March 2012

KILL DEVIL HILLS

PEDESTRIAN PLAN

Division of Bicycle & Pedestrian Transportation

Adopted XXX X, 2011 ● Draft Report● Kill Devil Hills, North Carolina

NCDOT Division of Bicycle & Pedestrian Transportation ● Henderson Consulting and The Louis Berger Group.

Acknowledgments

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The Project Team wish to thank the Town's Board of Commissioners and the citizens of Kill Devil Hills for making this Plan a reality. Thanks also to the North Carolina Department of Transportation for the NCDOT Pedestrian Planning Grant through the Division of Bicycle and Pedestrian Transportation, which partially funded this planning process.

Table of Contents

Executive Summary

This report outlines the goals, objectives, and vision for the Pedestrian Plan of Kill Devil Hills and it provides some key background information gathered from citizens, current policies/plans, research into collision patterns, and demographic trends that influence recommendations developed for the Plan.

In **Section 1**, a framework of the important strategies and goals is developed, building upon work performed by an *ad hoc* Steering Committee. Connectivity, Safety, and Multi-Functionality are cited as primary goals with separate sub-goals identified as explanatory components of each major goal. From a keyword exploration of the Steering Committee, the following Vision Statement was developed that serves as a guide for the Plan:

Kill Devil Hills is a community of active people enjoying a network of safe, well-lit walkways, street crossings and beach access areas.

The Steering Committee agreed on specific strategies, as follows:

1. Fill in gaps between existing sidewalks
2. Add sidewalks and extend shoulders north along Virginia Dare Trail (NC 12) and widen where practical to do so
3. Extend multi-use path south along Bay Drive
4. Extend safe routes to schools into neighborhoods
5. Enhance pedestrian friendly crossings of Croatan Highway (US 158)
6. Educate motorists, pedestrians and bicyclists to share the road
7. Promote citizen health and wellness by providing a safe, convenient and comfortable environment in which to walk, bicycle and exercise outdoors
8. Incorporate sustainable design concepts into pedestrian projects and programs

In **Section 2**, a better understanding of the history and key issues is developed from surveys and research into U.S. census demographic data sources. From this section we learn that a just over one percent of the population walked to work in 2000. There are 5.5 miles of road for every mile of sidewalk in Town; and many people believe that more pathways should be constructed to facilitate walking to schools, stores, restaurants, jobs, friends, and the beach.

Section 3 is focused on making connections between other planning efforts, policies, and this Pedestrian Plan. Preliminary recommendations are cited concerning, for example, policies on parking lot design, better activity-oriented programs, and clarifying the current sidewalk petitioning process. By improving the policy environment in these documents, and making sure that pedestrian considerations are in turn considered in updates of other plans, the long-term future of walking in Kill Devil Hills looks much brighter.

Section 4 provides design guidance for the Town of Kill Devil Hills as the Town, private developers, and the State Department of Transportation (NCDOT) construct new pedestrian facilities and reconstruct existing pedestrian facilities to meet a recommended standard. This is

guidance only; it does not supersede other, adopted design standards at the State or local levels, but rather encourages flexible and appropriate design considerations of pedestrians. Table 4.1 lists sidewalk and buffer width recommendations.

Section 5 describes local policies, plans and programs that can heavily influence the walkability of Kill Devil Hills. Policy amendments can often be achieved at low-cost to a municipality while resulting in substantial outcomes that could help Kill Devil Hills make notable progress in becoming a more walkable environment. It is strongly recommended that the Town work to update and/or create local ordinances to include more pedestrian-oriented language and guidance for walkable future development. A key recommendation is to appoint a standing Bicycle and Pedestrian Advisory Committee to help engage the public in the implementation of the Pedestrian Plan, as well as to help complete future planning efforts. Several program recommendations are made. Partnership opportunities are also identified.

Section 6 is packed with action steps to implement this Plan, requiring a coordinated effort among Town officials, leaders, and citizen volunteers. A phased implementation schedule that considers priority and cost organizes action steps into short and long-term recommendations.

- Short-term recommendations:
  within 10 years of Plan adoption;
  13 projects (see Table 6.1, page 69) total 5.1 miles
- Long-term recommendations:
  more than 10 years after Plan adoption;
  14 projects (see Table 6.2, page 70) total 10.8 miles

Four planning efforts, two internal policies, eight ordinances, and three programs are described. More than forty unique funding sources are described in Section 6, ranging from private sources to all levels of public funding including local, state, and federal sources.

Figure 1. Entrance to Wright Brothers National Memorial at US 158 and Prospect Avenue.

Section 1. Goals & Objectives

1.1 Introduction

The intent of the Kill Devil Hills Comprehensive Pedestrian Plan (the "Plan") is to provide guidance for making Kill Devil Hills a more pedestrian-friendly community. It is partially funded by a grant from NCDOT and matching funds from the Town of Kill Devil Hills.

This section introduces the framework of the Kill Devil Hills Pedestrian Plan, as well as the goals and objectives established by a Steering Committee.

Purpose. The Pedestrian Plan serves several purposes including:

- Promote a better understanding of the measures that can be taken to create a safer and more pleasant walking environment;
- Identify a clear schedule of projects, programs, and policies that Kill Devil Hills and partnering agencies can provide to improve the walking environment; and
- Create awareness of the positive effects of walking, including but not limited to:
    - a reliable substitute for some trips being made by automobile;
    - contribute to a healthier lifestyle; and
    - reduce carbon and other emissions associated with motorized travel.

The Pedestrian Plan recommends future pedestrian-related projects and facility improvements in the Town, as well as programs and policies that will support a pedestrian-friendly culture and help to further improve local walking conditions. Plan implementation will result in a safe, accessible pedestrian system that includes sidewalks, multi-use pathways and safe intersections, in addition to programs and policies that encourage residents and visitors alike to walk for health, recreation, fitness, cost-savings and basic transportation.

The Plan identifies the needs of Kill Devil Hills's varied population, including those of current and future residents, businesses, and tourists. The benefits of the Plan vary, including improved air quality, a healthier population, easier access to more places, reduced traffic congestion, and improved pedestrian safety for all citizens and visitors. All of these benefits amount to an overall improvement in quality of life which can make a community very attractive to newcomers and visitors, thus boosting the town's economy and vitality.

The following sections of this Plan provide recommendations for projects, programs, and policies to make Kill Devil Hills more pedestrian-friendly. The Plan also presents a list of priorities and a phased construction schedule, as well as cost estimates and potential funding sources, to assist with implementation of the Plan's recommendations. Map 1.1 shows the current location of popular destinations for people who choose to walk.

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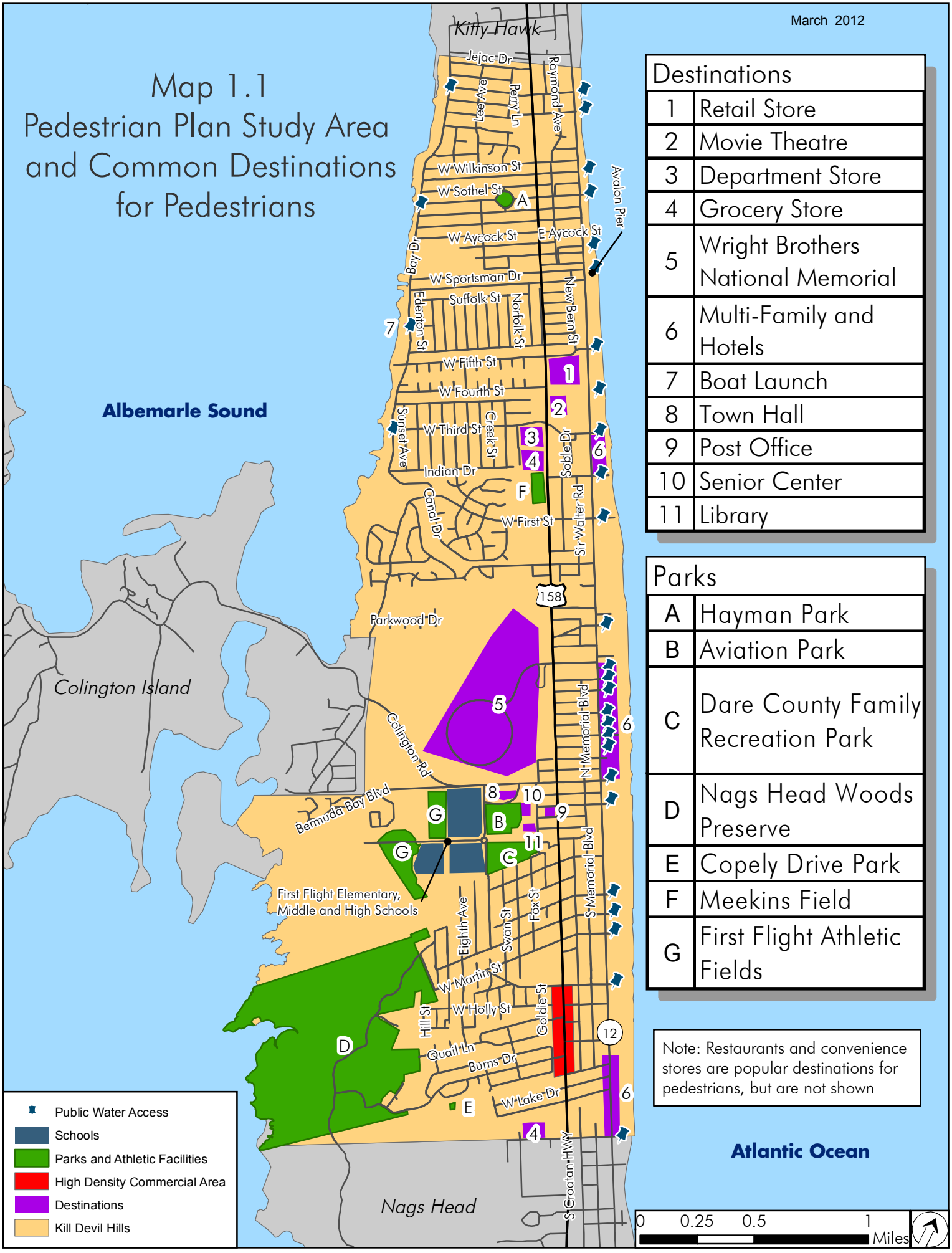
Map 1.1
Pedestrian Plan Study Area and Common Destinations for Pedestrians



Destinations	
1	Retail Store
2	Movie Theatre
3	Department Store
4	Grocery Store
5	Wright Brothers National Memorial
6	Multi-Family and Hotels
7	Boat Launch
8	Town Hall
9	Post Office
10	Senior Center
11	Library

Parks	
A	Hayman Park
B	Aviation Park
C	Dare County Family Recreation Park
D	Nags Head Woods Preserve
E	Copely Drive Park
F	Meekins Field
G	First Flight Athletic Fields

Note: Restaurants and convenience stores are popular destinations for pedestrians, but are not shown

1.2 Planning Process

The Kill Devil Hills Pedestrian Plan began in March, 2010 and completed in October, 2011. The Town retained a consulting team to draft the Plan, conduct public engagement exercises, and assist in facilitating a Steering Committee comprised of citizens, business representatives, school representatives, health care professionals, Town staff, and local pedestrian advocates. Table 1.1 shows a roster of the Steering Committee and staff who worked on the Plan. One public meeting and a two-day, summertime, on-street survey were conducted as part of the planning process to gather feedback from residents and visitors on the vision and recommendations for the future of Kill Devil Hills's pedestrian environment. In addition, the consultant conducted a field inventory of existing pedestrian facilities in Kill Devil Hills, which combined with public feedback, led to a list of prioritized project needs. Existing conditions analyses and recommended pedestrian improvements were refined through the development of this report reviewed in full by the Steering Committee.

Table 1.1. Steering Committee and Staff

Name	Affiliation	Representing
Steering Committee		
Dana Harris	Assistant Chief of Police	law enforcement
Laura Davis	YMCA	active living, wellness
Mandy Earnest	Dare Co. Health Dept.	health care
Eddie Goodrich	Resident	citizens
Tripp Hobbs	Dare County Schools	schoolchildren
Paul Keller	Pathways	visiting foreign Summer workers
Kate Murray	Resident	citizens, sustainable design
Brandi Rheubottom	Baum Center	seniors, health and wellness
Jim Snyder	Owns OBX Events	business owners
Steven Lambert	Albermarle Rural Planning Org.	State government funding, planning
Staff		
Greg Loy	Planning Director	Planning
Meredith Guns	Assistant Planner Director	Planning
Shanda Davenport	Planner	Planning
Steve Albright	Assistant Public Services Director	Public Services
Helen Chaney	Project Administrator	NCDOT Div. of Bicycle & Pedestrian
Michelle Peele	Mapping, Data & Report	The Louis Berger Group, Inc.
Roger Henderson	Project Manager	Henderson Consulting

1.3 Vision & Goals

On March 18, 2010 the Pedestrian Plan Steering Committee discussed the question, "Where should the Town be with regards to walking transportation in 20 years?" In order to develop a draft Vision Statement and Goals for the Pedestrian Plan, the Steering Committee provided short keyword phrases, which were then attached to small, transparent jars. Each committee member was given six white poker chips and one red poker chip to place into the jars with the white chips indicating support for the goal keyword, and the red chips indicating no support for the goal. Each of these goals and objectives should clearly support and connect with one or more of the Steering Committee's keywords. Table 1.2 illustrates how these connections are made for each keyword and each of the objectives.

Table 1.2. Translation of Committee Keywords into Goals

Key words offered by Committee	A.1 Design for Safety	A.2 Crossing Improvements	B.1 Development Policy	B.2 Connectivity	C.1 Economic Development	C.2 Support All Modes
Connect Residential with Retail	●	●	●	●	●	
Pedestrian Facilities on US 158	●	●		●	●	●
Improve Access to Beach		●		●		●
Pedestrian Facilities Need to be Multi-Functional				●	●	●
Improve Access to Schools	●	●		●		●
Include Improved Aesthetics			●		●	
Pave (put sidewalks) On Worn Paths				●		●

Based on committee input, the following goal statements and objectives were formulated.

Goal Strategy A. Safety on Every Facility. Highways and streets need to have safe, accessible pedestrian facilities.

A.1 Design for Safety. Major highways are important pathways for pedestrians. A disproportionate share of collisions have occurred on or near NC 12 and US 158. There is a paved shoulder on NC 12 and discontinuous sidewalks along US 158. Where sidewalk exists on US 158, there is a six- to eight-foot grass buffer. The design of these facilities is therefore critical: as new properties are developed or old ones redeveloped, replacing sidewalks with a minimum five-foot separation from moving traffic are critical elements of the design. Large corner radii at driveways and intersections and the provision of high-speed right turns should be used seldom, if ever, unless there is a demonstrable

risk that cannot be overcome through longer turning bays, changes in signal timing, or other measures.

A.2 Crossing Improvements. Safe crossings are an important element of any sidewalk system. Pedestrian countdown signals are now a standard. Americans with Disabilities Act compliance is not optional. Pedestrian push-button signal operations have to be accessible to anyone in a wheelchair and properly-designed curb ramps must be provided. A variety of pavement markings and median options are available. Traffic volume, pedestrian volume, and geometric aspects of each intersection should be considered when designing crossing improvements.

Goal Strategy B: Connectivity. Connecting homes, shops, public beach accesses, parks, and schools to each other is critical to the success of Kill Devil Hills.

B.1. Development Policy. The arrangement and proximity of land uses is the most important aspect of creating a transportation-oriented pedestrian environment. The development policies of Kill Devil Hills and NCDOT greatly influence the pedestrian-friendliness of our towns, cities, suburbs, and rural spaces. Therefore, the policies of our governments should support the mixing of different land uses; encourage high-quality design features; and allow for convenient access for more people to more destinations. This means, for example, that schools should remain where children can conveniently walk to schools, parks and athletic facilities; and parents can feel safe about them doing so.

B.2 Connectivity. The decision to connect neighborhoods, retail centers, offices, and natural areas (parks, public beach accesses and open spaces) should be an assumption, with exceptions allowed only in special circumstances. While the promotion of more vehicular traffic is not favored by most residents, creating accessible pedestrian ways is less objectionable and supported by many more people. The street standards of Kill Devil Hills should support pedestrian connections between development as well as requiring the full participation of the private sector in building connections on and adjacent to new development sites. This means that private or public development actions incorporate elements of the pedestrian transportation system into the design of transportation improvements.

Goal Strategy C: Multi-functional Transportation. The pedestrian system needs to enhance economic opportunities; other modes of transportation including motor vehicle travel, public transportation and cycling; and embrace the unique characteristics and history of Kill Devil Hills.

C.1 Economic Development. Many people come to Kill Devil Hills to enjoy the beach, Albermarle Sound and to visit the Wright Brothers National Memorial. A great pedestrian environment supports tourism and retail stores by adding recreational and mobility options. Encouraging more walking and running on the sidewalks and interconnecting them to form a network makes every place more accessible by foot and will help support businesses even in the face of high fuel prices. Safe, interconnected parking lots are one example.

C.2 Better Transportation – For Everyone. More separation (at least five feet) between moving traffic and pedestrians makes for a safer roadway for all user groups. Slowing turning vehicular traffic – when they are out of the way of high-speed traffic – make for fewer collisions with pedestrians at intersections and driveways.

Beautiful, scenic walkways are enjoyed by everyone, regardless of how they move through the Town. Better landscaping, pedestrian-scale lighting, and clean, well-maintained sidewalks, crosswalks, and other facilities enhance the appearance of Kill Devil Hills.

1.4 Conclusion

Walking is the Best Way to Experience Kill Devil Hills's Attractions and History. Programs, facilities, and education in school need to support a truly "hands-on" approach to learning about the great places of Kill Devil Hills, including parks, schools, beaches and waterfront areas, and historic properties. Important objectives include the creation of active lifestyle programs for kids, seniors, and office workers; as well as usable maps that highlight the important destinations relevant to both the past history and present activities are important objectives.

Figure 2. Walking is popular throughout Kill Devil Hills, by residents and visitors.

Section 2. Conditions and Issues

In order to create a better understanding of the community and the needs of its pedestrians, a two-pronged research project was conducted. The first phase of research was oriented toward ascertaining the composition of Kill Devil Hills's pedestrians through statistical data. The second phase of work was oriented toward gathering issues through (1) the Pedestrian Plan Steering Committee; and (2) an interview-type survey used to gather specific information from residents and visitors about their walking habits.

This section highlights the history of Kill Devil Hills and issues that the Town currently faces as it strives to improve its pedestrian conditions. Collision, demographic, and survey statistics are used to describe the people of Kill Devil Hills and their issues and concerns as they relate to walking in their community.

2.1 Transportation Innovation

The history of Kill Devil Hills has contributed to its present physical form. [Sources: David Stick. "*The Outer Banks of North Carolina: 1584-1958*" and the Town website]

1878: Kill Devil Hills Life Saving Station built, one of 11 along the Outer Banks

1880s: Plans for inland waterway to connect Chesapeake Bay with Beaufort Inlet

1901: Wireless telegraph installed at Kitty Hawk Weather Station

1903: First, successful heavier than air, powered controlled flight by Wright Brothers at Kill Devil Hill

1931: Bridge over Currituck Sound from Point Harbor built

Early 1930s: State highway (now NC 12) built

1938: U.S. Post Office established in Kill Devil Hills

1953: Town of Kill Devil Hills incorporated

1960s: Croatan Highway (US 158) built in Kill Devil Hills

1988: Kill Devil Hills' first large shopping center built

1996: Wright Brothers and Veterans Drive multi-use paths built

2002: NC 12 paved shoulder built

2003: Centennial Pathway multi-use path built

2008: Bay Drive multi-use path: Phase I completed

2011: Bay Drive multi-use path: Phase IV

Figure 3. Historical marker at Kill Devil Hill, commemorating the first successful flight.

Current Kill Devil Hills. The Town is constrained by water and adjacent towns. The Town has some diversity of housing types and residents, from single-family detached homes to multi-family attached, and hotel/motel lodging. Portions of the town are connected by grid-type blocks. Blocks measured at approximately 300 feet in their east-west dimension provide short distances between land uses. These development patterns have maintained good connectivity in the east-west orientation, however north-south connectivity is primarily limited to two state roadways, NC 12 and US 158, extending the entire distance of Kill Devil Hills.

Streets Connecting to Other Towns and Communities:
Croatan Highway (US 158)
Virginia Dare Trail (NC 12)
Colington Road (SR 1217)
Bay Drive

Streets Connecting within Kill Devil Hills:

East-West connecting bay and beach:
Arch Street
Helga Street
Chowan Street
Hayman Boulevard
Sportsman Drive
Avalon Drive
Fifth Street
Third Street
First Street
Landing Drive
Ocean Bay Boulevard / Colington Road

North-South oriented streets of significance:
Bay Drive; 1.8 miles long
Wrightsville Blvd; 1.0 mile
Memorial Avenue; 0.8 miles
Raymond Avenue; 0.8 miles

Businesses located along Croatan Highway (US 158) capitalize on attracting customers as they pass by plus a customer base that live nearby and travel a relatively short distance to shop. National travel surveys show that the majority of trips are less than three miles long. Most trips that begin and end in Kill Devil Hills are likely to be three miles or less each direction. This represents an opportunity for people to choose to walk or bike instead of driving these short distances. The challenge is evident: how to keep people who choose to walk in Kill Devil Hills safe. Lowering the speed limit on Croatan Highway from the current 50 mph to 35 or 40 mph is recommended.

Motorized Transportation. The busiest traffic corridor in Kill Devil Hills is Croatan Highway (US 158) carrying an average of 40,000 vehicles per day. In comparison, the traffic count on the Virginia Dare Trail (NC 12) was 5,800 vehicles per day. Counts were provided by NCDOT and represent 2008 conditions. Slowing traffic on Croatan Highway (US 158) would reduce the risk of injury and fatality if a pedestrian is struck by a vehicle.

Walking and Walking Destinations. One half-mile west from the busy Ocean Bay Boulevard/ Colington Road / Croatan Highway intersection sits First Flight High School, which in turn is flanked by First Flight Middle and Elementary Schools, athletic fields, youth center and a town park. All of these community facilities are located near what would be "walkable" neighborhood areas if the streets had sidewalks. Sixth Avenue is a north-south connecting street with a sidewalk that directly links the schools with neighborhoods to the south. Most of southwest Kill Devil Hills lies within a 30 minute walk of the schools.

Figure 4. Multi-use path in Kill Devil Hills.

Of course, the beach itself is a major destination and walking venue. The Virginia Dare paved shoulder (NC 12) is a popular walking route for citizens and visitors. There is evidence of how the Town has made walking convenient, safe and enjoyable - as well as enhancing business opportunities along the Virginia Dare Trail (NC 12). The addition of a sidewalk would enhance pedestrian and bicyclist safety. Along Croatan Highway (US 158), however, the walking environment is generally not as accommodating. Sidewalks are missing altogether along many segments, and Croatan Highway traffic is too fast (posted 50 mph speed limit) and too wide (five lanes) for many people to feel comfortable walking across it, even with signalized intersection crossings.

2.2 Pedestrians of Kill Devil Hills

Kill Devil Hills visitors find it a desirable place for many recreational activities including walking. Retail stores along the Virginia Dare Trail and Croatan Highway are popular destinations for utilitarian walking to stores, restaurants and bars. Visitors also enjoy walking for recreation.

The year-round population of Kill Devil Hills increased at an average annual rate of 2.5 percent from 1990 to 2009. Population changes are shown in Table 2.1. Estimates of the number of visitors in peak summer periods suggest the population of Kill Devil Hills swells to more than 40,000 based on hotel and vacation rental home occupancy figures.

Table 2.1. Population Trends, 1990 – 2009 Year-round population (est.)

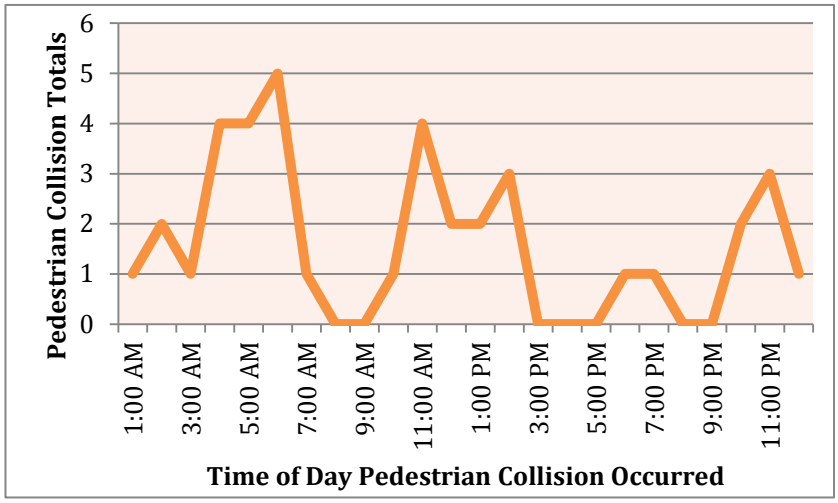
Demographic	1990	2000	2009
Population	4,238	5,897	6,825

2.3 Pedestrian Collision Locations

A collision history from 2000 to 2009 was constructed using reported collisions from the North Carolina Department of Transportation records. Any unreported collisions – and these are fairly commonplace – are not represented in the tables and charts on these pages.

Time-of-Day. While many collision patterns in coastal communities exhibit a "spike" in late-night hours due to people leaving restaurants and drinking establishments, Kill Devil Hills has peak collision periods, as shown in Chart 2.1, early in the morning (5:00 to 6:00 a.m.), mid-morning (10:00 to 11:00 a.m.) and mid-afternoon (1:00 to 2:00 p.m.). This type of pattern may reflect greater numbers of people walking due to recreational trip-making before work and during lunch periods.

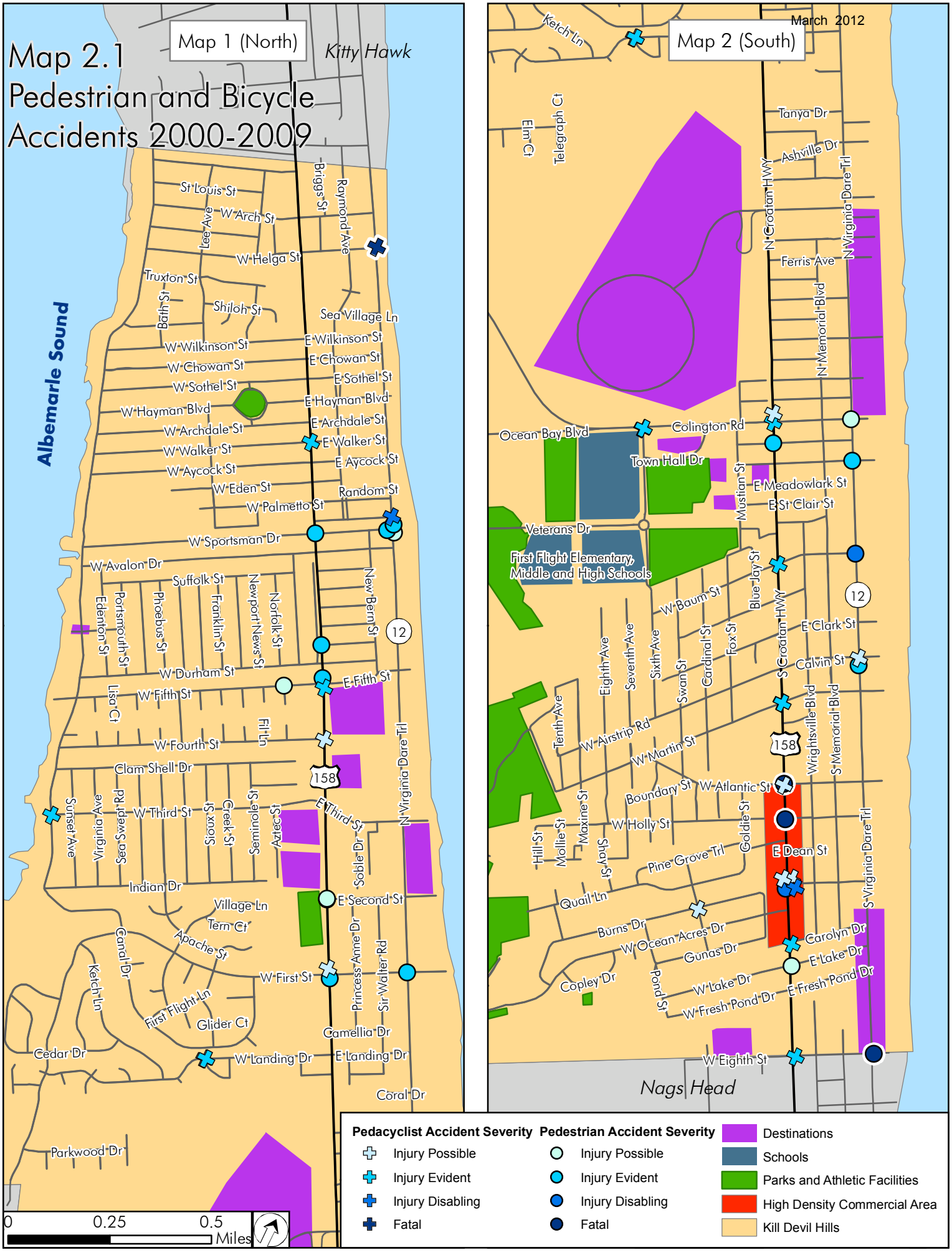
Chart 2.1. Pedestrian Collisions in Kill Devil Hills by Time of Day, Years 2000-2009



Location. Table 2.2 shows that Croatan Highway (US 158) and the Virginia Dare Trail (NC 12) are the two main centers of pedestrian collisions, with 70 percent of all pedestrian collisions occurring on one of these roads. In particular, clusters of pedestrian collisions (see red circles on Map 2.1) occurred on the Virginia Dare Trail (NC 12) south of a cluster of beachfront hotels, and a second area along the Virginia Dare Trail and Croatan Highway between First Street and Avalon Drive and also at Martin Street. Fatalities occurred along the Virginia Dare Trail (NC 12) at Eighth Street and on Croatan Highway (US 158) at Neptune Drive and Ocean Acres Drive.

Table 2.2. Pedestrian Collisions in Kill Devil Hills by Location, Years 2000-2009

	Number of Pedestrians	
	Fatalities	Severe injuries
Bay Drive	0	1
Colington Road	0	2
NC Hwy 12	2	7
US Hwy 158	2	13
Ocean Bay Blvd	0	1
Total	**4**	**24**


Map 2.1
Pedestrian and Bicycle Accidents 2000-2009
Map 1 (North)
Map 2 (South)
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Kitty Hawk
Nags Head
Albemarle Sound
Ketch Ln
Telegraph Ct
Elm Ct
Tanya Dr
Ashville Dr
N Virginia Dare Trl
N Croatan HWY
Ferris Ave
N Memorial Blvd
Ocean Bay Blvd
Colington Rd
Town Hall Dr
Mustian St
E Meadowlark St
E St Clair St
Veterans Dr
First Flight Elementary, Middle and High Schools
Blue Jay St
W Baum St
E Clark St
Calvin St
S Croatan HWY
Eighth Ave
Seventh Ave
Sixth Ave
Swan St
Cardinal St
Fox St
Tenth Ave
W Airstrip Rd
W Martin St
Wrightsville Blvd
S Memorial Blvd
158
12
Boundary St
W Atlantic St
E Dean St
W Holly St
Hill St
Mollie St
Maxine St
Snowy St
Goldie St
Pine Grove Trl
Quail Ln
Burns Dr
W Ocean Acres Dr
Gunas Dr
Carolyn Dr
E Lake Dr
W Lake Dr
W Fresh Pond Dr
E Fresh Pond Dr
Pond St
Copley Dr
S Virginia Dare Trl
W Eighth St
St Louis St
W Arch St
Lee Ave
Briggs St
Raymond Ave
W Helga St
Truxton St
Bath St
Shiloh St
Sea Village Ln
W Wilkinson St
E Wilkinson St
W Chowan St
E Chowan St
W Sothel St
E Sothel St
W Hayman Blvd
E Hayman Blvd
W Archdale St
E Archdale St
W Walker St
E Walker St
W Aycock St
E Aycock St
W Eden St
Random St
W Palmetto St
W Sportsman Dr
W Avalon Dr
Suffolk St
Edenton St
Portsmouth St
Phoebus St
Franklin St
Newport News St
Norfolk St
New Berne St
W Durham St
E Fifth St
W Fifth St
Lisa Ct
Fil-Mor
W Fourth St
Clam Shell Dr
W Third St
E Third St
Sunset Ave
Virginia Ave
Sea Swept Rd
Sioux St
Creek St
Seminole St
Aztec St
N Virginia Dare Trl
Soble Dr
Indian Dr
Village Ln
Tern Ct
E Second St
Apache St
Canal Dr
Ketch Ln
First Flight Ln
Glider Ct
W First St
Princess Anne Dr
Sir Walter Rd
Camellia Dr
Cedar Dr
W Landing Dr
E Landing Dr
Coral Dr
Parkwood Dr
0
0.25
0.5
Miles
Pedacyclist Accident Severity
Injury Possible
Injury Evident
Injury Disabling
Fatal
Pedestrian Accident Severity
Injury Possible
Injury Evident
Injury Disabling
Fatal
Destinations
Schools
Parks and Athletic Facilities
High Density Commercial Area
Kill Devil Hills

Statewide Pedestrian Collision Trends. The number of pedestrians involved in collisions with motor vehicles peaked in North Carolina in 2004 (2,584 collisions) and 2006 (2,560 collisions). According to a report prepared by the UNC Highway Safety Research Center for NCDOT, published August 2010, 170 pedestrians were killed and more than 240 were seriously injured each year for the five years between 2004 and 2008. The development of effective countermeasures to help prevent collisions and reduce the severity of these crashes is hindered by insufficient detail about the events of pedestrian-related crashes in typical databases."

As shown in Table 2.3, the most frequent type of pedestrian collision with a motor vehicle in North Carolina is the "Pedestrian Failure to Yield" classification, used to describe "all instances where a pedestrian was attempting to cross the roadway and apparently failed to yield the right-of-way to a through (not turning) motorist, but did not clearly run into the street or dash-out from an obscured location. This may include collisions where the pedestrian is trying to cross midblock, at an unmarked location and attempts to cross with an insufficient gap in traffic, crosses against a traffic signal at a controlled location, fails to detect an approaching motorist, or walks into a passing motor vehicle. This should not be construed to imply fault, as it is often unclear whether an implied crosswalk existed or who had the right-of-way." The "Dash into Road" classification, the third most frequent crash type, also describes a crossing situation, but one where the pedestrian runs into the roadway and is struck by a vehicle whose view of the pedestrian is not obstructed. "Dashes into Road" may occur at midblock and intersection locations.

Table 2.3. Most frequent collision type in North Carolina (2004-2008)

	Pedestrian Collision Type	Number of Collisions Statewide	Percent of Total
1.	Pedestrian Failed to Yield	1,790	14.2
2.	Parking Lot	1,058	8.4
3.	Dash into Road	973	7.7
4.	Walking along Road, Hit from Behind	874	7.0
5.	Backing Vehicle in Parking Lot	836	6.6
6.	Vehicle Hits Vehicle, then Pedestrian	641	5.1
7.	Dispute-related	470	3.7
8.	Off-roadway, Other, Unknown	402	3.2
9.	Motorist Left-turn, into ped	328	2.6
10.	Pedestrian on Vehicle	307	2.4
11.	Motorist Failed to Yield	306	2.4
	Total of Top 11 collision types	**7,985**	**63.5%**

A significant proportion of collisions involving pedestrians in the state occurred off the street and highway network. The second, fifth, and eighth most frequent collision types involving pedestrians occurred in (1) **Off-Roadway** locations including parking lots, involved (2) **Backing Vehicles** in parking lots, or occurred on (3) **other Off-Roadway locations** such as public and private driveways, unpaved areas and others. These three collision types account for more

than 18 percent of reported pedestrian collisions statewide. There are likely to be far more of these types of collisions that are not reported.

The fourth most frequent collision type involved **Pedestrians walking along the Road, with traffic, struck from behind**. This collision type typically occurs in locations lacking sidewalks. Situations in which the pedestrian is struck while walking facing traffic occurs less frequently, and primarily involves the pedestrian being struck from the front.

Unusual collision types including **Vehicle Hits Vehicle, then Pedestrian** and **Dispute-related** were sixth and seventh in frequency. The first describes situations in which the pedestrian is struck as the result of a vehicle first striking another vehicle or object before hitting a pedestrian. Dispute-related collisions are those in which a dispute or altercation between a driver and pedestrian resulted in a vehicle striking a pedestrian. A **Pedestrian on Vehicle** collision, tenth on the list, describes a situation in which the pedestrian was apparently clinging to or on a vehicle that started moving prior to the collision. These may be difficult collision types to address except with enforcement and education.

Pedestrian injuries have been on a downward trend nationally for the past two decades with 59,000 reported in 2009, representing a decrease of 10,000 reported injuries since 1998. However, hospital records research shows that only a fraction of pedestrian crashes that cause injury are ever recorded by law enforcement. National data indicate the loss of 4,092 lives in pedestrian-motor vehicle collisions in 2009, almost 11 people every day of the year, (source: NHTSA Traffic Safety Facts www.walkinginfo.org/facts).

In the national data, pedestrians are over-represented in collision data, accounting for more than 12 percent of fatalities but only 10.9 percent of trips. As with every mode of travel, there is clearly some risk associated with walking. However, walking remains a healthful, inherently safe activity for tens of millions of people every year. The public health community recognizes that lack of physical activity and a decline in bicycling and walking in particular is a major contributor to the hundreds of deaths caused by heart attacks and strokes – over 600,000 due to heart disease and an additional 136,000 due to stroke annually. These figures dwarf the 33,808 total deaths due to motor vehicle crashes and the relatively small 4,092 pedestrian deaths annually. In fact, the number of annual deaths caused by poor diet and physical inactivity increased by approximately 65,000, accounting for about 15.2 percent of the total number of deaths. (sources: www.pedbikeinfo.org and "*National Vital Statistics Report, Volume 58, Number 14*", Centers for Disease Control and Prevention; March 31, 2010. Note that year 2000 figures are cited above for the number of deaths by poor diet and lack of physical activity; year 2007 data for the number of deaths by heart attack and stroke, and 2009 data for the number of deaths by motor vehicle collisions with pedestrians.

Trends. As shown in Table 2.4, with the exception of a spike in 2003, the number of pedestrian collisions in Kill Devil Hills varied from a low of 1 per year to a high of 5. Year 2010 data will be filled-in for Table 2.4 when it becomes available. Kill Devil Hills ranks in the middle of the pack compared with peer cities shown in Table 2.4; all of which are beach communities with comparable population. Pedestrian collision "rates" are determined by dividing the US Census

Bureau population count in 2000 by the number of pedestrian collisions for each of the seven peer cities in North Carolina. It should be noted that the collision rate in Kill Devil Hills, expressed as 1 pedestrian collision for every 179 people, is better than in neighboring Nags Head and Kitty Hawk each of which had more pedestrian collisions per capita.

Table 2.4. Peer City Review: Nine-year Pedestrian Collision History, Years 2001-2009

Town	2001	2002	2003	2004	2005	2006	2007	2008	2009	Sum	Rate	2000 Pop
Carolina Beach	3	0	0	0	2	2	0	2	2	11	2.30	4,778
Oak Island	0	1	5	2	2	9	2	1	3	25	3.80	6,571
Wrightsville Beach	0	3	0	2	0	2	0	4	1	12	4.63	2,593
Emerald Isle	1	1	2	1	3	1	4	4	1	18	5.16	3,488
Kill Devil Hills	**4**	**1**	**7**	**2**	**5**	**4**	**4**	**1**	**5**	**33**	**5.60**	**5,897**
Kitty Hawk	1	4	3	2	2	4	0	2	2	20	6.69	2,991
Nags Head	3	3	3	1	2	0	0	5	3	20	7.41	2,700

Rate: is the number of pedestrian collisions for every 1,000 residents over a 9 year period. A low rate is good.

2.4 Facilities and Condition

Map 2.2 shows existing sidewalks, multi-use paths, paved shoulders, and destinations in Kill Devil Hills. Sidewalks and multi-use paths are in good condition, with the exception of many sections of older sidewalk along Croatan Highway (US 158). Generally, residential streets have no facilities for walking along or across the street, but traffic speeds are typically slower so walking in the street is perceived by some as being safe enough to walk there. The density of hotels, restaurants and stores on the Virginia Dare Trail (NC 12) create concentrations with high pedestrian activity. The paved shoulders along the Virginia Dare Trail (NC 12) facilitate walking and cycling.

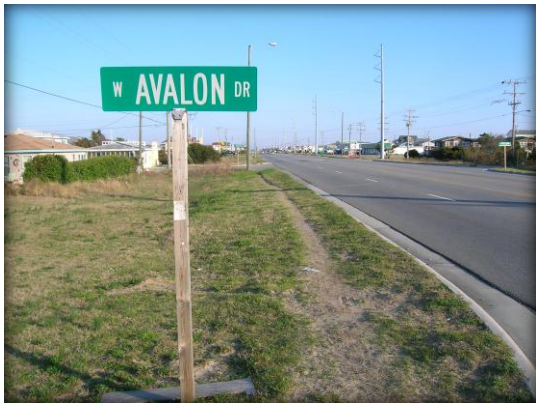
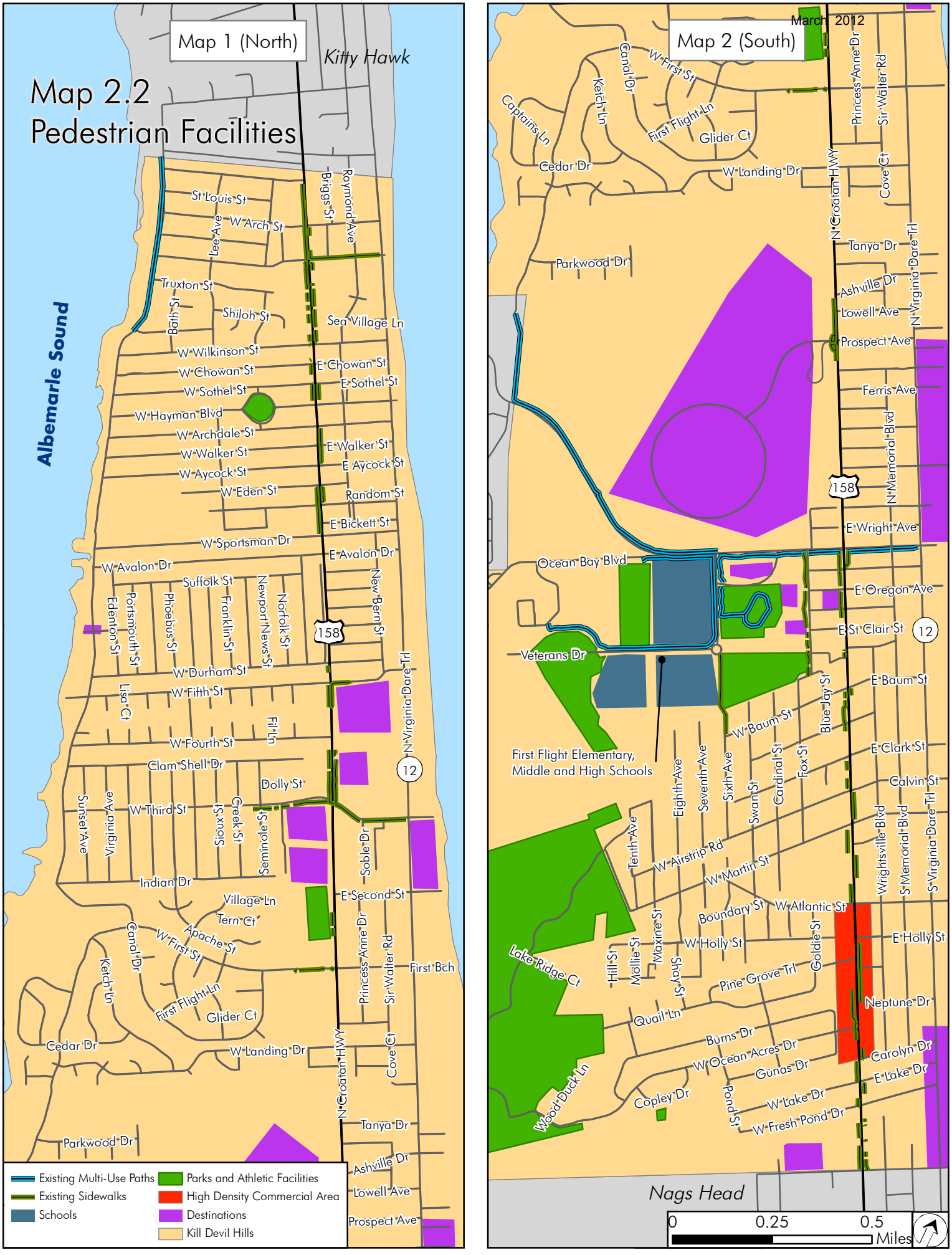


Figure 5. Worn path shows pedestrian demand along US 158 despite the lack of a sidewalk.

As of 2006, according to the Draft Land Use Plan, there were 62.26 miles of local streets and 11 miles of state-maintained roads in Kill Devil Hills. The Town uses funds received through the NCDOT Street Aid Allocation Program (also referred to as Powell Bill funds) to maintain the public roads that are not maintained by NCDOT directly. Including town and NCDOT roads, for every 5.5 miles of roadway centerline (not counting individual lanes), there is only one mile of


Map 1 (North)
Map 2 (South)
March 2012
Map 2.2
Pedestrian Facilities
Kitty Hawk
Albemarle Sound
Nags Head
First Flight Elementary, Middle and High Schools
Existing Multi-Use Paths
Existing Sidewalks
Schools
Parks and Athletic Facilities
High Density Commercial Area
Destinations
Kill Devil Hills
0
0.25
0.5
Miles

sidewalk throughout Kill Devil Hills. In comparison, in Morehead City, North Carolina this ratio is much higher at 2:1, indicating that there are two miles of centerline miles of roadway for every mile of sidewalk. Note that the maximum feasible ratio of roads to sidewalks is 1:2, since sidewalks can occur on both sides of a roadway.

Sidewalks connect residential areas with beach access corridors along First Street, Third Street, Fifth Street and Helga Street. The Town has developed a number of multi-use paths that it maintains and improves as necessary.

These paths are:

Bay Drive Multi-use Path – extends from the Kitty Hawk town limit south for one-half mile into Kill Devil Hills. It is a 10-foot wide multi-use path along the west side of Bay Drive adjacent to large overhead power lines. The facility is in excellent condition and is used regularly by pedestrians, cyclists, skaters and others. There are numerous crossings with driveways serving single-family homes, but very few street crossings. The Town plans to extend the path further south along Bay Drive, Canal Drive, and West First Street to connect with the Wright Brothers Multi-use Path. The Town received federal Safe Routes to Schools funding for the extension.

Figure 6. Bay Drive Multi-use Path

Figure 7. Centennial Multi-use Path

Centennial Multi-Use Path – completed in 2003 with County and State funds, this 1.17 mile long, 10-foot wide multi-use path along Veteran's Drive generally oriented north-south from Colington Road to West Baum Street and along Mustian Street from Colington Road to Hillside Drive and through the Town Hall campus connects the Baum Center, Town Hall, Aviation Park, and the following Dare County facilities: Library, Senior Center, Family Recreation Center. It is in good condition and is used regularly by pedestrians, cyclists, skaters and other forms of non-motorized transportation. Importantly, it connects with other paths including the Wright Brothers multi-use path, Ocean Bay multi-use path, and Veterans Drive multi-use path. Safe crossings are designed at intersections with streets.

NC 12 Paved Shoulder – built in 2002 with partial funding from the Dare County Tourism Board and NCDOT, this 6-foot wide paved shoulder on both sides of NC 12 runs from the southern border of Town, at the Nags Head town limit near Eighth Street, northward to Third Street which is a distance of about three miles. North of Third Street to Hayman Boulevard, a paved shoulder exists on both sides of NC 12 although the width varies from one to six feet (sometimes the shoulder is covered with sand, blown from the beach by high wind).

Figure 8. Cyclists and pedestrians on the NC 12 Paved Shoulder.

The NC 12 Paved Shoulder is bordered by residential and commercial uses, providing a link for pedestrians, cyclists, skaters and others. It is in good condition, despite the need to periodically sweep sand to the side. Town crews often sweep these wide paved shoulders rather than waiting for NCDOT. The paved shoulder is used by cyclists and pedestrians. Observations made mid-morning on a weekday in August 2010 near Eighth Street produced the count of pedestrians and bicyclists listed in Table 2.5.

Table 2.5. User Count on NC 12 Paved Shoulder

Number of Southbound Pedestrians	Number of Southbound Cyclists	Number of Northbound Pedestrians	Number of Northbound Cyclists	Number of Southbound Pedestrians	Number of Southbound Cyclists	Number of Northbound Pedestrians	Number of Northbound Cyclists
West side of NC 12				**East** side of NC 12			
4	14	7	4	4	4	4	8
Count conducted 9:40 to 10:10 a.m. August 11, 2010							

Note: Shaded cells indicate proper movements; that is, cyclist traveling with traffic, pedestrians traveling opposite traffic.

Figure 9. Ocean Bay Boulevard Multi-use Path.

Ocean Bay Multi-use Path – connects both sides of US 158 via a 10-foot wide multi-use path on the south side of Colington Road and Ocean Bay Boulevard. Colington Road changes names to Ocean Bay Boulevard at US 158. This one-half mile long trail connects the Regional Beach Access at Ocean Bay Boulevard/NC 12 with major community facilities in the center of the community including the library, three schools, recreation areas, the Senior Center, and Town Hall. It also connects with other paths including the Centennial Multi-use Path, Veterans Drive Multi-use Path, Wright Brothers Multi-use Path, and the NC 12 Paved Shoulder.

Veteran's Drive Multi-use Path – built in 1996 with partial funding from the Dare County Tourism Board, this nearly one mile long facility is a 10-foot wide paved path on the west side of Veterans Drive, extending from Colington Road on the north to the athletic fields at First Flight High School. The route links other paths, including the Wright Brothers Multi-use Path, the Ocean Bay Multi-use Path, and the Centennial Multi-use Path. This is an important connector serving pedestrians, cyclists, skaters and other non-motorized travel modes to all three public schools including adjacent and nearby athletic and recreational facilities.

Figure 10. Veteran's Drive Multi-use Path.

Wright Brothers Multi-use Path – completed in 1996 with partial funding from NCDOT, this nearly one mile long facility is a 10-foot wide paved multi-use path extending from the end of First Street (near Parkwood Drive) to the intersection of Colington Road / Veteran's Drive where it connects with other paths. The path is in excellent condition as it passes adjacent to single-family residential and federal (National Park Service) property. Along the route, the path connects with a paved driveway into a parking area for the Wrights Brothers National Memorial.

US 158 Signalized Crossings

There are ten signalized intersections on Croatan Highway (US 158) in Kill Devil Hills. All of these have marked crosswalks. The pavement markings at all but one were faded. An inventory of marked crosswalks is listed in Table 2.6.

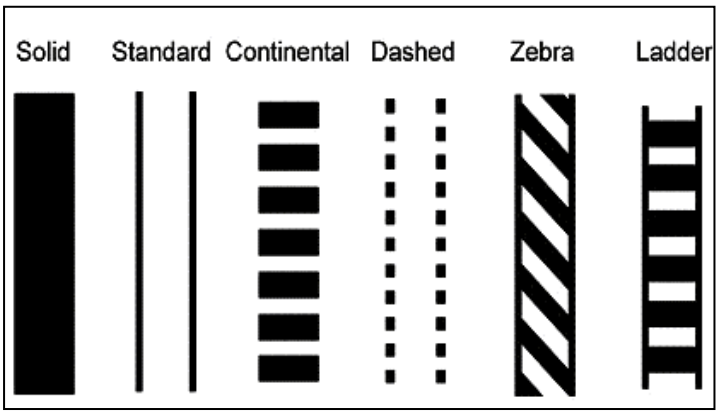
Figure 11. Marked crosswalk on US 158.

Table 2.6. Inventory of Marked Crosswalks in Kill Devil Hills

Intersection	Location of Marked Crosswalk in the Intersection	Crossing Type	Condition of Markings
US 158 at:			
Eighth Street	South side	Standard	Faded
Ocean Acres Dr.	South side	Standard	Faded
Neptune Drive	North side	Standard	Faded
Baum Street	South side	Zebra	Good
Ocean Bay Blvd.	South side	Standard	Faded
Prospect Avenue	None	-	-
First Street	North side	Standard	Faded
Third Street	South side	Standard	Faded
Fifth Street	South side	Standard	Faded
Helga Street	South side	Standard	Faded
NC 12 at:			
Eighth Street	West side	Continental	Good
Eighth Street	South side	Continental	Faded
Midblock between Fresh Pond Dr. and Eighth St.	-	Continental	Good
Neptune Drive	West side	Continental	Good
Neptune Drive	North side	Continental	Faded
Martin Street	West side	Continental	Good
Martin Street	North side	Continental	Faded
Calvin Street	South side	Continental	Good
Clark Street	West side	Continental	Good
Clark Street	South side	Continental	Good
Baum Street	West side	Continental	Good
Oregon Street	West side	Continental	Good
Carlton Street	West side	Continental	Good
Ocean Bay Blvd.	East side	Continental	Good
Ocean Bay Blvd.	West side	Continental	Good
Ocean Bay Blvd.	South side	Continental	Faded
Wright Avenue	West side	Continental	Good
Woodmere Ave.	South side	Continental	Good
Prospect Ave.	West side	Continental	Good
Ashville Drive	West side	Continental	Good
Ashville Drive	South side	Continental	Good
Tanya Drive	West side	Continental	Good
Coral Drive	West side	Continental	Good
Landing Drive	West side	Continental	Good
First Street	West side	Continental	Good
First Street	North side	Continental	Faded
Second Street	West side	Continental	Good
Third Street	South side	Continental	Good
Fourth Street	None	-	-
Fifth Street	North side	Continental	Faded
Avalon Drive	North side	Continental	Good
Hayman Blvd.	Center	Continental	Faded
Helga Street	North side	Continental	Good

Intersection	Location of Marked Crosswalk in the Intersection	Crossing Type	Condition of Markings
Sixth Avenue at:			
Baum Street	none	-	-
Elem. School	Mid-block	Continental	Good
Memorial Ave. at:			
Eighth Street	South side	Standard	Faded
Veterans Dr. at:			
Colington Road	West side	Continental	Faded
Colington Road	South side	Continental	Good
Aviation Park	Mid-block	Continental	Good
Elem. School	Mid-block	Continental	Good
Middle School	Mid-block	Continental	Good
Colington Road at:			
Wright Bro. Parking Lot	North side	Continental	faded

Inventory conducted May 2, 2011



Typical styles for marked crosswalks

Section 3. Policy and Plan Review

The decisions that shape the quality of the pedestrian experience are made every day, every time a new shopping center is built, an intersection is widened, a street paved. In turn, the Town of Kill Devil Hills makes decisions about how streets are designed, the amenities created as new private developments are constructed, and the priorities given to various kinds of improvements. The following is an assessment of the various policies, plans and regulations that directly or indirectly affect walking in Kill Devil Hills.

This section reviews current planning documents and policies in Kill Devil Hills that shape the day-to-day experiences of those who walk for recreation and transportation.

3.1 Existing Programs

- 2010-2011 Annual Town Budget
- 2008 Draft North Carolina State Transportation Improvement Program (2009-2015)

3.2 Existing Ordinances and Policies

- Kill Devil Hills Code of Ordinances including the Zoning Ordinance
- North Carolina DOT Policies
- Federal Highway Administration Policies

3.3 Existing Plans and Studies

- Draft Kill Devil Hills Land Use Plan Update

3.1 Existing Programs

2010 Adopted Town Budget for the Fiscal Year 2010-2011

The Town of Kill Devil Hills budget for the fiscal year that will end June 30, 2011 included $425,000 in combined Powell Bill (return-to-local source from State gas taxes) and Street funds, to accomplish street construction and drainage improvement projects of which $45,000 is adopted for discretionary street maintenance repair. As the typical amount spent in a fiscal year is $1 million, the current amount of discretionary funds is reflective of a tough economy, but as finances improve in the future it is hoped that greater funding levels can be programmed for sidewalk and trail construction.

North Carolina State Transportation Improvement Program (STIP)

(source: 2009-2015 Draft STIP for Division 1, online December 27, 2010: http://www.ncdot.org/planning/development/TIP/TIP/Trans/pdf/div1.pdf).

The biennial listing of projects expected to be funded with state and federal transportation funds was last published in June 2008 by NCDOT. Kill Devil Hills and Dare County participate in the programming process through the Albermarle Rural Planning Organization (RPO) together with Camden, Chowan, Currituck, Gates, Hyde, Pasquotank, Perquimans, Tyrrell, and Washington counties and cities and towns within those counties. The Draft STIP, expected to be approved in 2011, includes the following project in Kill Devil Hills:

US 158 Widening – starting in 2020, widen US 158 (R-3419) through Kill Devil Hills, from US 64 in Nags Head to Putter Lane in Kitty Hawk (14.6 miles) to add more travel lanes. This project has an estimated cost of $38.5 million.

3.2 Existing Policies & Ordinances

Kill Devil Hills Code of Ordinances

The Town of Kill Devil Hills maintains its ordinances on the town website (www.kdhnc.com, reviewed 12/28/10). A Town adopts and modifies its ordinances under the regulatory powers granted by the State of North Carolina to guide development, identify the appropriate uses for land in the municipal boundary and extra-territorial jurisdiction (ETJ), and provide guidance on appropriate actions for its citizens to protect their health and well-being. Kill Devil Hills's ordinances generally pay attention to pedestrian safety and address a number of factors that influence the walkability of a place.

Sidewalk Ordinance

Local laws pertaining to sidewalks can be found in the Kill Devil Hills Code of Ordinances. The Town Charter includes authorization for "Street Improvements" (Article VI) and "Street, Sidewalk and Stormwater Management Improvements" (Article VII).

The powers and duties of the Planning Board include the preparation and revision of a comprehensive and coordinated plan for the physical development of the town, including the "general location, character and extent of streets, bridges, parkways, and other public ways and open spaces and the most desirable pattern of land use within the area."

Definitions

Pedestrian – pedestrians are defined as "any person afoot" in the Kill Devil Hills Code: Section 70-01.

Sidewalk – "that portion of a street between the curblines, or the lateral lines of a roadway, and the adjacent property lines intended for the use of pedestrians."

Crosswalk – "that portion of a roadway ordinarily included within the prolongation or connection of the lateral lines of sidewalks at intersections or any portion of a roadway distinctly indicated for pedestrian crossing by lines or other markings on the surface**."**

Safety Zone – **"**the area or space officially set apart within a roadway for the exclusive use of pedestrians and which is protected or is so marked or indicated by adequate signs as to be plainly visible at all times while set apart as a safety zone**."**

Assessments –The Town has the ability to assess abutting property owners for sidewalk improvements or repairs, as provided by Article 7, Chapter 1b of the Code, including property on the opposite side of the street if a sidewalk is only built on one side. Section 91.48 states that "The improvement costs for street widths in excess of 16 feet, the cost of required drainage facilities which are larger in size than required in this subchapter and the total cost of all improvements at street intersections shall not be assessed against abutting property owners and shall be paid for by the town." Section 91.49 states that "petitions for street improvements include requests for sidewalk improvements in accordance with town specifications. Such sidewalk improvements may be constructed as part of the street improvement project and in the same manner, except that 100% of the total cost of sidewalk improvements, exclusive of the cost at intersections, shall be assessed against the property owner."

Section 91.16 (A1) states that "no material other than concrete or asphalt will be approved for any driveway or walkway construction within town-owned rights-of-way …".

Street Ordinance

The minimum standards for new street extensions of existing streets or alleys for which approval is required shall be as provided in Section 91.34 of the Code, including: a right-of-way width of 50 feet shall be dedicated for street purposes. The Board of Commissioners may require a right-of-way width of 80 feet if such street is to be used as a minor thoroughfare or where greater widths are required by a major street plan. Widths of new streets shall be as follows:

Local Access Streets – pave 50-foot right-of-way with minimum of 20 feet of bituminous paving surface.

Collector Streets – pave 60-foot right-of-way with minimum 24 feet of paving surface.

On-Street Parking – streets classified by the Public Services Director as allowing on-street parking shall be a minimum of 36 feet in width.

Access to Croatan Highway (US 158) is managed in the Zoning Ordinance (Section 153.078) such that "egress directly onto US 158/Croatan Highway must be determined on a case-by-case basis and approved by the Board of Commissioners. Access to the east side of the Virginia Dare Trail (NC 12) is regulated in Section 91.17 of the Town Code and access to the west side is "to be minimized" by accessing side streets instead of NC 12 wherever possible. Access management benefits pedestrians by reducing the number of driveways, hence the number of potential conflict points with motor vehicles.

The Street Ordinance section of the Kill Devil Hills Code of Ordinances (Appendix C, Section 16-2) addresses local laws pertaining to design issues for all public streets, sidewalks and other public places. The street ordinances should also reference NCDOT design standards, indicating

that streets are to be built to whichever standards are stricter. Subsections within the Street Ordinances pertaining to pedestrians include those listed below.

- Section 73.05 restricts bicycle riding on sidewalks.
- Section 73.03 states "No vehicle shall stop in any street except for the purpose of parking as prescribed in this chapter, unless such stop is made necessary by the approach of an emergency vehicle, by the approach of a funeral or other procession which is given the right-of-way, by the stopping of a public conveyance, by the lowering of railway gates, by the giving of traffic signals, the passing of some other vehicle or a pedestrian or by some emergency; and in any case covered by these exceptions such vehicles shall not stop so as to obstruct any footway, pedestrian aisle, safety zone, crossing or street intersection if it can be avoided."
    - Driveway construction is addressed in Kill Devil Hills's ordinances. Further guidance on driveway design and curb cuts is available in the federal ADA design guidelines (ADAAG). A design standard for this is not included in the ordinances, but could be added.

In the future, as discussions of creating a downtown in Kill Devil Hills moves forward, consideration should be given to the following supplementary language for the local street ordinances to help improve local pedestrian conditions, such as:

- All signs, awnings and canopies shall be a minimum of 7 feet above the sidewalk. This 7-foot vertical clearance allows pedestrians to safely traverse the sidewalk by passing under signage. All canopies and awnings must be reviewed and a permit issued prior to installation.
- Obstruction of the sidewalks with crates, boxes, barrels, stone, wood, construction materials or any other matter is not permitted, though businesses are permitted to place street furniture (e.g. benches, tables and chairs) in front of their businesses, provided 4 feet of unobstructed space is maintained for pedestrians. Obstruction of the sidewalks by tree trimmings or other landscaping waste is also prohibited.
- Assembling, collecting or standing in a sidewalk as to obstruct pedestrian traffic is not permitted. Street events, including demonstrations and pickets, require permits.
- Street performances must comply with a set of regulations and may only be considered for a permit in a business district.
- Sidewalk sale of merchandise and retail items is forbidden excepting newspaper vending machines with a Town permit.
- Sidewalk cafes following rules may be permitted. Clear space that is at least 4 feet of unobstructed width for pedestrians is required.
- Construction or remodeling projects taking place in close proximity to a public sidewalk are not mentioned. The ordinance could be amended to require the installation of scaffolding overhead for protection of pedestrians, prior to beginning construction.

Traffic Ordinances

Section 70.20 of the Kill Devil Hills Code deals with all local laws related to the operation of vehicles, traffic control devices and pedestrian traffic, among other topics.

- School zones are called out specifically in Section 71.18; it requires motorists to use care for the protection of children.
- Section 71.15 prohibits driving or parking on sidewalks.
- Section 71.01 and 71.02 prohibit bicyclists, roller skaters and others from clinging to a moving vehicle on the roadway.
- Address turning movements, and specifically prohibit right and/or left turning movements at intersections where signage prohibits such movements.
- Townwide speed limit of 25 miles per hour or less on most streets, except for 35 miles per hour on specifically cited streets.
- Through trucks are not permitted on Wrightsville Avenue and Memorial Boulevard in Kill Devil Hills, per Section 71.24 of the Town Code.
- Limit parking during certain hours at designated places between 7:30 a.m. and 3:30 p.m., which helps to maintain pedestrian and bicycle safety in the school area.

Vegetation Ordinance

Section 91.16 (B) allows for seeding or landscaping in the public right-of-way between the edge of road and property line as long as it "shall not obstruct the street, drainage or other function of the right-of-way". The presence or lack of street trees and landscaping greatly affects the pedestrian conditions of any public place.

Land Use Ordinance

A special section of the Code of Ordinances is the Subdivisions section (Chapter 152), which covers minimum requirements and subdivision plat approval along with standards. The Kill Devil Hills Zoning Ordinance (Section 153) divides Kill Devil Hills into four separate zoning categories for residential uses, one category for commercial use, two light industrial categories, two government and institutional categories, and a flexible use "Planned Unit Development" (PUD) category. The PUD category allows for adaptable zoning for mixed-use and other creative development, which can functionally affect the local pedestrian environment in a positive manner through more dense, clustered development and combined uses (i.e. office/residential) on a single plat.

The Ordinance could address the general layout of streets in residential development and discourage the use of dead-ends streets and cul-de-sacs as a means to avoid connections to other streets. While cul-de-sacs may cut down on through traffic and thereby reduce traffic speeds, developments with excessive cul-de-sacs are not considered pedestrian-friendly, as

they create long, circuitous walking distances that do not provide easy pedestrian access to destinations outside or within the neighborhood.

The Subdivision Ordinance provides "streets shall be designed or walkway and bikeway easements provided to assure convenient access to parks, playgrounds, schools and other places of public assembly. Walkway and bikeway easements shall be consistent with town standards."

Parking Ordinance: Section 153.076 Off-Street Parking and Loading includes design-oriented issues such that "every parking space shall be designed so that vehicles cannot extend beyond the perimeter … so that vehicles do not extend over sidewalks …". The ordinance also states that pea gravel is an acceptable construction material for single-family and duplex residential driveways and parking areas, however not in the public right-of-way (including sidewalks).

Building Façade Treatments

Pedestrian-friendly streetscapes can entice people to walk. Section 153.186 of the Kill Devil Hills Town Code includes requirements to create pleasing commercial building facades. For "structures up to 100,000 square feet of gross floor area with building frontage of 100 feet or greater, architectural variations shall be required every 50 feet." Ornamental landscaping is required along the front property line, consisting of "one tree every ten feet that shall not impede on the site triangle of a driveway or intersection."

Conclusion & Policy Recommendations

Overall, Kill Devil Hills's ordinances are well-structured to provide for substantial pedestrian accommodations and design elements essential to a pedestrian-friendly community. Allowing for proximity of compatible land uses through PUD's will encourage more compact "livable" developments, while the inclusion of appropriate design standards regarding visual, material, and mass elements of the built landscape will help to ensure a pleasant walking environment.

- Language on Traffic Impact Assessments could be useful in the Land Usage Ordinance, and could be tailored to specifically address bicycle and pedestrian flow and intersection design that safely accommodates pedestrians and bicyclists.
- Clarifying statements in the ordinances on the Town's sidewalk petition process would be useful, and should be structured so as not to overburden the adjacent property owners.
- Create a best practice parking lot design guide tied to certificates to be awarded to developers during the site design review process.
- Modify the sidewalk cost assessment policy to shift the cost to all taxpayers in Kill Devil Hills, recognizing that sidewalks are a general public benefit.

North Carolina Department of Transportation Policies

The North Carolina Department of Transportation (NCDOT) has adopted a number of policies addressing routine accommodation for bicycles and pedestrians on state maintained roadways.

These policies and guidelines should be applied when new construction, reconstruction, widening, or resurfacing projects impact the pedestrian environment in Kill Devil Hills and include the following:

- ***Board of Transportation Policy on Complete Streets*** – This policy was adopted in July 2009 to state North Carolina's approach to interdependent, multi-modal transportation networks that safely accommodate access and travel for all users. Additional work is being done as of this writing to prepare the actual guidelines and standards.
- ***Board of Transportation Resolution on Mainstreaming Non-motorized Transportation*** – This policy reaffirms the importance of bicycle and pedestrian facilities as an integral part of the overall statewide transportation system, and states that "bicycling and walking accommodations shall be a routine part of the North Carolina Department of Transportation's planning, design, construction, and operations activities." (http://www.ncdot.org/bikeped/lawspolicies/ policies)
- ***NCDOT Pedestrian Policy*** – This policy offers guidance providing pedestrian accommodations on state maintained roadways, and details standards for planning, design, construction, maintenance, and operations pertaining to pedestrian facilities and accommodations.
- ***NCDOT Guidelines for Accommodating Greenways with Road Improvement Projects*** – This policy addresses the intent of NCDOT to accommodate planned greenways, existing greenways, and greenway crossings in all highway planning and construction projects. The policy states that it "was incorporated so that critical corridors which have been adopted by localities for future greenways will not be severed by highway construction."
- ***Environmental Stewardship Policy of NCDOT and Division One*** – This policy outlines the Department and Division mission "to provide an integrated transportation system that enhances the state's well being." Goals of the policy include the provision of "a safe and well-maintained transportation system that meets the needs of our customers and supports the development of sustainable, vibrant communities. " Within the policy, environmental stewardship is defined as:
    - "Safeguarding the public's health by conducting our business in an environmentally responsible manner
    - Demonstrating our care for and commitment to the environment
    - Recognizing that our customers expect us to provide mobility and a quality of life that includes the protection of the natural resources and the cultural and social values of their community."

Federal Highway Administration (FHWA) Policy

Since the 1990's, significant changes have been made to Federal transportation policy and programs to improve bicycle and pedestrian safety and access. The 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) and the 1998 Transportation Equity Act for the 21st Century (TEA-21) were the basis for these changes. Each of these federal transportation bills

extended the consideration of non-motorized users in all roadway projects, and TEA-21 mandated an FHWA policy for mainstreaming non-motorized transportation.

(http://www.fhwa.dot.gov/environment/bikeped/guidance.htm).

The most recent version of the federal transportation bill, SAFETEA-LU, "confirms and continues the principle that the safe accommodation of non-motorized users shall be considered during the planning, development, and construction of all Federal-aid transportation projects and programs. To varying extents, bicyclists and pedestrians will be present on all highways and transportation facilities where they are permitted and it is clearly the intent of SAFETEA-LU that all new and improved transportation facilities be planned, designed, and constructed with this fact in mind."

> *"While these sections stop short of requiring specific bicycle and pedestrian accommodation in every transportation project, Congress clearly intends for bicyclists and pedestrians to have safe, convenient access to the transportation system and sees every transportation improvement as an opportunity to enhance the safety and convenience of the two modes. 'Due consideration' of bicycle and pedestrian needs should include, at a minimum, a presumption that bicyclists and pedestrians will be accommodated in the design of new and improved transportation facilities. In the planning, design, and operation of transportation facilities, bicyclists and pedestrians should be included as a matter of routine, and the decision to not accommodate them should be the exception rather than the rule. There must be exceptional circumstances for denying bicycle and pedestrian access either by prohibition or by designing highways that are incompatible with safe, convenient walking and bicycling."*

3.3 Existing Plans and Studies

2008-2009 Kill Devil Hills Land Use Plan

(source: Draft December 2009 reviewed 12/28/10)

The 3,585 acre study area for this land use plan covers the Town of Kill Devil Hills with a 2006 estimate of permanent population of 6,856 and an estimated 2010 population of 7,159. Projections published in the *Draft Land Use Plan* suggest the town may grow to 8,646 people by 2020 and 10,013 in 2030. Some of this population increase may be accommodated by the continued trend of converting short-term rental (vacation) housing into year-round use, particularly in areas west of US 158.

Estimates prepared for the Draft Land Use Plan, using information from the Town and Dare County Tax Department, suggest that during the busiest vacation periods, the number of people staying overnight in Kill Devil Hills (the "Estimated Peak Population") swells to slightly more than 40,000 people. The Draft Plan further states that "the major impact of the seasonal population is on the service delivery and infrastructure support … the most overstressed of the Kill Devil Hills infrastructure is the transportation system."

The purpose of the Plan is to review land development processes in the town and comply with the North Carolina Coastal Area Management Act (CAMA) requirements for up-to-date land use planning. Specific land use, transportation and development issues addressed in the plan include:

- Public access to public trust waters
- Land use compatibility
- Infrastructure carrying capacity
- Natural hazard areas
- Water quality
- Areas of environmental concern
- Areas of local concern, which are as follows:
    - Community attributes (enhancing positive attributes with very limited Town financial resources
    - Town services (providing needed services including unfunded mandates from the State and federal government
    - Development (using limited Town resources to combat private initiatives that may be contrary to Town policies and objectives)
    - Environment (patrol, police, manage, preserve and protect natural environmental features from man-made degradation)
    - Traffic and Transportation (lack of Town control of NC 12 and US 158 and limited Town financial resources)

Community Vision Statement - The Kill Devil Hills Board of Commissioners endorsed the following Vision Statement during the planning process. The purpose of the Vision Statement is to provide the foundation for setting priorities, defining goals and developing land use policies to achieve local government goals:

"Kill Devil Hills is, and will continue to be, a community:

- rich in history and tradition;
- environmentally attuned;
- mixing attributes of a vacation beach destination and a traditional Outer Banks community;
- characterized by a variety of residential development densities and a variety of commercial establishments serving year-round residents and seasonal visitors;
- possessing undisturbed natural areas such as Fresh Pond and the Maritime Forest, as well as the nationally significant Wright Brothers National Memorial; and,
- with major tourist attractions including the Atlantic Ocean and the waters of Kitty Hawk Bay, Albermarle Sound, and Roanoke Sound."

Description of Land Use – the general land use pattern in Kill Devil Hills has not changed since 1983; that is, it is primarily a residential resort community. It is a successful mix of resort beach and traditional Outer Banks residential development. New construction or redevelopment activity is typically associated with a service oriented, tourist driven economy.

Kill Devil Hills features several distinct development areas. The immediate oceanfront provides the setting for a number of hotels, motels and condominium projects, most of which were built in the 1970s and 1980s. Some of the older motor court motels date back to the 1960s. On the west side of the Virginia Dare Trail (NC 12), a second tier of residential structures exists that, due to their proximity to the Atlantic Ocean, have traditionally served as second homes for many of the Town's seasonal residents. These also provide seasonal accommodations for tourists when not occupied by the owner.

Between the Virginia Dare Trail (NC 12) and Croatan Highway (US 158) is land zoned broadly for commercial and multi-family residential development at liberal density ratios. There are still many single-family dwellings in these areas, resulting in a mix of land uses that is conducive to generating pedestrian trips thanks to short walking distances between origins and destinations.

A 300-foot deep swath of commercially-zoned land line both sides of Croatan Highway (US 158) through Kill Devil Hills. A growing food-oriented retail business district has emerged, particularly at the south end of the town, helping to establish Kill Devil Hills as the commercial hub of northern Dare County. There are also residential and public uses along Croatan Highway (US 158).

The majority of the Town's year-round residents live west of Croatan Highway (US 158). Land uses are predominately single-family residential and public use. Several single-family residential subdivisions line the west side of Croatan Highway (US 158).

Occasionally, land use compatibility problems occur as commercial and residential uses come into conflict. The use of buffers is seen as an acceptable means of minimizing such conflicts as are regulations governing outdoor displays. Effective integration of residential and commercial uses is important in creating and maintaining a pedestrian-friendly community.

Most of the land in Kill Devil Hills is developed. There are no agricultural, forestry or animal feeding operations. As of November 2008, the Town estimates that 1,140 parcels of land with development potential are platted but remain vacant. This represents 14.3 percent of all parcels in Kill Devil Hills. The total estimated acreage of undeveloped/vacant land is about 373 acres, which represents 10 percent of the Town's total acreage.

Figure 12. Baum Senior Center, one of many centrally located community facilities in Kill Devil Hills.

Community facilities are centrally located, which is a tremendous benefit for pedestrians. These include the campuses for First Flight Elementary School, First Flight

Middle School, First Flight High School and associated athletic facilities, the Town Skate Park, Roller Hockey Rink, Aviation Park, Dare County Family Recreation Park, Dare County Library, the U.S. Post Office, Senior Center, Visitors Center, Chamber of Commerce, and Town Hall. The center of this activity is about 3.5 miles from the farthest corner of Kill Devil Hills, so most of Kill Devil Hills is within a one-hour walk of these community facilities. Note that for most people, the recommended amount of exercise to maintain good health is 30 minutes or more each day.

The Land Use Plan outlines anticipated population growth, and sets joint policies for conformance with CAMA minimum use standards, maintaining existing community character and stormwater management. Land classification is categorized into eight types in a land classification map dated December 2009: single-family residential, multi-family residential, parkland/open space, commercial, institutional, utilty/infrastructure, right of way, and vacant.

Transportation section of Land Use Plan (Section VI:D) - the *Street Improvement Master Plan* is updated periodically and improvements are budgeted to match anticipated revenue annually. Over the past several years, general funds have been spent to build sidewalks and pathways in Kill Devil Hills.

Town staff analyzes and present needs assessments and recommendations to the Street Improvements and Special Projects Committee which recommends an improvement program to the Planning Board, which in turn recommends a program to the Board of Commissioners. The Town typically budgets between $500,000 and $1 million per year for street and drainage maintenance, however the recession of 2008-2010 resulted in reduced budgets and expenditures.

Section 4. Design Standards and Guidelines

The Division of Bicycle and Pedestrian Transportation (DBPT) of the North Carolina Department of Transportation (NCDOT) created guidelines to assist municipalities in planning and engineering a safe and comfortable walking environment for pedestrians. The guidelines presented are in accordance with standards set by the American Association of State Highway Transportation Officials (AASHTO), the Manual for Uniform Traffic Control Devices (MUTCD) and the Americans with Disabilities Act (ADA).

This section provides a set of guidelines for the design of pedestrian facilities, but does not supersede adopted design standards.

4.1 Sidewalks

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

Figure 13. Asphalt sidewalk on East 3rd Street, adjacent to moving traffic.

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

Sidewalk Widths

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

Multi-use paths and sidewalks near schools and other areas of high pedestrian activity call for much wider walkways. Sidewalks are typically built with curb and gutter sections. The DBPT recommends that areas with significant pedestrian traffic should feature ten- to twelve-foot wide sidewalks. Where sidewalks align with the edge of an angled or 90-degree parking lot, a

minimum of 30 inches of parked car overhang obstructing the sidewalk shall be taken into account in order to maintain the minimum travel path width.

AASHTO recommends construction of sidewalks on all city or town streets. The Institute of Transportation Engineers (ITE) recommends sidewalk installation on both sides of the street whenever possible for new urban and suburban streets, especially in commercial areas, and residential areas on major arterials and collectors. If sidewalks on both sides of the road are not possible, lower density rural residential areas might adequately serve its pedestrians with a sidewalk on only one side or with paved shoulders on both sides of the road.

It is important to note the potential for conflict between pedestrians and bicyclists on paved shoulder such as those on NC 12. Bicyclists and pedestrians must obey traffic laws and exercise caution in order to avoid potential crashes on paved shoulders.

Construction Materials and Methods

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

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

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

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

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

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

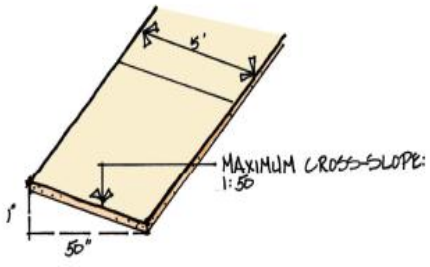
Alternative Materials Usage — Use of materials for sidewalks other than concrete (or asphalt for multi-use pathways and paved shoulders) and the construction methods used therewith must be approved by the Town engineer or designated representative on a case by case basis.

Grade

AASHTO recommends the following grades for sidewalks. Continuous sidewalk grades should not exceed 5% (1:20).

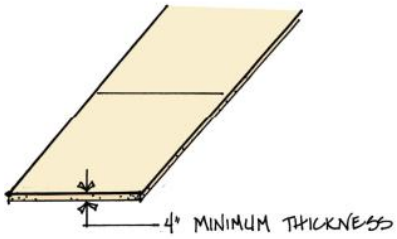
Cross-Slope

Sidewalks and walkways should be designed such that grades and cross slopes are minimized to allow those with mobility impairments to negotiate with greater ease. The maximum allowable cross-slope for sidewalks is 2% (1:50). At driveways, curb cuts, marked and unmarked crosswalks, the maximum allowable cross-slope must be maintained for a minimum width of 3 feet. Cross-slope should be oriented away from the sidewalk and sufficient to provide storm water runoff without creating standing water.



Sidewalk Thickness

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

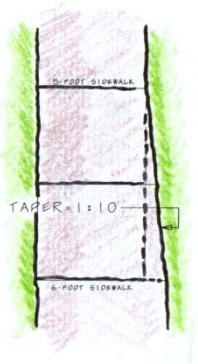


Transitions

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

Tapers

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

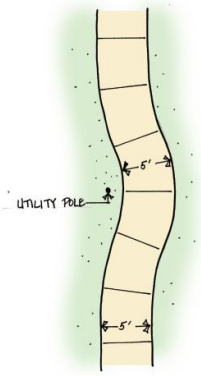


Sidewalk Alignment

Sidewalks should parallel the roadway.

Horizontal Curve Sections on Roadways

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



Presence of Natural and Manmade Features

The 5-foot minimum width of the travel path must be free of obstructions. The designer may propose altering the sidewalk path to avoid obstructions that are expensive to relocate, including but not limited to: transformers, large utility poles, and traffic signal hardware. Sidewalk path exceptions should be evaluated and approved on a case-by-case basis by the Town. Care should also be used to ensure that the travel path does not interfere with the integrity of trees or of historic features.

Meandering Sidewalks

Sidewalk meandering is strongly discouraged. Meanders must meet minimum ADA requirements unless otherwise approved by the municipality.

ADA: Dealing with Cross-Slope from Driveways

The design of sidewalk-driveway crossings should be such that wheelchair travel is safe along the sidewalk without directing the user into traffic through angled (cross) slope designs. Cross-slope on sidewalks should not exceed 2%, preferably not 1.5% where possible.

Sidewalk Buffers

Buffer zones between pedestrian paths and vehicular traffic provide a sense of security to those on foot or in wheelchairs and give the path a comfortable scale and clear definition. Buffers can also provide other benefits to pedestrians depending on the type used. Buffer zones may either be paved or they may involve a planting strip.

Figure 14. Sidewalk buffer on Neptune Drive.

Much like the sidewalk itself, the form and topography of a buffer may vary greatly. The two types of sidewalk buffers are planting strips and paved buffer zones. AASHTO recommends a buffer width of three to six feet for local or collector streets, and a buffer width of five to ten feet for arterial or major streets, whether for a paved buffer zone or a planting strip. A vertical curb is also recommended.

Planting Strips

Continuous zones of landscape, located between the sidewalk and the street curb or the edge of road pavement, perform a multitude of essential tasks. Planting strips contribute to the walkability of a street by providing space for landscaping. Planting strips are the preferred means of providing a buffer, but are not feasible or appropriate in all pedestrian situations.

The width of the planting strip shall increase with a greater plant density as the intensity of development increases. This separation from motorized traffic decreases road noise while

increasing a pedestrian's sense of security and comfort. Added benefits of this separation include space for signage, utilities (fire hydrants), and vegetation.

Paved Buffer Zones

In some situations, continuous planting strips are not appropriate, particularly where there is a high degree of foot traffic between the sidewalk and the street (for example, adjacent to on-street parking). As such, these strips are typically used in downtown or commercial areas. In these cases, a paved buffer zone should be provided between the travel path of the sidewalk and the curb. Though a constant width is preferred for this buffer zone, the width may vary as long as the buffer does not interrupt the pedestrian travel path. Items located in the buffer zone can include street furniture, planters, trees planted with tree grates, streetlights, street signs, fire hydrants, etc. Such items are placed in the buffer zones so as not to restrict pedestrian flow in the travel path.

Native street tree plantings in tree grates have historically proven to work successfully within these buffer zones. They regulate micro-climate, create a desirable sense of enclosure, promote a local ecological identity and connection to place, and can act as a pleasant integration of nature into an urban environment. In the event that a paved or vegetative buffer zone is not possible, a row of parked cars or a bike lane can be used to create this buffer.

Buffer Paving Options

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

Table 4.1. Buffer Widths

Type	Sidewalk Width	Planting Strips	
		With understory plantings	No understory plantings
Local streets	5 ft.	4 - 6 ft.	3 - 5 ft.
Thoroughfares and Collector streets	6 - 8 ft.	6 – 10 ft.	5 - 6 ft.
Business districts	*10 - 15 ft.	n/a	n/a

* Planting strip would be located within sidewalk width.

Additional Considerations

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

4.2 Multi-use Paths

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

Design Criteria

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

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

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

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

Vertical and Horizontal Clearance

Selective thinning of vegetation along a path increases sight lines and distances and enhances the safety of the path user. This practice includes removal of underbrush and limbs to create

open pockets within a forest canopy, but does not include the removal of the forest canopy itself. A total of 10 feet of vertical clearance should be provided.

Pavement Types

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

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

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

Pervious Concrete – This concrete allows storm water to percolate, reducing pollutants included in the stormwater runoff. It also can reduce the velocity of stormwater runoff, thereby reducing soil erosion. Some challenges with pervious concrete are that It is unfavorable to rollerblading and skateboarding and has a higher installation and maintenance cost.

Asphalt – Asphalt is a flexible pavement and can be installed on virtually any slope. Asphalt is smooth, joint free and softer than concrete, preferred by runners, rollerbladers, cyclists, people with low vision, wheelchair users, and parents pushing baby buggies. Construction costs are significantly less than for concrete. Install a minimum 2-inch asphalt thickness with 6-inch aggregate base course. Installation of a geotextile fabric beneath a layer of aggregate base course (ABC) can help to maintain the edge of a path. Asphalt pavement is also helpful in supporting a path in poor soils. Asphalt pavement can last up to 20 years with periodic maintenance. One important concern for asphalt paths is the deterioration of path edges. It is important to provide a 2’ wide graded shoulder to prevent path edges from crumbling.

Boardwalk – A boardwalk is a path made of wooden planks constructed for pedestrians or vehicles along beaches or through wetlands, coastal dunes and other sensitive environments.

Environmental Issues

Environmental protection should be a priority with the planning and construction of a path. Path design, construction type, and construction schedule should all reflect environmental considerations. For example, a path offers some leniency with its alignment compared to a

sidewalk, offering opportunities for selective clearing of vegetation. Also, asphalt may not be considered a good surface material in wet areas because of its petroleum base.

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

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

Figure 15. Path behind a drainage ditch in eastern North Carolina.

Path Amenities and Accessibility

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

Path amenities should be just as accessible as the paths themselves. Periodic rest areas off to the side of accessible paths are important features as well, and should be level and placed after a long ascent. These paths should be open at all hours so that it can serve as a reliable transportation route. Lighting in some situations should be avoided along greenways, as it would disrupt the atmosphere surrounding the path. A reflective stripe or markers would help to make this path navigable in limited light. Lighting the path itself can restrict the visibility of areas beyond the path. Existing street and structure lighting in urban areas can effectively and adequately light the adjacent path. For safety reasons, requiring that all bicycles and roller-bladers carry lights and all pedestrians wear reflective clothing during non-daylight hours would be useful.

4.3 Street Crossings

Raised or Lowered Medians on US 158

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

Figure 16. Mid-block high-visibility crosswalk with median refuge island.

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

Sensitivity to large vehicles (buses, trucks and fire equipment) dictates some elements of the median design, curb style, and placement. Median-controlled roadways reduce the number of turning conflicts and are generally preferred for both pedestrians and cyclists over a two-way, left-turn lane.

Landscaping on US 158

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

Median Pedestrian Refuge Islands on US 158

When used in conjunction with intersection crossings, medians can be used as a crossing island to provide a place of refuge for pedestrians. Median pedestrian refuge islands should be provided as a place of refuge for pedestrians crossing busy or wide roadways at intersections. Median crossings should be at least 6 feet wide in order to accommodate more than one pedestrian, while a width of 8 feet (where feasible) should be provided for bicycles, wheelchairs, and groups of pedestrians.

Median crossings should possess a minimum of a 4 foot square level landing to provide a rest point for wheelchair users. In cases where there are wide roads and high traffic volumes, a push-button pedestrian signal may be mounted in the refuge area to allow pedestrians to divide their trip into two halves as they cross the street.

Inventory of Marked Crosswalks

A marked crosswalk designates a pedestrian right-of-way across a street. It is often installed at controlled intersections or at key locations along the street (also referred to as mid-block crossings). A study should be completed prior to placing crosswalks to determine the need and the best type and location of that crosswalk. An inventory of marked crosswalks as of May 2011 is presented in Table 2.6.

North Carolina state law permits crossing at all intersections whether the intersection is marked with a crosswalk or not. Every attempt should be made to install crossings in places where pedestrians are most likely to cross.

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

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

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

Width of Crosswalks

Marked crosswalks should not be less than six feet in width. In business districts and other locations of high pedestrian traffic, a width of ten feet or greater should be considered. An engineering study may need to be performed to determine the appropriate design of a mid-block crosswalk on a multi-lane, high-speed roadway (for example, US 158).

Painted Crosswalks

Reflective paint is inexpensive but is considered more slippery than other devices such as inlay tape or thermoplastic. A variety of patterns may be employed as detailed below. Crosswalk markings should be white, per MUTCD. Crosswalk markings should extend the full length of the crossings. Crosswalk lines of 10 to 12 inches of width is the recommended minimum. Curb ramps and other sloped areas should be fully contained within the markings.

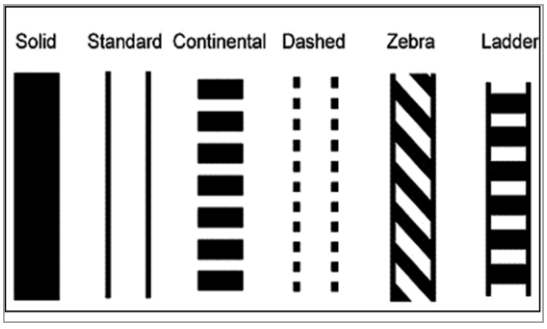


Figure 17. Types of crosswalk markings.

Pavement Treatment

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

Figure 18. Innovative pavement treatment at a crosswalk near the Baum Senior Center.

Raised Crosswalk

Figure 19. Raised crosswalk with slope-up and slope-down.

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

Mid-Block Crossings

Midblock crossings can help pedestrian access by supplementing crossing options. Midblock crossings may be used in areas where there are substantial pedestrian generators or where intersections along a roadway are spaced far apart. Mid-block crossings pose special problems for many state and local departments of transportation, since pedestrians will often choose to cross at the location that is the most convenient for them to do so, not necessarily where it is the safest. As a result, engineers and planners have developed guidelines for mid-block crossings.

Below are some general guidelines on mid-block crossings:

- Provide only on roads with a speed limit of less than 45 MPH.
- Do not install within 300 feet from another signalized crossing point.
- Base installation of a mid-block crossing on an engineering study or pedestrian route placement.
- These crossings are recommended near schools, pedestrian routes, retail areas, recreation, and residential areas.
- Require advance auto-warning signs and good visibility for both the driver and the pedestrian.
- Consider using rectangular-shaped rapid-flashing beacons (see below) to warn motorists.

- Providing a safe crossing point is necessary since pedestrians tend not to walk far for a signalized intersection.
- Provide an audible tone.
- Include a pedestrian refuge island on wide streets that:
    - Have fast vehicle speeds, or with large vehicle or pedestrian traffic volumes.
    - Where children, people with disabilities, or elderly people would cross.
    - Have complex vehicle movements.

Mid-Block Crossing Treatment:
Rectangular-Shaped Rapid Flashing with LED Crosswalk Beacon (Enhancer) device

One device to increase yielding rates on multilane roads is the use of pairs of rectangular yellow LED beacons that employ a stutter flash pattern similar to that used on emergency vehicles. This device will definitely be included in the new MUTCD. It has received interim approval from FHWA, so there is no need for state agencies to request approval for its usage. These lights can be used at stop-controlled intersections or at mid-block crossings, in addition to a crosswalk. A study shows that the rectangular rapid-flash LED flash beacons mounted to pedestrian signs along with advance yield markings during daytime and nighttime operation is the most effective device.

Figure 20. Mid-block crossing with rectangular-shaped rapid-flashing beacon.

Case Study: City of Wilmington, North Carolina – The Rectangular Rapid Flashing Beacon sign was used on a state road (South 3rd Street which is US 17 Business) at Anne Street. This intersection features a 35 mile per hour speed limit and average daily traffic volume of 25,290. The signs used were of the push-button variety (not continually flashing). The two signs together will be purchased for an estimated $20,000. Residents in the vicinity of the crossing agreed to contribute 10% of the cost. The City of Wilmington will pay for the remaining 90% of the cost of the signs. The sign choice was made by the City in "Walk Wilmington: A Comprehensive Pedestrian Plan". The project was installed in late 2009. Additional signs are planned. The City plans to use a high-visibility crosswalk, curb bulb-outs, median refuge island and advance warning signs and yield bars.

Advance Stop Bars
Vehicle and pedestrian visibility is increased by placing a vehicle advance stop bar 4 to 10 feet back from the pedestrian crosswalk at signalized crossings and mid-block crossings. In certain situations, a larger setback of the advance stop bar may be required. Advance stop bars are 1–2 feet wide and they extend across all approach lanes at intersections. The time and distance created allows a buffer in which the pedestrian and motorist can interpret each other's intentions. Studies

Figure 21. Advance stop bar at a signalized intersection.

have shown that this distance translates directly into increased safety for both motorist and pedestrian. One study in particular claims that by simply adding a "Stop Here for Pedestrians" sign reduced pedestrian motorist conflict by 67%. When this was used in conjunction with advance stop lines, it increased to 90%.

Pedestrian Signals

Traffic signals assign the right of way to motorists and pedestrians and produce openings in traffic flow, allowing time to cross the street. When used in conjunction with pedestrian friendly design, proper signalization should allow for an adequate amount of time for an individual to cross the street. The suggested amount of pedestrian travel speed recommended in the Manual on Uniform Traffic Control Devices (MUTCD) is 4 feet per second. However, a longer crossing time may be necessary to accommodate the walking speed of the elderly or children. Therefore it is suggested that a lower speed of 3.5 feet per second be used when there are elderly and children using an area.

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

Types of Pedestrian Signals

International Pedestrian Signals – According to the MUTCD, international pedestrian signal indication should be used at traffic signals whenever warranted. As opposed to early signalization that featured "WALK" and "DON'T WALK", international pedestrian symbols should be used on all new traffic signal installations. Existing "WALK" and "DON'T WALK" signals should be replaced with international symbols when they reach the end of their useful life. Symbols should be of adequate size, and clearly visible to make crossing safe for all pedestrians.

Countdown Signals – Countdown signals are pedestrian signals that show how many seconds the pedestrian has remaining to cross the street. The countdown numbers flash during the DON'T WALK phase, flashing yellow as it counts down.

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

Pedestrian Signal Timings - The timing of these or other pedestrian signals needs to be adapted to a given situation.

Figure 22. Audible crossing devices

There are three types of signal timing generally used: *concurrent*, *exclusive*, and *leading pedestrian interval* (LPI). The strengths and weaknesses of each will be discussed with an emphasis on when they are best employed.

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

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

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

The use of infrared or microwave pedestrian detectors has increased in many cities worldwide. These devices replace the traditional push-button system. Although still experimental, they appear to be improving pedestrian signal compliance as well as reducing the number of pedestrian and vehicle conflicts. Perhaps the best use of these devices is when they are employed to extend crossing time for slower moving pedestrians. Whether these devices are used or the traditional push-button system is employed, it is best to provide instant feedback to pedestrians regarding the length of their wait. This is thought to increase and improve pedestrian signal compliance.

Passive pedestrian detection equipment is becoming more common, and can be recommended in high-volume locations where many pedestrians are crossing a five-lane (or greater) street cross-section.

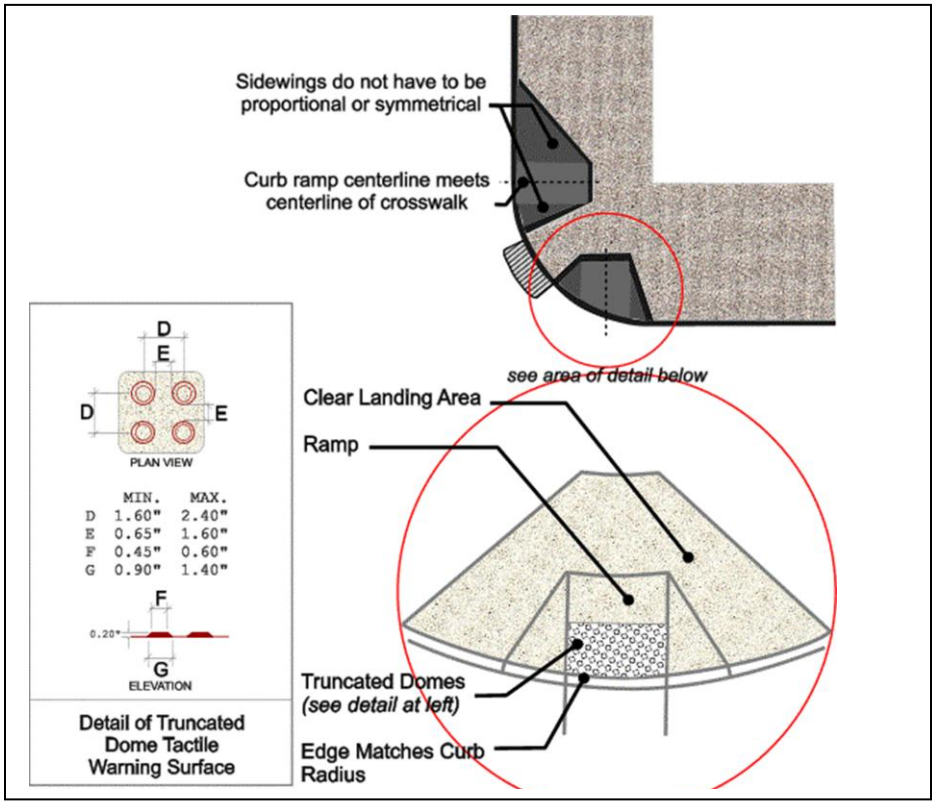
Figure 23. No right-turn on red sign.

Right Turn on Red Restrictions

Often motorists will either nudge into a crosswalk to check for oncoming traffic without looking for pedestrians or slow, but not stop, for the red-light while making the turn. There is legitimate concern that

eliminating an RTOR will only increase the number of right-turn-on-green conflicts where all of the drivers who would normally have turned on red, now are anxious to turn on green. Some experts are concerned that eliminating right on red will increase the number turning on green. Consider elimination on case by case basis and only where there are usually high pedestrian volumes.

Curb Ramps



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

Curb Extensions (Bulb Outs) and Curb Radii

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

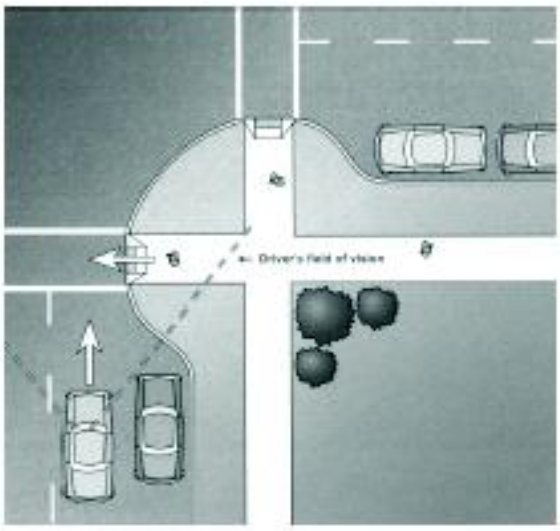


Figure 24. Lighter area depicts larger sidewalk as curbs extended into intersection.

Figure 235. Well-designed curb extension.

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

Table 4.2 illustrates the relationship between posted speeds and the curb (often called "corner") radius[ii]. Motorists will travel more slowly around corners with smaller curb radii even without the use of curb extensions.

Table 4.2. Curb Return Radii at Various Speeds

Speed Limit (mph)	Minimum Curb Radius (feet)
Local streets (10)	10 ft.
Local Street (25)	20 ft.
Collector Street (30)	30 ft.

Lighting

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

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

Each lighting situation is unique and must be considered on a case-by-case basis. Average maintained horizontal illumination levels of 5 lux (0.5 foot candles) to 22 lux (2 foot candles) should be considered, though higher levels are advisable in special areas where security problems might exist. Light poles should generally be 12 to 15 ft. high for lighting pedestrian areas. Luminaries and poles should be at a scale appropriate for pedestrian use.

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

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

Lighting should be sufficient so that pedestrians can see cars, and cars can see pedestrians. However, overlighting of an area can produce an environment that is unattractive to pedestrians.

It is important to note that every effort should be made to address and prevent light pollution. Also known as photo pollution, light pollution is "excess or obtrusive light created by humans." Whenever urban improvements are made where lighting is addressed, a qualified lighting expert should be consulted early in the process. This individual should not only create a safe and attractive ambiance, but will do so with the minimum of fixtures, an awareness of the

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

Signage

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

Wayfinding signage should orient and communicate in a clear, concise and functional manner. It should enhance pedestrian circulation and direct visitors and residents to important destinations. In doing so, the goal is to increase the comfort of visitors and residents while helping to convey a local identity. Regulations should also address the orientation, height, size, and sometimes even style of signage to comply with a desired local aesthetic.

It is recommended that municipalities adopt consistent and descriptive graphics to identify pedestrian routes. This signage system would assure pedestrians that they are safe and will not encounter gaps in facilities along these routes. A map should be incorporated into each route illustrating the entire pedestrian system and their location. Bus stops, destinations, and mileage should also be identified on the signs. Maintenance of signage is as important as walkway maintenance. Clean, graffiti free, and relevant signage enhances guidance, recognition, and safety for pedestrians. Pedestrian-related signage serves primarily to notify motorists and others of the presence of pedestrians.

The intended effect is to cause motorists drive more cautiously and reduce their speeds, thereby improving the safety for pedestrians.

Signs can be used in a variety of places, including at crosswalks, at intersections, in-street, and near schools. National standards for sign placement and use can be found in the Manual for Uniform Traffic Control Devices (MUTCD).

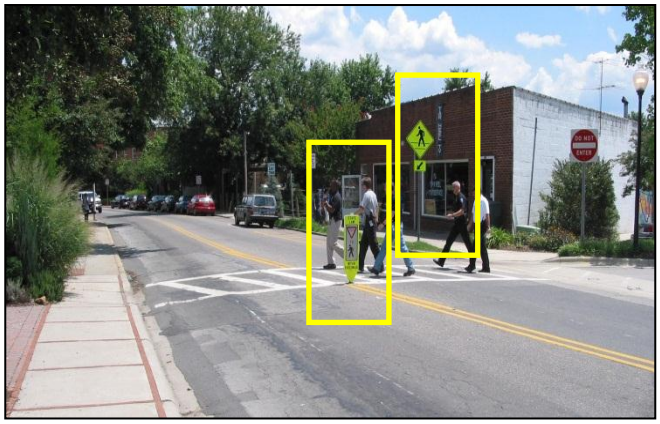
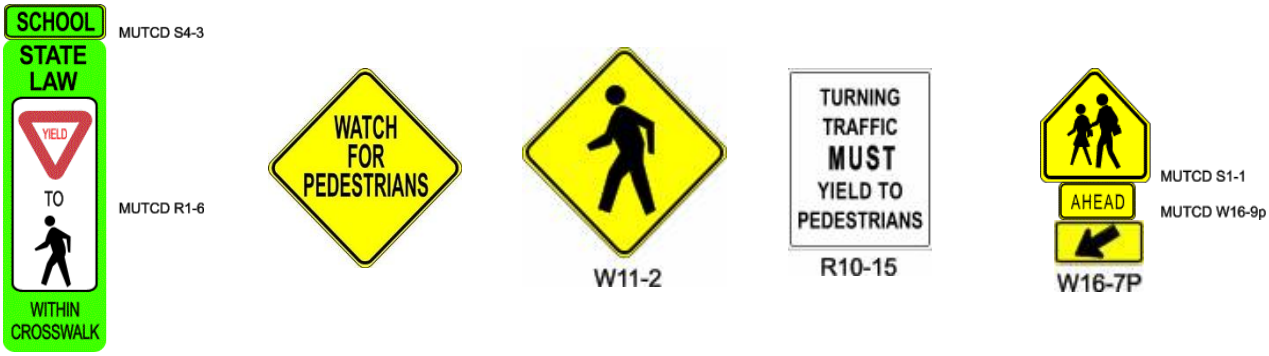


Figure 26. Two types of pedestrian crossing warning signs depicted; one in the street, the other adjacent.

The MUTCD provides guidance for warning signs which can be used at both crosswalks, or along the roadway:

"Nonvehicular signs may be used to alert road users in advance of locations where unexpected entries into the roadway or shared use of the roadway by ***pedestrians***, animals, and other crossing activities might occur." (Page 2C – 21, 2003 Edition)

Shown below are signs to consider installing. For more signs and detailed guidelines for sign installation and use, the Town should consult the MUTCD.



Warning Signs – The first sign is usually installed within the street to warn motorists to yield to pedestrians in a crosswalk - it does not have to be near a school. The second and third signs are common general pedestrian warning signs, while the fourth and fifth signs notify motorists of specific instances to watch for pedestrians. The fourth sign, "Turning Traffic", is usually placed at intersections to warn motorists that are turning right or left to yield to pedestrians in crosswalks. For the fifth sign, the top sign can either be combined with the smaller "ahead" sign or the arrow symbol to indicate the presence of a crosswalk to motorists in a school zone.

Figure 27. Standard pedestrian warning signs

Section 7 of the MUTCD is entirely devoted to "Traffic Controls for School Areas" and is the dominant guidance available to municipalities for installing signs and markings in school zones. The section provides valuable additional guidance for school crossing treatments that can be utilized for the planning and design of schools that should be considered when making safety improvements.

Planting Requirements – All understory plantings should be selected according to the standards described in the American Standard for Nursery Stock of the American Nursery and Landscape Association. Install and maintain plants according to the International Society of Arboriculture (ISA) guidelines.

Visibility – Understory plantings should never be allowed to obscure the line of sight between pedestrians and drivers. A clear view should be maintained between 30" and 72" above street. This area must be free of foliage for safe crossing visibility. Other plantings should also follow this rule within 50 ft. proximity of street corners and other designated crossing points.

Maintenance – Understory plantings require ongoing maintenance. Municipalities typically take responsibility for maintenance of these amenities, although there are instances where community groups have provided funding and volunteers for maintenance. In order to reduce the amount of maintenance necessary, it is helpful to use native plant material that is adapted to the local soil and climate. Growth pattern and space for maturation are important to avoid causing obstructions.

Pedestrian Overpass/Underpass

Pedestrian overpasses and underpasses allow for safe pedestrian movement over busy thoroughfares. These types of facilities typically feature very high construction costs. These facilities are problematic in many regards and should only be considered when no other solution is expected to be effective. Research shows that pedestrians will avoid using such a facility if they perceive the ability to cross at grade as taking about the same amount of time. ADA requirements for stairs, ramps, and elevators often require the construction of an enormous structure that is visually disruptive.

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

In addition, they should be considered only for crossing arterials with greater than 20,000 vehicle trips per day and speeds 35 - 40 mph and over. Minimum widths for these structures should follow the guidelines for sidewalk width.

Figure 28. Pedestrian Overpass.

Underpasses should have a daytime minimum illuminance of 10 footcandles, achievable through artificial and/or natural light provided through an

open gap to sky between the two sets of highway lanes, and a night time level of 4 foot-candles. In underpasses, where vertical clearance allows, the pedestrian walkway should be separated from the roadway by more than a standard curb height. Consider acoustics measures within underpasses to reduce noise impacts to pedestrians and bicyclists.

Transit Stop Treatments

Figure 29. Ped-friendly bus stop.

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

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

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

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

Traffic Calming Techniques

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

Traffic Circles – A traffic circle is a circular shaped intersection featuring a central island. Traffic is allowed to go in one direction only, circling a central island. Traditionally, right of way belongs to the traffic entering a circle. In some instances, though circles give right-of-way to the primary roads. Studies have shown that traffic circles reduce angle and turning crashes and are effective in reducing vehicle speeds in the immediate vicinity of the circle. Traffic circles are a more costly device for traffic calming and require extensive evaluation to determine their effectiveness in a particular location. Traffic circles reduce vehicular speeds as drivers need to slow down in order to maneuver around them. They may be appropriate on local and collector streets.

Figure 30. Traffic circle.

Roundabouts – In roundabouts, as opposed to traffic circles, entering traffic must yield to traffic already in the circulatory roadway. Various other differences between roundabouts and traffic circles are shown in the chart below.

Roundabout	Traffic circle
Entering vehicles yield	Stop sign, stop signal, or giving priority to entering vehicles
Vehicles in the roundabout have priority over the entering vehicle	Allow weaving areas to resolve conflicted movement
Use deflection to maintain low speed operation	Some large circles provide straight path for higher speed
No parking is allowed	Some large circles permit parking within the circle
Pedestrians are (usually) prohibited from the central island	Some large circles allow pedestrians on central island
All vehicles circulate around the central island	Mini-traffic circles with left-turning vehicles passing to the left* of the central island.
(Source for table: Oregon Department of Transportation, *Modern Roundabouts for Oregon*)	

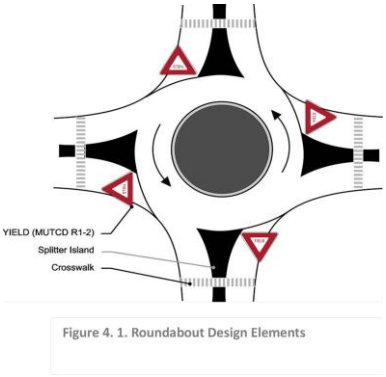


Figure 31. Typical modern roundabout.

Roundabouts can be problematic for pedestrians. Every effort must be made to prompt motorists to yield to pedestrians crossing the crosswalks. A low design speed is required to improve pedestrian safety. Pedestrian refuge islands and single lane approaches both lend to pedestrian safety. Problems also arise with vision-impaired pedestrians because there are not proper audible cues associated with when to cross. Studies are underway to develop and test solutions. Auditory accessible pedestrian signals placed on sidewalks and refuge islands are one solution, but there is no research to prove their efficacy.

In areas where traffic is low, a roundabout presents no problems for most bicyclists. However, in multi-lane roundabouts where speeds are higher, and the traffic is heavy, bicyclists are at a distinct and dangerous disadvantage. Adding a bike lane within such a roundabout has not proven to be effective. A possible solution involves creating a bike lane that completely skirts the roundabout allowing the cyclist to use or share the pedestrian route.

The recommended maximum entry design speed for roundabouts ranges from 15 mph for 'mini-roundabouts' in neighborhood settings, to 20 mph for single-lane roundabouts in urban settings, to 25 mph for single-lane roundabouts in rural settings. Refer to roundabout diagram for typical crosswalk placement. In addition, refer to FHWA's report, *Roundabouts: An Informational Guide*. The report provides information on general design principles, geometric elements, and provides detailed specifications for the various types of roundabouts.

Roundabouts can be appropriate for collector and arterial streets carrying up to 20,000 vehicles per day, although detailed traffic capacity studies should be conducted to study the specific intersection traffic dynamics.

Speed humps and speed tables are also traffic calming devices.

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

Figure 32. Residential speed hump.

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

Textured Pavements – Textured street pavement provides a visual and tactile cue for drivers that they are driving in an area of high pedestrian usage. Stamped asphalt or concrete is often used, or alternate paving materials, to create an uneven surface for vehicles and pedestrians to traverse. Similarly, they cue pedestrians that they are entering a vehicular zone, and are a particularly effective treatment to warn visually impaired pedestrians. Textured street pavements should be used in areas of substantial pedestrian activity and where noise is not a major concern.

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

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

Figure 33. Well-designed crossing of a trail at a public street.

Section 5. Policies and Programs

Local policies, plans and programs can heavily influence the walkability of a community, and often shape the pedestrian environment, sometimes even without the intent of doing so. Creating strong policies and plans that help to actively create good walking conditions will mean a more balanced future transportation network and a shared private/public burden for providing that benefit. Policy amendments, planning activities and program offerings can often be achieved at low-cost to a municipality while resulting in substantial outcomes that could help Kill Devil Hills make notable progress in becoming a more walkable environment.

Section 5 emphasizes the specific recommendations stemming from the policy review and presents new recommendations for working with key partners to develop better awareness of and behavior towards pedestrians.

5.1 Improvements to Existing Policies and Plans

The following are policy recommendations to be considered in the Town Code.

Sidewalk Conditions – All street curbs being constructed or reconstructed for should be reviewed to consider adding or modifying the design of wheelchair ramps for physically handicapped at all intersections where both curb and gutter and sidewalks are provided and at other major points of pedestrian flow.

Some additional and supplementary language to the local street ordinances could help improve local pedestrian conditions, such as:

Speed Limit Modification – Section 71.19 addresses driving with care around children and requires motorists to avoid "play streets" if possible, and to use the utmost care around children when driving on such a street is necessary for business purposes or to access a residence. Additional language setting a Town-wide speed limit for such streets might be considered for additional reinforcement of these requirements.

It is recommended that the Board of Commissioners request that NCDOT lower the posted speed limit on US 158 from 50 mph to 40 mph. The purpose is to recognize the road traverses an urban area with people of all ages and abilities desiring to walk across it.

Crosswalks – Address pedestrian-related traffic ordinances so that vehicles are required to yield the right-of-way to pedestrians in the street. North Carolina state statute requires motorists to also yield to pedestrians in unmarked crosswalks except where there is a traffic signal or pedestrian signal. This could and should be reinforced in the local ordinances to clarify a motorist's legal requirements in Kill Devil Hills. One strategy is to require all pedestrian crosswalks to be marked with "Yield Right of Way to Pedestrians" signs, legible to motorists from 250 feet away.

Sidewalk Easements and Buffer Zones – It is recommended that the Town change the minimum sidewalk requirement to 5 feet throughout the town, with a minimum of 6 feet along US 158.

The Ordinance should require a "minimum 5 foot wide planting strip along all rights-of-way and ten feet minimum along US 158" to increase the buffer between pedestrians and moving traffic.

It is recommended that the Town incorporate design standards of sidewalks to include vegetative buffers between the sidewalk and roadway. Urban street trees should be discouraged because the natural processes in a beach environment make it difficult for many species to survive. Instead, understory plantings and grasses can be beneficial and aesthetically pleasing, providing a barrier and habitat for birds. The design standards should specify plantings that will not obstruct views and require little maintenance; that is, native plantings. The standards should also recommend planting spacing for various types of plants; that is, larger shrubs will have different spacing recommendations than small shrubs.

The Subdivision Ordinance provides "streets shall be designed or walkway and bikeway easements provided to assure convenient access to parks, playgrounds, schools and other places of public assembly. Walkway and bikeway easements shall be consistent with town standards." It is recommended that the ordinance be amended to add an encouragement for street design that provides for the safe and convenient movement of motor vehicles and pedestrians in development that is not subdivided.

In addition to considering these recommendations, several additions to the Code of Ordinances could enhance the pedestrian environment and include:

- Language on Traffic Impact Assessments could be useful in the Zoning and Subdivision Ordinance, and could be tailored to specifically address bicycle and pedestrian traffic flow and intersection design that safely accommodates pedestrians and bicyclists.
- Clarifying statements in the ordinances on the Town's sidewalk petition process would be useful, and should be structured so as not to overburden the adjacent property owners.
- Create a best practice parking lot design guide and award deserving developers during the site design review process.
- Modify the sidewalk cost assessment policy to shift the cost to all taxpayers in Kill Devil Hills, recognizing that sidewalks are a general public benefit.

Kill Devil Hills will experience growth and development in the years to come, driven in no small part by its coastal location, beach climate, and resort reputation. The shape and quality of future development will greatly impact the pedestrian-friendliness of the Town. If the Town can work with the development community to create a more multi-modal transportation network that includes sidewalk connections, multi-use trails and perhaps public transit, Kill Devil Hills will continue to stand out as a community with a high quality of life that attracts new

residents, visitors, businesses and further economic development. For this reason, it is strongly recommended that the Town work to update and/or create local ordinances to include more pedestrian-oriented language and guidance for walkable future development. Table 5.1 lists recommended changes to local ordinances.

Table 5.1. Local Ordinance Recommendations

Policy Area	Recommended Change
Minimum Sidewalk Requirement	Modify the Zoning Ordinance so that all sidewalk requirements should clearly state that five (5) feet is the minimum width in residential areas, ten (10) feet along US 158, and ten (10) feet in commercial districts.
Americans with Disabilities Act compliance	Town sidewalk and street design standards should accommodate United States Justice Department requirements to accommodate people with disabilities. The ADA Accessibility Guidelines (ADAAG) should be adopted, by reference, for local design.
Multi-use Trail Requirements	Recommend to developers the construction of 10 to 12-foot wide multi-use trail connectors during redevelopment to connect to the path network.
Parking Lot Design	Amend the Town's zoning ordinances to address pedestrian access, connectivity and safety in parking lot design. In large redevelopment projects, walkways should be required through a parking lot to a business or nonresidential development, in order to provide better access from a public street, through the development to the business entrance. A walkway should be required for any parking lot three parking bays or more in width.
Traffic Impact Assessment	Consider text amendment on Traffic Impact Assessments in the Zoning Ordinance, to specifically address on-site bicycle and pedestrian traffic flow and intersection design along the project frontage that safely accommodates pedestrians. Include off-site provisions for sidewalk connections and pedestrian signals/crosswalks within a reasonable distance of proposed major subdivisions, offices, recreational centers, and other important pedestrian generators or attractors.

As listed in Table 5.2, internal policy changes and complementary planning efforts could be achieved in order to reinforce the Pedestrian Plan's recommendations and proposed outcomes. During the Plan's development, several pedestrian-friendly policy and program recommendations specific to Kill Devil Hills were identified and discussed. Recommendations for all such policy and plan development are included in Table 5.2 below.

Table 5.2. Internal Policy Recommendations

Countdown Pedestrian Signals	Formalize a town policy of installing countdown pedestrian signal heads and crosswalks with the installation of all new signalized intersections. Provide pedestrian signals even in locations without sidewalk on one or both sides of an intersection.
Citizen-initiated Sidewalk Petition Process	1. Use the petition process contained in the Town Charter, or 2. Develop a sidewalk petition process and budget allocation to handle "spot improvements," allowing citizens to make requests for sidewalk connections that will quickly and easily fill gaps in the pedestrian network.
Curb Ramps	Modify curb ramp design standards to conform to ADA requirements and ensure new curb ramps are constructed during all new street/intersection construction, as mandated by ADA requirements.
Sidewalk and Crosswalk Maintenance	Coordinate with NCDOT to develop a sidewalk and crosswalk maintenance budget and schedule to keep up with regular repair needs.
Crosswalk Inventory	Maintain the inventory of crosswalks and pedestrian facilities prepared during the Pedestrian Plan.

5.2 Programs and Partnering Opportunities

Pedestrian facilities alone do not make a town pedestrian-friendly. A variety of policy changes and programs should also be implemented to cultivate and support a pedestrian-friendly culture. A pedestrian-friendly culture has several different characteristics, including the behavior of people when they are walking, the attitude of motorists in the community towards pedestrians, and the role of police and other law officials in enforcing pedestrian safety. To address all of these elements, programs are often created to fit within the "five E's" of pedestrian programming: (1) education, (2) encouragement, (3) enforcement, (4) evaluation and the physical changes recommended as a part of (5) engineering.

Education programs teach others about safe pedestrian behaviors, the benefits of walking, and can assist people in feeling more comfortable with their "new" mode of travel. Education programs can also be used to teach motorists how to interact safely with pedestrians. Encouragement programs, like education programs, can also teach about the benefits of walking, and serve to promote walking and pedestrian-friendly behavior through various activities and incentives. Enforcement programs provide the "teeth" of a safe and legal pedestrian environment. When law enforcement officers and other officials protect pedestrians and encourage walking, this sends a clear message that the presence of pedestrians is a

legitimate and permanent condition in the town's transportation network. Evaluation programs should focus on key metrics that will demonstrate to decision-makers that investments in pedestrian transportation are meeting, or not meeting, the goals of this Plan. Engineering programs represent the most significant investment of resources in terms of cost and staff time, evidenced by completed construction projects.

The sections that follow include recommendations for a well-rounded pedestrian program in the Town of Kill Devil Hills.

Education Program Recommendations

Safe Routes to School Program

Kill Devil Hills secured a Safe Routes to Schools grant to build Phase IV of the Bay Drive multi-use path. According to the Federal Highway Administration's website for Safe Routes to School, in 1969 about half of all students walked or bicycled to school. Today, however, over half of all children arrive at school in private automobiles and only 15 percent of all school trips are made by walking or bicycling. Designed to address these dramatic statistics, the Safe Routes to School Program is intended to create and promote safe walking and cycling to school in order to improve safety near schools, promote active lifestyles, and reduce pollution and congestion caused by school traffic. The first Safe Routes to School program was begun in Europe in the late 1970's, but the first program in the United States began in the Bronx, NY, in 1997. Now, less than 10 years later, the Safe Routes to School Program has become both a federally-funded and grassroots national movement.

A Safe Routes to School (SRTS) program is a school-based effort that involves young students, teachers, law enforcement officers and parents in the development of school safety and encouragement initiatives such as Walk to School Day, Walking Wednesdays, pedestrian safety assemblies and bicycle rodeos. These programs can help engage children in safe walking behaviors and encourage more walking and healthier lifestyles. Common steps to creating a successful program are to kick-off with an event on International Walk-to-School Day, then subsequently work with PTA members, teachers and students to identify needs and program ideas while incorporating encouragement measures and education into the school curriculum for students to learn safe walking and bicycling skills and the benefits of an active lifestyle.

Funds are available through the North Carolina Department of Transportation for both planning and infrastructure intended to encourage safe walking and bicycling to elementary and middle schools. Development of a SRTS Action Plan could help with program development and in making key physical improvements within the vicinity of local schools. SRTS workshops are also available through NCDOT to aid in the development of local SRTS Action Plans and are an opportunity to bring together school administrators, faculty, staff, and representatives from related agencies such as health departments, law enforcement, engineering, and city planning to discuss local issues and solutions. Resources and information are available at: www.saferoutesinfo.org. NCDOT funding applications and information on local resources are available at: http://www.ncdot.org/ transit/bicycle/saferoutes/SafeRoutes.html.

Recommendation: A Safe Routes to School program is a recurring activity and will require support from Town and County staff, school administration, and parents and faculty; however, the benefits will continue with children into adulthood. Town of Kill Devil Hills staff should coordinate with the Dare County public school administration at either a system-wide or individual school level, to encourage and support the establishment of a Safe Routes to School program at First Flight Elementary and First Flight Middle Schools in Kill Devil Hills.

The purpose of these materials would be to educate Kill Devil Hills' citizens about safe walking behaviors, safe driving behaviors around pedestrians, the proper use of pedestrian facilities like pedestrian signals, and the benefits of walking such as health and the environment. Such educational materials can be distributed to outdoor groups and outdoor supply vendors, as well as distributed at community facilities. In addition, materials could be created for distribution to developers to educate them about pedestrian-friendly design and construction techniques.

Sample Safe Routes To Schools Materials (stickers for children)

Bicycle and Pedestrian Program Website

The Town of Kill Devil Hills and other Outer Banks communities could work collectively to create a website to promote walking. Events held by local groups that are accessible for pedestrians and bicyclists could be featured. A bicycle and pedestrian program website could provide links to local event calendars, fitness and walking program information, host a pedestrian safety webpage and/or interactive child safety site, and provide PDF links to walking route maps and other information. Such a website could be a clearinghouse for all pedestrian-related information and would offer a great resource to citizens and visitors interested in active living opportunities and foot tours of the region.

Recommendation: It is recommended that the Town develop a bicycle and pedestrian program website to act as a clearinghouse for all pedestrian-related information for residents and visitors. Such a website could use its own catchy domain name, like "BikeWalkOuterBanks.org" and be linked to the Town's website from the homepage. The bicycle and pedestrian program website would be educational in nature, and promote tours and outings in Kill Devil Hills for residents and tourists.

Pedestrian Safety Education Campaign

A pedestrian safety campaign can be a branded town-wide effort involving multiple Town departments including Public Services, Planning and Inspections, and Police, together with civic organizations and neighborhood groups in an awareness building effort to address local pedestrian issues.

Figure 34. Sample Pedestrian Education Material

Pedestrian safety initiatives might focus on speeding, reckless driving, unsafe pedestrian behavior, child safety or failure to yield issues. For instance, speeding motorists might be targeted with a "Keep Kids Alive, Drive 25" campaign, while common but unsafe pedestrian behavior is addressed through educational materials and handouts distributed at local events and public venues like the library and schools. TV and radio PSAs on pedestrian safety might be utilized to create local awareness of issues such as school zone safety. Finally, the Town might also consider posting bicycle and pedestrian related laws and safety information permanently on the Kill Devil Hills Town website for reference. For a list of relevant state statutes, visit www.ncdot.org/bikeped/lawspolicies/default.htm.

The simplest way to spread information about safe pedestrian behavior is to create promotional and educational materials for distribution at various venues throughout the Town, and to Town staff, major employers, and future residents.

Figure 35. Sample Pedestrian Education Material

Well-designed pedestrian safety and promotional materials are available for free from FHWA and the National Center for SRTS.

Source: www.saferoutesinfo.org

Encouragement Program Recommendations

Bike/Pedestrian Advisory Committee

One approach to formalizing the Town's commitment to pedestrian-friendliness is to establish a standing Pedestrian and Bicycle Advisory Committee. The Committee should be a standing committee comprised of Town residents committed to making Kill Devil Hills a more bicycle- and pedestrian-friendly community. Members of the advisory committee would provide input on town decisions, actions, plans, and policies from a bicycle and pedestrian perspective. They would also lead volunteer efforts at Town-

sponsored events and generally advocate for a more bicycle- and pedestrian-friendly community.

A Town staff member should be appointed to liaison with the Committee and work part-time or full-time to help coordinate bicycle and pedestrian planning and programming activities and implement recommendations of the Pedestrian Plan.

Recommendation: The Town Planning Board and Board of Commissioners should enhance the existing "Street Improvements and Special Projects Committee" to establish a bicycle and pedestrian advisory function and appoint citizen members who support encouragement efforts and are willing to monitor progress on implementation of the Pedestrian Plan recommendations.

Pedestrian Wayfinding System and Route Maps

More and more communities are using pedestrian and bicycle wayfinding systems to provide visitors and residents with directional and distance information to major landmarks, parks and other local attractions. Given Kill Devil Hills's visitor attractions, and well-used recreational facilities (for example the Family Recreation Center, Aviation Park, etc.), a similar system may be very useful here.

Pedestrian wayfinding signs should be at an appropriate height of 7 to 8 feet high, with a font and orientation appropriate for pedestrian viewing. Distance information should be provided in blocks or miles; a map is also quite useful for visitors. Such a system could incorporate local themes, allowing Kill Devil Hills or Outer Banks artists a hand in designing the sign templates. Opportunities for private-public partnerships exist, such as working with area retailers or hotels along the route to sponsor signage and/or complementary brochures in exchange for a mention in the guide.

Recommendation: Develop a system of wayfinding signs to direct pedestrians to major landmarks, recreation facilities and parks, multi-use trails, and other public attractions in the Town with wayfinding signage. Develop a complementary map and brochure for visitors and residents to use in navigating the town by foot. Pedestrian safety information could be included, as well as information on local cultural sites, landmarks and businesses (for example historic homes, parks, museum, and retailers). The map might be available for distribution at Town Hall, local retail venues, restaurants, on the internet and through the Outer Banks Chamber of Commerce and Dare County Visitors Bureau.

Walking Tours

With Kill Devil Hills's high pedestrian rates and seasonal influx of tourists, it is apparent that many residents and visitors enjoy Kill Devil Hills by foot. More communities are capitalizing on existing sidewalks and trails by offering walking tours that highlight cultural and ecological attractions. Providing route maps and working with volunteers to lead the tours can be a cost effective way to add value to visitors, and offer a healthy group activity for residents to enjoy.

Recommendation: Work with the Dare County Health Department to incorporate regular pedestrian outings in Kill Devil Hills for residents and/or tourists, which highlight the natural resources of the town and surrounding area; historical and cultural landmarks; and popular destinations. An existing, similar tour experience could be modified slightly and supported with mapping that emphasizes pedestrian-scale elements and favorable walking routes. A larger tour could be a weekly or monthly endeavor, organized to meet regularly at the same place/time, but using different routes and/or facilitators to spice things up. The walking tours might highlight local historic homes, Albermarle Sound natural water features, local heritage and cultural facts, gardens or other natural resources. For examples of a successful set of heritage tours in New Bern, NC, visit the following website: www.visitnewbern.com/heritage_tours.htm.

Healthy Living Initiative

The Town is participating in the NC Healthy Carolinians program (www.healthycarolinians.org) through the Division of Public Health in the NC Department of Health and Human Services (DHHS). One of the major characteristics of a pedestrian-friendly town is to have a body of citizens, town staff and elected leaders who support and encourage pedestrian-friendliness. Usually this requires that residents and town officials are educated about the economic, health, and general quality of life benefits of a pedestrian-friendly space. In order to facilitate this, it is recommended that Town establish a Healthy Living Initiative that consists of several outreach activities. One event could be a Walk to Work Day at Town Hall, perhaps in conjunction with the annual Bike to Work Week in May of each year. During this day, residents of Kill Devil Hills, Town Hall employees, students, and others could be encouraged to walk to work and school. Other events could include a 5K Walk/Run each year in Kill Devil Hills or "Race to the Beach" along NC 12 and Veteran's Drive and Ocean Bay Boulevard Multi-use Trails. Additionally, educational activities could be held at Town Hall, such as presentations on pedestrian- and bicycle-friendliness to learn about the projects, programs, and policies that can encourage a more bicycle and pedestrian-friendly city. Several organizations, such as the National Center for Bicycling and Walking (www.bikewalk.org), Walkable Communities, Inc., and the Complete Streets initiative (www.completestreets.org), provide resources such as speakers, handouts, guides, and publications which can be used for the education and encouragement component of the event. Local businesses might be asked to encourage employee participation in workplace walking clubs and events, along with the promotion of a local walking route and corresponding map (see below).

This program should be promoted in local schools, health centers and at local events. A "Fitness Challenge" event and/or regular senior walking program could be incorporated. Business sponsors could help purchase low-cost pedometers and walking route maps for distribution.

Recommendation: Consider working with the Dare County Health Department and other local partners to create a healthy living initiative that promotes walking for fitness. The initiative could engage adult and child residents, students and visitors in fun activities, such as a 5K Walk/Run Event and workplace walking challenges.

Enforcement Program Recommendations

Traffic Enforcement

Many communities rely on a traffic enforcement unit of the Police Department or Sheriff's department to conduct periodic ticketing and speed enforcement efforts on problem streets. Speeding, failure to yield to pedestrians in a crosswalk, red-light running, and rolling stops are often targets of traffic enforcement to enhance pedestrian safety. Because of the expenses involved and staffing resources needed to conduct traffic enforcement, it is often used as a follow-up activity to educational and encouragement efforts, or as a last-resort for addressing a problem location or issue. However, in many cases it can be a worthwhile expense and helps to reinforce new behaviors when traffic calming, speed limit changes, educational campaigns or other pedestrian improvements have been implemented.

Other effective passive enforcement options include active speed monitor signs and speed trailers. Like a standard speed limit sign, active speed monitors indicate the permanent speed limit for a given street but also use radar to detect the speed of passing cars.

Below the permanent speed limit text, a digital display shows the speed of passing cars and flashes to indicate to speeding drivers when to slow down. These signs are very appropriate for high pedestrian areas where drivers need to constantly aware of pedestrians, such as in a school zone. Similar to active speed monitors, a speed trailer is a speed detection device that monitors the speed of passing vehicles and displays travel speeds on a digital screen in full view of drivers. Speed trailers also often flash when drivers are speeding, but unlike active speed monitors, they are typically used on a temporary basis for problem streets to reinforce local speed limits and make drivers aware that the Police are monitoring the area.

A customer-friendly program might simply hand out warning tickets and a one-page informational brochure showing the location of pedestrian collisions, their seriousness, and the driver's role in preventing them.

Recommendation: Work with the local police department to enforce speeding, failure to yield to pedestrians in crosswalks, and other violations in targeted areas such as school zones, pedestrian focus areas or downtown. Other passive enforcement options could include the purchase and rotating display of a speed trailer at problem spots where speeding and traffic issues are reported as a problem. Active speed monitors, on trailers or mounted on sign posts, should be considered where speeding is a continual problem.

Partnership Opportunities

Many of the education, encouragement and enforcement programs will be carried out by partnerships between Town departments, local nonprofit and civic organizations, business owners, developers and others. Creating strong partners in the town-wide effort to improve pedestrian safety and increase walkability will help spread the word and awareness of the importance of walking in the community, as well as lead to programs that can withstand the

test of time. Potential partners for implementation of the Kill Devil Hills Pedestrian Plan include:

Outer Banks Kiwanis Club

Outer Banks Chamber of Commerce

Dare County Health Department

Local neighborhoods groups

Dare County School System

Local Parent Teacher Associations (PTAs)

Town of Kill Devil Hills Police Department

Dare County Sheriff's Office

Local Lions and Rotary Clubs

Albermarle Region R Council of Governments

Local business owners

Section 6. Implementation Plan

6.1 Introduction and Purpose

Section 6 contains recommended changes to the Town of Kill Devil Hill's public rights-of-way that will create a safe, accessible, and connected system of walkways. The main types of recommendations in this section include sidewalks, greenways / multi-use trails, and street crossing improvements. The intent of the Plan is to provide guidance for making Kill Devil Hills a more pedestrian-friendly community.

This section summarizes implementation strategies for the Town of Kill Devil Hills.
Short-term = 10 years
Long-term = more than 10 years

Purpose. The Pedestrian Plan serves several purposes including:

- Promote a better understanding of the measures that can be taken to create a safer and more pleasant walking environment;
- Identify in the Plan a clear schedule of projects, programs, and policies that Kill Devil Hills and partnering agencies can provide to improve the walking environment; and
- Create awareness of the positive effects of walking, including but not limited to:
  - a reliable substitute for some trips being made by private auto now;
  - contribute to a healthier lifestyle; and
  - reduce carbon and other emissions associated with motorized travel.

The Plan recommends facilities, programs and policies that will support a pedestrian-friendly culture and help to further improve local walking conditions. The results of the Plan will be a safe, accessible pedestrian system that includes sidewalks, multi-use pathways and safe intersections, in addition to programs and policies that encourage residents and visitors alike to walk for health, recreation, fitness, cost-savings and basic transportation.

The Plan identifies the needs of Kill Devil Hills's varied population, including those of current and future residents, businesses, and tourists. The benefits of the Plan vary, including improved air quality, a healthier and more physically active population, easier access to more places, reduced traffic congestion, and improved pedestrian safety for all citizens and visitors. All of these benefits amount to an overall improvement in quality of life to make the community attractive to newcomers and visitors, thus boosting the town's economy and vitality.

Adopting the Pedestrian Plan is the first step toward a walkable community. Implementation of the Pedestrian Plan will require a coordinated effort among Town officials, community leaders, and citizen volunteers. This section provides action steps for moving forward with the Plan, as well as potential funding sources and partners for proposed projects. Additionally, this section identifies a phased implementation schedule that considers priority and cost with the goal of creating a pedestrian-friendly community. Priorities are based on spreading projects across the community in each phase, but pursuing connectivity and utility of each project so that it connects people with places.

6.2 Action Steps

Completing the following action steps will help guide the development of the pedestrian network, and create a supportive program and policy environment.

1) **Adopt this Plan**. Adoption of the Plan will be the first step. Once adopted, the Plan should be forwarded to County, regional and State decision-makers, such as Dare County, Albermarle COG and RPO, and NCDOT Division One office, for inclusion in regional planning and project development processes.

2) **Form a Pedestrian and Bicycle Advisory Committee**. Building on the momentum to keep citizens engaged in a permanent, standing committee structure will allow continued citizen involvement in the Plan's implementation.

3) **Secure funding for top priority projects**. For Kill Devil Hills to become pedestrian-friendly, it must have the priorities and funding available to proceed with implementation. The Town should secure funding for implementation of several high-priority projects and develop a long-term funding strategy. This will reinforce the commitment to the Plan and reaffirm to residents that the Plan is moving forward.

4) **Begin work on top priority projects listed in Section 6.3**. In addition to committing local funds to high-priority projects in the Pedestrian Plan, the Town is in a position to work with NCDOT on a local Safe Routes to School (SRTS) project and/or seek other State, national or private funding sources for continued, long-term success in implementing the Plan.

5) **Adopt ordinance that support the goals of the Pedestrian Plan**. Proposed ordinance changes that will be important to balance the public / private burden of implementing the Pedestrian Plan are listed in Section 5 and below in Section 6.3 These include requiring sidewalks and multi-use trail easements in new development projects.

6) **Embark on complementary planning efforts.** The Town should incorporate the recommendations of the Pedestrian Plan into future and existing Plans developed at the local level. For instance, the recommendations of the Pedestrian Plan should be incorporated into the Comprehensive Plan and into future small area plans for districts within Kill Devil Hills. Kill Devil Hills should continue to coordinate planning activities with neighboring towns and Dare County to encourage connected facilities.

7) **Develop supportive education, encouragement and enforcement programs.** A variety of programs should also be implemented to create and support a pedestrian-friendly culture. Programs and policy priorities should be implemented along with facility projects.

6.3 Project, Program, and Policy Implementation

Summary of Recommendations

Tables 6.1, 6.2, 6.3 and 6.4 summarize specific policy, program and project recommendations that have been made in order of short and long-term time frames. Each table should be used by the Town as a flexible framework for implementing the recommendations in the Plan – recognizing that it is important to capitalize on unexpected opportunities while also pursuing long-term goals. In general, the Town should consider working with a wide range of partners such as those listed in Section 6.4 to implement various elements of the Plan and conduct periodic evaluations of projects, policies and programs after implementation.

Sidewalks – the recommended sidewalks in Kill Devil Hills are shown in Map 6.1. They connect to destinations throughout the community by extending the existing sidewalk network.

- *Sidewalks in Kill Devil Hills should be a minimum of 5 feet in width and, where possible, should include a five-foot wide landscaped buffer between the sidewalk and roadway curb-and-gutter.*
- *Sidewalks along Croatan Highway (US 158) should be a minimum of 6 feet in width and, where possible, should include a ten-foot wide landscaped buffer.*

Multi-use Trails – designed to accommodate a variety of trail users including bicyclists, walkers, hikers, joggers, wheelchair users, and skaters.

- *Multi-use Trails in Kill Devil Hills should be a minimum of 10 feet in width.*
- *Surface types vary according to use, but paved asphalt is standard for trails accommodating bicyclists and other wheeled users; an 18-inch strip of gravel on each side of paved trails is recommended to accommodate walkers and runners who prefer a softer trail surface.*

Pedestrian-friendly Street Crossings – This Plan identifies street crossings that are in need of minor to significant improvements.

- *Crossings that link to sidewalk on each side should possess curb cuts with ramps and marked crosswalks.*
- *Busy intersections could have a variety of improvements, such as countdown signals, curbed refuge islands in the median, and curb extensions.*

Some of these treatments have been proven to reduce crashes.

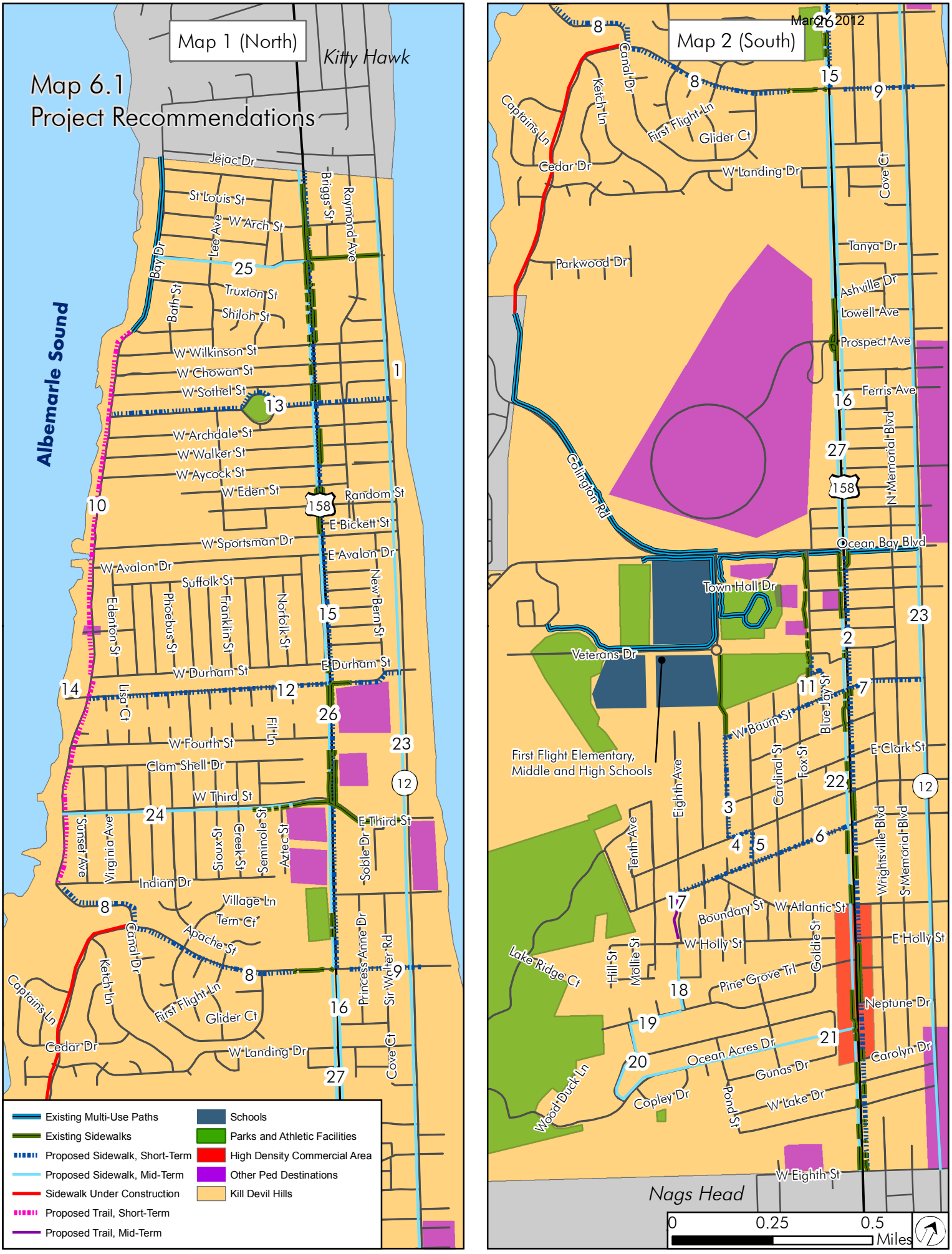

Map 1 (North)
Map 2 (South)
Map 6.1
Project Recommendations
Kitty Hawk
Albemarle Sound
Nags Head
March 26 2012
Jejac Dr
St Louis St
W Arch St
Lee Ave
Bay Dr
Bath St
Truxton St
Shiloh St
Briggs St
Raymond Ave
W Wilkinson St
W Chowan St
W Sothel St
W Archdale St
W Walker St
W Aycock St
W Eden St
Random St
E Bickett St
W Sportsman Dr
E Avalon Dr
W Avalon Dr
Suffolk St
Edenton St
Phoebus St
Franklin St
Norfolk St
New Bern St
W Durham St
E Durham St
Lisa Ct
Fil Ln
W Fourth St
Clam Shell Dr
W Third St
E Third St
Sunset Ave
Virginia Ave
Sioux St
Creek St
Seminole St
Aztec St
Soble Dr
Indian Dr
Village Ln
Tern Ct
Apache St
Princess Anne Dr
Sir Walter Rd
Canal Dr
Ketch Ln
Captains Ln
First Flight Ln
Glider Ct
Cedar Dr
W Landing Dr
Cove Ct
Parkwood Dr
Tanya Dr
Ashville Dr
Lowell Ave
Prospect Ave
Ferris Ave
N Memorial Blvd
Colington Rd
Ocean Bay Blvd
Town Hall Dr
Veterans Dr
First Flight Elementary,
Middle and High Schools
Blue Jay St
W Baum St
E Clark St
Cardinal St
Fox St
Eighth Ave
Tenth Ave
Wrightsville Blvd
S Memorial Blvd
Boundary St
W Atlantic St
E Holly St
W Holly St
Hill St
Mollie St
Goldie St
Lake Ridge Ct
Pine Grove Trl
Neptune Dr
Ocean Acres Dr
Gunas Dr
Carolyn Dr
Copley Dr
Pond St
W Lake Dr
Wood Duck Ln
W Eighth St
158
Existing Multi-Use Paths
Existing Sidewalks
Proposed Sidewalk, Short-Term
Proposed Sidewalk, Mid-Term
Sidewalk Under Construction
Proposed Trail, Short-Term
Proposed Trail, Mid-Term
Schools
Parks and Athletic Facilities
High Density Commercial Area
Other Ped Destinations
Kill Devil Hills
0
0.25
0.5
Miles

Table 6.1. Short-term (within 10 years) Project Recommendations

SHORT-TERM PROJECT RECOMMENDATIONS					
Map ID	Schedule	Location	Type	Length (in miles)	Construction Cost (2011 $)
1	**Short**	Install streetlights at pedestrian crosswalks on NC 12 at: Fifth St, Woodmere Av, Calvin St, and Neptune Dr. Relocate existing streetlights to position directly at crossings on NC 12 at: Hayman Blvd, Avalon Dr, Third St, and First St.	Street-lights	n/a	To be determined
2	**Short**	US 158 east side: Ocean Bay Blvd to Eighth Street	Sidewalk	0.438	$250,000
3	**Short**	Sixth Ave one side: Baum St. to Airstrip Rd.	Sidewalk	0.333	150,000
4	**Short**	Airstrip Rd one side: Sixth Ave. to Swan St.	Sidewalk	0.065	30,000
5	**Short**	Swan St one side: Airstrip Rd. to Martin St.	Sidewalk	0.083	35,000
6	**Short**	Martin St one side: Eighth Ave. to NC 12	Sidewalk	0.67	300,000
7	**Short**	Baum St. one side: Sixth Ave. to NC 12	Sidewalk	0.32	145,000
8	**Short**	W. First St one side: Canal Drive to US 158 and Canal Drive one side: W. First St. to Indian Drive	Sidewalk	0.6	650,000
9	**Short**	E. First St south side: US 158 to NC 12	Sidewalk	0.237	107,000
10	**Short**	Bay Dr. trail: Nixonton St. to Avalon Drive	Trail	0.60	240,000
11	**Short**	Blue Jay St: Baum St. to Hillside Dr. & Hillside Dr: Blue Jay St. to Mustian St.	Sidewalk	0.32	145,000
		See Table 6.2 for Map ID numbers 12 and 13			
14	**Short**	Bay Dr. trail: Avalon Dr. to Third St.	Trail	0.63	250,000
15	**Short**	US 158 east side: Kitty Hawk limit to First St.	Sidewalk	0.850	390,000
			Subtotal	5.1	$ 2.69 Million

Note: projects are not in priority order or in sequence of construction

Table 6.2. Long-term (10 or more years) Project Recommendations

LONG-TERM PROJECT RECOMMENDATIONS					
Map ID	Schedule	Location	Type	Length (in miles)	Construction Cost (2011 $)
12	**Long**	Fifth St. south side: Bay Dr. to NC 12	Sidewalk	0.855	385,000
13	**Long**	Hayman Blvd one side: Bay Dr. to US 158	Sidewalk	0.507	230,000
16	**Long**	US 158 east side: First St. to Ocean Bay Blvd.	Sidewalk	0.941	$ 380,000
17	**Long**	Build Trail extending Eighth Avenue: Martin to Holly St.	Trail	0.116	60,000
18	**Long**	Shay St. one side: Holly St. to Quail Lane	Sidewalk	0.167	75,000
19	**Long**	Quail Ln. one side: Shay St. to Heather Ln.	Sidewalk	0.145	65,000
20	**Long**	Heather Ln. one side: Quail Ln. to Ocean Acres Dr.	Sidewalk	0.087	40,000
21	**Long**	Ocean Acres Dr one side: Heather Ln. to US 158	Sidewalk	0.65	305,000
22	**Long**	US 158 west side: Colington Rd. to Eighth St.	Sidewalk	0.669	305,000
23	**Long**	Build curb/gutter/sidewalk on one side NC 12: Kitty Hawk limit to Eighth Street	Sidewalk	4.75	$2.2 million
24	**Long**	Third St. one side: Bay Dr. to US 158	Sidewalk	0.424	190,000
25	**Long**	Helga St. one side: Bay Dr. to US 158	Sidewalk	0.337	150,000
26	**Long**	US 158 west side: Kitty Hawk limit to First St.	Sidewalk	1.154	450,000
27	**Long**	US 158 west side: First St. to Colington Rd.	Sidewalk	0.983	335,000
			Subtotal	10.8	$ 2.65 Million

Table 6.3. Recommended Policy Changes

POLICY CHANGES	
Description	**Type**
Adopt a Complete Streets policy	Policy/Ordinance
Develop Sidewalk & Multi-use Path Requirements including Street Crossings	Planning Effort/Ordinance
Modify Curb Ramp Design Standards to Meet ADA Requirements	Policy/Ordinance
Establish Policy & Ordinance for Local School Zone Improvements	Policy/Ordinance
Modify Land Use Ordinance to facilitate mixed-use as a special use in specific districts within Kill Devil Hills	Local Ordinance
Establish Parking Lot Design Standards for Pedestrian Access	Local Ordinance
Update Recreation Facility Master Plan	Planning Effort
Establish Pedestrian & Bicycle Advisory Committee	Planning Effort
Establish Sidewalk/Crosswalk/Greenway Maintenance Program	Internal Policy
Establish Sidewalk Petition Process	Internal Policy
Establish Pedestrian-friendly Overlay Districts	Planning Effort/Ordinance
Driveway access management policy	Ordinance

Table 6.4. Recommended Programs

PROGRAMS		
Description	**Type**	**Potential Partners**
Safe Routes to School: Walking School Bus	Education / encouragement	Dare County School District, PTA
Pedestrian law update / online training for Town Police	Training	Governors Highway Safety Program, NCDOT Division of Bicycle and Pedestrian Transportation
Senior Games at Aviation Park	Encouragement	Healthy Carolinians, lead

System Plan – Map 6.1 shows the recommended sidewalk and path system for Kill Devil Hills. The system map extends and connects existing sidewalk and trails to close gaps, serve destinations, and create an interconnected network of walkways for residents and visitors. As shown in Figure 6.1, the ultimate plan, when complete, will form a hybrid grid system of walkways along the following corridors:

Streets Connecting to Other Towns:

Croatan Highway (US 158) – about 4 miles of sidewalk currently exist along US 158 which covers less than 50% of the recommended distance (interconnected sidewalks the length of Kill Devil Hills on both sides). There are numerous gaps in existing sidewalks along both sides of US 158. There are many destinations along Croatan Highway for pedestrians, including retail stores, restaurants, bars. Repairs are recommended to damaged sections of US 158 sidewalk. In addition, Table 6.3 lists six separate projects for US 158 sidewalks and one new traffic signal.

The recommended priorities on Croatan Highway (US 158) are as follows:

1. Build/repair/close gaps in sidewalk on east side to serve combination of visitors and residents.
2. Begin with south end of town (south of Ocean Bay Boulevard), then the north end of town (north of First Street), followed by the central part of town (First Street to Ocean Bay Boulevard)
3. Reconstruct wheelchair curb ramps to meet ADA standards as part of each sidewalk section contract.
4. Install with consistency high-visibility crosswalk markings and pedestrian countdown signals as part of each sidewalk section contract.

Croatan Highway (US 158) Recommendation: full sidewalks, wheelchair ramps, street crossings on both sides of US 158 from the town limits at Nags Head to Kitty Hawk. The construction cost (estimated in 2011 dollars) is $2.3 million. The cost will be higher if it is built in multi-year phases as recommended. Cost figures presented in this report are purely planning level, order-of-magnitude estimates of construction cost for the current year. They do not include right-of-way, utilities, financing (debt), survey, design, or environmental mitigation. The estimator does not control the cost of construction materials nor does it have influence over the prices charged by private, independent contractors.

(Corresponding Map 6.1 ID numbers are: 2, 15, 16, 22, 26, 27)

These projects serve as a means of completing a patchwork of existing sidewalks along US 158. Once these projects have been constructed a complete sidewalk infrastructure will exist along US 158 through Kill Devil Hills. The purpose and importance of these projects as a whole is to enhance pedestrian safety and encourage alternative means of transportation.

Virginia Dare Trail (NC 12): in addition to the NC 12 bike path, build a 4.5 mile long sidewalk on one side of NC 12 from the town limits at Nags Head to Kitty Hawk. The sidewalk would be separated from the paved bike path by a curb. The construction cost (in 2011 dollars) is $2.2 million.

Parallel Route: a 1.7 mile long route that is between, and parallel to, US 158 and NC 12 is Carolyn Drive/Memorial Boulevard. To enhance the safety of pedestrians and reduce travel time for cyclists, stop signs could be installed on cross (east-west) streets. A northern terminus could be connected to NC 12 via a new easement (only for non-motorized travel) linking Memorial Boulevard with NC 12 at Woodmere Avenue.

- Carolyn Drive: NC 12 to Memorial Boulevard (a distance of about 350 feet)
- Memorial Boulevard: Carolyn Drive to Woodmere Avenue

Virginia Dare Trail (NC 12) Recommendations – several unprotected street crossings across the Virginia Dare Trail could be improved for pedestrian safety during evening, night and early morning periods with adjustments, relocations and installation of some new streetlights. Several crossings have no light; these are on NC 12 at Fifth Street, Woodmere Avenue, Calvin Street, and Neptune Drive. Several crossings have a streetlight nearby, but additional luminence could be shed on the actual crosswalk if the pole/light were relocated; these are near: Hayman Boulevard, Avalon Drive, Third Street and First Street.

(Corresponding Map 6.1 ID numbers are: 1, 23)

This single project will create a sidewalk along NC 12 through the entire length of the Town. In addition to creating a dedicated pedestrian facility along Virginia Dare Trail it will also connect to several East/West routes in an effort to create a complete pedestrian network.

Bay Drive: multi-use trail that will connect the town limit at Kitty Hawk with neighborhoods and the Wrights Brothers multi-use trail.

(Corresponding Map 6.1 ID numbers are: 8, 10, 14)

These projects are the final phases of a complete multi-use path along Bay Drive. The importance of this path is to provide a recreational facility through neighborhoods in addition to connecting to both existing and proposed East/West connectors, paths, and sidewalks in an effort to create a complete network of pedestrian oriented facilities. On a large scale, this project will complete the 16-mile Wright Brothers Bikeway by connecting a path system from Kitty Hawk to Whalebone Junction in Nags Head. Also, on a Town scale this will provide connectivity for northern neighborhoods to schools, County recreation facilities, and the public library.

East-west streets connecting bay and beach within Kill Devil Hills: these projects connect origins and destinations on opposite sides of US 158 by creating linkages at appropriate intersections. The completion of these individual projects will also enhance pedestrian safety for both visitors and locals by providing dedicated routes across US 158 to the beach as an alternative mode of transportation.

(Corresponding Map 6.1 ID numbers are: 6, 7, 8, 9, 12, 13, 24, 25)

W. Arch Street / E. Helga Street - sidewalk is recommended to be built on one side of West Arch Street between Bay Drive and US 158. To travel to and from the beach and bay, pedestrians can use the existing sidewalk on the west side of US 158 to access the signalized intersection at Helga Street / US 158 and the existing sidewalk on East Helga Street. These streets are less than one-quarter mile (a quarter-mile is typically a 5-minute walk) from the town limit at Kitty Hawk so they will serve residents living north of Wilkinson Street who want to access the beach at Helga or Arch Street public beach accesses or Kitty Hawk Bay at the Arch Street access. North-south access, perhaps along Lee Street, will be on low-speed, low-volume residential streets so sidewalks are not a cost-effective investment for any north-south streets in this part of town.

Hayman Boulevard – just one-half mile south of the Arch Street/Helga Street project is Hayman Boulevard. There is an existing public parking facility on East Hayman Boulevard serving beach visitors. There is also a public park, Hayman Park, west of US 158. There is a public access to Kitty Hawk Bay at Hayman Boulevard and Bay Drive. These three community facilities align sufficiently to recommend a sidewalk on one side of Hayman Boulevard to connect them. One key missing infrastructure element is a safe crossing of US 158. A new traffic signal is recommended in this Pedestrian Plan to serve all of these community facilities and to create a more acceptable spacing of signals along US 158 for pedestrians. Currently there is a one-mile spacing between signals at Helga / US 158 and at Fifth Street / US 158. This spacing results in a 20-minute addition to a pedestrians' walk time, which most would not be willing to do. The cost of a new signal with mast arms at Hayman Boulevard / US 158 is $180,000 in 2011 dollars. Approval would be necessary from the NCDOT Division 1 office.

Fifth Street - two-thirds of a mile south of Hayman Boulevard is Fifth Street. There is an existing traffic signal at Fifth Street / US 158 and an existing 5-foot wide concrete sidewalk on the south side, transitioning mid-block to the north side of East Fifth Street between US 158 and the Virginia Dare Trail (NC 12). It is recommended to build a sidewalk on the south side of West Fifth Street between the K-Mart sidewalk and NC 12. There are fewer driveway conflicts on the south side compared with the north side of West Fifth Street and sidewalk is already on the south side of East Fifth Street.

Third Street - less than one-third of a mile south of Fifth Street is Third Street. There is an existing traffic signal at Third Street / US 158 and an existing five-foot wide paved shoulder on the south side of Third Street connecting US 158 and NC 12. A sidewalk is recommended on one side of West Third Street connecting the retail centers on the west side of US 158 with Bay Drive.

First Street – It is recommended to build a sidewalk on one side of West First Street that will connect all of the following: Wrights Brothers Multi-use Trail, US 158 and NC 12.

Prospect Avenue – It is recommended to build a sidewalk on one side of Prospect Avenue to create a key sidewalk connector between the National Wrights Brothers Memorial and a cluster of hotels along NC 12.

Ocean Bay Boulevard / Colington Road – there are existing sidepaths along these roads.

School Neighborhood: these projects connect neighborhoods south of Baum Street to an existing network of sidewalks that primarily serve the First Flight Schools complex and destinations beyond. These extend and expand on the existing sidewalk infrastructure surrounding the First Flight Schools complex and create a network of connectivity for all neighborhoods south of Colington Road. The importance of these projects is to create a safe network of sidewalks, to connect the densely populated neighborhoods together and with the nearby school system, Dare County recreation facilities, and public library using alternative transportation.

(Corresponding Map 6.1 ID numbers are: 3, 4, 5, 11)

Mustian Street / Hillside Drive / Blue Jay Street / Baum Street – It is recommended to build a sidewalk with curb and gutter on one side of segments of these streets, as shown on Map 6.1, to connect residential neighborhoods with community facilities including the Dare County Recreation Center, library, senior center, Post Office, Aviation Park, three schools, Town Hall and the Outer Banks Chamber of Commerce (Visitors Center).

Safe Routes to School Projects: build sidewalk along one side of Sixth Avenue, Airstrip Road, Swan Street, Martin Street, Baum Street in the short-term to provide a safer route to First Flight Elementary, Middle and High Schools. These projects will extend the benefit of the existing sidewalk along Sixth Avenue that connects the schools with Sixth Avenue at Baum Street.

(Corresponding Map 6.1 ID numbers are: 17, 18, 19, 20 and 21)

Sixth Avenue / Airstrip Road/ Swan Street / Martin Street / Shay Street / Quail Lane / Heather Lane – It is recommended to build a sidewalk with curb and gutter on one side of various short street segments to zig-zag strategically through residential neighborhoods, as shown on Map 6.1, that will connect to the sidewalk on Sixth Avenue leading to the three public schools: First Flight Elementary, Middle and High Schools.

Ocean Acres Drive – It is recommended to build a sidewalk with curb and gutter on one side of Ocean Acres Drive to connect residential neighborhoods with restaurants and other retail outlets along US 158 and NC 12 plus, eventually, to the nature preserve at the west end of Ocean Acres Drive.

Policy Recommendations

Complete Streets Policy – The North Carolina Board of Transportation adopted a Complete Streets Policy in 2009 directing the Department of Transportation to consider the needs of all users of the transportation system including pedestrians, bicyclists, transit patrons as well as motorists and truck drivers. In 2011 NCDOT released a draft Complete Streets Planning and Design Guide for public review and comment. It would be appropriate for the Town of Kill Devil Hills to consider adopting a resolution or an ordinance in support of complete streets.

Sidewalk, Multi-use Path and Street Crossings Requirement – Site developments should be responsible for building sidewalk or multi-use paths along their frontage and short segments adjacent to their site if needed to close a gap in the pathway network. Street crossings such as crosswalks and pedestrian signal heads and countdown signals may be appropriate to require of some developers based on proximity to the intersection and the amount of use for the crossing that would be generated by the development.

Modify Design Standards to Meet or Exceed ADA – the Americans with Disabilities Act (of 1991) led to the issuance of design guidelines ("ADA Accessibility Guidelines" or ADAAG) and now "Proposed Accessibility Guidelines for Pedestrians in the Public Right-of-way" (PROWAC). There are significant differences between these documents. The Town should prepare a Transition Plan to document the resources it plans to allocate and the timetable for doing so to eliminate the deficiencies relative to the minimum (ADAAG) or desirable condition (PROWAG).

Local School Zone Improvements – public schools are clustered in one area. A recent law enacted by the State of North Carolina will increase fines and penalties for exceeding the speed limit in a properly signed and marked school zone.

Facilitate Mixed-use Development/Redevelopment – mixed-use developments, particularly those with buildings that are in close proximity to each other, generate more pedestrian travel compared with single-use developments. The Land Use ordinance should be reviewed to assess what, if any, changes could be accepted that would facilitate a more effective mix of uses.

Parking Lot Design Standards - there are several big parking lots in Kill Devil Hills that do not provide walkways for people to travel between their parking space and the building entrance. Design standards could be adopted for redevelopment projects that would require a walkway in any new parking lot that has three or more parking bays. The walkway should be aligned toward the front entrance of the building.

Recreation Facility Master Plan Update – the Master Plan provides a natural link to the planning of sites and facilities that generate pedestrian travel. Following adoption of the Pedestrian Plan, it may be appropriate for the Town to revisit the Recreation Facility Master Plan.

Advisory Committee – other cities and towns in North Carolina have benefitted from citizen volunteer involvement that is well-organized and structured. Advocacy, education, and encouragement efforts can all be realized working through an established committee. The

committee could serve in an advisory role to the Board of Commissioners with regularly scheduled reports from the committee.

Maintenance Program – resources to maintain sidewalks and multi-use paths should be planned and programmed as regular line items in the Town budget.

Overlay districts – establishing an overlay district for a portion of a corridor or the entire length of a corridor that is, or likely is to be frequented by pedestrian travel, can be used to require developers to implement pedestrian-oriented streetscapes. Pedestrian-level lighting, adequate sidewalks and edges can all be included in an overlay district.

Driveway Access Management – NCDOT regulates driveways on state-owned roads (US 158 and NC 12 in Kill Devil Hills). The Town may want to consider adapting the NCDOT policy contained in "Street and Driveway Access to North Carolina Highways" for local use on non-State owned streets.

6.4 Partnership Opportunities

Many of the education, encouragement and enforcement programs will be carried out by partnerships between Town departments, local nonprofit and civic organizations, business owners, developers and others. Creating strong partners in the town-wide effort to improve pedestrian safety and increase walkability will help spread the word and awareness of the importance of walking in the community, as well as lead to programs that can withstand the test of time.

Potential partners for implementation of the Kill Devil Hills Pedestrian Plan include:

- Outer Banks Chamber of Commerce
- Dare County Health Department
- Local neighborhoods groups
- Dare County School System
- Local Parent Teacher Associations (PTAs)
- Town of Kill Devil Hills Police Department
- Dare County Sheriff's Office
- Local Kiwanis, Lions and Rotary Clubs
- Albermarle Region R Council of Governments
- Local business owners

6.5 Program Evaluation

Evaluation is a useful tool for measuring local progress after the adoption of a Plan. Following up on program activities to verify successes and make changes as needed, and tracking key indicators such as crash statistics, can help provide a focus for future implementation and re-evaluate new needs. It is recommended that the Town of Kill Devil Hills consider working with

a citizen committee, such as the proposed new Bicycle/Pedestrian Committee to help implement the Plan, track successes, re-evaluate needs and help to conduct future Plan updates. Key indicators that Town staff, citizens and committee members might track include:

- Number of students walking/biking to school
- Records of pedestrian collisions in Kill Devil Hills
- Participation in programs, such as the Safe Routes to Schools Program
- Database of sidewalk, trail & intersection improvements and conditions

6.6 Funding

Pedestrian facilities are constructed – and therefore funded – through a number of avenues. Funding can be divided into four categories: local, state, federal, and private funding. The following paragraphs describe some of the more prominent sources in each category. Kill Devil Hills should tap into all of these sources, and search for others as well, in order to take advantage of the funds available.

Local Funding

Currently, Kill Devil Hills spends between $500,000 and $1 million annually for street improvements, which may include pedestrian improvements. In the future, Kill Devil Hills may wish to consider creating a specific annual budget item to set aside funds for improving pedestrian facilities, especially "spot improvements" to the local sidewalk network. A specific budget item is the most direct way to ensure that funding for pedestrian facilities is available, but often a town's budget may be too limited to finance this work. Pedestrian facilities can also be built through "incidental" projects, by ensuring that such features are constructed with any new projects or improvements, such as parks and recreation facilities, libraries, schools, roadway reconstruction, and new roads. In addition, future private development should be reviewed for adequate pedestrian access and connections. As discussed in the policy recommendations of Section 5: Programs and Policy Recommendations, this may mean the Town should require developers to install sidewalk with new construction.

Municipalities also often plan for the funding of pedestrian facilities or improvements through development of Capital Improvement Programs (CIP). 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 is 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 town-wide 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 (TIF) 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 increased 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. While not carrying the long history of TIF actions as do other states like South Carolina, North Carolina can legally use this mechanism now.

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 Florida residents 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 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.

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. 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. This is an existing source, through the Dare County Tourism Board which has already funded many miles of multi-use trail in Kill Devil Hills.

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. Trail 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 discharges 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 impact fees through local enabling legislation granted by the NC State Legislature. 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 Kill Devil Hills is interested in pursuing 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 trail or pedestrian facility that crosses through the property, or adjacent to the property being developed.

Payment In-Lieu Fees. As an alternative to requiring developers to dedicate on-site sidewalk or 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 payment in-lieu fees. This alternative allows the community 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 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).

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 methodology and will explore implementation strategies. The municipality can manage maintenance responsibilities either through its own staff or through private contractors.

State Transportation Funding

The North Carolina Department of Transportation (NCDOT) is the single largest source of funding available to Kill Devil Hills for pedestrian facilities, with the following potential funding sources:

State Transportation Improvement Program (STIP) – This program is the overall funding source for study, design, and construction of major transportation projects, including pedestrian facilities, in the state. Frequently, projects funded by the STIP are also partly funded by other sources, including matching funds from local municipalities. Pedestrian facilities are eligible for funding from this program as independent projects separate from a roadway construction, widening, or some other sort of roadway work, but one of the most cost-effective and efficient ways to gain funding for pedestrian facility construction is to incorporate them as incidental to a larger project. Overall, most pedestrian accommodations within the state are made as incidental improvements.

In North Carolina, the Department of Transportation, Division of Bicycle and Pedestrian Transportation (DBPT, or "Division") manages the Transportation Improvement Program (TIP) selection process for independent bicycle and pedestrian projects. Projects programmed into the TIP as "independent projects" are those which are not related to a scheduled highway project. "Incidental projects" – those related to a scheduled highway project – are bicycle and pedestrian accommodations, such as sidewalks, included as incidental features of highway projects. 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.

The DBPT has historically had an annual budget of approximately six million dollars, although the level of this funding is subject to change depending on the deliberations of the NC Board of Transportation. Eighty percent (80%) of these funds are typically from federal Surface Transportation Program Enhancement funds while the State Highway Trust Fund provides the remaining 20 percent of the funding. Each year, the DBPT regularly sets aside a total of $200,000 of TIP funding for NCDOT 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.

A total of $5.3 million dollars of TIP funding is typically available for funding various bicycle and pedestrian independent projects, including the construction of multi-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/bikeped/ funding/default.html.

Transportation Enhancement Program - 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:

- Bicycle and Pedestrian Facilities
- Bicycle and Pedestrian Safety
- Acquisition of Scenic Easements, Scenic or Historic Sites
- Scenic or Historic Highway Programs (including tourist or welcome centers)
- Landscaping and other Scenic Beautification
- Historic Preservation
- Rehabilitation of Historic Transportation Facilities
- Preservation of Abandoned Rail Corridors
- Control of Outdoor Advertising
- Archaeological Planning and Research
- Environmental Mitigation
- 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 next call has not been scheduled; in fact, these monies are at risk given the current State budget shortfall. In fiscal year 2010-2011 NCDOT reprogrammed these funds to pay for highway landscaping. For more information, visit: www.ncdot.org/programs/Enhancement.

Spot Improvement Program - The NCDOT Bicycle and Pedestrian Transportation Division budgets $500,000/year for "spot" safety improvements throughout the State. These improvements include items such as signing, grate replacement, bike rack installations, hazard remediation at skewed railroad crossings, and other small-scale improvements. The Spot Improvement Program is used only for bicycle and pedestrian projects; however, it should not be viewed as a priority source for funding identified projects. It is typically used for small-scale and special-situation projects that are not of a significantly large enough scale to merit being a TIP project. Taking these requirements into consideration, proposals for projects should be submitted directly to the Bicycle & Pedestrian Transportation Division.

Small Urban Funds – 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.

High Hazard Elimination Program – 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.

Powell Bill Funds – 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/programs/Powell_Bill.

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 which have predominately been enforcement 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 2012 GHSP grant anytime until March 31, 2011, 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/.

Sidewalk Program – Each year, a total of $1.4 million in federal Surface Transportation Program Enhancement funding is set aside for sidewalk construction, maintenance and repair. Each of the 14 highway divisions across the state receives $100,000 annually 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.

Safe Routes to School Program – 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. NCDOT is charged with disseminating SRTS funding. The State of North Carolina allocated $15 million in Safe Routes to School funding for fiscal years 2005 through 2009 for infrastructure or non-infrastructure projects. The next allocation is pending reauthorization of the federal transportation act. 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/safety/safeRoutes or contact the DBPT / NCDOT at (919) 707-2604.

Other State Funding Sources

Several other North Carolina-sponsored opportunities for acquiring planning, design, and / or construction monies are available through state-level institutions that are not associated with the Department of Transportation. These opportunities are described briefly below.

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.onencnaturally.org/pages/conservationtaxcredit.html.

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 2010 is $862,000 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: www.ncparks.gov/about/grants/lwcf_main or contact John Poole at (919) 715-2662 or by e-mail: John.Poole@ncdenr.gov.

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 January. For more information, visit: http://www.ncparks.gov/about/grants/trails_main.php.

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://www.ncparks.gov/about/trails_main.php. Applications are due during the month of January, however the current federal transportation program expires in 2010 and Congress has not reauthorized the six-year program. For more information, call (919) 715-8699. Also see http://www.fhwa.gov/environment/rectrails/

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. PARTF funds are allocated through the North Carolina Trails Program to help fund beach accesses, state trail systems, and local trail construction efforts. 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. Only about 30% of the PARTF program goes to fund local trail programs, and the selection process is therefore highly competitive. Selection is based on numerous factors including geographic equity, population size, and scoring criteria that notably incorporate the following: presence of planning documents that support the project; public outreach that shows support; site suitability; size/impact of project; and commitment to operating and maintaining the project upon completion. As with most grant programs, the sponsor should be prepared to adhere closely to the rules governing the grant program, including the preparation of detailed expenditure reports and requests for reimbursement (www.ncparks.gov/About/grants/partf_main.php). For information on how to apply, visit: www.partf.net/learn.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 2010-2011 adopted state budget for North Carolina includes $50 million for the Clean Water Management Trust Fund. 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.onencnaturally.org/pages/conservationtaxcredit.html.

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. Grants range from $1,000 to $15,000. 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.ncforestservice.gov/urban/ urban_grant_overview.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**.

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. Local matching funds equal to 50 percent are required. For more information, visit www.ncwater.org/Financial_Assistance or e-mail Jeff Bruton at Jeff.Bruton@ncdenr.org. Mr. Bruton's phone number is 919-715-0387.

Small 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, contact Gary.A.Dimmick@hud.gov or call him at (336) 547-4000 extension 2047 or visit www.hud.gov/offices/cpd/ communitydevelopment/programs/stateadmin.

Physical Activity in the Built Environment Policy Initiative Grants Program. Occasional grants appear on a non-recurring basis, such as this one sponsored by the NC Department of Public Health for a fifteen-month period beginning in Fiscal Year 2010-2011. These grants, based on availability of funds, will be awarded through a competitive application process to municipalities to develop policy initiatives that help shape state policy as it relates to physical activity and health. The Physical Activity and Nutrition (PAN) Branch in the North Carolina Division of Public Health will be responsible for the administration of these grant funds. Awards will be made to chartered municipalities of the State of North Carolina. Projects will be granted up to $24,999. The final number of awards is based on availability of funds. Funding for this Initiative comes from the American Recovery and Reinvestment Act (ARRA) award to North Carolina made by the Center for Disease Control and Prevention. For more information, visit www.eatsmartmovemorenc.com.

North Carolina Health and Wellness Trust Fund. The NC Health and Wellness Trust Fund (HWTF) was created by the General Assembly as one of three 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 HWTF and Blue Cross and Blue Shield of North Carolina (BCBSNC) established the Fit Community designation and grant program to recognize 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 physical activity, healthy eating and tobacco use prevention in communities, schools, and workplaces. Designations are 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 office will be provided), as well as the 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.

Federal Funding Sources

Federal transportation dollars are used for a number of the funding programs listed in Section 6.6.3, however other non-transportation programs are available through the federal government to fund pedestrian facilities, many of which are geared toward parks and recreation, natural resource conservation and environmental stewardship. These funding options are as follows:

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/

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.

Public Lands Highways Discretionary Fund. The Federal Highway Administration administers discretionary funding for projects that improve access to and within federal lands. Congress designated $83 million in fiscal year 2010 Public Lands Highways Discretionary funds for specific projects. Funding requests for future projects should be submitted by states as part of reauthorization of the federal transportation act. For information on how to apply, visit: http://www.fhwa.dot.gov/discretionary/plhcurrsola3.cfm or contact Anna Franzino at (202) 366-9488 or via e-mail: Anna.Franzino@dot.gov.

Private Funding and Partnerships

Another method of funding pedestrian systems and greenway trails is to partner with public agencies, private companies and/or not-for-profit organizations. Contrary to NCDOT and federal funding, most private funding sources offer limited grants. In addition, public-private 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" 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 multi-use paths or greenways. Name recognition for corporate partnerships could be accomplished through trailhead signage 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 an attorney involved in the process.

The following paragraphs provide descriptions of some private funding sources that Kill Devil Hills might consider.

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 from 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 asked 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. The 2010-2011 budget signed by the Governor includes $50 million for the Clean Water Management Trust Fund and $2 million for the Agricultural Development and Farmland Preservation Trust Fund. 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. 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. TPL's legal and real estate specialists work with landowners, government agencies, and community groups for the creation of urban parks and greenways, open space dedication, and land conservation. 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.

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. 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. The American

Hiking Society will consider project types such as acquisition of trails and trail corridors, building and maintaining and constituency building around specific trail projects including volunteer recruitment and support. The National Trails Fund 2010 application has closed. For more information on future applications for the National Trails fund grants, contact Heather Sable via e-mail: HSable@americanhiking.org or visit the website: www.americanhiking.org/alliance/fund.html.

Robert Wood Johnson Foundation Active Living By Design Awards. Active Living by Design is a national program of the Robert Wood Johnson Foundation and is administered by the UNC School of Public Health. The program establishes innovative approaches to increase physical activity through community design, public policies and communications strategies. Active Living by Design is funding 25 community partnerships across the country to demonstrate how changing community design will impact physical activity. Although funding is currently not available for additional communities, the Town of Kill Devil Hills should continue to monitor Active Living by Design as a potential funding source should the Town chose to make a commitment to healthy living. For more information, please see: http://www.rwjf.org/grants/

6.7 Conclusion

Using this plan as a guide, the Town of Kill Devil Hills should be able to create a better, safer network of sidewalks, greenway trails and crossings for pedestrians. The Town's next step is to address the short-term priority program, policy, and project recommendations. At the same time, the Town should also start to lay the groundwork for the longer-term recommendations by developing relationships with potential partners such as the Outer Banks Chamber of Commerce, and the Dare County Tourism Board, and by starting to budget for future projects. Most importantly, the Town should continue its efforts to raise awareness about the importance of making a community more walkable in order to continue to cultivate support for more pedestrian improvements and programs. Residents, visitors, and local leaders should be familiar with the economic, health, and environmental benefits of a community in which there is less dependence on automobiles and more reliance on foot travel as not only a form of recreation, but also as a form of transportation.

As a small town anticipating future growth and development, Kill Devil Hills is in an ideal situation to develop an even more walkable community. The Town should capitalize on its location and its attractions, such as core area with so many community facilities and coastal attractions, to reinforce its existing pedestrian infrastructure with new projects and improvements. With careful planning, deliberate steps and persistence, Kill Devil Hills can become a more pedestrian-friendly community.

Appendix A
Inventory of Existing Sidewalk Locations in Kill Devil Hills

West Side US 158 (from South to North)

	Sidewalk	No Sidewalk
8th Street-Fresh Pond Drive	+575 ft.	-52 ft.
Fresh Pond Drive-Lake Drive	+118 ft.	-100 ft
Lake Drive-Ocean Acres Drive	+352 ft.	-147 ft.
Ocean Acres Drive-Pine Grove Trail	+435 ft.	-285 ft.
Pine Grove Trail-Atlantic Street	+245 ft.	-350 ft.
Atlantic Street-Boundary Street	+270 ft.	0 ft.
Boundary Street-Martin Street	+317 ft.	-301 ft.
Martin Street-Airstrip Road	+0 ft.	-380 ft.
Airstrip Road-Clark Street	+275 ft.	-80 ft.
Clark Street-Corrigan Street	+70 ft.	-278 ft.
Corrigan Street-Baum Street	+380 ft.	0 ft.
Baum Street-St Clair Street	+435 ft.	-210 ft.
St Clair Street-Meadowlark Street	+88 ft.	-65 ft.
Meadowlark Street-Oregon Avenue	+192 ft.	0 ft.
Oregon Avenue-Carlton Avenue	+202 ft.	0 ft.
Carlton Avenue-Colington Road	+169 ft.	0 ft.
Colington Road-Porthole Court	+788 ft.	-3867 ft.
Porthole Court-Landing Drive	+0 ft.	-206 ft.
Landing Drive-First Street	+0 ft.	-965 ft.
First Street-Third Street	+298 ft.	-1479 ft.

West Side of US 158 (continued)

Third Street-Fourth Street	+476 ft.	-107 ft.
Fourth Street-Fifth Street	+296 ft.	-357 ft.
Fifth Street-Durham Street	+95 ft.	-107 ft.
Durham Street-Avalon Drive	+0 ft.	-1283 ft.
Avalon Drive-Sportsman Drive	+0 ft.	-185 ft.
Sportsman Drive-Palmetto Street	+204 ft.	-142 ft.
Palmetto Street-Eden Street	+212 ft.	0 ft.
Eden Street-Aycock Street	+204 ft.	0 ft.
Aycock Street-Walker Street	+0 ft.	-174 ft.
Walker Street-Archdale Street	+0 ft.	-175 ft.
Archdale Street-Hayman Blvd	+0 ft.	-148 ft.
Hayman Blvd-Sothel Street	+225 ft.	0 ft.
Sothel Street-Chowan Street	+170 ft.	0 ft
Chowan Street-Wilkinson Street	+0 ft.	-118 ft.
Wilkinson Street-Helga Street	+955 ft.	0 ft.
Helga Street-Arch Street	+400 ft.	0 ft.
Arch Street-Cameron Street	+550 ft.	0 ft.
Total:	8,901 ft.	11,709 ft.
	20,610 ft.	
	43%	57%

9 Blocks without any sidewalks
12 Blocks fully covered by a sidewalk
16 Blocks with partial sidewalk coverage

East Side US 158 South to North

	Sidewalk	No Sidewalk
Eighth Street-Fresh Pond Drive	+351 ft.	-202 ft.
Fresh Pond Drive-Lake Drive	+88 ft.	-107 ft.
Lake Drive-Carolyn Drive	+220 ft.	-0 ft.
Carolyn Drive-Neptune Drive	+111 ft.	-322 ft.
Neptune Drive-Dean Street	+307 ft.	-0 ft.
Dean Street-Holly Street	+341 ft.	-0 ft.
Holly Street-Atlantic Street	+0 ft.	-336 ft.
Atlantic Street-Martin Street	+309 ft.	-529 ft.
Martin Street-Calvin Street	+367 ft.	-0 ft.
Calvin Street-Clark Street	+126 ft.	-221 ft.
Clark Street-Corrigan Street	+0 ft.	-360 ft.
Corrigan Street-Baum Street	+108 ft.	-220 ft.
Baum Street-Goddard Avenue	+473 ft.	-0 ft.
Goodard Avenue-St Clair Street	+0 ft.	-202 ft.
St Clair Street-Meadowlark Street	+0 ft.	-221 ft.
Meadowlark Street-Oregon Avenue	+0 ft.	-230 ft.
Oregon Avenue-Carlton Avenue	+0 ft.	-220 ft.
Carlton Avenue-Ocean Bay Blvd.	+256 ft.	-0 ft.
Ocean Bay Blvd.-Wright Avenue	+0 ft.	-230 ft.
Wright Avenue-Aviation Avenue	+0 ft.	-224 ft.
Aviation Avenue-Pinehurst Avenue	+0 ft.	-230 ft.

East side of US 158 (continued)

Pinehurst Avenue-Sutton Avenue	+0 ft.	-230 ft.
Sutton Avenue-Carlow Avenue	+0 ft.	-230 ft.
Carlow Avenue-Raleigh Avenue	+0 ft.	-230 ft.
Raleigh Avenue-Baker Avenue	+0 ft.	-230 ft.
Baker Avenue-Ferris Avenue	+0 ft.	-230 ft.
Ferris Avenue-Woodmere Avenue	+0 ft.	-220 ft.
Woodmere Avenue-Prospect Avenue	+0 ft.	-360 ft.
Prospect Avenue-Lowell Avenue	+0 ft.	-360 ft.
Lowell Avenue-Ashville Drive	+0 ft.	-193 ft.
Ashville Drive-Veelee Drive	+0 ft.	-373 ft.
Veelee Drive-Tanya Drive	+0 ft.	-236 ft.
Tanya Drive-Landing Drive	+0 ft.	-970 ft.
Landing Drive-Camellia Drive	+0 ft.	-265 ft.
Camellia Drive-First Street	+0 ft.	-675 ft.
First Street-Second Street	+0 ft.	-948 ft.
Second Street-Third Street	+0 ft.	-984 ft.
Third Street-Fifth Street	+1164 ft.	-306 ft.
Fifth Street-Durham Street	+0 ft.	-218 ft.
Durham Street-Charlotte Street	+0 ft.	-200 ft.
Charlotte Street-Greensboro Street	+0 ft.	-205 ft.
Greensboro Street-Greenville Street	+0 ft.	-205 ft.
Greenville Street-Rocky Mount Street	+0 ft.	-200 ft.

East side of US 158 (continued)

Rocky Mount Street-Wilson Street	+0 ft.	-200 ft.
Wilson Street-Avalon Drive	+0 ft.	-200 ft.
Avalon Drive-Sportsman Drive	+0 ft.	-205 ft.
Sportsman Drive-Bickett Street	+0 ft.	-119 ft.
Bickett Street-Palmetto Street	+0 ft.	-174 ft.
Palmetto Street-Eden Street	+112 ft.	-0 ft.
Eden Street-Aycock Street	+0 ft.	-149 ft.
Aycock Street-Walker Street	+200 ft.	-0 ft.
Walker Street-Archdale Street	+196 ft.	-0 ft.
Archdale Street-Hayman Blvd	+0 ft.	-200 ft.
Hayman Blvd.-Sothel Street	+215 ft.	-0 ft.
Sothel Street-Chowan Street	+0 ft.	-156 ft.
Chowan Street-Wilkinson Street	+69 ft.	-85 ft.
Wilkinson Street-Helga Street	+657 ft.	-160 ft.
Helga Street-Arch Street	+245 ft.	-153 ft.
Arch Street-Town Line	+0 ft.	-572 ft.
Total:	+5,915 ft.	-14,295 ft.
	20,210 ft.	
	29%	71%

39 Blocks without any sidewalks
10 Blocks fully covered by a sidewalk
10 Blocks with partial sidewalk coverage

Sidewalk Coverage along US 158

East Side of 158

Total:
5,915 feet of sidewalk for 29%
14,295 feet without sidewalk for 71%
39 Blocks without any sidewalks
10 Blocks fully covered with a sidewalk
10 Blocks with partial sidewalk coverage

West Side of 158

Total:
8,901 ft. feet of sidewalk for 43%
11,709 feet without sidewalks for 57%
9 Blocks without any sidewalks
12 Blocks fully covered by a sidewalk
16 Blocks with partial sidewalk coverage

East and West Sides of 158

Total:
14,816 feet of sidewalk for 36%
26,004 feet without sidewalks for 64%
48 Blocks without any sidewalks
22 Blocks fully covered by sidewalks
26 Blocks with partial sidewalk coverage

Ocean Bay Boulevard North

7,731 feet of sidewalk for 27%
20,438 feet without sidewalks for 73%
41 Blocks without any sidewalks
11 Blocks fully covered by a sidewalk
10 Blocks with partial sidewalk coverage

Ocean Bay Boulevard South
7,180 feet of sidewalk for 57%
5,418 feet without sidewalks for 43%
7 Blocks without any sidewalks
11 Blocks fully covered by a sidewalk
16 Blocks with partial sidewalk coverage