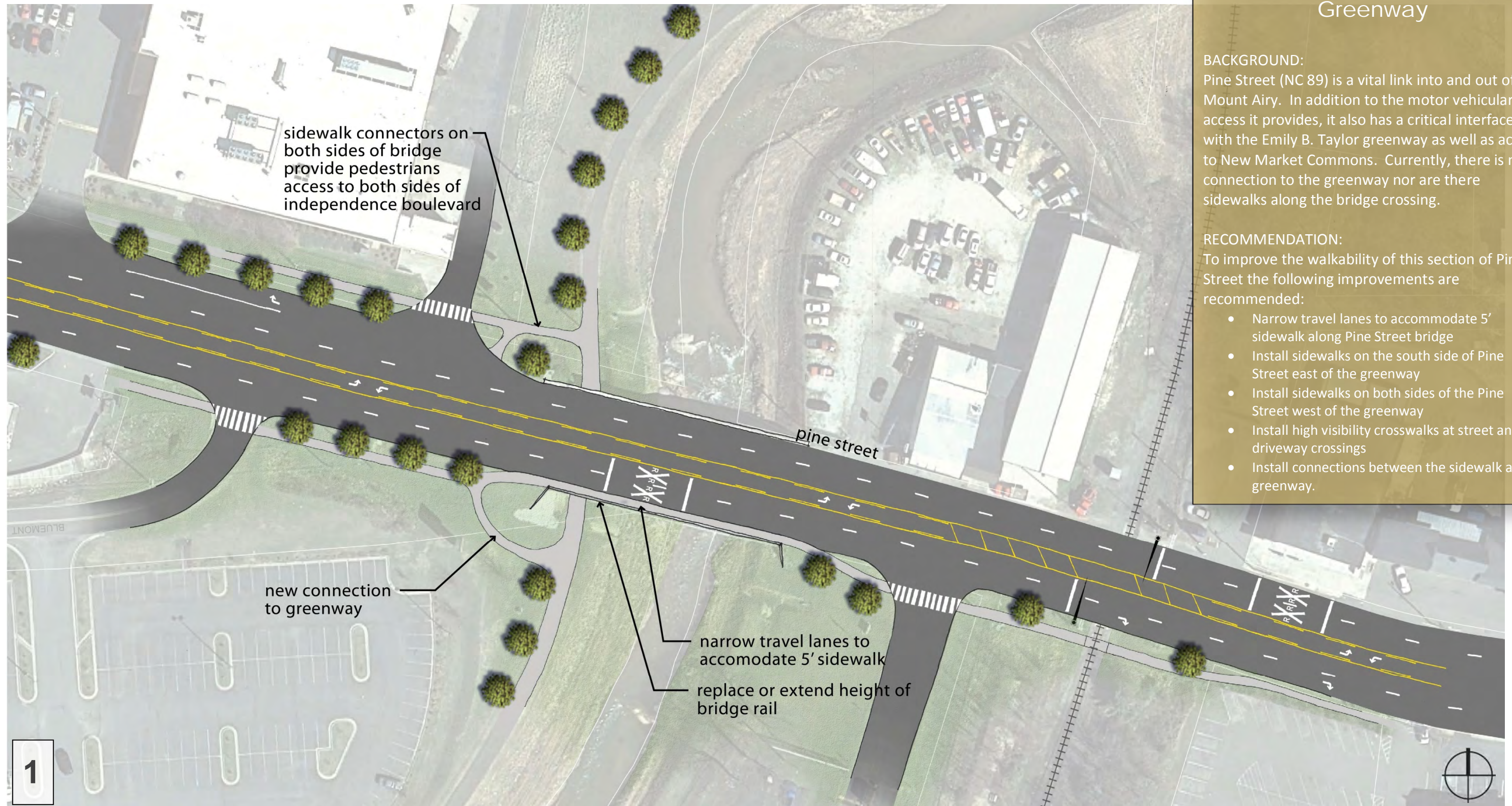
### BACKGROUND:

Pine Street (NC 89) is a vital link into and out of Mount Airy. In addition to the motor vehicular access it provides, it also has a critical interface with the Emily B. Taylor greenway as well as access to New Market Commons. Currently, there is no connection to the greenway nor are there sidewalks along the bridge crossing.

### RECOMMENDATION:

To improve the walkability of this section of Pine Street the following improvements are recommended:

- Narrow travel lanes to accommodate 5' sidewalk along Pine Street bridge
- Install sidewalks on the south side of Pine Street east of the greenway
- Install sidewalks on both sides of the Pine Street west of the greenway
- Install high visibility crosswalks at street and driveway crossings
- Install connections between the sidewalk and greenway.







### Lebanon Street at Grace Street

#### BACKGROUND:

Lebanon Street provides a critical connection to the Emily B. Taylor greenway as well as Veterans Park. Grace Street is a residential collector between Lebanon and Main Street. Sidewalks are intermittent along Lebanon Street and not present along Grace Street.

#### RECOMMENDATION:

To improve the walkability of this intersection the following improvements are recommended:

- Installation of sidewalks along both sides of Lebanon Street
- Install sidewalks on the north side of Grace Street
- Install high visibility crosswalks at street and driveway crossings
- Install pedestrian height barrier rail along the Lebanon Street bridge
- Installation of pedestrian heads
- Installation of pedestrian refuge islands on Lebanon Street



## Main Street at First Baptist Church

### BACKGROUND:

First Baptist Church was organized in 1879 with work starting on the original granite sanctuary in 1906. An offsite parking lot is needed to accommodate the large congregation during worship, funerals, and holidays. The current unsignalized crossing is located too close to Galloway Street, signage has become faded and the crosswalk is deteriorated.

### RECOMMENDATION:

To improve the safety of this crossing the following improvements are recommended:

- Relocate the crosswalk to opposite the front door to the church
- Install high visibility crosswalks and advance signage
- Install a Hawk signal or a flashing beacon





## Newsome/Carter Street at US 52

### BACKGROUND:

Newsome Street connects to a high transit dependent population to the north. Currently, there are no sidewalks or pedestrian amenities at or leading to the intersection with US 52. Carter Street provides a connection to the PART park and ride lot.

### RECOMMENDATION:

To improve the walkability to and through this intersection the following improvements are recommended:

- Installation of sidewalks on one side of Newsome and Carter Streets
- Install high visibility crosswalks at street and driveway crossings
- Installation of pedestrian heads
- Installation of pedestrian refuge island on US 52





## East Pine Street at Riverside Drive

### BACKGROUND:

Pine Street, just as it does on the west side of Mount Airy, intersects with a greenway. This greenway, the Ararat River greenway, begins at Riverside Park just north of this intersection. Like many intersections outside the core downtown of Mount Airy, the intersection of E. Pine Street and Riverside Drive lacks pedestrian facilities and connections to and from the intersection. Sidewalks are also not present along Riverside Drive to Riverside Park.

### RECOMMENDATION:

To improve the walkability of this intersection the following improvements are recommended:

- Installation of sidewalks along both sides of Pine Street and Riverside Drive
- Install high visibility crosswalks at street and driveway crossings
- Improve connection to sidewalk along Pine Street to Ararat River Greenway
- Installation of pedestrian heads at signalized intersection
- Installation of pedestrian refuge islands on Riverside Drive



5



## Pine Street at Renfro Street

### BACKGROUND:

Located at the intersection of Renfro Street and Pine Street, Reeves Community Center is the heart of the Mount Airy Community and is a popular destination throughout the entire day. Unfortunately, it is located on one of the busiest intersections in Mount Airy. Because of its popularity parking is at a premium. Patrons park wherever they find an empty spot.

### RECOMMENDATION:

To improve the walkability of this intersection the following improvements are recommended:

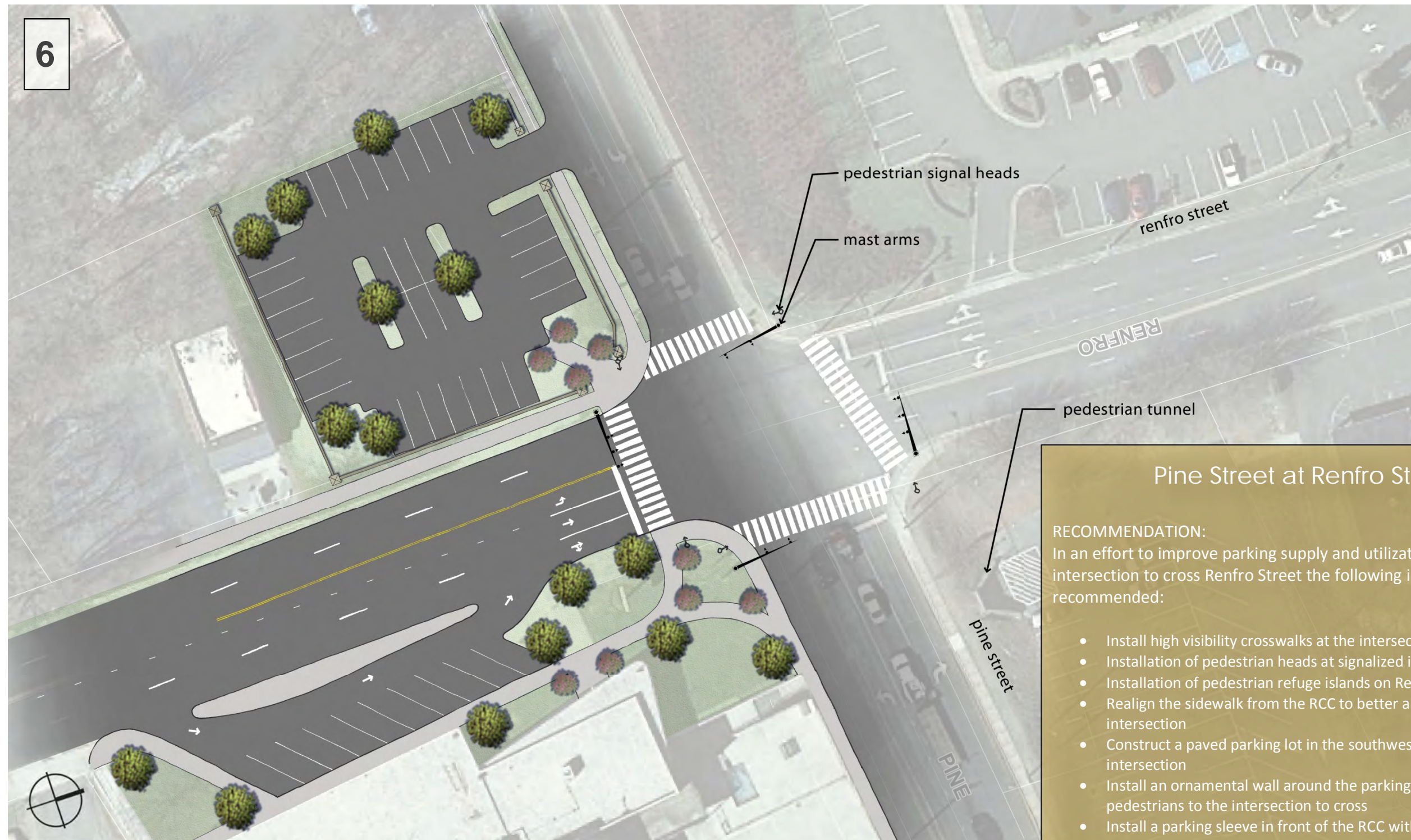
- Install high visibility crosswalks at the intersection
- Installation of pedestrian heads at signalized intersection
- Installation of pedestrian refuge islands on Renfro Street



6

Given the sensitive nature of the intersection, several alternatives were developed for this intersection. The proceeding pages highlight these improvements and alternatives.





### Pine Street at Renfro Street

#### RECOMMENDATION:

In an effort to improve parking supply and utilization of the intersection to cross Renfro Street the following improvements are recommended:

- Install high visibility crosswalks at the intersection
- Installation of pedestrian heads at signalized intersection
- Installation of pedestrian refuge islands on Renfro Street
- Realign the sidewalk from the RCC to better align with the intersection
- Construct a paved parking lot in the southwest quadrant of the intersection
- Install an ornamental wall around the parking lot to channelize pedestrians to the intersection to cross
- Install a parking sleeve in front of the RCC with 10 spaces.





### Pine Street at Renfro Street

#### RECOMMENDATION:

In an effort to improve parking supply and utilization of the intersection to cross Renfro Street the following improvements are recommended:

- Reconfigure Renfro Street to provide for on-street parking, one dedicated through lane and auxiliary turn lanes.
- Install high visibility crosswalks at the intersection
- Installation of pedestrian heads at signalized intersection
- Installation of pedestrian refuge islands on Renfro Street
- Realign the sidewalk from the RCC to better align with the intersection
- Construct a paved parking lot in the southwest quadrant of the intersection
- Install an ornamental wall around the parking lot to channelize pedestrians to the intersection to cross
- Install a parking sleeve in front of the RCC with 10 spaces.



## Cherry Street Park

An alternative to improving the intersection at Renfro Street and Pine Street, the Cherry Street Park provides for additional parking as well as programmed open space in downtown Mount Airy. The option also includes improvements at Cherry Street and Renfro Street to improve pedestrian connectivity to the RCC.

### RECOMMENDATION:

In an effort to improve parking supply and utilization of the intersection to cross Renfro Street the following improvements are recommended:

- Install high visibility crosswalks at the intersection
- Installation of pedestrian heads at signalized intersection
- Installation of pedestrian refuge islands on Renfro Street
- Construct a paved parking lot in the northwest quadrant of the intersection
- Install an active park along Main Street







## US 52 at Rockford Street

### BACKGROUND:

Touted as the worst pedestrian friendly intersection in Mount Airy, the intersection is the confluence of many things; two US highways (52 and 601), railroad, Emily B Taylor Greenway, and Lovills Creek.

### RECOMMENDATION:

To improve the walkability of this intersection the following improvements are recommended:

- Install high visibility crosswalks at the intersection
- Installation of pedestrian heads
- Installation of pedestrian refuge islands on US 52
- Narrow lanes on Rockford Street by 1 ft to gain an 8 foot sidewalk bridge crossing
- Install a 10 ft shared use path on Rockford Street west of US 52



## Policies and Guidelines

The City of Mount Airy has supported moving pedestrian projects forward through the establishment of smart policies and providing good guidance. The City currently requires sidewalks be constructed as new development projects are completed in the area. However, there are some other policy and guidance initiatives that could be put in place to further improve the pedestrian environment.

- Revise the current sidewalk guidelines periodically to ensure consistency with best practices. Appendix B of this report provides a summary of design guideline best practices.
- Develop a capital improvements program for the City of Mount Airy. This program should include a dedicated funding source for pedestrian facilities.
- Take a more active role in promoting enhanced funding opportunities through grant applications and other initiatives. More information on existing and potential funding sources can be found in Appendix A.
- Adhere to the agreed-upon set of priorities to ensure funds are directed towards priority projects. Funding opportunities are limited, so conforming to the vetted methodology is a good way to allocate money where it is most needed. It is recommended that a criteria system be developed to establish and rank priority projects.
- Consider making the PAC a permanent oversight committee for pedestrian related decisions-making promoting consistency with the adopted pedestrian plan.
- Consider the development of a comprehensive Wayfinding plan for Mount Airy to give direction to and from the facilities that are present.

## Education, Enforcement, Encouragement

Improvements to pedestrian infrastructure and enhanced local policies will result in a better walking environment. However, the positive impacts of these improvements can be further expanded by complementing them with a set of encouragement, enforcement, and education programs.

- The schools local to Mount Airy should continue to participate in the National Walk to School Day each year. This program offers encouragement to children, parents, faculty, and staff to walk to school and provides an opportunity to educate students about safe practices and the benefits of walking.
- Work with the Chamber of Commerce and local businesses to expand the concept of the walk to school day by also including walk/bike to work days.
- In order to improve pedestrian crossing safety, local enforcement agencies should monitor driving speeds on local roads and actively ticket speeders when problems are identified.
- Work with local schools to take part in the Safe Routes to School program to encourage and provide a safe environment for children and educators to walk or bike to school. More information on this program can be found at [www.safety.fhwa.dot.gov/saferoutes](http://www.safety.fhwa.dot.gov/saferoutes).
- Participate in the North Carolina School Crossing Guard Training Program to properly train law enforcement officers who are responsible for training crossing guards.
- Promote “Watch for Me NC”, a pedestrian education and enforcement campaign to help decrease the amount of pedestrians injured in accidents involving vehicles.



*Emily B Taylor Greenway at Independence Boulevard*



*Ararat River nature sculpture*



*Downtown Mount Airy along Main Street*





# COMPREHENSIVE PEDESTRIAN PLAN

*City of Mount Airy*

## Appendix

Appendix A	Funding Opportunities
Appendix B	Design Resources
Appendix C	Questionnaire/Results
Appendix D	Market Profile
Appendix E	Census Profile

Items in the Technical Appendix represent components that have been developed outside the process of creating the Comprehensive Pedestrian Plan. The placement of *Funding Opportunities* (Appendix A) and *Design Resources* (Appendix B) in this section was done to keep the narrative of the summary workbook specific to the City of Mount Airy allowing for ease of use by a broad spectrum of readers. The appendix therefore serves as a technical resource for practitioners and staff.





# COMPREHENSIVE PEDESTRIAN PLAN

## City of Mount Airy

## Appendix A – Funding Opportunities

The construction of a comprehensive connected pedestrian network and ancillary facilities can occur through incremental adoption of local policies and programs and state programs, as well as through the receipt of private contributions. With this in mind, it will be important for the City of Mount Airy to identify funding sources to implement the recommendations of this plan. While some projects and programs will be funded by the City, alternatives are available to provide financial support for improving the local pedestrian network.

### Local and Regional Programs

Local funds should be used for projects not on major state routes. Usually these are most successful when a state-funded incidental project — such as a road widening — has already been programmed. Local funding sources tend to be flexible, and include general revenue expenditures as well as proceeds from bond programs. An exception to this policy may include high priority connections along roads unlikely to be developed.

#### *Capital Improvement Program*

As mentioned in Chapter 4, the City of Mount Airy does not currently have an established capital improvement program. Formally developing this program would provide the City with a formalized way to allocate their resources and stick to their vetted prioritization methodology.

#### *Powell Bill*

Powell Bill funds are collected by the state in the form of a gasoline tax. The amount of these funds distributed to a municipality is based on the number of street miles to be maintained and the Town's population. These funds are most often used for maintenance of existing or construction of new sidewalks.

#### *Transportation Bonds*

Transportation bonds have been instrumental in the strategic implementation of local roadways, transit, and non-motorized travel throughout North Carolina. Voters in communities both large and small regularly approve the

use of bonds in order to improve their transportation system. Improvements to the pedestrian system in Mount Airy would be a type of project that could be funded using a transportation bond program.

### State and Federal Programs

In comparison with local funds, state and federal funds are not as flexible in terms of their use. Usually these projects focus on the needs of vehicles, either in terms of capacity or safety — for example, widening projects. It can be difficult, however, to secure sidewalk and pedestrian crossing facilities in state construction projects.

On July 6, 2012, the President signed into law the Moving Ahead for Progress in the 21<sup>st</sup> Century Act (MAP-21). This was the first long-term highway authorization enacted since 2005. With guaranteed funding for highways, highway safety, and public transportation totaling \$105 billion, MAP-21 provides the vital resources to continue transportation investment in our nation. Provisions address specific safety issues, including pedestrian and bicycle safety. New federal transportation legislation is currently under consideration by Congress.

Funds for pedestrian and bicycle projects come from several different sources that are described in this section; however, allocation of those funds depends on the type of project or program and other criteria. The information provided in this section is intended to present a basic overview of the process.

#### *Transportation Improvement Program (TIP)*

As a part of the state's Transportation Improvement Program (TIP), pedestrian TIP projects can receive allocations through an array of funding resources including Federal Aid Construction Funds and State Construction Funds. As a part of the application process, strict criteria must be met before project selection. These criteria include providing right-of-way information, meeting a set of design standards, showing a need for a project, local support of the project, and the inclusion of the project in a pedestrian planning process. Pedestrian projects may appear in the

TIP as standalone projects or as incidental projects through another roadway project.

#### *Safe Routes to School*

Safe Routes to School receives funding through the federal MAP-21 legislation and provides funding for individual schools to create route plans or develop facilities that create a safer walking and biking environment for their students. North Carolina has a yearly application program for which any school, school district, municipality or other governmental body, or non-profit association may apply. The City of Mount Airy is encouraged to partner with local schools in pursuing funding from this source. For more information, visit <http://www.saferoutesinfo.org/>.

#### *Enhancement Grants*

The Enhancement Grant program promotes the implementation of projects not typically associated with the road-building mindset. While the construction of roads is not the intent of the grant, the construction of bicycle and pedestrian facilities is one of many enhancements that the grant targets. Enhancement funding is administered through the TIP. For more information, visit <http://www.ncdot.org/programs/enhancement/>.

#### *Recreational Trails Program*

The Recreational Trails Program is a federal initiative assisting with the development of non-motorized and motorized trails. Grant recipients must demonstrate conformity with North Carolina's Statewide Comprehensive Outdoor Recreation Plan (SCORP). This program is administered for North Carolina through the NC Division of Parks and Recreation. For more information, visit [http://www.ncparks.gov/About/trails\\_RTP.php](http://www.ncparks.gov/About/trails_RTP.php).

#### *Land and Water Conservation Fund (LWCF)*

The Land and Water Conservation Fund was developed in 1965 with the objective of encouraging the creation of local parks and recreation facilities. This fund is now the primary source of federal money for land acquisition for open space, parks, and natural areas. Grants from the





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LWCF can be used for a range of recreational facilities, including trails and greenways. For more information, visit [http://www.ncparks.gov/About/grants/lwcf\\_main.php](http://www.ncparks.gov/About/grants/lwcf_main.php).

### *Community Development Block Grant*

Federal funding for pedestrian projects can come from sources outside the transportation and environmental realms. The Community Development Block Grant program is administered by the U.S. Department of Housing and Urban Development (HUD). The intent of this grant is to serve the needs of moderate or low-income areas through activities such as neighborhood revitalization, economic development, and facilities improvements. These grants have successfully been used for the development of pedestrian facilities in the state of North Carolina. For more information, visit [http://portal.hud.gov/hudportal/HUD?src=/program\\_office/comm\\_planning/communitydevelopment/programs](http://portal.hud.gov/hudportal/HUD?src=/program_office/comm_planning/communitydevelopment/programs).

### *Hazard Elimination and Railway-Highway Crossing Programs*

These funds are an additional subset of the State Transportation Improvement Program (STIP) funding, constituting 10% of a state's funds. This program is intended to inventory and correct the safety concerns of all travel modes. These funds can be used to construct corridor or intersection-level improvements that focus on safety enhancements.

### *NCDOT Division Funds*

NCDOT separates the state into 14 divisions. Surry County is in Division 11. Division funds are another resource that provides allocations or discretionary funding for special projects within each division.

### *North Carolina's Clean Water Management Trust Fund (CWMTF)*

At the end of each fiscal year, 6.5 percent (or a minimum of \$30 million) of the unreserved credit balance in North Carolina's General Fund is placed in the CWMTF. The revenue of this fund is allocated as grants to local

governments, state agencies, and conservation nonprofits to help finance projects that specifically address water pollution problems. CWMTF funds may be used to establish a network of riparian buffers and greenways for environmental, educational, and recreational benefits. For more information, visit <http://www.cwmtf.net/>.

### *North Carolina Parks and Recreation Trust Fund (PARTF)*

The NC Parks and Recreation Trust Fund provides funding to acquire park lands and to build and maintain park facilities. This program, managed by the North Carolina Division of Parks and Recreation, offers grants to local communities that can be used for programs such as trail construction or maintenance. For more information, visit [http://www.ncparks.gov/About/grants/partf\\_main.php](http://www.ncparks.gov/About/grants/partf_main.php).

### *North Carolina Conservation Tax Credit*

The North Carolina Conservation Tax Credit was developed with the intent of preserving natural or rural areas by incentivizing conservation. Through this program, open spaces or natural areas can be set aside for future use as greenways or trail facilities. For more information, visit <http://www.onencnaturally.org/pages/conservationtaxcredit.html>.

### *Governor's Highway Safety Program (GHSP)*

The Governor's Highway Safety Program is committed to enhancing the safety of the roadways in North Carolina. To achieve this, GHSP funding is provided through an annual program, upon approval of specific project requests, to undertake a variety of pedestrian and bicycle safety initiatives. Communities may apply for a GHSP grant to be used as seed money to start a program to enhance highway safety. Once a grant is awarded, funding is provided on a reimbursement basis and evidence of reductions in crashes, injuries, and fatalities is required. For more information, visit [www.ncdot.org/secretary/GHSP](http://www.ncdot.org/secretary/GHSP).

### *North Carolina Adopt-A-Trail Grant Program*

The North Carolina Division of Parks and Recreation oversees this grant program with the intent of funding trail construction and maintenance projects. Grant amounts typically do not exceed \$5,000. For more information, visit [http://www.ncparks.gov/About/trails\\_AAT.php](http://www.ncparks.gov/About/trails_AAT.php).

## Public/Private Initiatives

### *Active Living by Design (ALbD)*

Active Living by Design is a program sponsored by the Robert Wood Johnson Foundation. ALbD seeks to bring together the health care and transportation communities to create an environment that encourages residents to pursue active forms of transportation such as walking and bicycling. Grants are awarded each year to a selected number of communities that are then required to produce a local match. These grants can be used to create plans, change land use policies, institute education policies, and develop pilot projects. For more information, visit [www.activelivingbydesign.org](http://www.activelivingbydesign.org).

### *Fit Together*

Fit Together is a partnership of the NC Health and Wellness Trust Fund and Blue Cross and Blue Shield of NC. The grant initiative "recognizes and rewards North Carolina communities' efforts to support physical activity and healthy eating initiatives in the community, schools, and workplaces, as well as tobacco-free school environments." This program awards up to nine partnerships with up to \$30,000 annually for a two year period. For more information on the Fit Together grant initiative, visit [www.healthwellNC.com](http://www.healthwellNC.com).

### *The Trust for Public Land*

Founded in 1972, the Trust for Public Land (TPL) is the only national nonprofit working exclusively to protect land to enhance the health and quality of life in American communities. TPL works with landowners, government agencies, and community groups to create urban parks and greenways as well as to conserve land for watershed





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protection. For more information on the Trust for Public Land, visit [www.tpl.org](http://www.tpl.org).

### *National Trails Fund*

The National Trails Fund was established by the American Hiking Society in 1998. This privately-funded grant program awards money for the construction and maintenance of hiking trails. Awards range between \$500 and \$5,000, and are targeted for non-profit organizations. For more information, visit <http://www.americanhiking.org/>.

### *Developer Contributions*

Through diligent planning and early project identification, regulations, policies, and procedures can be developed to protect future pedestrian corridors and require contributions from developers when the property is subdivided. The City of Mount Airy does a good job with its coordination with developers on the construction of pedestrian facilities. This collaboration has allowed the City to benefit from new pedestrian facilities, which are also viewed as an asset to the new development to prospective residents and businesses

### *Impact Fees*

Developer impact fees and system development charges are another funding option for communities looking for ways to pay for transportation infrastructure. They are most commonly used for water and wastewater system connections or police and fire protection services, but they have recently been used to fund school systems and pay for the impacts of increased traffic on existing roads. Impact fees place the costs of new development directly on developers and indirectly on those who buy property in the new developments. Impact fees free other taxpayers from the obligation to fund costly new public services that do not directly benefit them. Although other states in the country use impact fees, they have been controversial in North Carolina and only a handful of communities have approved the use of impact fees. The use of impact fees requires special authorization by the North Carolina General Assembly.

### *Corporate Partnerships*

Involvement between public and private entities does not have to be strictly financial in nature. By providing area

businesses with information on the benefits of walking and bicycling, along with material on the infrastructure available in the community, employees may be encouraged to pursue alternate forms of transportation. These collaborative relationships can also be used when building support for new infrastructure projects.

### *Volunteer Participation*

When considering the development of off-road trail systems, volunteer participation is a definitive way to express community buy-in and build a case for financial support. Much of the clearing and natural-surface trail building work can be completed through volunteer efforts. The Town should collaborate with local interest groups and organizations such as the Chamber of Commerce to gather volunteers. Volunteer input is also a great way to emphasize the desire for priority projects to potential funding agencies.



## Design Resources – Best Practices

The Comprehensive Pedestrian Plan isn't intended to be a substitute for feasibility analysis or engineering design. However, the provision of best practices regarding design and placement is intended to aid planners and decision makers as incremental implementation occurs. The information contained within this appendix represents an assemblage of information collected by the project team and NCDOT. Over time these standards may change as new techniques evolve. Therefore, it's important to reference new reference material when published by industry leaders including Federal Highway Administration (FHWA), American Association of State Highway and Transportation Officials (AASHTO), Institute of Traffic Engineers (ITE), American

### Sidewalks

Sidewalks are extremely important public right of-way components often times adjacent to, but separate from automobile traffic. In many ways, they act as the seam between private residences, stores, businesses, and the street. Sidewalks are spaces where children play, neighbors meet and talk, shoppers meander casually, parents push strollers, and commuters walk to transit stops or directly to work. Because of the social importance of these spaces, great attention should be paid to retrofit and renovate areas with disconnected, dangerous, or otherwise malfunctioning sidewalks.

The Federal Highway Administration (FHWA) defines sidewalks as "walkways that are parallel to a street or highway" and walkways as generally being "pedestrian paths, including plazas and courtyards."

### Sidewalk Widths

BPTD recommends a minimum travel path width of 5 ft. for a sidewalk or walkway, in accordance with the American Association of State and Highway Transportation Officials (AASHTO), the Federal Highway Administration (FHWA), and the Institute of Transportation Engineers (ITE). A sidewalk width of 5 feet is considered ample room for two people to walk abreast or for two pedestrians to pass each other.

Often downtown areas, near schools, transit stops, or other areas of high pedestrian activity call for much wider sidewalks. Sidewalks are typically built with curb and gutter sections. The division recommends that areas with significant pedestrian traffic should feature eight- to ten-foot wide sidewalks. Where sidewalks align with the edge of an angled or 90-degree parking lot, a minimum of 30 inches of parked car overhang obstructing the sidewalk shall be taken into account in order to maintain the minimum travel path width.

AASHTO recommends the construction of sidewalks on all city or town streets, including those in rural areas. The Institute of Transportation Engineers (ITE) recommends sidewalk installation on both sides of the street whenever possible for new urban and suburban streets, especially in commercial areas, residential areas with 4 or more units per acre, or residential areas on major arterials and collectors. If sidewalks on both sides of the road are not possible, lower density rural residential or suburban areas might adequately serve its pedestrians with a sidewalk on only one side. Under certain low-traffic, low-density situations, a wide paved shoulder can serve as an adequate pedestrian path.

It is important to note the potential for conflict between pedestrians and bicyclists on paved shoulder. Both bicyclists and pedestrians must exercise caution in order to avoid potential crashes on paved shoulders.

### Construction Materials and Methods

Improvements for new, retrofitted, and repair to sidewalks throughout the municipality should be constructed using the following methods and materials:

**Materials** — Sidewalks should be constructed of Portland Cement Concrete (PCC) with a 14-day flexural strength that is not less than 3,000 pounds per square inch (psi).

**Subgrade Preparation** — Subgrade should be thoroughly compacted and finished to a smooth, firm surface, and should be moist at the time the concrete is placed.

**Subgrade Compaction** — Except in areas where it is impractical to use standard type rollers, compaction should be by means of vibratory hand compactors.

**Final Finish** — Surface finish for sidewalks should be completed by brushing (with brooms) or by another approved method to provide a uniform non-skid surface.

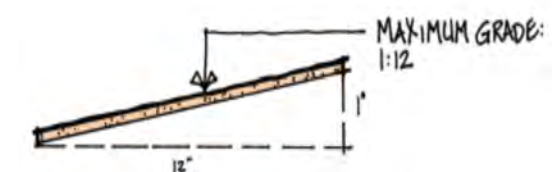
**Inspections and Performance** — Sidewalk forms should be inspected by municipal staff prior to the placement of concrete. Concrete that does not meet minimum mixture and strength standards or settles after placement should be removed and replaced by the installer.

**Alternative Materials Usage** — Use of materials for sidewalks other than concrete and the construction methods used therewith must be approved by the city or town engineer or designated representative on a case by case basis. There are some successful examples where other materials such as asphalt, crushed stone, granite fines, or other slip resistant material have been used. Concrete is preferred surface, providing the longest service life and requiring the least maintenance.

### Grade

AASHTO recommends the following grades for sidewalks: Continuous sidewalk grades should not exceed 5% (1:20). However, in areas where the existing topography or the adjacent street cause grades of more than 5%, sidewalk grades of up to 8.33% (1:12) may be used for a rise of no more than 2.5 feet, provided that level landings (grades less than 0.5%) are provided at the end of such grades and are at least 5 feet long.

In cases where grades greater than 8.33% (1:12) must be negotiated, switchbacks or other approved ramping techniques must be provided and will conform to ADA requirements. Additional right-of-way and/or easements necessary to accommodate these features will be obtained by the applicant and legally dedicated to the city or town.

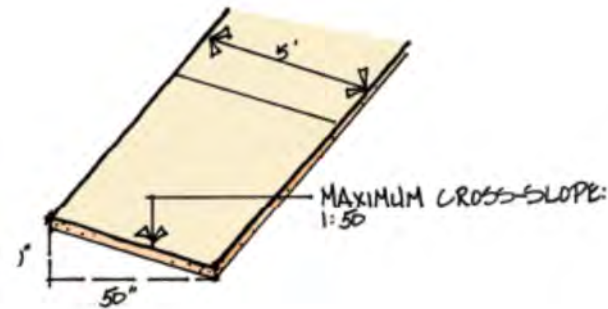


### Cross-Slope

Sidewalks and walkways should be designed such that grades and cross slopes are minimized to allow those with mobility impairments to negotiate with greater ease. The maximum allowable cross-slope for sidewalks is 2% (1:50). At driveways, curb cuts, and both marked and unmarked crosswalks, the maximum allowable cross-slope must be maintained for a minimum width of 3 feet. Cross-slope



should be oriented toward the adjacent roadway and sufficient to provide storm water runoff without creating standing water on the walkway.



## Sidewalk Thickness

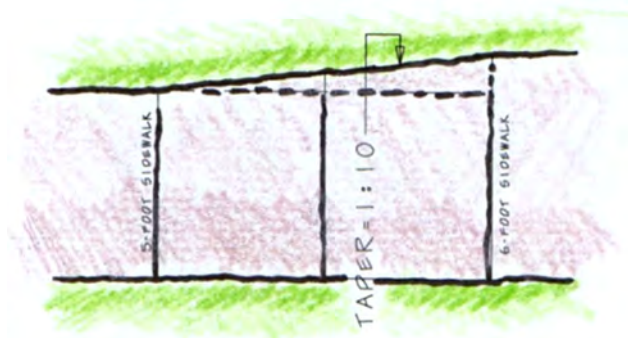
A minimum thickness (or depth) of 4 inches of concrete is required for all new sidewalks except as noted. To accommodate the additional loading caused by pedestrian density or by vehicles crossing a sidewalk, a thickness of 6 inches is required where sidewalks intersect at wheelchair/crosswalk ramps, and at driveways that use a ramp or apron-type access to cross the sidewalk from the adjacent public street.

## Transitions

Wheelchair ramp and driveway transitions to or crossing sidewalks must conform to current ADA requirements.

## Tapers

Transitional tapers to and from sidewalks of different widths are to be at a maximum rate of 1-foot of width per 10 feet of length (1:10) except as approved by the Town.



## Sidewalk Alignment

Sidewalks should parallel the roadway. Typical exceptions include:

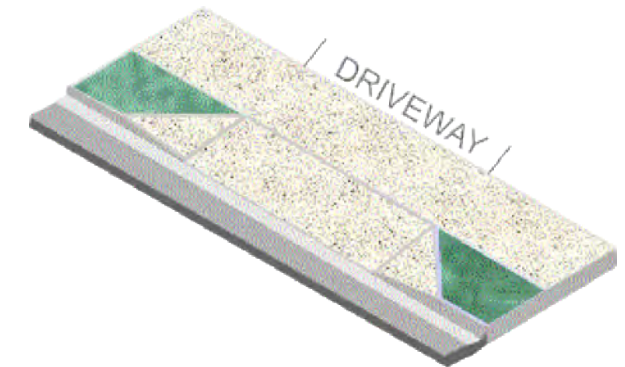
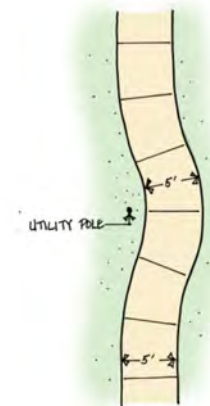
**Horizontal Curve Sections on Roadways** — In situations where a roadway curves at an angle greater than 60 degrees (and where right-of-way permits), the designer is permitted to adjust the curve of the sidewalk to more easily accommodate pedestrians.

**Presence of Natural and Manmade Features** — The 5-foot minimum width of the travel path must be free of obstructions. The designer may be permitted to alter the sidewalk path to avoid significant obstructions including but not limited to: transformers, utilities, fire hydrants, and traffic signal hardware. Sidewalk path exceptions should be evaluated and approved on a case-by-case basis by the Town. Care should also be used to ensure that the travel path does not interfere with the integrity of trees or of historic features.

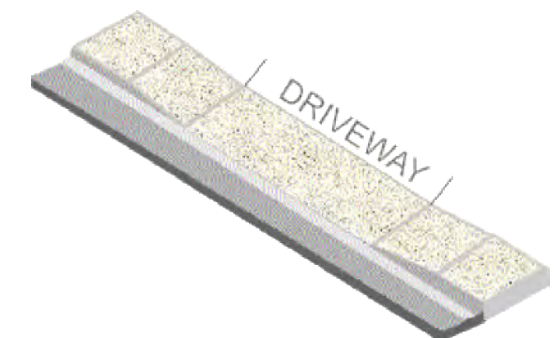
**Meanders** — Sidewalk meandering is encouraged providing it complies with ADA and AASHTO standards. People generally prefer to walk in a straight line, particularly when walking for utilitarian purposes. Meanders must meet minimum ADA requirements unless otherwise approved by the Town.

**ADA: Dealing with Cross-Slope from Driveways**

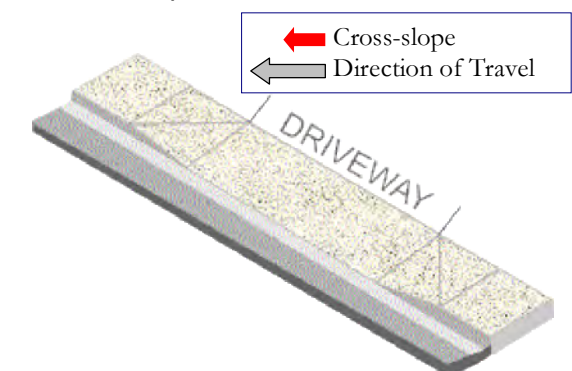
The figures at right indicate the preferred (top), conditionally acceptable (middle), and unacceptable (bottom) design solutions for new driveways as they interface with sidewalks. The intent is to make wheelchair travel safe along the sidewalk without directing the user into traffic through angled (cross)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



**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.





## Sidewalk Buffers

Buffer zones between pedestrian paths and vehicular traffic provide a sense of security to those on foot or in wheelchairs and give the path a comfortable scale and clear definition. Buffers can also provide other benefits to pedestrians depending on the type used. Buffer zones may either be paved, providing space between the pedestrian and traffic, or they may involve a planting strip with trees and shrubs, but is not recommended for high-traffic pedestrian areas. Much like the sidewalk itself, the form and topography of a buffer may vary greatly. AASHTO recommends a buffer width of two to four feet for local or collector streets, and a buffer width of five to six feet for arterial or major streets, whether for a paved buffer zone or a planting strip.

## Planting Strips

Continuous zones of landscape, located between the sidewalk and the street curb or the edge of road pavement, perform a multitude of essential tasks. Planting strips contribute to the walkability of a street by providing shade. In addition to providing shade, street trees - along with turf and other plantings - help reduce urban temperatures, improve water quality, lower stormwater management costs, and add beauty to the street for the pedestrian, the driver, and the adjacent land use.

The recommended planting width to permit healthy tree growth is 4 to 10 feet measured from the back of curb. Planting strips, or tree lawns, are the preferred means of providing a buffer, but are not feasible or appropriate in all pedestrian situations.

The width of the planting strip shall increase with a greater plant density and potential as the intensity of development increases. This separation from motorized traffic decreases road noise while increasing a pedestrian's sense of security and comfort. Added benefits of this separation include space for signage, utilities (fire hydrants), and vegetation.

## Paved Buffer Zones

In some situations, continuous planting strips are not feasible, particularly where there is a high degree of foot traffic between the sidewalk and the street. As such, these planting strips are typically used in downtown or commercial areas. In these cases, a paved buffer zone should be provided between the travel path of the sidewalk and the curb. Though a constant width is

preferred for this buffer zone, the width may vary as long as the buffer does not interrupt the pedestrian travel path. Items located in the buffer zone can include street furniture, planters, trees planted with tree grates, streetlights, street signs, fire hydrants, etc. Such items are placed in the buffer zones so as not to restrict pedestrian flow in the travel path.

Street tree plantings in tree pits with grates and guards have historically proven to work successfully within these buffer zones. They regulate micro-climate, create a desirable sense of enclosure, promote a local ecological identity and connection to place, and can act as a pleasant integration of nature into an urban environment. For healthy trees, attention should be given to amending the soil and providing drainage within the tree pits. In the event that a paved or vegetative buffer zone is not possible, a row of parked cars or a bike lane can be used to create this buffer.

Type	Sidewalk Width	Planting Strips/ Buffer	
		With Street Tree	No Street Tree
Local residential	5 ft.	4 - 6 ft.	3 - 5 ft.
Thoroughfares/ Collectors	6 - 8 ft.	6 - 10 ft.	5 - 6 ft.
Downtown or business districts	*10 - 15 ft.	n/a	n/a

\* Planting strip or tree pit would be located within sidewalk width.

A different type of paving from the sidewalk paving could be considered for the buffer zone for various reasons.

Textured pavements, pavers or pervious pavement can be used to add significant aesthetic value and help define a unique place. Using pervious materials for parking, sidewalk furniture areas, and for frontage zones could reduce environmental concerns. A change in paving type can help distinguish the pedestrian buffer zone from the pedestrian travel path. Sand-set pavers are recommended in the buffer zone for ease of utility maintenance. In designing sidewalk buffers, it is important to provide adequate clearance from potential obstructions.

## Additional Considerations

Though the buffers described above each provide some sort of physical barrier from moving vehicular traffic, it is vital for pedestrians on the sidewalk to have a clear view of drivers and vice-versa. This is a particularly important consideration in designing and maintaining planting strips. It is important to eliminate both high and low contact points with tree branches, mast-arm signs, overhanging edges of amenities or furniture. In addition, it is necessary to provide two feet of clear space from store fronts to accommodate shy distance from walls and the opening and closing of doors.

## Paths/Greenways

### Shared-Use Paths

Shared-use paths are paved road-like facilities designed to be used by pedestrians and bicyclists as well as others, including those on roller blades, skateboards and other alternative modes of transportation. Paths can be paved or unpaved, can be along creeks or streams, and can be designed to accommodate a variety of path users.

The alignment of these corridors should avoid road right-of-way whenever possible to minimize intersection and driveway crossings. Because these paths typically do not cross roads at signalized intersections, they should include pedestrian crosswalks, underpasses, culverts, or overpasses at each road crossing for safety.



## Design Criteria

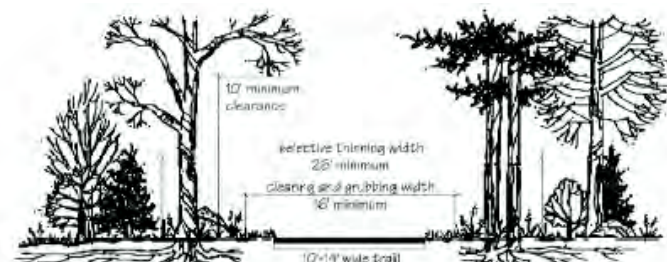
Shared-use paths shall be designed with clearance requirements, minimum radii, stopping sight distance requirements, and other criteria — similar to the criteria for roadway design. High standards should be observed when designing these paths.

Shared-use paths shall be a minimum of 10 feet wide; with minimum 2 foot wide graded shoulders on each side (AASHTO recommends 5 foot shoulders) to protect users from grade differences. These shoulders can be grass, sand, finely crushed rock or gravel, natural groundcover, or other material. Sections of the path where shoulders cannot be provided because of stream crossings or other elevated grade issues should have protection such as rails, fences, or hedges.

Paths of 12'-14' in width are preferred for areas where high volumes of users are expected. If it is not possible to increase the width, including a divider line down the center for bi-directional traffic can be helpful as a means of increasing safety for path users. Width of a path may be reduced to 8 feet, depending upon physical, environmental or right-of-way constraints and topography.

These paths should keep the contour of the land for aesthetic and environmental reasons, but for practicality reasons should not be unnecessarily curved. The minimum radii or curvature recommended by AASHTO is 30-50 feet, and the cross slope should typically be less than 2%. The grade should not be more than 5%, but could reach 11% for short distances according to ADA and AASHTO guidelines. Right angles should be avoided for safety reasons, especially when considering bridge and road crossings.

Vegetation clearing guidelines for path



## Vertical and Horizontal Clearance

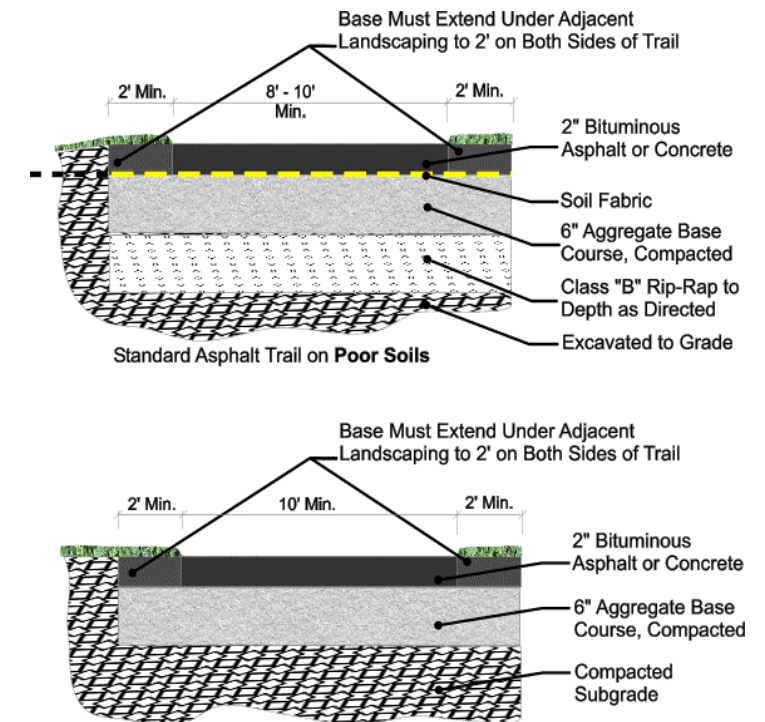
Selective thinning of vegetation along a path increases sight lines and distances and enhances the safety of the path user. This practice includes removal of underbrush and limbs to create open pockets within a forest canopy, but does not include the removal of the forest canopy itself. A total of 8 to 10 feet of vertical clearance should be provided.

## Pavement Types

Each path is unique in terms of its location, design, environment, and intended use. For each segment of the path, care should be given to selecting the most appropriate pavement type, considering cost-effectiveness, environmental benefit, and aesthetics.

Typical pavement design for a paved, off-road, shared-use paths and greenway paths should be based upon the specific loading and soil conditions for each project. These paths should be designed to withstand the loading requirements of occasional maintenance and emergency vehicles. Pavement types may vary between conventional or pervious concrete, asphalt, crusher fines, dirt or boardwalk.

**Conventional Concrete** – In areas prone to frequent flooding, it is recommended that concrete be used because of its excellent durability. Concrete surfaces are capable of holding up well against the erosive action of water, root intrusion and subgrade deficiencies such as soft soils. Of all surface types, it is the strongest and has the lowest maintenance requirement, if it is properly installed. Installation of concrete is the most costly of all surface types, but, when properly installed, requires less periodic maintenance than asphalt or crusher fines. It is recommended to install 4-inch thickness on compacted 4-inch aggregate base course.



**Pervious Concrete** – This concrete is a recent invention which allows storm water to percolate, reducing pollutants included in the stormwater runoff, when used over permeable soils, superior traction, unfavorable to rollerblading and skateboarding, higher installation cost.

**Asphalt** – Asphalt is a flexible pavement and can be installed on virtually any slope. Asphalt is smooth, joint free and softer than concrete, preferred by runners, rollerbladers, cyclists, handicap users, and parents pushing baby buggies. In most cases, construction costs significantly less. Standard installation calls for a minimum of 2-inch 1-2 asphalt thickness with 4-inch aggregate base course. Installation of a geotextile fabric beneath a layer of aggregate base course (ABC) can help to maintain the edge of a path. Asphalt pavement is also helpful in supporting a path in poor soils. Asphalt pavement can last up to 20 years with periodic maintenance. One important concern for asphalt paths is the deterioration of path edges. It is important to provide a 2' wide graded shoulder to prevent path edges from crumbling.

**Crusher fines** – Excellent for running paths, as well as walking, mountain bike and equestrian use. Can be constructed to meet ADA requirements. Paths must be smoothed out and graded several times per year.



Constructed of small, irregular and angular particles of rock, crushed into an interlocking tight matrix. It does require additional maintenance.

Dirt – Recommended for hiking trails, mountain bike tracks, and equestrian uses. It is important to grade swells on steep slopes to avoid erosion.

Boardwalk – A structure made of wooden planks constructed for pedestrians or cyclists along beaches or through wetlands, coastal dunes and other sensitive environments.

## Environmental Issues

Environmental protection should be a priority with the planning and construction of a path. Path design, construction type, and construction schedule should all reflect environmental considerations. For example, a path offers some leniency with its alignment compared to a sidewalk, offering opportunities for selective clearing of vegetation. Also, asphalt may not be considered a good surface material in wet areas because of its petroleum base and its tendency to float when flooded.

Greenway paths improve water quality by establishing buffers along creeks and streams. These buffers provide habitat for a diversity of plant and animal species. They serve as natural filters, trapping pollutants from urban runoff, eroding areas and agricultural lands. Stream buffers also reduce the severity of flooding by releasing storm water more gradually, giving the water time to evaporate, or percolate into the ground and recharge aquifers, or be absorbed and transpired by plants. In addition, paths provide more transportation choices for people who wish to walk or bicycle. By doing so, they help to decrease dependence upon automobiles and thus contribute to improved air quality. All proposed paths and other improvements should be designed, constructed and maintained with their ecological value in mind. Any disturbance of natural features should be kept to a minimum and conform to all jurisdictional environmental policy and ordinances.

The protection of streams by easement and the creation of paths along this greenway easement can help to ensure that no dumping occurs in the waterway, as users of this facility would report dumping to authorities. There is a need to help preserve these resources by ensuring that there is sufficient space between the greenway path and the waterway, by avoiding building adjacent to trees, and

by avoiding constructing on rock features, such as escarpments.

## Path Amenities and Accessibility

Though paths should be thought of as roadways for geometric and operational design purposes, they require much more consideration for amenities than do roadways. Shade and rest areas with benches and water sources should be designed along shared-use paths. Where possible, vistas should be preserved. Way finding signs (e.g., how far to the library or the next rest area, or directions to restrooms) are important for non-motorized users.

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

## Sidepath/Wide Sidewalk

A sidepath is essentially a shared-use path that is oriented alongside a road. The AASHTO *Bike Guide* and *North Carolina Design Guidelines* strongly caution those contemplating a sidepath (or wide sidewalk) facility to investigate various elements of the roadway corridor environment and right-of-way before making a decision. AASHTO provides nine cautions/criteria for designing sidepaths.<sup>1</sup>

In addition to the AASHTO cautions, research from the US and abroad confirm that bicycle/ motor vehicle crash rates are higher for bicyclists riding on a sidepath than on a roadway.<sup>2,3,4,5,6</sup>

<sup>1</sup> AASHTO, pp. 34-35.

<sup>2</sup> Kaplan, J. "Characteristics of the Regular Adult Bicycle User." FHWA, U.S. Department of Transportation, 1975.

<sup>3</sup> Moritz, W. "Adult Bicyclists in the United States - Characteristics and Riding Experience in 1996." *Transportation Research Record* 1636, TRB, Washington, DC, 1998

<sup>4</sup> Wachtel, A. and D. Lewiston. "Risk Factors for Bicycle-Motor Vehicle Collisions at Intersections." *ITE Journal*, September, 1994.

<sup>5</sup> Räsänen, M. "How to decrease the number of bicycle accidents? A research based on accidents studied by road accident investigation teams and planning guides of four cities." Finnish Motor Insurer's

Consequently, designers are advised to be very careful when choosing to design sidepaths. There are some high-volume, high-speed roadways where sidepaths are the only bicycle facility that can be provided without very costly changes to the roadway corridor. In these cases, a sidepath may be the preferred alternative. This decision must consider the magnitude of intersecting driveway and roadway conflicts. If possible, sidepaths should be provided on both sides of the roadway to encourage bicyclists to ride in the same direction as adjacent traffic. Finally, the long-term strategy on these roadways should be to widen the road or narrow the lanes to provide additional space for bicyclists in on-road bike lanes or shoulders.



One recently completed research study suggests that there may be ways to mitigate some of the safety risks associated with sidepaths.<sup>7</sup> This research effort found that crashes occur less often when the speed of the trail user is reduced. This means some sort of "traffic calming" treatment for the trail may be appropriate at intersections. At signalized intersections, it is best to treat the path

Centre, Traffic Safety Committee of Insurance Companies. VALT. Finland, 1995.

<sup>6</sup> Summala, H., E. Pasanen, M. Räsänen, and J. Sievänen, J. "Bicycle Accidents and Drivers' Visual Search at Left and Right Turns." *Accident Analysis and Prevention*. Elsevier Science Ltd., 1996/03, 28(2), pp.147-53, 1996.

<sup>7</sup> Petritsch, Landis, Huang, Challa. "Sidepath Safety Model - Bicycle Sidepath Design Factors Affecting Crash Rates," submitted to TRB for publication, July 2005.



roadway crossings as crosswalks, bringing the pathway close to the adjacent roadway so its signals can be incorporated into the overall signalization plan. Additional treatments to the typical pedestrian heads may be desirable at these intersections. At unsignalized intersections it is best to move the sidepath out of the area of the side street intersection with the adjacent roadway. This allows motorists to deal with one intersection at a time. Additionally, bicyclists are only required to scan in two directions.

## Roadway Features

### Raised or Lowered Medians

Medians are barriers in the center portion of a street or roadway. Medians allow for less interaction between cars and bicycle and pedestrians, and make more opportunities for bicycle lanes. A center turn lane can be converted into a raised or lowered median thus increasing motorist safety. Travel lanes may be narrowed to accommodate the placement of a median. Raised or lowered medians should provide ample cues for people with visual impairments to identify the boundary between the crossing island and the roadway. According to AASHTO guidelines, the length of a median should be at least 20 feet.

A continuous median can present several problems when used inappropriately. If all left-turn opportunities are removed, there runs a possibility for increased traffic speeds and unsafe U-turns at intersections. Additionally, the space occupied may be taking up room that could be used for bike lanes or other treatments. An alternative to the continuous median is to create a segmented median with left turn opportunities.

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.

### Landscaping

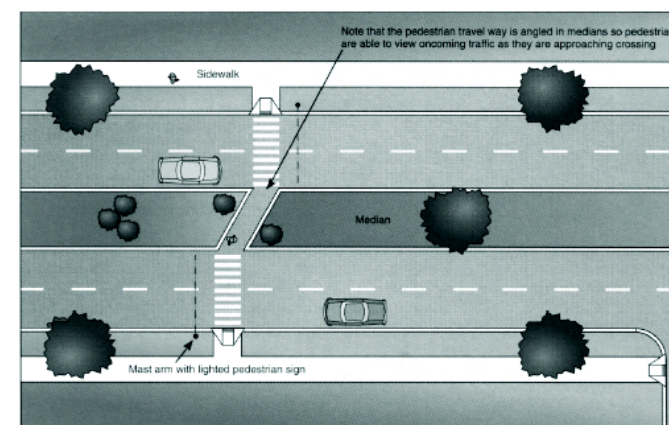
Medians provide opportunities for landscaping that in turn can change the character of the street and help to slow traffic. Landscaping should not obstruct the visibility between motorists and pedestrians.

### Median Pedestrian Refuge Islands

When used in conjunction with mid-block or intersection crossings, medians can be used as a crossing island to provide a place of refuge for pedestrians. Pedestrian refuge islands should be designed along roadways with fewer lanes and pedestrian signals that will allow the pedestrian enough time to cross the street.

Median pedestrian refuge islands should be provided as a place of refuge for pedestrians crossing busy or wide roadways at either mid-block locations or intersections. Median crossings should be at least 6 feet wide in order to accommodate more than one pedestrian, while a width of 8 feet (where feasible) should be provided for bicycles, wheelchairs, and groups of pedestrians.

The graphic below indicates the design and markings associated with refuge islands. Note that pavement markings delineate the approach to the islands and that the islands are "split" to allow for a level platform for wheelchair use. Median crossings should possess a minimum of a 4 foot square level landing to provide a rest point for wheelchair users. 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 pedestrians 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 for pedestrians.



Median Pedestrian Refuge Island

### Marked Crosswalks

A marked crosswalk designates a pedestrian right-of-way across a street. It is often installed at controlled intersections or at key locations along the street (a.k.a. mid-block crossings). A study should be completed prior to placing crosswalks to determine the need and the best type and location of that crosswalk.

North Carolina state law permits crossing at all intersections whether the intersection is marked with a crosswalk or not. Every attempt should be made to install crossings in places where pedestrians are most likely to cross. A well-designed traffic calming location is not effective if pedestrians are using other unmodified and potentially dangerous locations to cross the street.

Marked pedestrian crosswalks may be used under the following conditions: 1) At locations with stop signs or traffic signals, 2) At non-signalized street crossing locations in designated school zones, and 3) At non-signalized locations where engineering judgment dictates that the use of specifically designated crosswalks are desirable.

There is a variety of form, pattern, and materials to choose from when creating a marked crosswalk. It is important however to provide crosswalks that are not slippery, are free of tripping hazards, or are otherwise not difficult to maneuver by any person including those with physical mobility or vision impairments.

Although marked crosswalks provide strong visual clues to motorists that pedestrians are present, it is important to consider the use of these elements in conjunction with other traffic calming devices to fully recognize low traffic speeds and enhance pedestrian safety.

Width - Marked crosswalks should not be less than six feet in width. In downtown areas or other locations of high pedestrian traffic, a width of ten feet or greater should be considered.

An engineering study may need to be performed to determine the appropriate width of a crosswalk at a given location.

Paint - Reflective paint is inexpensive but is considered more slippery than other devices such as inlay tape or thermoplastic. A variety of patterns may be employed as detailed in the figure above. Crosswalk markings should be white, per MUTCD. Crosswalk markings should extend the full length of the crossings. Crosswalk lines of 10-12 inches of width are the recommended minimum. Curb



ramps and other sloped areas should be fully contained within the markings.

## *Pavement Treatment*

A variety of colors or textures may be used to designate crossings. These materials should be smooth, skid-resistant, and visible. Although attractive materials such as inlaid stone or certain types of brick may provide character and aesthetic value, the crosswalk can become slippery. Also, as it degrades from use or if it is improperly installed, it may become a hazard for the mobility or vision impaired.

## *Raised Crosswalk*



In areas with a high volume of pedestrian traffic, particularly at mid-block crossings, a crosswalk can be raised to create both a physical impediment for automobiles and a reinforced visual clue to the motorist. Raised crosswalks are typical on two-lane streets with a speed limit of less than 35 mph. In conjunction with raised crosswalks, it is necessary to use detectable truncated dome warnings at the curb lines. Visible pavement markings are necessary for the roadway approach slopes.

## *Mid-Block Crossings*

Midblock crossings can help pedestrian access by supplementing crossing options. Midblock crossings may be used in areas where there are substantial pedestrian generators or where intersections along a roadway are spaced far apart. 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. As a result,

engineers and planners have developed guidelines for mid-block crossings.

Below are some general guidelines on mid-block crossings:

- Provide only on roads with a speed limit of less than 45 MPH.
- Do not install within 300 feet from another signalized crossing point.
- Base installation of a mid-block crossing on an engineering study or pedestrian route placement.
- These crossings are recommended near schools, pedestrian routes, retail areas, recreation, and residential areas.
- Require advance auto-warning signs and good visibility for both the driver and the pedestrian.
- Providing a safe crossing point is necessary since pedestrians tend not to walk far for a signalized intersection.
- Provide an audible tone.
- Include a pedestrian refuge island on wide streets that:
  - a) Have fast vehicle speeds, or with large vehicle or pedestrian traffic volumes.
  - b) Where children, people with disabilities, or elderly people would cross.
  - c) Have complex vehicle movements.

## *Advance Stop Bars*

Vehicle and pedestrian visibility is increased by placing a vehicle advance stop bar 4 to 10 feet back from the pedestrian crosswalk at signalized crossings and mid-block crossings. In certain situations, a larger setback of the advance stop bar may be required. Advance stop bars are 1–2 feet wide and they extend across all approach lanes at intersections. The time and distance created allows a buffer in which the pedestrian and motorist can interpret each other's intentions. Studies have shown that this distance translates directly into increased safety for both motorist and pedestrian. One study in particular claims that by simply adding a "Stop Here for Pedestrians" sign reduced pedestrian motorist conflict by 67%. When this was used in conjunction with advance stop lines, it increased to 90%.

## *Pedestrian Signals*

Traffic signals assign the right of way to motorists and pedestrians and produce openings in traffic flow, allowing pedestrians time to cross the street.

When used in conjunction with pedestrian friendly design, proper signalization should allow for an adequate amount of time for an individual to cross the street. The suggested amount of pedestrian travel speed recommended in the Manual on Uniform Traffic Control Devices (MUTCD) is 4ft/sec. However, a longer crossing time may be necessary to accommodate the walking speed of the elderly or children. Therefore it is suggested that a lower speed of 3.5ft/sec be used whenever there are adequate numbers of elderly and children using an area.

Engineering, as well as urban design judgment, must be used when determining the location of traffic signals and the accompanying timing intervals. Although warrants for pedestrian signal timing have been produced by the MUTCD, each site must be analyzed for factors including new facility and amenity construction (i.e. a popular new park or museum) to allow for potential future pedestrian traffic volume. In addition, creating better access to existing places may in fact generate a higher pedestrian volume.

## *Pedestrian Signals & Intersections*

International Pedestrian Symbols - According to the MUTCD, international pedestrian signal indication should be used at traffic signals whenever warranted. As opposed to early signalization that featured "WALK" and "DON'T WALK", international pedestrian signal symbols



Advance stop bar

Source: Pedestrian and Bicycle Information Center Image Library

should be used on all new traffic signal installations. Existing "WALK" and "DON'T

WALK" signals should be replaced with international symbols when they reach the end of their useful life. Symbols should be of adequate size, and clearly visible to make crossing safe for all pedestrians.

Countdown Signals - Countdown signals are pedestrian signals that show how many seconds the pedestrian has remaining to cross the street. The countdown can begin at the beginning of the WALK phase, perhaps flashing white



or yellow, or at the beginning of the clearance, or DON'T WALK phase, flashing yellow as it counts down.

**Audible Signals** - Audible cues can be used to pulse along with a countdown signal. The signals are used for visually and audibly impaired individuals. Consideration should be paid to the noise impact on the surrounding neighborhoods when deciding to use audible signals.

**Pedestrian Signal Timings** - The timing of these or other pedestrian signals needs to be adapted to a given situation. There are three types of signal timing generally used: concurrent, exclusive, and leading pedestrian interval (LPI). The strengths and weaknesses of each will be discussed with an emphasis on when they are best employed.

**Concurrent signal timing** refers to a situation where motorists running parallel to the crosswalk are allowed to turn into and through the crosswalk, left or right, after yielding to pedestrians. This condition is not considered as safe as some of the latter options, however this type of signal crossing generally allows for more pedestrian crossing opportunities and less wait time. In addition, traffic is allowed to flow a bit more freely. Concurrent signal timing is best used where lower volume turning movements exist.

Where there are high-volume turning situations that conflict with pedestrian movements, the exclusive pedestrian interval is the preferred solution. The exclusive pedestrian interval stops traffic in all directions. In order to keep traffic flowing regularly, there is often a greater pedestrian wait time associated with this system.

A proven enhancement that prevents many of the conflicts addressed under either of the former methods is Leading Pedestrian Signal (LPI). An LPI works in conjunction with a concurrent signal timing system and simply gives the pedestrian a few seconds head start on the parallel traffic. An advance walk signal is received prior to a green light for motorists. This creates a situation where the pedestrian can better see traffic, and more importantly, the motorists can see and properly yield to pedestrians. As with the exclusive pedestrian interval, an audible cue will need to accompany the WALK signal for the visually impaired.

The use of infrared or microwave pedestrian detectors has increased in many cities worldwide. These devices replace the traditional push-button system. Although still experimental, they appear to be improving pedestrian signal compliance as well as reducing the number of

pedestrian and vehicle conflicts. Perhaps the best use of these devices is when they are employed to extend crossing time for slower moving pedestrians. Whether these devices are used or the traditional push-button system is employed, it is best to provide instant feedback to pedestrians regarding the length of their wait. This is thought to increase and improve pedestrian signal compliance.



A low cost sign that restricts right-hand turns at a red light.

Source: Pedestrian and Bicycle Information Center

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.

## Right Turn on Red Restrictions

Introduced in the 1970's as a fuel saving technique, the Right Turn on Red (RTOR) law is thought to have had a detrimental effect on pedestrians. The issue is not the law itself but rather the relaxed enforcement of certain caveats within the law such as coming to a complete stop and yielding to pedestrians. Often motorists will either nudge into a crosswalk to check for oncoming traffic without looking for pedestrians or slow, but not stop, for the red-light while making the turn. There is legitimate concern that eliminating an RTOR will only increase the number of right-turn-on-green conflicts where all of the drivers who would normally have turned on red, now are anxious to turn on green.



R10-11



R1-5

Consider elimination on case by case basis and only where there are usually high pedestrian volumes.

## Curb Ramps

Curb ramps are critical features that provide access between the sidewalk and roadway for wheelchair users, people using walkers, crutches, or handcarts, people pushing bicycles or strollers, and pedestrians with mobility or other physical impairments. In accordance with the 1973 Federal Rehabilitation Act and to comply with the 1990 Federal ADA requirements, curb ramps must be installed at all intersections and mid-block locations where pedestrian crossings exist. In addition, these federal regulations require that all new constructed or altered roadways include curb ramps. Although the federally prescribed maximum slope for a curb ramp is 1:12 or 8.33% and the side flares (or "sidewings" as listed in the graphic) of the curb ramp must not exceed a maximum slope of 1:10 or 10.0%, it is recommended that much less steep slopes be used whenever possible. It is also recommended that two separate curb ramps be provided at each intersection. The minimum width for the curb ramp is four feet. With only one large curb ramp serving the entire corner, there is not safe connectivity for the pedestrian. Dangerous conditions exist when the single, large curb ramp inadvertently directs a pedestrian into the center of the intersection, or in front of an unsuspecting, turning vehicle. 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.<sup>i</sup> Two separate curb ramps, one for each crosswalk, should be provided at each corner of an intersection.

For additional information on curb ramps see the Federal Highway Administration and Designing Sidewalks and Trails for Access, Parts I and II, by the Federal Highway Administration.

## Curb Extensions ("Bulb Outs," "Chokers," "Neckdowns") and Curb Radii

A curb extension, or bulb out, is an extension of the sidewalk into the parking lane of a street. Because these curb extensions physically narrow the roadway, a pedestrian's crossing distance and consequently the time spent in the street is reduced. In addition, curb extensions may encourage motorists to drive slower by narrowing the travel lane and reducing vehicular speeds during turning movements at intersections. Curb extensions can be

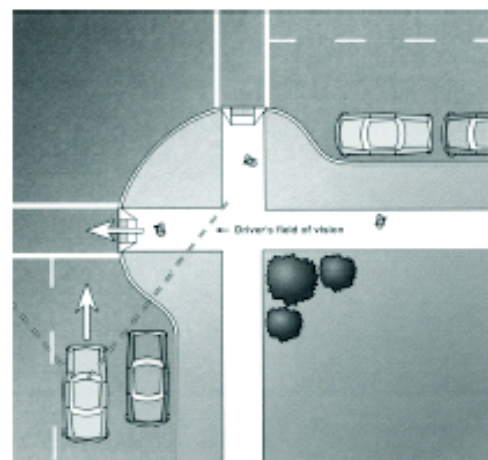


placed either at mid-block crossings or at intersections. Curb extensions at midblock locations are known as “chokers.” Curb extensions at intersections can also be referred to as “neckdowns.”



Sightlines and pedestrian visibility are reduced when motor vehicle parking encroaches too close to corners creating a dangerous situation for pedestrians. When placed at an intersection, curb extensions preclude vehicle parking too close to a crosswalk. Also, curb extensions at intersections can greatly reduce turning speed, especially if curb radii are set as tight as possible. Finally, curb extensions also reduce travel speeds when used in mid-block crossings because of the reduced street width. Curb extensions should only be used where there is an existing on-street parking lane and should never encroach into travel lanes, bike lanes, or shoulders.

By reducing a pedestrian's crossing with a bulb out, less time is spent in the roadway, and pedestrian vehicle conflicts are reduced.



Posted Speed Limit (mph)	Minimum Curb Radius (Feet)
Residential Street, 15-25 mph	5
Residential Street, 25-35 mph	10
Collector Street, 30-45 mph	20

Maximum Desired Speed and Curb Radii

The following table illustrates the relationship between posted speeds and the curb (often called “corner”) radius. Motorists will travel more slowly around corners with smaller curb radii even without the use of curb extensions.

## Lighting

Proper lighting in terms of quality, placement, and sufficiency can greatly enhance a nighttime urban experience as well as create a safe environment for motorists and pedestrians. Two-thirds of all pedestrian fatalities occur during low-light conditions. Attention should be paid to lighting walkways and crossings, so that there is sufficient ambience for motorists to see pedestrians. Pedestrian lighting should be considered for areas of higher pedestrian volume, including downtown and key intersections. Lighting in commercial areas should be provided on both sides of the street.

In most cases, roadway street lighting can be designed to illuminate the sidewalk area as well. The visibility needs of both pedestrian and motorist should be considered. In commercial or downtown areas and other areas of high pedestrian volumes, the addition of lower level, pedestrian-scale lighting to streetlights with emphasis on crossings and intersections may be employed to generate a desired ambience. Lighting for sidewalks and off-street paths should be provided where considerable pedestrian traffic is expected at night, where there is insufficient available light from the surrounding area, and at all designated road crossings.

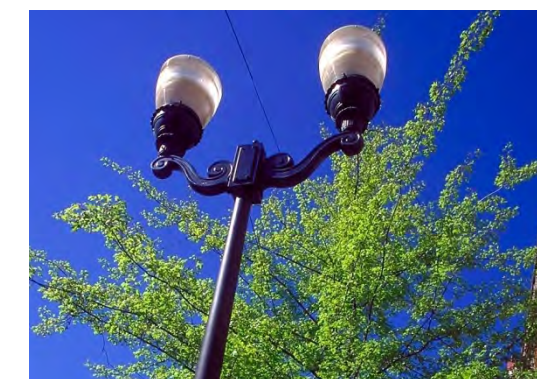
Each lighting situation is unique and must be considered on a case-by-case basis. Average maintained horizontal illumination levels of 5 lux (0.5 foot candles) to 22 lux (2 foot

candles) should be considered. Sometimes, higher levels are advisable in special areas where security problems might exist. Light poles should generally be 12 to 15 ft. high for lighting pedestrian areas. Luminaries and poles should be at a scale appropriate for pedestrian use.

Light fixtures, as well as other on-street facilities, like street furniture, can add a great deal in terms of street aesthetics and reinforce community identity. It is recommended that the community adopt a particular style of street lighting fixture appropriate for the municipality’s identity and coordinate this choice with stylistic choices in other street facilities.

Sophisticated lighting needs to be directional and focused upon the street. A flat lens light is the best choice in lighting the street. Fixtures that produce glare should be avoided, as they produce diffused light, and sometimes make visibility difficult. The pedestrian-level lighting that is preferred includes mercury vapor, metal halide, or incandescent. Although low-pressure sodium lights may be energy-efficient, they are less desirable due to the color distortion they create. High-pressure sodium lights are preferable, as they create less color distortion.

Lighting should be sufficient so that pedestrians can see cars, and cars can see pedestrians. However, overlighting of an area can produce an environment that is unattractive to pedestrians, and the resulting glare becomes an environmental issue.



Source:  
Pedestrian and  
Bicycle  
Information  
Center

It is important to note that every effort should be made to address and prevent light pollution. Also known as photo pollution, light pollution is “excess or obtrusive light created by humans.” Whenever urban improvements are made where lighting is addressed, a qualified lighting expert should be consulted early in the process. This individual should not only create a safe and attractive ambience,



but will do so with the minimum of fixtures, an awareness of the importance of minimizing photo pollution,

and with a focus on minimizing future energy use. A thoughtful plan of how and where to light will reap benefits not only in potential reduced infrastructure cost, but future energy costs as well.

### Signage

Signage can be an effective tool to alert drivers to reduce speeds and allow pedestrians to exercise extra caution. It is important not to cause “clutter” when using a variety of signage. This can cause complacency and noncompliance with signs in general. Signs, and the sign text, should be large enough to be seen from a distance. It is imperative that all signs be properly located so as not to obstruct the pedestrian and visibility triangles of motorists.

Signage is governed by the MUTCD, which provides specifications on the design and placement of signage on the right-of-way. There are three types of signage: 1) *Wayfinding* signage 2) *Regulatory* and 3) *Warning signs*. Maintenance of signage is as important as walkway maintenance. Clean, graffiti free, and relevant signage enhances guidance, recognition, and safety for pedestrians.

### Wayfinding

Wayfinding or guide signs give notice of traffic laws or regulations that pedestrians, cyclists, and motorists are required by law to follow. Wayfinding signage should orient and communicate in a clear, concise and functional manner. It should enhance pedestrian circulation and direct visitors and residents to important destinations. In doing so, the goal is to increase the comfort of visitors and residents while helping to convey a local identity. Regulations should also address the orientation, height, size, and sometimes even style of signage to comply with a desired local aesthetic.

It is recommended that municipalities adopt consistent and descriptive graphics to identify pedestrian routes. This signage system would assure pedestrians that they are safe and will not encounter gaps in facilities along these routes. A map should be incorporated into each route illustrating the entire pedestrian system and their location. Bus stops, destinations, and mileage should also be identified on the signs.

### Regulatory Signs and Warning Signs

Regulatory signs give notice of traffic laws or regulations that pedestrians, cyclists and motorists are required by law to follow. Warning signs call attention to unexpected conditions on, or adjacent to, a roadway, bike or pedestrian facility that can be potentially hazardous to users.

Pedestrian-related signage serves primarily to notify motorists and others of the presence of pedestrians. The intended effect is to cause motorists drive more cautiously and reduce their speeds, thereby improving the safety for pedestrians in the given area. Signs can be used in a variety of places, including at crosswalks, at intersections, in-street, and near schools. National standards for sign placement and use can be found in the Manual for Uniform Traffic Control Devices (MUTCD). The MUTCD provides guidance for warning signs which can be used at both crosswalks, or along the roadway:

The following are some recommended signs which municipalities should consider installing. For more signs and more detailed guidelines for sign installation and use, the municipality should consult the MUTCD. The S4-3/R1-6 as well as the W11-2 signs are regulatory, while the sign furthest to the right is a wayfinding signs. The remaining signs directly below are warning signs.

The first sign is usually installed within the street to warn motorists to yield to pedestrians in a crosswalk. The “school” sign (MUTCD S4-3) is added to the in-street sign for placement near a school. The second and third signs are commonly used pedestrian warning signs, while the fourth and fifth signs notify motorists of specific instances to watch for pedestrians. The fourth sign, “Turning Traffic”, is usually placed at intersections to warn motorists that are turning right or left to yield to pedestrians in crosswalks. The sign at the far right is an examples of typical wayfinding signage to help direct cyclists at major decision points along a route. For the fifth sign, the top sign can either be combined with the smaller “ahead” sign or the arrow symbol to indicate the presence of a crosswalk to motorists in a school zone.



### School Zone Treatments / School Routes

Section 7 of the MUTCD is entirely devoted to “Traffic Controls for School Areas” and is the dominant guidance available to municipalities for installing signs and markings in school zones. The 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.

MUTCD Pedestrian-Related Signage

Regulatory Signs

School Warning and Informational Signs

	REGULATORY	WARNING	INFORMATIONAL
Yield here to Peds	R1-5	28.11	450x450 (18x18)
Yield here to Peds	R1-5a	28.11	450x600 (18x24)
In-Street Ped Crossing	R1-6, R1-6a	28.12	900x900 (36x36)
Peds and Bikes Prohibited	R5-10b	28.36	750x450 (30x18)
Peds Prohibited	R5-10c	28.36	600x300 (24x12)
Walk on Left Facing Traffic	R9-1	28.43	450x600 (18x24)
Cross only at Crosswalks	R9-2	28.44	300x450 (12x18)
No Ped Crossing	R9-3a	28.44	450x450 (18x18)
No Hitch Hiking	R9-4	28.43	450x600 (18x24)
No Hitch Hiking (symbol)	R9-4a	28.43	450x450 (18x18)
Bikes Yield to Peds	R9-6	98.10	300x450 (12x18)
Ped Traffic Symbol	R10-4b	28.45	225x300 (9x12)
School Advance Warning	S1-1	78.08	900x900 (36x36)
School Bus Stop Ahead	S3-1	78.10	750x750 (30x30)
Pedestrian Traffic	W11-2	28.43	750x750 (30x30)
Playground	W15-1	28.42	750x750 (30x30)
Hiking Trail	I-4	~	600x600 (24x24)

1. Larger signs may be used when appropriate.  
2. Dimensions are shown in millimeters followed by inches in parentheses and are shown as width x height.  
3. First dimension in millimeters; dimensions in inches are in inches.  
4. All information in table taken directly from MUTCD.



## Street Trees

Street trees enhance the landscape for pedestrians, creating an attractive and comfortable environment for walking. Street trees also act as a traffic calming device, encouraging drivers to drive more slowly. In addition, a large line of leafy street trees can absorb engine noise, providing enough of a buffer to block street traffic noise from reaching private yards and homes. Trees also improve air quality by consuming carbon dioxide and emitting oxygen. Street trees may also increase real estate values by increasing curb appeals of homes. This Plan strongly recommends that municipalities adopt a tree ordinance to give direction for tree installation and maintenance.

**Planting requirements** - All street trees should be selected according to the standards described in the American Standard for Nursery Stock of the American Nursery and Landscape Association. Install and maintain trees according to the International Society of Arboriculture (ISA) guidelines. A landscape architect should be consulted to select the proper tree and planting technique.

**Visibility** - Street trees should never be allowed to obscure the line of sight between pedestrians and drivers. A clear view should be maintained between 30" and 72" above street. This area must be free of limbs and foliage for safe cross visibility. Other plantings should also follow this rule within 50 ft. proximity of street corners and other designated crossing points. In order to maintain visibility, provide shade, and a comfortable pedestrian corridor, street trees should primarily be vase shaped, columnar, or oval in form (habit) with large spreading crowns.

**Roots** - Avoid trees with aggressively invasive roots adjacent to pavement or buildings.

**Size** - Large trees (growing over 35 ft. in height at maturity) are preferred as street trees except near overhead utility lines. Small trees (growing less than 35 feet in height at maturity) should be used in areas directly adjacent to or under utility lines.

**Spacing** – typically, large trees should be spaced approximately 40 – 50 feet on center when planted in a line, and small trees spaced at approximately 30 ft. The spacing of street trees in a planting strip will depend upon the size of the tree and upon the demand for sidewalk furniture and parking.

**Tree Pits and Tree Grates** - Street trees should generally be located in open planting strips. However, tree pits with tree grates may be a practical, although expensive, alternative in very high pedestrian traffic areas. Tree grates should generally not encroach upon the travel path. For optimal pedestrian safety and comfort, all tree grates used should meet the ADA standards for "accessible pathway".

**Maintenance** - Trees and landscaping require ongoing maintenance. Local municipalities typically take responsibility for maintenance of these amenities, although there are instances where local community groups have provided funding and volunteers for maintenance. In order to reduce the amount of maintenance necessary, it is helpful to use native plant material that is already adapted to the local soil and climate. Growth pattern and space for maturation, particularly with larger tree plantings, are important to avoid cracking sidewalks and causing a pedestrian obstruction.



## Pedestrian Overpass/Underpass

Pedestrian overpasses and underpasses efficiently allow for pedestrian movement across busy thoroughfares. These types of facilities typically feature very high construction costs.



*Attempting to separate pedestrians from the street is often problematic. As shown here, given the opportunity, many choose to cross at street level.*

These facilities are problematic in many regards and should only be considered when no other solution is expected to be effective. Research shows that pedestrians will avoid using such a facility if they perceive the ability to cross at grade as taking about the same amount of time. ADA requirements for stairs, ramps, and elevators often require the construction of an enormous structure that is visually disruptive.

Overpasses and underpasses should only be considered with rail lines, high volume traffic areas such as freeways, and other high volume arteries.

In addition, they should be considered only for crossing arterials with greater than 20,000 vehicle trips per day and speeds 35 - 40 mph and over. Minimum widths for these structures should follow the guidelines for sidewalk width. Underpasses should have a daytime illuminance minimum of 10 fc achievable through artificial and/or natural light provided through an open gap to sky between the two sets of highway lanes, and a night time level of 4 foot-candle. In underpasses, where vertical clearance allows, the pedestrian walkway should be separated from the roadway by more than a standard curb height. Consider



acoustics measures within underpasses to reduce noise impacts to pedestrians and bicyclists.

## Transit Stop Treatments

To accommodate as many users as possible, a transit system must include well-planned routes and safe, accessible stops. Bus stops should be designed to accommodate the appropriate number of users and should be highly visible to pedestrians and motorists.

Bus or other transit stops should be located in places that are most suitable for passengers. For example, stops should be provided near higher density residential areas, commercial or business areas, and schools, and connected to these areas by sidewalk.

As with any human scale design element discussed, safety is an important factor to consider when locating bus stops. In the case of a bus stop, special attention should be paid to the number of lanes and direction of traffic when deciding to locate a stop on the near or far side of an intersection. Also special consideration must be paid to the wheelchair lifts in terms of how and where the mobility impaired will exit and enter the bus. It is good practice to construct a transit stop just beyond an intersection, which encourages riders to cross the intersection behind the bus and in full view of approaching motorists. The location also should be set back enough from the roadway to buffer users from traffic without impeding pedestrian activity.

Safety and comfort at a bus stop is determined by the amenities offered to users. Bus stop signage including route information, shelter with seating, trash cans, and bicycle parking encourage transit use. Pedestrian-level lighting improves the visibility of pedestrians to motorists and increases the level of safety for users. At a minimum, marked crosswalks (especially at mid-block stops), curb ramps, and proper sidewalk widths should be considered.

*Images Right: standard DOT bridge with sidewalk and railing*

*Bottom High quality bus station amenities*

## Bridges

Provisions should be made to include a walking facility as a part of vehicular bridges, if there is an indication that pedestrians would use the facility. It is important to consider the needs of pedestrians when planning for a bridge replacement or the construction of a new bridge. Sidewalks on bridges should be a minimum of 5 feet wide, with a minimum handrail height of 42."





## Traffic Calming Techniques

Traffic Calming Devices (TCDs) are physical measures in street design that cue drivers to slow down. The effectiveness of TCDs does not depend upon a driver's compliance with traffic signs and signals, or police enforcement, though they may be used effectively in conjunction with them. In coordinated combinations, TCDs reduce speeds, alert drivers to pedestrians, and reduce the severity of collisions. TCDs listed below are generally recommended for consideration on a project-by-project basis. These include traffic circles, roundabouts, speed humps, speed tables, textured pavements and curb extensions (bulbouts). Curb extensions are discussed in detail earlier in this section.

Neighborhood Traffic Circles - a small, raised circular island positioned in the center of an intersection, designed to slow traffic by requiring traffic to maneuver around the island.

Roundabout –circular intersection with raised circular islands in the center, with “yield on entry” and deflecting islands on all approaches designed to slow traffic. Traffic proceeds in a counterclockwise direction. Roundabouts are highly engineered to accommodate specific traffic types, volumes and speeds.

Speed Humps - raised sections of a roadway. They are similar to a speed bump in their application, but a speed hump is wider and has a sloping side taper so they are easy to navigate at slower speeds. They are placed across residential streets to control chronic speeding problems where other methods of slowing traffic have not been effective. They are designed to calm traffic in residential areas, particularly near parks and schools. The physical impact on passing vehicles is less severe at slower speeds than at higher speeds. Studies indicate that speed humps reduce speeds by approximately six miles per hour. A standard speed hump has a length of approximately 22 feet and a height of 3 and 5/8 inches at its center.

Speed Tables – flat-topped speed humps typically long enough for the entire wheelbase of a passenger car to rest on the flat section. They are often constructed with brick or other textured materials on the flat section.

Textured Pavements - stamped pavement or alternate paving materials to create an uneven surface for vehicles and pedestrians to traverse. Textured street pavement provides a visual and tactile cue for both drivers that they are driving in an area of high pedestrian usage. Similarly,

they cue pedestrians that they are entering a vehicular zone, and are a particularly effective treatment to warn visually impaired pedestrians. Textured street pavements should be used in areas of substantial pedestrian activity and where noise is not a major concern.

Curb Extensions –rounded extensions of the curb which slow vehicles by alerting drivers to potential pedestrians, visually tightening the vehicular path, and physically reduces turning radii, thereby encouraging a decrease in vehicle speeds. Curb extensions also increase safety for pedestrians by shortening the road crossing distance. Curb extensions are covered in more detail earlier in this section.



Top left: neighborhood traffic circle

Top right: modern roundabout

Bottom left: raised crosswalk

Bottom right: Speedbump



## Temporary Work

Temporary work should be accessible. Where construction blocks a public sidewalk for more than a short time, an alternate accessible route should be provided that is cane-detectable. Sidewalk barriers should be continuous and cane-detectable as well. Temporary events and facilities should also meet accessibility criteria.



<sup>i</sup> Vanguard Company, accessed November, 2005  
(<http://www.vanguardonline.com/downloads.asp>)

<sup>ii</sup> 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](http://www.ci.durham.nc.us/departments/works/handbook/reference_guide.pdf))





## Mount Airy Comprehensive Pedestrian Plan

### 1. INTRODUCTION

The City of Mount Airy needs your input concerning pedestrian access and mobility in Mount Airy. Your responses to this questionnaire will be combined with other materials collected during the study to help shape recommendations of the Comprehensive Pedestrian Plan.

#### 1. How long have you lived in Mount Airy?

- ☐ How long have you lived in Mount Airy? Less than one year
- ☐ 1-5 years
- ☐ 5-10 years
- ☐ More than 10 years
- ☐ Do not reside in Mount Airy

#### 2. How old are you?

- ☐ How old are you? Under 18
- ☐ 18-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65 or older

#### 3. How important to you is the goal of creating a walkable community?

- ☐ How important to you is the goal of creating a walkable community? Very important
- ☐ Somewhat important
- ☐ Not important
- ☐ Don't know

## Mount Airy Comprehensive Pedestrian Plan

#### 4. How pedestrian friendly is Mount Airy today?

- ☐ How pedestrian friendly is Mount Airy today? Very pedestrian friendly
- ☐ Somewhat pedestrian friendly
- ☐ Somewhat unfriendly to pedestrians
- ☐ Very unfriendly to pedestrians

#### 5. How often do you make walking trips now?

- ☐ How often do you make walking trips now? 5+ times per week
- ☐ 3-4 times a week
- ☐ At least once a week
- ☐ A few times a month
- ☐ Never

#### 6. For what purpose do you walk now or would you want to walk in the future? (check all that apply)

- ☐ For what purpose do you walk now or would you want to walk in the future? (check all that apply) Fitness or recreation
- ☐ Primary transportation
- ☐ Social visits
- ☐ Shopping
- ☐ Walking the baby or dog
- ☐ Other (please specify)





### Mount Airy Comprehensive Pedestrian Plan

**7. What are the biggest factors that discourage walking in Mount Airy? (check all that apply)**

- ☐ What are the biggest factors that discourage walking in Mount Airy? (check all that apply) Lack of sidewalks or trails
- ☐ Poorly maintained sidewalks
- ☐ Traffic
- ☐ Unsafe road crossings
- ☐ Lack of nearby destinations
- ☐ Aggressive motorists behavior
- ☐ Physical barriers
- ☐ Lack of time
- ☐ Lack of interest
- ☐ Other (please specify)

**8. What destinations would you most like to get to in Mount Airy? (select your top THREE destinations)**

- ☐ What destinations would you most like to get to in Mount Airy? (select your top THREE destinations) Trails and greenways
- ☐ Parks
- ☐ Shopping
- ☐ Restaurants
- ☐ Civic buildings (library, City Hall)
- ☐ Work
- ☐ Entertainment
- ☐ Public Transportation
- ☐ School
- ☐ Other (please specify)

### Mount Airy Comprehensive Pedestrian Plan

**9. The City has limited funding to address all of the pedestrian needs in Mount Airy. To help prioritize, which types of improvements are most important to you (select your top THREE)**

- ☐ The City has limited funding to address all of the pedestrian needs in Mount Airy. To help prioritize, which types of improvements are most important to you (select your top THREE) Replace/repair existing sidewalks
- ☐ Fill in the gaps in the existing sidewalk network
- ☐ Add new sidewalks
- ☐ Add crosswalks and other improvements at key crossings
- ☐ Construct a greenway trail/multi-use path system
- ☐ Create more pedestrian friendly destinations
- ☐ Improve public transportation
- ☐ Address barriers to pedestrian travel
- ☐ Improve pedestrian accommodations at key intersections (crosswalks, ramps, signals)
- ☐ Other (please specify)





### Mount Airy Comprehensive Pedestrian Plan

10. Rate the importance of adding crosswalk and sidewalk improvements to the following locations.

	Very important	Important	Somewhat important	Not important
Transit stops	<input type="radio"/> Very important	<input type="radio"/> Important	<input type="radio"/> Somewhat important	<input type="radio"/> Not important
Schools	<input type="radio"/> Very important	<input type="radio"/> Important	<input type="radio"/> Somewhat important	<input type="radio"/> Not important
Retail developments	<input type="radio"/> Very important	<input type="radio"/> Important	<input type="radio"/> Somewhat important	<input type="radio"/> Not important
Grocery stores	<input type="radio"/> Very important	<input type="radio"/> Important	<input type="radio"/> Somewhat important	<input type="radio"/> Not important
Pharmacies	<input type="radio"/> Very important	<input type="radio"/> Important	<input type="radio"/> Somewhat important	<input type="radio"/> Not important
Parks	<input type="radio"/> Very important	<input type="radio"/> Important	<input type="radio"/> Somewhat important	<input type="radio"/> Not important
Neighborhoods	<input type="radio"/> Very important	<input type="radio"/> Important	<input type="radio"/> Somewhat important	<input type="radio"/> Not important
Other (please specify)	<input type="text"/>			

11. What do you think are the top THREE roadway corridors most needing pedestrian facilities or pedestrian facility improvements?

- 
- 
- 

### Mount Airy Comprehensive Pedestrian Plan

12. What do you think are the top THREE intersections most needing pedestrian facilities or pedestrian facility improvements?

- 
- 
- 

13. What strategies would you be supportive of the City using to develop/improve pedestrian facilities in the City? (check all that apply)

- ☐ Provisions in the Land Development Code (LDC)
- ☐ Dedicated funding sources in Town budget
- ☐ Bonds
- ☐ Grants
- ☐ Private financing
- Other (please specify)

14. Please visit <http://www.walkscore.com> to learn more about Walk Score how it works and to determine the Walk Score for your residence or neighborhood.





Question 1: How long have you lived in Mount Airy?

How long have you lived in Mount Airy?		
Answer Options	Response Percent	Response Count
Less than one year	2.7%	14
1-5 years	9.0%	47
5-10 years	10.2%	53
More than 10 years	65.8%	343
Do not reside in Mount Airy	12.3%	64
<i>answered question</i>		521

Question 2: How old are you?

How old are you?		
Answer Options	Response Percent	Response Count
Under 18	0.0%	0
18-24	1.5 %	8
25-34	10.7%	56
35-44	16.1%	84
45-54	23.6%	123
55-64	19.0%	99
65 or older	29.0%	151
<i>answered question</i>		521

Question 3: How important to you is the goal of creating a walkable community?

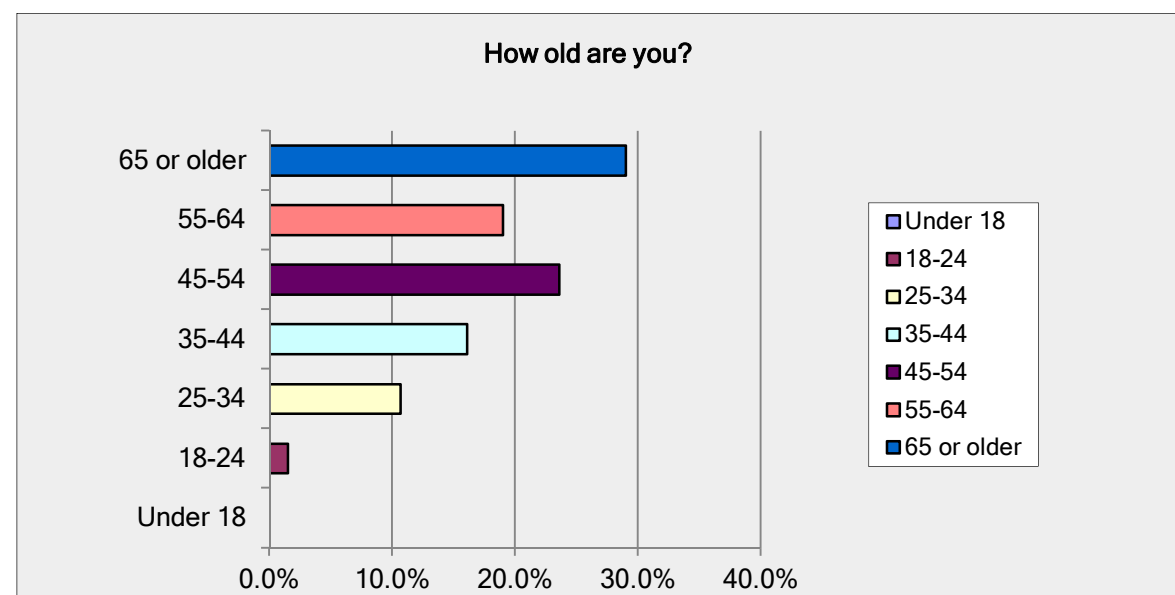
Answer Options	Response Percent	Response Count
Very important	60.8%	317
Somewhat important	31.7%	165
Not important	4.2%	22
Don't know	3.3%	17
<i>answered question</i>		521

Question 4: How pedestrian friendly is Mount Airy today?

Answer Options	Response Percent	Response Count
Very pedestrian friendly	23.2%	121
Somewhat pedestrian friendly	63.1%	329
Somewhat unfriendly to pedestrians	10.6%	56
Very unfriendly to pedestrians	3.1%	16
<i>answered question</i>		521

Question 5: How often do you make walking trips now?

How often do you make walking trips now?		
Answer Options	Response Percent	Response Count
5+ times per week	12.7%	66
3-4 times a week	20.5%	107
At least once a week	21.5%	112
A few times a month	29.4%	153
Never	15.9%	83
<i>answered question</i>		521





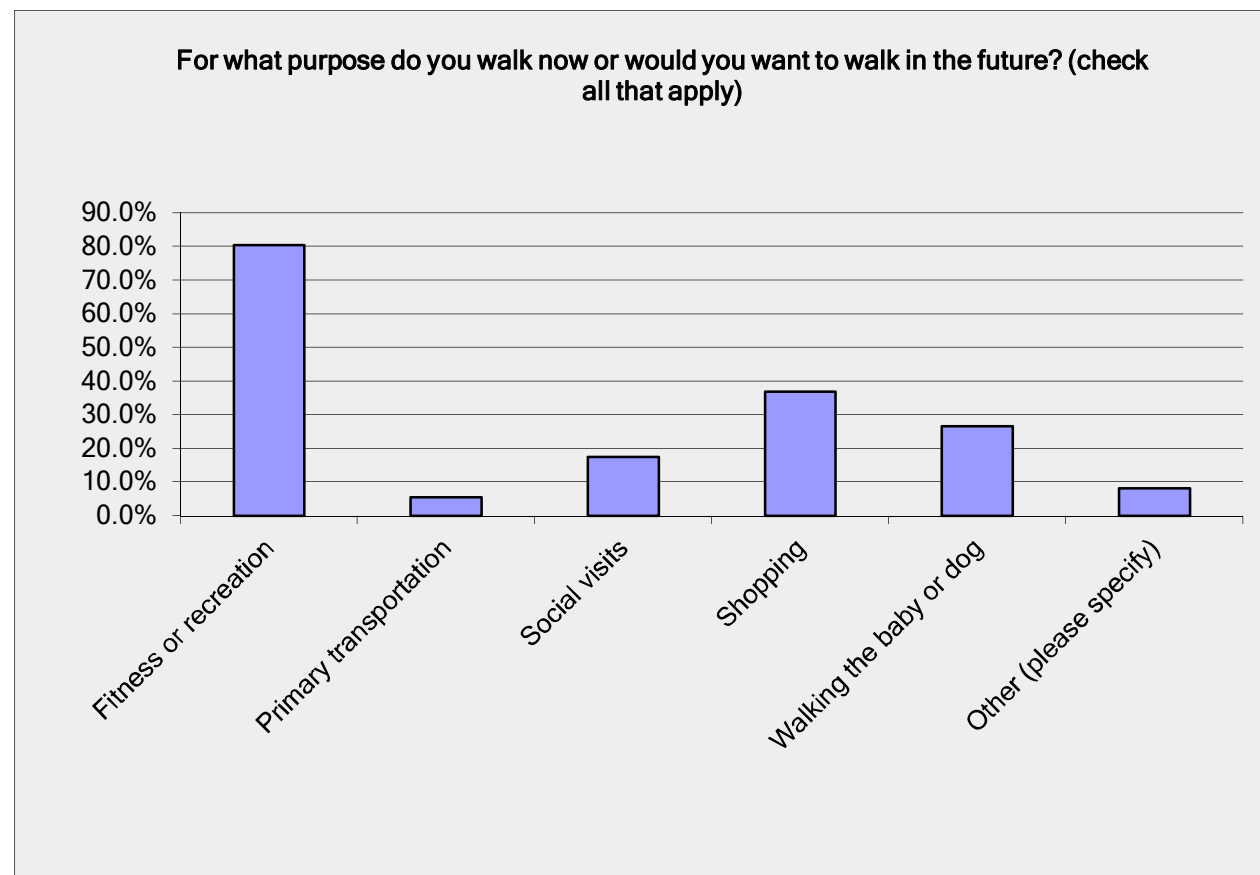


# COMPREHENSIVE PEDESTRIAN PLAN

City of Mount Airy

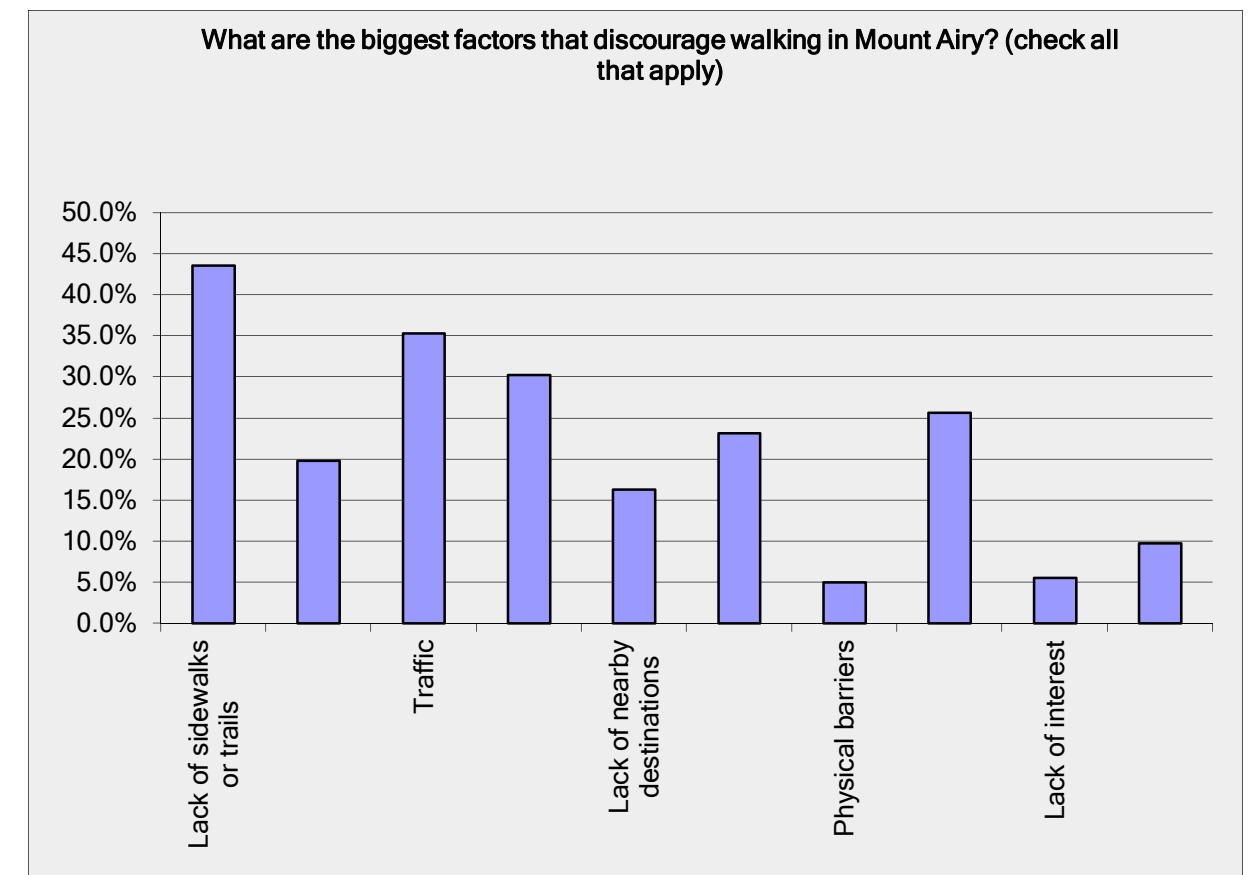
Question 6: For what purpose do you walk now or would you want to walk in the future?

For what purpose do you walk now or would you want to walk in the future? (check all that apply)		
Answer Options	Response Percent	Response Count
Fitness or recreation	80.4%	419
Primary transportation	5.6%	29
Social visits	17.5%	91
Shopping	36.9%	192
Walking the baby or dog	26.7%	139
Other (please specify)	8.1%	42
<i>answered question</i>		<b>521</b>



Question 7: What are the biggest factors that discourage walking in Mount Airy?

What are the biggest factors that discourage walking in Mount Airy? (check all that apply)		
Answer Options	Response Percent	Response Count
Lack of sidewalks or trails	43.6%	227
Poorly maintained sidewalks	19.8%	103
Traffic	35.3%	184
Unsafe road crossings	30.3%	158
Lack of nearby destinations	16.3%	85
Aggressive motorists behavior	23.2%	121
Physical barriers	5.0%	26
Lack of time	25.7%	134
Lack of interest	5.6%	29
Other (please specify)	9.88%	51
<i>answered question</i>		<b>521</b>

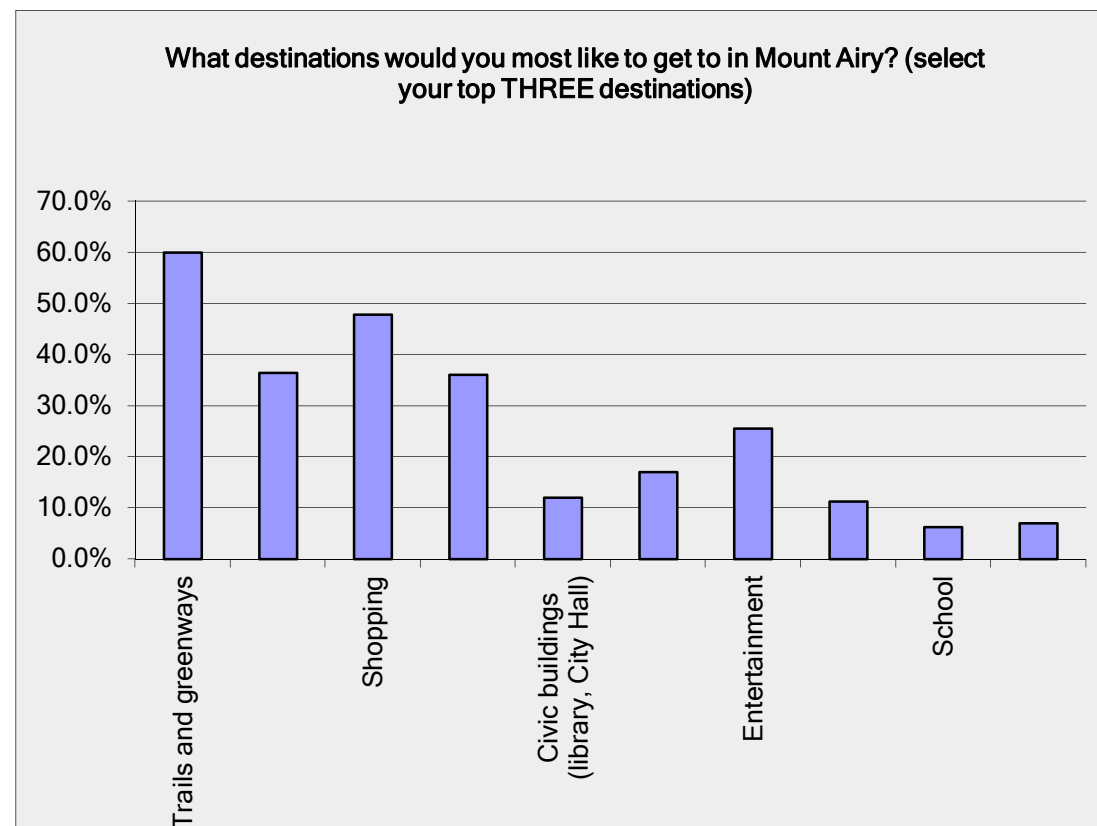






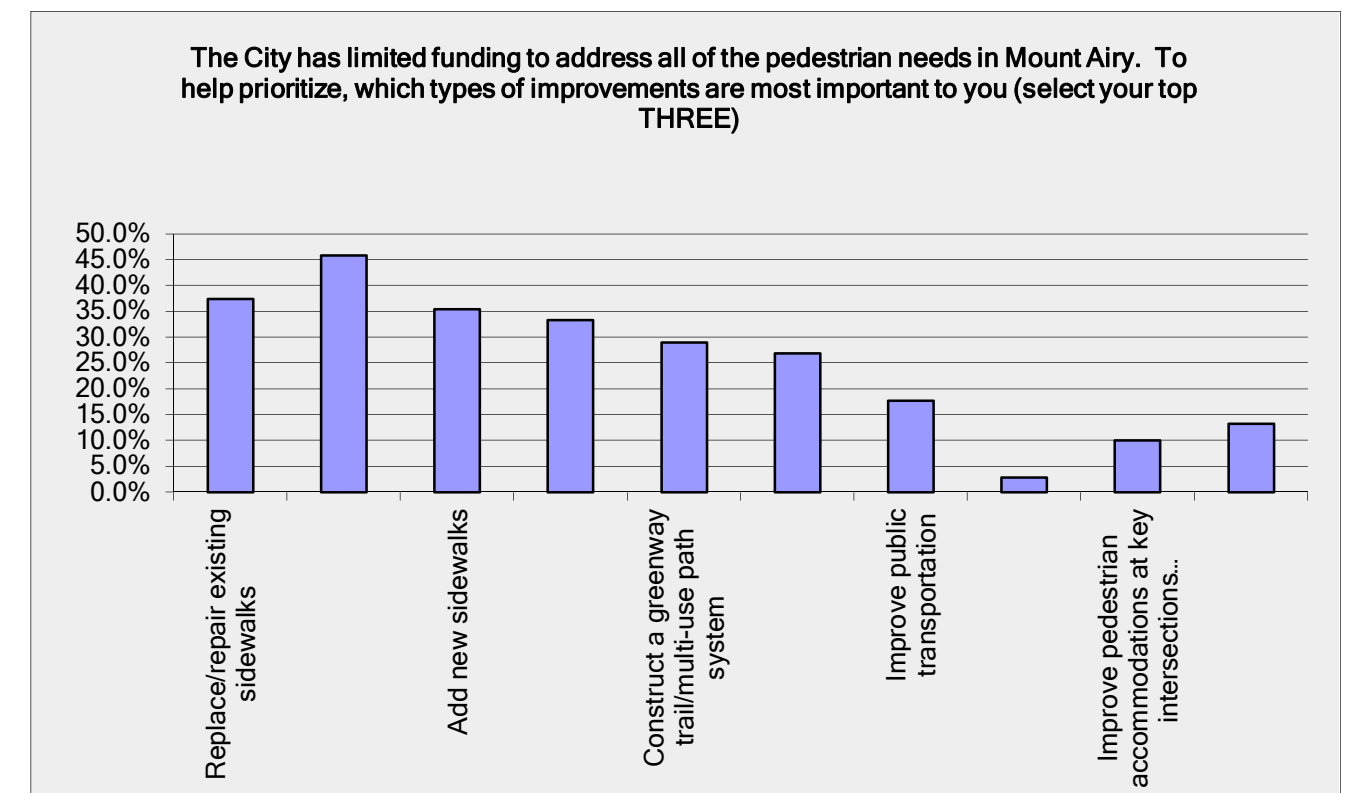
## Question 8: What destinations would you most like to get to in Mount Airy?

What destinations would you most like to get to in Mount Airy? (select your top THREE destinations)		
Answer Options	Response Percent	Response Count
Trails and greenways	59.9%	312
Parks	36.5%	190
Shopping	47.8%	249
Restaurants	36.1%	188
Civic buildings (library, town hall)	12.1%	63
Work	17.1%	89
Entertainment	25.5%	133
Public Transportation	11.3%	59
School	6.3%	33
Other (please specify)	7.1%	37
<i>answered question</i>		<b>521</b>



## Question 9: The City has limited funding to address all of the pedestrian needs in Mount Airy. To help prioritize, which types of improvements are most important to you?

The City has limited funding to address all of the pedestrian needs in Mount Airy. To help prioritize, which types of improvements are most important to you (select your top THREE)		
Answer Options	Response Percent	Response Count
Replace/repair existing sidewalks	37.4%	195
Fill in the gaps in the existing sidewalk network	45.9%	239
Add new sidewalks	35.5%	185
Add crosswalks and other improvements at key crossings	33.4%	174
Construct a greenway trail/multi-use path system	29.0%	151
Create more pedestrian friendly destinations	26.9%	140
Improve public transportation	17.7%	92
Address barriers to pedestrian travel	2.9%	15
Improve pedestrian accommodations at key inter...	10.0%	52
Other (please specify)	13.2%	69
<i>answered question</i>		<b>521</b>

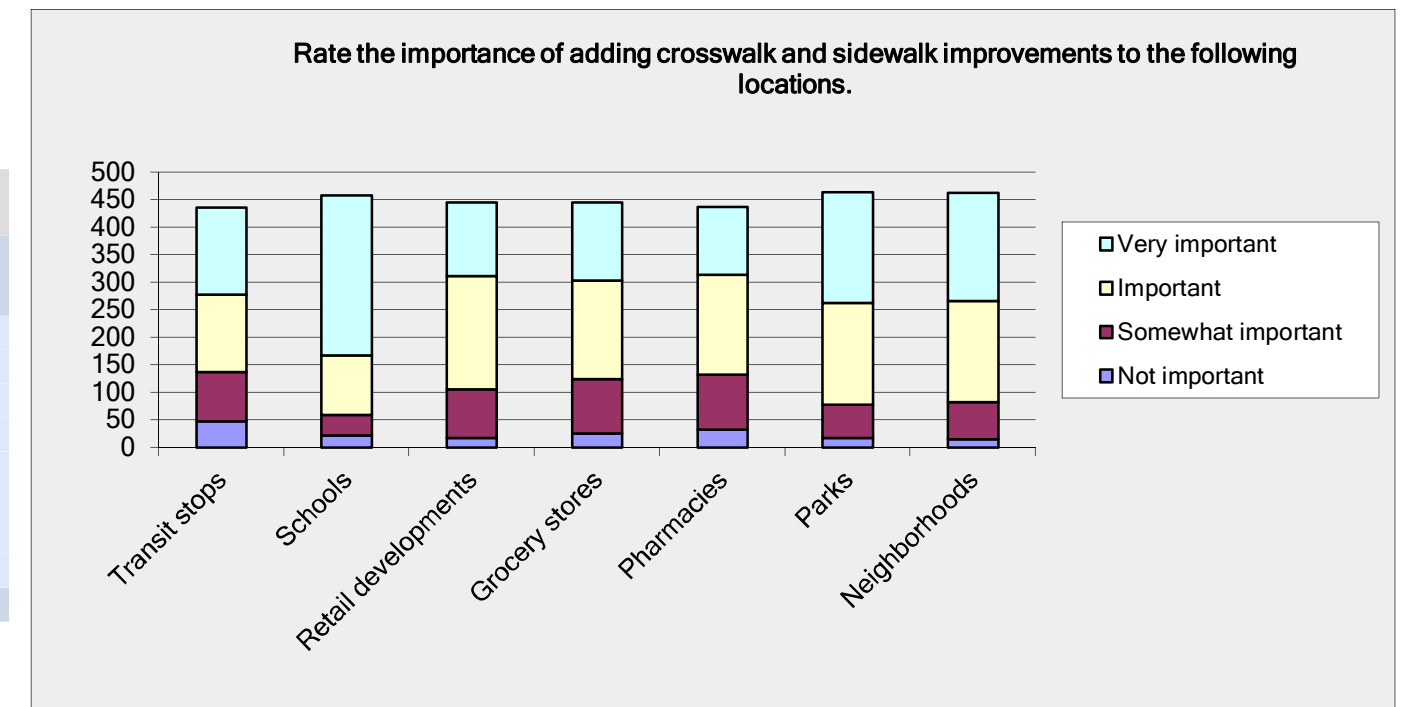






**Question 10:** Rate the importance of adding crosswalk and sidewalk improvements to the following locations.

Rate the importance of adding crosswalk and sidewalk improvements to the following locations.					
Answer Options	Very important	Important	Somewhat important	Not important	Response Count
Transit stops	158	141	89	48	436
Schools	290	109	37	22	458
Retail developments	134	206	89	17	446
Grocery stores	142	179	99	26	446
Pharmacies	124	181	101	32	438
Parks	201	185	60	18	464
Neighborhoods	197	184	67	15	463
Other (please specify)					25
<i>answered question</i>					<b>521</b>



**Question 11:** What do you think the top three Roadway corridors most needing pedestrian facilities or pedestrian facility improvements?

1. 601/Rockford Street
2. US 52
3. Renfro Street
4. Main Street
5. Independence
6. Riverside Drive
7. NC 89
8. Pine Street

**Question 12:** What do you think are the Top THREE intersections most needing pedestrian facilities or pedestrian facility improvements?

1. Renfro Street at Pine Street
2. US 52 at US 601
3. Renfro Street at Independence Street
4. Lebanon Street at Grace Street
5. US 52 at Newsome Street
6. Main Street at Renfro Street
7. US 52 at Pine Street
8. Pine Street at Riverside Drive

**Question 13:** What strategies would you be supportive of the City using to develop/improve pedestrian facilities in the City?

What strategies would you be supportive of the City using to develop/improve pedestrian facilities in City? (check all that apply)		
Answer Options	Response Percent	Response Count
Provisions in the Land Development Code (LDC)	28.2%	147
Dedicated funding sources in Town budget	46.1%	240
Bonds	21.1%	110
Grants	77.2%	402
Private financing	26.3%	137
Other (please specify)		18
<i>answered question</i>		<b>521</b>





COMPREHENSIVE PEDESTRIAN PLAN  
City of Mount Airy



Market Profile

Mount Airy City, NC  
Mount Airy city, NC (3744800)  
Geography: Place

Mount Airy city, NC (3744800)		
<strong>Population Summary</strong>		
2000 Total Population	10,699	
2010 Total Population	10,388	
2012 Total Population	10,426	
2012 Group Quarters	265	
2017 Total Population	10,522	
2012-2017 Annual Rate	0.18%	
<strong>Household Summary</strong>		
2000 Households	4,627	
2000 Average Household Size	2.21	
2010 Households	4,721	
2010 Average Household Size	2.13	
2012 Households	4,728	
2012 Average Household Size	2.15	
2017 Households	4,789	
2017 Average Household Size	2.14	
2012-2017 Annual Rate	0.26%	
2010 Families	2,706	
2010 Average Family Size	2.85	
2012 Families	2,702	
2012 Average Family Size	2.86	
2017 Families	2,746	
2017 Average Family Size	2.86	
2012-2017 Annual Rate	0.32%	
<strong>Housing Unit Summary</strong>		
2000 Housing Units	5,137	
Owner Occupied Housing Units	56.1%	
Renter Occupied Housing Units	34.0%	
Vacant Housing Units	9.9%	
2010 Housing Units	5,296	
Owner Occupied Housing Units	50.9%	
Renter Occupied Housing Units	38.3%	
Vacant Housing Units	10.9%	
2012 Housing Units	5,316	
Owner Occupied Housing Units	50.2%	
Renter Occupied Housing Units	38.7%	
Vacant Housing Units	11.1%	
2017 Housing Units	5,389	
Owner Occupied Housing Units	51.0%	
Renter Occupied Housing Units	37.9%	
Vacant Housing Units	11.1%	
<strong>Median Household Income</strong>		
2012	\$29,399	
2017	\$33,672	
<strong>Median Home Value</strong>		
2012	\$95,071	
2017	\$109,926	
<strong>Per Capita Income</strong>		
2012	\$21,195	
2017	\$23,604	
<strong>Median Age</strong>		
2010	45.8	
2012	45.8	
2017	47.2	

**Data Note:** Household population includes persons not residing in group quarters. Average Household Size is the household population divided by total households. Persons in families include the householder and persons related to the householder by birth, marriage, or adoption. Per Capita Income represents the income received by all persons aged 15 years and over divided by the total population.  
**Source:** U.S. Census Bureau, Census 2010 Summary File 1. Esri forecasts for 2012 and 2017. Esri converted Census 2000 data into 2010 geography.

May 08, 2013



Market Profile

Mount Airy City, NC  
Mount Airy city, NC (3744800)  
Geography: Place

Mount Airy city, NC (3744800)		
<strong>2012 Households by Income</strong>		
Household Income Base	4,729	
<\$15,000	26.7%	
\$15,000 - \$24,999	16.0%	
\$25,000 - \$34,999	14.0%	
\$35,000 - \$49,999	12.1%	
\$50,000 - \$74,999	14.0%	
\$75,000 - \$99,999	7.2%	
\$100,000 - \$149,999	7.1%	
\$150,000 - \$199,999	1.3%	
\$200,000+	1.5%	
Average Household Income	\$45,285	
<strong>2017 Households by Income</strong>		
Household Income Base	4,789	
<\$15,000	25.6%	
\$15,000 - \$24,999	12.9%	
\$25,000 - \$34,999	12.8%	
\$35,000 - \$49,999	12.2%	
\$50,000 - \$74,999	16.5%	
\$75,000 - \$99,999	8.7%	
\$100,000 - \$149,999	8.1%	
\$150,000 - \$199,999	1.6%	
\$200,000+	1.6%	
Average Household Income	\$50,448	
<strong>2012 Owner Occupied Housing Units by Value</strong>		
Total	2,669	
<\$50,000	12.1%	
\$50,000 - \$99,999	42.0%	
\$100,000 - \$149,999	19.8%	
\$150,000 - \$199,999	11.4%	
\$200,000 - \$249,999	7.5%	
\$250,000 - \$299,999	3.0%	
\$300,000 - \$399,999	2.6%	
\$400,000 - \$499,999	1.0%	
\$500,000 - \$749,999	0.6%	
\$750,000 - \$999,999	0.2%	
\$1,000,000 +	0.0%	
Average Home Value	\$122,630	
<strong>2017 Owner Occupied Housing Units by Value</strong>		
Total	2,749	
<\$50,000	7.9%	
\$50,000 - \$99,999	37.7%	
\$100,000 - \$149,999	22.1%	
\$150,000 - \$199,999	16.0%	
\$200,000 - \$249,999	9.4%	
\$250,000 - \$299,999	2.9%	
\$300,000 - \$399,999	2.3%	
\$400,000 - \$499,999	0.9%	
\$500,000 - \$749,999	0.5%	
\$750,000 - \$999,999	0.2%	
\$1,000,000 +	0.0%	
Average Home Value	\$132,366	

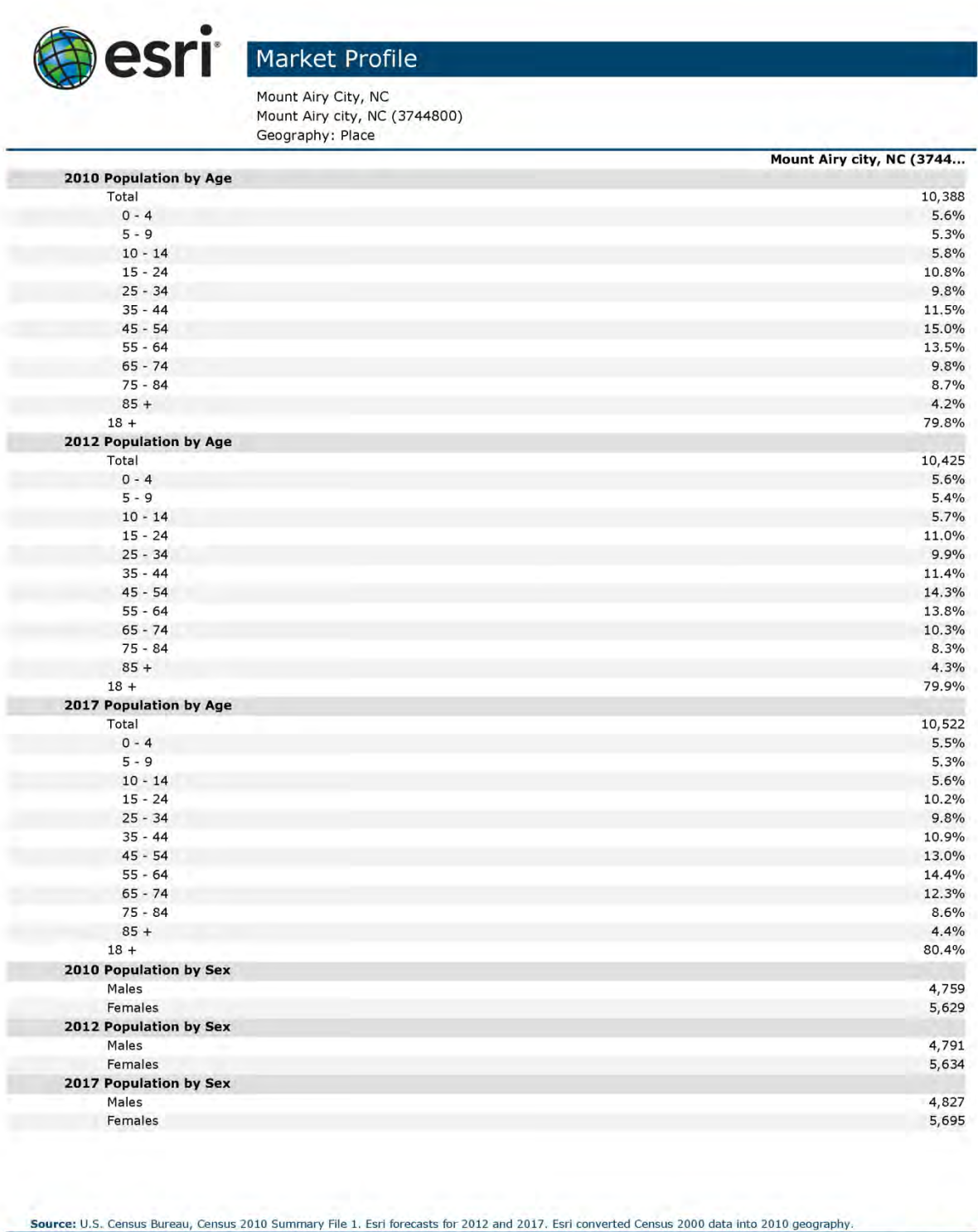
**Data Note:** Income represents the preceding year, expressed in current dollars. Household income includes wage and salary earnings, interest dividends, net rents, pensions, CSI and welfare payments, child support, and alimony.  
**Source:** U.S. Census Bureau, Census 2010 Summary File 1. Esri forecasts for 2012 and 2017. Esri converted Census 2000 data into 2010 geography.

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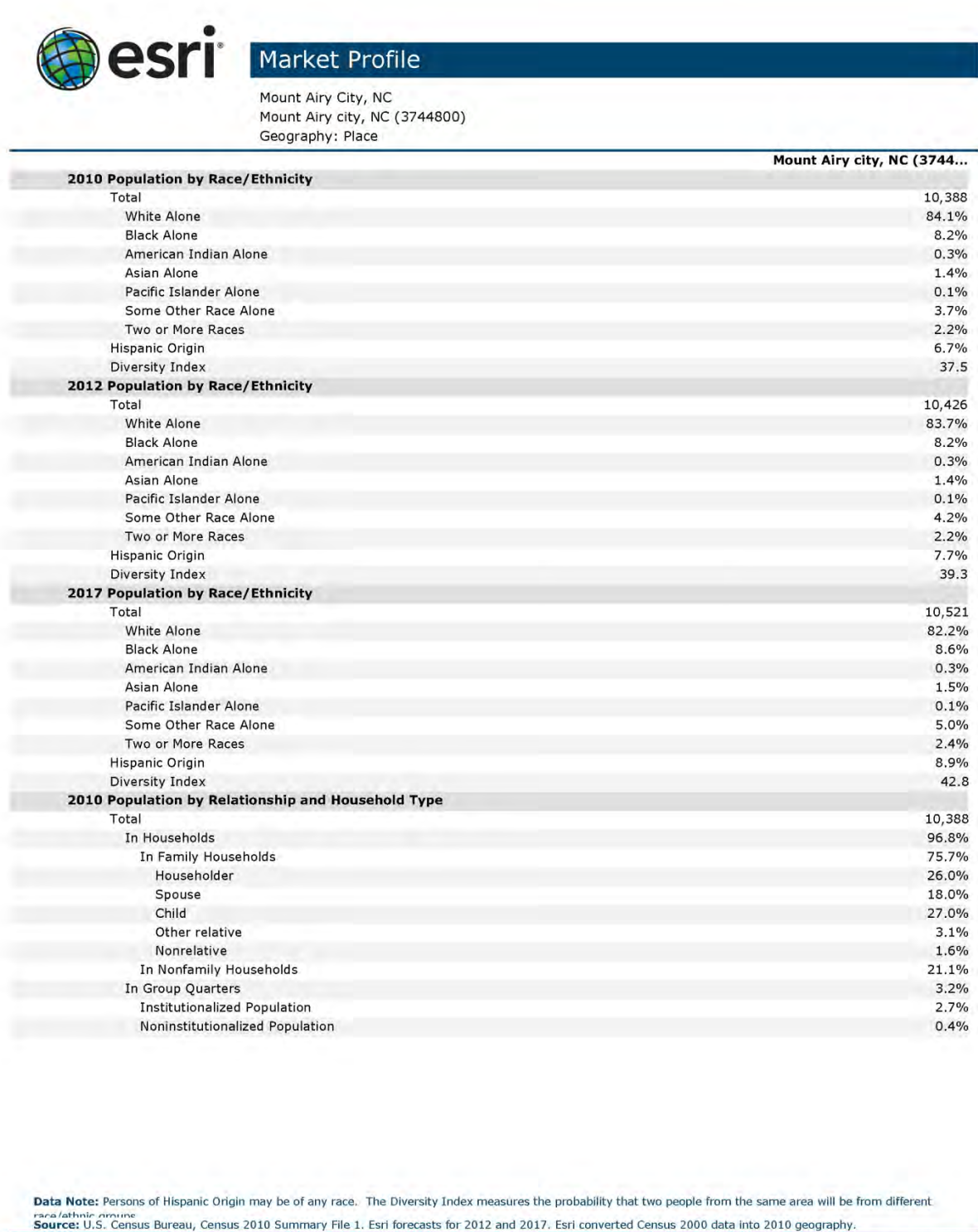




COMPREHENSIVE PEDESTRIAN PLAN  
City of Mount Airy



May 08, 2013



May 08, 2013





# COMPREHENSIVE PEDESTRIAN PLAN

## City of Mount Airy

## Appendix E – Census Profile



### Census 2010 Summary Profile

Mount Airy City, NC  
Mount Airy city, NC (3744800)  
Geography: Place

	2000	2010	2000-2010 Annual Rate
Population	10,699	10,388	-0.30%
Households	4,627	4,721	0.20%
Housing Units	5,137	5,296	0.31%
<b>Population by Race</b>			
Total		Number	Percent
Population Reporting One Race		10,388	100.0%
White		10,160	97.8%
Black		8,741	84.1%
American Indian		856	8.2%
Asian		29	0.3%
Pacific Islander		148	1.4%
Some Other Race		6	0.1%
Population Reporting Two or More Races		380	3.7%
Total Hispanic Population		228	2.2%
		699	6.7%
<b>Population by Sex</b>			
Male		4,759	45.8%
Female		5,629	54.2%
<b>Population by Age</b>			
Total		10,388	100.0%
Age 0 - 4		579	5.6%
Age 5 - 9		554	5.3%
Age 10 - 14		602	5.8%
Age 15 - 19		613	5.9%
Age 20 - 24		512	4.9%
Age 25 - 29		490	4.7%
Age 30 - 34		523	5.0%
Age 35 - 39		528	5.1%
Age 40 - 44		665	6.4%
Age 45 - 49		767	7.4%
Age 50 - 54		792	7.6%
Age 55 - 59		713	6.9%
Age 60 - 64		688	6.6%
Age 65 - 69		490	4.7%
Age 70 - 74		531	5.1%
Age 75 - 79		492	4.7%
Age 80 - 84		412	4.0%
Age 85+		437	4.2%
Age 18+		8,294	79.8%
Age 65+		2,362	22.7%
<b>Median Age by Sex and Race/Hispanic Origin</b>			
Total Population		45.8	
Male		42.8	
Female		48.5	
White Alone		48.2	
Black Alone		40.3	
American Indian Alone		38.8	
Asian Alone		27.9	
Pacific Islander Alone		17.5	
Some Other Race Alone		24.7	
Two or More Races		16.1	
Hispanic Population		23.8	

**Data Note:** Hispanic population can be of any race. Census 2010 medians are computed from reported data distributions.  
**Source:** U.S. Census Bureau, Census 2010 Summary File 1. Esri converted Census 2000 data into 2010 geography.



### Census 2010 Summary Profile

Mount Airy City, NC  
Mount Airy city, NC (3744800)  
Geography: Place

<b>Households by Type</b>		
Total	4,721	100.0%
Households with 1 Person	1,867	39.5%
Households with 2+ People	2,854	60.5%
Family Households	2,706	57.3%
Husband-wife Families	1,874	39.7%
With Own Children	626	13.3%
Other Family (No Spouse Present)	832	17.6%
With Own Children	431	9.1%
Nonfamily Households	148	3.1%
All Households with Children	1,182	25.0%
Multigenerational Households	133	2.8%
Unmarried Partner Households	174	3.7%
Male-female	157	3.3%
Same-sex	17	0.4%
Average Household Size	2.13	
<b>Family Households by Size</b>		
Total	2,706	100.0%
2 People	1,396	51.6%
3 People	604	22.3%
4 People	429	15.9%
5 People	180	6.7%
6 People	63	2.3%
7+ People	34	1.3%
Average Family Size	2.85	
<b>Nonfamily Households by Size</b>		
Total	2,015	100.0%
1 Person	1,867	92.7%
2 People	130	6.5%
3 People	10	0.5%
4 People	4	0.2%
5 People	3	0.1%
6 People	1	0.1%
7+ People	0	0.0%
Average Nonfamily Size	1.09	
<b>Population by Relationship and Household Type</b>		
Total	10,388	100.0%
In Households	10,060	96.8%
In Family Households	7,866	75.7%
Householder	2,706	26.0%
Spouse	1,874	18.0%
Child	2,800	27.0%
Other relative	322	3.1%
Nonrelative	164	1.6%
In Nonfamily Households	2,194	21.1%
In Group Quarters	328	3.2%
Institutionalized Population	285	2.7%
Noninstitutionalized Population	43	0.4%

**Data Note:** Households with children include any households with people under age 18, related or not. Multigenerational households are families with 3 or more parent-child relationships. Unmarried partner households are usually classified as nonfamily households unless there is another member of the household related to the householder. Multigenerational and unmarried partner households are reported only to the tract level. Esri estimated block group data, which is used to estimate polygons or non-standard geography. Average family size excludes nonrelatives.  
**Source:** U.S. Census Bureau, Census 2010 Summary File 1.

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# COMPREHENSIVE PEDESTRIAN PLAN

## City of Mount Airy

## Appendix E – Census Profile



### Census 2010 Summary Profile

Mount Airy City, NC  
Mount Airy city, NC (3744800)  
Geography: Place

Family Households by Age of Householder		
Total	2,706	100.0%
Householder Age 15 - 44	977	36.1%
Householder Age 45 - 54	587	21.7%
Householder Age 55 - 64	467	17.3%
Householder Age 65 - 74	352	13.0%
Householder Age 75+	323	11.9%
Nonfamily Households by Age of Householder		
Total	2,015	100.0%
Householder Age 15 - 44	365	18.1%
Householder Age 45 - 54	321	15.9%
Householder Age 55 - 64	425	21.1%
Householder Age 65 - 74	312	15.5%
Householder Age 75+	592	29.4%
Households by Race of Householder		
Total	4,721	100.0%
Householder is White Alone	4,116	87.2%
Householder is Black Alone	386	8.2%
Householder is American Indian Alone	16	0.3%
Householder is Asian Alone	40	0.8%
Householder is Pacific Islander Alone	1	0.0%
Householder is Some Other Race Alone	102	2.2%
Householder is Two or More Races	60	1.3%
Households with Hispanic Householder	181	3.8%
Husband-wife Families by Race of Householder		
Total	1,874	100.0%
Householder is White Alone	1,706	91.0%
Householder is Black Alone	82	4.4%
Householder is American Indian Alone	5	0.3%
Householder is Asian Alone	24	1.3%
Householder is Pacific Islander Alone	0	0.0%
Householder is Some Other Race Alone	38	2.0%
Householder is Two or More Races	19	1.0%
Husband-wife Families with Hispanic Householder	77	4.1%
Other Families (No Spouse) by Race of Householder		
Total	832	100.0%
Householder is White Alone	609	73.2%
Householder is Black Alone	149	17.9%
Householder is American Indian Alone	4	0.5%
Householder is Asian Alone	6	0.7%
Householder is Pacific Islander Alone	0	0.0%
Householder is Some Other Race Alone	47	5.6%
Householder is Two or More Races	17	2.0%
Other Families with Hispanic Householder	70	8.4%
Nonfamily Households by Race of Householder		
Total	2,015	100.0%
Householder is White Alone	1,801	89.4%
Householder is Black Alone	155	7.7%
Householder is American Indian Alone	7	0.3%
Householder is Asian Alone	10	0.5%
Householder is Pacific Islander Alone	1	0.1%
Householder is Some Other Race Alone	17	0.8%
Householder is Two or More Races	24	1.2%
Nonfamily Households with Hispanic Householder	34	1.7%

Source: U.S. Census Bureau, Census 2010 Summary File 1.



### Census 2010 Summary Profile

Mount Airy City, NC  
Mount Airy city, NC (3744800)  
Geography: Place

Total Housing Units by Occupancy		
Total	5,296	100.0%
Occupied Housing Units	4,721	89.1%
Vacant Housing Units		
For Rent	198	3.7%
Rented, not Occupied	4	0.1%
For Sale Only	102	1.9%
Sold, not Occupied	27	0.5%
For Seasonal/Recreational/Occasional Use	46	0.9%
For Migrant Workers	1	0.0%
Other Vacant	197	3.7%
Total Vacancy Rate	10.9%	
Households by Tenure and Mortgage Status		
Total	4,721	100.0%
Owner Occupied	2,695	57.1%
Owned with a Mortgage/Loan	1,571	33.3%
Owned Free and Clear	1,124	23.8%
Average Household Size	2.22	
Renter Occupied	2,026	42.9%
Average Household Size	2.02	
Owner-occupied Housing Units by Race of Householder		
Total	2,695	100.0%
Householder is White Alone	2,466	91.5%
Householder is Black Alone	159	5.9%
Householder is American Indian Alone	3	0.1%
Householder is Asian Alone	18	0.7%
Householder is Pacific Islander Alone	0	0.0%
Householder is Some Other Race Alone	29	1.1%
Householder is Two or More Races	20	0.7%
Owner-occupied Housing Units with Hispanic Householder	54	2.0%
Renter-occupied Housing Units by Race of Householder		
Total	2,026	100.0%
Householder is White Alone	1,650	81.4%
Householder is Black Alone	227	11.2%
Householder is American Indian Alone	13	0.6%
Householder is Asian Alone	22	1.1%
Householder is Pacific Islander Alone	1	0.0%
Householder is Some Other Race Alone	73	3.6%
Householder is Two or More Races	40	2.0%
Renter-occupied Housing Units with Hispanic Householder	127	6.3%
Average Household Size by Race/Hispanic Origin of Householder		
Householder is White Alone	2.06	
Householder is Black Alone	2.25	
Householder is American Indian Alone	2.56	
Householder is Asian Alone	3.45	
Householder is Pacific Islander Alone	2.00	
Householder is Some Other Race Alone	3.66	
Householder is Two or More Races	2.35	
Householder is Hispanic	3.50	

Source: U.S. Census Bureau, Census 2010 Summary File 1.

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