TOWN OF ELON

Bicycle, Pedestrian and Lighting Plan

An Alternative Transportation Strategy

PIEDMONT TRIAD COUNCIL OF GOVERNMENTS

FULL REPORT
AUGUST 2008

TOWN OF ELON 1893

Town of Elon
Bicycle, Pedestrian and Lighting Plan
Adopted by the Town of Elon _____2008

Board of Alderman

Jerry Tolley (Mayor)
Ronald A. Klepcyk (Mayor Pro Tem)
Mark Greene
Jo M. Grimley
Davis E. Montgomery
Lawrence Slade

Planning Board

Monti Allison
Jim Beasley
Tom Blume
Zandrel Bradsher
Frank Chandler
Sean Tencer (Staff Liason)
Robert Harris
Davis Montgomery (Board Liason)
Diane Gill (ETJ)
Wilma Williamson (ETJ)

Plan Task Force

Monti Allison
George Donovan
Jim Edmonds
Tom Flood
Amy Harper-Wallace
Smith Jackson
Ron Klepcyk
Glenda Linens
LaVell Lovette
Ken Mullen
Mike Nunn (MPO Staff)
Patricia Patterson (Staff)
Rob Saunders
Sean Tencer (Staff)
Steve Trogdon

Town Staff

Mike Dula	Town Manager
Franz Holt	Town Engineer (consultant)
Chief LaVell Lovette	Elon Police Department
Sean Tencer	Town Planner

Piedmont Triad Council of Governments

Hanna Cockburn, AICP	Planning Program Manager
Jesse Day	Regional Planner (Project Lead)
Anita Henderson	GIS Intern
Paul M. Kron, ASLA, AICP	Regional Planning Director
Kristen Selikoff	GIS Manager

Table of Contents

CHAPTER 1: INTRODUCTION 1
1.1 Scope and Purpose 1
1.2 Background 1
1.3 History 2
1.4 Vision and Goals 2
CHAPTER 2: EXISTING CONDITIONS 5
2.1 Overview 5
2.2 Demographics 5
2.3 Crash Data 15
2.4 Community Issues 16
2.5 Inventory and Assessment of Existing Facilities 18
2.6 Relevant Statutes and Local Ordinances 29
2.7 Relevant Local, Regional and State Plans and Guidelines 30
2.8 Other Programs and Initiatives 33
CHAPTER 3: ALTERNATIVE TRANSPORTATION SYSTEM PLAN 35
3.1 Pedestrian, Bicycle and Lighting System Overview 35
3.2 Pedestrian System Recommendations 37
3.3 Bicycle System Recommendations 40
3.4 Lighting System Recommendations 42
3.5 Policy and Program Recommendations 44
3.6 Small Area System Plan Overview and Recommendations 51
3.7 Current Project Opportunities 62
CHAPTER 4: IMPLEMENTATION 63
4.1 Action Plan 63
APPENDIX A: PROJECT DEVELOPMENT 65
A.1 Pedestrian and Bicycle Facility Guidelines 66
A.2 Lighting Guidelines 83
A.3 Cost Estimates for Typical Sidewalk, Bicycle Lane and Shared-use Path Improvements 86
A.4 Project Prioritization 88
A.5 Project Cost Estimates and Phasing Tables 91
A.6 Review of Funding Opportunities 95
APPENDIX B: REFERENCES 114
APPENDIX C: SURVEY RESULTS 116
APPENDIX D: MEETING NOTES 140

Table of Figures

Figure 2.1 - Population and Growth 6
Figure 2.2 - Ethnicity and Race Statistics (Census – 2000) 6
Figure 2.3 - Population by Age Range (Census – 2000) 7
Figure 2.4 - Poverty Rate and Income (Census – 2000) 8
Figure 2.5 - Educational Attainment (Census – 2000) 9
Figure 2.6 - Vehicle Ownership (Census – 2000) 10
Figure 2.7 - Labor Force Statistics (Census – 2000) 11
Figure 2.8 – Persons with Disabilities (Census – 2000) 11
Figure 2.9 - Journey to Work Statistics (Census – 2000) 12
Figure 2.10 - Travel Time to Work (Census – 2000) 12
Figure 2.11 - Where Elon Residents Work 13
Figure 2.12 - Where Persons Working in Elon Live 14
Figure 2.13 - Elon Bicycle and Pedestrian Crashes (2001-2006) 15
Figure 2.14 – Elon Sidewalk Lengths 18
Map 2.1 – Existing Pedestrian Facilities 19
Map 2.2 – Existing Bicycle Facilities 20
Figure 2.15 – Elon University Transportation System Map and Trip Counts 21
Map 2.3 – Existing Lighting and Transit Facilities 25
Map 2.4 – Park and School Walk Zones 27
Figure 2.16 – Elon University Parking Capacity 28
Figure 3.1 – Proposed Sidewalk Corridor Improvement 37
Figure 3.2 – Proposed Intersection Improvements 38
Figure 3.3 – Proposed Shared Use Paths and Lengths 38
Map 3.1 - Proposed Pedestrian Facilities 39
Figure 3.4 – Proposed On Road Bicycle Improvements with Priority Score 40
Map 3.2 – Proposed Bicycle Improvements 41
Figure 3.5 – Proposed Corridors for Lighting Improvement 42
Map 3.3 - Proposed Lighting Improvements 43
Figure 3.6 - Cul-de-Sac and Shared-use 45
Figure 3.7 – Proposed Sidewalk Improvements, University Area and Downtown 51
Figure 3.8 – Proposed Bicycle Facility Improvements, University Area and Downtown 52
Map 3.4 - University and Downtown Proposed Pedestrian, Bicycle and Lighting Improvements 57
Figure 3.9 – Proposed Sidewalk Corridor Projects, Twin Lakes Area 58
Figure 3.10 – Proposed Bicycle Corridor Projects 58
Figure 3.11 – Proposed Shared Use Paths, Twin Lakes Area 59
Map 3.5 – Twin Lakes Area Proposed Pedestrian, Bicycle and Lighting Improvements 61
Figure A.1 – Crosswalk Design 67
Figure A.2 - In-Pavement Yield to Pedestrian Sign 67
Figure A.3 - Median/Refuge Islands 68
Figure A.4 - Pedestrian Signal 68
Figure A.5 - Pedestrian in Roadway Light 69
Figure A.6 - Reduction in Curb Radii 70
Figure A.7 - Curb Ramp and Sidewalk Landing Specifications 70

Figure A.8 - Residential Street Cross Section 72
Figure A.9 - Commercial/Main Street Area Cross Section 72
Figure A.10 - MUTCD Pedestrian Related Signage 73
Figure A.11 - MUTCD School Zone Pedestrian Related Signage 74
Figure A.12 - Shared-use Path Cross-section and Overhead View 76
Figure A.13 - MUTCD Bicycle Lane Markings 78
Figure A.14 – Bicycle Lane Design with a Right Turn Only Lane 79
Figure A.15 - Common MUTCD Warning and Informational Signs for Bicyclists 80
Figure A.16 – Shared Roadway Marking 81
Figure A.17 – Paved Shoulder Cross-Section 82
Figure A.18 – Lighting Fixtures Available from Duke Energy 84
Figure A.19 – Duke Energy Outdoor Lighting Service Schedule 85
Figure A.20 - General Pedestrian Facility Cost Estimates 86
Figure A.21 - General Bicycle Facility Cost Estimates 86
Figure A.22 – Shared Use Facility Cost Estimates 87
Figure A.23 - Sidewalk Project Cost Estimates and Phasing 92
Figure A.24 - Shared Use Path Project Cost Estimates and Phasing 93
Figure A.25 - Bicycle Facility Project Cost Estimates and Phasing 94

[THIS PAGE INTENTIONALLY LEFT BLANK]

CHAPTER 1: INTRODUCTION

1.1 Scope and Purpose

The primary purpose of this plan is to identify and prioritize key opportunities for improving Elon's bicycle, pedestrian, and lighting systems over the next 20 years. Implementation of proposed improvements will help encourage greater citizen participation in active transportation and physical activity on a coordinated network of alternative transportation facilities. Key objectives of this plan include: improving the health and fitness of Town residents and University students, reducing traffic congestion, improving air quality, improving pedestrian safety, and helping to provide a pedestrian-friendly environment for existing and future residents and visitors. Reaching these objectives will improve quality of life for all residents.

1.2 Background

The way people move around in their local communities has dramatically changed over the last 50 years. American lives have become increasingly dominated by the automobile and marked by a distinct pattern of physical inactivity, particularly in the Southeastern United States. Providing safe and accessible places to walk and bicycle will help Elon reduce automobile trips and traffic congestion, and in turn, reduce air pollutants and increase the overall health of the community. In addition, providing a wider mix of land uses in close proximity to each other can reduce travel distances, encourage more foot traffic and reduce car trips. Well-designed neighborhoods with ample opportunities for walking and biking can increase our quality of life and foster a greater sense of community.

The three key elements of a well-designed bicycle and pedestrian-friendly communities include:

- Safety – (e.g. issues of traffic, crime, buffering, lighting);
- Access – (e.g. sidewalks, bicycle lanes, parking, curb ramps, crossing treatments, connected streets); and
- Comfort – (e.g. lighting, sidewalk width, compatible land uses, shade).

Design characteristics that serve as some of the basic building blocks of bicycle and pedestrian-friendly communities include:

- Connectivity (bicycle routes/lanes, close sidewalk gaps, build cul-de-sac paths and connections between different land uses e.g. residential and commercial);
- Separation from traffic (bike-lanes, planting strips, landscaping, bulb-outs);
- Supportive land-use patterns (mixed use, higher density, design for the pedestrian);
- Designated space (5ft+ sidewalks in residential areas and 8-12ft sidewalks in downtown and around schools);

- Accessibility (ADA ramps, crosswalks, ped-head signals);
- Street furniture (places to sit, drinking fountains, trash receptacles); and
- Security and visibility (lighting, landscaping and site distance).

Elon cannot achieve a walkable community by itself. Neighboring jurisdictions must participate in improving transportation options as well, encouraging mixed land use and providing inviting public spaces to walk, transport and recreate.

1.3 History

Some Elon citizens use walking and bicycling as a form of transportation. However, walking is not as prevalent as it once was in our country. In 1969, an average of 42% of school children walked or bicycled to school nationwide. By 2001 only 16% of school children walked or bicycled to school (CDC, 2005). This is partly due to a change in where families choose to live but also is influenced by the built environment that tends to under serve multi-modal transportation needs. Special projects in cooperation with the University and NCDOT have helped to start a network of sidewalks and trails in Elon. However, there are important connections needed to enhance the Town's existing pedestrian and bicycling network.

Safe and inviting places to walk and bicycle are important anywhere people want to go, but particularly near neighborhoods, schools, universities, senior centers, downtown, shopping areas and hospitals. At some point in our journey to work, school or shopping, everyone is a pedestrian. Whether walking is our mode of travel for the entire journey or only for the portion of our trip from the car to the front door, a walking environment that provides a safe, accessible and a comfortable journey is important.

The Town of Elon Bicycle, Pedestrian and Lighting plan is an innovate effort to develop a strategy for the development of a safe, secure and comprehensive network of sidewalks, trails and on-road bicycle lanes that serve recreation and transportation needs. This planning effort is a major step forward for walking and bicycling in Elon. The Town completed a land development plan in 2002 which included references and action items addressing policies and projects related to pedestrian friendliness, bikeablity, trail development and quality of life. Following the completion of the plan, the Town of Elon wrote a new development ordinance that enhances walking and bicycle friendliness. Additional changes to the Town ordinances and improvements suggested in this plan could enhance these provisions.

1.4 Vision and Goals

Important to developing and implementing any plan is a set of vision and goals for the future. The following vision statement and goals were drafted by the plan task force and have been refined using public input. The following vision statement looks ahead to Elon in the year 2030.

Vision Statement

In the year 2030 the Town of Elon will have a pedestrian, bicycle and lighting system that will tie major residential areas together, providing students and residents *safe and well-lit* access from residential areas to campus academic and recreational facilities and the downtown. Elon will maintain a *quality of life* that is green, safe and healthy, accommodating the needs of students and residents. Spacious *bicycle and pedestrian paths* will exist downtown and will also connect with Burlington and Gibsonville encouraging walking, running and biking throughout Elon and neighboring communities. Facilities will be *safe, functional, innovative, well-used and maintained*. Elon will provide *connectivity* between residences and grocery shopping, restaurants and other destinations, providing *key access points to destinations and anchors* of activity in the Town and University.

Goals

The following goals are organized into pedestrian, bicycling and lighting system goals. These goals serve to guide the process by which specific policies, programs and projects will be developed.

Pedestrian System

Build Wide Sidewalks from Residential Areas to Key Destinations

- Build wide sidewalks with adequate width, allowing pedestrians to walk safely to any location, especially along major thoroughfares with key destination points and anchors;
- Connect existing and future neighborhoods with key destinations, making it possible for pedestrians to walk in town to all locations;
- Connect student residential communities to campus activity centers enabling students to walk to campus; and
- Prioritize street sidewalk improvements and areas that attract residents and students to walk and jog for recreation or transportation.

Transit Connections

- Provide transit shelters and seating areas with trash bins and shelters.

Safety and Intersection Improvements

- Ensure safe railroad and roadway crossings.

Other

- Provide leisure areas for walking & bicycling; and
- Provide a "bridge" between the younger (Elon University) and older (Twin Lakes) generation.

Bicycle System

Bicycle Parking

- Provide safe, well lit places to lock bicycles.

On-road Accommodation

- Provide separated bicycle lanes on major roads and arteries;
- Provide bikeway connections to community parks, shopping and other destinations, while providing opportunities to exercise; and

- Connect the University housing areas with key University academic, athletic and entertainment anchors.

Off-Road Accommodation

- Create bicycle paths connecting Elon to Burlington and other outlying areas;
- Provide safe off-road bicycle paths with adequate lighting;
- Provide bikeway connections to community parks, shopping and other destinations, while providing opportunities to exercise; and
- Connect the University housing areas with key University academic, athletic and entertainment anchors.

Lighting System

Lighted Pathways

- Provide well lit pathways to encourage pedestrian traffic to key evening destinations;
- Establish secure lighting in heavily traveled pedestrian areas; and
- Complete lighting on outdoor lighting walkways, including high use and high density areas.

Security and Safety

- Provide well lit emergency stations to improve safety; and
- Install lights along all major thoroughfares.

General Lighting

- Provide better lighting away from the University;
- Be more efficient and innovative in replacing light bulbs; and
- Provide adequate lighting for 24 hour use facilities.

CHAPTER 2: EXISTING CONDITIONS

2.1 Overview

Important to the Elon planning process is the assessment of existing conditions, (e.g. population demographics, vehicle ownership, existing facilities, etc.) which lays the foundation for future projects, policies and programs. The existing conditions chapter includes an assessment of many different facts, issues and input through community outreach and surveys. This information is balanced against demographics, evaluation of crash data, the location and function of the pedestrian and bicycle network and how people use facilities, an inventory of existing sidewalks, pathways and lighting, and an overview of existing ordinances, statutes, plans and programs.

2.2 Demographics

The demographic analysis for the Town of Elon is taken primarily from the US Census and American Factfinder. Elon statistics, when compared to the State of North Carolina appear quite different in some categories. This statistical variation has to do in most cases with the large student population compared to the overall population in Elon. For example, the unemployment rate seems high compared to the State average in 2000, due to the high percentage of college-age students in Elon's population. Following the Town of Elon data from the US Census, enrollment statistics at the University are included, as well as crash data from the Town of Elon's police department.

Population and Growth

The Town of Elon's population in 2006 totaled 7,097 people and the area of the municipality totaled nearly 3.6 square miles. The growth from 1990-2006 totaled over 50% in both land area and population. Figure 2.1 includes population, land area and density figures for the Town of Elon. The majority of Elon's population is White at 86.6%, minority population includes Black at 10.2%, Hispanic at 1.6% and Asian at 1%. Other ethnicities are less than 0.5%.

Figure 2.1 - Population and Growth

Population	Population	Land Area
2006	7,097	3.59
2000	6,748	3.38
1990	4,448	2.51
1980	2,873	1.16
Growth	Elon	NC
2000-2006	5.2%	9.7%
1990-2000	51.7%	21.3%
1980-1990	54.8%	12.8%
Persons per square mile	Elon	NC
2006	1977.4	181.2
2000	1994.6	165.2
1990	1772.1	136.1

Source: NC Office of Budget & Management, 2006 figures released in July of 2007 and the US Census Bureau, decennial census.

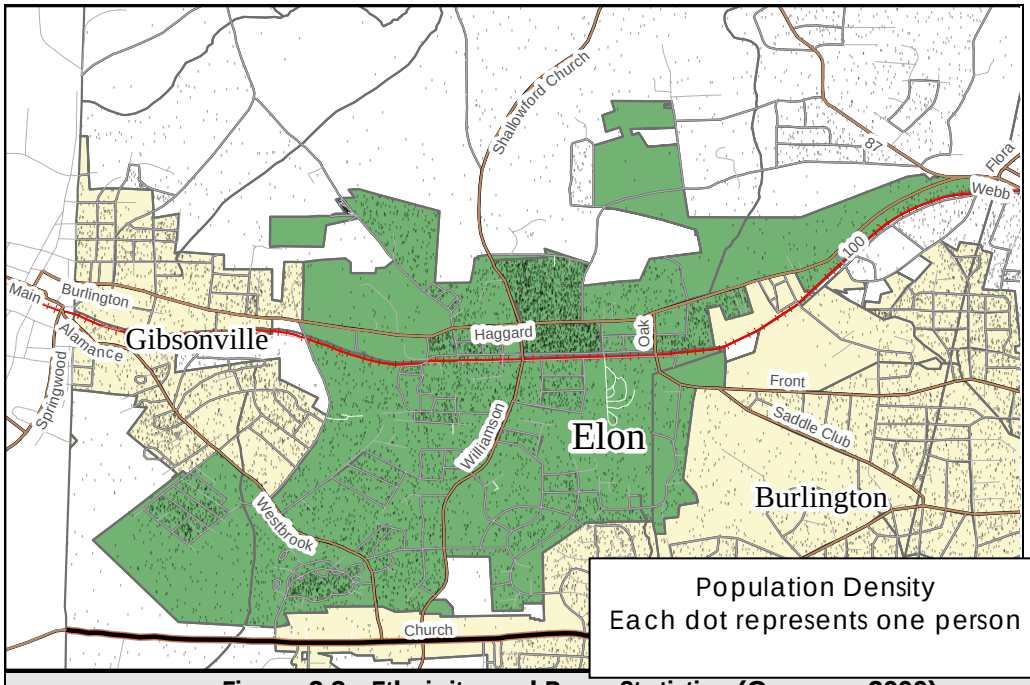
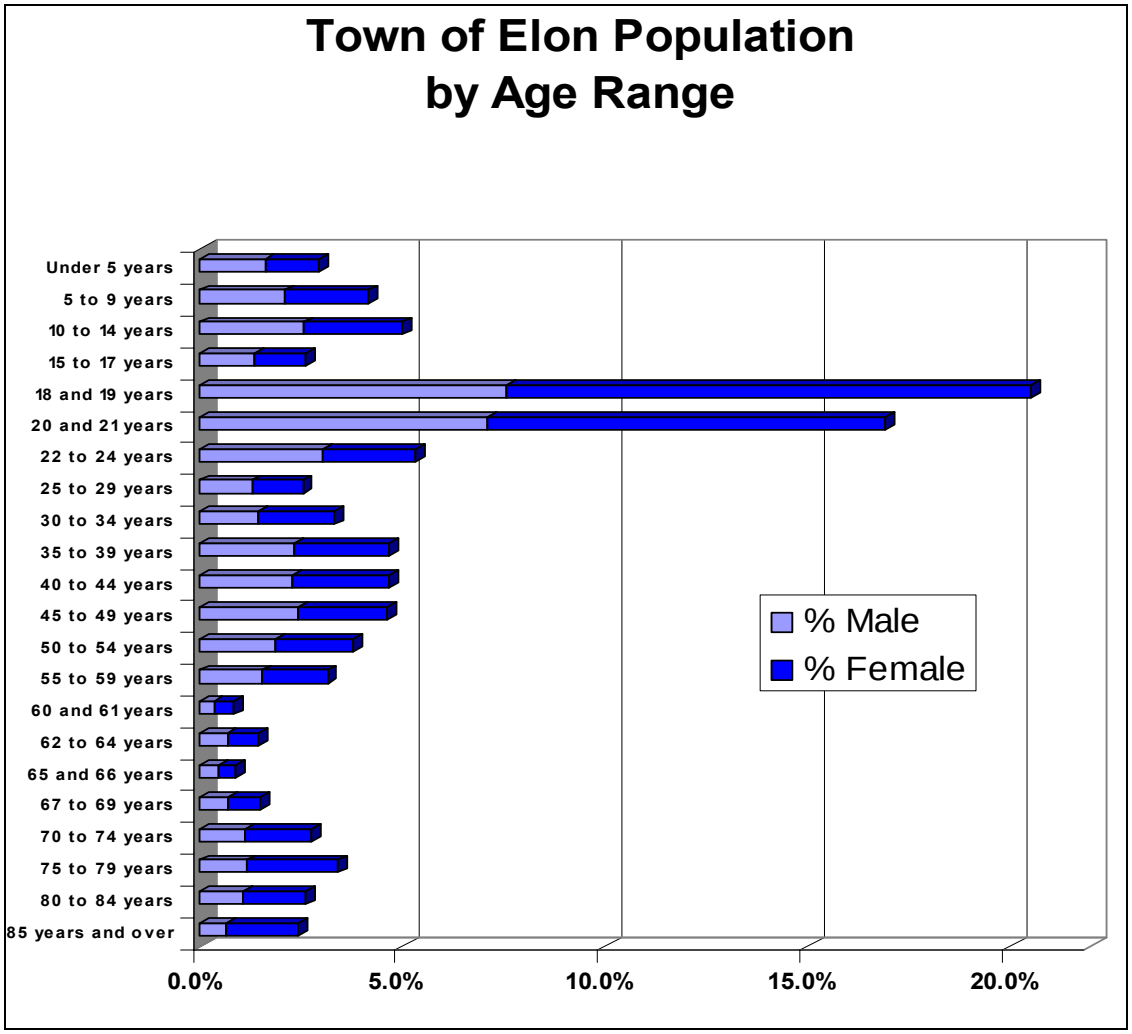


Figure 2.2 - Ethnicity and Race Statistics (Census – 2000)

	Elon	NC
Race and Ethnic Origin		
Non-Hispanic		
White	86.6%	70.2%
Black or African American	10.2%	21.4%
American Indian / Alaska Native	0.0%	1.2%
Asian	1.0%	1.4%
Native Hawaiian / Pacific Islander	0.0%	0.0%
Some other race	0.1%	0.1%
Multi-racial	0.5%	1.0%
Hispanic or Latino	1.6%	4.7%

Females ages 18-21 make up 23% of the town's population, while males ages 18-21 make up 15%. The largest detailed demographic group in Elon is white females between the ages of 18 and 19 (comprising almost 12% of the total population of the Town).

Figure 2.3 - Population by Age Range (Census – 2000)			
Age	Population by Age	% for Elon	% for NC
0 - 17	989	14.7%	24.4%
18 - 24	2,878	42.7%	10.0%
25 - 44	1,024	15.2%	31.1%
45 - 64	931	13.8%	22.5%
65+	916	13.6%	12.0%

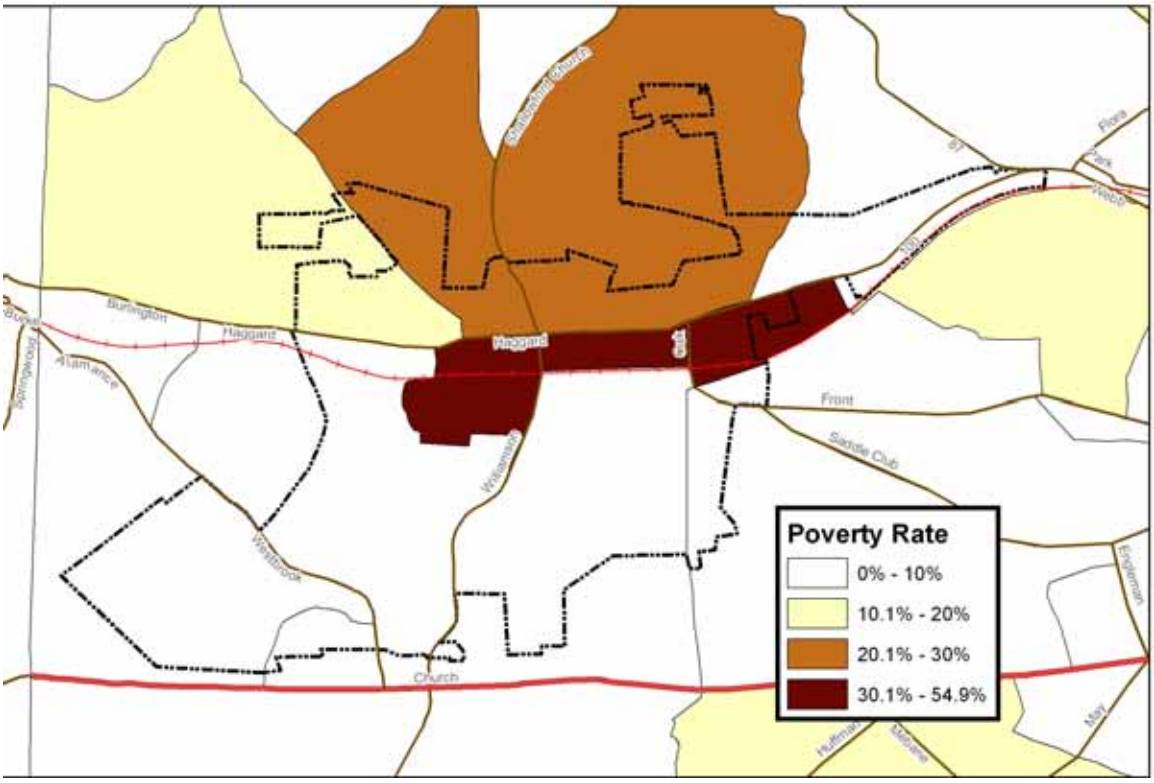


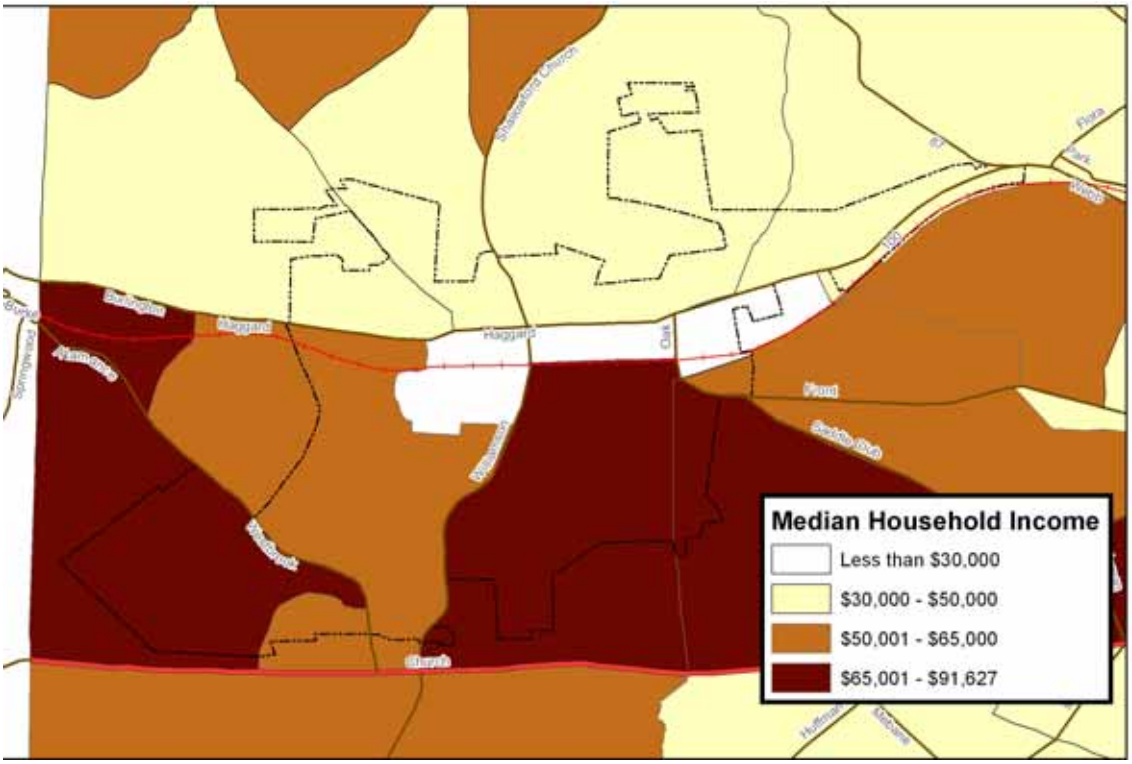
Income and Education

The poverty rate in Elon outpaces the state rate, but this variation is likely due to the student population attending Elon University. The rate among ages 18-24 is over three times the state average totaling 76.1%. The rate of poverty for children under 18 is well below the state average at 6.5%. The median household income is above the state average, totaling $41,049 in 2000. See Figure 2.4 for more information.

Figure 2.4 - Poverty Rate and Income (Census – 2000)

	Elon	NC
Poverty Rate	20.9%	12.3%
Children under 18	6.5%	16.1%
Age 18 - 24	76.1%	21.0%
Age 25 – 44	4.5%	9.5%
Age 45 – 64	3.3%	8.2%
Age 65+	9.9%	13.2%
Median Household Income	$41,049	$39,184





Elon outpaces the state averages for educational attainment as shown in Figure 2.5. The existence of the University and the large role it plays in the community has significant influence on these demographics.

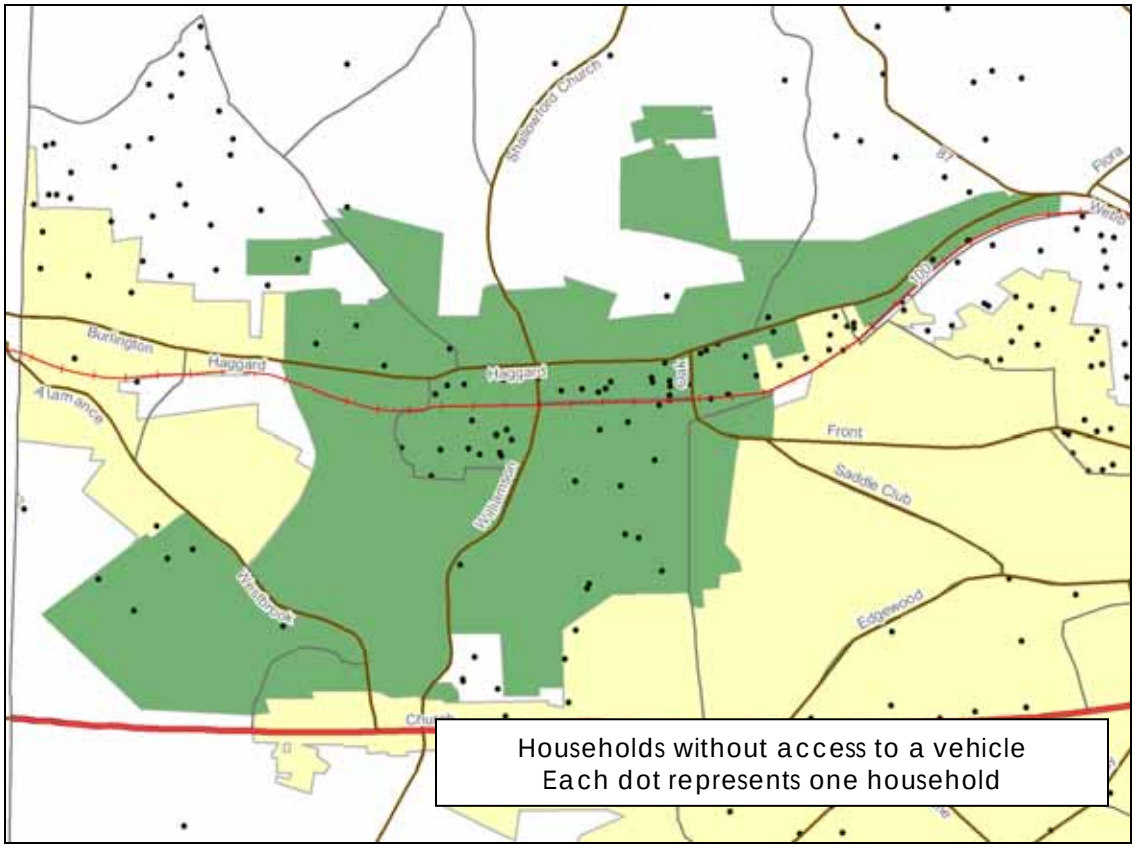
Figure 2.5 - Educational Attainment (Census – 2000)		
	Elon	NC
High School Diploma or higher	87.3%	78.1%
At least some college courses	64.6%	49.7%
Bachelor's Degree or higher	40.6%	22.5%
Graduate Level Degree or higher	13.7%	7.2%

Vehicle Ownership, Labor Force and Disability

Vehicle ownership in Elon is below the state average, where 7.5% of households do not have access. Vehicle ownership is influenced by household income and is naturally influenced upwards by more wealth. Shown in Figure 2.6 below, this important statistic shows what percentage of the population is forced to walk or bicycle to destinations. Most households in Elon without a vehicle are headed by a person under the age of 24 or by those ages 75 and older. Another 610 households (or 32.2% of all households) in Elon have access to only one vehicle.

Figure 2.6 - Vehicle Ownership (Census – 2000)

	Elon	NC
Households without access to a vehicle	4.5%	7.5%
Under age 24	9.1%	10.0%
Age 24-64	2.6%	5.4%
Age 65+	5.0%	15.4%

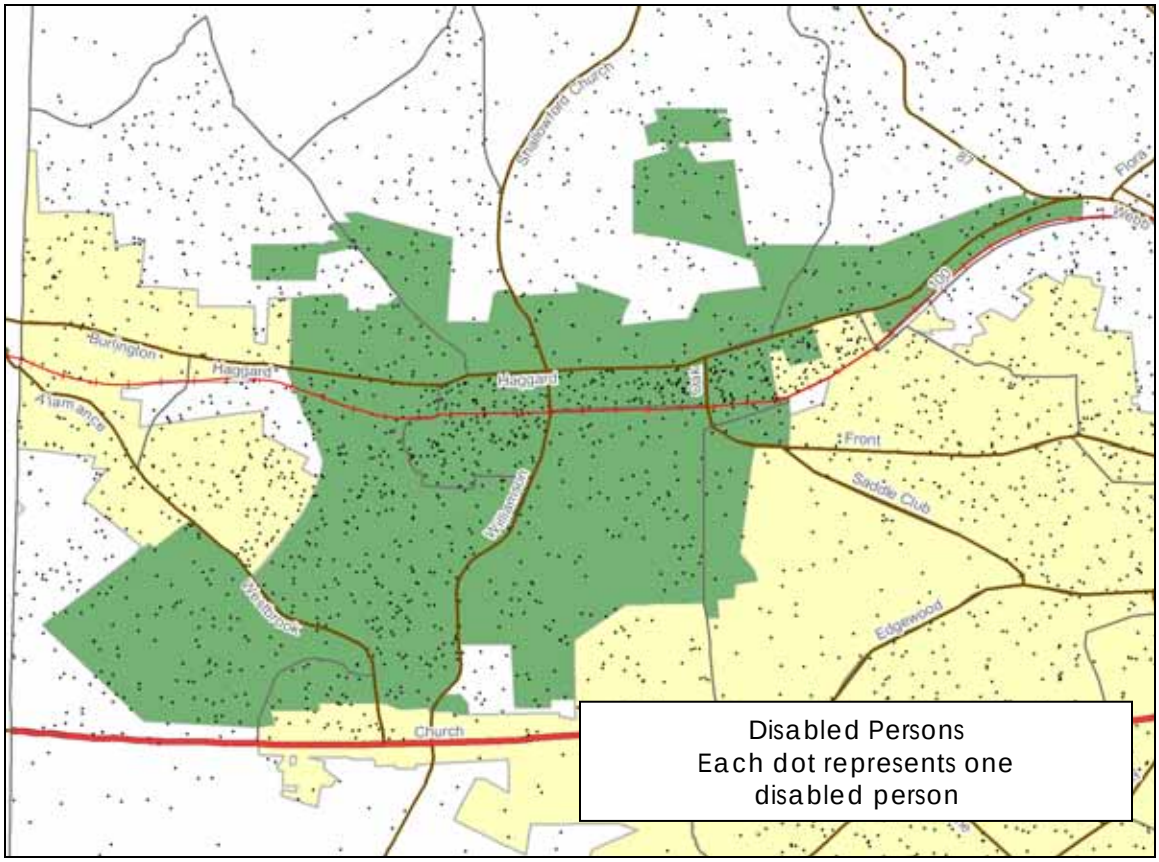


Similar to the poverty rate, the unemployment rate in Elon outpaces the state average by four-fold in Figure 2.6. This is likely due to the high student population reporting unemployment on the Census form.

Figure 2.7 - Labor Force Statistics (Census – 2000)		
	Elon	NC
Labor Force	3,394	
% of adults in the labor force	58.4%	65.7%
Unemployment Rate	20.8%	5.2%

One of every five individuals in Elon has a disability. Well-designed sidewalks and trails make it easier for people with disabilities to be mobile.

Figure 2.8 – Persons with Disabilities (Census – 2000)		
	Elon	NC
Disabled Persons	1,264	
% of Disabled Persons	19.6%	21.1%



Travel Time and Commuting Patterns

Nearly one in ten residents of Elon either bicycle or walk to work or school. This rate is nearly 5 times the North Carolina average as shown in Figure 2.9. Many residents live within walking distance of Elon University. Also contained in Figure 2.9 are where residents are working; one in five are commuting outside of the County and only 16% work in the Town of Elon.

Figure 2.9 - Journey to Work Statistics (Census – 2000)

Means of transportation to work (all workers 16+)	Elon	NC
Drive alone	77.5%	79.4%
Carpool	9.1%	14.0%
Bicycle or Walk	10.3%	2.1%
Public Transportation / Other	1.5%	2.6%
Worked at home	1.7%	2.7%
% of residents working in Elon	16.0%	n/a
% of residents working elsewhere in Alamance Co.	63.4%	n/a
% of residents working outside of Alamance Co.	20.6%	n/a

Source: 2000 Census of Population & Housing.

The travel time to work shown in Figure 2.10 correlates to the journey to work statistics. When compared to the North Carolina average, Elon residents are spending 25% less time commuting. Over 70% of residents are spending 20 minutes or less commuting to work compared to less than 50% for North Carolina as a whole.

Figure 2.10 - Travel Time to Work (Census – 2000)

	Elon	NC
Less than 10 minutes	30.4%	13.5%
10-19 minutes	43.3%	34.1%
20-29 minutes	13.9%	21.9%
30 minutes or more	12.4%	30.5%
Average (in minutes)	16.1	24.0

The figures below show detailed commuting figures into and out of Elon. Figure 2.11 shows where Elon residents work and Figure 2.12 shows where persons working in Elon live. This census data is a relatively new feature based off of survey reporting.

Report Title: Commute Shed Report - Where Residents in the Selection Area are Employed

Figure 2.11 - Where Elon Residents Work

Resident-Held Jobs by Category	2004		2003		2002	
	Count	Share	Count	Share	Count	Share
* All Jobs	1,649	100.0%	1,468	100.0%	1,633	100.0%
* All Jobs (Private Sector Only)	1,430	86.7%	1,281	87.3%	1,440	88.2%
* All Primary Jobs (Worker's highest paying job)	1,533	93.0%	1,383	94.2%	1,521	93.1%
* All Primary Jobs (Private Sector Only)	1,327	80.5%	1,205	82.1%	1,340	82.1%
Baseline Count of Jobs	**2004**		**2003**		**2002**	
	Count	**Share**	**Count**	**Share**	**Count**	**Share**
All Jobs	1,649	100.0%	1,468	100.0%	1,633	100.0%

Job counts in Cities/Towns Where Residents are Employed	2004		2003		2002	
	Count	Share	Count	Share	Count	Share
* Burlington, North Carolina	488	29.6%	458	31.2%	565	34.6%
* Greensboro, North Carolina	191	11.6%	152	10.4%	165	10.1%
* Durham, North Carolina	81	4.9%	52	3.5%	34	2.1%
* Graham, North Carolina	62	3.8%	65	4.4%	69	4.2%
* Charlotte, North Carolina	51	3.1%	48	3.3%	36	2.2%
* Raleigh, North Carolina	44	2.7%	41	2.8%	44	2.7%
* Elon, North Carolina	43	2.6%	27	1.8%	41	2.5%
* Mebane, North Carolina	38	2.3%	24	1.6%	15	0.9%
* Chapel Hill, North Carolina	31	1.9%	15	1.0%	13	0.8%
* High Point, North Carolina	24	1.5%	24	1.6%	16	1.0%
* All Other Locations	596	36.1%	562	38.3%	635	38.9%

Job counts in Counties Where Residents are Employed	2004		2003		2002	
	Count	Share	Count	Share	Count	Share
* Alamance, North Carolina	916	55.5%	856	58.3%	1,014	62.1%
* Guilford, North Carolina	284	17.2%	243	16.6%	238	14.6%
* Durham, North Carolina	82	5.0%	57	3.9%	38	2.3%
* Wake, North Carolina	65	3.9%	61	4.2%	69	4.2%
* Mecklenburg, North Carolina	54	3.3%	50	3.4%	41	2.5%
* Orange, North Carolina	53	3.2%	38	2.6%	49	3.0%
* Forsyth, North Carolina	24	1.5%	15	1.0%	22	1.3%
* Rockingham, North Carolina	16	1.0%	11	0.7%	9	0.6%
* Pitt, North Carolina	13	0.8%	5	0.3%	7	0.4%
* New Hanover, North Carolina	13	0.8%	9	0.6%	17	1.0%
* All Other Locations	129	7.8%	123	8.4%	129	7.9%

Report Title: Labor Shed Report - Where Workers Live that are Employed in the Selection Area

Figure 2.12 - Where Persons Working in Elon Live

Area Employment by Category	2004		2003		2002	
	Count	Share	Count	Share	Count	Share
Total Employers:	72		71		64	
* All Jobs	1,131	100.0%	1,229	100.0%	1,054	100.0%
* All Jobs (Private Sector Only)	1,016	89.8%	1,114	90.6%	937	88.9%
* All Primary Jobs (Worker's highest paying job)	1,064	94.1%	1,156	94.1%	981	93.1%
* All Primary Jobs (Private Sector Only)	952	84.2%	1,047	85.2%	870	82.5%
Baseline Count of Jobs	**2004**		**2003**		**2002**	
	Count	Share	Count	Share	Count	Share
All Jobs	1,131	100.0%	1,229	100.0%	1,054	100.0%
Job counts in Cities/Towns Where Workers Live	**2004**		**2003**		**2002**	
	Count	Share	Count	Share	Count	Share
* Burlington, North Carolina	270	23.9%	292	23.8%	237	22.5%
* Greensboro, North Carolina	54	4.8%	56	4.6%	54	5.1%
* Gibsonville, North Carolina	51	4.5%	45	3.7%	40	3.8%
* Graham, North Carolina	46	4.1%	54	4.4%	55	5.2%
* Elon, North Carolina	43	3.8%	27	2.2%	41	3.9%
* Mebane, North Carolina	17	1.5%	21	1.7%	14	1.3%
* Charlotte, North Carolina	16	1.4%	14	1.1%	12	1.1%
* Glen Raven, North Carolina	15	1.3%	23	1.9%	14	1.3%
* Durham, North Carolina	13	1.1%	13	1.1%	10	0.9%
* Raleigh, North Carolina	12	1.1%	9	0.7%	11	1.0%
* All Other Locations	594	52.5%	675	54.9%	566	53.7%
Job counts in Counties Where Workers Live	**2004**		**2003**		**2002**	
	Count	Share	Count	Share	Count	Share
* Alamance, North Carolina	646	57.1%	718	58.4%	593	56.3%
* Guilford, North Carolina	144	12.7%	146	11.9%	169	16.0%
* Caswell, North Carolina	42	3.7%	47	3.8%	30	2.8%
* Catawba, North Carolina	23	2.0%	21	1.7%	17	1.6%
* Orange, North Carolina	22	1.9%	21	1.7%	24	2.3%
* Wake, North Carolina	20	1.8%	17	1.4%	22	2.1%
* Mecklenburg, North Carolina	19	1.7%	18	1.5%	15	1.4%
* Durham, North Carolina	17	1.5%	14	1.1%	11	1.0%
* Rockingham, North Carolina	15	1.3%	19	1.5%	16	1.5%
* Randolph, North Carolina	11	1.0%	12	1.0%	6	0.6%
* All Other Locations	172	15.2%	196	15.9%	151	14.3%
Job counts in States Where Workers Live	**2004**		**2003**		**2002**	
	Count	Share	Count	Share	Count	Share
* North Carolina	1,060	93.7%	1,142	92.9%	992	94.1%
* California	22	1.9%	15	1.2%	4	0.4%
* Virginia	7	0.6%	10	0.8%	6	0.6%
* All Other Locations	42	3.7%	62	5.0%	52	4.9%

University Enrollment and Trends

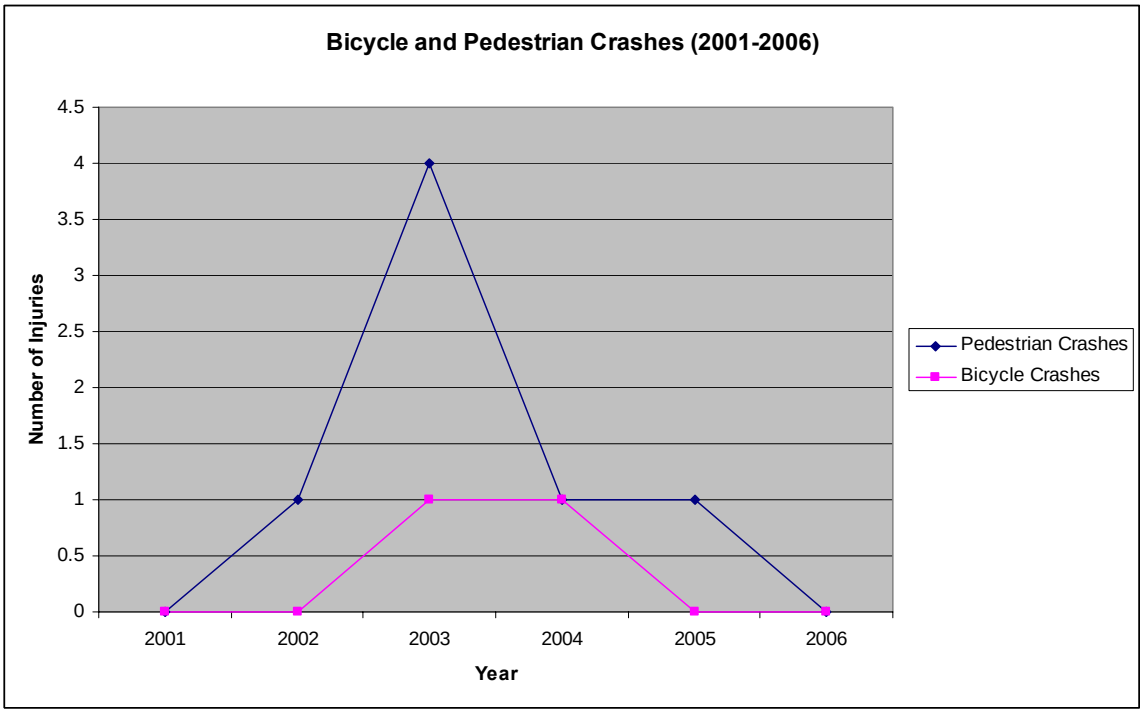
The University of Elon keeps track of enrollment and student housing data for its students. For the year 2007-2008 the Undergraduate enrollment was 4,939, the Graduate enrollment was 298 for the same time period. There are approximately 2% of undergraduates and nearly 40% of graduates attending part time. The projected undergraduate enrollment growth is approximately 300-400 students over the next 5 years for a total enrollment between 5,200 and 5,400 students by 2013. Graduate enrollment is projected to grow 50-100 students over the same period, for a projected enrollment of over 500 students by 2013.

Over half (58%) of Elon University students live on-campus and 42% live in off-campus housing. Much of the off-campus housing is within walking distance of the University and is also served by the Elon University transit system.

2.3 Crash Data

The bicycle and pedestrian crash data for the Town of Elon indicates the year and locationof each crash. The data was supplied by the Town of Elon police department.

Figure 2.13 - Elon Bicycle and Pedestrian Crashes (2001-2006)



There were a total of 9 bicycle and pedestrian crashes from 2001-2006. The majority of these crashes occurred where Williamson Avenue and Oak Street cross the North Carolina Railroad between Trollinger and Lebanon Avenue. The location of the 2001-2006 crash data is included in Map 2.1 and 2.2.

2.4 Community Issues

A task force was established to identify community issues and guide the planning process. The task force began meeting in September of 2007. The full meeting notes of the task force and other related meetings are available in the Appendix.

Public Meetings

The first public meeting for the plan was held on February 13, 2008. A summary of the bicycle, pedestrian and lighting plan process was shared with 30 members of the public. Participants engaged in a mapping exercise indicating areas of concerns with regards to bicycle, pedestrian and lighting. Additional feedback was given on specific policies and programs to promote bicycling and walking.

The second public meeting was held June 12, 2008. Draft results and recommendations were reported during an open house session to 13 citizens. Response to the plan was positive, with concern about resources to pay for the cost of sidewalk and pathway construction. The feedback from this meeting has been incorporated in to the recommendations in Chapter 3.

Elon Elementary School Pedestrian and Bicycle Safety

A bicycle and pedestrian safety assembly for nearly 600 kids grades K-5 was held at Elon Elementary on June 3, 2008. Crossing safety and bicycle helmet use was discussed with the kids, with an opportunity for questions and comments. There were fewer than 5 kids that walked to school and no kids that bicycled to school. The school administration is interested in conducting a Safe Routes to School Workshop to look at ways of encouraging more children to walk and bicycle.

Bicycling Focus Group Meeting

A meeting of local cyclists was held on June 11, 2008 to discuss specific issues relating to bicycling in Elon. There were a number of suggestions made to improve bicycle transportation, including: new pathway connections linking neighborhoods, improved signage, maintenance of the current NCDOT Bike Route 70, bicycle parking improvement and private funding support of shared use path facilities.

Survey Summary

There were 276 respondents to the Elon Bicycle, Pedestrian and Lighting survey. The survey opened in January 2008 and closed March 17, 2008. Respondents were asked 21 questions about bicycle, pedestrian, lighting and funding issues. The survey was made available on the internet and in paper format. The survey was advertised through public meetings, newspaper, the Town website and mailing lists. Here is a brief summary of the survey results.

Walking

- 93% of respondents thought that the goal of creating a walking friendly community was either important or very important. Over half of respondents walked more than 5 times a week.

- 42% reported lack of sidewalks and trails as the biggest factor discouraging them from walking;
- New sidewalks were reported by 45% to be the number 1 action to increase walking; and
- 37% reported school or University and 19% reported trails and greenways as destinations they would most like to get to.

Lighting

- 92% thought that adequate lighting of streets and sidewalks was very important or important;
- Energy efficient lighting was reported by 85% to be very important or important.
- 39% thought that aesthetically pleasing lighting was important or very important even if there are higher costs.

Bicycling

- 76% thought that the goal of creating a bicycling friendly community was either important or very important.
- 30% bicycle a few times per week or more.
- 35% reported to like bicycling on main thoroughfares and 27% reported to like bicycling on greenways or trails (versus neighborhood or collector streets).
- 45% report lack of roadways with bicycle lanes and 12% report traffic as the biggest factors discouraging bicycling; while 60% report that bicycle lanes are most needed to encouraging bicycling.

Funding

- Grants (41%), Public/private partnerships (21%) and impact fees on new development (19%) were the top three choices for funding improvements to pedestrian, bicycle and lighting infrastructure.

A detailed report of the survey and survey tool can be found in the Appendix of this report.

2.5 Inventory and Assessment of Existing Facilities

A detailed inventory of existing sidewalks, trails, roadway widths and streetlights was completed in Elon during this planning process to estimate resources needed for future facility development. This section summarizes the number of streetlights, linear feet of sidewalk, length of trails and existing parking in the Town of Elon.

There is a significant level of sidewalk and decorative street lighting in the downtown area and on the University campus, but gaps resulting in access and safety concerns were identified. Maps 2.1, 2.2 and 2.3 provides information on existing sidewalks, bicycle paths, transit and streetlights.

Sidewalks

There is a total of 131,725 feet or 25 miles of sidewalk in the Town of Elon. The Twin Lakes community has about 11 miles of sidewalk; Elon University has just over 10 miles of sidewalk; other sidewalk in Elon is equal to 11 miles. These figures do not include the shared use pathway along University Drive, which is approximately ¾ of a mile long, which is a bicycling and walking facility.

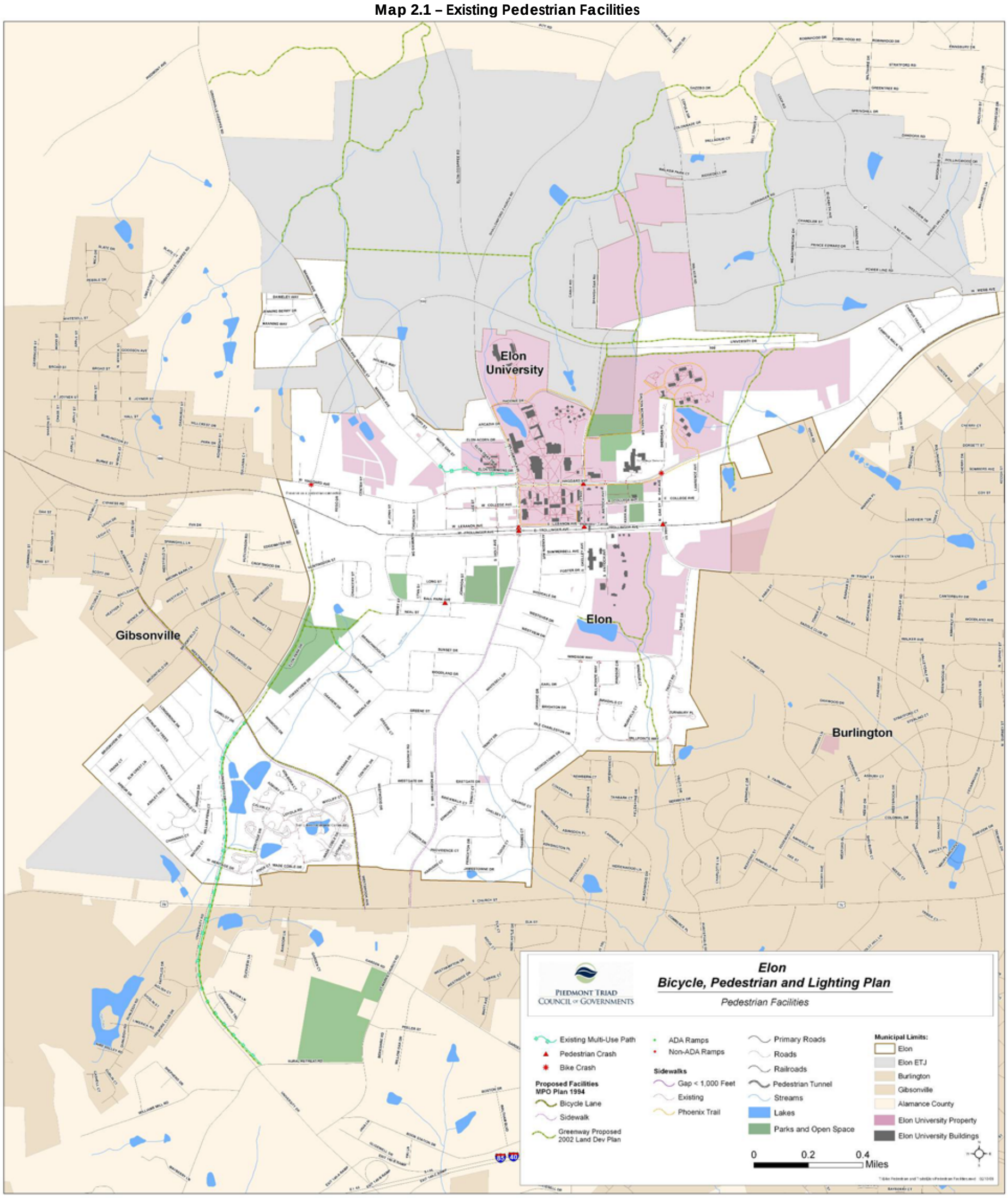
Figure 2.14 – Elon Sidewalk Lengths

Sidewalk	Distance (Mi)	Distance (ft)
Twin Lakes	3.7	19,655
Elon University	10.3	54,184
Balance of Community	11.0	57,887
Total	**25.0**	**131,725**

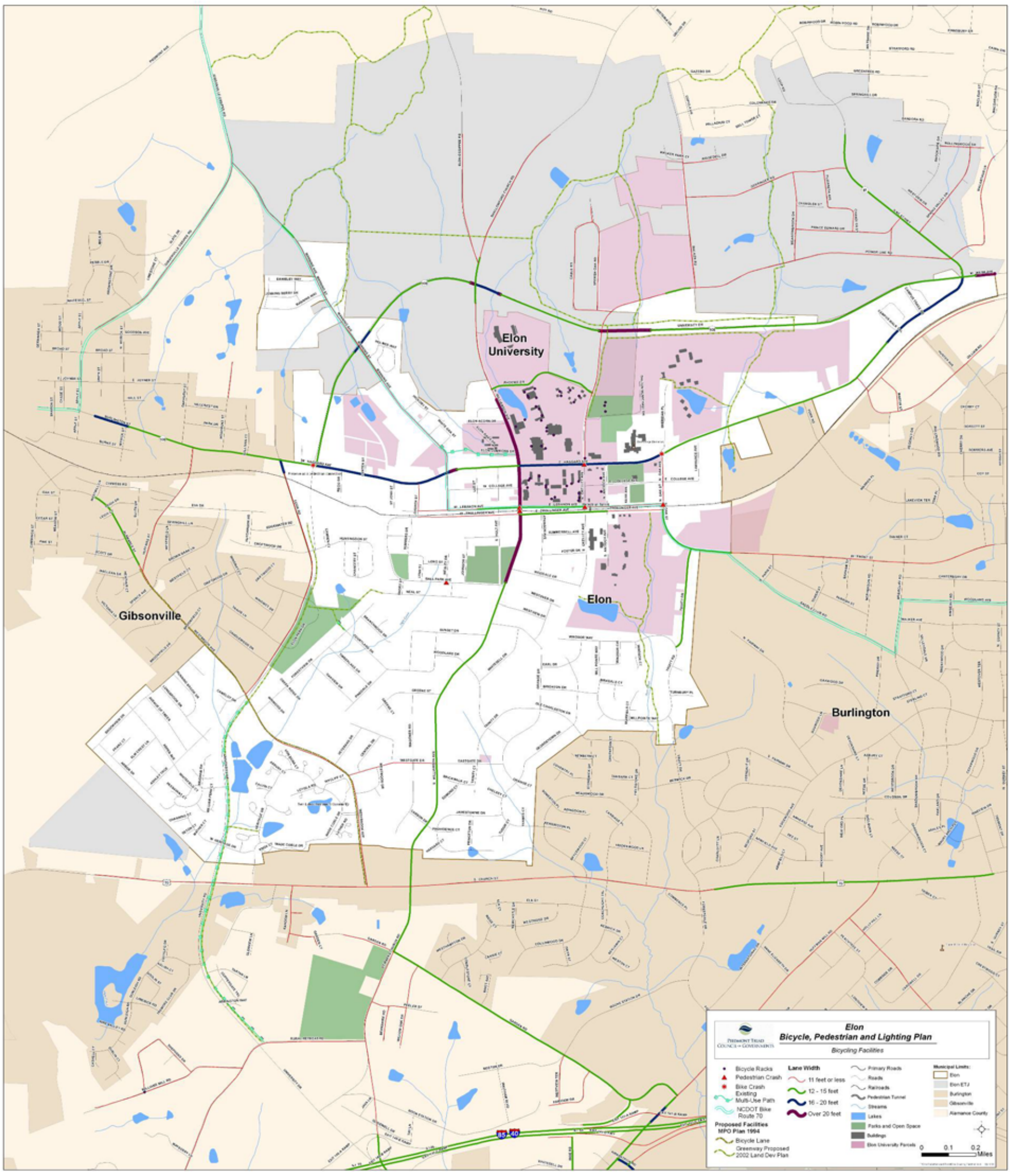
Bicycle Facilities

The Town of Elon has a shared-use pathway along University Drive that is approximately ¾ of a mile long. The 10 foot paved trail was installed with the recent widening project on University Drive. In addition, there is a signed bicycle route through town, NCDOT Bike Route 70 on Manning, Lebanon and Oak Street. There are a number of roadways in the Town of Elon that may be suitable for installing on-road facilities such as bicycle lanes, wide curb lanes and shoulders, however none of these routes are currently striped for bicycle facilities. The University has a series of bicycle racks on campus to promote bicycling to campus. Map 2.2 below shows the road width where data is available. Roadways with more than 12 foot lane widths may be suitable for improvements to benefit bicycle transportation.

Map 2.1 – Existing Pedestrian Facilities



Map 2.2 – Existing Bicycle Facilities

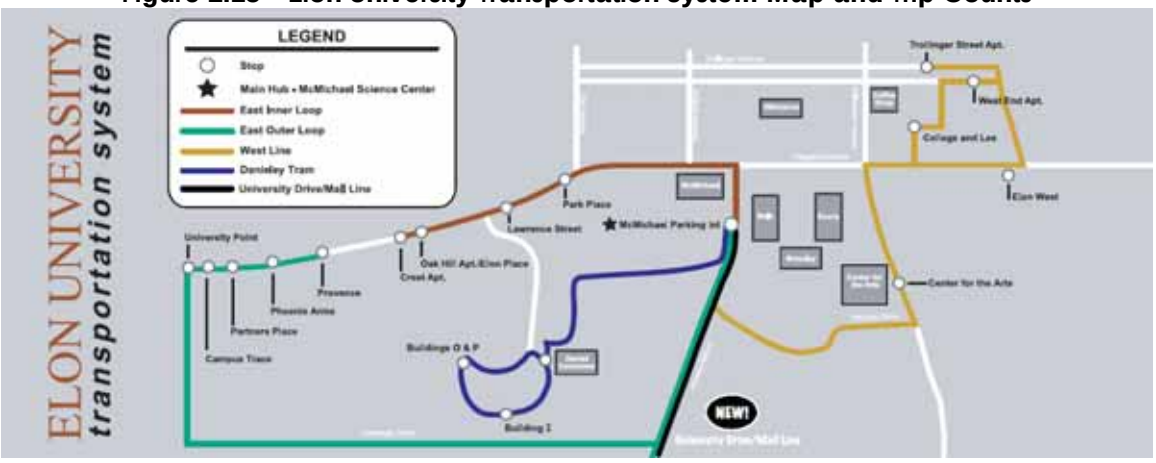


Transit Facilities

The Elon University Transportation System runs five different routes between residential areas, the University and local shopping areas. The map in figure 2.15 indicates the location of the transit lines and where the scheduled stops are located. There are a total of 18 different scheduled transit stops between the five routes.

Elon University in conjunction with the Piedmont Authority for Regional Transportation (PART) acquired 6 bio-diesel powered buses to serve the transportation needs of Elon University students and town residents. Service on the new buses began in January 2007, replacing the older buses serving the University. Elon University is covering the operating costs of the service through students fees and general fund support. There were 132,878 trips on the Elon University transit in 2005-2006 (Sept.-May) on 3 routes, which increased to 175,090 trips on 4 routes in 2006-2007 for the same time period. An additional route was added in 2007-08 to the University Drive shops and Mall, but the number of trips on all transit dropped to a total of 93,883 for the same time period. The drop in transit use can be attributed primarily to fewer riders on the Danieley Tram route. The new Koury Business center and the Collanades dorm and dining hall brought student destinations within walking distance, replacing transit trips with walk trips.

Figure 2.15 – Elon University Transportation System Map and Trip Counts



Transit Route	Person Trips 2005-2006	Person Trips 2006-2007	Person Trips 2007-2008
East Shuttle (now Inner and Outer Loop)	4,155	n/a	n/a
Danieley Tram 7a-7p	97,328	103,044	63,062
Danieley Tram 7p-3a	26,988	27,588	11,908
West End (now West Line)	4,407	4,293	5,207
Inner Loop (previously East Shuttle)	n/a	11,820	4,318
Outer Loop (previously East Shuttle)	n/a	17,735	7,881
University Drive/Mall Line	n/a	n/a	1,507
Total Person Trips	**132,878**	**164,480**	**93,883**

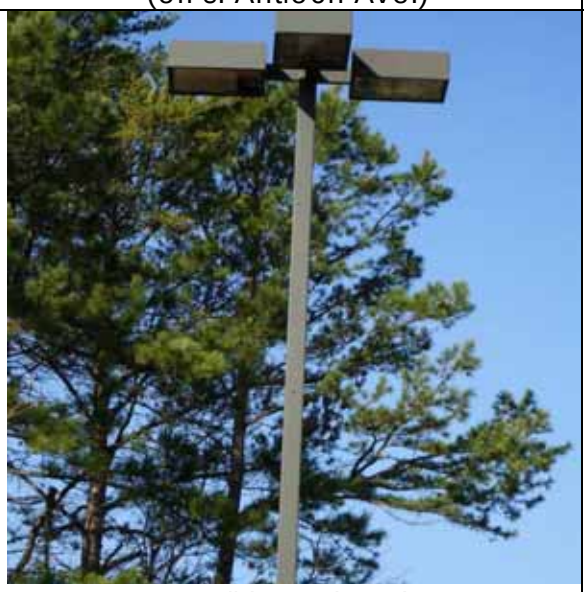
Streetlights

A detailed inventory of streetlights in Elon is maintained by Duke Power. With the assistance of the City of Burlington GIS department, this information was incorporated into a GIS mapping database. In addition to location, the inventory includes information about lumens, fixture style, pole style, height and color. An inventory of the University campus lighting was completed and combined with the existing streetlight data for the Town of Elon. A detailed inventory can be found in the Appendix. The different styles of lighting on the University and in the Town of Elon are illustrated here. Eight different unique styles have been found in the Town of Elon.

Athletic Fields Array
(off Phoenix Drive)

Golf / Driving Range Array
(off S. Antioch Ave.)

Small box 2-head
(parking lot off Lebanon Ave)



Small box 3 head
(parking lot off Phoenix Drive near athletic fields)

Deluxe Traditional
(near Whitney Bldg on Lebanon Ave.)

Cylindrical - Decorative
(off Phoenix Drive)

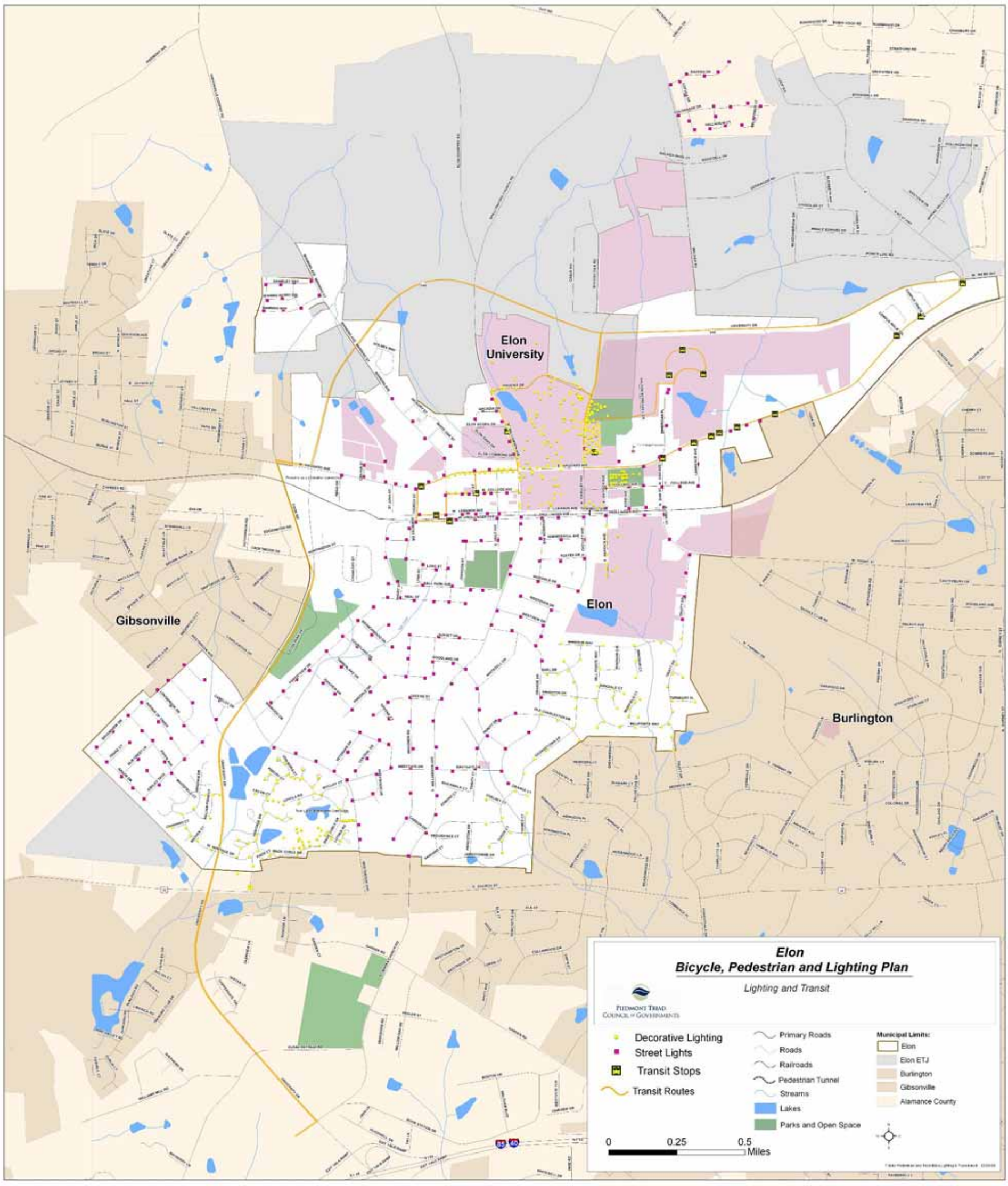
Acorn
(Millpoint Neighborhood)

Deluxe Acorn - Decorative
(Haggard and Williamson Ave.)

Traditional (Haggard Ave.)	NEMA Standard of Cobra (Lebanon Ave.)

There are a total of 637 streetlights in the Town of Elon. On the Elon University campus, there are 189 different lighting fixtures or arrays. Decorative lighting is centered around Elon University and some newer neighborhoods. There are 228 decorative light fixtures. Over half (322) of streetlights in Elon are Cobra or NEMA Standard issue fixtures by Duke Energy. The other streetlights are the parking lot box lights or athletic field lights, which total 87 units.

Map 2.3 – Existing Lighting and Transit Facilities



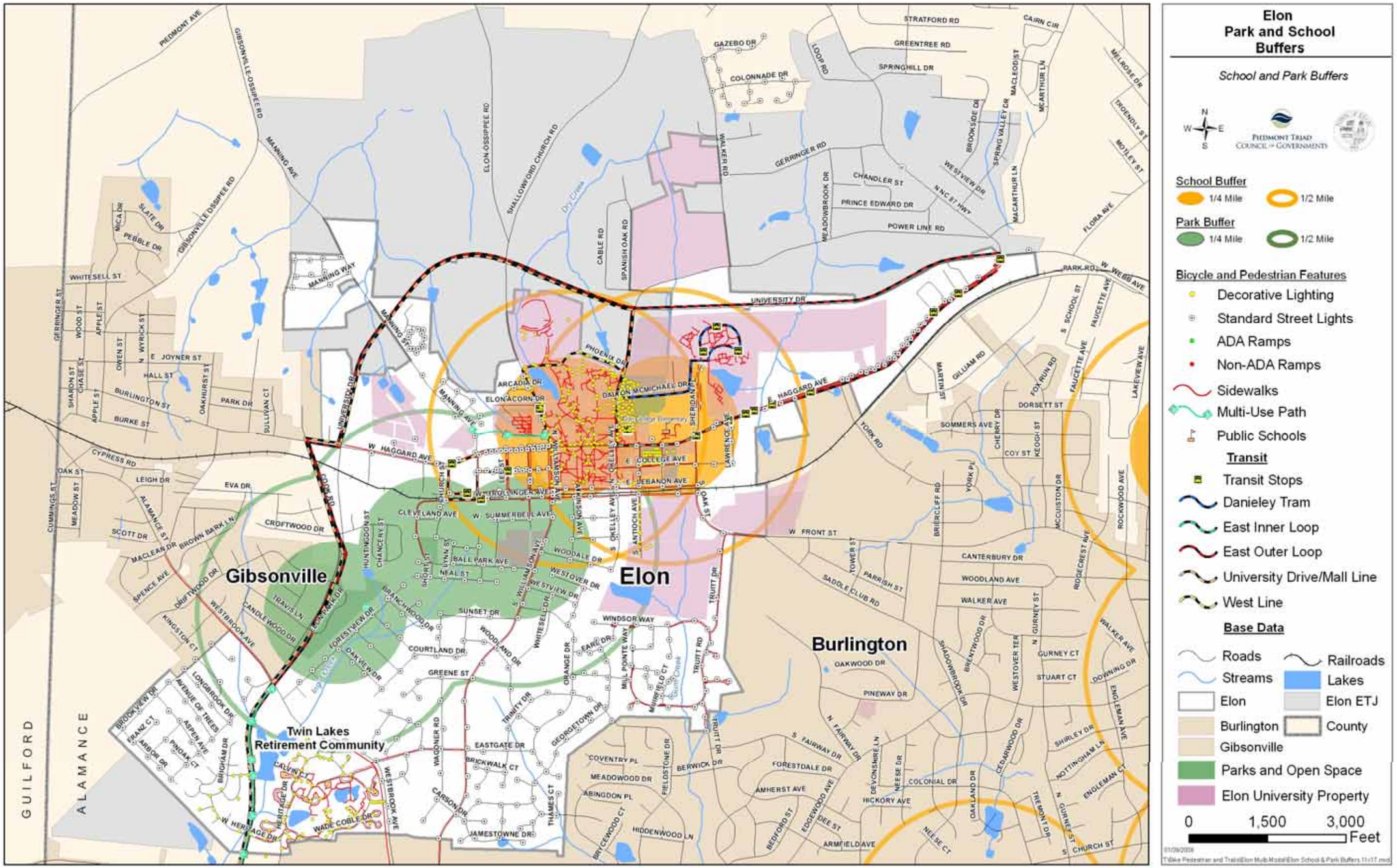
Origins and Destinations

Elon's neighborhoods, parks, schools, University and downtown area are recognized as community trip generators or places where people will walk or bicycle, serving as the beginning or end point of many trips. Nationwide, the automobile is used for 75 percent of trips one mile or less. Approximately forty percent of trips to visit friends and relatives and for other social and recreational purposes (e.g., to go to the gym, attend a movie, visit a park, or visit a library) totaling a mile or less are accomplished by walking. It is important to provide opportunities to safely walk to parks, schools, restaurants and shops. One of the primary purposes of this plan is to increase the number of walking and bicycling trips.

Map 2.4 - Parks and School Buffers illustrate the location parks, schools and the University in the Town of Elon in relation to neighborhoods. The location of what are called origin and destination points are important to understanding where pedestrians and bicyclists are likely to travel. Schools and parks are the common destination of many vehicular trips that can be replaced by foot travel. Map 2.4 shows school buffers in a light shade of brown for ¼ mile radius and a brown line for a ½ mile radius from the center of the school. The park buffers are shown in a light shade of green for ¼ mile radius and green line for a ½ mile radius from the center of the park.

The buffers drawn around each of the parks and schools indicate a 5 minute walk (1/4 mile) or 10 minute walk (1/2 mile) radius. Ten minutes is typically the longest distance most individuals feel comfortable walking for transportation when there is a safe and secure pedestrian environment. Obstacles to walking and bicycling include unsafe intersections, dead-end streets without pathway or sidewalk connections, areas of heavy vehicular traffic, sidewalks without adequate buffers or roadways without walking of bicycling facilities.

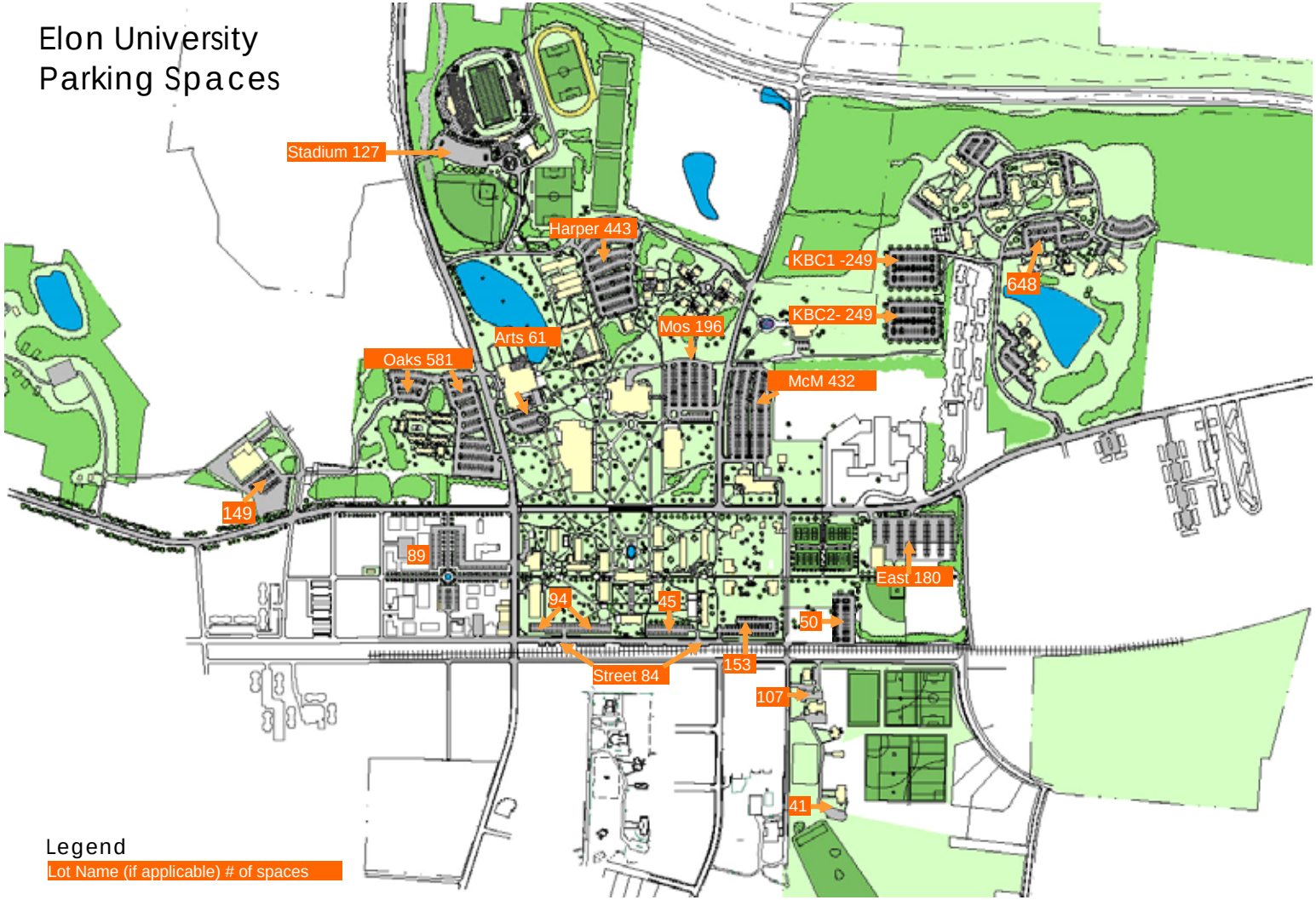
Map 2.4 – Park and School Walk Zones



Parking Capacity

The University of Elon has a number of parking lots for staff, students and visitors. There are 18 University parking lots with a total of 3,544 spaces. On-street parking in the downtown area from Williamson Avenue east along Trollinger Avenue provides an estimated 100 spaces.

Figure 2.16 – Elon University Parking Capacity



2.6 Relevant Statutes and Local Ordinances

The Town of Elon adopted a unified Land Development Ordinance to regulate development and construction in 2004. The policies relating directly to bicycling, walking and lighting from Section 5.6 and 5.7 Street and Greenway Design Regulations of the LDO are included below.

Sidewalk Design Guidelines: Residential sidewalks will be a minimum of 5 feet in width. Sidewalks serving mixed use and commercial areas will be a minimum of 8 feet in width. In front of retail storefronts within designated activity centers sidewalks will be a minimum of 12 feet in width. (LDO Section 5.7.4.1)

Pedestrian Crosswalks: Where deemed necessary by the Technical Review Committee, a pedestrian crosswalk at least 10 feet in width may be required to provide convenient public access to a public areas such as a park, greenway, or school. Crosswalks must be ADA compliant. (LDO Section 5.7.4.9)

Sidewalk Connectivity: Infill or new development requires the dedication of right of way and sidewalk construction to connect with existing sidewalk. (LDO Section 5.7.4)

Bicycle Lanes and Paths: All new developments within the existing town limits will include bike lanes, a minimum of four feet in width, on new streets. New developments outside the town limits (in ETJ) will include bike paths a minimum of eight feet in width and separated from vehicular traffic. Bike lanes and bike paths will be designed according to the *North Carolina Bicycle Facilities Planning and Design Guidelines*. (LDO Section 5.7.4.2)

Bicycle Parking: The Town of Elon has works with new businesses in Elon to require bicycle racks in or adjacent to parking lots for non-residential and multi-family development (LDO Section 5.6.2.3).

Greenway Trail Design Guidelines: Shared-use trails should accommodate a variety of users including walkers, joggers, cyclists, and in-line skaters. The trails are required to be paved at a minimum width of 10 feet. When the trail is in a flood zone, a minimum 20 foot vegetative buffer between nearby streams and trail should be left intact. (LDO Section 5.7.8)

Street Lights: Streetlights will be installed by the developer on all streets at an average separation of 160 to 200 feet. The Town will accept responsibility of the lights at the time streets are accepted for maintenance. (LDO Section 5.7.4.8)

Street Trees: Planting strips are required for sidewalk development. Specifications include a maximum of 40 feet between large maturing trees. Large canopy trees are required to have an 8 foot planting strip. (LDO Section 5.7.6)

Design and construction specifications will be based on NCDOT standards for streets, sidewalks, bike lanes, greenways and signage. The *Traditional Neighborhood Development Guidelines Manual* and *Subdivision Roads Minimum Construction Standards Manual* published by NCDOT are used as a regulatory reference. Design guidelines and cross-sections for different pedestrian and bicycle facilities can be found in the Appendix.

2.7 Relevant Local, Regional and State Plans and Guidelines

The Town of Elon embarked on an innovative planning effort by combining bicycle, pedestrian and lighting into a comprehensive master plan. Some bicycle and pedestrian policy, infrastructure and facilities have been incorporated into a number of recent planning efforts within Elon, in addition to various regional and statewide planning initiatives.

Elon Land Development Plan (2002)

In 2002, the Town of Elon completed a Land Development Plan (LDP) assessing existing conditions and trends for land development until 2010. The plan was followed by a new land development ordinance based upon the recommendations of the LDP. In regards to increasing bicycle and pedestrian-friendliness, the LDP proposed the following policies:

Growth Management Policies

1.2 Preserve, invest in, and expand our downtown to create a vibrant community-wide activity center that is pedestrian-friendly and includes a variety of services, shops, restaurants, offices, and public spaces.

1.3 Identify appropriate locations for the development of new activity centers, to create attractive, pedestrian-friendly centers for community life, containing a variety of shops, civic, office, and residential uses within convenient walking distance of existing and future neighborhoods.

1.6 Encourage the development of office land uses in convenient locations above shops and in pedestrian-friendly activity centers, to reduce traffic and build a greater sense of community.

1.8 Encourage new residential development to be pedestrian friendly and well connected to the rest of the community, providing a range of opportunities for adequate, affordable, quality housing for all residents and a wider variety of housing types.

1.10 Encourage the development of new neighborhoods that add to the livability and small town character of Elon by providing a walkable, mixed-use, pedestrian-friendly environment.

1.11 Make sure that open space, parks & squares are part of every new neighborhood, and that these amenities are well connected by greenways, sidewalks, and bike lanes, and added to existing neighborhoods where appropriate and feasible.

Planning Coordination Policies

2.2 Encourage University development that keeps Town entrances aesthetically pleasing, includes pedestrian connections throughout Town (walking paths, sidewalks, bike paths, and greenways), and that creates a strong sense of community and adds to the Town's quality of life.

Quality of Life / Environmental Stewardship Policies

3.1 Maintain and improve our air quality by encouraging clean industry, discouraging noxious uses such as hog farms, and by following smart growth principles that encourage pedestrian-friendly, mixed-use land use patterns, more sidewalks, bike lanes & greenways, interconnected street patterns, and open space (cluster) development (like Twin Lakes) in rural conservation areas.

3.4 Continue to add community amenities (public buildings and squares, parks and green spaces, sidewalks, greenways, nature trails, bike lanes, etc.) as we continue to grow.

3.5 Provide abundant open space & recreational opportunities throughout the community.

3.7 Maintain the "village" concept as new land development occurs.

Public Services & Infrastructure Policies

4.2 Encourage the appropriate location of schools and other civic uses, to complement other growth management and community-building goals.

4.3 Make sure our parks, recreation & open space system keeps pace with growth, adding a variety of active and passive new parks & programs as needed.

4.4 Make sure our parks, recreation & open space system becomes in integral part of our community as each new neighborhood is developed, and that each component is well connected through a network of sidewalks, bike lanes, walking trails, and greenways.

4.8 Make sure our transportation system includes a variety of alternative transportation options including sidewalks, bike lanes, walking trails, greenways, transit (local & regional), para-transit, as well as roads & the by-pass, and that it supports alternative land use patterns such as Traditional Neighborhood Developments (TNDs) and Transit Oriented Developments (TODs).

Burlington-Graham MPO Transportation Plan (2004)

The Town of Elon is a member of the Burlington-Graham Urban Area, designated as a Metropolitan Planning Organization (MPO) for transportation planning purposes. The Burlington-Graham MPO completed and adopted a Long Range Transportation Plan in 2004, with a twenty-five year planning horizon (2005-2030). The plan analyzes household and employment figures to identify existing and projected future deficiencies in the region's thoroughfare system, and to establish proposed road building and alternative transportation improvement projects to address these deficiencies over the next twenty-five years.

The Burlington-Graham MPO developed an update to the Long Range Transportation Plan (LRTP) in 2008, which builds from findings in the 2004 plan. The planning horizon in this update extends until 2035.

Existing and Projected Road Deficiencies: Within Elon's portion of the Burlington-Graham MPO Urban Area, there are no road segments identified as being presently at or over capacity. In addition, there are no road segments identified as likely to be over capacity by the year 2025. The busiest road segments within the Elon area include Williamson Avenue between Green Street and Eastgate Drive with 14,000 average daily trips (ADT) and Williamson between College and Trollinger Avenue, with 12,000 ADT; Haggard Avenue from O'Kelley to Oak Street with 8,300 ADT; Oak Street between Truitt Drive and Lebanon Avenue with 7,000 ADT and University Drive between Manning and Williamson Avenue with 4,900 ADT.

2009-2015 TIP Review: A review of the Transportation Improvement Plan (TIP) for the Town of Elon indicates that there is one project to be completed in the next five years (2008-2013). The project (TIP # U-3110) includes improvements along Cook Road from Westbrook Avenue to NC 100 (Haggard Avenue). The planned improvements include a bridge over the NCRR and another bridge over NC 100 and a re-alignment to better link with University Drive.

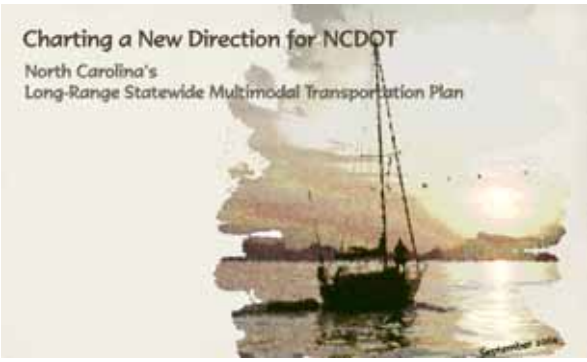
Burlington-Graham Urban Area Bicycle and Pedestrian Facility Inventory and Plan (1994)

This plan, which is referenced in the 2004 LRTP MPO Plan, outlines the following three projects affecting Elon, with a description of the facility type, proposed improvement, and estimated cost:

- Western Alamance Parkway Bike Path and Sidewalk – A municipal bike path and sidewalk located along the Western Alamance Parkway in Elon to the Medical Center in Burlington at an estimated cost of $265,000 (1994$).
- Williamson Avenue Sidewalk – A pedestrian sidewalk installed along Williamson Avenue in Elon to Church Street in Burlington at an estimated cost of $440,000 (1994$).

- Westbrook Avenue Bike Lane and Sidewalk – An on-street bike lane and off-street sidewalk as part of a road widening project along Westbrook Avenue from McLean Drive in Gibsonville to US70 in Burlington, at an estimated cost of $700,000 (1994$).

NCDOT Long Range Statewide Multi-Modal Transportation Plan (2004)



Completed in 2004, this plan calls for an increase in bicycle and pedestrian funding from an annual average of $6 million/year to $12 million/year over the next 25 years. The plan also emphasizes the need for mainstreaming bicycle and pedestrian planning and design so that these facilities are included earlier in the process of roadway design. The plan recognizes that the construction of sidewalks places an undue burden on local government for the cost of including sidewalks in road projects.

Bicycling and Walking in North Carolina: A Long-Range Transportation Plan (1996)

This long range plan was completed in 1996 and laid the groundwork for bicycle and walking initiatives across the state. The plan provides 5 goals and 21 focus areas with the overarching vision to provide "All citizens of North Carolina and visitors to the State [the ability to] walk and bicycle safely and conveniently to their desired destinations with reasonable access to all roadways."

2.8 Other Programs and Initiatives

Pedestrian and Bicycle Safety Education: The Elon College Elementary School works on a number of different fronts to promote bus, pedestrian and bicycle safety to its students. The Physical Education program works on regular bus safety classes, which includes education on how to behave as a pedestrian around the bus and other vehicles. Once every two years bicycle safety is taught to elementary school students using a fleet of bikes provided by the Alamance County School System.

Crossing Guard Enforcement: The Elon College Elementary School has a crossing guard stationed at the school driveway access on Haggard Avenue across from the Elon College tennis courts. The crossing guard is employed with the Town of Elon to ensure safe crossing of Haggard for walkers and to control traffic when necessary.

Walk to New York Program: The Twin Lakes retirement community held a program in 2007 to encourage residents to keep track of walking distance. Residents could walk inside or outside to accumulate miles towards the goal of walking from Elon to New York, which is approximately 800 miles. The program proved successful and many of the residents participated.

Eat Smart, Move More: The Alamance County Health Department works with local Alamance County communities to promote walking, bicycling and other physical activity and nutrition programs through awareness and events. Successful programs have been implemented in neighboring Burlington. Elon is eligible to participate in this County program.

CHAPTER 3: ALTERNATIVE TRANSPORTATION SYSTEM PLAN

3.1 Pedestrian, Bicycle and Lighting System Overview

The Town of Elon has a nearly complete sidewalk network in the University and downtown areas providing a walkable town center around Williamson Avenue between Haggard and Lebanon Avenue. Twin Lakes Retirement Community and the Millpoint Subdivision also have sidewalk networks. There are quite a few small gaps in the pedestrian system that need to be filled. Section 3.2 summarizes pedestrian system recommendations.

The on-street bicycle network in Elon consists of shared travel lanes and no dedicated on street facilities. North Carolina Bike Route 70 crosses the Town of Elon on Manning, Lebanon and Oak Street. Bicycling activity has been observed in Elon, especially while Elon University is in session, and a number of roadways have been proposed for installation of bicycle lanes or wide shoulders. The lane widths of commonly traveled roads in Elon are color coded on the existing Bicycling Facilities map in Chapter 2.

The recently completed University Drive bypass and adjacent shared-use path is a promising result of recent policies adopted by the Town of Elon that call for bicycle and pedestrian accommodation for all new roads. Important to the future walkability and bikeability of this corridor will be the continuation of the shared-use path when phase II of the Cook Road/University Drive improvements begin in 2010. Other gateways into Elon include Haggard Avenue from Gibsonville and Williamson Avenue, Front Street and West Webb Avenue from Burlington.

The lighting system in Elon consists of decorative lighting in the University area, downtown, Twin Lakes and some newer neighborhoods. Standard telephone pole mounted lights exist in older neighborhoods and along heavily traveled corridors such as Williamson and Haggard Avenue (outside the downtown and University area). There are several corridors where lighting coverage needs to be improved. Specific areas recommended for improvement are provided in Section 3.4 below.

This Plan outlines a series of projects, programs and policy recommendations. Section 3.2, 3.3 and 3.4 pertain to *project* recommendations, which will require the largest amount of funding to complete. Projects are grouped by a) corridors, b) intersections and c) shared-use paths. Shared-use path recommendations focus on the creation of new corridor connections to parks, schools and shopping. Corridor projects are prioritized based on factors explained in the Appendix. Intersection projects are not prioritized and should be low cost enough to complete in a relatively short time period of 1-5 years. Section 3.6 provides more detail about the specific project recommendations in small area plans.

Sidewalk and intersection improvements are considered on-road improvements, which offer safe pedestrian transportation options in existing street corridors. Shared-use path and trail improvements are considered off-road improvements and provide important long-term non-motorized connections near streams, sewer lines or other corridors. Bicycle lane facilities are considered on-road improvements. Lighting improvements include areas where gaps need to be filled or lighting quality and aesthetics need to be improved. Project improvements have been identified using the following sources and criteria:

a) public comments (survey, public meeting maps or questionnaire);
b) higher traffic volume streets and intersections with observed high levels of walking behavior;
c) safety concerns resulting from crash data and demographic analysis;
d) proximity to trip generators (parks, schools, shopping, Downtown);
e) steering committee recommendations
f) previous plan recommendations (e.g. Land Development Plan); and
g) project staff field analysis.

3.2 Pedestrian System Recommendations

The pedestrian facilities recommended for improvement include sidewalks, intersections and shared-use path facilities. The sidewalk corridor improvements have been prioritized using the factors shown below in Figure 3.1. The prioritization process used for corridor and intersection improvements combine factors used in the Graham, NC Pedestrian Transportation Plan (2006), the Durham, NC Pedestrian Transportation Plan (2006) and the Portland, OR Pedestrian Plan (1998). A wide range of factors were used for project prioritization, the higher the score, the higher the priority. The scoring system used to rate each project will serve as a guide to programming resources for projects. However, opportunities for improvement to certain corridors may arise (i.e. unplanned road projects, repaving projects, utility installation or specific funding opportunities) initiating the construction of projects that may not be a top priority. More detail on each of the factors and their value are found in the Appendix.

Figure 3.1 – Proposed Sidewalk Corridor Improvement

Project ID	Side	Street	From	To	Length (ft)	Existing Sidewalk Opposite Side	Public Comments (5 to 10=3; 11 to 20=4; >20=5)	Proximity to school zones (within 1/4 mile = 3; 1/2 = 2)	Proximity to parks and recreation (within 1/4 mile = 3; 1/2 mile = 2)	Crashes (1 crash 2001-2006)	Small gaps (<1,000 ft)	Road type (arterial or collector >15000ADT)	Compatible land use (multi-family residential, commercial, institutional or downtown)	Curb and gutter existing	Connectivity to existing sidewalk	Proximity to Transit (<1,000ft)	Score Total
S-693, S-694, S-695	W	WILLIAMSON AVENUE	EXISTING SIDEWALK	CHURCH STREET	7,320		5	3	3	2	0	3	3	2	2	0	23
S-612	N	E LEBANON AVENUE	S OAK STREET	KERR AVENUE	610		3	3	2	2	2	3	3	0	2	2	22
S-617	N	W LEBANON AVENUE	CHURCH STREET	MANNING AVENUE	520		3	2	3	0	2	3	3	2	2	2	22
S-619, S-690	N	W HAGGARD AVENUE	UNIVERSITY DRIVE	HOLT AVENUE	1,965		5	3	2	0	0	3	3	2	2	2	22
S-626, S-687	N	E HAGGARD AVENUE	LAWRENCE AVENUE	UNIVERSITY DRIVE	6,110		5	3	2	0	0	3	3	2	2	2	22
S-607	S	E TROLLINGER AVENUE	S OAK STREET	ANTIOCH AVENUE	880		4	3	2	2	2	3	3	0	2	0	21
S-594	S	W TROLLINGER AVENUE	CHURCH STREET	HOLT AVENUE	1,450		4	2	3	0	0	3	3	2	2	2	21
S-579, S-613, S-610	W	OAK STREET	E HAGGARD AVENUE	TOWN LINE	2,080		4	3	3	2	0	3	3	0	0	2	20
S-712	E	MANNING AVENUE	LAUREL OAK STREET	E HAGGARD AVENUE	1,520		3	2	2	0	0	3	3	0	2	2	17
S-588, S-589, S-627	S	E HAGGARD AVENUE	EXISTING SIDEWALK	UNIVERSITY DRIVE	5,110		5	0	0	0	0	3	3	0	0	2	13
S-704, S-705, S-706	W	WESTBROOK AVENUE	MACLEAN DRIVE	CHURCH STREET	6,890		4	0	2	0	0	3	0	0	2	2	13
S-711	E	S O KELLEY AVENUE	WOODALE DRIVE	TROLLINGER AVENUE	1,470		0	2	2	0	0	0	3	2	2	0	11
S-628	E	TRUITT DRIVE	WINDSOR WAY	S OAK STREET	1,950		3	2	0	0	0	0	2	2	2	0	11
S-689	N	WESTGATE DRIVE	WESTBROOK AVENUE	WILLIAMSON AVENUE	1,710		0	0	0	0	0	0	0	0	0	0	0

Intersection improvement projects are shown below in Figure 3.2. These proposed improvements may include pedestrian refuge islands, curb ramps, crosswalks, traffic calming or other measures to increase pedestrian and bicycle safety. These improvements are not prioritized; however all of the intersections are in need of improvement and can be completed using minimal resources. A more detailed review of these intersections and what specific improvements are recommended can be found in the Small Area System Plan section.

Figure 3.2 – Proposed Intersection Improvements

ID	LOCATION
I-1	TROLLINGER/LEBANON/RAILROAD & WILLIAMSON AVENUE
I-2	TROLLINGER/LEBANON/RAILROAD & OAK STREET
I-3	WESTBROOK ROAD & UNIVERSITY DRIVE
I-5	HAGGARD AVENUE & OAK STREET
I-6	HAGGARD AVENUE & MANNING AVENUE
I-8	UNIVERSITY DRIVE & N OKELLEY AVE

The following shared-use paths are proposed to connect neighborhoods and improve pedestrian and bicycle connections for transportation and recreation. These connections provide key access points to destinations including work, school, shopping and recreation. The top three projects were ranked by the steering committee.

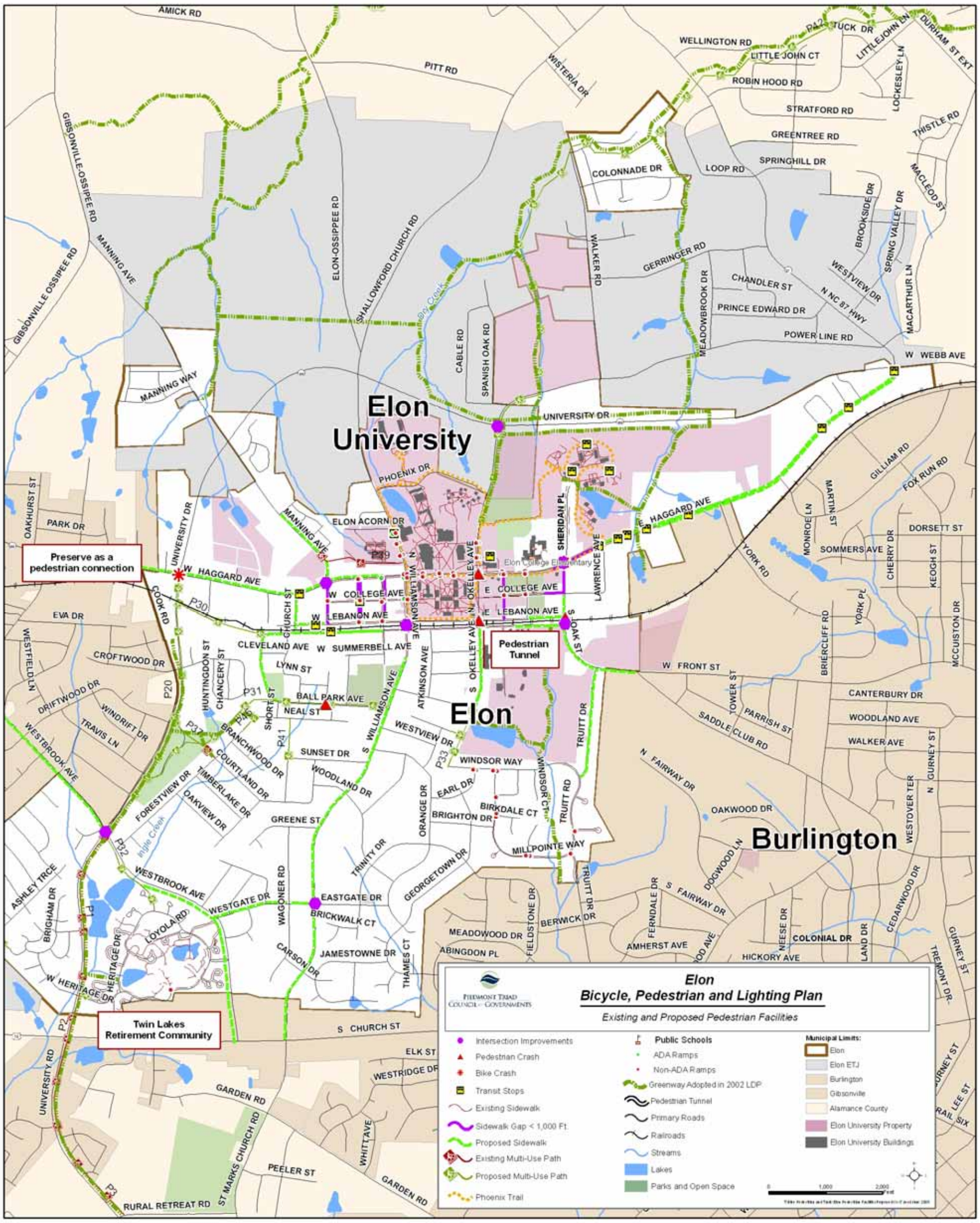
Figure 3.3 – Proposed Shared Use Paths and Lengths

PROJECT ID	LOCATIONS	LENGTH (FT)	WIDTH (FT)	SURFACE	RANK
P-20	UNIVERSITY DRIVE	4,900	10	PAVED	1
P-31	SCHMIDT PARK AND BALL PARK AVENUE CONNECTOR	3,000	10	PAVED	2
P-43	RAMP FROM TWIN LAKES TO SHARED-USE PATH	100	10	PAVED	3
P-30	RAILROAD CONNECTOR TO UNIVERSITY DRIVE	1,700	10	PAVED	n/a
P-32	TWIN LAKES CONNECTOR TO UNIVERSITY DRIVE	1,400	10	PAVED	n/a
P-33, P-44	OKELLEY, WESTOVER AND MILLPOINT CONNECTOR	1,300	10	PAVED	n/a
P-37	SCHMIDT PARK PATH IMPROVEMENT	730	10	PAVED	n/a
P-41	NEAL STREET CONNECTOR	690	10	NATURAL	n/a
P-42	MOUNTAINS TO SEA TRAIL CONNECTOR	18,500*	10	NATURAL	n/a
P-45	FORESTVIEW DRIVE AND NEAL STREET CONNECTOR	300	10	PAVED	n/a
P-46	ARBOR DRIVE AND HUTCHINSON CT CONNECTOR	200	10	PAVED	n/a

*The distance of the MST Trail connection inside the town limits is approximately 8,750ft.

There were nearly 28 miles of potential greenway trails identified in the 2002 Elon Land Development Plan, much of which extend into areas outside Elon's city limits. As new development occurs, the Town of Elon should preserve previous and newly identified potential and proposed shared-use paths through the subdivision and easement acquisition process.

Map 3.1 - Proposed Pedestrian Facilities



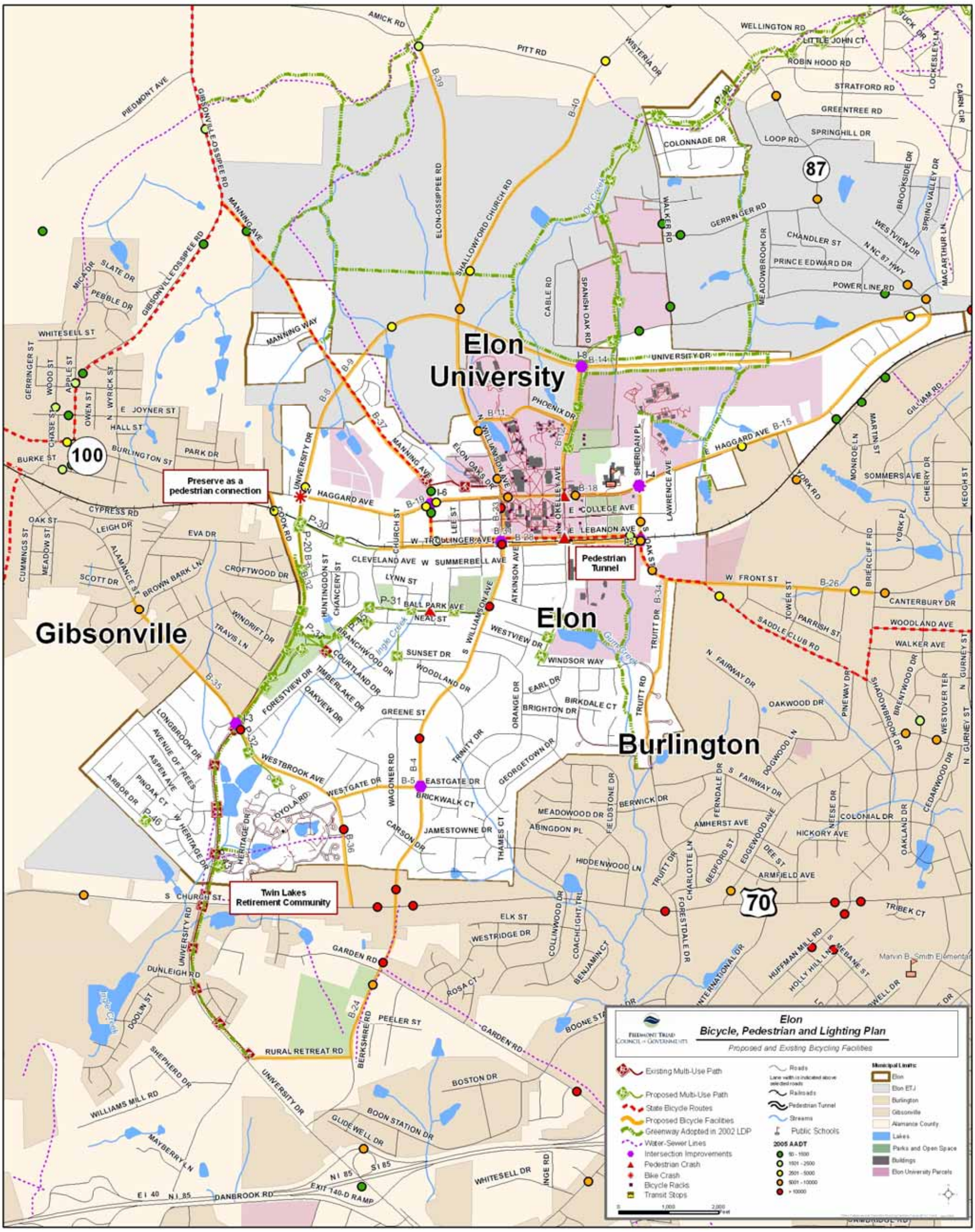
3.3 Bicycle System Recommendations

The majority of the heavier traveled roads are proposed for bicycle improvements to facilitate bicycle transportation and recreation. The level of effort required to complete the facilities will vary based on existing pavement width, adjoining land uses, adjacent facilities, repaving schedules and other factors. The bicycle system recommendations are prioritized using a different set of factors from the pedestrian facilities. The ranked bicycle transportation improvements shown in Figure 3.4 indicate proposed improvements and existing travel lane width to install bicycle lanes, striping or some other improvements to facilitate bicycle travel while also accommodating motor vehicle travel. The higher the score total, the higher the rank. See Section 3.6 for further detail on specific facility recommendations. Map 3.2 displays on-road and off-road proposed bicycling system improvements. More detail on each of the factors and their value are found in the Appendix.

Figure 3.4 – Proposed On Road Bicycle Improvements with Priority Score

Project ID	Street	From/To	Lane Width (ft)	Length (ft)	Direct Access to a Park	Direct Access to a School or University	Average Daily Traffic (ADT); 1 (1500-5k); 2 (5k-10k); 3 (>10k)	Speed Limit - 1 (35-44), 2 (45-54) and 3 (>55)	Transit Route Connectivity	Crashes	Connects to Proposed or Existing Greenway	Direct Access to Commercial District	Score Total
B-2, B-3, B-4, B-23, B-24, B-25	WILLIAMSON AVENUE & ST. MARKS CHURCH ROAD	PHEONIX DRIVE TO RURAL RETREAT ROAD	12 to 22	15,570	2	3	3	2	2	2	2	3	19
B-18, B-19	HAGGARD AVENUE	OAK STREET TO UNIVERSITY DRIVE	15 to 20	6,875	2	3	2	1	2	2	2	3	17
B-15	HAGGARD AVENUE	W WEBB AVENUE TO OAK STREET	12	6,950	0	3	2	2	2	2	2	3	16
B-5, B-35, B-36	WESTBROOK AVENUE	CHURCH STREET TO MACLEAN DRIVE	10	10,400	2	0	3	1	2	0	2	3	13
B-37	MANNING AVENUE	ETJ LIMITS TO W HAGGARD AVENUE	9 to 12	7,450	0	3	0	3	2	0	2	3	13
B-12, B-13	N O'KELLEY AVENUE	E HAGGARD AVENUE TO UNIVERSITY DRIVE	9	2,630	2	3	0	1	2	2	2	0	12
B-40	SHALLOWFORD CHURCH ROAD AND WILLIAMSON AVENUE	ETJ LIMITS TO PHEONIX DRIVE	10	7,910	0	3	1	2	2	0	2	2	12
B-6	UNIVERSITY DRIVE	W HAGGARD AVENUE TO WESTBROOK AVENUE	10	4,900	2	0	1	2	2	2	2	0	11
B-8, B-9, B-14, B-16	UNIVERSITY DRIVE	W HAGGARD AVENUE TO E HAGGARD AVENUE	12 to 15	11,290	0	0	1	3	2	2	2	0	10
B-26	OAK & FRONT STREETS	E HAGGARD AVENUE TO BRIERCLIFF ROAD	10 to 18	6,300	0	3	2	1	2	2	0	0	10
B-31	MANNING & W LEBANON AVENUE	W HAGGARD AVENUE TO OAK STREET	9 to 12	4,900	0	3	1	1	2	0	0	3	10
B-28	TROLLINGER AVENUE	BALL PARK AVENUE TO OAK STREET	11	5,300	0	0	1	1	2	0	2	3	9
B-11	PHOENIX DRIVE	OKELLEY AVENUE TO WILLIAMSON AVENUE	12	2,100	0	3	0	0	2	0	2	0	7
B-29	CHURCH STREET	HAGGARD AVENUE TO TROLLINGER AVENUE	9	620	0	0	0	1	2	0	0	3	6
B-32	COOK ROAD	BURLINGTON STREET TO CROFTWOOD DRIVE	10	2,100	0	0	1	1	2	0	2	0	6
B-39	ELON-OSSIPPEE ROAD	ETJ LIMITS TO SHALLOWFORD CHURCH ROAD	10 to 15	5,260	0	0	1	3	0	0	2	0	6
B-34	TRUITT DRIVE	OAK STREET TO CITY LIMITS	15	3,600	0	0	1	1	0	0	0	0	2

Map 3.2 – Proposed Bicycle Improvements



3.4 Lighting System Recommendations

The lighting system in Elon needs to be improved in certain areas. The problem areas result from either gaps in lighting, aesthetically unpleasing lighting or insufficient light fixtures (e.g. wasted light away from the ground, low wattage, etc.). Figure 3.5 and Map 3.3 indicate existing corridors that need lighting improvements.

Figure 3.5 – Proposed Corridors for Lighting Improvement	
University Dr	O'Kelley Ave
Lebanon Ave	Truitt Dr
Trollinger Ave	Westbrook Ave
Oak Ave	Westgate and Eastgate Dr
Williamson Ave	Cook Rd
Haggard Ave	Wade Coble Dr
Antioch Ave	Beth Schmidt Park
Kerr Ave	

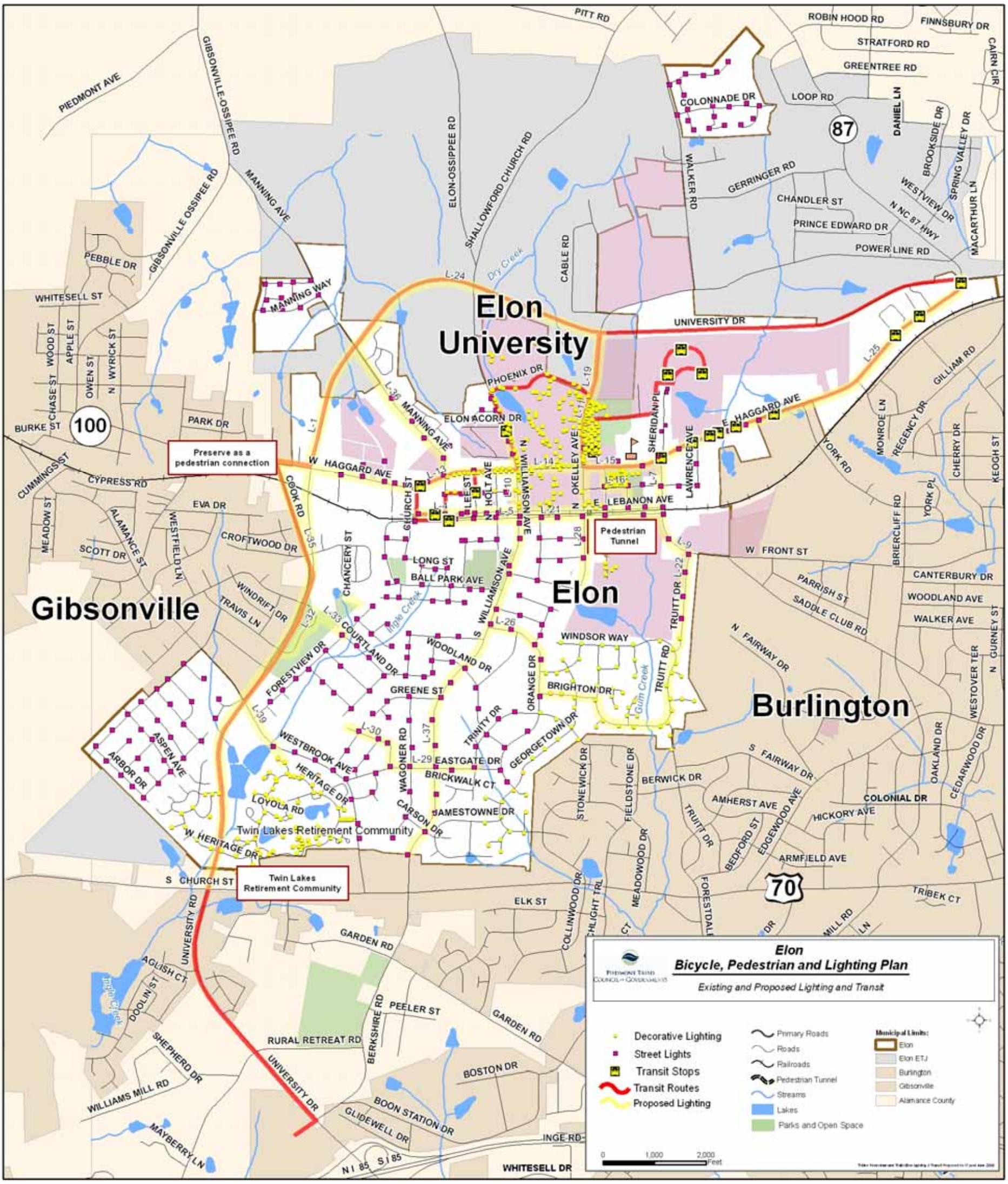
The distance between light fixtures should match the LDO requirement for new development, which calls for light fixtures to be spaced 160 to 200 feet apart. In the instance that new lighting installations will reduce the distance below the suggested spacing distance, consideration of adjusting pole height, wattage and foot candle should be managed through consultation with a lighting specialist or Duke Energy. Where there are transit stops, additional lighting should be installed at the stop for transit user safety.

University Drive North of Church Street

The University Drive corridor needs the most improvement in lighting. There are no street lamps along this corridor north of Church Street. The installation of lamps that illuminates the shared-use path as well as University Drive should be a top priority improvement in 2009. Funds from Elon and Gibsonville should be budgeted for lighting this corridor.

Further details on lighting fixtures, energy efficient bulbs and fixture arrays can be found in the Appendix.

Map 3.3 - Proposed Lighting Improvements



3.5 Policy and Program Recommendations

the Town of Elon currently has a number of policies pertaining to bicycle and pedestrian transportation. The Land Development Ordinance calls for the preservation of open space and encourage pedestrian and bicycle travel through a number of existing regulations outlined in Chapter 2.

Policy Recommendations and Ordinance Changes

The following recommended changes build upon policies developed in the Town's 2004 Land Development Ordinance and were suggested by the task force, project staff and public comment.

Issue 1: Funding sidewalk construction in existing development

Current Policy: Reliance upon the Town general fund, State transportation funding and donations to build new sidewalk.

Recommended Policy: To supplement other sources of funding for sidewalk construction, the Town should set up a fair, but comprehensive assessment policy to facilitate and fund the development of a connected sidewalk system.

Issue 2: Public access easements

Current Policy: The Town does not currently acquire shared-use path, trail or other public access easements with sewer and water easements as lines are extended.

Recommended Policy: As new sewer lines are extended along proposed greenway corridors recommended in this plan or along stream corridors, acquire public access easements for non-motorized users for both sewer line use and future trail use. Include a requirement in the subdivision ordinance that requires public access easements along proposed greenways when land is subdivided within the Town Limits and extra territorial zoning jurisdiction.

Issue 3: Promoting mixed use zoning (e.g. Town Center, Village Center and Neighborhood Center) designation

Current Policy: Few areas have been zoned to accommodate the mixed uses allowed in the above zoning districts.

Recommended Policy: Proactively explore the possibility of designating more mixed-use districts in Elon. Creating mixed use districts will allow new development to have a range of uses thereby allowing shorter trips that can be made by foot or bicycle.

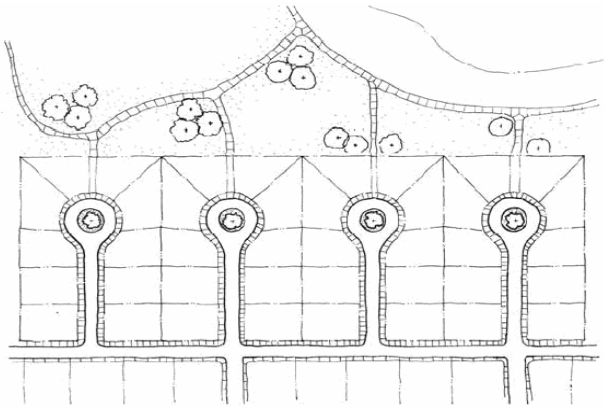
Issue 4: Sidewalk requirements for change of use – all zoning districts

Current Policy: No requirements for sidewalk construction with change of use (e.g. change from residential to commercial).

Recommended Policy: Require sidewalk installation with a change of use.

Issue 5: Cul-de-sac connections

Figure 3.6 - Cul-de-Sac and Shared-use Path/Street Connection (Nashville, TN)



Current Policy: No requirements for pathway connections in cul-de-sac subdivision developments.

Recommended Policy: Provide requirements for cul-de-sac development to accommodate pedestrians by connecting cul-de-sacs with the nearest neighboring street or parks. In Figure 3.6 the cul-de-sacs are connected by pathway to an adjacent trail. In cases where there are no pathways or streets to connect to behind the cul-de-sac, appropriate right-of-way should be set aside to connect with future cul-de-sacs, streets or pathways during the subdivision process.

Issue 6: Pedestrian access on bridges

Current Policy: No requirements for pedestrian access on bridges.

Recommended Policy: Require all bridges within Town limits and ETJ to be equipped with sidewalks or an offset that provides space for future sidewalks due to the Town's desire to have an interconnected pedestrian friendly community. This will ensure pedestrian access as bridges are replaced by the State.

Cul-de-sac Connector - Canby, Oregon

Issue 7: Sustainable and energy efficient lighting

Current Policy: Requirement to place streetlights in new subdivisions and on new streets 160 to 200 feet apart. No requirement on the type of lighting or energy use.

Recommended Policy: Require closer light spacing in high pedestrian activity centers and on major corridors. Explore lower wattage lights that also provide enough lumens for needed safety in Elon. Produce list of sustainable lighting vendors to share with developers and seek input yearly to update list and keep current.

Issue 8: Complete Streets

Current Policy: The Town of Elon requires the provision of a "complete street" when ***new*** roads are developed, which include provisions for sidewalks, bicycle paths and/or bicycle lanes.

Recommended Policy: Adopt the "Complete Streets" policy for all ***existing*** road reconstruction, in addition to new construction. The policy would require that roads being resurfaced also be evaluated to include bicycle lanes and sidewalks.

Issue 9: Scenic Corridor Overlay District

Current Policy: No current overlay district

Recommended Policy: Work with the Appearance Commission to create this new overlay district to help beautify and preserve major and minor thoroughfares. The features would include lighting specifications, landscape requirements, signage requirements and other features to improve and preserve scenic beauty.

Issue 10: Decorative Lighting Overlay District

Current Policy: No current overlay district

Recommended Policy: Create this new overlay district to include detail on aesthetic and energy efficient design, spacing requirements, foot candle and lumens. Create the first district in the downtown area.

Issue 11: Require shared-use pathways along existing major arterials

Current Policy: Shared-use pathways and/or sidewalks are required for ***new*** roads.

Recommended Policy: Conduct a study to determine the feasibility of shared-use pathways along ***existing*** arterial corridors with few driveway cuts (i.e. existing University Drive) and sidewalks along arterial and collector corridors with significant driveway cuts. Require construction of pathways or sidewalk when new land development occurs.

Issue 12: Trail access under new road bridges

Current Policy: None

Recommended Policy: Require that road bridge design accommodate future trail development where greenways or conservation areas are proposed – or within ½ mile of parks or schools. Conduct a study that identifies the feasibility of trail development under existing bridges in the town limits and ETJ.

Program Recommendations

Coordination with other municipalities on bicycle and pedestrian transportation
Elon participates in the Burlington-Graham MPO Transportation Advisory Committee, responsible for transportation funding and issues in all of Alamance County and its municipalities. Encourage the development of a bicycle and pedestrian transportation advisory committee to the MPO that will work to refine and develop regional bicycle and pedestrian transportation initiatives that connect across municipal lines, encourage active transportation, cleaner air and personal health.

Establish Streetscape Committee
Establish a streetscape committee, under the Appearance Commission to target specific routes identified in this plan for lighting, trees and landscaping along existing streets & roads. The streetscape committee could also explore a *traffic calming* program in coordination with streetscape enhancements. Enhance lighting to accommodate and encourage pedestrian or bicycle travel.

Sidewalk Art Program
Encourage creative use of public sidewalks within the downtown area(i.e. ability to set up chairs, apply for art enhancements on the sidewalk, etc.). Help businesses develop a theme or design for the sidewalk in front of their stores and shops in cooperation with Elon University classes. Work with the newly established streetscape committee and the existing appearance commission to implement the program and supply seed funding for the first year of this program.

Bicycle Route Maintenance
The state bicycle route through Elon as well as any bicycle facilities that are installed should be cleaned regularly to avoid collecting debris that will discourage bicycling on these facilities as well as reduce safety.

Bicycle Parking Program
Elon University provides bicycle parking on campus and bicycle racks are required in new multi-family or commercial development. However, existing developments lack ample bicycle parking. The Town, neighboring jurisdictions and the Burlington-

Campus Bike Rack

Graham Metropolitan Planning Organization should assess needs and provide funds for a bicycle parking program across the region. Bicycle racks and lockers should be placed at key locations (e.g. shopping centers, downtown areas, community centers, etc.) to encourage bicycle travel.

Crosswalk Spot Improvement Program
Regularly check existing crosswalks for wear and tear and work to repaint or tape existing crosswalks to improve visibility. Work to identify crossing locations that may need additional treatments such as in-pavement crosswalk signs, stamped pavement or other features to slow traffic and increase pedestrian safety.

Benches and Plantings
Provide more sidewalk space and plantings around benches in the downtown and Haggard Avenue where space allows. Consider sidewalk width expansion in key locations. Consider adding more benches as well.

Photo: Dan Burden

Establish a Downtown Walking Promotion Program
Working with the County Department of Health, Twin Lakes, the University, downtown businesses and neighborhoods, establish walking programs in the downtown and Beth Schmidt Park. Encourage participants to walk or bicycle to the event. The programs can be organized by individual employers/employees or among different employers and employees. The program will benefit the health of Elon citizens by increasing daytime and evening physical activity, while reducing health care costs, making workers more productive and reducing stress. In the first year, a pilot program for either downtown or Beth Schmidt Park is appropriate. The program should then be evaluated for effectiveness, improved, adjusted and then expanded to other locations if there is interest.

Pedestrian Laws Training Program
This program created by the NCDOT Bicycle and Pedestrian Program is designed for children, adults or police. The program should cover the following topics: Right-of-way at crosswalks, right turn on red, yielding to vehicles, walking on roadways without sidewalks, railroad crossings and more. More information about North Carolina pedestrian laws can be found here: http://www.ncdot.org/transit/bicycle/laws/resources/lawsguidebook.html .

Adopt a Road / Adopt a Sidewalk Programs
Adopt a Road programs are seen in many communities across North Carolina. The program provides resources to the community to sponsor and help to clean up road litter. The Town of Elon can begin a similar program for its sidewalks and (future) shared-use paths. This program could also be used as a means for the community to alert the Town when there is a maintenance issue with a sidewalk,

or as a means for a sidewalk to get special attention, funding, and improvements because of the dedication of its community sponsor. If effective, the quality of the sidewalk system will increase significantly.

Safe Routes to School Programs (SRTS)

The Safe Routes to School program is a national and international movement to enable and encourage children, including those with disabilities, to walk and bicycle to school. Safe Routes to School programs are comprehensive efforts that look at ways to make walking and bicycling to school a safer and more appealing transportation alternative, thus encouraging a healthy and active lifestyle from an early age. The North Carolina SRTS program http://www.ncdot.org/transit/bicycle/saferoutes/SafeRoutes.html is administered by the North Carolina Department of Transportation Bicycle and Pedestrian Transportation Program. There is funding available for a broad spectrum of initiatives including, but not limited to:

- Walking school bus programs (i.e. groups of students and parents/teachers walking to school) www.walkingschoolbus.org;
- Crossing guard training;
- One-time walking and bicycling safety events (i.e. bicycle rodeos, safety and health awareness fairs, walk to school day - www.walktoschool.org);
- Safety curriculum (i.e. printing safety curriculum and training for teachers);
- Bicycling and walking improvements (i.e. sidewalks, paths, bike parking, bike lanes, crossing treatments); and
- Weekly walking or bicycling programs (i.e. walking Wednesdays, Walk across America).

Many of the SRTS programs take few resources to get started (aside from bicycling and walking facility improvements), however a "local champion" will be needed to start and implement Safe Routes to School programs. The "local champion" will likely be a parent or teacher who can lead the effort on Safe Routes to School. This is a significant opportunity to fund programs educating and encouraging both students and parents about the benefits of walking or bicycling to school.

Tree Programs

Explore enhanced tree planting and preservation programs for the Town of Elon. Build on existing programs, encourage quality tree cover through the efforts of the Tree Preservation Committee. Basic requirements of the enhanced ordinance should include:

- If trees are cut down, replacement trees should be of equal or greater than the diameter of the trees cut, multiple trees can be planted where

the sum of the diameters are equal to the diameter of the trees cut down;

- Provide more detailed guidance on the types of trees and landscaping for commercial and retail areas; and
- Provide a certified part-time ISA arborist to educate and enforce the ordinance.

Some cities have worked with the utility company to provide free saplings and trees to customers. In addition education for citizens, businesses and developers about affordable and quality trees can be beneficial to improve the tree canopy, property aesthetics and the pedestrian experience.

3.6 Small Area System Plan Overview and Recommendations

University and Downtown Plan

The University and Elon's downtown are a unique and aesthetically pleasing pedestrian friendly environment. This small area, shown in Map 3.4 below is bounded by University Drive to the North, Manning Avenue to the West, Trollinger Avenue to the South and Oak Street to the East. There are wide sidewalks and pedestrian pathways on campus that provide connectivity within campus and to the downtown. Many of the buildings and shops along Williamson, Haggard, College, Lebanon Avenue and the railroad are built with minimal setback from the street and provide parking on the street or behind the buildings, hidden from pedestrian view. This provides an inviting and interesting walking environment.

Williamson Avenue Sidewalk

The University has been actively improving the pedestrian crossings on Haggard, N. O'Kelley and Williamson Avenue over the past several years and the results have been very beneficial to the safety and access of pedestrians.

Sidewalk Corridor Improvements

There are multiple small (less than 1,000 ft in length) sidewalk gaps that can be closed with modest investment. These projects to close gaps between existing sidewalk are shown in purple on Map 3.4 below. The gap projects include Manning, Lee, Holt, Antioch and Oak Avenue. Other proposed sidewalk projects that extend the existing sidewalk network in the downtown core are found in Figure 3.7.

Figure 3.7 – Proposed Sidewalk Improvements, University Area and Downtown

Project ID	*Side*	*Street*	*From/To To*	*Length (ft)*
S-612	N	E LEBANON AVENUE	S OAK STREET TO KERR AVENUE	610
S-619, S-690	N	W HAGGARD AVENUE	UNIVERSITY DRIVE TO HOLT AVENUE	1,965
S-626, S-687	N	E HAGGARD AVENUE	LAWRENCE AVENUE TO UNIVERSITY DRIVE	6,110
S-607	S	E TROLLINGER AVENUE	S OAK STREET TO ANTIOCH AVENUE	880
S-594	S	W TROLLINGER AVENUE	CHURCH STREET TO HOLT AVENUE	1,450
S-579, S-613, S-610	W	OAK STREET	E HAGGARD AVENUE TO TOWN LINE	2,080
S-712	E	MANNING AVENUE	LAUREL OAK STREET TO E HAGGARD AVENUE	1,520
S-588, S-589, S-627	S	E HAGGARD AVENUE	EXISTING SIDEWALK TO UNIVERSITY DRIVE	5,110

Bicycle Corridor Improvements

Many of the downtown streets have been proposed for bicycle facility improvements. However, many of the streets will require additional pavement width to easily accommodate bicyclists. The downtown streets in Figure 3.8 have been identified for improvements. Generally where width is sufficient, this space can be reserved for future bicycle lanes, however ample width on continuous segments on both sides of the road should be achieved prior to bicycle lane designation. Completing a dedicated facility for the entire segment will avoid confusion and create a better overall bicycling facility. When future paving projects are planned, adding width to accommodate a wide outside curb lane (e.g. the travel lane closest to the curb) or bicycle lane should be included for the following road segments.

Figure 3.8 – Proposed Bicycle Facility Improvements, University Area and Downtown

Project ID	*Corridor*	*From/To*	*Lane Width (ft)*	*Improvement*	*Length (ft)*
B-2, B-3, B-4, B-23, B-24, B-25	WILLIAMSON AVENUE & ST. MARKS CHURCH ROAD	HAGGARD AVENUE TO RURAL RETREAT ROAD	12 to 22	Bicycle lane with road reconstruction; Sharrow from Haggard to Trollinger	13,990
B-15, B-18, B-19	HAGGARD AVENUE	UNIVERSITY DRIVE TO W WEBB AVENUE	12 to 20	Bicycle lane and share the road signs	6,400
B-12, B-13	N O'KELLEY AVENUE	E HAGGARD AVENUE TO UNIVERSITY DRIVE	9	Share the road signs	2,630
B-6	UNIVERSITY DRIVE	W HAGGARD AVENUE TO WESTBROOK AVENUE	10	4 foot paved shoulder with road reconstruction	4,900
B-11, B-25	SHALLOWFORD CHURCH ROAD AND WILLIAMSON AVENUE	UNIVERSITY DRIVE TO W HAGGARD AVENUE	10 to 22	Bicycle lane with road reconstruction and share the road signs	7,700
B-8, B-9, B-14, B-16	UNIVERSITY DRIVE	W HAGGARD AVENUE TO E HAGGARD AVENUE	12 to 15	4 foot paved shoulder with road resurfacing	11,290
B-26	OAK & FRONT STREETS	E HAGGARD AVENUE TO BRIERCLIFF ROAD	10 to 18	Bicycle lane with road reconstruction and share the road signs	6,300
B-31	MANNING & W LEBANON AVENUE	W HAGGARD AVENUE TO OAK STREET	9 to 12	Share the road signs	4,900
B-28	TROLLINGER AVENUE	BALL PARK AVENUE TO OAK STREET	11	Share the road signs	5,300
B-11	PHOENIX DRIVE	OKELLEY AVENUE TO WILLIAMSON AVENUE	12	Share the road signs	2,100

Crossing Improvements

Recent crossing improvements on Haggard Avenue at the core of campus provide safe pedestrian crossings north and south of this busy Avenue. There are 4 intersections in the University and Downtown area identified for crossing improvements to enhance safety, comfort and access for pedestrians. The crossing improvements should be designed to enhance safety for bicyclists and pedestrians well as automobiles. The recommendations for improvement are separated into short and long-term recommendations. The Short-Term recommendations should be completed in *3 years or less*. The Long-Term recommendations should be completed in *3 to 5 years.*

TROLLINGER/LEBANON/RAILROAD & WILLIAMSON AVENUE

Williamson Avenue and the NC Railroad

This intersection has been identified for improvement because of observed high pedestrian traffic, lack of appropriate handicap access, and 2 pedestrian crashes between 2001-2006. The intersection connects Town Hall, the Post Office and residences with downtown and the University. Previous planning efforts have identified this intersection for improvement, including a Federal Highway Administration Pedestrian Safety Roadshow in 2001 and the Land Development Plan in 2002. Safety enhancements across the railroad will need to be coordinated with multiple agencies including the Town, Burlington-Graham MPO, NCDOT and the NC Railroad.

Short-Term Improvements

- Improve crosswalk markings at the intersection of Williamson, Lebanon and Trollinger Avenue;
- Install a pedestrian activated signal with a leading pedestrian interval to allow pedestrians to cross the intersection before vehicles, avoiding conflicts with left or right turning traffic; and
- Construct sidewalk and ADA accessible ramps across the railroad to connect with existing sidewalks on Williamson, Lebanon and Trollinger Avenue.

Long-Term Improvements

- Install an automatic pedestrian gate at the railroad crossing to discourage pedestrian crossings when a train is approaching; and

- Construct a well-designed, aesthetically pleasing fence along the NC Railroad right-of-way to discourage pedestrians from crossing the railroad tracks, except at designated crossings.

TROLLINGER/LEBANON/RAILROAD & OAK STREET

Oak Street and NC Railroad looking North

This intersection has been identified for improvement because of a pedestrian crash between 2001-2006, observed high pedestrian use and a proposed sidewalk along Oak Street. On the southwest corner of the intersection, Elon University is planning an athletic field complex, which will create a relational high volume of pedestrian traffic at this intersection when complete. This intersection is a popular jogging route with a connection to the Millpoint neighborhood to the south. The railroad is constructing a pedestrian tunnel to divert some pedestrian traffic at Antioch Street. However, this intersection will likely continue to experience high pedestrian traffic.

Short-Term Improvements

- Install crosswalk markings on Lebanon and Trollinger Avenue; and
- Encourage pedestrians with signage to cross the railroad where the pedestrian tunnel is being constructed near Antioch Avenue.

Long-Term Improvements

- Construct sidewalk access across the NC Railroad to meet up with the proposed sidewalk along Oak Street; and
- Install an automatic pedestrian gate at the railroad crossing to discourage pedestrian crossings when a train is approaching.

HAGGARD AVENUE & OAK STREET

Oak St. and Haggard Ave. Looking East on Haggard Ave.

This intersection has been identified for improvement based on observed high-pedestrian use and a pedestrian crash near the intersection between 2001-2006. Located on the edge of campus and adjacent to the Elon Elementary School, this intersection is used heavily by Elon students, faculty and staff for recreational jogging or pedestrian transportation. There are existing sidewalks on the north side of

this intersection along Haggard Avenue. Sidewalks are proposed on the west side of Oak Street heading south.

Short-Term Improvements

- Install crosswalk markings on Haggard Avenue; and
- Install curb ramps facing Haggard Avenue at the northwestern and southwestern corner of the intersection to create better connection with the future sidewalk on Oak Street south of the intersection.

Long-Term Improvements

- Install a pedestrian activated signal and leading pedestrian interval to allow pedestrians to cross the intersection avoiding conflicts with turning traffic; and
- Improve the sidewalk across the Sheridan Place driveway apron providing a level sidewalk surface.

HAGGARD AVENUE & MANNING AVENUE

Haggard and Manning Avenue looking north

This intersection was identified for improvement based on comments from the steering committee and the general public. Although there have not been any reported bicycle or pedestrian crashes at this intersection, pedestrian traffic has been observed. There are a number of residences along Manning Avenue north of this intersection, which are within walking distance of the downtown.

Short-Term Improvements

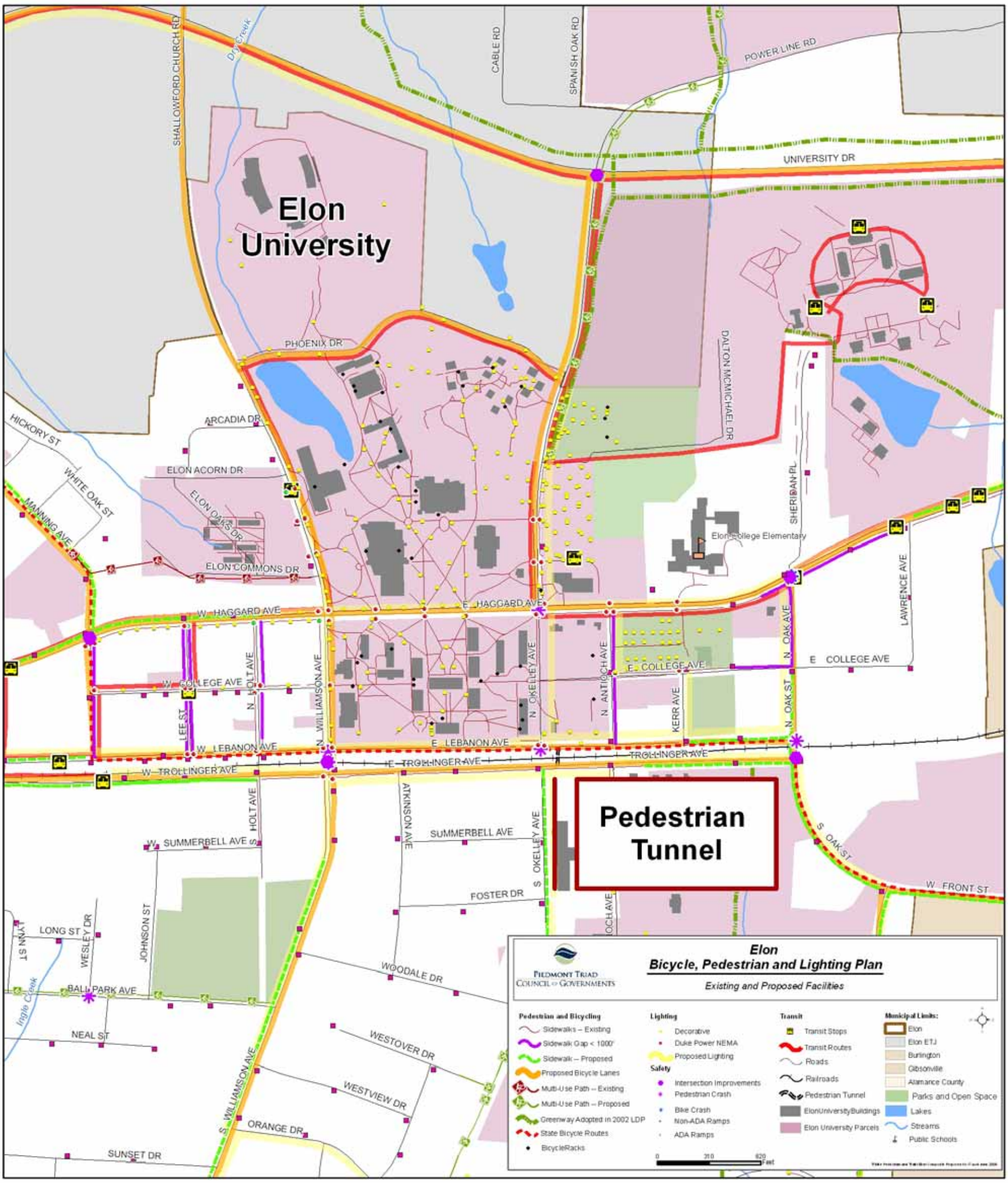
- Install crosswalk markings on Haggard Avenue;
- Install curb ramps facing Haggard Avenue at the southeastern and northeastern corner of the intersection; and
- Install in-pavement "*yield to pedestrians in crosswalk*" sign bollards.

Lighting Improvements

Most of the downtown streets are indicated for improvements to lighting. Infill lighting should match existing light fixtures and pole heights from adjacent areas. Where sidewalk or pathway projects are proposed, lighting improvements should be made at the time of sidewalk construction. Strong consideration should be given to the use of decorative and sustainable lighting fixtures and placement of utility lines underground. The following streets in the downtown and University area need gaps in the existing lighting system filled.

- Williamson Avenue south of Trollinger Avenue;
- Haggard Avenue from Manning Avenue to Oak Avenue;
- N. O'Kelley Avenue from Lebanon Avenue to Phoenix Drive;
- Oak Avenue from Haggard Avenue to Truitt Drive;
- Lebanon Avenue from Manning to Oak Avenue;
- Trollinger Avenue from Church Street to Oak Avenue;
- Antioch Avenue;
- College Avenue; and
- Kerr Avenue.

Map 3.4 - University and Downtown Proposed Pedestrian, Bicycle and Lighting Improvements



Twin Lakes Area Plan

The Twin Lakes Retirement Community is located on the southwestern edge of Elon. The City of Burlington lies to the south and east and Gibsonville lies to the north and west. The community was completed in 1983 and has over 300 independent living residences which are supported by recreation and health service facilities. There are a number of different sidewalks and walking paths in the community, affording residents an opportunity for healthy and active lifestyle options. The community is located about ½ mile from Beth Schmidt Park and is bisected by University Drive. Pathway connections are proposed to link Twin Lakes to both Beth Schmidt Park (ID # P-32) and the shared-use pathway along University Drive (ID # P-43).

Sidewalk Corridor Improvements

Two sidewalk projects are proposed for the Twin Lakes area shown in Figure 3.9. A sidewalk is proposed along Westbrook Avenue to connect the Twin Lakes Retirement Community to shops and restaurants along Church Street. In addition a sidewalk is proposed along Westgate Drive to connect with a sidewalk proposed along Williamson Avenue.

Figure 3.9 – Proposed Sidewalk Corridor Projects, Twin Lakes Area

Project ID	*Side*	*Street*	*From/To*	*Length (ft)*
S-704, S-705, S-706	W	WESTBROOK AVENUE	MACLEAN DRIVE TO CHURCH STREET	6,890
S-689	N	WESTGATE DRIVE	WESTBROOK AVENUE TO WILLIAMSON AVENUE	1,710

Bicycle Corridor Improvements

There are two roads adjacent to the Twin Lakes Retirement Community proposed for bicycle facility improvement, Westbrook Avenue and Westgate Drive. The roadway will need to be widened at least 9 feet to accommodate 4-foot bicycle lanes in both directions on Westgate and Westbrook Avenue. Sight distance issues near the intersection of Westgate and Westbrook Avenue should be explored and mitigated through landscape control or a flashing light showing the approach of oncoming traffic.

Figure 3.10 – Proposed Bicycle Corridor Projects

Project ID	*Corridor*	*From/To*	*Lane Width (ft)*	*Improvement*	*Length (ft)*
B-5, B-35, B-36	WESTBROOK AVENUE AND WESTGATE AVENUE	CHURCH STREET TO MACLEAN DRIVE AND WILLIAMSON AVENUE	10	Bicycle lane with road reconstruction	10,400

Crossing Improvements

There is one intersection in the Twin Lakes area proposed for improvement.

WESTBROOK ROAD & UNIVERSITY DRIVE

Pedestrian Looking to Cross University Drive at Westbrook Avenue (facing north towards Beth Schmidt Park)

The Beth Schmidt Park lies to the north and east of the intersection. The University Drive shared use path terminates at this intersection. The next phase of the University Drive road construction is scheduled to begin in 2010, which will effect this intersection. This intersection was selected for improvement based upon public feedback and the proximity to the Beth Schmidt Park. Pedestrian crossing of University Drive and Westbrook Avenue should be facilitated to encourage trips by foot to the park.

Short-Term Improvements

- Install a pedestrian refuge island on University Drive on the north and south side of the intersection to facilitate pedestrian crossing.

Shared Use Path Improvements

Proposed shared-use paths in the Twin Lakes area are outlined in Figure 3.11. Project P-32 links the north side of the Twin Lakes Retirement Community with Beth Schmidt Park via a shared-use path along Westbrook Avenue. The project P-43 would connect W. Heritage Drive to the shared use path that runs along University Drive. The Arbor Drive and Hutchinson Ct. connector, project P-43, would connect two cul-de-sacs on the west side of University Drive. The ramp project was ranked as the #3 priority for shared use paths by the plan task force. The ramp from W. Heritage Drive is a relatively short section of improvement that will provide Twin Lakes residents an opportunity for pedestrian access to the shared use path along University Drive.

Figure 3.11 – Proposed Shared Use Paths, Twin Lakes Area

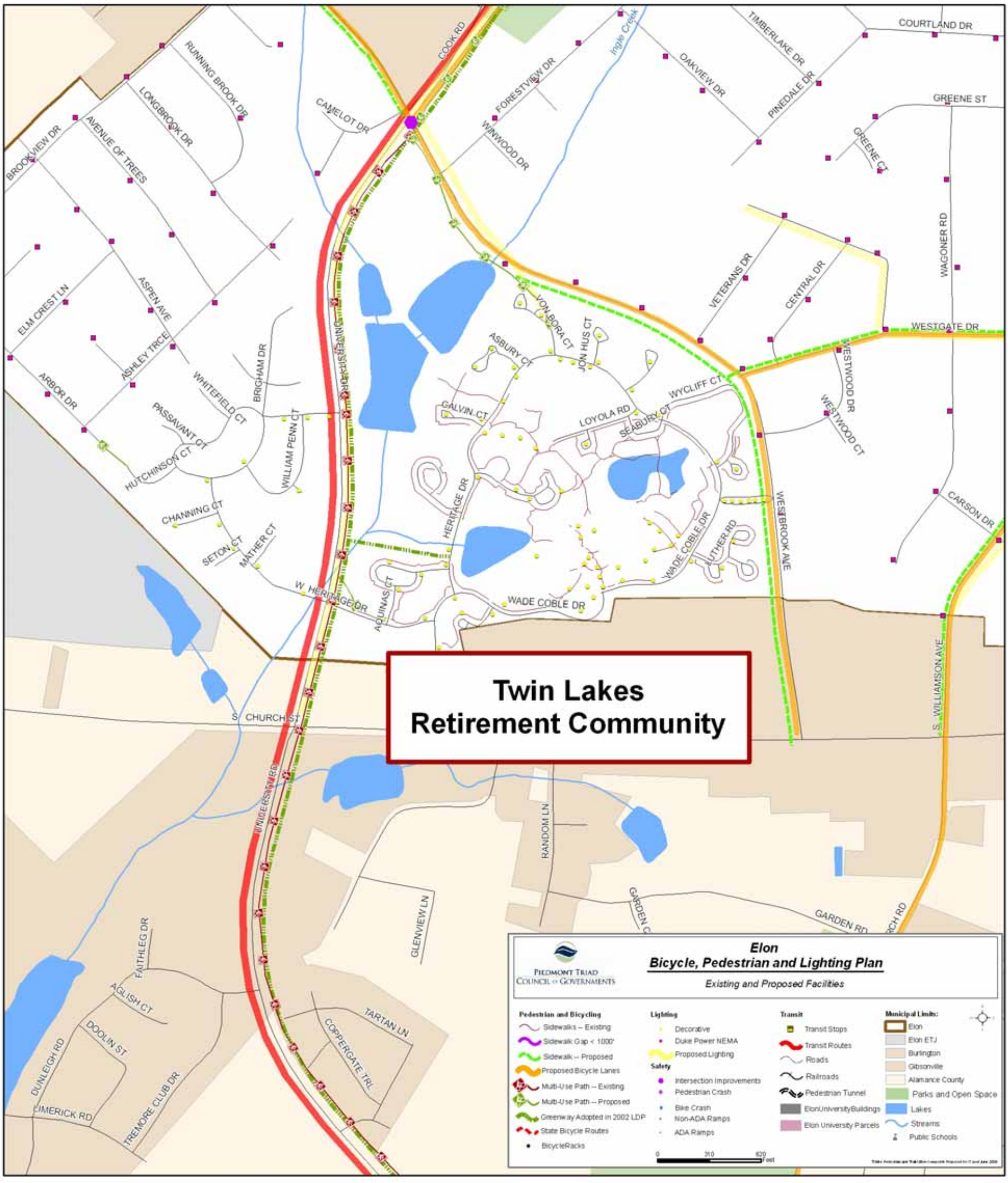
ID	LOCATIONS	LENGTH (ft)
P-32	TWIN LAKES CONNECTOR TO UNIVERSITY DRIVE	1,400
P-43	RAMP FROM TWIN LAKES TO SHARED-USE PATH	50
P-46	ARBOR DRIVE AND HUTCHINSON CT CONNECTOR	200

Lighting Improvements

The University Drive corridor needs lighting improvements. New lighting should illuminate both University Drive and the shared-use path. Currently there is no lighting along this corridor from the municipal limits with Burlington north past Haggard Avenue. Lighting in the Twin Lakes Retirement Community is well placed and provides ample illumination. Proposed trail and sidewalk projects should incorporate lighting improvements as projects are designed and constructed.

University Drive Path South of Church Street Provides Ample Lighting of Path and Roadway

Map 3.5 – Twin Lakes Area Proposed Pedestrian, Bicycle and Lighting Improvements



3.7 Current Project Opportunities

The University Drive phase II project TIP # U-3110 calls for widening Cook Road from 2 lanes to 4 lanes from Westbrook Avenue to Haggard Avenue and aligning the thoroughfare with the new University Drive. The planned improvements include a bridge over the NCRR and Haggard Avenue (NC 100) and a re-alignment to better link with University Drive. The initial design for the project includes a 10 ft. wide shared-use path north of Westbrook Avenue up to the bridge over the NCRR and Haggard Avenue. It is recommended that the bridge include a shared use path 10ft wide allowing a continuous shared-use path connection from shopping areas south of Church Street with Haggard Avenue, facilitating the use of bicycling and walking for transportation.

CHAPTER 4: IMPLEMENTATION

Effective implementation of recommended projects, programs and policies outlined in this plan will require the sustained, focused and coordinated efforts by Town leaders, the University and the public. The schedule of action items on the following page outlines how plan recommendations can be implemented and the entities with primary responsibility for carrying out each action item.

The Town of Elon should capitalize on unplanned road projects or other opportunities that may take precedence over scheduled action items. The list of action items should be reviewed and evaluated by Town staff and reprioritized every 2 to 5 years. In addition to maintaining a list of completed projects, the Town should conduct an annual audit of sidewalk, bike lane and lighting systems to identify changing issues and focus resources efficiently.

4.1 Action Plan

A step-by-step implementation process is detailed for the next 2 years. The action items are grouped by year and in most cases are not in sequential order. The suggested party or parties who need to complete each action step is also included. Opportunities to implement certain action items may arise before others and these opportunities should be pursued. The action items below are a menu of options for the Town of Elon to pursue as time, resources and political will allow.

One of the *most important* action items is the formation of an alternative transportation working group. The working group will advocate for implementation of the plan and assist in public outreach and grant writing, Town staff communication and other duties. The working group will likely be involved in each of the action items, and will need to recruit new members to share the work load and maintain active participation.

If there are budgetary implications for action items, the budget amount is indicated. Each new project or program and policy change should be evaluated for effectiveness as needed. In 2013, a broader assessment and evaluation of efforts should be performed to both look at proposed changes and their progress, but also to look at new ideas and new challenges.

Implementation Action Plan

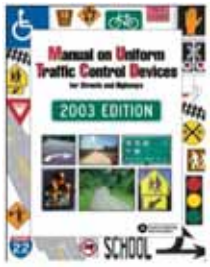
FY 2008-2009 Action Items	Who Completes Action Item
2008.1 Complete *2* priority sidewalk projects, 2 shared use path projects, 2 bicycle lane projects and 3 crossing improvement projects; **BUDGET: $400,000**	**Town of Elon, Sub-contractor and University**
2008.2 Work to update subdivision and zoning ordinance to aid in pedestrian and bicycle transportation;	**Town of Elon Planning, Zoning Board**
2008.3 Establish alternative transportation working group to develop a *bicycle parking program* and other programs of interest	**Members of the community, focus group and meeting attendees invited to participate**
2008.4 Seek funding sources needed to build projects;	**Town of Elon Planning Department, Alternative Transportation Working Group and University Intern**
2008.4.1 Establish grant writing schedule and seek grants for specific projects to achieve 2008.1 goals 2008.4.2 Provide matching money for grant applications; 2008.4.3 Establish Elon Greenway Trust Fund; 2008.4.4 Seek Safe Routes to School Funding; 2008.4.5 Increase Capital Program funding for sidewalks; 2008.4.6 Seek other funding sources;	**Town of Elon, Intern, NCDOT, Task Force, University, Working Group and Non-Profit Partners**

FY 2009-2010 Action Items	Who Completes Action Item
2009.1 Complete *2 additional* sidewalk projects, 2 shared use path projects, 2 bicycle lane projects and 2 crossing improvement projects; **BUDGET: $400,000**	**Town of Elon, Sub-contractor and University**
2009.2 Adopt an update to subdivision and zoning ordinance to aid in pedestrian and bicycle transportation;	**Town of Elon Planning, Zoning Board**
2009.3 Have alternative transportation working group coordinate with Elon University, Elon Elementary, businesses and churches to encourage more walking and bicycling, conduct SRTS Workshop	**Working Group, University, Elon Elementary**
2009.4 Continue to seek funding sources needed to build pedestrian projects;	**Town of Elon Planning Department and University Intern**
2009.4.1 Establish 2009 grant writing schedule and seek grants for specific projects to achieve 2009.1 goals 2009.4.2 Provide matching money for grant applications; 2009.4.3 Safe Routes to School Implementation; 2009.4.4 Renew Capital Program funding for sidewalks; 2009.4.5 Seek other funding sources;	**Town of Elon, Intern, NCDOT, Task Force, University, Alternative Transportation Working Group and Non-Profit Partners**

APPENDIX A: PROJECT DEVELOPMENT

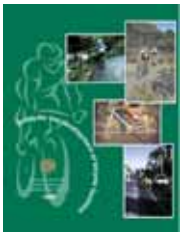
A.1 Pedestrian and Bicycle Facility Guidelines

There are a number of ways to build the facilities called for in this plan. Many of the facility improvement recommendations will need further investigation and engineering before improvements and design are finalized. The designs and improvements to federally funded streets must follow Federal Highway Administration guidelines outlined in the Manual of Uniform Traffic Control Devices (MUTCD) or be in jeopardy of losing funding or additional liability. More flexibility is allowed for municipal owned streets where local or state funding is used.



Additional guidance for trails, sidewalks and bicycle lanes can be found in the following manuals:

American Association of State Highway and Transportation Officials (AASHTO) Guide to the Development of Bicycle Facilities (1999)



AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (2004)

NCDOT Pedestrian Facility Design Guidelines (1995)

North Carolina Bicycle Facilities Planning and Design Guidelines (1995)

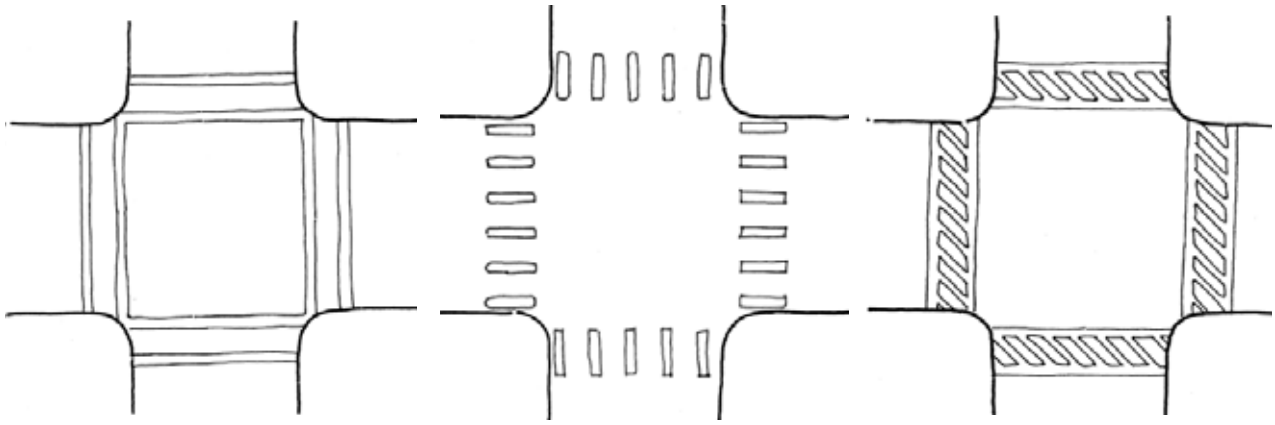
Intersections

Pedestrian-vehicular conflict occurs primarily at intersections. As shown by the intersection project recommendations found in the above small area plans, features that help pedestrians include: crosswalks, curb ramps, refuge islands, signals, signs and other treatments. Some of the most important treatments for improving pedestrian intersection crossings are included below, but there are many other treatments to consider. The *PEDSAFE: Pedestrian Safety Guide and Countermeasures Selection System* should also be consulted in addition to a number of the other resources found in the References section of this Plan in deciding improvements to intersections.

Crosswalks

Crosswalks direct pedestrians to the best places to cross the street. Curb ramps should be aligned with crosswalks. Crosswalks do not always provide the needed safety to cross a street safely, for example on higher speed arterial streets, additional treatments are needed to make it safe for pedestrians to cross, including medians, crossing islands and other treatments.

Figure A.1 – Crosswalk Design



Horizontal Line (most common *Ladder Style (high vis., low maintenance)* *Diagonal (high vis., and maintenance)*
Courtesy: ITE

The crosswalk designs shown in Figure A.1 are approved by the MUTCD. The horizontal line crosswalk is common in Elon. The ladder and diagonal style are the most visible design. When installed correctly, the ladder style requires less maintenance as the hash marks can be aligned so that motor vehicle wheels will not track over them, reducing wear and tear.

Figure A.2 - In-Pavement Yield to Pedestrian Sign

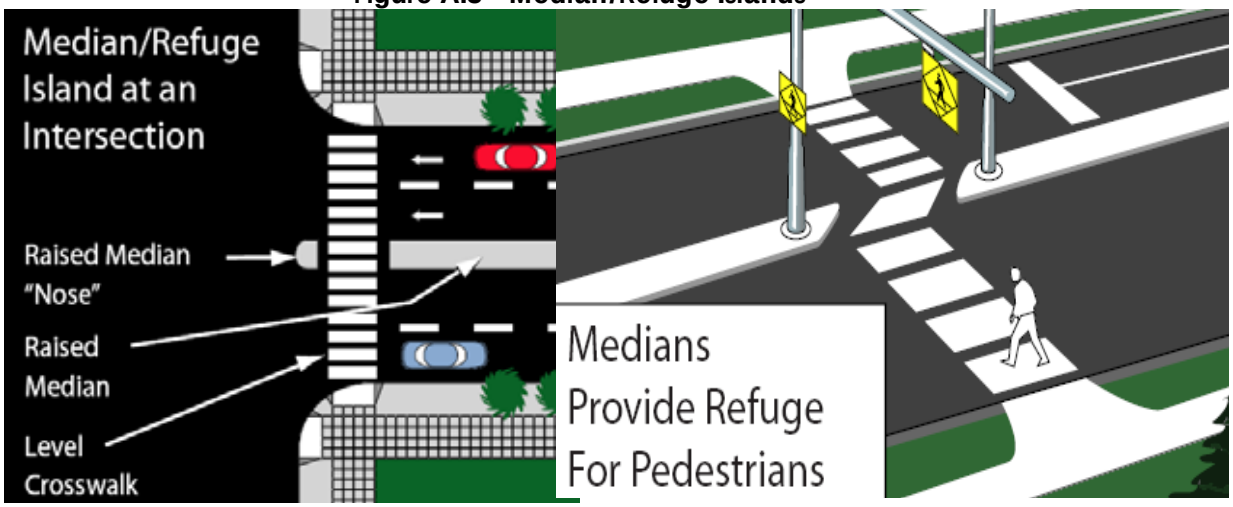
In Pavement Yield to Pedestrian Sign - Greensboro, NC

It is important to study the best crosswalk locations before installation. The vehicles need to be able to see the pedestrians and the pedestrians need to be able to see the vehicles. In addition, there must be ample room for wheelchair landings where the curb ramp meets the sidewalk. Figure A.2 shows the sign design from the MUTCD which can be placed on plastic bollards in advance of the crosswalk as shown in the photo. These improvements are recommended in a number of intersections for Elon.

Refuge Islands

The design and installation of a refuge island (or crossing island) at an intersection is shown in Figure A.3 on the left. The installation of a crossing island increases the safety of pedestrians allowing refuge when a complete crossing is interrupted by speeding or turning vehicles. The refuge or crossing island is especially helpful to pedestrians on major thoroughfares with 3 or more lanes. The figure on the right shows how a median can help pedestrians across the street where there is no intersection.

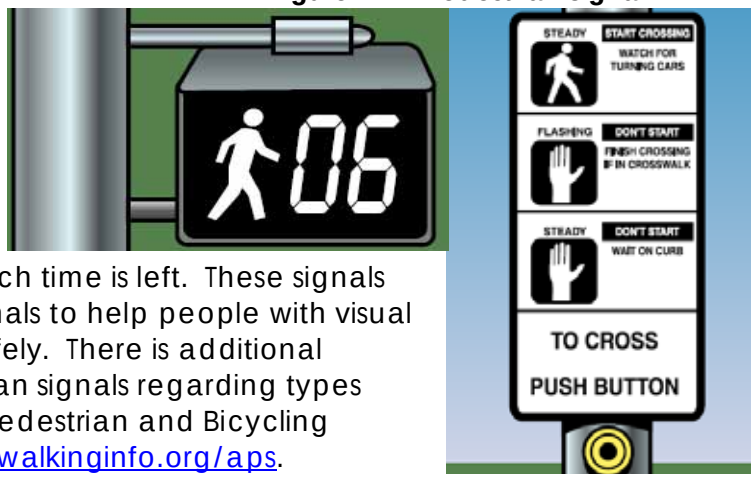
Figure A.3 - Median/Refuge Islands



This installation would be appropriate on long blocks where pedestrians are observed crossing mid-block and it is a far distance to nearest intersection. There are no specific recommendations for a mid-block crossing with a median in this Plan, but there may be an opportunity to install this treatment in the future on some of the major thoroughfares or in the Central City Planning area.

Pedestrian Signalization

Figure A.4 - Pedestrian Signal



The push button and sign is associated with the pedestrian signal or "ped-head" to indicate the different phases of the pedestrian signal. The signal shows the amount of time the pedestrian has to cross the street and counts down to show how much time is left. These signals can be equipped with audible signals to help people with visual impairment know when to cross safely. There is additional information on accessible pedestrian signals regarding types and placement guidelines at the Pedestrian and Bicycling Information Center website: www.walkinginfo.org/aps.

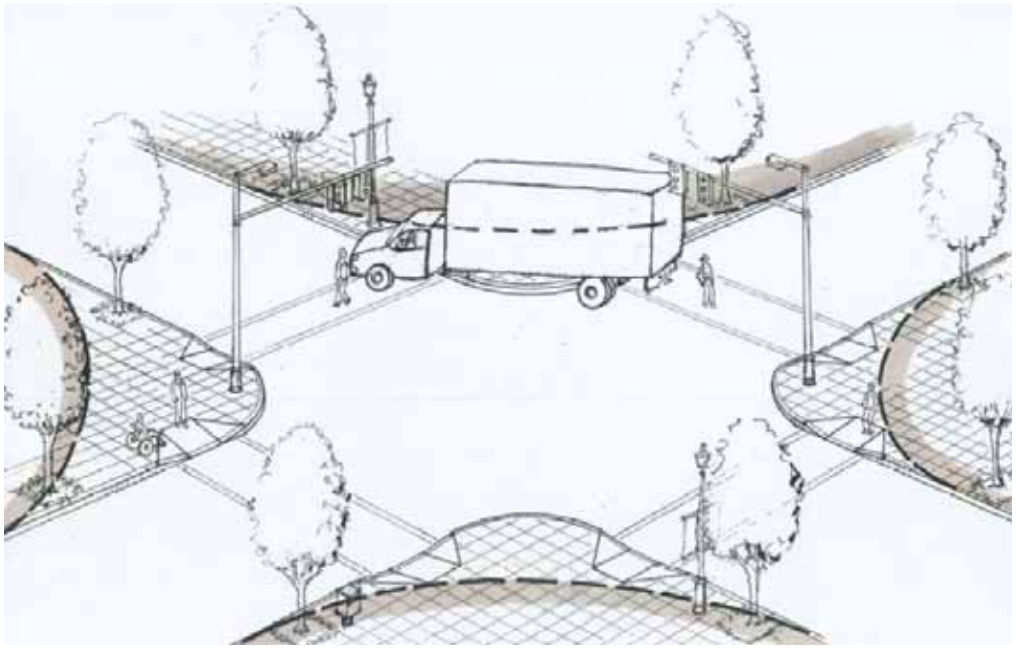
Figure A.5 - Pedestrian in Roadway Light

The pedestrian in roadway light and sign shown in Figure A.5 provides automobile traffic a warning signal that pedestrians are in the roadway. The light can be activated either by a sensor or by push-button activation for pedestrians using a designated crosswalk across the street. This application is particularly useful for mid-block crossings or crosswalks with poor sight distance. The sign used with the flashing light is from the MUTCD Chapter 2C and is coded W11-2.

Bulb-outs or Curb Radii

The curb radii of an intersection influences not only crossing distance, but also the speed of vehicles traveling through the intersection. Decreasing the crossing distance by reducing the curb radius can help pedestrian safety and comfort and shorten street crossing times. Large trucks can maneuver through the intersections by traveling slower or encroaching slightly into the other travel lanes as necessary to complete turns.

Figure A.6 - Reduction in Curb Radii



Source: Kimley-Horn Associates

Curb Ramps

There are many locations along existing sidewalks where the installation of curb ramps will enhance the walking environment. The design shown here follows the guidelines of the ADA. Each four-way intersection should have eight (8) ramps or two (2) to a corner. The width of the ramp should be at least 4' and a detectable warning (truncated domes) should extend 24" from the bottom of the ramp, covering the entire width of the ramp.

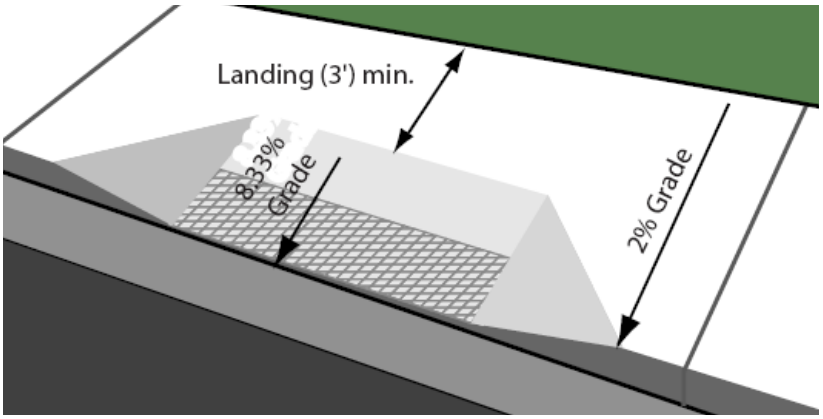


Figure A.7 - Curb Ramp and Sidewalk Landing Specifications

Sidewalks

The most important feature of the pedestrian transportation system is the sidewalk. Without a sidewalk, many people will not or cannot walk safely along streets and roads. Many of the recommendations for improvement have suggested closing sidewalk gaps, improving handicap accessibility, and making neighborhood connections to the University and nearby parks.

The following recommendations for sidewalk construction and design are from the Institute for Transportation Engineers:

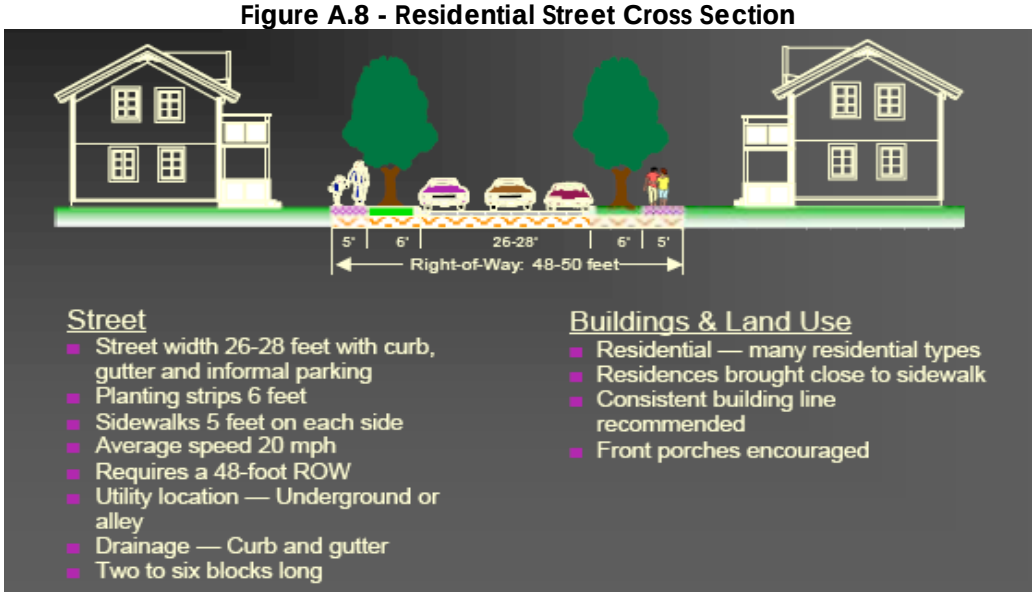
- Central Business District: Wide enough to accommodate users. Minimum 8 feet (not including the planting strip or street furniture).
- Commercial area outside the central business district: 7 feet wide if no planting strip is possible, or 5 feet wide with a 2-8 foot planting strip (Wider planting strips accommodate greater buffers from traffic and the opportunity to plant large shade trees).
- 4 to 8 foot wide planting strips are recommended along all sidewalks to provide separation from vehicles. This space is useful for landscaping, lighting, trash receptacles, water fountains, benches, temporary storage of weather debris and the room to accommodate driveway ramping while maintaining a level or near level (<2%) sidewalk cross slope.
- Crosswalks should have direct alignment with curb ramps at intersections.
- Sidewalks should be clear of obstructions such as utility poles, sign posts, fire hydrants, etc.
- Vertical clearance should be at least 7 feet from ground level to the bottoms of signs or the lowest tree branches.
- Increasing sidewalk widths by 2-3 feet would accommodate shoulder-high intrusions like building walls, bridge railings, and fences.
- Maximum cross-slope of 1:50 (2%). Limit running slope to 5% (1:20), or no greater than 8.33% (1:12) where topography requires it. Building access ramps with landings and handrails would help users.

The existing sidewalk standards for the Town of Elon have no explicit requirement for planting strips. A minimum planting strip of 6ft and a maximum planting strip of 8ft in residential areas is suggested in residential areas where 5ft sidewalks are required. In commercial and the central business district where 8-12 ft sidewalks are required, there should be more flexibility in use of the sidewalk space (e.g. street furniture, brick patterns, etc).

It is important to design sidewalks to be level across driveways, including both the cross and running slope. The 'Level Landing" picture shows an example of how a continuous sidewalk grade can be maintained. This design helps people in wheelchairs negotiate driveways and driveway aprons with ease.

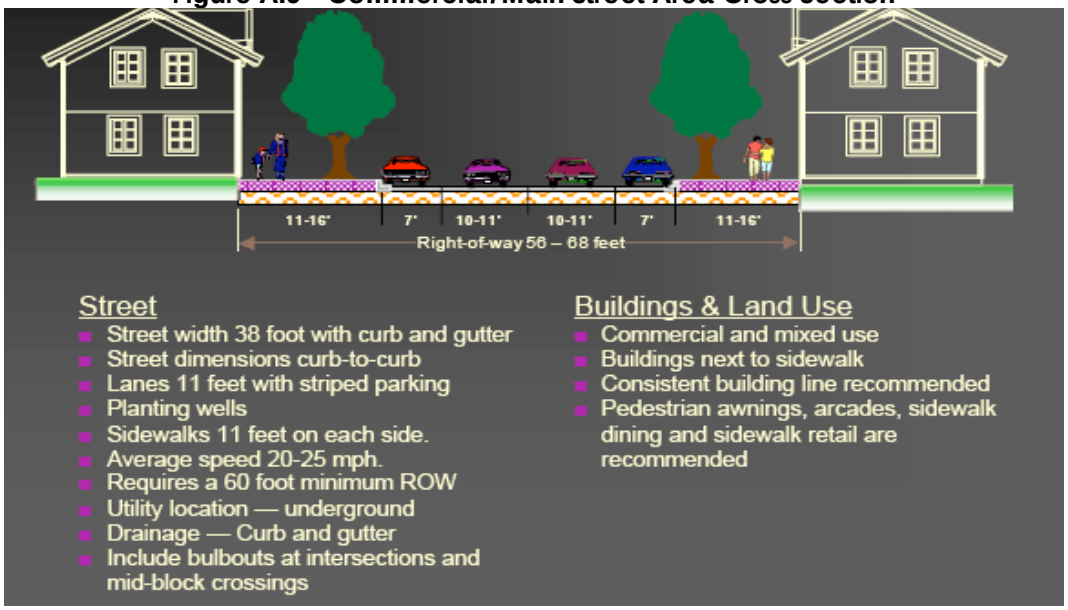
The street cross sections that follow are part of "Street Designs that Support Walkable, Livable Communities" by Paul Zykofsky and Dan Burden. The street cross section shown in Figure A.8 is appropriate for residential neighborhoods in the Town of Elon. A minimum 5' sidewalk ordinance exists, but a minimum 6' of planting/utility strip should be added.

Figure A.8 - Residential Street Cross Section



In commercial areas, the planting strips should not encroach on the travel way of the sidewalk, which should be at least 8' in width between the building and the planting wells or street furniture in the central business district and at least 7' in width in other commercial areas. The street cross section shown in Figure A.9 is appropriate for commercial and downtown areas.

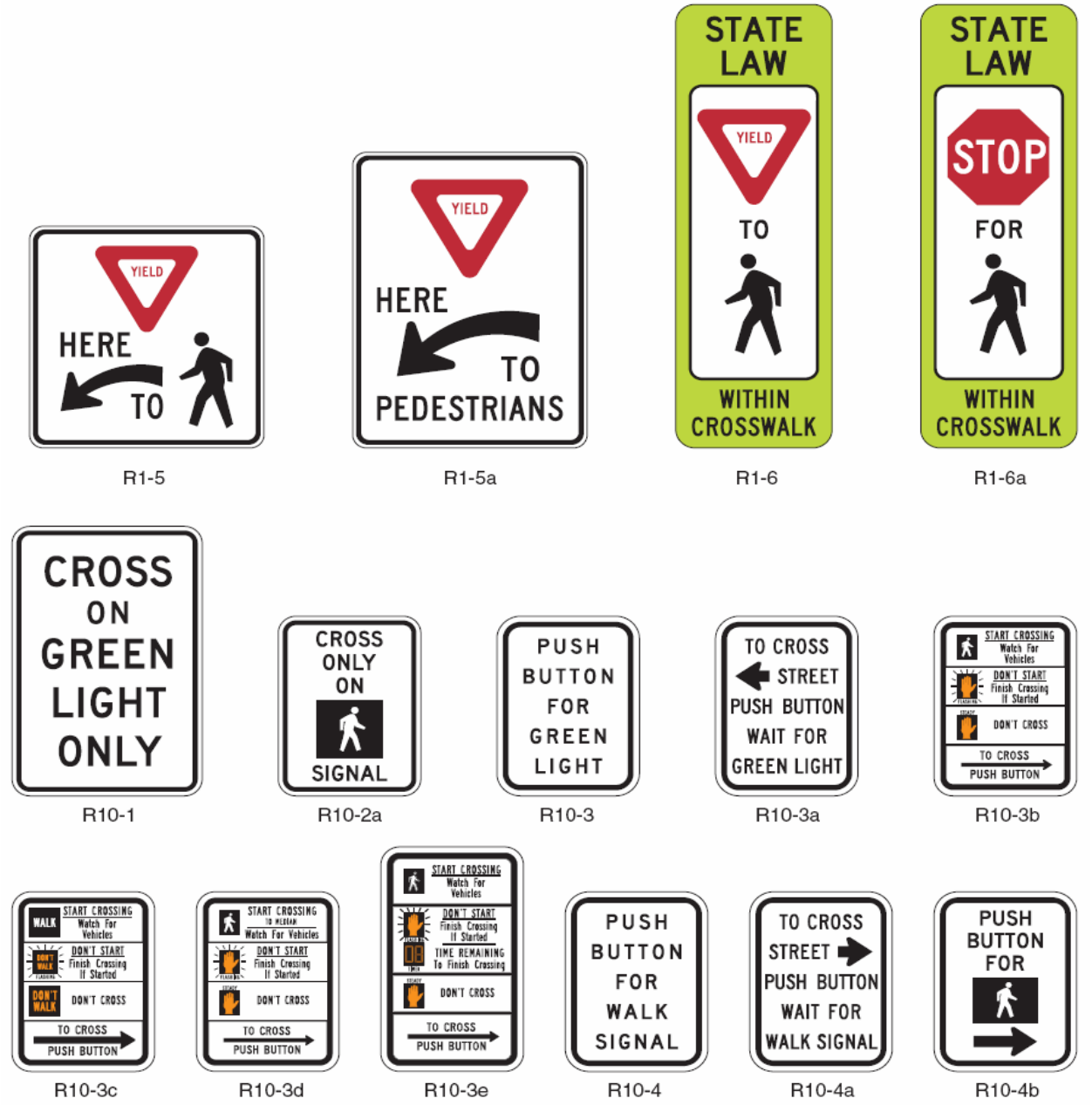
Figure A.9 - Commercial/Main Street Area Cross Section



Pedestrian Related Signage

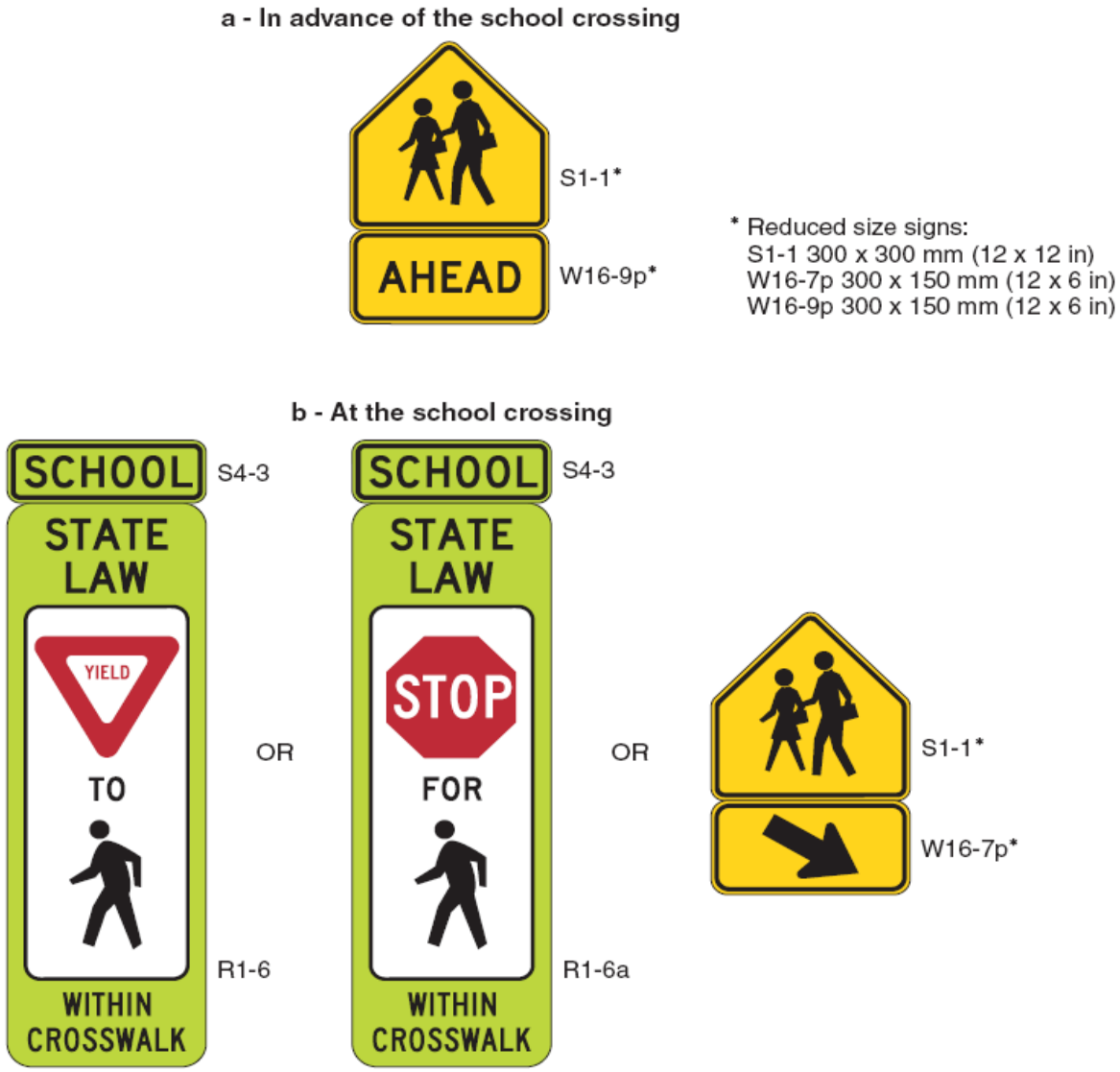
There are a number of warning signs to aid drivers in observing traffic laws and to avoid problems with pedestrians. Figure A.10 shows examples of pedestrian signage from the MUTCD. The majority of pedestrian signs can be found in Chapter 2B and 2C. School safety signage is found in Part 7 of the MUTCD and examples are shown in Figure A.11. The number below each sign indicates the code for the design of the traffic control device.

Figure A.10 - MUTCD Pedestrian Related Signage



Source: MUTCD 2003 Chapter 2B and 2C

Figure A.11 - MUTCD School Zone Pedestrian Related Signage



Source: MUTCD 2003 Part 7

Innovative Sidewalk Materials and installation

This section provides information on additional materials to consider when building new or repairing existing sidewalk infrastructure.

Rubber Sidewalk (Source: Rubber Sidewalks, Inc.)

Rubber Sidewalk

The rubber sidewalk shown here reduces maintenance costs when compared to concrete sidewalks. According to Rubber Sidewalks, Inc. the average cost per square foot, including break out and installation is $15.00. The cost for a linear foot of rubber sidewalk (5' width) is approximately $75. When including the cost of grading for new installations, the cost is competitive with concrete installation. The rubber sections of sidewalk are large tiles that can be removed for tree root maintenance as well. In most cases, concrete sidewalk must be replaced after tree root maintenance.

Root Barriers

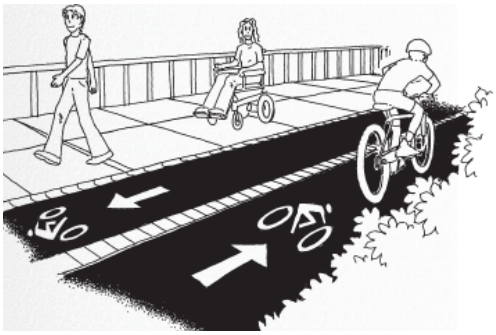
There are a number of different vendors that supply root barriers for street tree plantings. The root barriers should be installed when a street tree is first planted, but can also be installed around mature trees. The root barrier should surround the tree root ball in a circle for newly planted trees. Mature trees will need to have the roots trimmed and a barrier installed between the tree and sidewalk or path. If installed correctly, the root barrier forces tree roots downward away from the sidewalk, path, building or utilities.

Root Barrier (Source: Vespro, Inc).

Root barriers can be made with any impermeable durable material that can withstand burial in soil for an extended period of time. Root barriers are recommended to be installed to a depth of 30 inches minimum and they must extend above the surface of the soil enough to prevent roots from growing over the top. There are root barrier materials that are permeable to moisture but will not allow roots to grow through, but may be more expensive.

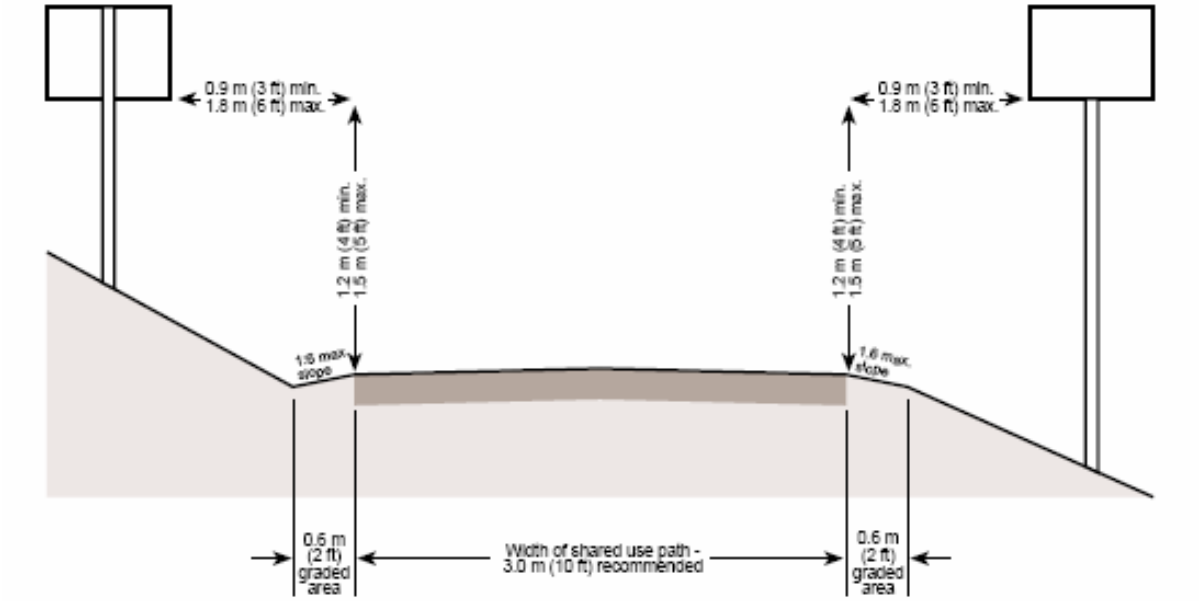
Shared-use Paths

Shared-use paths benefit, pedestrians, bicyclists, in-line skaters and other non-motorized vehicle users. These facilities are extremely popular when designed and built correctly. Shared-use paths can serve as transportation or recreation and provide a motor-vehicle free walking or bicycling experience. These pathways may run along streams, abandoned railroads or major corridors. The establishment of greenways serve a transportation purpose, but are also linear park systems. The construction of shared-use paths creates an opportunity to preserve environmentally sensitive lands and wildlife, while serving recreation or transportation needs.



There are a number of proposed shared-use paths included in this Plan. The AASHTO design guidelines provided in the American Association of State Highway and Transportation Officials' Guide for the Planning, Design, and Operation of Pedestrian Facilities (AASHTO, 2004) and the AASHTO Guide for the Development of Bicycle Facilities (AASHTO. 1999) recommends width of shared-use paths 10ft minimum and 2ft shoulders for two-directional traffic. A yellow line should separate the pathway into two lanes and at least 8ft of vertical clearance is required. The right-of-way including the trail, shoulders, drainage and signage placement will need to be at least 20' in width depending on design. Figure A.10 below shows an elevation view of a shared-use path cross section.

Figure A.12 - Shared-use Path Cross-section and Overhead View



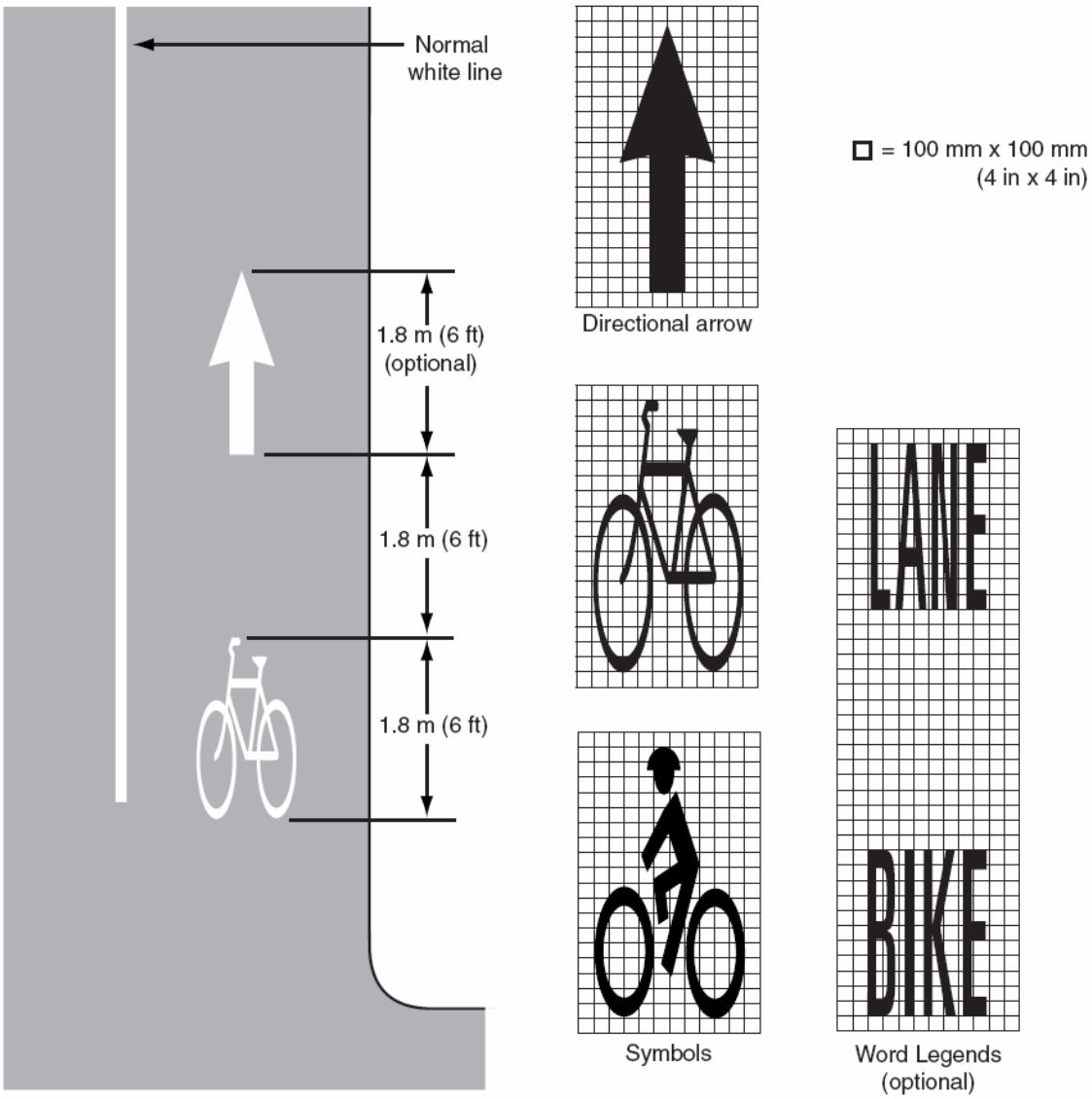
Source: Guide for the Development of Bicycle Facilities, Copyright 1999 by AASHTO. Used by permission.

Additional guidance and standards on shared-use paths can be found at the North Carolina Dept. of Transportation Division of Bicycle and Pedestrian Transportation:
http://www.ncdot.org/transit/bicycle/projects/project_types/Multi_Use_Pathways2.pdf .

Bicycle Lanes

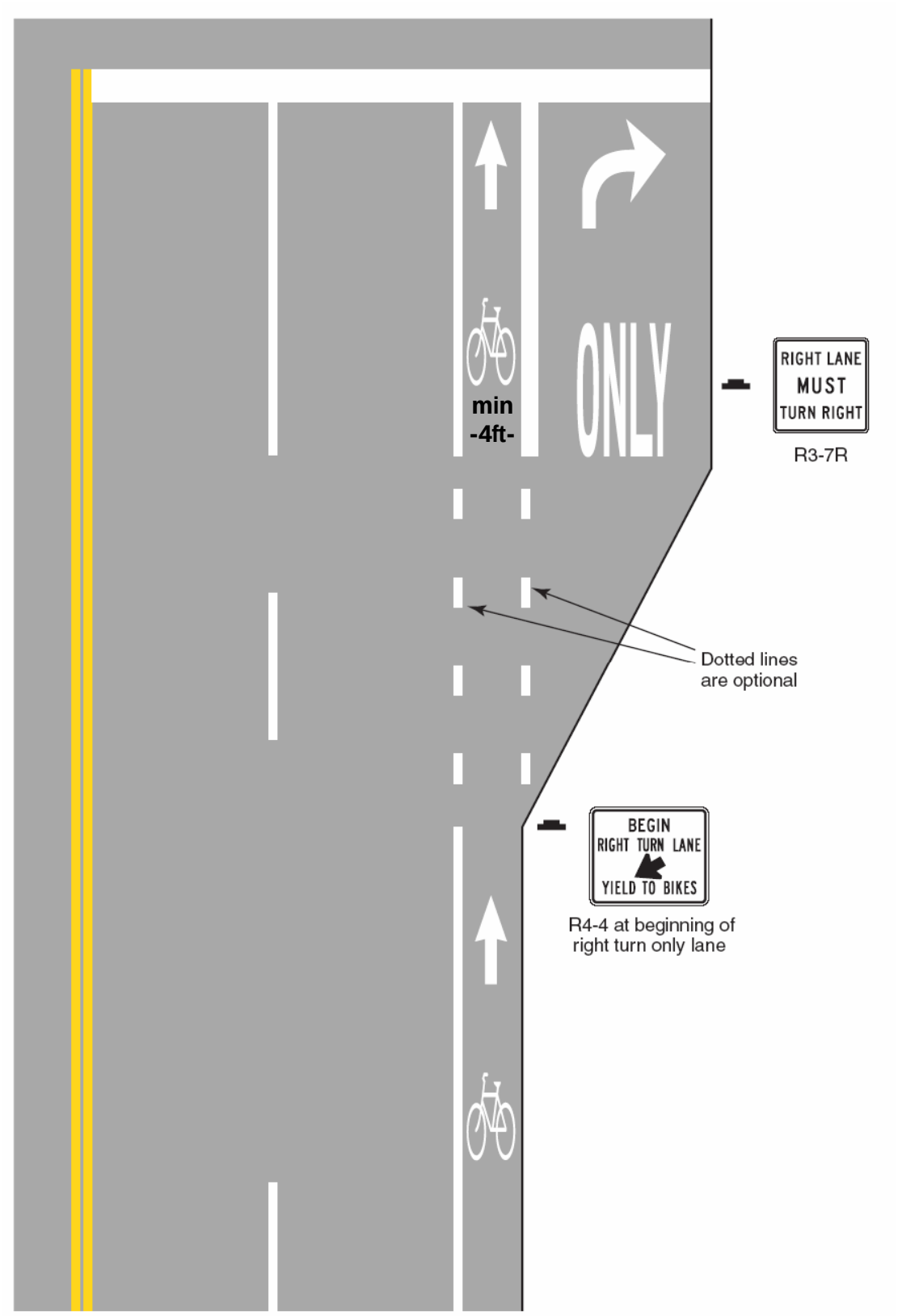
This plan calls for a number of bicycle lane improvements, both in the short term and long term. Bicycle lanes offer a designated bicycle facility in an existing road right-of-way. Bicycle lanes can be installed where existing travel lane width allows or can be incorporated in new or expanded roads.

Figure A.13 - MUTCD Bicycle Lane Markings



Source: MUTCD 2003 Part 9

Figure A.14 – Bicycle Lane Design with a Right Turn Only Lane



Source: MUTCD 2003 Part 9

Shared Roadway

A number of the streets in Elon may not receive near term installation of bicycle facility improvements. However, a number of the more traveled routes include recommendations for signage improvement, including "Share the Road" signs (MUTCD W11-1 & W16-1) found in Figure A.15 below. Flourescent yellow signs are more visible and should be chosen in place of the traditional yellow color shown below. Most municipal sign shops should have the new fluorescent yellow sign color in stock.

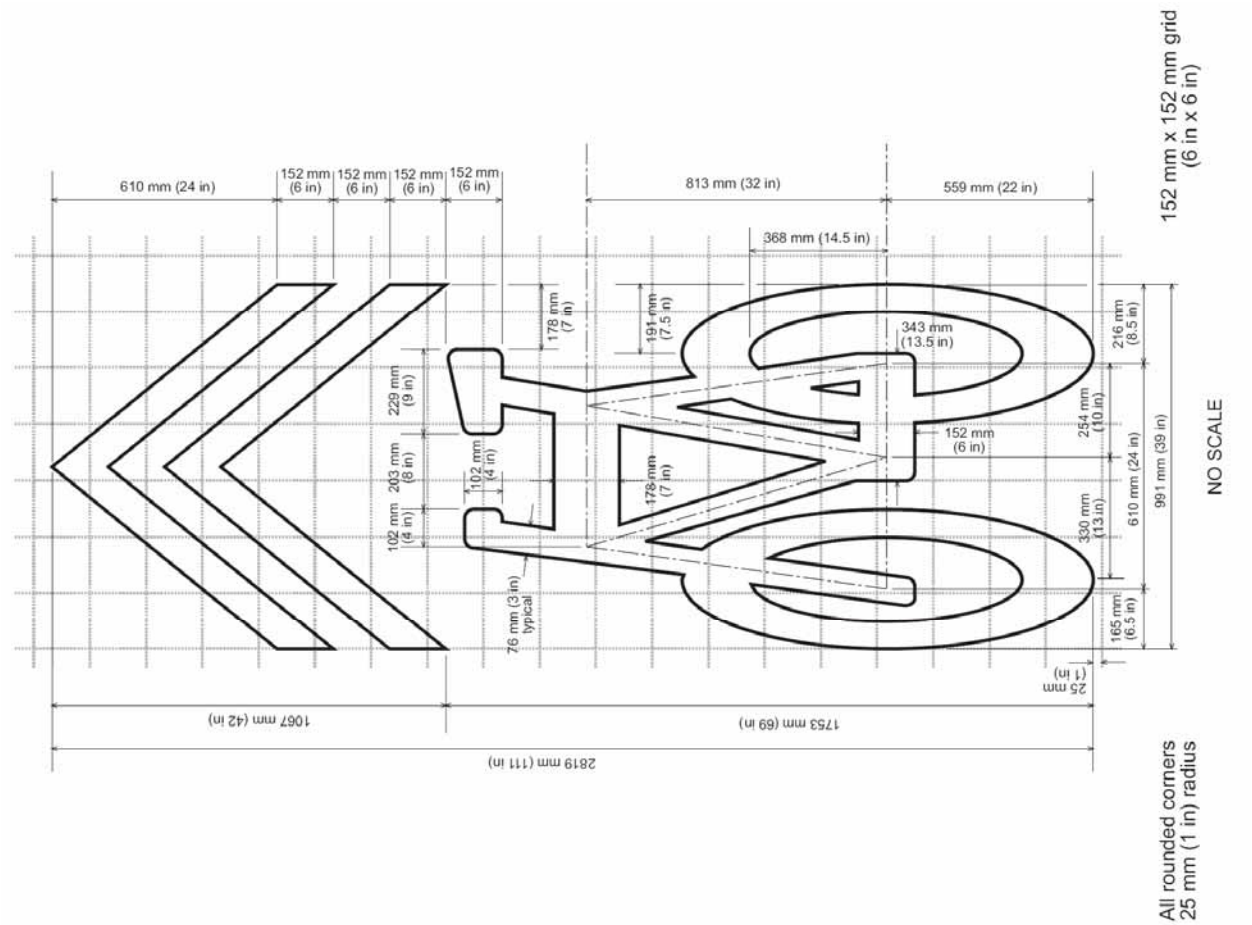
Figure A.15 - Common MUTCD Warning and Informational Signs for Bicyclists

Source: MUTCD 2003 Part 9

A shared roadway marking or sharrow is recommended for Williamson Avenue. The MUTCD approval is scheduled for 2009, based upon experimental success over the past few years in cities across the United States. The sharrow is most commonly recommended on high traffic roads, with adjacent parallel parking. The design serves as a guide to keeping bicyclists away from the door zone of adjacent parked cars.

New sharrows in northwest Portland, OR
(Source: www.bikeportland.org)

Figure A.16 – Shared Roadway Marking

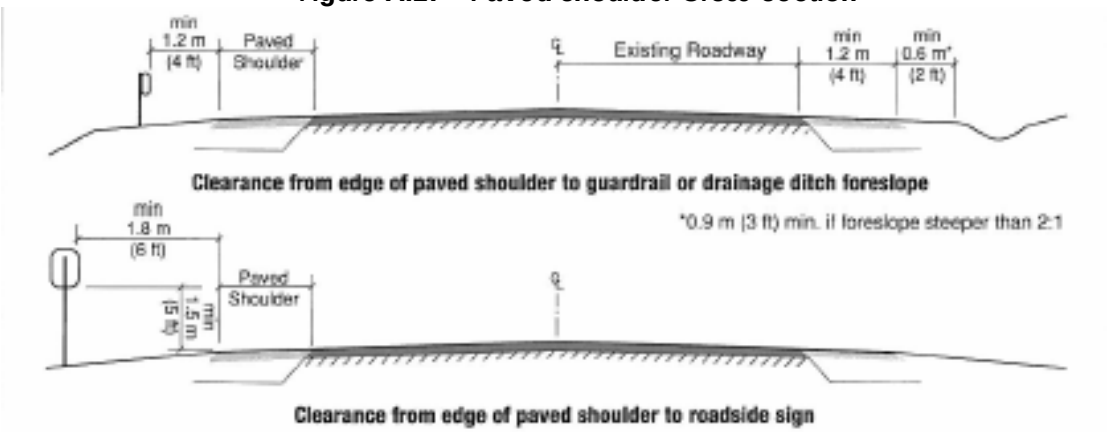


Source: CalTrans Policy Directive 05-10

Paved Shoulders

In addition to bicycle lanes, share the road signs and shared use paths, the addition of paved shoulders on existing roadways outside the downtown can improve the safety and comfort of bicyclists and motorisits on the road. At least 4ft of paved shoulder is recommended for the safety of bicyclists, which also improves the safety of automobile drivers by preventing accidents from automobile wheels getting caught in the dirt shoulder and causing "run-off the road" accidents. In addition, pavement edge deterioration is significantly reduced with the installation of paved shoulders.

Figure A.17 – Paved Shoulder Cross-Section



Source: NC Bicycle Facilities Planning and Design Guidelines

If space constraint does not allow 4ft shoulders, the addition of any additional paved shoulder width will help improve the roadway for bicycling. In contrast, where space allows for shoulders greater than 4ft in width, this option should be explored.

The primary difference between paved shoulders and bicycle lanes is that a paved shoulder is constructed on roads without curb and gutter and a bicycle lane is placed on streets with curb and gutter. Both facilities provide ample space for bicyclists and automobiles to travel the same corridor. On more rural roads with higher posted speeds, paved shoulders are essential to safe multi-modal travel.

A.2 Lighting Guidelines

There are a myriad of different lighting fixture and pole styles available for use today. More sustainable lighting designs and technology are reaching the marketplace weekly. However, some hurdles to new technologies such as solid state lighting (e.g. LEDs) and solar powered light fixtures and arrays continue to prevent widespread use. These hurdles include high upfront costs, unreliable performance, narrow foot candle, lumen losses in fixtures and heat dissipation issues.

The Department of Energy conducts the Commercially Available LED Product Evaluation and Reporting (CALiPER) Program to review the efficacy of newly available LED and solid state lighting applications. The Round 5 tests conducted from January to April 2008 showed an efficacy range of 9 - 59 lumens/watt (e.g. light output vs. power), which compares to a range of 50 – 60 lumens/watt for the existing street lights in Elon. The solid state lighting is currently better suited for areas where less illumination is needed. The SSL or LED fixtures are more efficient at lower wattages than comparable technologies used in street lights, which are designed for higher wattages and greater lumens.

Lighting design is much more flexible than sidewalk or bicycle lane design, free from strict guidance such as the MUTCD manual or ADA accessibility guidelines. Duke Energy provides much of the lighting fixtures in Elon and in neighboring jurisdictions. The Cobra style is a standard Duke Energy fixture and is provided at no charge (except for future electricity and maintenance costs) to municipalities for installation on new streets and developments. The University area has a number of decorative light fixtures that have been provided by different vendors.

Figure A.18 show an array of decorative fixtures available from Duke Energy on the next page. Figure A.19 on the following page shows Duke Energy's Outdoor Lighting Schedule, which the Town currently employs for its streetlights.

Figure A.18 – Lighting Fixtures Available from Duke Energy

FIXTURES *Photos are representative of fixture and pole styles. Actual products and colors may vary slightly. Please inquire about our other fixture/pole combinations.*

DELUXE ACORN
This enhanced Victorian-style fixture adds curb appeal to any walkway or sidewalk and dramatically limits unwanted 'up light.' It is available on multiple pole styles and a mounting height of 12 ft.
Colors: Black Green

SIX-SIDED TRADITIONAL
The six-sided traditional is designed to reduce light pollution while still providing excellent lighting and aesthetics. It is typically used for sidewalk and pathway lighting and is available on multiple pole styles and a mounting height of 12 ft.
Colors: Black Green

DELUXE TRADITIONAL
This elegant colonial style fixture makes a dramatic statement as it lights walkways and pathways and comes on multiple pole styles and a mounting height of 12 ft.
Colors: Black

OPEN TRADITIONAL
This environmentally-friendly fixture provides an installation with curb appeal and is available on multiple pole styles and a mounting height of 12 ft.
Colors: Black Green

ACORN
Reminiscent of turn-of-the-century lights, this is the perfect choice for historic neighborhoods and revitalized downtown areas. Typically used for sidewalk and pathway lighting, it is available on multiple pole styles and a mounting height of 12 ft.
Colors: Black Green

TRADITIONAL
The Traditional fixture fits any neighborhood and provides pathway lighting. It is available on multiple pole styles and a mounting height of 12 ft.
Colors: Black

POST TOP
This attractive colonial style fixture is a perfect residential light and an ideal complement to any home. The post top light mounts on an 8 ft. pole.
Colors: Black

TEARDROP
This beautiful fixture is multifunctional and adds elegance wherever it is placed. The Teardrop is used to light sidewalks, pathways, parking lots and streets and has mounting heights of 15 ft. and 25 ft. There are two options available for brackets.
Colors: Black Green
Available on pole style "C" only.

CUBE
This fixture is the perfect choice wherever large areas are to be covered with lighting, such as in larger parking areas.
Colors: Black Bronze
Available on pole style "A" only.

SHOEBOX
This is an excellent blend of form and functionality that is ideal for illuminating parking lots. It is available in multiple mounting heights and colors.
Colors: Black Bronze Gray Green
Available on pole style "A" only.

COBRA
An ideal fixture for broadly casting light on roadways and increasing drivers' safety. Multiple bracket lengths are available to move lamps beyond tree growth and ensure it is properly directed. It is available in multiple colors and pole heights.
Colors: Black Bronze Gray Green
Available on pole style "A" only.

FLOODLIGHT
Aesthetically pleasing, this directional fixture puts light where you need it most - particularly for security purposes. It is available in multiple colors.
Colors: Black Bronze Gray Green
Available on pole style "A" only.

www.duke-energy.com

Figure A.19 – Duke Energy Outdoor Lighting Service Schedule

Duke Energy Carolinas, LLC

Electricity No. 4
North Carolina Twenty-Fourth Revised Leaf No. 32
Superseding North Carolina Twenty-Third Revised Leaf No. 32

SCHEDULE OL (NC)
OUTDOOR LIGHTING SERVICE

AVAILABILITY (North Carolina Only)
Available to the individual customer for lighting of outdoor areas at locations on the Company's distribution system. Service under this Schedule may be withheld or discontinued at the option of the Company.

RATE:
(A) Bracket-Mounted Luminaires
All-night outdoor lighting service using Company standard equipment mounted on standard poles:

Lamp Rating			Per Month Per Luminaire*		
Lumens	kWh Per Month	Style	Existing Pole (1) *Plus 0.8757 cents/kWh	New Pole *Plus 0.8757 cents/kWh	New Pole Served Underground *Plus 0.8757 cents/kWh
		High Pressure Sodium Vapor			
4,000	21	Post Top (2)	NA	NA	$13.00
9,500	47	Suburban (3)	$ 7.54	$13.24	$17.29
9,500	47	Urban	$ 8.59	$14.29	$18.34
13,000	56	Suburban (4) (in suitable mercury fixture)	$ 8.18	NA	NA
16,000	70	Urban	$ 9.00	$14.70	$18.75
27,500	104	Urban	$10.35	$16.05	$20.10
50,000	156	Urban	$12.20	$17.90	$21.95
		Metal Halide			
9,000	43	Urban	$ 9.99	$15.71	$19.78
40,000	155	Urban	$14.95	$20.65	$24.70
110,000	395	Area	$48.55	$56.05	$60.10
		Mercury Vapor ** (Closed to new installations)			
4,000	41	Post Top (2)	$ 6.19 (5)	NA	$13.00 (6)
7,500	75	Suburban (3)	$ 6.34	$12.04	$16.09
7,500	75	Urban (6)	$ 7.28	$12.98	$17.03
20,000	152	Urban (6)	$ 9.33	$15.03	$19.08

(1) The "Existing Pole" rate is applicable to installations, including pole, installed prior to November 12, 1991. After this date, the "Existing Pole" rate is available only for luminaires attached to poles which are not installed solely to support the luminaire.
(2) Luminaire is not available for the lighting of streets, roadways, and other vehicle thoroughfares.
(3) Closed to new installations on or after July 1, 2005
(4) Closed to new installations on or after September 15, 1985
(5) Closed to new installations on or after November 12, 1991
(6) Closed to new contracts on or after October 1, 2007 for luminares installed before January 1, 2008

** For mercury vapor luminaires installed prior to January 1, 2008, the Company will continue to replace lamps and make repairs other than ballasts, as long as mercury vapor lamps continue to be reasonably available from suppliers. If a ballast replacement is required, the Company will either convert the luminaire to another luminaire of similar size and lumen output where the luminaire can utilize reasonably available compatible ballast, or provide the closest size high pressure sodium luminaire under the applicable rate for the modified luminaire.

(B) Other Luminaires
Decorative and non-standard luminaires can be installed on request, at the Company's option, at the rate in (A) above plus an extra monthly charge equal to 1.7% of the estimated difference in cost installed between the luminaire and structure requested and the equivalent luminaire and wood pole in (A) above.

(C) Underground Charges
(1) Additional monthly charge for the underground conductor system:

Feet Per Pole	From Overhead System	From Underground System
Over 150 feet	$.07 for each increment of 10 feet, less, over 150 feet	$.07 for each increment of 10 feet, less, over 150 feet

(2) When the installation requires the cutting and replacing of pavement of more than one drive or one walkway per luminaire, 1.7% of the estimated cost of this cutting and replacing of pavement will be added to the charges above.
(3) When an installation is in an area served by a concrete-encased duct system, additional charges stated above will not apply and, instead, the additional monthly charge will be 1.7% of the estimated cost of the underground conductor system.
(4) An underground conductor system, up to 150 feet per pole, can be installed to an existing pole under the "Existing Pole" rate in (A) above, for an additional monthly charge of $4.05 per pole. For installations over 150 feet per pole, the charges under (C) (1) above will apply in addition to the $4.05 charge.

A.3 Cost Estimates for Typical Sidewalk, Bicycle Lane and Shared-use Path Improvements[1]

The following cost estimates may be used in estimating the provision of resources to fund projects outlined in this plan and are current for 2008. In many cases, costs may significantly vary based upon geology, topography and market fluctuations in labor and material costs. It is recommended that cost updates be appended to this report every year to reflect current trends. New cost estimates can be requested from the NCDOT Bicycle and Pedestrian Program or from the Pedestrian and Bicycling Information Center.

Figure A.20 - General Pedestrian Facility Cost Estimates

Pedestrian Facilities		
Facility	**Unit**	**Unit Cost**
*Sidewalk	Linear foot	$75 when curb and gutter is included $50 when curb and gutter is not included
High-Visibility Crosswalk (Thermoplastic)	Linear foot	$500
Parallel line Crosswalk (Paint)	Linear foot	$300
Raised Crosswalk (Speed Table)	Linear foot	$2,500
Speed Hump	Linear foot	$1,700-$2,000
Refuge Island	Per Location	$10,000-$40,000
Pedestrian Signal	Per Location	$40,000-$75,000
Pedestrian Signs	Single sign	$250-$350
Curb Extension	Per corner	$5,000-$10,000
Curb Ramp	Per corner	$1,200

*Cost includes clearing, grubbing and grading. Geotextile cost or other major costs, including utility relocation, are not included in estimates.

Figure A.21 - General Bicycle Facility Cost Estimates

On-Road Bicycle Facilities		
Facility	**Unit**	**Unit Cost**
Install bicycle route signs	Per sign	$250-$350
Install bicycle lanes (on existing pavement or during repaving)	Linear mile	$14,000
Restripe roadway for wide outside lanes	Linear mile	$14,000
Remove existing markings (lane removal or lane width reduction) and install bicycle lanes	Linear mile	$48,000
Install shared lane markings (on existing pavement or during repaving)	Linear mile	$8,000
Construct wide outside lanes (additional lane pavement added during roadway construction)	Linear mile	$300,000

[1] Provided by the NCDOT Bicycle and Pedestrian Program (April 2008)

Bicycle Parking Facilities

Facility	Unit	Unit Cost
Bicycle rack (purchase and install)	One rack	$700
Bicycle locker (purchase and install)	One locker	$2,000

Figure A.22 – Shared Use Facility Cost Estimates

Shared-Use Pedestrian and Bicycle Facilities

Facility	Unit	Unit Cost
*Construct 10-foot shared-use path	Linear foot Linear mile	$133 $700,000
*Construct 10-foot sidepath or widen existing sidewalk to 8 feet for ped/bike use	Linear foot Linear mile	$133 $700,000
Construct 10-foot crushed stone walkway	Linear foot Linear mile	$15-$25 $80,000-$106,000
Construct 6- to 8-foot wooden or recycled synthetic material boardwalk	Linear foot Linear mile	$200-$250 $1,000,000-$1,300,000

*Cost includes clearing, grubbing and grading. Geotextile cost or other major costs, including utility relocation, are not included in shared-use path or sidepath estimates. Shared-use paths and sidepaths are asphalt, with 2" asphalt and 6" aggregate base course.

A.4 Project Prioritization

Prioritizing projects is an important part of this plan. The ranking of projects will help the Town Planner and Administration decide which projects to pursue first. In many cases opportunities will arise that allow lower ranked projects to be built first (e.g. an NCDOT road project, road resurfacing plans, private funding, etc.). This section explains in more detail what factors were used to develop a prioritization list for sidewalks, bicycle facilities, intersection improvements and shared-use path projects.

Sidewalk Project Prioritization Factors

The following prioritization factors have been weighted and are used to determine the prioritization of sidewalk **corridor** projects. The total maximum score possible from the following factors is 27.

Public comments

- The improvements that received a total of 5 to 10 comments in the surveys or public meetings get 3 points, improvements that received 11 to 20 comments get 4 points and improvements that received over 20 comments get 5 points.

Proximity to schools zones

- The improvement receives a score of 3 points if a portion of the project lies within ¼ mile of a school or 2 points if within ½ mile of school.

Proximity to parks and recreation

- The improvement receives a score of 3 points if a portion of the project lies within ¼ mile of a park or 2 points if within ½ mile of park.

Crashes

- The improvement receives a score of 2 points if a pedestrian/vehicle or bicycle/vehicle crash occurred along the corridor. The crashes are based on the Elon Police Department records for 2001-2006.

Small gaps

- Those projects that are less than 1,000 ft in length of sidewalk and are joined by existing sidewalk on both ends of the project will receive a score of 2 points.

Road type

- Those projects that are along roadways that carry more than 1,500 average annual daily traffic (AADT) will receive a score of 3 points – primarily arterial and collector streets. There are some streets that may be considered local, but carry more than 1,500 AADT and will also receive a score of 3 points.

Compatible land use

- Projects that are along roadways abutting land use that is either downtown, commercial, institutional or multi-family residential receives a score of 3 points.

Curb and gutter existing

- Projects along roadways that already have curb and gutter existing receive a score of 2 points. Streets with curb and gutter are less expensive to retrofit with sidewalk. If there are road projects that include curb and gutter, the option of installing a sidewalk during road construction should be explored for cost efficiency.

Connectivity to existing sidewalk

- If the project connects to an existing sidewalk, that project will receive 2 points. The project does not need to connect to a sidewalk on both ends, just one.

Proximity to transit

- The improvement receives a score of 2 points if it connects to or lies along an existing transit route.

Bicycle Project Prioritization Factors

The following prioritization factors have been weighted and are used to determine the prioritization of **bicycle corridor** projects. The total maximum score possible from the following factors is 20.

Direct Access to a Park

- The improvement receives a score of 2 points if a portion of the project lies within ½ mile of a park or recreation facility. These facilities include all Town and University parks and fields.

Direct Access to a School or University

- The improvement receives a score of 3 points if a portion of the project lies within ½ mile of a school. The projects that provide a direct connection to school also receive this 4 point score.

Average Daily Traffic (ADT)

- The improvement receives a score of 3 points if the ADT is > 10,000 vehicles, 2 points if the ADT is between 5,000 and 10,000 vehicles and one point if the ADT is between 1,500 and 5,000 vehicles.

Speed Limit

- The improvement receives a score of 3 points if the speed limit is 55mph or over, 2 points if the limit is between 45-54 mph and 1 point if the limit is between 35-44 mph.

Transit Route Connectivity

- The improvement receives a score of 2 points if it connects with an existing transit route.

Crashes

- The improvement receives a score of 2 points if 1 or more pedestrian/vehicle or bicycle/vehicle crashes occurred along the corridor. The crashes are based on the Elon Police Department records for 2001-2006.

Connect to a Proposed or Existing greenway

- If the project intersects with a proposed shared-use path as described in the Town's Land Development plan or this plan or to an existing shared-use path, the project receives a score of 2 points.

Direct Access to a Commercial District

- Projects that are along roadways abutting land use that is either downtown, commercial, institutional or multi-family residential receives a score of 3 points.

Intersection Improvement Prioritization

The intersections identified for improvement have not been prioritized. The reasonably low cost for intersection redesign or retrofit can be accomplished on all intersections in a relatively short time period, possible in less than 5 years. The specific improvements outlined in Chapter 3 should be incorporated into the Metropolitan Transportation Improvement Program.

Shared Use Path Prioritization

The top three shared-use path projects were ranked by the plan task force. The criteria used to determine which improvements to select were based upon estimated cost, ability to leverage NCDOT resources and proximity to the existing shared-use path on University Drive.

A.5 Project Cost Estimates and Phasing Tables

Figure A.23 - Sidewalk Project Cost Estimates and Phasing

Project ID	Side	Street	From	To	Length (ft)	Score Total**	Cost Per Foot*	Additional Expense	Total Cost	Notes
S-693, S-694, S-695	W	WILLIAMSON AVENUE	EXISTING SIDEWALK	CHURCH STREET	7,320	23	$75		$549,000	Alternate option is to locate the sidewalk behind the ditch and swale, some curb and gutter
S-612	N	E LEBANON AVENUE	S OAK STREET	KERR AVENUE	610	22	$75		$45,750	
S-617	N	W LEBANON AVENUE	CHURCH STREET	MANNING AVENUE	520	22	$50		$26,000	
S-619, S-690	N	W HAGGARD AVENUE	UNIVERSITY DRIVE	HOLT AVENUE	1,965	22	$50		$98,250	
S-626, S-687	N	E HAGGARD AVENUE	LAWRENCE AVENUE	UNIVERSITY DRIVE	6,110	22	$50		$305,500	
S-607	S	E TROLLINGER AVENUE	S OAK STREET	ANTIOCH AVENUE	880	21	$75		$66,000	
S-594	S	W TROLLINGER AVENUE	CHURCH STREET	HOLT AVENUE	1,450	21	$50		$72,500	
S-579, S-613, S-610	W	OAK STREET	E HAGGARD AVENUE	TOWN LINE	2,080	20	$75	$10,000	$166,000	Extra fill required south of Trollinger Avenue
S-712	E	MANNING AVENUE	LAUREL OAK STREET	E HAGGARD AVENUE	1,520	17	$75		$114,000	
S-588, S-589, S-627	S	E HAGGARD AVENUE	EXISTING SIDEWALK	UNIVERSITY DRIVE	5,110	13	$75		$383,250	
S-704, S-705, S-706	W	WESTBROOK AVENUE	MACLEAN DRIVE	CHURCH STREET	6,890	13	$75		$516,750	
S-711	E	S O KELLEY AVENUE	WOODALE DRIVE	TROLLINGER AVENUE	1,470	11	$50		$73,500	
S-628	E	TRUITT DRIVE	WINDSOR WAY	S OAK STREET	1,950	11	$50		$97,500	
S-689	N	WESTGATE DRIVE	WESTBROOK AVENUE	WILLIAMSON AVENUE	1,710	0	$75		$128,250	

Est. Cost	
Up to 5 Years	**$1,329,000**
Up to 10 Years	**$1,313,250**
Total	**$2,642,250**

Total Sidewalk/ft 39,585

Total Sidewalk/mi 7.5

*Estimates based on 2008 NCDOT Bike Ped Program Estimates, cost varies depending on whether curb and gutter exists

**Score Total based on priority scoring explained in the appendix

Figure A.24 - Shared Use Path Project Cost Estimates and Phasing

Project Id	*Locations*	*Length (ft)*	*Width (ft)*	*Surface*	*Rank*	*Estimated Cost Per Foot **	*Additional Expense***	*Additional Expense Desc.*	*Total****
P-20	UNIVERSITY DRIVE	4,900	10	PAVED	1	$133			$782,040
P-31	SCHMIDT PARK AND BALL PARK AVENUE CONNECTOR	3,000	10	PAVED	2	$133	$12,500	50 FT OF BOARDWALK	$493,800
P-43	RAMP FROM TWIN LAKES TO MULTI-USE PATH	100	10	PAVED	3	$133	$5,000		$21,960
P-30	RAILROAD CONNECTOR TO UNIVERSITY DRIVE	1,700	10	PAVED	n/a	$133			$271,320
P-32	TWIN LAKES CONNECTOR TO UNIVERSITY DRIVE	1,400	10	PAVED	n/a	$133			$223,440
P-33, P-44	OKELLEY, WESTOVER AND MILLPOINT CONNECTOR	1,300	10	PAVED	n/a	$133			$207,480
P-37	SCHMIDT PARK PATH IMPROVEMENT	730	10	PAVED	n/a	$133			$116,508
P-41	NEAL STREET CONNECTOR	690	10	NATURAL	n/a	$25	$12,500	50 FT OF BOARDWALK	$35,700
P-42	MOUNTAINS TO SEA TRAIL CONNECTOR	18,500	10	NATURAL	n/a	$25	$42,750	25 FT BRIDGE	$606,300
P-45	FORESTVIEW DRIVE AND NEAL STREET CONNECTOR	300	10	PAVED	n/a	$133			$47,880
P-46	ARBOR DRIVE AND HUTCHINSON CT CONNECTOR	200	10	PAVED	n/a	$133			$31,920
	Total Shared Use Path/ft	**32,820**							
	Total Shared Use Path/mi	**6.2**							

	Est. Cost
Up to 5 Years	**$1,297,800**
Up to 20 Years	**$1,540,548**
Total	**$2,838,348**

*Estimates based on 2008 NCDOT Cost Estimate
**Estimates based on 2007 Eden Greenway Plan
***Total Includes a 20% Fringe cost for engineering

Figure A.25 - Bicycle Facility Project Cost Estimates and Phasing

Project ID	Street	From/To	Lane Width (ft)	Length (ft)	Score Total	Short-Term Improvement Up to 5 Years	Mid-Term Improvement Up to 10 Years	Long-Term Improvement Up to 20 Years	Short-Term Base Cost**	Mid-Term Base Cost**	Long-Term Base Cost**	Short Term Cost (Est. $2008)	Mid-Term Cost (Est. $2008)	Long-Term Cost (Est. $2008)	Notes
B-2, B-3, B-4, B-23, B-24, B-25	WILLIAMSON AVENUE & ST. MARKS CHURCH ROAD	PHEONIX DRIVE TO RURAL RETREAT ROAD	12 to 22	15,570	19	Sharrow* from Haggard to Trollinger	Bicycle lane with road reconstruction		$8,000	$300,000		$1,500	$880,000		Sharrow is a shared lane marking
B-18, B-19	HAGGARD AVENUE	OAK STREET TO UNIVERSITY DRIVE	15 to 20	6,875	17	Restripe existing roadway for bicycle lanes			$14,000			$18,000			Existing width allows for immediate installation of bicycle lanes
B-15	HAGGARD AVENUE	W WEBB AVENUE TO OAK STREET	12	6,950	16	Share the road signs			$350			$2,800			8 signs
B-5, B-35, B-36	WESTBROOK AVENUE	CHURCH STREET TO MACLEAN DRIVE	10	10,400	13		Bicycle lane with road reconstruction			$300,000			$590,000		
B-37	MANNING AVENUE	ETJ LIMITS TO W HAGGARD AVENUE	9 to 12	7,450	13		4 foot paved shoulder with road resurfacing			$300,000			$420,000		
B-12, B-13	N O'KELLEY AVENUE	E HAGGARD AVENUE TO UNIVERSITY DRIVE	9	2,630	12	Share the road signs			$350			$1,100			3 signs
B-40	SHALLOWFORD CHURCH ROAD AND WILLIAMSON AVENUE	ETJ LIMITS TO PHEONIX DRIVE	10	7,910	12		4 foot paved shoulder with road resurfacing			$300,000			$450,000		
B-6	UNIVERSITY DRIVE	W HAGGARD AVENUE TO WESTBROOK AVENUE	10	4,900	11		4 foot paved shoulder with road reconstruction			$300,000			$280,000		
B-8, B-9, B-14, B-16	UNIVERSITY DRIVE	W HAGGARD AVENUE TO E HAGGARD AVENUE	12 to 15	11,290	10		4 foot paved shoulder with road resurfacing			$300,000			$640,000		
B-26	OAK & FRONT STREETS	E HAGGARD AVENUE TO BRIERCLIFF ROAD	10 to 18	6,300	10	Share the road signs	Bicycle lane with road reconstruction		$350	$300,000		$700	$360,000		2 signs
B-31	MANNING & W LEBANON AVENUE	W HAGGARD AVENUE TO OAK STREET	9 to 12	4,900	10	Share the road signs			$350			$1,400			4 signs
B-28	TROLLINGER AVENUE	BALL PARK AVENUE TO OAK STREET	11	5,300	9	Share the road signs			$350			$1,400			4 signs
B-11	PHOENIX DRIVE	OKELLEY AVENUE TO WILLIAMSON AVENUE	12	2,100	7	Share the road signs			$350			$700			2 signs
B-29	CHURCH STREET	HAGGARD AVENUE TO TROLLINGER AVENUE	9	620	6	Share the road signs			$350			$700			2 signs
B-32	COOK ROAD	BURLINGTON STREET TO CROFTWOOD DRIVE	10	2,100	6	Share the road signs	Preserve bicycle/pedestrian access across RR when road closes		$350			$700			2 signs
B-39	ELON-OSSIPPEE ROAD	ETJ LIMITS TO SHALLOWFORD CHURCH ROAD	10 to 15	5,260	6			4 foot paved shoulder with road resurfacing			$300,000			$300,000	
B-34	TRUITT DRIVE	OAK STREET TO CITY LIMITS	15	3,600	2	Stripe edgeline to narrow travel lanes to 10 feet			$14,000			$9,500			Distance outside of edgeline will vary from 2 to 5ft
		Total Bicycle Lane/Shoulder ft		**63,985**											
		Total Bicycle Lane/Shoulder mi		**12.1**											

Est. Cost	
Up to 5 Years	**$38,500**
Up to 10 Years	**$3,620,000**
Up to 20 Years	**$300,000**
Total	**$3,958,500**

*Pending 2009 MUTCD Approval for Sharrow Installation

**Based on NCDOT 2008 Cost Estimates

A.6 Review of Funding Opportunities[2]

Local, state, federal, and private funding is available to support the planning, construction, right of way acquisition and maintenance of bicycle and pedestrian facilities. Available funding sources are related to a variety of purposes including transportation, water quality, hazard mitigation, recreation, air quality, wildlife protection, community health, and economic development. This appendix identifies a list of some of the bicycle and pedestrian facility funding opportunities available through federal, state, nonprofit and corporate sources. An important key to obtaining funding is for local governments to have adopted plans for greenway, bicycle, pedestrian or trail systems in place prior to making an application for funding.

Funding Allocated by State Agencies

Funding Opportunities Through NCDOT:

Bicycle and Pedestrian Independent Projects Funded Through the Transportation Improvement Program (TIP):

In North Carolina, the Department of Transportation, Division of Bicycle and Pedestrian Transportation (DBPT) manages the Transportation Improvement Program (TIP) selection process for bicycle and pedestrian projects.

Projects programmed into the TIP are independent projects – those which are not related to a scheduled highway project. Incidental projects – those related to a scheduled highway project – are handled through other funding sources described in this section.

The division has an annual budge of $6 million. Eighty percent of these funds are from STP-Enhancement funds[3], while the State Highway Trust provides the remaining 20 percent of the funding.

Each year, the DBPT regularly sets aside a total of $200,000 of TIP funding for the department to fund projects such as training workshops, pedestrian safety and research projects, and other pedestrian needs statewide. Those interested in learning about training workshops, research and other opportunities should contact the DBPT for information.

[2] Provided by the NCDOT Bicycle and Pedestrian Program (April 2008)

[3] After various administrative adjustments for programs within the Surface Transportation Program, or "STP", there is a 10% set-aside for Transportation Enhancements. The 10% set-aside is allocated within NCDOT to internal programs such as the Bicycle/Pedestrian Division, the Rail Division, the Roadside Environmental Unit, and others. The Enhancement Unit administers a portion of the set-aside through the Call for Projects process.

A total of $5.3 million dollars of TIP funding is available for funding various bicycle and pedestrian independent projects, including the construction of shared-use trails, the striping of bicycle lanes, and the construction of paved shoulders, among other facilities. Prospective applicants are encouraged to contact the DBPT regarding funding assistance for bicycle and pedestrian projects. For a detailed description of the TIP project selection process, visit: http://www.ncdot.org/transit/bicycle/funding/funding_TIP.html. Another $500,000 of the division's funding is available for miscellaneous projects.

Incidental Projects – Bicycle and pedestrian accommodations such as bike lanes, widened paved shoulders, sidewalks and bicycle-safe bridge design are frequently included as incidental features of highway projects. In addition, bicycle-safe drainage grates are a standard feature of all highway construction. Most bicycle and pedestrian safety accommodations built by NCDOT are included as part of scheduled highway improvement projects funded with a combination of National Highway System funds and State Highway Trust Funds.

Sidewalk Program – Each year, a total of $1.4 million in STP-Enhancement funding is set aside for sidewalk construction, maintenance and repair. Each of the 14 highway divisions across the state allocates $100,000 annually from each division's budget for this purpose. Funding decisions are made by the district engineer. Prospective applicants are encouraged to contact their district engineer for information on how to apply for funding.

Governor's Highway Safety Program (GHSP) – The mission of the GHSP is to promote highway safety awareness and reduce the number of traffic crashes in the state of North Carolina through the planning and execution of safety programs. GHSP funding is provided through an annual program, upon approval of specific project requests. Amounts of GHSP funds vary from year to year, according to the specific amounts requested. 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. Evidence of reductions in crashes, injuries, and fatalities is required. For information on applying for GHSP funding, visit: www.ncdot.org/programs/ghsp/.

Funding Available Through North Carolina Metropolitan Planning Organizations (MPOs)

MPOs in North Carolina which are located in air quality nonattainment or maintenance areas have the authority to program Congestion Mitigation Air Quality (CMAQ) funds. CMAQ funding is intended for projects that reduce transportation related emissions. Some NC MPOs have chosen to use the CMAQ funding for bicycle and pedestrian projects. Local governments in air quality nonattainment or maintenance area should contact their MPO for information on CMAQ funding opportunities for bicycle and pedestrian facilities.

Transportation Enhancement Call for Projects, EU, NCDOT

The Enhancement Unit administers a portion of the enhancement funding set-aside through the Call for Projects process. In North Carolina the Enhancement

Program is a federally funded cost reimbursement program with a focus upon improving the transportation experience in and through local North Carolina communities either culturally, aesthetically, or environmentally. The program seeks to encourage diverse modes of travel, increase benefits to communities and to encourage citizen involvement. This is accomplished through the following twelve qualifying activities:

1. Bicycle and Pedestrian Facilities
2. Bicycle and Pedestrian Safety
3. Acquisition of Scenic Easements, Scenic or Historic Sites
4. Scenic or Historic Highway Programs (including tourist or welcome centers)
5. Landscaping and other Scenic Beautification
6. Historic Preservation
7. Rehabilitation of Historic Transportation Facilities
8. Preservation of Abandoned Rail Corridors
9. Control of Outdoor Advertising
10. Archaeological Planning and Research
11. Environmental Mitigation
12. Transportation Museums

Funds are allocated based on an equity formula approved by the Board of Transportation. The formula is applied at the county level and aggregated to the regional level. Available fund amount varies. In previous Calls, the funds available ranged from $10 million to $22 million.

The Call process takes place on even numbered years or as specified by the Secretary of Transportation. The Next Call is anticipated to take place in 2009. For more information, visit: www.ncdot.org/financial/fiscal/Enhancement/

Bicycle and Pedestrian Planning Grant Initiative, managed by NCDOT, DBPT

To encourage the development of comprehensive local bicycle plans and pedestrian plans, the NCDOT Division of Bicycle and Pedestrian Transportation (DBPT) and the Transportation Planning Branch (TPB) have created a matching grant program to fund plan development. This program was initiated through a special allocation of funding approved by the North Carolina General Assembly in 2003 along with federal funds earmarked specifically for bicycle and pedestrian planning by the TPB. The planning grant program was launched in January 2004, and it is currently administered through NCDOT-DBPT and the Institute for Transportation Research and Education (ITRE) at NC State University. Over the past three grant cycles, 48 municipal plans have been selected and funded from 123 applicants. A total of $ 1,175,718 has been allocated. Funding is secured for 2007 at $400,000. Additional annual allocations will be sought for subsequent years. For more information, visit www.itre.ncsu.edu/ptg/bikeped/ncdot/index.html

Safe Routes to School Program, managed by NCDOT, DBPT

The NCDOT Safe Routes to School Program is a federally funded program that was initiated by the passing of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005, which establishes a national SRTS program to distribute funding and institutional support to implement SRTS programs in states and communities across the country. SRTS programs facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools. The Division of Bicycle and Pedestrian Transportation at NCDOT is charged with disseminating SRTS funding.

The state of North Carolina has been allocated $15 million in Safe Routes to School funding for fiscal years 2005 through 2009 for infrastructure or non-infrastructure projects. All proposed projects must relate to increasing walking or biking to and from an elementary or middle school. An example of a non-infrastructure project is an education or encouragement program to improve rates of walking and biking to school. An example of an infrastructure project is construction of sidewalks around a school. Infrastructure improvements under this program must be made within 2 miles of an elementary or middle school. The state requires the completion of a competitive application to apply for funding. For more information, visit www.ncdot.org/programs/safeRoutes/ or contact Leza Mundt at DBPT/NCDOT, (919) 807-0774.

Small Urban Funds managed by NCDOT Highway Division Offices

Small Urban Funds are available for small improvement projects in urban areas. Each NCDOT Highway Division has $2 million of small urban funds available annually. Although not commonly used for bicycle facilities, local requests for small bicycle projects can be directed to the NCDOT Highway Division office for funding through this source. A written request should be submitted to the Division Engineer providing technical information such as location, improvements being requested, timing, etc. for thorough review.

Hazard Elimination Program by NCDOT Highway Division Offices

This program focuses on projects intended for locations that should have a documented history of previous crashes. Bicycle and pedestrian projects are eligible for this program, although the funds are not usually used for this purpose. This program is administered through the NCDOT Division of Highways. Similar to the Small Urban Funds, it is a significantly limited funding source.

The North Carolina Conservation Tax Credit (managed by NCDENR)

This program, managed by the North Carolina Department of Environment and Natural Resources, provides an incentive (in the form of an income tax credit) for landowners that donate interests in real property for conservation purposes. Property donations can be fee simple or in the form of conservation easements or bargain sale. The goal of this program is to manage stormwater, protect water

supply watersheds, retain working farms and forests, and set-aside greenways for ecological communities, public trails, and wildlife corridors. For more information, visit: www.enr.state.nc.us/conservationtaxcredit/.

Land and Water Conservation Fund (LWCF)

The Land and Water Conservation Fund (LWCF) program is a reimbursable, 50/50 matching grants program to states for conservation and recreation purposes, and through the states to local governments to address "close to home" outdoor recreation needs. LWCF grants can be used by communities to build a trail within one park site, if the local government has fee-simple title to the park site. Grants for a maximum of $250,000 in LWCF assistance are awarded yearly to county governments, incorporated municipalities, public authorities and federally recognized Indian tribes. The local match may be provided with in-kind services or cash. The program's funding comes primarily from offshore oil and gas drilling receipts, with an authorized expenditure of $900 million each year. However, Congress generally appropriates only a small fraction of this amount. The allotted money for the year 2007 is $632,846.

The Land and Water Conservation Fund (LWCF) has historically been a primary funding source of the US Department of the Interior for outdoor recreation development and land acquisition by local governments and state agencies. In North Carolina, the program is administered by the Department of Environment and Natural Resources. Since 1965, the LWCF program has built a permanent park legacy for present and future generations. In North Carolina alone, the LWCF program has provided more than $63 million in matching grants to protect land and support more than 800 state and local park projects. More than 37,000 acres have been acquired with LWCF assistance to establish a park legacy in our state. For more information, visit: http://ils.unc.edu/parkproject/lwcf/home1.html

NC Adopt-A-Trail Grant Program

This program, operated by the Trails Section of the NC Division of State Parks, offers annual grants to local governments to build, renovate, maintain, sign and map and create brochures for pedestrian trails. Grants are generally capped at about $5,000 per project and do not require a match. A total of $108,000 in Adopt-A-Trail money is awarded annually to government agencies. Applications are due during the month of February. For more information, visit : http://ils.unc.edu/parkproject/trails/grant.html.

Recreational Trails Program

The Recreational Trails Program (RTP) is a grant program funded by Congress with money from the federal gas taxes paid on fuel used by off-highway vehicles. This program's intent is to meet the trail and trail-related recreational needs identified by the Statewide Comprehensive Outdoor Recreation Plan. Grant applicants must be able contribute 20% of the project cost with cash or in-kind contributions. The program is managed by the State Trails Program, which is a section of the N.C. Division of Parks and Recreation.

The grant application is available and instruction handbook is available through the State Trails Program website at http://ils.unc.edu/parkproject/trails/home.html. Applications are due during the month of February. For more information, call (919) 715-8699.

North Carolina Parks and Recreation Trust Fund (PARTF)

The fund was established in 1994 by the North Carolina General Assembly and is administered by the Parks and Recreation Authority. Through this program, several million dollars each year are available to local governments to fund the acquisition, development and renovation of recreational areas. Applicable projects require a 50/50 match from the local government. Grants for a maximum of $500,000 are awarded yearly to county governments or incorporated municipalities. The fund is fueled by money from the state's portion of the real estate deed transfer tax for property sold in North Carolina.

The trust fund is allocated three ways:

- 65 percent to the state parks through the N.C. Division of Parks and Recreation.
- 30 percent as dollar-for dollar matching grants to local governments for park and recreation purposes.
- 5 percent for the Coastal and Estuarine Water Access Program.

For information on how to apply, visit:: www.partf.net/learn.html

Powell Bill Program

Annually, State street-aid (Powell Bill) allocations are made to incorporated municipalities which establish their eligibility and qualify as provided by statute. This program is a state grant to municipalities for the purposes of maintaining, repairing, constructing, reconstructing or widening of local streets that are the responsibility of the municipalities or for planning, construction, and maintenance of bikeways or sidewalks along public streets and highways. Funding for this program is collected from fuel taxes. Amount of funds are based on population and mileage of town-maintained streets. For more information, visit www.ncdot.org/financial/fiscal/ExtAuditBranch/Powell_Bill/powellbill.html.

Clean Water Management Trust Fund

This fund was established in 1996 and has become one of the largest sources of money in North Carolina for land and water protection. At the end of each fiscal year, 6.5 percent of the unreserved credit balance in North Carolina's General Fund, or a minimum of $30 million, is placed in the CWMTF. The revenue of this fund is allocated as grants to local governments, state agencies and conservation non-profits 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. The fund has provided funding for land acquisition of numerous greenway projects featuring trails, both paved and unpaved. For a history of awarded grants in North Carolina and more information about this fund and applications, visit www.cwmtf.net/.

Natural Heritage Trust Fund

This trust fund, managed by the NC Natural Heritage Program, has contributed millions of dollars to support the conservation of North Carolina's most significant natural areas and cultural heritage sites. The NHTF is used to acquire and protect land that has significant habitat value. Some large wetland areas may also qualify, depending on their biological integrity and characteristics. Only certain state agencies are eligible to apply for this fund, including the Department of Environment and Natural Resources, the Wildlife Resources Commission, the Department of Cultural Resources and the Department of Agriculture and Consumer Services. As such, municipalities must work with State level partners to access this fund. Additional information is available from the NC Natural Heritage Program. For more information and grant application information, visit www.ncnhtf.org/.

North Carolina Conservation Tax Credit Program

North Carolina has a unique incentive program to assist land-owners to protect the environment and the quality of life. A credit is allowed against individual and corporate income taxes when real property is donated for conservation purposes. Interests in property that promote specific public benefits may be donated to a qualified recipient. Such conservation donations qualify for a substantial tax credit. For more information, visit: www.enr.state.nc.us/conservationtaxcredit/.

Urban and Community Forestry Assistance Program

This program offers small grants that can be used to plant urban trees, establish a community arboretum, or other programs that promote tree canopy in urban areas. The program operates as a cooperative partnership between the NC Division of Forest Resources and the USDA Forest Service, Southern Region. To qualify for this program, a community must pledge to develop a street-tree inventory, a municipal tree ordinance, a tree commission, and an urban forestry-management plan. All of these can be funded through the program. For more information, contact the NC Division of Forest Resources. For more information and a grant application, contact the NC Division of Forest Resources and/or visit http://www.dfr.state.nc.us/urban/urban_grantprogram.htm.

Ecosystem Enhancement Program

Developed in 2003 as a new mechanism to facilitate improved mitigation projects for NC highways, this program offers funding for restoration projects and for protection projects that serve to enhance water quality and wildlife habitat in NC. Information on the program is available by contacting the Natural Heritage Program in the NC Department of Environment and Natural Resources (NCDENR). For more information, visit www.nceep.net/pages/partners.html or call 919-715-0476.

Conservation Reserve Enhancement Program (CREP)

This program is a joint effort of the North Carolina Division of Soil and Water Conservation, the NC Clean Water Management Trust Fund, the Ecosystem Enhancement Program (EEP), and the Farm Service Agency - United States Department of Agriculture (USDA) to address water quality problems of the Neuse, Tar-Pamlico and Chowan river basins as well as the Jordan Lake watershed area.

CREP is a voluntary program that seeks to protect land along watercourses that is currently in agricultural production. The objectives of the program include: installing 100,000 acres of forested riparian buffers, grassed filter strips and wetlands; reducing the impacts of sediment and nutrients within the targeted area; and providing substantial ecological benefits for many wildlife species that are declining in part as a result of habitat loss. Program funding will combine the Federal Conservation Reserve Program (CRP) funding with State funding from the Clean Water Management Trust Fund, Agriculture Cost Share Program, and North Carolina Wetlands Restoration Program.

The program is managed by the NC Division of Soil and Water Conservation. For more information, visit www.enr.state.nc.us/dswc/pages/crep.html

Agriculture Cost Share Program

Established in 1984, this program assists farmers with the cost of installing best management practices (BMPs) that benefit water quality. The program covers as much as 75 percent of the costs to implement BMPs. The NC Division of Soil and Water Conservation within the NC Department of Environment and Natural Resources administers this program through local Soil and Water Conservation Districts (SWCD). For more information, visit www.enr.state.nc.us/DSWC/pages/agcostshareprogram.html or call 919-733-2302.

Water Resources Development Grant Program

The NC Division of Water Resources offers cost-sharing grants to local governments on projects related to water resources. Of the seven project application categories available, the category which relates to the establishment of greenways is "Land Acquisition and Facility Development for Water-Based Recreation Projects." Applicants may apply for funding for a greenway as long as the greenway is in close proximity to a water body. For more information, see: www.ncwater.org/Financial_Assistance or call 919-733-4064.

Small Cities Community Development Block Grants

State level funds are allocated through the NC Department of Commerce, Division of Community Assistance to be used to promote economic development and to serve low-income and moderate-income neighborhoods. Greenways that are part of a community's economic development plans may

qualify for assistance under this program. Recreational areas that serve to improve the quality of life in lower income areas may also qualify. Approximately $50 million is available statewide to fund a variety of projects. For more information, visit
www.hud.gov/offices/cpd/communitydevelopment/programs/stateadmin/ or call 919-733-2853.

North Carolina Health and Wellness Trust Fund

The NC Health and Wellness Trust Fund was created by the General Assembly as one of 3 entities to invest North Carolina's portion of the Tobacco Master Settlement Agreement. HWTF receives one-fourth of the state's tobacco settlement funds, which are paid in annual installments over a 25-year period. Fit Together, a partnership of the NC Health and Wellness Trust Fund (HWTF) and Blue Cross and Blue Shield of North Carolina (BCBSNC) announces the establishment of Fit Community, a designation and grant program that recognizes and rewards North Carolina communities' efforts to support physical activity and healthy eating initiatives, as well as tobacco-free school environments. Fit Community is one component of the jointly sponsored Fit Together initiative, a statewide prevention campaign designed to raise awareness about obesity and to equip individuals, families and communities with the tools they need to address this important issue.

All North Carolina municipalities and counties are eligible to apply for a Fit Community designation, which will be awarded to those that have excelled in supporting the following:
• physical activity in the community, schools, and workplaces
• healthy eating in the community, schools, and workplaces
• tobacco use prevention efforts in schools
Designations will be valid for two years, and designated communities may have the opportunity to reapply for subsequent two-year extensions. The benefits of being a Fit Community include:
• heightened statewide attention that can help bolster local community development and/or economic investment initiatives (highway signage and a plaque for the Mayor's or County Commission Chair's office will be provided)
• reinvigoration of a community's sense of civic pride (each Fit Community will serve as a model for other communities that are trying to achieve similar goals)
• use of the Fit Community designation logo for promotional and communication purposes. The application for Fit Community designation is available on the
Fit Together Web site: www.FitTogetherNC.org/FitCommunity.aspx.

Fit Community grants are designed to support innovative strategies that help a community meet its goal to becoming a Fit Community. Eight to nine, two-year grants of up to $30,000 annually will be awarded to applicants that have a demonstrated need, proven capacity, and opportunity for positive change in addressing physical activity and/or healthy eating.For more information, visit: www.healthwellnc.com/

The North Carolina Division of Forest Resources

Urban and Community Forestry Grant can provide funding for a variety of projects that will help toward planning and establishing street trees as well as trees for urban open space. See:
http://www.dfr.state.nc.us/urban/urban_ideas.htm

Funding Allocated by Federal Agencies

Wetlands Reserve Program

This federal funding source is a voluntary program offering technical and financial assistance to landowners who want to restore and protect wetland areas for water quality and wildlife habitat. The US Department of Agriculture's Natural Resource Conservation Service (USDA-NRCS) administers the program and provides direct payments to private landowners who agree to place sensitive wetlands under permanent easements. This program can be used to fund the protection of open space and greenways within riparian corridors. For more information, visit http://www.nrcs.usda.gov/PROGRAMS/wrp/.

The Community Development Block Grant (HUD-CDBG)

The U.S. Department of Housing and Urban Development (HUD) offers financial grants to communities for neighborhood revitalization, economic development, and improvements to community facilities and services, especially in low and moderate income areas. Several communities have used HUD funds to develop greenways, including the Boulding Branch Greenway in High Point, North Carolina. Grants from this program range from $50,000 to $200,000 and are either made to municipalities or non-profits. There is no formal application process. For more information, visit:
www.hud.gov/offices/cpd/communitydevelopment/programs/.

USDA Rural Business Enterprise Grants

Public and private nonprofit groups in communities with populations under 50,000 are eligible to apply for grant assistance to help their local small business environment. $1 million is available for North Carolina on an annual basis and may be used for sidewalk and other community facilities. For more information from the local USDA Service Center, visit:
http://www.rurdev.usda.gov/rbs/busp/rbeg.htm

Rivers Trails and Conservation Assistance Program (RTCA)

The Rivers, Trails, and Conservation Assistance Program, also known as the Rivers & Trails Program or RTCA, is the community assistance arm of the National Park Service. RTCA staff provide technical assistance to community groups and local, State, and federal government agencies so they can conserve rivers, preserve open space, and develop trails and greenways. The RTCA program implements the natural resource conservation and outdoor recreation mission of the National Park Service in communities across America

Although the program does not provide funding for projects, it does provide valuable on-the-ground technical assistance, from strategic consultation and partnership development to serving as liaison with other government agencies. Communities must apply for assistance. For more information, visit: www.nps.gov/ncrc/programs/rtca/ or call Chris Abbett, Program Leader, at 404-562-3175 ext. 522.

Public Lands Highways Discretionary Fund

The Federal Highway Administration administers discretionary funding for projects that will reduce congestion and improve air quality. The FHWA issues a call for projects to disseminate this funding. The FHWA estimates that the PLHD funding for the 2007 call will be $85 million. In the past, Congress has earmarked a portion of the total available funding for projects. For information on how to apply, visit: http://www.fhwa.dot.gov/discretionary/

Local Funding Sources

Municipalities often plan for the funding of pedestrian facilities or improvements through development of Capital Improvement Programs (CIP). In Raleigh, for example, the greenways system has been developed over many years through a dedicated source of annual funding that has ranged from $100,000 to $500,000, administered through the Recreation and Parks Department. CIPs should include all types of capital improvements (water, sewer, buildings, streets, etc.) versus programs for single purposes. This allows municipal decision-makers to balance all capital needs. Typical capital funding mechanisms include the following: capital reserve fund, capital protection ordinances, municipal service district, tax increment financing, taxes, fees, and bonds. Each of these categories are described below.

Capital Reserve Fund

Municipalities have statutory authority to create capital reserve funds for any capital purpose, including pedestrian facilities. The reserve fund must be created through ordinance or resolution that states the purpose of the fund, the duration of the fund, the approximate amount of the fund, and the source of revenue for the fund. Sources of revenue can include general fund allocations, fund balance allocations, grants and donations for the specified use.

Capital Project Ordinances

Municipalities can pass Capital Project Ordinances that are project specific. The ordinance identifies and makes appropriations for the project.

Municipal Service District

Municipalities have statutory authority to establish municipal service districts, to levy a property tax in the district additional to the citywide property tax, and to

use the proceeds to provide services in the district. Downtown revitalization projects are one of the eligible uses of service districts.

Tax Increment Financing

Tax increment financing is a tool to use future gains in taxes to finance the current improvements that will create those gains. When a public project, such as the construction of a greenway, is carried out, there is an increase in the value of surrounding real estate. Oftentimes, new investment in the area follows such a project. This increase sit value and investment creates more taxable property, which increases tax revenues. These increased revenues can be referred to as the "tax increment." Tax Increment Financing dedicates that increased revenue to finance debt issued to pay for the project. TIF is designed to channel funding toward improvements in distressed or underdeveloped areas where development would not otherwise occur. TIF creates funding for public projects that may otherwise be unaffordable to localities. The large majority of states have enabling legislation for tax increment financing.

Installment Purchase Financing

As an alternative to debt financing of capital improvements, communities can execute installment/ lease purchase contracts for improvements. This type of financing is typically used for relatively small projects that the seller or a financial institution is willing to finance or when up-front funds are unavailable. In a lease purchase contract the community leases the property or improvement from the seller or financial institution. The lease is paid in installments that include principal, interest, and associated costs. Upon completion of the lease period, the community owns the property or improvement. While lease purchase contracts are similar to a bond, this arrangement allows the community to acquire the property or improvement without issuing debt. These instruments, however, are more costly than issuing debt.

Taxes

Many communities have raised money through self-imposed increases in taxes and bonds. For example, Pinellas County residents in Florida voted to adopt a one-cent sales tax increase, which provided an additional $5 million for the development of the overwhelmingly popular Pinellas Trail. Sales taxes have also been used in Allegheny County, Pennsylvania, and in Boulder, Colorado to fund open space projects. A gas tax is another method used by some municipalities to fund public improvements. A number of taxes provide direct or indirect funding for the operations of local governments. Some of them are:

Sales Tax

In North Carolina, the state has authorized a sales tax at the state and county levels. Local governments that choose to exercise the local option sales tax (all counties currently do), use the tax revenues to provide funding for a wide variety of projects and activities. Any increase in the sales tax, even if applying to a single county, must gain approval of the state legislature. In 1998, Mecklenburg

County was granted authority to institute a one-half cent sales tax increase for mass transit.

Property Tax

Property taxes generally support a significant portion of a municipality's activities. However, the revenues from property taxes can also be used to pay debt service on general obligation bonds issued to finance greenway system acquisitions. Because of limits imposed on tax rates, use of property taxes to fund greenways could limit the municipality's ability to raise funds for other activities. Property taxes can provide a steady stream of financing while broadly distributing the tax burden. In other parts of the country, this mechanism has been popular with voters as long as the increase is restricted to parks and open space. Note, other public agencies compete vigorously for these funds, and taxpayers are generally concerned about high property tax rates.

Excise Taxes

Excise taxes are taxes on specific goods and services. These taxes require special legislation and the use of the funds generated through the tax are limited to specific uses. Examples include lodging, food, and beverage taxes that generate funds for promotion of tourism, and the gas tax that generates revenues
for transportation related activities.

Occupancy Tax

The NC General Assembly may grant towns the authority to levy occupancy tax on hotel and motel rooms. The act granting the taxing authority limits the use of the proceeds, usually for tourism-promotion purposes.

Fees

Three fee options that have been used by local governments to assist in funding pedestrian and bicycle facilities are listed here:

Stormwater Utility Fees

Greenway sections may be purchased with stormwater fees, if the property in question is used to mitigate floodwater or filter pollutants.

Stormwater charges are typically based on an estimate of the amount of impervious surface on a user's property. Impervious surfaces (such as rooftops and paved areas) increase both the amount and rate of stormwater runoff compared to natural conditions. Such surfaces cause runoff that directly or indirectly discharge into public storm drainage facilities and creates a need for stormwater management services. Thus, users with more impervious surface are charged more for stormwater service than users with less impervious surface. The rates, fees, and charges collected for stormwater management services may not exceed

the costs incurred to provide these services. The costs that may be recovered through the stormwater rates, fees, and charges includes any costs necessary to assure that all aspects of stormwater quality and quantity are managed in accordance with federal and state laws, regulations, and rules.

Streetscape Utility Fees

Streetscape Utility Fees could help support streetscape maintenance of the area between the curb and the property line through a flat monthly fee per residential dwelling unit. Discounts would be available for senior and disabled citizens. Non-residential customers would be charged a per foot fee based on the length of frontage on streetscape improvements. This amount could be capped for non-residential customers with extremely large amounts of street frontage. The revenues raised from Streetscape Utility fees would be limited by ordinance to maintenance (or construction and maintenance) activities in support of the streetscape.

Impact Fees

Developers can be required to provide greenway impact fees through local enabling legislation. Impact fees, which are also known as capital contributions, facilities fees, or system development charges, are typically collected from developers or property owners at the time of building permit issuance to pay for capital improvements that provide capacity to serve new growth. The intent of these fees is to avoid burdening existing customers with the costs of providing capacity to serve new growth ("growth pays its own way"). Greenway impact fees are designed to reflect the costs incurred to provide sufficient capacity in the system to meet the additional needs of a growing community. These charges are set in a fee schedule applied uniformly to all new development. Communities that institute impact fees must develop a sound financial model that enables policy makers to justify fee levels for different user groups, and to ensure that revenues generated meet (but do not exceed) the needs of development. Factors used to determine an appropriate impact fee amount can include: lot size, number of occupants, and types of subdivision improvements. If Holly Springs is interested in pursuing open space impact fees, it will require enabling legislation to authorize the collection of the fees.

Exactions

Exactions are similar to impact fees in that they both provide facilities to growing communities. The difference is that through exactions it can be established that it is the responsibility of the developer to build the greenway or pedestrian facility that crosses through the property, or adjacent to the property being developed.

In-Lieu-Of Fees

As an alternative to requiring developers to dedicate on-site greenway sections that would serve their development, some communities provide a choice of paying a front-end charge for off-site protection of pieces of the larger system. Payment is generally a condition of development approval and recovers the cost of the off-site land acquisition or the development's proportionate share of the cost of a regional facility serving a larger area. Some communities prefer in-lieu-of fees. This alternative allows community staff to purchase land worthy of protection rather than accept marginal land that meets the quantitative requirements of a developer dedication but falls a bit short of qualitative interests.

Bonds and Loans

Bonds have been a very popular way for communities across the country to finance their pedestrian and greenway projects. A number of bond options are listed below. Contracting with a private consultant to assist with this program may be advisable. Since bonds rely on the support of the voting population, an education and awareness program should be implemented prior to any vote. Billings, Montana used the issuance of a bond in the amount of $599,000 to provide the matching funds for several of their TEA-21 enhancement dollars. Austin, Texas has also used bond issues to fund a portion of their bicycle and trail system.

Revenue Bonds

Revenue bonds are bonds that are secured by a pledge of the revenues from a certain local government activity. The entity issuing bonds, pledges to generate sufficient revenue annually to cover the program's operating costs, plus meet the annual debt service requirements (principal and interest payment). Revenue bonds are not constrained by the debt ceilings of general obligation bonds, but they are generally more expensive than general obligation bonds.

General Obligation Bonds

Cities, counties, and service districts generally are able to issue general obligation (G.O.) bonds that are secured by the full faith and credit of the entity. In this case, the local government issuing the bonds pledges to raise its property taxes, or use any other sources of revenue, to generate sufficient revenues to make the debt service payments on the bonds. A general obligation pledge is stronger than a revenue pledge, and thus may carry a lower interest rate than a revenue bond. Frequently, when local governments issue G.O. bonds for public enterprise improvements, the public enterprise will make the debt service payments on the G.O. bonds with revenues generated through the public entity's rates and charges. However, if those rate revenues are insufficient to make the debt payment, the local government is obligated to raise taxes or use other sources of revenue to make the payments. G.O. bonds distribute the costs

of land acquisition and greenway development and make funds available for immediate purchases and projects. Voter approval is required.

Special Assessment Bonds

Special assessment bonds are secured by a lien on the property that benefits by the improvements funded with the special assessment bond proceeds. Debt service payments on these bonds are funded through annual assessments to the property owners in the assessment area.

State Revolving Fund (SRF) Loans

Initially funded with federal and state money, and continued by funds generated by repayment of earlier loans, State Revolving Funds (SRFs) provide low interest loans for local governments to fund water pollution control and water supply related projects including many watershed management activities. These loans
typically require a revenue pledge, like a revenue bond, but carry a below market interest rate and limited term for debt repayment (20 years).

Other Local Options

Facility Maintenance Districts

Facility Maintenance Districts (FMDs) can be created to pay for the costs of on-going maintenance of public facilities and landscaping within the areas of the Town where improvements have been concentrated and where their benefits most directly benefit business and institutional property owners. An FMD is needed in order to assure a sustainable maintenance program. Fees may be based upon the length of lot frontage along streets where improvements have been installed, or upon other factors such as the size of the parcel. The program supported by the FMD should include regular maintenance of streetscape of off road trail improvements. The municipality can initiate public outreach efforts to merchants, the Chamber of Commerce, and property owners. In these meetings, Town staff will discuss the proposed apportionment and allocation methodlogy and will explore implementation strategies.

The municipality can manage maintenance responsibilities either through its own staff or through private contractors.

Partnerships

Another method of funding pedestrian systems and greenways is to partner with public agencies and private companies and organizations. Partnerships engender a spirit of cooperation, civic pride and community participation. The key to the involvement of private partners is to make a compelling argument for their participation. Major employers and developers should be identified and provided with a “Benefits of Walking”-type handout for themselves and their employees. Very specific routes that make critical connections to place of

business would be targeted for private partners' monetary support following a successful master planning effort. Potential partners include major employers which are located along or accessible to pedestrian facilities such as shared-use paths or greenways. Name recognition for corporate partnerships would be accomplished through signage trail heads or interpretive signage along greenway systems. Utilities often make good partners and many trails now share corridors with them. Money raised from providing an easement to utilities can help defray the costs of maintenance. It is important to have a lawyer review the legal agreement and verify ownership of the subsurface, surface or air rights in order to enter into an agreement.

Local Trail Sponsors

A sponsorship program for trail amenities allows smaller donations to be received from both individuals and businesses. Cash donations could be placed into a trust fund to be accessed for certain construction or acquisition projects associated with the greenways and open space system. Some recognition of the donors is appropriate and can be accomplished through the placement of a plaque, the naming of a trail segment, and/or special recognition at an opening ceremony. Types of gifts other than cash could include donations of services, equipment, labor, or reduced costs for supplies.

Volunteer Work

It is expected that many citizens will be excited about the development of a greenway corridor. Individual volunteers from the community can be brought together with groups of volunteers form church groups, civic groups, scout troops and environmental groups to work on greenway development on special community work days. Volunteers can also be used for fund-raising, maintenance, and programming needs.

Private Foundations and Organizations

Many communities have solicited greenway funding assistance from private foundations and other conservation-minded benefactors. Below are a few examples of private funding opportunities available in North Carolina.

Land for Tomorrow Campaign

Land for Tomorrow is a diverse partnership of businesses, conservationists, farmers, environmental groups, health professionals and community groups committed to securing support from the public and General Assembly for protecting land, water and historic places. The campaign is asking the North Carolina General Assembly to support issuance of a bond for $200 million a year for five years to preserve and protect its special land and water resources. Land for Tomorrow will enable North Carolina to reach a goal of ensuring that working farms and forests; sanctuaries for wildlife; land bordering streams, parks and greenways; land that helps strengthen communities and promotes job growth; historic downtowns and neighborhoods; and more, will be there to enhance the

quality of life for generations to come. For more information, visit http://www.landfortomorrow.org/

The Trust for Public Land

Land conservation is central to the mission of the Trust for Public Land (TPL). Founded in 1972, the Trust for Public Land is the only national nonprofit working exclusively to protect land for human enjoyment and well being. TPL helps conserve land for recreation and spiritual nourishment and to improve the health and quality of life of American communities. TPL's legal and real estate specialists work with landowners, government agencies, and community groups to:

• Create urban parks, gardens, greenways, and riverways
• Build livable communities by setting aside open space in the path of growth
• Conserve land for watershed protection, scenic beauty, and close-to home recreation safeguard the character of communities by preserving historic landmarks and landscapes.

The following are TPL's Conservation Services:

• Conservation Vision: TPL helps agencies and communities define conservation priorities, identify lands to be protected, and plan networks of conserved land that meet public need.
• Conservation Finance: TPL helps agencies and communities identify and raise funds for conservation from federal, state, local, and philanthropic sources.
• Conservation Transactions: TPL helps structure, negotiate, and complete land transactions that create parks, playgrounds, and protected natural areas.
• Research & Education: TPL acquires and shares knowledge of conservation issues and techniques to improve the practice of conservation and promote its public benefits.

Since 1972, TPL has worked with willing landowners, community groups, and national, state, and local agencies to complete more than 3,000 land conservation projects in 46 states, protecting more than 2 million acres. Since 1994, TPL has helped states and communities craft and pass over 330 ballot measures, generating almost $25 billion in new conservation-related funding. For more information, visit http://www.tpl.org/.

Z. Smith Reynolds Foundation

This Winston-Salem based Foundation has been assisting the environmental projects of local governments and non-profits in North Carolina for many years. The foundation has two grant cycles per year and generally does not fund land acquisition. However, the foundation may be able to support municipalities in other areas of greenways development. More information is available at www.zsr.org.

North Carolina Community Foundation

The North Carolina Community Foundation, established in 1988, is a statewide foundation seeking gifts from individuals, corporations, and other foundations to build endowments and ensure financial security for nonprofit organizations and institutions throughout the state. Based in Raleigh, North Carolina, the foundation also manages a number of community affiliates throughout North Carolina that make grants in the areas of human services, education, health, arts, religion, civic affairs, and the conservation and preservation of historical, cultural, and environmental resources. In addition, the foundation manages various scholarship programs statewide. Web site: http://nccommunityfoundation.org/

National Trails Fund

In 1998, the American Hiking Society created the National Trails Fund, the only privately supported national grants program providing funding to grassroots organizations working toward establishing, protecting and maintaining foot trails in America. Each year, 73 million people enjoy foot trails, yet many of our favorite trails need major repairs due to a $200 million in badly needed maintenance. National Trails Fund grants give local organizations the resources they need to secure access, volunteers, tools and materials to protect America's cherished public trails. For 2005, American Hiking distributed over $40,000 in grants thanks to the generous support of Cascade Designs and L.L.Bean, the program's Charter Sponsors. To date, American Hiking has granted more than $240,000 to 56 different trail projects across the U.S. for land acquisition, constituency building campaigns, and traditional trail work projects. Awards range from $500 to $10,000 per project.

What types of projects will American Hiking Society consider? Securing trail lands, including acquisition of trails and trail corridors, and the costs associated with acquiring conservation easements. Building and maintaining trails which will result in visible and substantial ease of access, improved hiker safety, and/ or avoidance of environmental damage. Constituency building surrounding specific trail projects - including volunteer recruitment and support. Web site: www.americanhiking.org/alliance/fund.html.

Bikes Belong Foundation

The Bikes Belong Grants Program strives to put more people on bicycles more often by funding important and influential projects that leverage federal funding and build momentum for bicycling in communities across the U.S. These projects include bike paths, lanes, and routes, as well as bike parks, mountain bike trails, BMX facilities, and large-scale bicycle advocacy initiatives.

Since 1999, Bikes Belong has awarded 166 grants to municipalities and grassroots groups in 44 states and the District of Columbia, investing nearly $1.3 million in community bicycling projects and leveraging more than $476 million in federal, state, and private funding.

APPENDIX B: REFERENCES

Guide for the Development of Bicycle Facilities, American Association of State Highway and Transportation Officials (AASHTO), 1999
http://bookstore.transportation.org

AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities 2004
http://bookstore.transportation.org

Americans with Disabilities - Department of Justice
http://www.ada.gov/srchfoia.htm

Designing Sidewalks and Trails for Access
http://www.fhwa.dot.gov/environment/sidewalk2/pdf.htm

Graham, NC Pedestrian Plan, 2006

Manual of Uniform Traffic Control Devices, FHWA, 2003
http://mutcd.fhwa.dot.gov/

Mooresville, NC Pedestrian Plan, 2005

New Bern, NC Bicycle Plan, 2005

North Carolina Department Division of Bicycle and Pedestrian Transportation – Helpful Links
http://www.ncdot.org/transit/bicycle/safety/safety_links.html

North Carolina Department Division of Bicycle and Pedestrian Transportation – Shared-use Pathway Design Manual
http://www.ncdot.org/transit/bicycle/projects/project_types/Multi_Use_Pathways2.pdf

North Carolina Department Division of Bicycle and Pedestrian Transportation Bicycle and Facilities Planning and Design Guidelines
http://www.ncdot.org/transit/bicycle/projects/resources/projects_facilitydesign.html

Pedestrian and Bicycling Information Center - Developing Pedestrian Plans and Policies
www.walkinginfo.org/develop/

PEDSAFE – Pedestrian and Bicycling Information Center
www.walkinginfo.org/pedsafe/

Portland, OR Pedestrian Plan, 2005

Project for Public Spaces
www.pps.org

Root Barriers March 2002 *Horticulture Update*, Dr. Welch, William Extension Horticulture, Texas Cooperative Extension, The Texas A&M University System, College Station, Texas.

http://aggie-horticulture.tamu.edu/extension/newsletters/hortupdate/mar02/art3mar.html

Scenic America's Model Tree Ordinance http://www.scenic.org/tree/model_ordinance

Solid-State Lighting: DOE SSL Commercial Product Testing Program
http://www.netl.doe.gov/ssl/comm_testing.htm

"Street Designs that Support Walkable, Livable Communities" Zykofsky, Paul and Burden, Dan

"Visions for a New American Dream" Nelessen, Anton Clarence, p. 155

Walkability Checklist
www.walkinginfo.org/

APPENDIX C: SURVEY RESULTS

Spring 2008

For the Elon Bicycle, Pedestrian and Lighting Plan, a survey was conducted of residents and people who work or go to school in Elon. There were 276 respondents to the Elon Bicycle, Pedestrian and Lighting survey. The survey opened in late January 2008 and closed March 17, 2008. Respondents were asked 21 questions about bicycle, pedestrian, lighting and funding issues. The survey was available on the internet through the Town's website and also available in paper format to residents across the Town. The survey was advertised through public meetings, newspaper, the Town website and mailing lists.

Survey Summary Findings:

Walking

- 93 % thought that the goal of creating a walking friendly community was either important or very important. Over half of respondents walked more than 5 times a week.
- 42 % reported lack of sidewalks and trails as the biggest factor discouraging them from walking; and new sidewalks were reported by 45% to be the number 1 action to increase walking.
- 37% reported school or University and 19% reported trails and greenways as destinations they would most like to get to.

Lighting

- 92 % thought that adequate lighting of streets and sidewalks was very important or important; energy efficient lighting was reported by 85% to be very important or important.
- 39% thought that aesthetically pleasing lighting was important or very important even if there are higher costs.

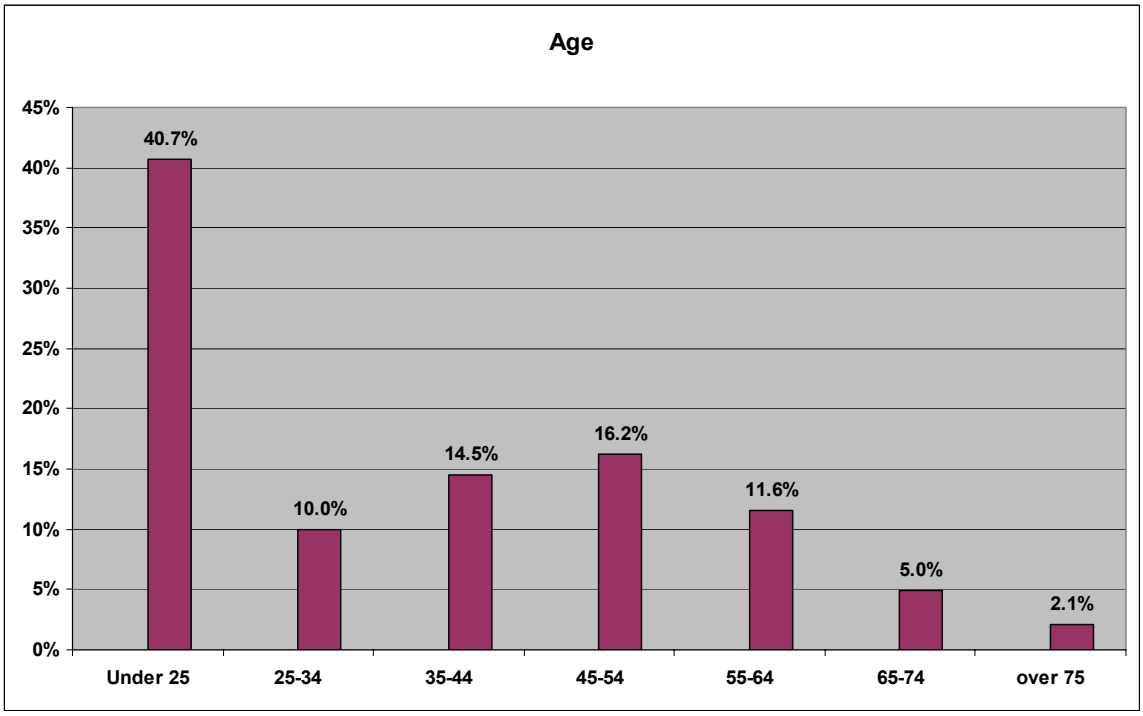
Bicycling

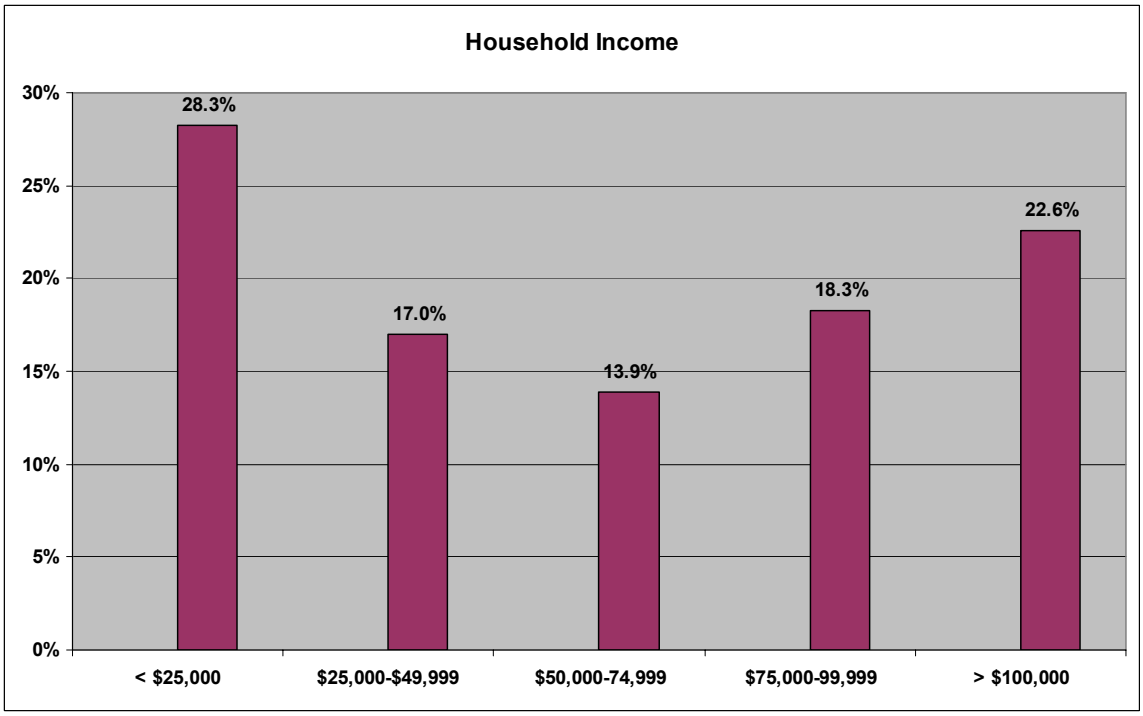
- 76% thought that the goal of creating a bicycling friendly community was either important or very important.
- 30% bicycle a few times per week or more.
- 35% reported to like bicycling on main thoroughfares and 27% reported to like bicycling on greenways or trails (vs. neighborhood or collector streets).
- 45% report lack of roadways with bicycle lanes and 12% report traffic as the biggest factors discouraging bicycling; while 60% report that bicycle lanes are most needed to encouraging bicycling.

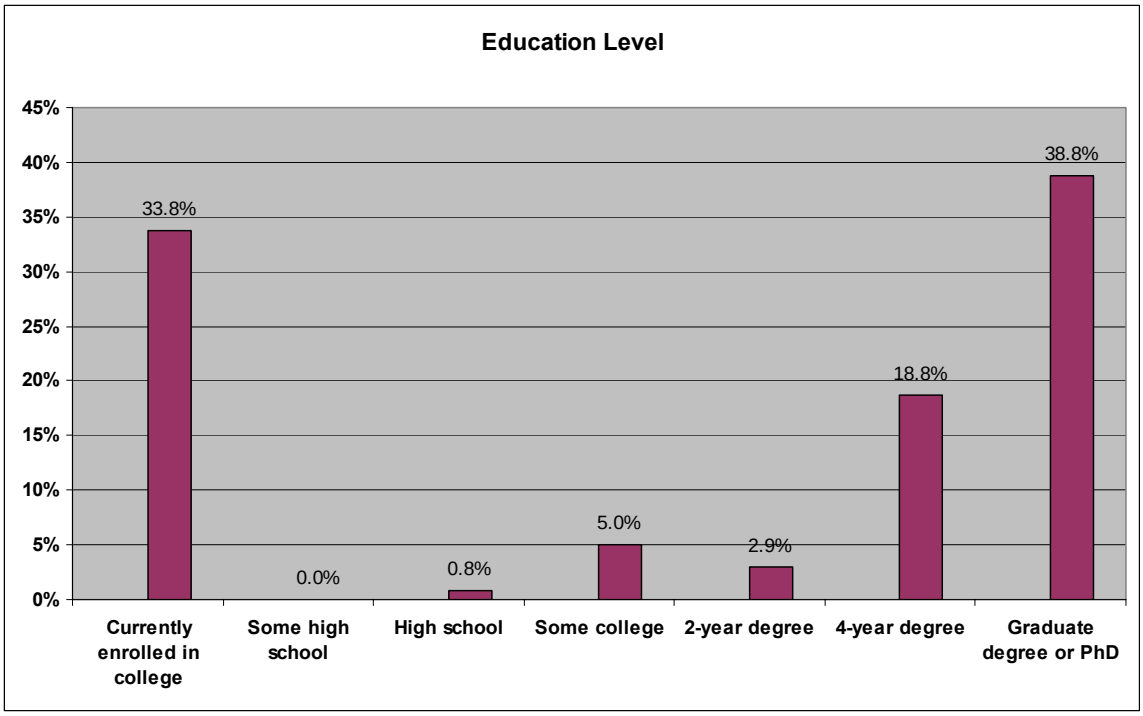
Funding

- Grants (41%), Public/private partnerships (21%) and impact fees on new development (19%) were the top three choices for funding improvements to pedestrian, bicycle and lighting infrastructure.

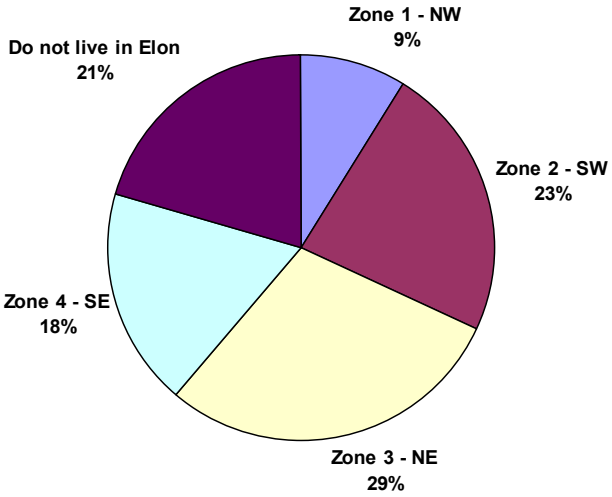
Demographics of Respondents






Education Level
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
33.8%
0.0%
0.8%
5.0%
2.9%
18.8%
38.8%
Currently enrolled in college
Some high school
High school
Some college
2-year degree
4-year degree
Graduate degree or PhD

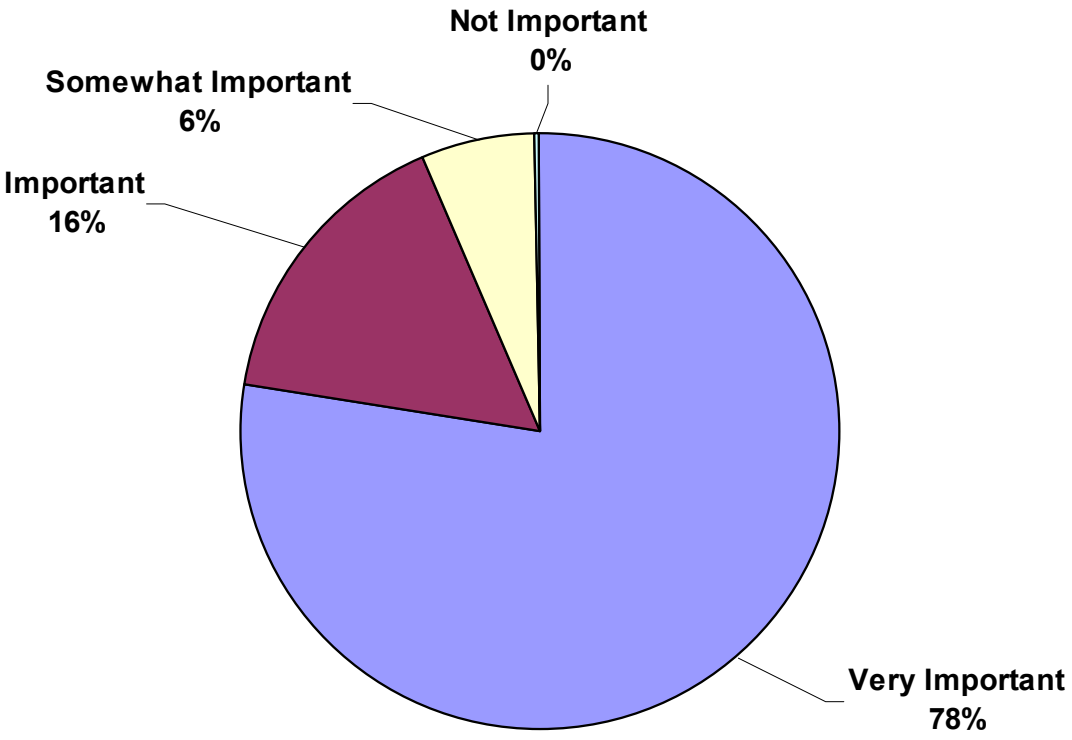
Location


Zone 1 - NW
9%
Zone 2 - SW
23%
Zone 3 - NE
29%
Zone 4 - SE
18%
Do not live in Elon
21%

Town of Elon
Zone 1
NW
Zone 3
NE
Zone 2
SW
Zone 4
SE

1. How important to you is the goal of creating a walking-friendly community? (select one)		
Answer Options	Response Percent	Response Count
Very Important	77.5%	207
Important	16.1%	43
Somewhat Important	6.0%	16
Not Important	0.4%	1
answered question		267
skipped question		9

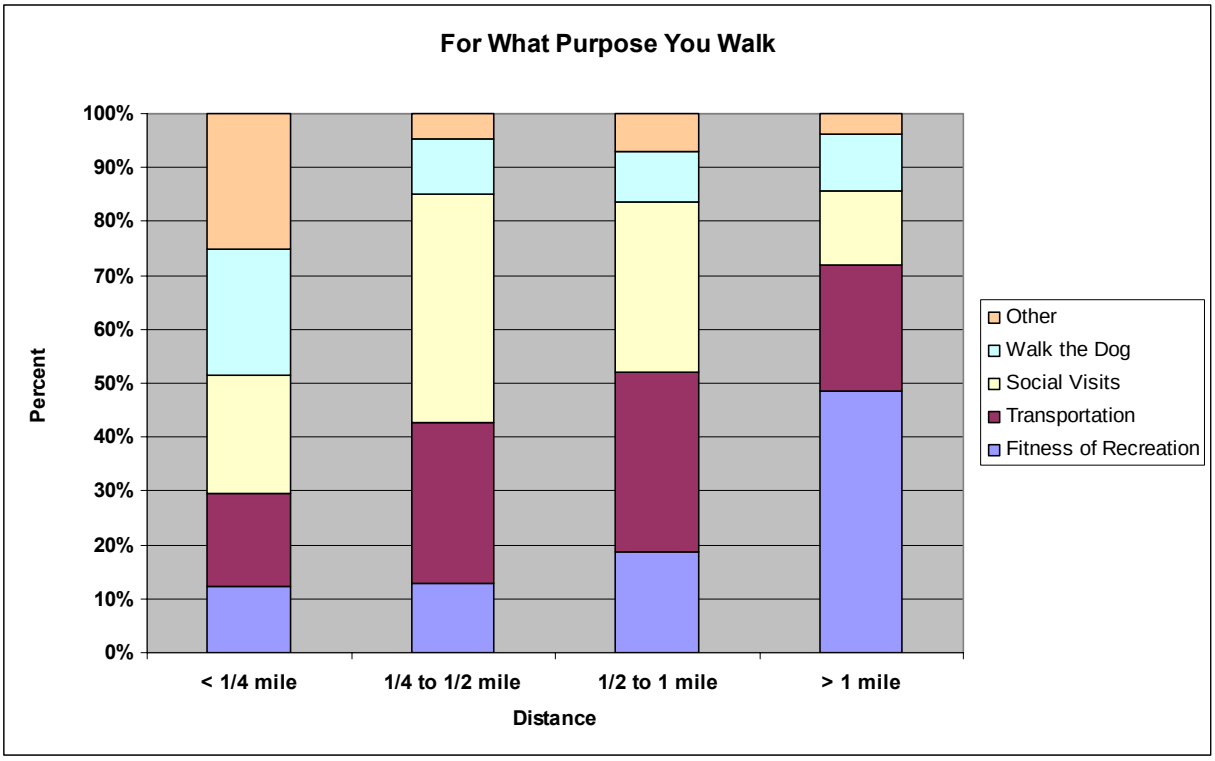
Importance of a Walking-Friendly Community



2. How often do you walk now? (select one)		
Answer Options	**Response Percent**	**Response Count**
More than 5 times per week	57.5%	150
Few times per week	28.4%	74
Few times per month	11.5%	30
Less than once a month	2.7%	7
	answered question	**261**
	skipped question	**15**

3. For what purpose do you walk now? If you do not walk now, for what purpose would you walk in the future? Please also include the distance. (select all that apply)

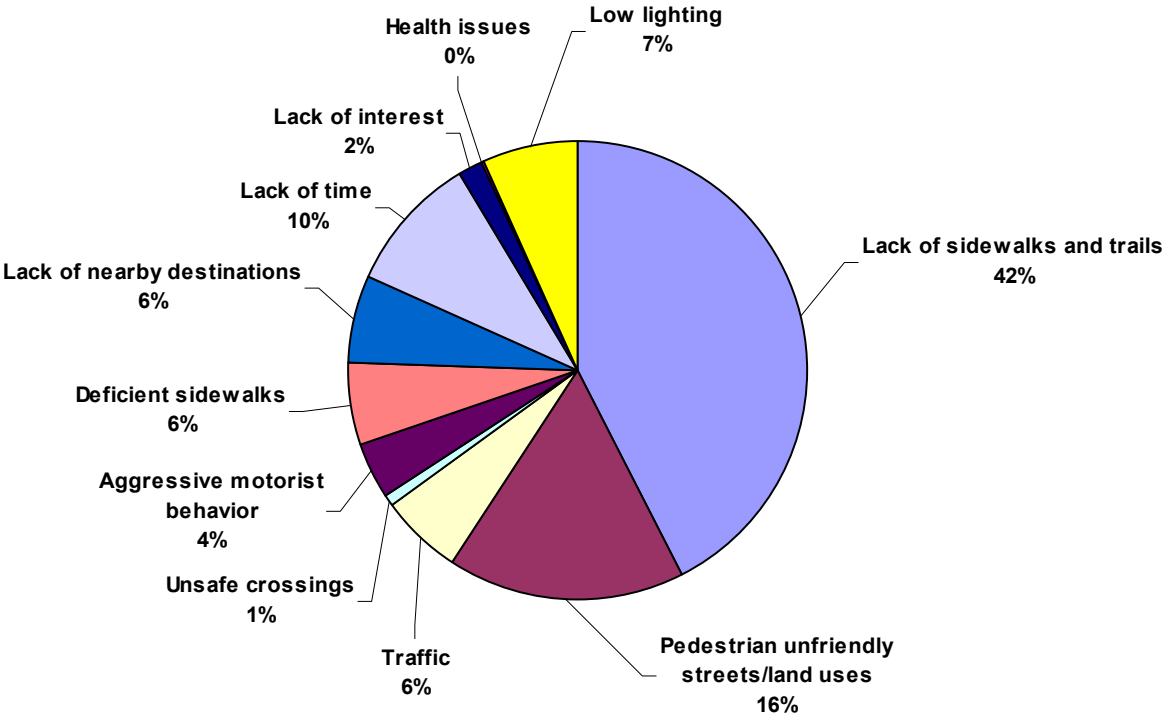
Answer Options	< 1/4 mile	1/4 to 1/2 mile	1/2 to 1 mile	> 1 mile	Response Count
Fitness or recreation	27	19	32	159	231
Walking for transportation (i.e. work, shopping, school)	38	44	57	77	200
Social visits	48	63	54	45	191
Walking the dog	52	15	16	35	115
Walking the baby/pushing a stroller	55	7	12	12	86
Other (please specify)					18
answered question					270
skipped question					6



4. What are the biggest factors that discourage you from walking? (Please rank your top 5, 1 being most discouraging and 5 being least discouraging)

Answer Options	1 Most	2	3	4	5 Least	Rating Average	Response Count
Lack of sidewalks and trails	110	42	26	15	17	2	210
Pedestrian unfriendly streets/land uses	43	58	36	20	12	2.4	169
Traffic	15	18	44	23	31	3.3	131
Unsafe crossings	2	18	32	33	25	3.6	110
Aggressive motorist behavior	10	14	18	34	24	3.5	100
Deficient sidewalks	15	36	19	25	18	3	113
Lack of nearby destinations	16	17	19	30	25	3.3	107
Lack of time	25	18	13	11	15	2.7	82
Lack of interest	4	6	6	7	16	3.6	39
Health issues	1	1	7	6	21	4.3	36
Low lighting	17	20	25	31	27	3.3	120
Other (please specify)							9
answered question							266
skipped question							10

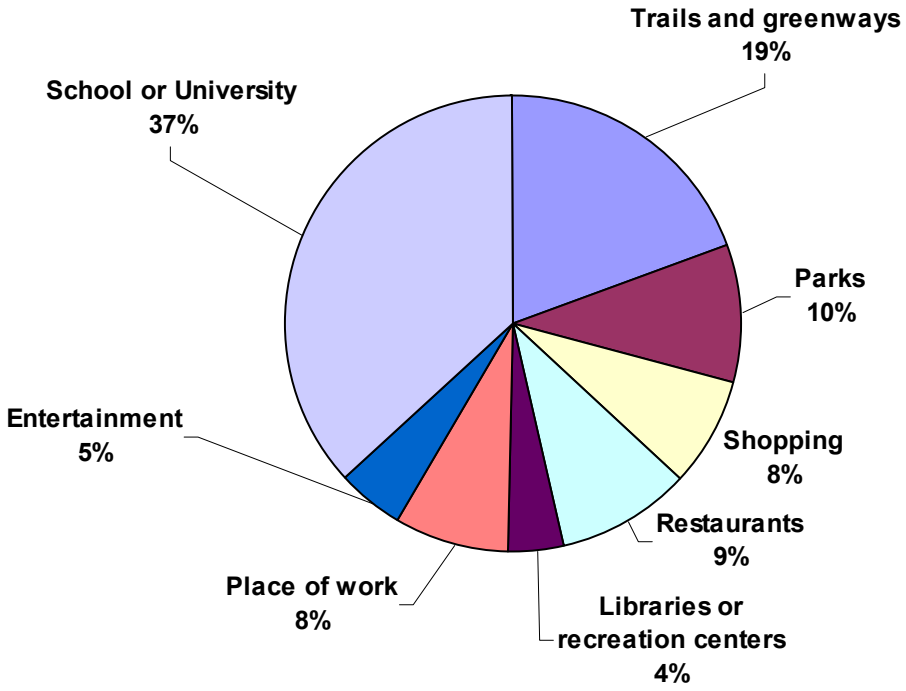
Biggest Factors Discouraging Walking
Ranked #1



5. What walking destinations would you most like to get to? (Please rank your top 5, 1 being most desirable and 5 being least desirable)

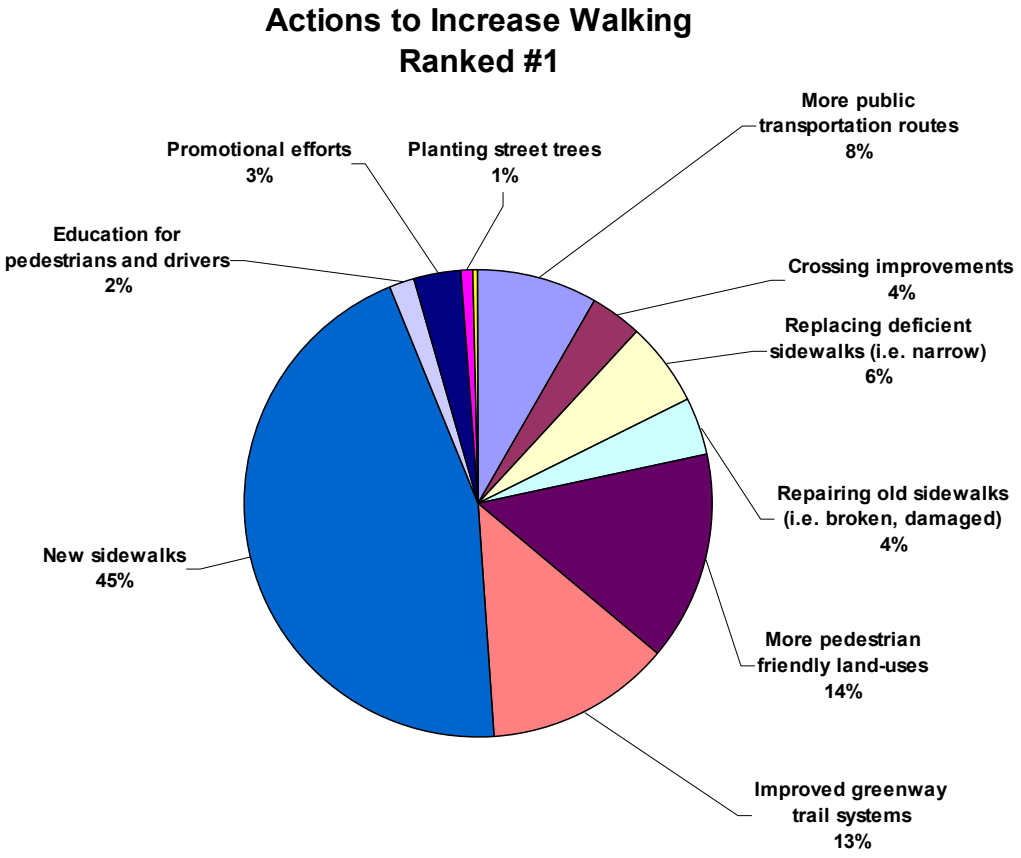
Answer Options	1 Most	2	3	4	5 Least	Rating Average	Response Count
Trails and greenways	47	37	24	28	21	2.6	157
Parks	24	42	34	35	18	2.9	153
Shopping	19	24	21	25	36	3.3	125
Restaurants	23	28	41	34	29	3.1	155
Libraries or recreation centers	9	29	39	29	26	3.3	132
Place of work	20	24	14	17	23	3.0	98
Entertainment	11	21	32	26	43	3.5	133
School or University	90	23	23	21	11	2.0	168
Other (please specify)							13
answered question							246
skipped question							30

Destinations You Would Like to Get To Ranked #1



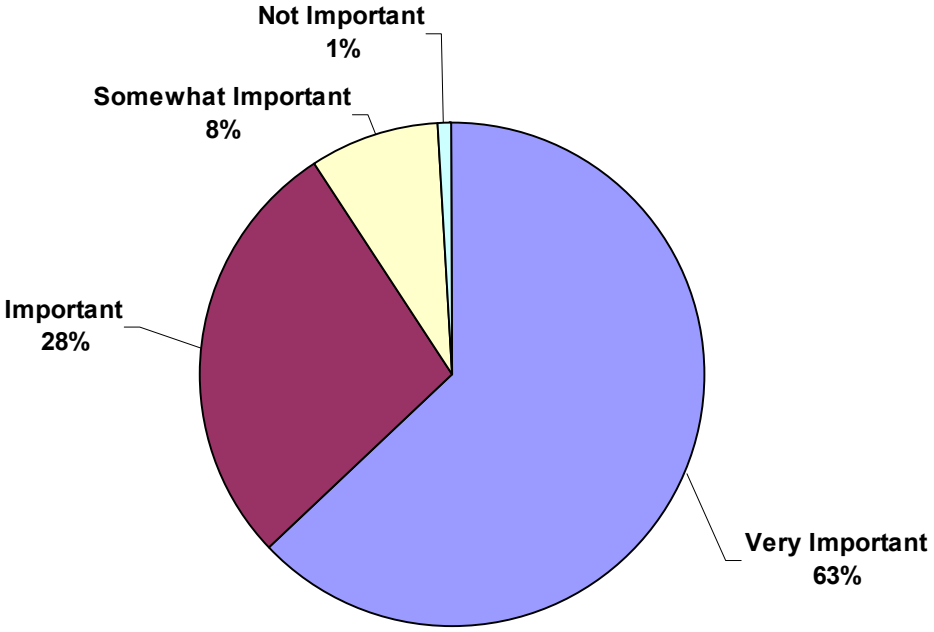
6. What actions do you think are the most needed to increase walking in the community? (Please rank your top 5, 1 being most needed and 5 being least needed)

Answer Options	1 Most	2	3	4	5 Least	Rating Average	Response Count
More public transportation routes	21	21	14	17	19	2.9	92
Crossing improvements	9	31	32	33	20	3.2	125
Replacing deficient sidewalks (i.e. narrow)	14	22	28	29	18	3.1	111
Repairing old sidewalks (i.e. broken, damaged)	10	22	23	21	23	3.3	99
More pedestrian friendly land-uses	36	50	36	32	22	2.7	176
Improved greenway trail systems	32	46	28	32	16	2.7	154
New sidewalks	112	31	15	9	12	1.8	179
Education for pedestrians and drivers	4	7	15	13	15	3.5	54
Promotional efforts	8	0	15	10	16	3.5	49
Planting street trees	2	4	15	14	21	3.9	56
Benches	1	5	14	10	29	4.0	59
						Other (please specify)	21
						answered question	**250**
						skipped question	**26**



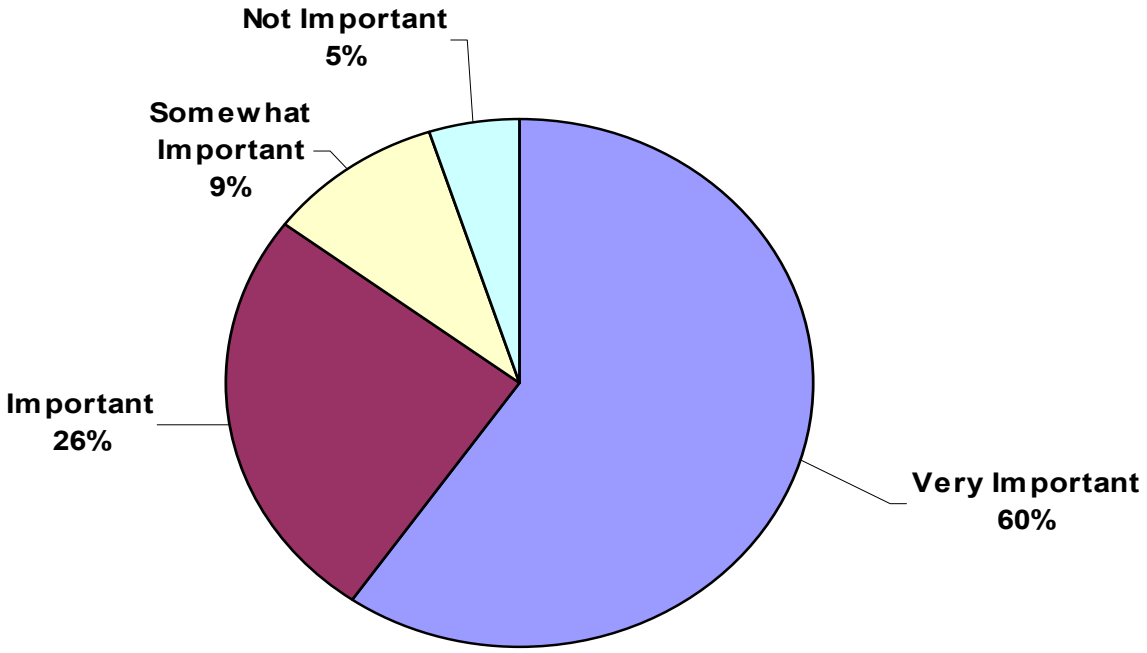
7. How important is adequate lighting of streets, sidewalks and trails? (select one)		
Answer Options	**Response Percent**	**Response Count**
Very Important	62.7%	158
Important	28.2%	71
Somewhat Important	8.3%	21
Not Important	0.8%	2
	Comments	34
	answered question	**252**
	skipped question	**24**

Importance of Adequate Lighting for Streets, Sidewalks and Trails



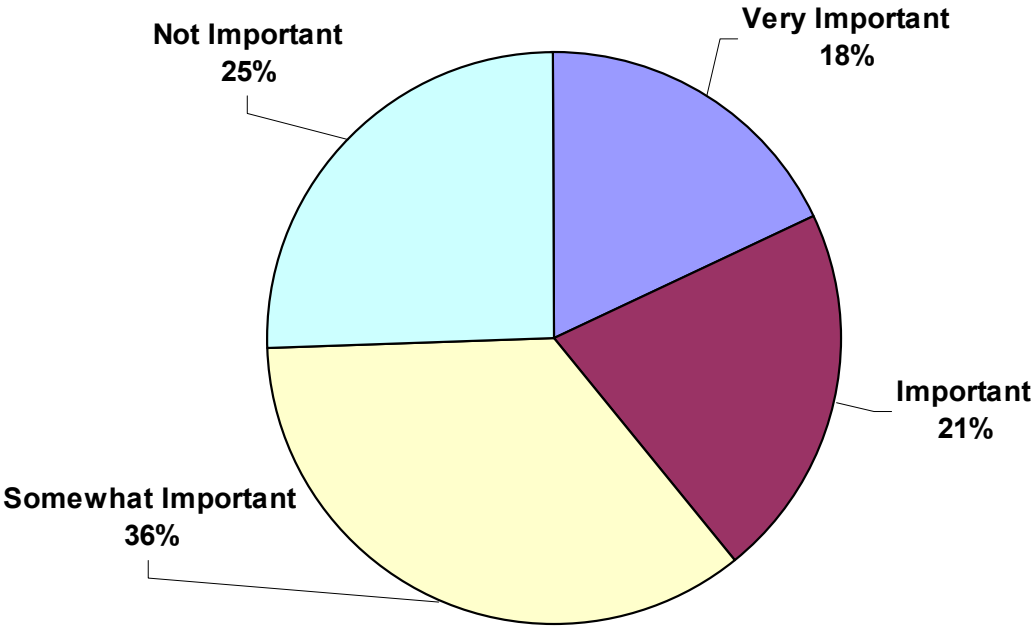
8. How important are energy efficient streetlights such as solar powered lights and LED street lights? (select one)		
Answer Options	**Response Percent**	**Response Count**
Very Important	59.7%	151
Important	25.7%	65
Somewhat Important	9.5%	24
Not Important	5.1%	13
	Comments	22
	answered question	**253**
	skipped question	**23**

Importance of Energy Efficient Streetlights



9. Is it important for the Town of Elon to purchase streetlights and poles that are more aesthetically pleasing that may cost more? (select one)		
Answer Options	**Response Percent**	**Response Count**
Very Important	17.9%	45
Important	21.1%	53
Somewhat Important	35.5%	89
Not Important	25.5%	64
	Comments	25
	answered question	**251**
	skipped question	**25**

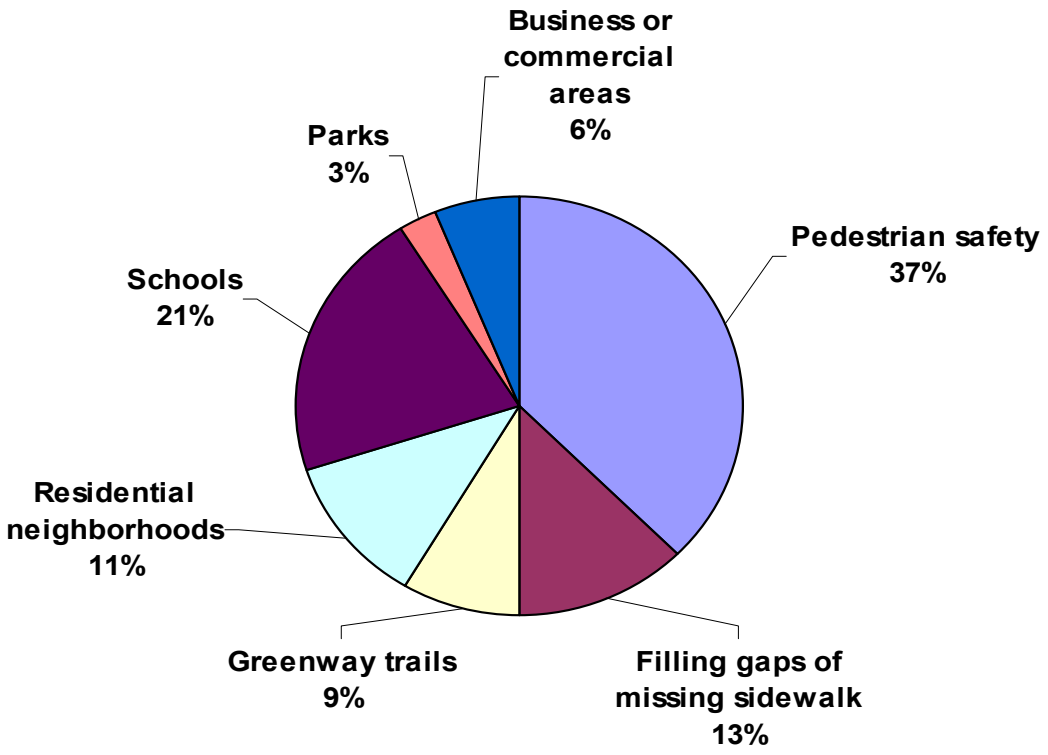
Importance of Aesthetic Lighting when Costing More



10. What should be the most important considerations in determining locations to develop future sidewalks? (Please rank your top 5, 1 being most needed and 5 being least needed)

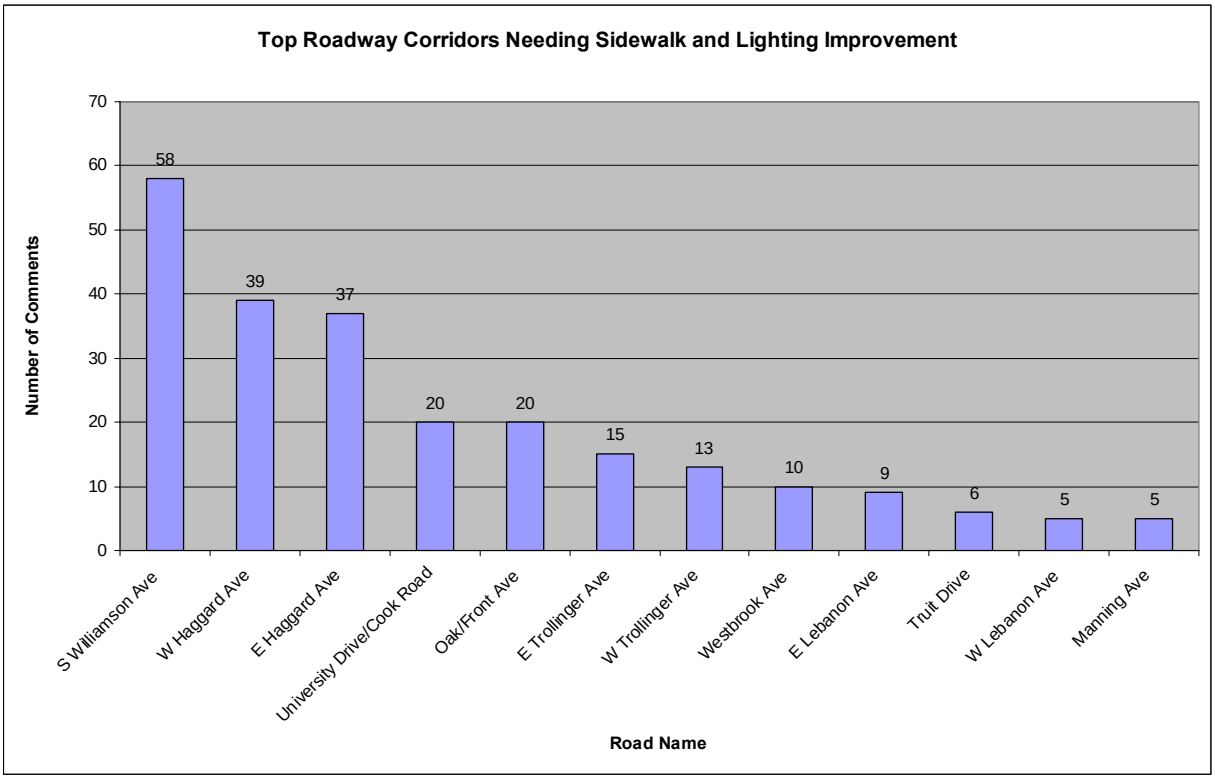
Answer Options	1 Most	2	3	4	5 Least	Rating Average	Response Count
Pedestrian safety	105	41	26	11	14	1.9	197
Filling gaps of missing sidewalk	35	48	40	25	29	2.8	177
Greenway trails	24	30	32	29	28	3.0	143
Residential neighborhoods	32	48	38	37	30	2.9	185
Schools	59	33	35	32	22	2.6	181
Parks	8	18	34	47	44	3.7	151
Business or commercial areas	17	28	35	35	36	3.3	151
						Other (please specify)	6
						answered question	246
						skipped question	30

Important Locations for Future Sidewalks
Ranked #1



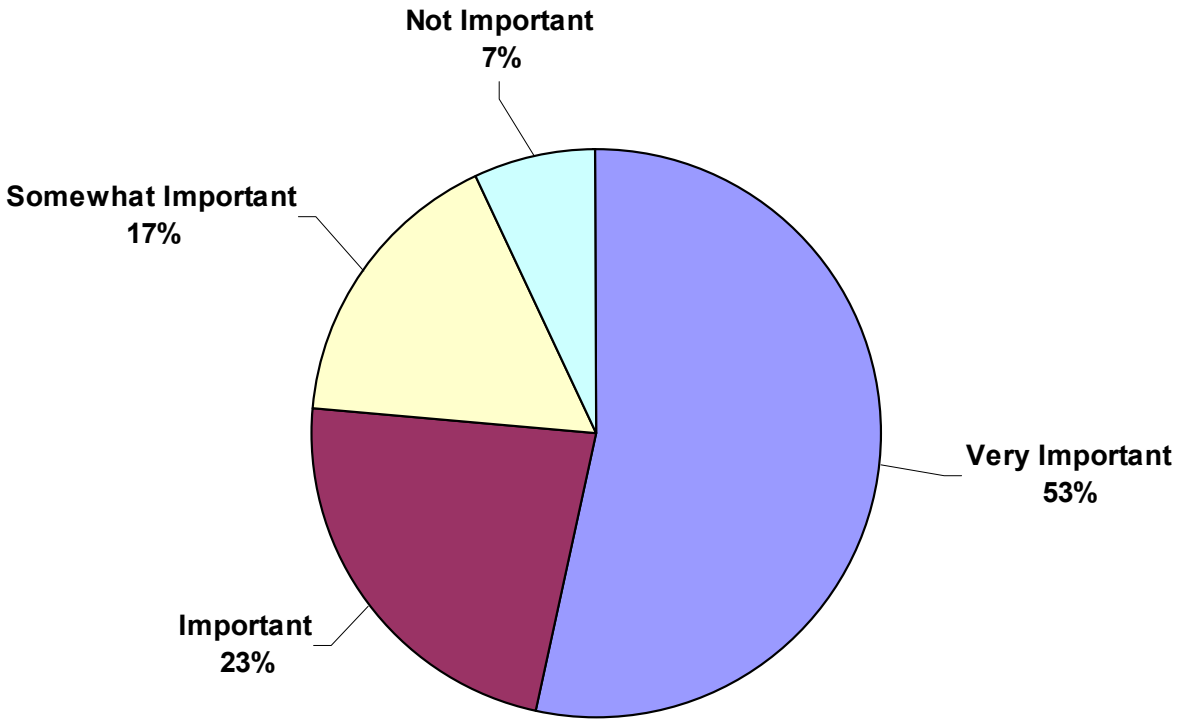
11. What do you think are the top roadway corridors most needing sidewalk or trail improvements? Where are lighting improvements needed? Please be specific, include cross streets or landmarks where possible. Example: Oak Street from the railroad north to Haggard Avenue.

Answer Options	Response Count
	168
answered question	168
skipped question	108



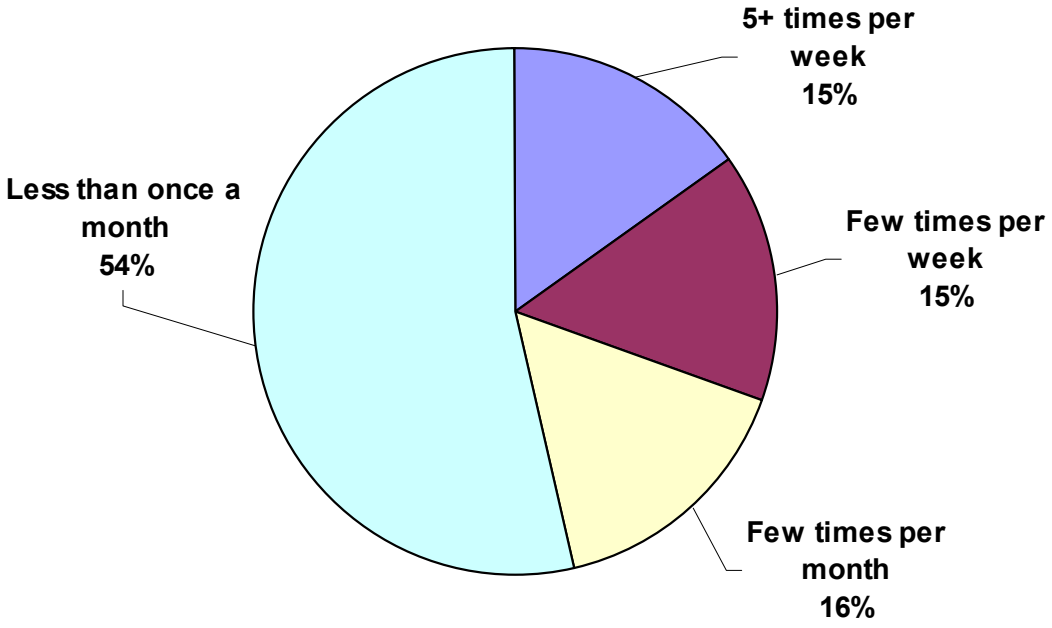
12. How important to you is the goal of creating a bicycle-friendly community? (select one)		
Answer Options	**Response Percent**	**Response Count**
Very Important	53.4%	133
Important	22.9%	57
Somewhat Important	16.9%	42
Not Important	6.8%	17
	answered question	**249**
	skipped question	**27**

Importance of a Bicycle-Friendly Community



13. How often do you bicycle? (select one)		
Answer Options	Response Percent	Response Count
5+ times per week	15.2%	37
Few times per week	15.2%	37
Few times per month	16.0%	39
Less than once a month	53.5%	130
answered question		243
skipped question		33

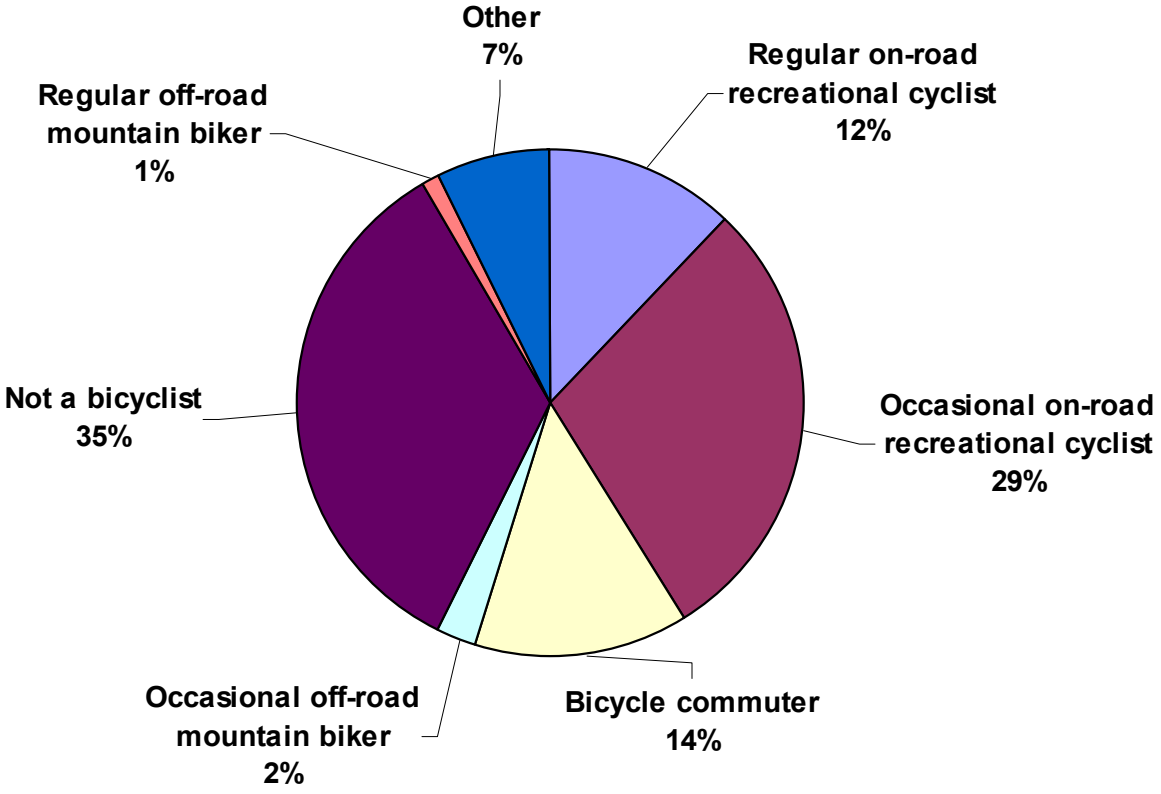
How Often You Bicycle



14. Which terms best describe your level of bicycling activity? (select one)

Answer Options	Response Percent	Response Count
Regular on-road recreational cyclist	12.1%	30
Occasional on-road recreational cyclist	29.0%	72
Bicycle commuter	13.7%	34
Occasional off-road mountain biker	2.4%	6
Not a bicyclist	34.3%	85
Regular off-road mountain biker	1.2%	3
Other	7.3%	18
	answered question	248
	skipped question	28

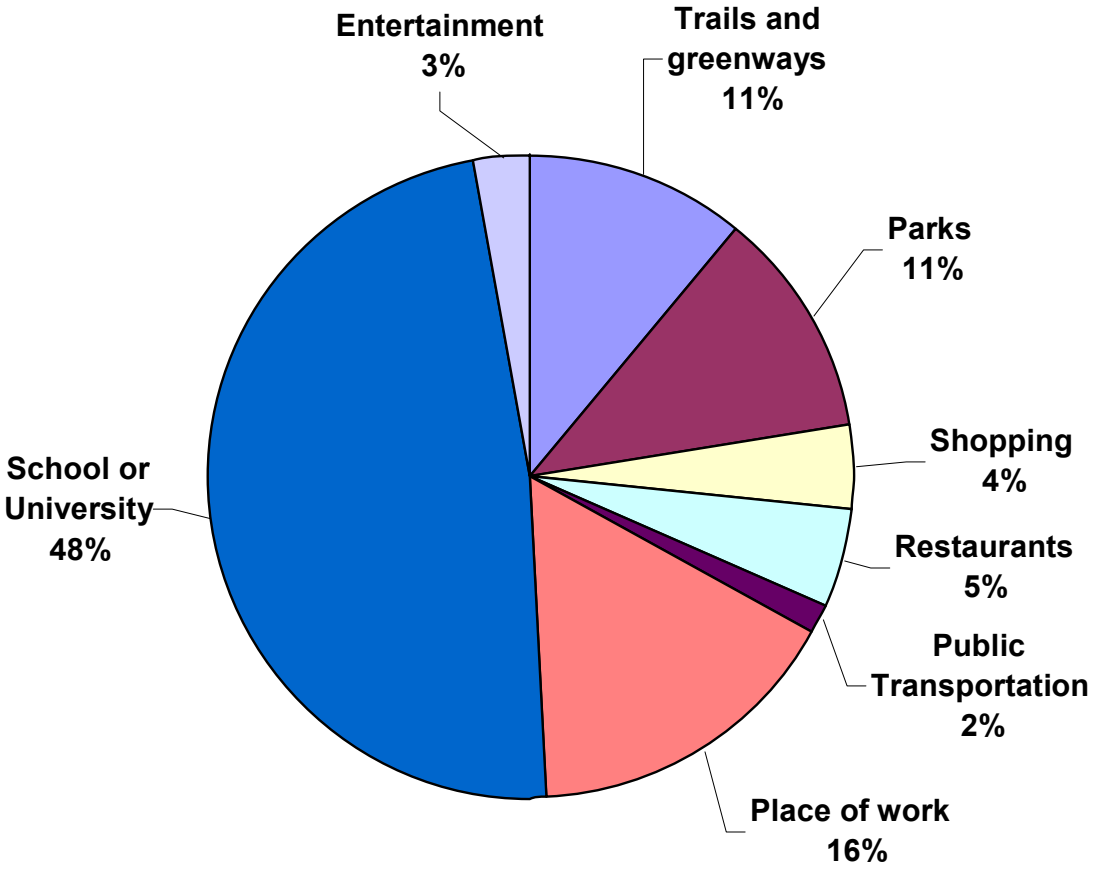
Level of Bicycling Activity



15. What bicycling destinations would you most like to get to? (Please rank your top 5, 1 being most desirable and 5 being least desirable)

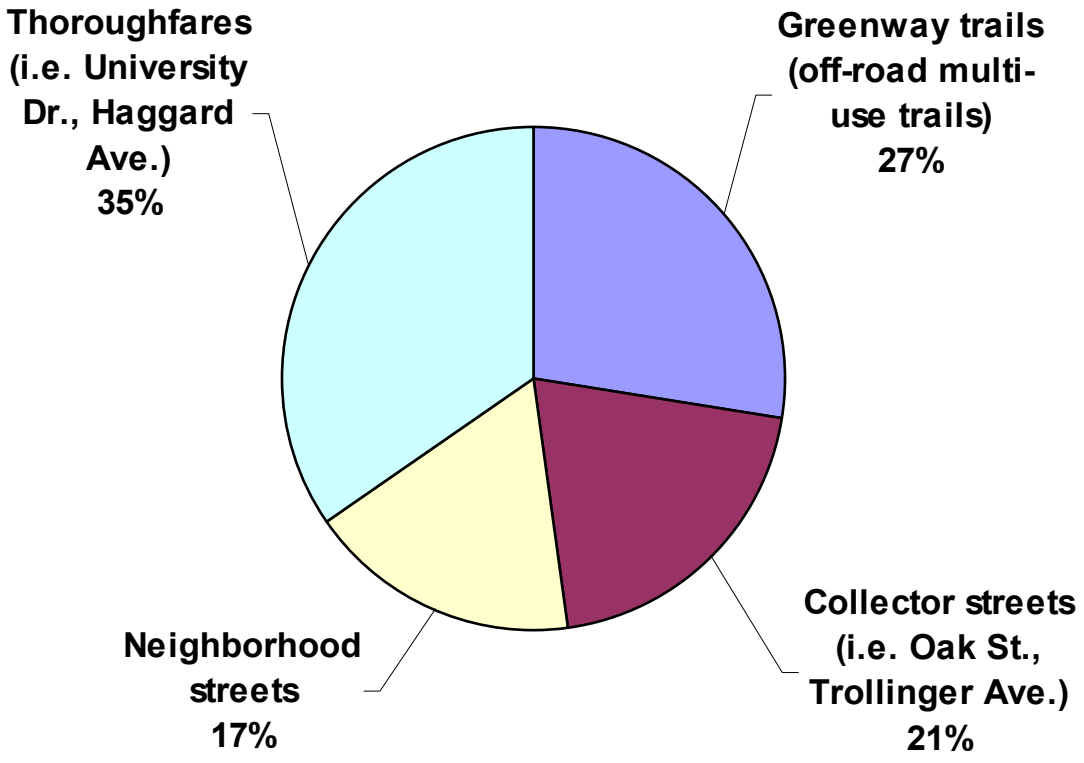
Answer Options	1 Most	2	3	4	5 Least	Rating Average	Response Count
Trails and greenways	21	33	40	21	17	2.8	132
Parks	21	35	33	26	13	2.8	128
Shopping	8	20	16	18	39	3.6	101
Restaurants	9	18	20	25	29	3.5	101
Public Transportation	3	5	8	13	12	3.6	41
Place of work	30	32	20	21	10	2.5	113
School or University	90	24	12	10	7	1.7	143
Entertainment	5	13	21	22	22	3.5	83
						Other (please specify)	10
						answered question	189
						skipped question	87

Bicycling Destinations You Most Like to Get To Ranked #1



16. What types of facilities would you most like to bicycle on? (Please rank, 1 being most desirable and 4 being least desirable)						
Answer Options	1 Most	2	3	4 Least	Rating Average	Response Count
Greenway trails (off-road shared-use trails)	52	43	32	44	2.4	171
Collector streets (i.e. Oak St., Trollinger Ave.)	39	50	49	30	2.4	168
Neighborhood streets	33	52	56	33	2.5	174
Thoroughfares (i.e. University Dr., Haggard Ave.)	66	30	26	50	2.3	172
					Other (please specify)	12
					answered question	192
					skipped question	84

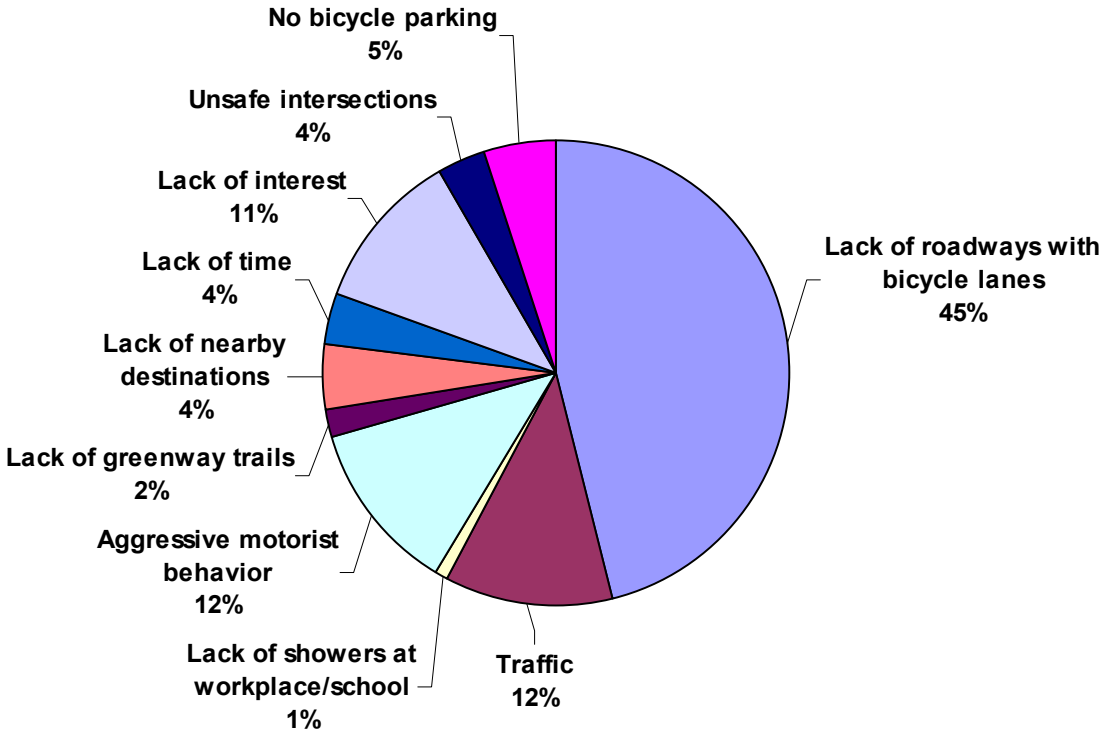
Facilities You Like to Bicycle On



17. What are the biggest factors that discourage bicycling activity? (Please rank your top 5, 1 being most discouraging and 5 being least discouraging)

Answer Options	1 Most	2	3	4	5 Least	Rating Average	Response Count
Lack of roadways with bicycle lanes	104	31	31	11	6	1.8	183
Traffic	26	49	34	31	12	2.7	152
Lack of showers at workplace/school	2	5	6	5	18	3.9	36
Aggressive motorist behavior	27	38	33	29	24	2.9	151
Lack of greenway trails	4	25	20	31	23	3.4	103
Lack of nearby destinations	10	9	14	21	19	3.4	73
Lack of time	8	11	8	12	18	3.4	57
Lack of interest	25	5	7	8	9	2.5	54
Unsafe intersections	8	35	35	30	29	3.3	137
No bicycle parking	11	7	19	15	26	3.5	78
						Other (please specify)	9
						answered question	228
						skipped question	48

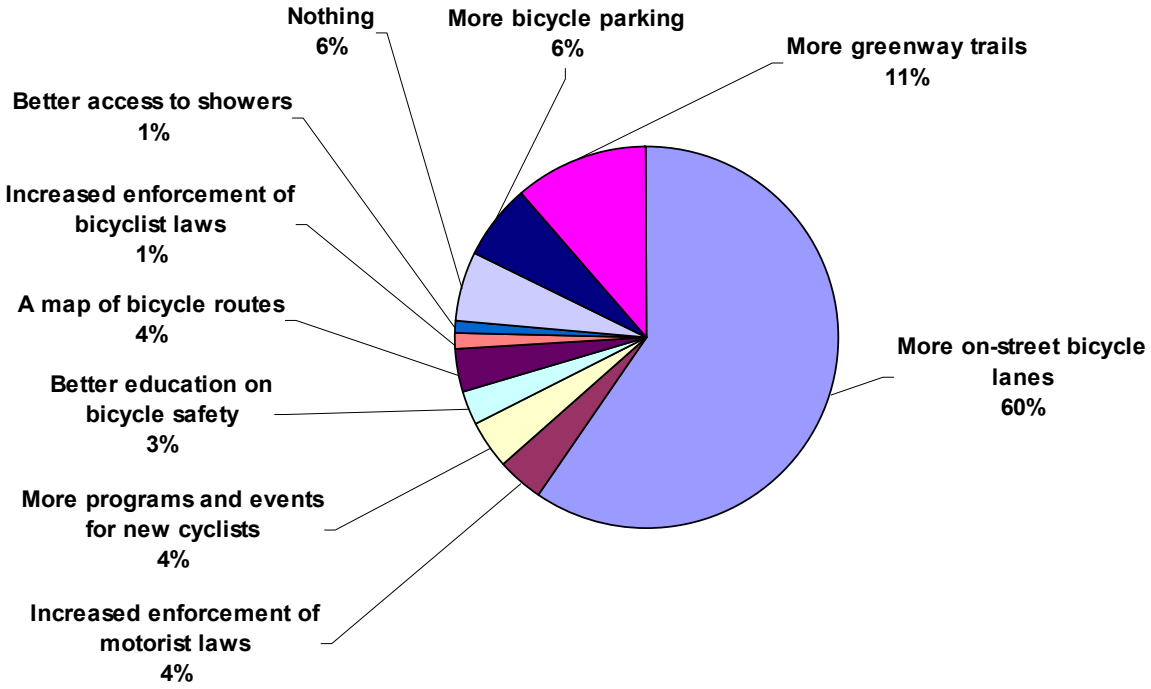
Biggest Factors Discouraging Bicycling



18. What do you think is most needed to increase bicycling in Elon? (Please rank your top 5, 1 being most needed and 5 being least needed)

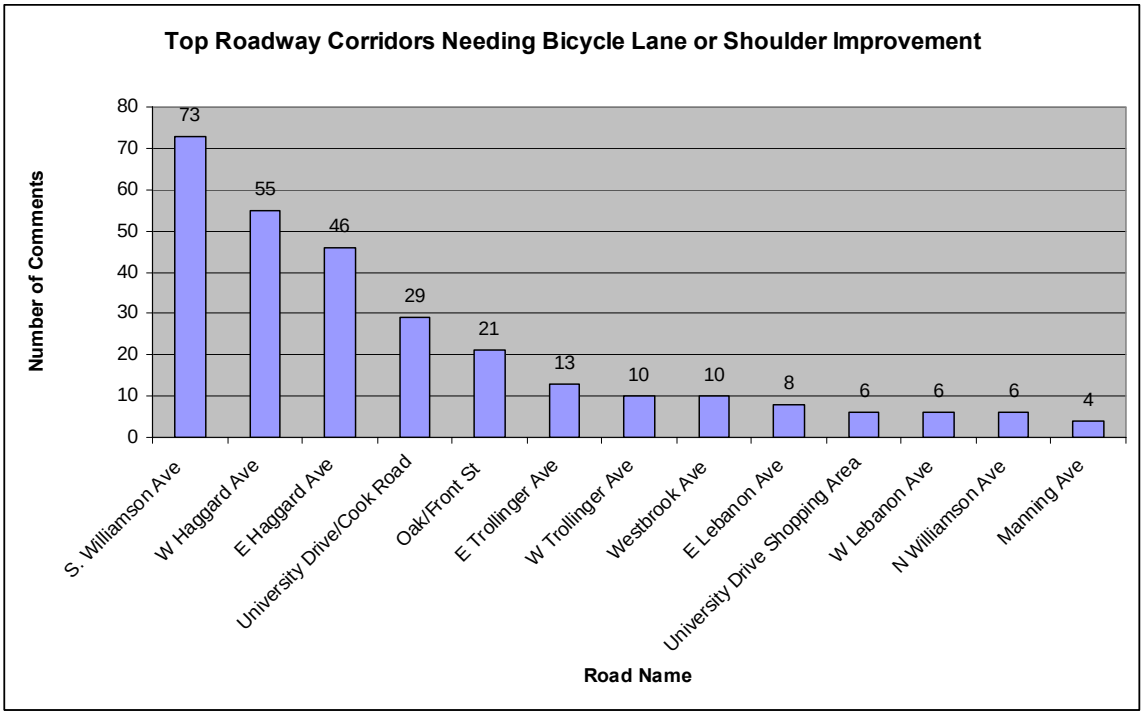
Answer Options	1 Most	2	3	4	5 Least	Rating Average	Response Count
More on-street bicycle lanes	130	37	18	6	5	1.6	196
Increased enforcement of motorist laws	9	28	23	24	14	3.1	98
More programs and events for new cyclists	9	9	19	30	20	3.5	87
Better education on bicycle safety	6	7	16	11	25	3.6	65
A map of bicycle routes	8	31	31	37	14	3.1	121
Increased enforcement of bicyclist laws	3	7	10	11	15	3.6	46
Better access to showers	2	5	4	3	13	3.7	27
Nothing	13	1	7	1	13	3.0	35
More bicycle parking	14	24	30	24	21	3.1	113
More greenway trails	25	48	28	22	12	2.6	135
						Other (please specify)	16
						answered question	**219**
						skipped question	**57**

Most Needed to Increase Bicycling



19. What do you think are the top priority corridors most needing bicycle lane or shoulder improvements? Please be specific, include cross streets or landmarks where possible. Example: Oak Street from the railroad north to Haggard Avenue.

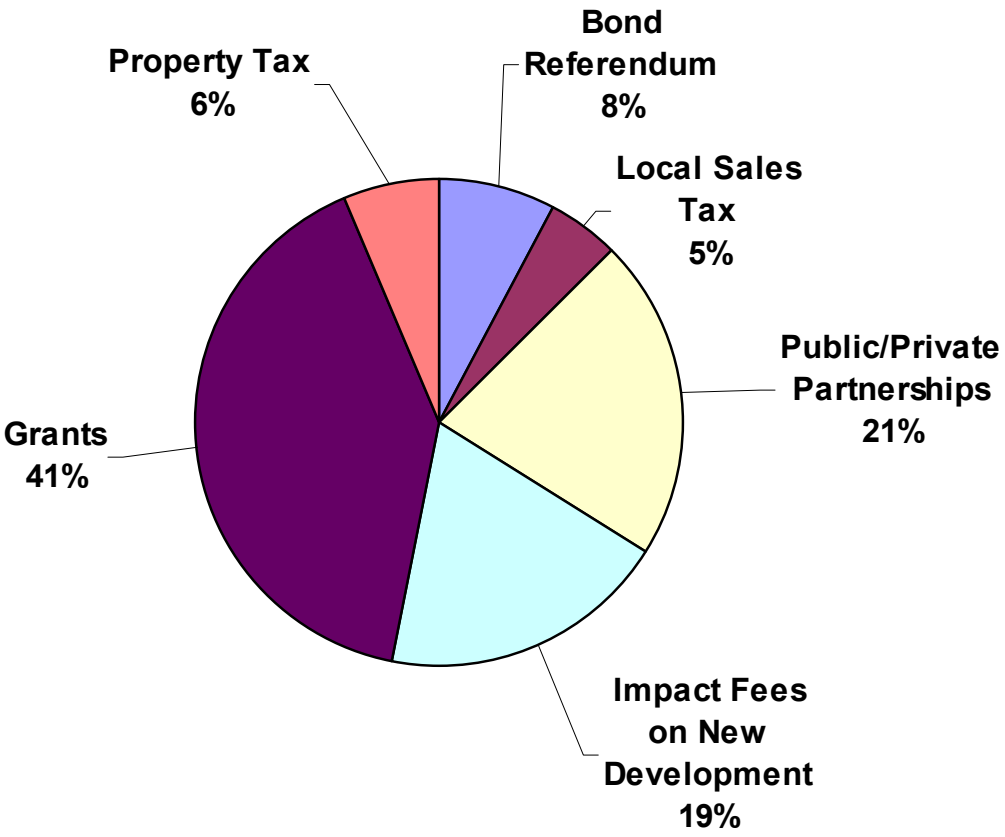
Answer Options	Response Count
	138
answered question	138
skipped question	138



20. Please rank your interest in using the following funding sources to improve sidewalks, shared-use trails and lighting in Elon (Please rank all sources, 1 being most interested and 6 being least interested).

Answer Options	1 Most	2	3	4	5	6 Least	Rating Average	Response Count
Bond Referendum	19	23	41	50	27	28	3.7	188
Local Sales Tax	12	23	25	22	50	60	4.3	192
Public/Private Partnerships	53	71	41	22	10	7	2.4	204
Impact Fees on New Development	47	39	41	36	19	17	3.0	199
Grants	100	47	24	19	11	5	2.1	206
Property Tax	16	16	35	28	47	50	4.2	192
							Other (please specify)	12
							answered question	222
							skipped question	54

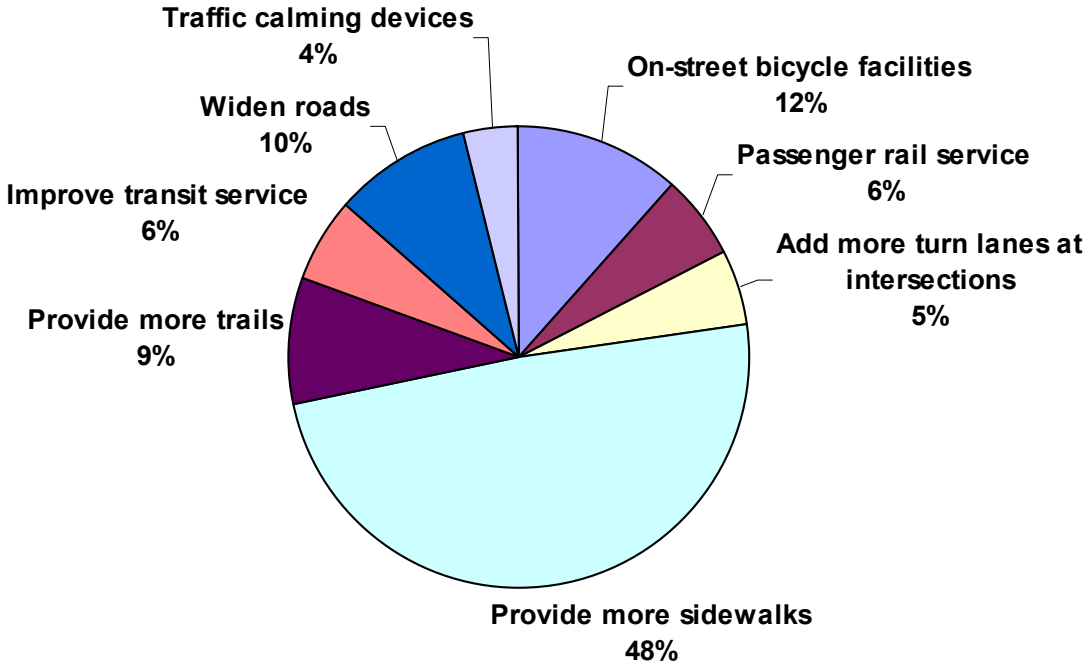
Your Interest in Using Specific Funding Sources for Improvements



21. Please rank the importance of the following transportation improvements. (Please rank your top 5, 1 most needed and 5 least needed)

Answer Options	1 Most	2	3	4	5 Least	Rating Average	Response Count
On-street bicycle facilities	27	56	36	25	24	2.8	168
Passenger rail service	14	7	15	21	25	3.4	82
Add more turn lanes at intersections	12	20	12	27	40	3.6	111
Provide more sidewalks	114	41	33	18	7	1.9	213
Provide more trails	21	44	45	32	28	3.0	170
Improve transit service	13	16	16	33	23	3.4	101
Widen roads	23	30	43	24	15	2.8	135
Traffic calming devices	9	14	23	24	23	3.4	93
Other (please specify)							8
answered question							236
skipped question							40

Importance of Transportation Improvements



APPENDIX D: MEETING NOTES

Elon Bicycle, Pedestrian and Lighting Master Plan

NOTES

Task Force Meeting #1
September 25, 2007 3:30-5pm

The meeting began at 3:30pm. The task force committee members introduced themselves and answered the question:

> "Why are you concerned about improving bicycling and walking conditions in Elon?"

A number of ideas were suggested including concerns about: *safety, health, inadequate lighting, heavy pedestrian traffic, quality of life, connections to adjoining towns and neighborhoods.*

The scope of work and planning process was then reviewed. A scope of work document describing the steps of the planning process and a timeline was included with a 3 ring binder for every committee member. The role of the task force is to guide the planning process and provide a framework of values for plan development.

Jesse Day presented a short 15 minute presentation of walkable and bikeable community elements, concepts and images. The images were shown to help committee members visualize potential improvements in Elon and typical constraints to walkability and bikeability that may need to be addressed.

Following the presentation, task force members formed 3 work groups and engaged in a mapping exercise to record issues concerning bicycling, walking and lighting in Elon. The three groups recorded on the maps: 1) areas of concern, 2) places people would like to go and 3) places people currently go. Different colors were used to signify these different issues and members were encouraged to provide additional explanation as to whether issues related to the bicycle, pedestrian or lighting system. See the planning maps (produced for the next meeting) for further information on the results of this exercise.

A vision and goal writing exercise followed the mapping exercise. The results of this exercise are included below. Task Force members were encouraged to write individually about a vision for the Town of Elon and goals for its pedestrian, bicycle and lighting system. Following the individual writing exercise some members shared some of their thoughts on the future of bicycling and walking in Elon.

The meeting adjourned at 5:05pm.

Elon Bicycle, Pedestrian and Lighting Master Plan
VISION Discussion

The following key issues were mentioned individually for inclusion in a vision statement for the bicycle, pedestrian and lighting system of 2025. Members finished the following statement:

"In the year 2025 the Town of Elon will have a pedestrian, bicycle and lighting system that will..."
Tie the major residential areas together; providing student access from residential areas to campus facilities and provide adequate lighting for leisure activities to provide safety and visibility
a) Will provide more spacious bicycle and pedestrian paths in downtown; b) Provide students with well-lighted bicycle and walking from campus to their residences in the town; c) would allow safe crossing of railroads and high traffic roadways; and d) Connect with shopping and recreational areas
Will accommodate students & residents completely within the University Drive perimeter, expanding to mill point and then encompassing Williamson Drive towards I-40
Maintain quality of life, green, safe and healthy. Connections will be made inside and outside of town with different generations, families and physical ability
Provide connectivity between residences and grocery shopping and other stores
Encircle the town and provide access points for neighborhoods and the campus, plus provde access to retail areas for pedestrians and cyclists
Provide safe travel around and through the community
Encourage walking, running and biking throughout Elon and connecting to Burlington/Gibsonville via walkways and bikeways
Provide loops that connect the key areas of the town and the key anchors of the University
Safe, functional, innovative, along major thoroughfares, well used and maintained

Elon Bicycle, Pedestrian and Lighting Master Plan
GOALS Discussion

The following goals for the pedestrian, bicycle and lighting system in Elon were generated by Task Force members. In some cases goals were mentioned by multiple people and that number is included in the tables below.

Key ***pedestrian*** system goals for Elon include:

Goal	**# of Times Mentioned**
Build wide sidewalks with adequate width	3
Connect neighborhoods	2
Provide seating areas with trash bins and shelters	2
Ensure safe railroad and roadway crossings	2
Connect activity centers with residential areas (functional routes to key growth areas	2
Make it possible for pedestrians to walk in town to all locations	2
Connect student residential communities to campus facilities	
Provide leisure areas for walking & bicycling	
Sidewalks on both sides of every road, prioritize areas that attract residents and students to walk and jog	
Enable students to walk to campus	
Provide a bridge between the younger (Elon U) and older (Twin Lakes) generation	
Sidewalks along major thoroughfares	
Specific Improvements: a) Haggard Avenue from EU to University Point and Bypass; b) Campus to Truitte Drive/Millpoint Area; c) Sidewalks on Williamson from Davidson Park to University Drive; d) O'Kelley and Campus to University Drive	

Elon Bicycle, Pedestrian and Lighting Master Plan

Key ***bicycle*** system goals for Elon include:

Goals	# of Times Mentioned
Provide safe, well lit places to lock bikes	3
Provide separated bicycle lanes on major roads and arteries	2
Create bicycle paths connecting Elon to Burlington and other outlying areas	2
Provide safe off-road bicycle paths with adequate lighting	
Access to University Drive and along Williamson Rd to Davidson Park, Schmitz Park and Cook Road	
Bicycle paths on major streets; Williamson, Haggard, University Drive, etc. so cyclists are not riding in the streets	
Provide places to exercise for residents	
Provide access to community parks/shopping/etc.	
Connect the University housing areas with the University academic, athletic and entertainment areas	

Key ***lighting*** system goals for Elon include:

Goals	# of Times Mentioned
Provide well lit pathways to encourage pedestrian traffic, especially evening destinations	3
Establish secure lighting in heavily traveled pedestrian areas - a) University Drive from Haggard to 87	
Provide better lighting away from University	
Be more efficient in replacing burned out lights	
Provide well lit emergency stations to improve safety	
Provide adequate lighting for 24 hour use facilities	
Complete lighting on major walks, high use areas and high density areas	
Pedestrian walking with innovative lighting	
Lights along all major thoroughfares	
Install lighting on Williamson, W Trollinger, W Lebanon and O'Kelley	

Elon Bicycle, Pedestrian and Lighting Master Plan

NOTES

Task Force Meeting #2
October 30, 2007 3:30-5pm

Task Force Members Present:
Ken Mullen
Steve Trogdon
Monti Allison
Glenda Linens
George Donovan
Staff Present:
Sean Tencer
Jesse Day
Paul Kron

The meeting began at 3:35 pm.

After a brief review of the agenda and previous task force meeting, Sean Tencer from the Town of Elon reviewed the existing Town of Elon bicycle, pedestrian and lighting programs and policies. Elon's existing regulations are as follows:

- Require sidewalk easement for subdivisions
- Encourage bicycle racks for new business
- Duke Energy provides basic "cobra head" lighting, but decorative lighting may be included in development at an additional cost

Discussion of potential programs and policies followed the brief presentation on existing programs and policies. Examples from other jurisdictions include:

Pedestrian Policy and Program Examples

- Require sidewalks construction in new development and change of use and require sidewalks at least 5ft in width
- Establish signage standards to assist in wayfinding and improving safety
- Establish a traffic calming program
- Prioritize sidewalk construction and crossing improvements around schools
- Require street trees and plantings between roads and sidewalks
- Require pedestrian connections between parking areas
- Increase planning and program coordination with neighboring jurisdictions
- Establish an artwork program to be included in sidewalk and street design
- Establish a Safe Routes to School walking and bicycling program based around education, encouragement, engineering and enforcement

Bicycling Policy and Program Examples

- Require bicycle lanes on all new arterial and collector roads
- Establish a bicycle level of service (rating or bikeability) score for existing facilities
- Require bicycle parking for new commercial development
- Place share the road signs in key locations

Lighting Policy and Program Examples

- Eliminate street light and athletic field glare as much as possible

- Minimize energy use by using better bulbs and solar power
- Designate lighting districts outlining foot candle, spacing, bulbs, energy efficiency

Policies, Programs and Pilot Projects Tools and Solutions Workshop

The workshop notes on the following pages were preceded by a brief discussion of the following vision statement and goals. Task force members are encouraged to review and offer suggestions for updating the following vision statement draft and pedestrian, bicycle and lighting system goals. In addition if there are program, policy or project ideas, please suggest them for including in the Tools and Solutions Workshop tables on the following pages.

Draft Vision Statement

In the year 2025 the Town of Elon will have a pedestrian, bicycle and lighting system that will tie major residential areas together, providing students and residents *safe and well-lit* access from residential areas to campus academic and recreational facilities and the downtown. Elon will maintain a *quality of life* that is green, safe and healthy, accommodating student's and resident's needs. Spacious *bicycle and pedestrian paths* will exist downtown and will also connect with Burlington and Gibsonville encouraging walking, running and biking throughout Elon and neighboring communities. Facilities will be *safe, functional, innovative, well-used and maintained*. Elon will provide *connectivity* between residences and grocery shopping, restaurants and other destinations, providing *key access points to destinations and anchors* of activity in the Town and University.

Draft Pedestrian System Goals

Build Wide Sidewalks from Residential Areas to Key Destinations

- Build wide sidewalks with adequate width, allowing pedestrians to walk safely to any location, especially along major thoroughfares with key destination points and anchors
- Connect existing and future neighborhoods with key destinations, making it possible for pedestrians to walk in town to all locations
- Connect student residential communities to campus activity centers enabling students to walk to campus
- Prioritize street sidewalk improvements and areas that attract residents and students to walk and jog for recreation or transportation

Transit Connections

- Provide transit shelters and seating areas with trash bins

Safety and Intersection Improvements

- Ensure safe railroad and roadway crossings

Other

- Provide leisure areas for walking & bicycling
- Provide a "bridge" between the younger (Elon University) and older (Twin Lakes) generation

Draft Bicycle System Goals

Bicycle Parking

- Provide safe, well lit places to lock bicycles

On-road Accommodation

- Provide separated bicycle lanes on major roads and arteries
- Provide bikeway connections to community parks, shopping and other destinations, while providing opportunities to exercise
- Connect the University housing areas with key University academic, athletic and entertainment anchors

Off-Road Accommodation

- Create bicycle paths connecting Elon to Burlington and other outlying areas
- Provide safe off-road bicycle paths with adequate lighting
- Provide bikeway connections to community parks, shopping and other destinations, while providing opportunities to exercise
- Connect the University housing areas with key University academic, athletic and entertainment anchors

Draft Lighting System Goals

Lighted Pathways

- Provide well lit pathways to encourage pedestrian traffic to key evening destinations
- Establish secure lighting in heavily traveled pedestrian areas
- Complete lighting on outdoor lighting walkways, including high use and high density areas

Security and Safety

- Provide well lit emergency stations to improve safety
- Install lights along all major thoroughfares

General Lighting

- Provide better lighting away from University
- Be more efficient and innovative in replacing light bulbs
- Provide adequate lighting for 24 hour use facilities

Tools and Solutions Workshop – Meeting #2

PILOT PROJECTS

Tool / Solution (What)	Purpose & Place (Why & Where)	Timeframe / Priority (When)	Responsible Parties (Who)	Resources Needed (How)
Build sidewalk from Twin Lakes along Westbrook to B. Schmidt Park	To achieve the goal(s) of connecting neighborhoods with destination points	Mid-Range (2-3 years)	Town and Twin Lakes	Planning and engineering $ = Transportation enhancements, Town funding
Extend sidewalk along Trollinger from Oak to Truitt Street	To achieve the goal(s) of safe pedestrian and bicycle access to fields for university and neighborhoods	Mid-Range (2-3 years)	Town	Planning and engineering $ = Transportation enhancements, Town funding
Build sidewalk from Haggard to Trollinger along Oak Street	To achieve the goal(s) of connecting university to fields	Short-Range (1 year)	Town	Planning and engineering $ = Transportation enhancements, Town and University funding
Continue sidewalk along Haggard Avenue from Manning to University Drive	To provide pedestrian connectivity for the University and Downtown	Long-Range	Town	$ = Transportation enhancements, Town funding
University Drive shared-use path extension to B. Schmidt Park and connect to neighborhoods on east side of the park	To achieve the goal(s) of better pedestrian connectivity to Park from surrounding neighborhoods	Short Range (1 year)	Town and NCDOT	Planning and engineering $ = Transportation enhancements, STP
Shared-use path along Westgate from Westbrook to Williamson and along Williamson to downtown	To achieve the goal(s) of connecting neighborhoods and providing a recreation loop	Long-Range (3-5 years)	Town	Planning and engineering $ = Transportation enhancements, Town funding
Bicycle lanes along Haggard Ave from University to University Drive	To achieve the goal(s) of connecting the University with bicycle access for students	Long-Range (3-5 years)	NCDOT and Town	Planning, engineering $ = Transportation enhancements
University Drive lighting from Twin Lakes through B. Schmidt Park to Haggard Avenue	To achieve the goal(s) of a lighted gateway into the Town and to make it more welcoming	Mid-Range (2-3 years)	Gibsonville, Town, NCDOT and Duke Energy	Town funding
Lighting along Trollinger and Oak Street	To achieve the goal(s) of safety for bicyclists and pedestrians using the athletic fields south of the railroad track	Mid-Range (2-3 years)	Town, University and Duke Energy	Town and University funding

Tools and Solutions Workshop – Meeting #2

POLICIES, GUIDELINES & REGULATIONS

Tool / Solution (What)	Purpose & Place (Why & Where)	Timeframe / Priority (When)	Responsible Parties (Who)	Resources Needed (How)
Require planting strips (>4ft) between the sidewalk and the street in new development	To achieve the goal(s) of safety, comfort and promoting walking	Short-Range (Next Year)	Town Planning	Maintenance
Require assessment to fund new sidewalk construction in existing development	To achieve the goal(s) of expanding the sidewalk network	Short-Range (Next Year)	Town Planning and planning board	Attorney, analysis of potential resources
Require bicycle lanes on all new arterial and collector roads	To achieve the goal(s) of promoting cycling and replacing automobile trips with bicycle trips	Short-Range (Next Year)	Town Planning and NCDOT	
Require shared-use pathways along major arterials	To achieve the goal(s) of promoting cycling and replacing automobile trips with bicycle trips	Short-Range (Next Year)	Town Planning and NCDOT	Maintenance
Require streetlights to have sustainable lighting (fluorescent and LEDs)	To achieve the goal(s) of safety, energy conservation, energy savings and maintenance	Short-Range (Next Year)	Developers, University, Twin Lakes, Town Planning and Duke Energy	University, local resources, debt financing for upfront costs, State energy office
Establish a lighting district with style, foot candle, lumens and spacing standards	To achieve the goal(s) of safety and aesthetics	Short-Range (Next Year)	Town Planning and Duke Energy	Local resources and homeowner's association
Establish Scenic Corridor Overlay to help beautify and preserve major or minor thoroughfares (200' from centerline of road)	To achieve the goal(s) of better architecture, lighting and beautification	Long-Range (3-5 Years)	Town Planning	Ordinance drafting

Tools and Solutions Workshop – Meeting #2 **PROGRAMS**				
Tool / Solution (What)	**Purpose & Place (Why & Where)**	**Timeframe / Priority (When)**	**Responsible Parties (Who)**	**Resources Needed (How)**
Establish a streetscaping committee to identify and target specific routes for lighting, trees and landscaping along existing streets & roads	To achieve the goal(s) of walkability, safety, beautification and slowing traffic	Mid-Range (2-3 Years)	Town and University	Town and University funding, Transportation Enhancements funding, Tree City USA
Downtown walking program	To achieve the goal(s) of increase physical activity	Short-Range (Next Year)	Town and Health Department	Fit community grant funding
Sidewalk art program	To achieve the goal(s) of improving the aesthetics of the Town	Mid-Range (2-3 Years)	Town University Elon Elementary	Class project
Safe Routes to School program	To achieve the goal(s) of improving safety and improving physical activity among children	Mid-Range (2-3 Years)	Town Elon Elementary	NCDOT Safe Routes to School Grant Program
Establish a crosswalk improvement program	To achieve the goal(s) of improving safety and walkability	Mid-Range (2-3 Years)	Town University	Town and University Funding, Spot Improvement funding from MPO

Following the tools and solutions workshop, the meeting adjourned at approximately 5:00pm. The next task force meeting will be scheduled on email, since a majority of task force members could not be present.

Elon Bicycle, Pedestrian and Lighting Plan

NOTES
Task Force Meeting #3
January 29, 2008 3:30-5pm

Task Force Present: George Donovan, Tom Flood, Smith Jackson, Ron Klepcyk, Glenda Linens, Ken Mullen, Rob Saunders, Steve Trogdon and Trish Patterson
Staff Present: Hanna Cockburn, Jesse Day, Sean Tencer

The meeting started at 3:35. The previous meeting notes from October 30th, 2007 were reviewed. The railroad crossing study was distributed, which reviewed pedestrian safety and access issues of the Oak Street and Williamson Avenue crossings of the North Carolina Railroad. The first draft of the report was distributed for review by the task force. The existing conditions including demographics, crash data, sidewalks, bicycle lanes, paths and other information were included in the report.

The public involvement plan for the Bicycle, Pedestrian and Lighting Plan was then reviewed, including the survey, public meeting agenda and focus group plan.

A draft of the survey was distributed and some changes were suggested. It was recommended that a question gauging the citizen's level of interest for different kinds of funding sources be included (e.g. property tax, sales tax, etc.). A review of the survey distribution plan was conducted. The survey will be available online and in paper format. Paper surveys will be given out to the following locations the Community Center at Beth Schmidt Park, Town Hall, Elementary School, Twin Lakes and key University Locations. The online survey will be distributed on the University eNET, Town Website, via task force member contact lists, the Pendulum, Rock Creek News and other outlets.

The public workshop agenda was reviewed. The workshop was shortened from 2 hours to 90 minutes. A flier about the workshop would be helpful in order to get the word our about the public meeting.

After the public workshop and survey data is collected, focus groups will be used to gather additional input into bicycling, walking and lighting conditions. The focus groups will consist of senior citizens, University students, parents and faculty, elementary school kids and business owners. The focus groups will be used to gather more insight into recommendations for future improvements.

Additional task force meetings and a second public workshop will be scheduled for the spring to review and revise draft recommendations resulting from task force and public involvement.

Elon Bicycle, Pedestrian and Lighting Plan

AGENDA
Public Meeting # 1
February 13, 2008
6-7:30pm

30 Attendees

Welcome and Overview of Project **10 min**

- Review draft vision statement and goals

Walking and Bicycling-Friendly Communities **30 min**

- PowerPoint presentation with images of walking and bicycle-friendly communities
- Questions and discussion of walking and bicycle-friendly community concepts

Mapping Workshop **40 min**

Three stations (bicycle, walking and lighting maps with existing conditions)

- Map the following:
  - Existing walking and bicycling routes (BLUE)
  - Intersections or areas of concern (RED)
  - Places you would like to walk or bicycle (GREEN)
- Fill out a questionnaire on walking, bicycling and lighting conditions in Elon

Summary and Next Steps **10 min**

- Brief report of task force work
- Development of draft plan and schedule

Elon Bicycle, Pedestrian and Lighting Plan

NOTES
Elon Elementary Safe Routes to School Assembly
June 3, 2008

A pedestrian and bicycle safety talk was conducted at the Elon Elementary School. Two assemblies of grades K-2 and 3-5 learned about pedestrian and bicycle safety. Sean Tencer, Dave Gammon and Jesse Day talked with the children about the Elon Bicycle, Pedestrian and Lighting Plan, crossing the street safely, how to wear a helmet and some of the health problems associated with physical inactivity. In addition children mapped the way their route to school and observed some pictures that showed scenes where automobile drivers were not following the rules (e.g. parking in the crosswalk, parking on the sidewalk, etc.). There were less than 5 kids that walked to school and none that bicycled.

Grades 3-5 were asked about what problems they see out on the roadway, here are some of the problems that were mentioned:

- No traffic lights
- Elon University students stopping
- People parked in crosswalks
- Speeding
- Crossing railroad tracks
- No crosswalks

Following the talk, the PTO and teachers were approached about conducting an NCDOT Safe Routes to School workshop in the fall of 2008. There was significant interest from the PTO president and school faculty in working on conducting a workshop on Safe Routes to Elon Elementary School.

Elon Bicycle, Pedestrian and Lighting Plan

NOTES
Bicyclist Focus Group
June 11, 2008

Attendees: Richard Mann, Dave Gammon, Anthony Crider, Megan Squire, Herb Houserburd, Rich D'Amato
Staff: Jesse Day

A small group of bicyclists met to discuss the Elon Bicycle, Pedestrian and Lighting Plan at the Acorn Coffee Shop in downtown Elon. The meeting focused on specific projects that would benefit bicycle transportation and recreation and how to fund these projects. In addition there was discussion of how to increase bicycle parking in Elon.

The following are points and ideas made at the meeting:

- Current NCDOT Route 70 through town (Manning Ave., Lebanon Ave., Oak and Front Street) could use additional way finding signage and share the road signs
- Front and Oak Street will need to be resurfaced soon providing an opportunity for considering bicycle lane facilities
- Three additional short pathway connectors were suggested between Arbor and W. Heritage Drive, Neal Street and Forrestview Drive and Westview Drive and O'Kelley Drive
- Bicycle facilities on Manning Avenue, Elon-Ossipee Road and Shallowford Church Road should be extended to ETJ limits.
- Begin a public/private partnership to fund bicycle parking
- Begin a public/private partnership to fund pathway connections linking neighborhoods.

The focus group will be a valuable resource in implementing the plan and will be a resource to look to for funding and support of projects, programs and policies in the plan.

Elon Bicycle, Pedestrian and Lighting Plan

NOTES

Public Meeting # 2
June 12, 2008
7-8:30pm

The second public meeting was an open house meeting format. Approximately 15 town residents attended this meeting. Proposed bicycle, pedestrian and lighting improvements were displayed on maps, with an opportunity for discussion and feedback with project staff.

In addition, copies of the draft report were distributed to residents to review proposed policy and program recommendations. Feedback was generally in support of building projects already recommended, with a number of additional path and bike lane connections called for in the Millpoint neighborhood, Twin Lakes area and north of University Drive.

The report was placed on the Town's website for review and comments at the time of this second public meeting.

PIEDMONT TRIAD
COUNCIL OF GOVERNMENTS
2216 W. Meadowview Road, Ste. 201
Greensboro, NC 27407
www.ptcog.org
(336) 294-4950