



TOWN OF KNIGHTDALE, NC

FINAL DRAFT DOCUMENT

11/16/12

COMPREHENSIVE PEDESTRIAN PLAN



WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS



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TOWN OF KNIGHTDALE, NC



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EXECUTIVE SUMMARY

OVERVIEW

The Town of Knightdale is located in Wake County, east of Raleigh, NC. The Town's proximity to the state's Capital, Research Triangle Park, US 264, I-540, and local universities, as well as its available amenities and available land have led to its increased growth in the past decades. The growing Town is home to numerous subdivisions and commercial developments, but development has largely occurred as land was acquired and without a unified growth plan. Shopping centers have developed along Business 64 (Knightdale Boulevard), creating a busy commercial corridor of disjointed commercial strips that are largely car-focused and unfriendly to pedestrians. Many of the outlying residential subdivisions have sidewalks within them, but limited pedestrian connections to the commercial centers and Town amenities, such as Town Hall, parks, the library, and schools.

The Town and citizens of Knightdale support the move towards a more pedestrian friendly community as shown in survey questionnaires and planning initiatives undertaken by the Town. The Town has added language to its Comprehensive Plan and Unified Development Ordinance (UDO) that support pedestrian friendly and pedestrian-oriented design initiatives. The Comprehensive Plan describes Design Districts which are used instead of typical Land Use designations. These Design Districts allow for a variety of uses within the same district that conform to Design Standards. This distinction allows for a mixture of uses, enhancing our ability to create walkable community nodes by bringing places where people live, work, and play closer together. The Design Standards in the Comprehensive Plan include a guideline specifically related



Sidewalk along Lynnwood Road shows a pleasant walk with trees through residential neighborhoods. (above); Sidewalk along US 64 shows a grass barrier between pedestrians and cars along a busy street. (below)



to pedestrians: “Pedestrian travel should be comprehensively planned to accommodate substantial on-site pedestrian activities as well as movement within and through the site.”

As part of this Comprehensive Pedestrian Plan, additional recommendations to the Unified Development Ordinance will be given to complement the existing guidelines and reinforce a pedestrian friendly community. These recommendations will be discussed in Section 8.2 of this document.



The community’s interest in creating a friendlier pedestrian network is apparent through public input at various Public Meetings where the desire for pedestrian friendly commercial areas, connected neighborhoods, and new sidewalks were noted. A commitment to implementing these improvements will help ensure that the Town grows in a direction that offers pedestrians an environment where walking is encouraged and supported.



Sidewalk along US 64 connects businesses and crosses driveway cuts (above); Sidewalk along Lynnwood Road shows prominent pedestrian crossing sign and marked crosswalk. (below)

VISION AND GOALS

With the help of a Bicycle and Pedestrian Planning Grant Initiative from the North Carolina Department of Transportation (NCDOT), the Town of Knightdale is moving closer toward making their vision for a pedestrian-friendly community a reality by developing a Comprehensive Pedestrian Master Plan. A steering committee comprised of community members and Town staff guided the Pedestrian Plan process and developed the Vision and Goals for the plan. In addition to five steering committee meetings, three public meetings were held, as well as a mapping workshop to gain valuable public input from the community.



Vision Statement:

The Knightdale Pedestrian Plan will create a healthier and more dynamic community by improving pedestrian safety and connectivity.

Goals:

- ◆ Provide walkways for people of all ages, regardless of physical condition.
- ◆ Provide safe access to walkways for residents and visitors and promote a feeling of safety and security through proper lighting and protection from vehicles, while providing emergency vehicle access.
- ◆ Promote health and wellness by providing walking facilities that connect to destinations and community assets, reducing the need to drive.
- ◆ Recommend safe methods and alternatives for pedestrian movement, including proper signage, lighting, and pedestrian crossing signals.
- ◆ Provide connections to other existing or planned transportation modes, reinforcing a seamless, multi-modal transit system that improves quality of life for residents and visitors to Knightdale.
- ◆ Provide interconnectivity between existing and proposed greenways, sidewalks, and bicycle routes throughout Knightdale.
- ◆ Consider cost implications of plan implementation and provide an estimate of probable cost for construction.
- ◆ Create a plan that can be used for future Town and regional planning and funding opportunities.



Sidewalks along US 64 provide limited connectivity with some missing segments and a lack of crosswalks, putting pedestrians in unsafe situations (below).



PEDESTRIAN PROJECT RECOMMENDATIONS

The Comprehensive Pedestrian Master Plan identifies major corridors, as well as localized (or “spot”) areas in immediate need of improvement, as well as locations for future improvements. These improvements have been classified as Short Term projects and Long Term projects. The Short Term and Long Term project recommendations are discussed in further detail in Section 7 of this report.



Smithfield Road near First Avenue has limited opportunities for sidewalks due to an embankment on one side and limited right-of-way conditions.

Areas in immediate need of improvement, which are incorporated into the larger Pedestrian System Plan are discussed in Section 4 of this document.

Pedestrian Corridors:

The following identify longer sections along roadways that are in need of improvement.

- Smithfield Road - from Knightdale High School to 1st Avenue.
- Knightdale Boulevard - from I-540 to Old Knight Road
- Hodge Road - from Lynwood Road to Hodge Road Elementary School
- Smithfield Road - from 1st Avenue to the Town limits at Broadway Street.
- Hodge Road - from Knightdale Boulevard to Lynnwood Road; from Hodge Road Elementary School to Kemp Drive.
- 1st Avenue/Old Knight Road
- Knightdale Boulevard - from I-540 west to the Town limits.
- Smithfield Road from Knightdale High School to the Town’s proposed greenway system and Town limits.

“Spot” Improvements:

The following improvements are smaller, critical locations in



need of immediate improvement.

- Northside of Knightdale Boulevard - multiple locations where there are gaps in the sidewalk system.
- Southside of Knightdale Boulevard - multiple locations where there are gaps in the sidewalk system.
- 1st Avenue - connection in front of new park to Knightdale Boulevard.
- Hodge Road - from Princeton Manor to Lynwood Road; continue east to the existing sidewalk on Lynwood Road.
- Hodge Road, over railroad tracks.
- Intersection at Hinton Oaks Blvd. and Knightdale Blvd.
- Intersection at Smithfield Road and Knightdale Blvd. (*partly funded)
- Intersection at Hodge Road and Lynnwood Road
- Intersection at Smithfield Road and 1st Avenue
- Intersection at 1st Avenue/Old Knight Road and Knightdale Blvd.
- Intersection at Smithfield Road and Main Street
- Intersection at Smithfield Road and Maple Street
- Northside of Knightdale Boulevard from the Shopping Center east of I-540, west across the interchange to the existing sidewalk west of the I-540 interchange.
- North side of Knightdale Boulevard - multiple locations where there are gaps in the sidewalk system that are longer segments or not immediately connecting popular destinations.
- South side of Knightdale Boulevard - multiple locations where there are gaps in the sidewalk system that are longer gaps or not immediately connecting popular destinations.
- North side of Lauren's Way - large gap in the sidewalk system between W Cameo Lane and Stanway Drive.
- Knightdale Boulevard - from Old Knight Road east to Schneider Electric.



- Brookfield Drive from Carrington Drive to the Town Limits
- Mingo Creek Greenway - from Mingo Creek Park to the park on 1st Avenue.
- Forestville Road between Smithfield Road and Old Knight Road - from existing sidewalk to Old Knight Road.

By planning now, the Town of Knightdale will be better positioned to implement the improvements and new pedestrian facilities recommended in this Master Plan in a more cost efficient and timely manner. This Comprehensive Master Plan is meant to complement previous planning efforts and provide additional information to help expand existing pedestrian facilities.

The Comprehensive Pedestrian Master Plan will provide conceptual facility standards and general design guidelines for future development, as well as conceptual retrofits of current facilities in need of improvement or repair. The Plan will also provide recommendations regarding new facilities and programs, and guidance in project prioritization. Finally, basic cost estimates will be provided along with potential funding sources for pedestrian related projects.

The intent of this Comprehensive Pedestrian Master Plan is not to provide specific development design standards for the Town of Knightdale, but to develop guidelines and recommendations that may be followed to create an integrated and cohesive town in functionality and aesthetic appearances. Development Standards and Code Regulations may be developed further as a result of the recommendations outlined in this Master Plan.



SECTION 1- INTRODUCTION

1.1-SCOPE AND PURPOSE OF PLAN

The purpose of the Town of Knightdale's Comprehensive Pedestrian Master Plan is to improve the quality and connectivity of Knightdale's pedestrian environment by focusing on both on-street sidewalks and off-street pedestrian paths to create a safe, accessible, and functional pedestrian system. The Pedestrian Plan will give general recommendations related to the entire Extraterritorial Jurisdiction (ETJ) of Knightdale, with specific sidewalk improvements and additions focused within the Town limits, particularly in the Old Town and Knightdale Boulevard central core of Town. The Existing Conditions map in the Appendix illustrates the project scope of this Master Plan.

1.2-OVERVIEW

The Town of Knightdale Comprehensive Pedestrian Master Plan was made possible through a \$24,800 Bicycle and Pedestrian Planning Grant Initiative funded through the North Carolina Department of Transportation (NCDOT), with an additional \$12,000 match from the Town of Knightdale. The purpose of this Pedestrian Master Plan is to create a document through proper planning and public process that will guide the improvement of the accessibility, connectivity, safety, and overall functionality of the pedestrian environment within Knightdale. A commitment to providing facilities and amenities for active lifestyles and pedestrian access to destinations will positively contribute to the mental and physical health of residents and visitors, as well as their overall quality of life.





Vision Statement:

The Knightdale Pedestrian Plan will create a healthier and more dynamic community by improving pedestrian safety and connectivity.

Pedestrian and bicycle issues are increasingly gaining notice and many government agencies, special interest groups, municipalities, and counties are integrating pedestrians and bicyclists into their comprehensive transportation systems. The Town of Knightdale's Comprehensive Pedestrian Master Plan is an example of this growing awareness and provides an opportunity for the Town to plan for the future needs of its present and future residents.

The Town of Knightdale is located in Wake County, North Carolina. Knightdale is experiencing increased growth as a result of its proximity to Raleigh, solid employment in the area, particularly with the attraction of Research Triangle Park (RTP), and the strength of several universities in the Triangle. Knightdale is also strategically located as a commuter Town because

of its proximity to I-540, US 264, and the Raleigh Beltline: I-440. These factors, in addition to the available land in Knightdale, the high quality of Town facilities and ample commercial amenities, contribute to the continued growth in Knightdale. This Pedestrian Master Plan will help guide the improvement and development of pedestrian facilities and provide networks to help meet the future needs and desires of community residents and visitors. Many of the residents of Knightdale live in single family homes within the Town and commute to work several miles away - in Raleigh or RTP. This arrangement means that while a sidewalk network linking people to their places of employment may not be as imperative, creating safe walking routes from homes to commercial businesses and recreation facilities will continue to be demanded by residents as an enhancement



to Knightdale’s quality of life.

However, consideration should be made for a sidewalk network to carpool or mass transit locations. This will allow residents the flexibility of an option to driving to work.

1.3-VISION STATEMENT

The Knightdale Town Council’s vision is to “promote wellness through healthy and active neighborhoods and businesses”. This vision, along with a stated intent by the Town to promote development that is more pedestrian friendly and to provide better connectivity, resulted in the Comprehensive Pedestrian Plan’s Vision Statement.

The Comprehensive Pedestrian Plan Vision Statement has guided the Pedestrian Plan process and served as a tool to ensure the goals and needs of the community are being met.

The Town’s stated goals

reflect a desire to meet the needs of all of the Town’s residents and visitors, and to focus especially on health, safety and connectivity. Links between the existing sidewalk and greenway networks were identified as a major priority for the Comprehensive Pedestrian Plan. The Steering Committee stressed that in order to keep up with the growth of Knightdale and to continue to attract young, working families, a comprehensive pedestrian network is imperative for the Town.

Goals:

- ◆ Provide walkways for people of all ages, regardless of physical condition.
- ◆ Provide safe access to walkways for residents and visitors and promote a feeling of safety and security through proper lighting and protection from vehicles, while providing emergency vehicle access.
- ◆ Promote health and





wellness by providing walking facilities that connect to destinations and community assets, reducing the need to drive.

- ◆ Recommend safe methods and alternatives for pedestrian movement, including proper signage, lighting, and pedestrian crossing signals.
- ◆ Provide connections to other existing or planned transportation modes, reinforcing a seamless, multi-modal transit system that improves quality of life for residents and visitors to Knightdale.
- ◆ Provide interconnectivity between existing and proposed greenways, sidewalks, and bicycle routes throughout Knightdale.
- ◆ Consider cost implications of plan implementation and provide an estimate of probable cost for construction.
- ◆ Create a plan that can be used for future Town and regional planning and funding opportunities.

1.4-HISTORY and BENEFITS OF PEDESTRIAN FACILITIES

With increased pedestrian facilities and amenities, the Town of Knightdale will gain many physical, social, and economic benefits for the Town and its residents and visitors. For example, benefits of pedestrian facilities and pedestrian friendly communities include:

Physical:

- ◆ Reductions in automobile air and noise pollution
- ◆ Improved health of community residents
- ◆ Improved safety and accessibility

Social:

- ◆ Enhanced community environment, “livability” and quality of life
- ◆ Increased community interaction
- ◆ Stronger community identity



Economic:

- ◆ Attractive amenities for visitors and residents
- ◆ Reductions in vehicular traffic
- ◆ Quality of life contributes to economic potential of Town
- ◆ Pedestrian facilities and connectivity benefit businesses and increase accessibility

These concepts are discussed in more detail below with supporting references and documentation.

Reduction in air and noise pollution:

Walking uses calories, not fossil fuels. Motor vehicle fossil fuel emissions create a substantial amount of air pollution. Within the first few minutes of vehicular movement, 60% of the pollution is created according to walkinginfo.org., a website provided by the U.S. Department of

Transportation through the University of North Carolina Highway Safety Research Center. The quality of the physical environment greatly contributes to the quality of life and health of residents. When air and noise pollution is low, the emotional and physical health of residents is heightened.

Improved health of community residents:

Inactivity and sedentary lifestyles have become more and more common in our society. Regular physical activity can reduce the risk of heart disease, stroke, hypertension, high cholesterol, and diabetes among other diseases. Regular exercise can also contribute to overall mental health by reducing anxiety and depression.

North Carolina has the 12th highest rate of adult obesity in the nation, at 28.3%, and the 14th highest of overweight



youths at 33.5%. (Trust for America’s Health and the Robert Wood Johnson Foundation, 2009)

“Physical activity helps control weight gain, prevents heart disease, helps control cholesterol levels and diabetes, slows bone loss associated with advancing age, lowers the risk of certain cancers and helps reduce anxiety and depression.” (Partnership for Prevention, 2001)

Walking is one form of exercise that not only allows people to reach their desired destination, but also improves health and quality of life. Many experts believe that increasing active transportation such as walking, cycling, running and skating is the most practical and effective way to improve public fitness. One major study concluded, “...regular walking and cycling are the only realistic way that the

population as a whole can get the daily half hour of moderate exercise which is the minimum level needed to keep reasonably fit...” (Physical Activity Task Force, 1995).

This Comprehensive Pedestrian Plan is funded in part by a grant from NCDOT Bicycle and Pedestrian Division. NCDOT has adopted a Mission Statement on public health, making this aspect of a pedestrian plan all the more important and timely.

Enhanced community environment, “livability” and quality of life:

The ability to reach a destination through walking rather than driving a motor vehicle has many social benefits for a community. Pedestrian facilities contribute to and encourage building social ties among members of the community. Walkable communities, including both



sidewalks and greenways provide facilities which increase the amount of face to face interaction among community members. Additionally, walkable communities encourage increased time dedicated to exercise and recreation and visibility within communities. Increased visibility in turn increases safety. These benefits all contribute to the overall quality of life for residents as well as the “livability” of a place.

Increased community interaction:

Residents living and working in walkable communities interact at a much higher rate due to their incidental contact with other residents. This interaction and visibility enhances the overall sense of community as well as the safety of an area. Pedestrian facilities that link destinations such as retail centers, parks, greenways, and schools also

encourage interaction within a community.

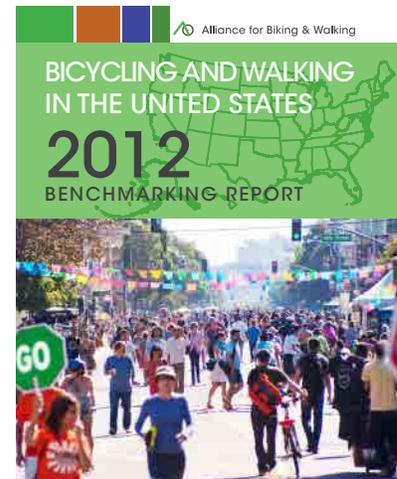
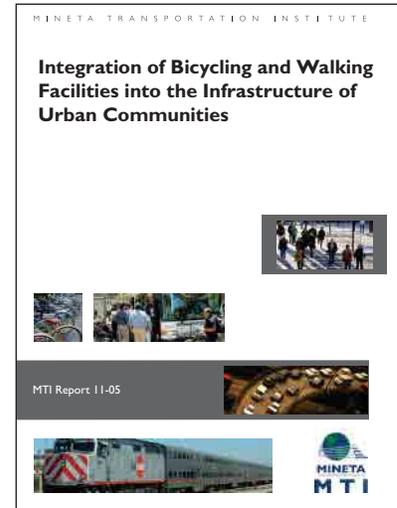
Creates a community identity:

Pedestrian facilities can be incorporated in a manner that reflects a particular history or geographic region of a community. For example, materials used for sidewalks, crosswalks, and pedestrian lighting can reinforce a community’s identity. The use of native street trees can contribute to the overall identity of the community’s heritage.

Signage along a pedestrian system can also explain the history of the community and indicate any important sites or events.

Residents can take pride in the attractiveness and unique character of their community, while also enjoying a safe and accessible pedestrian system.

Attractive amenities for visitors:





Visitors are attracted to places that are easy and safe to get around. By providing a variety of pedestrian facilities such as formalized routes, greenways, multi-use paths, wide sidewalks, and vehicle separation, a community can diversify the pedestrian experience and satisfy the needs of all visitors and residents. In addition, when visitors feel more comfortable walking through town, they are more likely to take their time visiting local businesses, thus supporting the local economy.

Reductions in vehicular traffic:

Walking and bicycling are viable means of transportation over short distances and reduce the volume of vehicular traffic, in addition to the need for infrastructure such as parking spaces and extra vehicular lanes. Reducing vehicular traffic increases the safety of the streets for pedestrians

and bicyclists, improves the environment, reduces dependence upon fossil fuels, and increases residents' health.

The Town of Knightdale has now completed sufficient planning and taken the proper steps toward achieving the benefits described above. The Town has had many partners and advocates throughout the planning process including the North Carolina Department of Transportation, the Capital Area Metropolitan Planning Organization, Town Staff and community members. Previous Town planning documents will be discussed in further detail in Section 3: Current Plans, Programs, and Policies.

WALKING TRENDS

Numerous studies exist on ways to make walking safer for pedestrians, emerging trends in designing streets and walkways, and statistics on accidents, walking, and



driving.

In addition to NCDOT trends and guidelines, the following reports were reviewed:

- *Integration of Bicycling and Walking Facilities into the Infrastructure of Urban Communities:* Mineta Transportation Institute, May 2011.
- *Bicycling and Walking in the United States – 2012 Benchmarking Report:* Alliance for Biking & Walking, 2012.

Traffic Calming

The *Integration of Bicycling and Walking Facilities into the Infrastructure of Urban Communities* discusses how the built environment can affect walking. Related to traffic accidents, the report states:

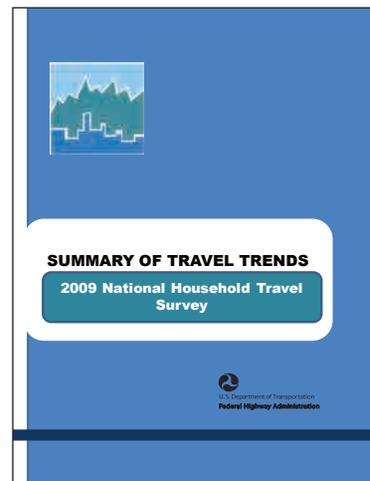
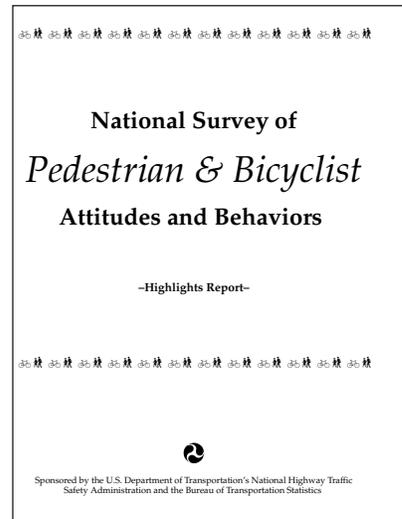
“Looking at the interface with automobile drivers, the literature on traffic education specifically

discusses the need to design the built environment to avoid pedestrian and cyclist collisions. Traffic calming is reported to reduce the number of traffic fatalities by 53 percent on average in traffic-calmed neighborhoods compared to those that are not.”

Traffic calming techniques will be discussed in more detail in Section 5 of this report. They include traffic circles, roundabouts, speed humps, speed tables, textured pavement, chicanes, and curb extensions.

WALKING STATISTICS

The following report’s poll of pedestrians revealed important preferences: (*Integration of Bicycling and Walking Facilities into the Infrastructure of Urban Communities*)





- 40-60% of pedestrians consider the presence of a sidewalk an important factor in route choice.
- About 70% of users will cross a street where there is a crosswalk, rather than crossing at the most convenient location.
- 38% will divert their route to use a crosswalk
- 20% will not divert their route to use a crosswalk.
- 85% say route choice is influenced by the presence of a mid-block crosswalk.
- 74% say the presence of a signal influenced their decision to cross.
- 10% say they wait for a green signal to cross.

The above report also cited the following statistics:

“Many pedestrians are willing to walk about half a mile to access a train station. This is twice the assumed acceptable walking distance commonly used for planning purposes.” (Schlossberg et al)

According to the National Household Travel Survey (conducted by the Federal Highway Administration), in 2009 91% of work trips were by car, 3.7% by public transit, and 3% by walking. However, social and recreational trips revealed more walkers with 76.9% traveling by car, 1.3% by public transit, and 17.5% by walking.

2010 US Census Data shows that 77% percent of workers drove to work alone, 10% carpooled, 4.9% took public transit, 2.8% walked, and 4.3% worked from home. The average travel time to work was 25 minutes.

A study in Montgomery County, Maryland, revealed that “the presence of sidewalks is a significant predictor for whether people walked to transit, cycled to transit, or drove to work.” (Mineta Transportation Institute)



The Bureau of Transportation Statistics' (BTS) 2002 *National Survey of Pedestrian and Bicyclist Attitudes and Behaviors* had the following relevant statistics:

78.7% of the driving age public reported walking, running or jogging outdoors for five minutes or more at least once during the summer of 2002. This reinforces the point that most people are pedestrians at some point, even if they do not walk to work or other destinations with frequency.

Approximately 80% of respondents between the ages of 16-54 reported that they had walked within the last 30 days of taking the survey.

The average length of a walking trip on a typical summer day was 1.2 miles.

26.9% of trips were shorter than ¼ mile

Walking trips taken for exercise or recreation averaged 1.9 miles, as

compared to .8 miles for trips taken for other purposes.

Additional BTS statistics from National Survey:

Primary Purpose of Walking Trips:

- Exercise – 27%
- Run Personal Errands – 17.3%
- Recreation – 15.3%
- To go home – 10.2%
- Visit a friend or relative – 8.8%
- Commute to school or work – 5.1%
- Walk the dog – 4%
- Other – 12.3%

Facilities used for Walking

Trips:

- Sidewalks – 45.1%
- Paved Roads – 24.8%
- Shoulders of Paved Roads – 8.4%
- Unpaved Roads – 8%
- Multi-use Path – 5.8%
- Grass or fields – 4.9%
- Other – 3%

North Carolina ranks 43rd in biking/ walking levels nationwide and due to the low level of walkers and bicyclers, North Carolina ranked 44th in bicycle/ pedestrian fatality rates.



Perceptions on Design of Walking Facilities:

- 74.1% - very or somewhat satisfied with how their communities are designed for pedestrian safety.
- 34% - recommended the following changes to their communities for pedestrians:
 - Provide pedestrian facilities (sidewalks, traffic signals, lighting, crosswalks) – 74.7%
 - Improve existing pedestrian facilities - 12.5%
 - Enforce laws governing pedestrians – 5.1%
 - Make areas for walking safer – 4.7%
 - Change existing laws governing pedestrians – 2.8%
 - Other – 8.7%

The 2012 Benchmarking Report - *Bicycling and Walking in the United States* also has numerous informative statistics on

walking trends.

“Bicyclists and pedestrians make up 12% of all trips and account for 14% of traffic fatalities. Yet, just 1.6% of federal transportation funds go to these modes.”

North Carolina ranks 43rd in commuter biking/walking levels nationwide. Due to the low level of walkers and bicyclers, North Carolina ranked 44th in bicycle/pedestrian fatality rates. However, North Carolina’s per capita spending on bicycle and pedestrian facilities was higher, ranking 27th in the country. In fact, the City of Raleigh (adjacent to Knightdale) is 17th out of 50 cities on per capita funding for bicycle and pedestrian funding.

North Carolina ranks in the top 1/3 among states for policy related to pedestrians, but in the middle to bottom 1/3 for “mode share” (workers who commute by foot or



bicycle), safety, funding, education/encouragement, and advocacy. The high ranking on the number of policies promoting bicycling and walking adopted by the state is a result of trying to reach goals, such as increasing walking and bicycling, decreasing fatalities, adopting master plans for bicycling and walking, as well as adopting a *Complete Streets Policy*.

DESIGN TRENDS

Complete Streets is a term for designing transportation corridors to meet the needs of all users: pedestrians, bicyclists, motorists, and transit riders. When a municipality adopts a *Complete Streets* policy, it commits to meeting the needs of all of citizens, regardless of age or ability. Complete Streets also provide citizens choices, by giving users the opportunity to choose to walk or cycle to destinations.

Land planning is also an important factor in encouraging walking by creating walkable communities and an appealing built environment. *America Walks* recommends:

- Create a range of housing opportunities and choices.
- Encourage community and stakeholder collaboration.
- Foster distinctive, attractive communities with a strong sense of place.
- Make development decisions predictable, fair, and cost effective.
- Mix land uses
- Preserve open space, farmland, natural beauty, and critical environmental areas.
- Provide a variety of transportation choices.
- Strengthen and direct development towards existing communities.
- Take advantage of compact building design.

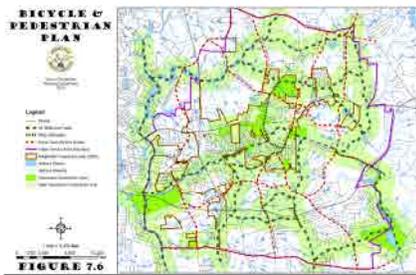
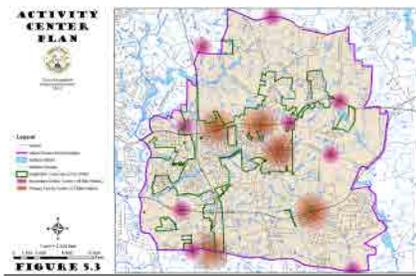
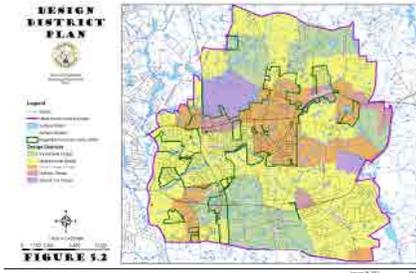


Before: Four Lanes with no center turn lanes



After: Two Lanes with a center turn lane, pedestrian refuge island and bike lanes.

Before and after photos of Philo Road in Urbana, IL, from www.vtpi.org, demonstrates a typical "Road Diet".



Maps from the Town of Knightdale Comprehensive Plan were useful when creating the Comprehensive Pedestrian Plan

Road diets refer to narrowing streets to allow more room for items such as: landscaped medians; traffic calming devices; sidewalks; car turn lanes; on-street parking; and bicycle lanes. Many cities have discovered that excessively wide roads with multiple lanes encourage speeding and reduce safety for pedestrians and bicyclists. By reducing the number of lanes or the width of the lanes, motorists slow down, the street can be shared by all users, and the street becomes a more pleasant place for pedestrians to walk.

1.5-EXISTING PLANS/ POLICIES

Knightdale’s Comprehensive Pedestrian Master Plan is meant to complement previous planning efforts and provide additional information to help expand upon existing pedestrian facilities. The Town of Knightdale and Wake County have a

variety of ongoing plans and policies which directly affect the safety and appearance of the pedestrian environment. These tools deal specifically with open space development, address the goals of growth, development, zoning, and transportation. The following public documents and sources were reviewed to prepare the Comprehensive Pedestrian Master Plan:

- ◆ Knightdale Comprehensive Plan
- ◆ Knightdale 2007 Town Council Vision Statement
- ◆ Knightdale Old Town Small Use Plan
- ◆ Knightdale Unified Development Ordinance
- ◆ Capital Area Metropolitan Planning Organization (CAMPO) regional maps
- ◆ Wake County GIS



The following maps from the Knightdale Comprehensive Plan were also utilized and studied:

Design District Plan

Districts create nodes with different sets of design guidelines. Allows for a variety of uses that conform to design guidelines, rather than land use designations that limit specific uses.

Activity Center Plan

Shows nodes that are designated as major destinations/activity centers.

Gateway Design District Overlay

Signifies major entrances/corridors into Town.

Parks, Recreation & Open Space Plan

Shows existing and proposed parks and facilities, along with proposed greenway corridors

Arterial & Collector Street Plan

Shows major and minor streets as well as proposed road extensions and connections.

Functional Class Plan

Shows major and minor roads and right-of-ways.

Bicycle & Pedestrian Plan

Shows proposed wide sidewalks through Town and greenway trails, as well as proposed bicycle routes. Also indicates pedestrian destination areas and areas of pedestrian connectivity.

Mass Transit Plan

Shows destination areas for transit; future transit hub study area and desired regional transit connectivity

In addition to the steering committee’s guidance and public input, the above documents and maps provided insight about the Town’s direction and focus



for pedestrian planning. In particular, the Knightdale Comprehensive Plan provided a framework for understanding the Town’s growth projections, focus areas of development, and development guidelines for **Form Based Code**. These elements combine to create a cohesive growth pattern for the Town consisting of a more inter-connected community, pedestrian friendly environment, node-based development with neighborhood destination points, and an effort to preserve the rural heritage of the Town through smart growth patterns and architectural vernacular that complements the area.

1.6-OVERALL GOALS

Short Term Projects

The following areas were identified through site analysis, public input, steering committee input, and crash data as critical,

short-term projects for improvement. These projects should take priority and be implemented as funds are available to improve the safety and connectivity of the Town of Knightdale. More detailed descriptions of each project area are included in Section 4.2.

Short-term “Spot” Improvements:

These projects provide connectivity to destinations such as schools, neighborhoods, businesses, and Town facilities. They either provide needed pedestrian improvements to meet safety or connectivity goals or complete gaps in the existing sidewalk system.

- Northside of Knightdale Boulevard - multiple locations where there are gaps in the sidewalk system.
- Southside of Knightdale Boulevard - multiple locations where there are gaps in the sidewalk system.



- 1st Avenue - connection in front of new park to Knightdale Boulevard.
- Hodge Road - from Princeton Manor to Lynwood Road; continue east to the existing sidewalk on Lynwood Road.
- Hodge Road, over railroad tracks.
- Intersection at Hinton Oaks Blvd. and Knightdale Blvd.
- Intersection at Smithfield Road and Knightdale Blvd. (*partly funded)
- Intersection at Hodge Road and Lynnwood Road
- Intersection at Smithfield Road and 1st Avenue
- Intersection at 1st Avenue/ Old Knight Road and Knightdale Blvd.
- Intersection at Smithfield Road and Main Street
- Intersection at Smithfield Road and Maple Street
- Northside of Knightdale Boulevard from the Shopping Center east of I-540, west across the interchange to the existing sidewalk west of the I-540 interchange.
- North side of Knightdale Boulevard - multiple locations where there are gaps in the sidewalk system that are longer segments or not immediately connecting popular destinations.
- South side of Knightdale Boulevard - multiple locations where there are gaps in the sidewalk system that are longer gaps or not immediately connecting popular destinations.
- North side of Lauren's Way - large gap in the sidewalk system between W Cameo Lane and Stanway Drive.
- Knightdale Boulevard - from Old Knight Road east to Schneider Electric.
- Brookfield Drive from Carrington Drive to the Town Limits
- Mingo Creek Greenway - from Mingo Creek Park to the park on 1st Avenue.
- Forestville Road between Smithfield Road and Old Knight Road - from existing sidewalk to Old Knight Road.



Short-Term Corridor Improvements:

Corridor improvements are longer projects along roadways that involve streetscape enhancements, such as lighting, long stretches of sidewalks, road improvements, landscape treatments or other large-scale improvements.

- Smithfield Road - from Knightdale High School to 1st Avenue.
- Knightdale Boulevard - from I-540 to Old Knight Road
- Hodge Road - from Lynwood Road to Hodge Road Elementary School
- Smithfield Road - from 1st Avenue to the Town limits at Broadway Street.
- Hodge Road - from Knightdale Boulevard to Lynnwood Road; from Hodge Road Elementary School to Kemp Drive.
- 1st Avenue/Old Knight Road
- Knightdale Boulevard - from I-540 west to the Town limits.

- Smithfield Road from Knightdale High School to the Town's proposed greenway system and Town limits.

Long Term Projects

Long-term projects have been identified as projects that would benefit the community, but are not considered a top priority for safety or connectivity. However, these projects would be valuable amenities to the Town and should be included in future requests for grant money or state funding. More detailed descriptions of each project area are included in Section 4.3.

- Sidewalk/Trail Construction of Mingo Creek Greenway
- Sidewalk Construction along east Knightdale Boulevard
- Sidewalk Construction in outlying residential neighborhoods



SECTION 2 - EVALUATING CURRENT CONDITIONS

2.1 - COMMUNITY OVERVIEW

DEMOGRAPHICS AND COMMUNITY NEEDS

Knightdale is one of the youngest municipalities in Wake County, North Carolina. Wake County is a dynamic, growing area that is home to the state's capital, several universities, and Research Triangle Park - a vibrant business and technology center. While Knightdale has its own history of farming and railroad industry, its proximity to these nearby assets has encouraged its exponential growth in the past decade.

The 2010 US Census reported that Knightdale has a population of 11,401 with a make-up of 50% white, 38.3% black and 11.4% Hispanic.

Of Knightdale's 11,401 residents, approximately 5.1% are living below the poverty level.

Housing is dominated by affordable, owner-occupied, single-family housing. The median value of owner-occupied housing units is \$171,600 and an average of 2.88 people live in each Knightdale household.

Children and adolescents:

Children and many adolescents do not have the ability to drive themselves and therefore rely on others for transportation. Children aged 17 years or younger account for 37.2% of the Town's current population. Safe, accessible, and efficient pedestrian facilities are essential to this portion of the population who do not and can not own and drive vehicles especially when destinations such as schools,



public parks, the library, and other destinations are not in immediate proximity

Race:

Race	Percent
White	50%
African American	38.3%
Native American or Alaskan native	0.6%
Asian	1.7%
Hawaiian or other Pacific islander	.1%
Hispanic or Latino	11.4%
Other Races	0.8%
Two or more Races	3.5%
White, not Hispanic	45.9%

Income and Poverty Status:

Income	Percent
Annual per capita income	\$26,546
Annual Median Household Income	\$71,922

Age:

Age Distribution	Percent
Ages 0 - 4	7.8%
Ages 5 - 17	29.4%
Ages 18 - 64	56.4%
Ages 65 +	6.4%

to most residential neighborhoods. Pedestrian facilities allow for children and adolescents to walk to their destinations and it is essential that these pedestrian connections be safe for all who participate. Crosswalks, pedestrian refuge islands, and pedestrian signalization can help this user group cross streets by interacting with automobiles safely.

The elderly and people with disabilities:

Many people, including some elderly individuals, have disabilities that preclude driving. 6.4 percent of the population is 65 years of age and older. This aging

population group also may rely heavily on others to get them where they need to go. Safe and accessible pedestrian facilities connecting destinations are necessary so this portion of the population feels safe and able to walk. Pedestrian facilities which are fully ADA compliant are essential for all communities. Crosswalks, pedestrian refuge islands, ADA ramps and pedestrian signalization can help this user group cross streets more safely.

As Knightdale continues to become a destination for working families, a clear and defined pedestrian environment should be developed to safely connect residents to destinations and points of interest. Creating this unified pedestrian network will improve Knightdale’s reputation as a progressive, safe, healthy place to live with an excellent quality of life.



Knightdale’s Comprehensive Pedestrian Master Plan will help guide the improvement and development of pedestrian facilities and provide networks to help meet the future needs and desires of residents and visitors.

A map of the study area for this pedestrian master plan can be found on the Existing Conditions map in the Appendix.

PUBLIC INVOLVEMENT

An important part of the planning process is public participation. The opinions, concerns and involvement of the public are a crucial element in developing a pedestrian plan which is consistent with the desires of the public. Public “buy-in” and support of the Pedestrian Master Plan is necessary for the Plan to be a useful tool for the Town.

A variety of methods were used to integrate the citizens of Knightdale into the analysis and design process for the Pedestrian Master Plan. The following elements were central to the public input process:

- Five Steering Committee Meetings
- Two formal Public Meetings / Open Houses
- Survey Questionnaires
- Design Charrette

The public meetings and design workshop also provided the Town staff and steering committee members the opportunity to interact with members of the public and share ideas and desires.

Steering Committee

In developing this Comprehensive Pedestrian Master Plan, the Design Team met with a **Steering Committee** comprised of



Steering Committee meetings were well attended and offered important insight into the Town’s needs.



representatives from NC DOT, the Town of Knightdale, CAMPO, Land Use Review Board members, Chamber of Commerce officials, as well as interested citizens with varied backgrounds and experiences. The Steering Committee held a total of five meetings and offered initial insight and analysis of the Town and its needs, input on the Vision Statement for the Comprehensive Pedestrian Master Plan and feedback throughout the process.

The Design Team held a kick-off meeting with members of the Steering Committee and a representative from NCDOT. The steering committee provided input on how to reach the public, existing barriers to pedestrian connectivity and key destinations in downtown. The Steering Committee also provided input on a Vision Statement for this project and on questions for a survey questionnaire to distribute to

the public.

Four additional Steering Committee meetings were held to finalize the Vision Statement and Survey, gain additional insight and perspective on pedestrian needs, and provide guidance to the consultants on the Pedestrian Plan.

Public Meetings

The first two public meetings were held at the Library and Town Hall with a good cross-section of Knightdale's population in attendance. The meetings resulted in the distribution of numerous surveys and input from the public regarding existing constraints to walking in Knightdale, along with preferred destinations or high priority areas within Town.

Many residents expressed a positive feeling toward walking in their own neighborhoods, but difficulty in reaching destinations outside their subdivisions. Several residents said they



would like to walk from their homes or offices to commercial and retail businesses along Knightdale Boulevard, but cannot do so without connected sidewalks along Knightdale Boulevard or crosswalks crossing the busy street. Many residents also described Smithfield Road as a dangerous road in need of sidewalks, especially because many people currently walk along the road from their apartments. Some people were not even aware of the existing greenways and most expressed a desire to use greenways if they were more available and accessible.

A third Public Meeting was held in September during the Movie Night at the Recreation Center in Knightdale. This meeting/open house gave citizens an opportunity to comment upon the Proposed Pedestrian Network Map and Project Priority Areas. The turnout for this open house was high with at least 25 people reviewing the maps

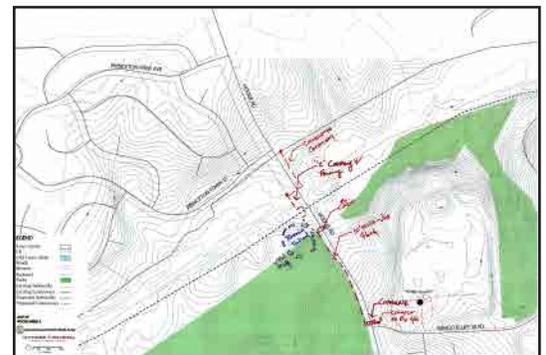
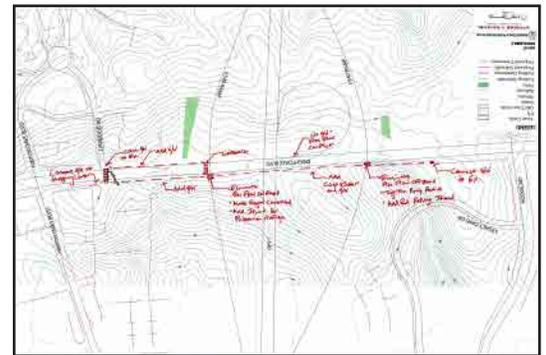
and providing input.

Design Charrette

A design Charrette was conducted at the Chamber of Commerce, giving the public an opportunity to provide input on specific project priority areas with design challenges. The Charrette focused on three project priority areas that needed additional attention and clarification:

1. A safe pedestrian route along **Smithfield Road south and the intersection of 1st Avenue.**
2. A viable pedestrian connection across the **I-540/Business 64 interchange.**
3. A pedestrian connection **across the railroad tracks from the Mingo Creek subdivision** to the greenway system.

The Charrette offered a chance for the public to give input on preferences for



Plans, aerial photographs, precedent photos, and existing site photos were studied to develop design solutions to the three identified Project Priority Areas. The three plans above show possible design solutions for each area as discussed at the Charrette.



design solutions for these areas and to suggest priority project areas for pedestrians.

13 people attended the charrette, including council members, Town staff, members of the public, the Town Mayor, and Steering Committee members.

In addition to sketching ideas on maps provided, most of the attendees took a walking tour of the Smithfield Road/1st Avenue intersection to better understand the design challenges in this area.

The following solutions to the three project priority areas were proposed:

1. Due to the limited right-of-way for a sidewalk along Smithfield Road south, the attendees agreed that it would be more feasible to provide pedestrian connectivity in this area by instead diverting the sidewalk along Maple Street. A sidewalk is proposed along

Smithfield Road to Harper Park, then travelling down Maple Street to connect to existing sidewalks on Second Avenue and First Avenue. The sidewalk would also continue along First Avenue with a crosswalk across Smithfield Road to connect to existing sidewalks.

The Town has agreed to close a railroad crossing at Fayetteville Street and in return will receive upgrades to the intersection of First Avenue and Smithfield Road. These improvements will include turn lanes and a pedestrian crossing.

The Town has requested money from DOT in the past for road widening improvements along Smithfield Road, but these requests have been denied so far. If the money is attained for these improvements, a sidewalk should be included along Smithfield Road south at that time.

2. By studying highway interchange precedents for



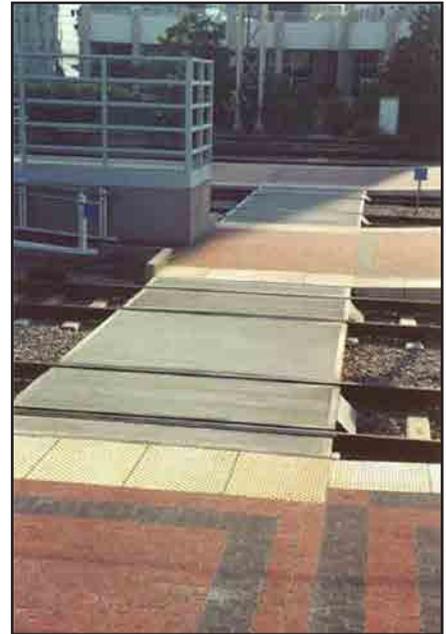
safe pedestrian crossings and consulting with DOT staff, a general design solution was proposed for the I-540/US 64 interchange. The solution consists of:

- Adding a sidewalk on the north side of US 64.
- Eliminating “free flow” on and off ramps by including traffic signals.
- Adding crosswalks and pedestrian refuge islands for pedestrians to safely cross the on and off ramps.
- Tightening the on and off ramp radii to reduce the walking distance for pedestrians and increase visibility.
- Adding curb and gutter and a five foot sidewalk along the US 64 overpass.
- Connecting to existing sidewalks on the east and west sides of the interchange.
- It was determined that due to the “free-flow” nature of the clover leaf on the south side

of the interchange, a sidewalk could not be safely introduced on the south side of US 64.

3. Railroad crossing precedents were studied to develop a design solution for the railroad crossing on Hodge Road. Major points include:

- There appears to be ample space along the side of the road to include a 10’ wide multi-use path, which will connect to the existing wide sidewalk north of the railroad crossing. A



A pedestrian crossing at a railroad track should be flush to allow safe crossing for those with disabilities and bicyclists.

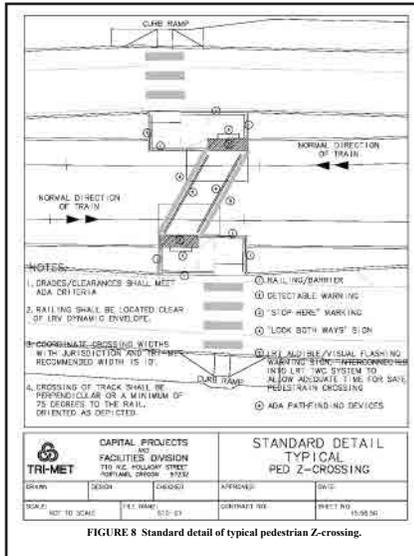


FIGURE 8 Standard detail of typical pedestrian Z-crossing.



A "Z" type pedestrian crossing at a railroad, along with fencing to keep pedestrians on the sidewalk helps to increase safety and awareness at the crossing.

- 10' wide multi-use path was proposed because this will offer a connection to both the existing wide sidewalk and the existing and proposed greenway trail on the north side of the railroad.
- A typical "Z" type of crossing is proposed to increase safety for the pedestrians at the crossing. This is particularly important if the trail is a multi-use path to slow bicyclists and joggers as they approach the railroad crossing. A "Z" crossing will require a fence around the sidewalk, along with a jog in the path to keep pedestrians and cyclists on the path and make them aware of the crossing.
- A potential trailhead could be located at the existing Veteran's of Foreign Wars building if there is significant interest.

- An existing culvert will need to be studied to ensure the grade is sufficient to include a multi-use path along Hodge Road.
- The multi-use path should continue south to cross at a proposed crosswalk to existing sidewalks on Mingo Bluff Boulevard. This will provide safe connectivity to the Mingo Bluff subdivision, as well as the Hodge Road Elementary School.
- The multi-use path should continue north of the railroad crossing to connect to the existing wide sidewalk and provide a crosswalk to the east side of Hodge Road that will eventually connect to the greenway.

Public Survey

The Steering Committee provided input into the design of a survey questionnaire related to pedestrian activity



and safety. These surveys were dispersed through permanent displays at the Eastern Regional Library and Knightdale Town Hall, through Neighborhood Associations, on the Town Website and through the Steering Committee’s social media and networking links. Steering Committee members also volunteered to disperse surveys to the Principals of the local schools, a local Hispanic grocery store, churches, and the Health Department. The surveys were also available online through *Survey Monkey* and were distributed at every public meeting and the Workshop. The public survey questionnaires were distributed through a variety of methods to reach as much of the public as possible.

The survey consisted of a one page (front and back) handout with 10 questions including multiple choice, Yes or No, and open-ended questions.

A sample survey questionnaire is included in the Appendix of this document. The survey generally showed that most people currently walk in their neighborhoods, which is consistent with where most of the existing sidewalk network is located. Most people stated they walked for exercise and an overwhelming 89.9% of respondents stated that Knightdale needs improved pedestrian facilities. When questioned about their support for increased taxes to pay for

Property Tax Implications			
Tax Rate Increase	Property Value	Tax Per Month	Tax Per Year
\$0.002	\$100,000	\$0.16	\$2
	\$150,000	\$0.25	\$3
	\$200,000	\$0.33	\$4
	\$250,000	\$0.42	\$5
	\$300,000	\$0.50	\$6
\$0.005	\$100,000	\$0.42	\$5
	\$150,000	\$0.62	\$7.50
	\$200,000	\$0.83	\$10
	\$250,000	\$1.04	\$12.50
	\$300,000	\$1.25	\$15
\$0.01	\$100,000	\$0.83	\$10
	\$150,000	\$1.25	\$15
	\$200,000	\$1.66	\$20
	\$250,000	\$2.08	\$25
	\$300,000	\$2.50	\$30



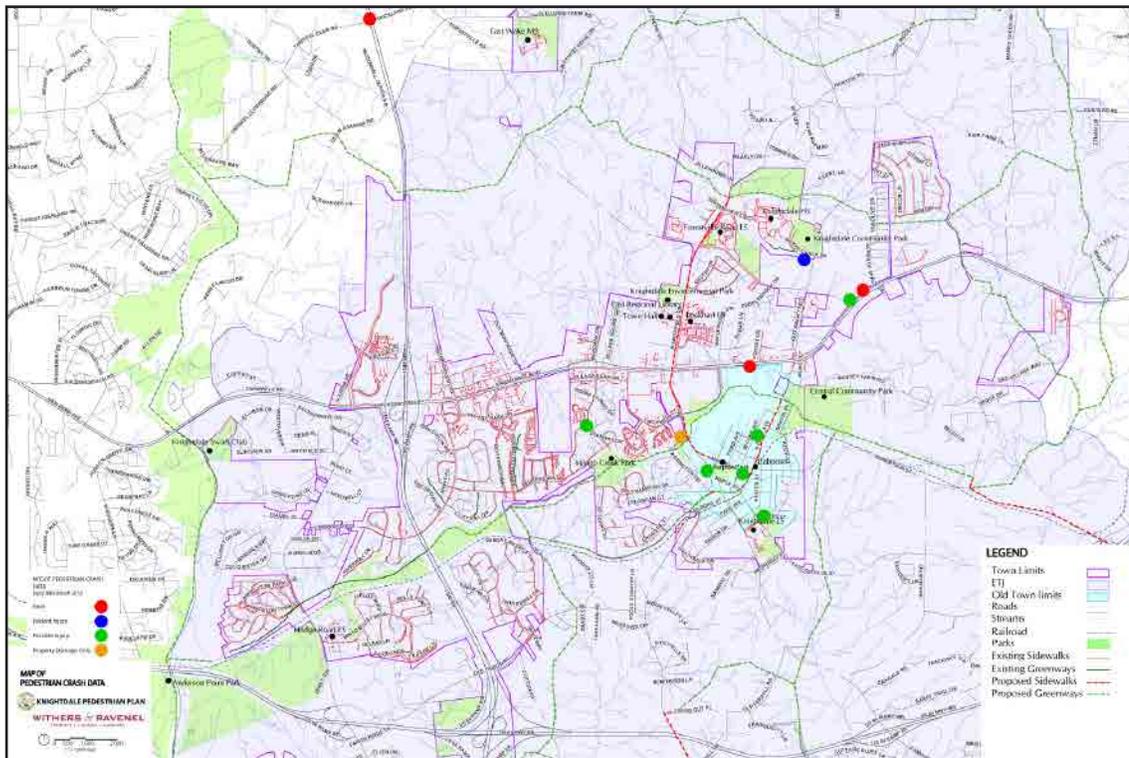
sidewalk improvements, approximately 55.8% of respondents stated they would support a \$.002 rate increase, 37.3% stated support for a \$.005 rate increase, and 36.7% expressed support for a \$.01 rate increase.

The above methods of public participation provided a thorough understanding of the needs, desires and

System Plan, as shown in the Appendix.

NCDOT Pedestrian Crash Data

NCDOT supplied data related to pedestrian crashes along state roads in the past ten years. The data was geo-referenced and mapped to illustrate where these accidents have occurred.



The data supports much of the public input and site analysis indicating that Business 64 and Smithfield Road south are in need of pedestrian safety

The Crash Data Map indicates places with fatal crashes (red dots), evident injuries from the crash (blue dots), possible injuries from the crash (green dots), and property damage only (gold dots).

concerns of the community and were reflected in the final proposed Pedestrian

improvements, as well as the section of Old Knight Road near the high school.



The Crash Data map is included in the Appendix for reference. Red dots indicate fatal crashes, blue dots indicate evident injuries from the crash, green dots indicate possible injuries, and the gold dot indicates property damage only. The spreadsheet of where and when these accidents occurred is included in the Appendix for reference.



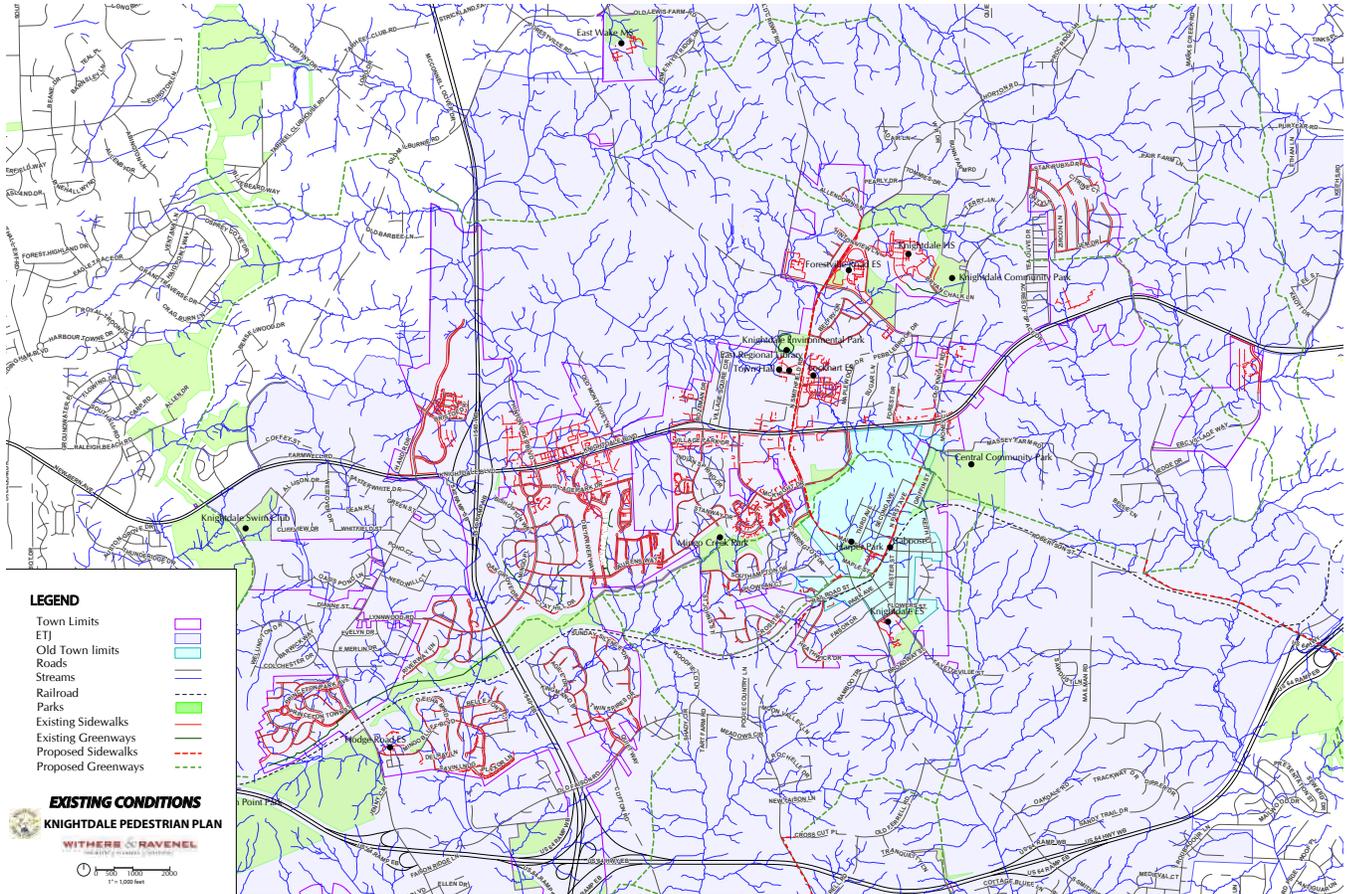
2.2-ASSESS LOCAL PEDESTRIAN NETWORK

The current sidewalk system in Knightdale was evaluated and mapped in order to help determine where new facilities are needed and which sidewalks are in need of upgrades. In addition to assessing where additional sidewalks are needed, this initial assessment identified gaps in the existing system and intersections in need of improvement.

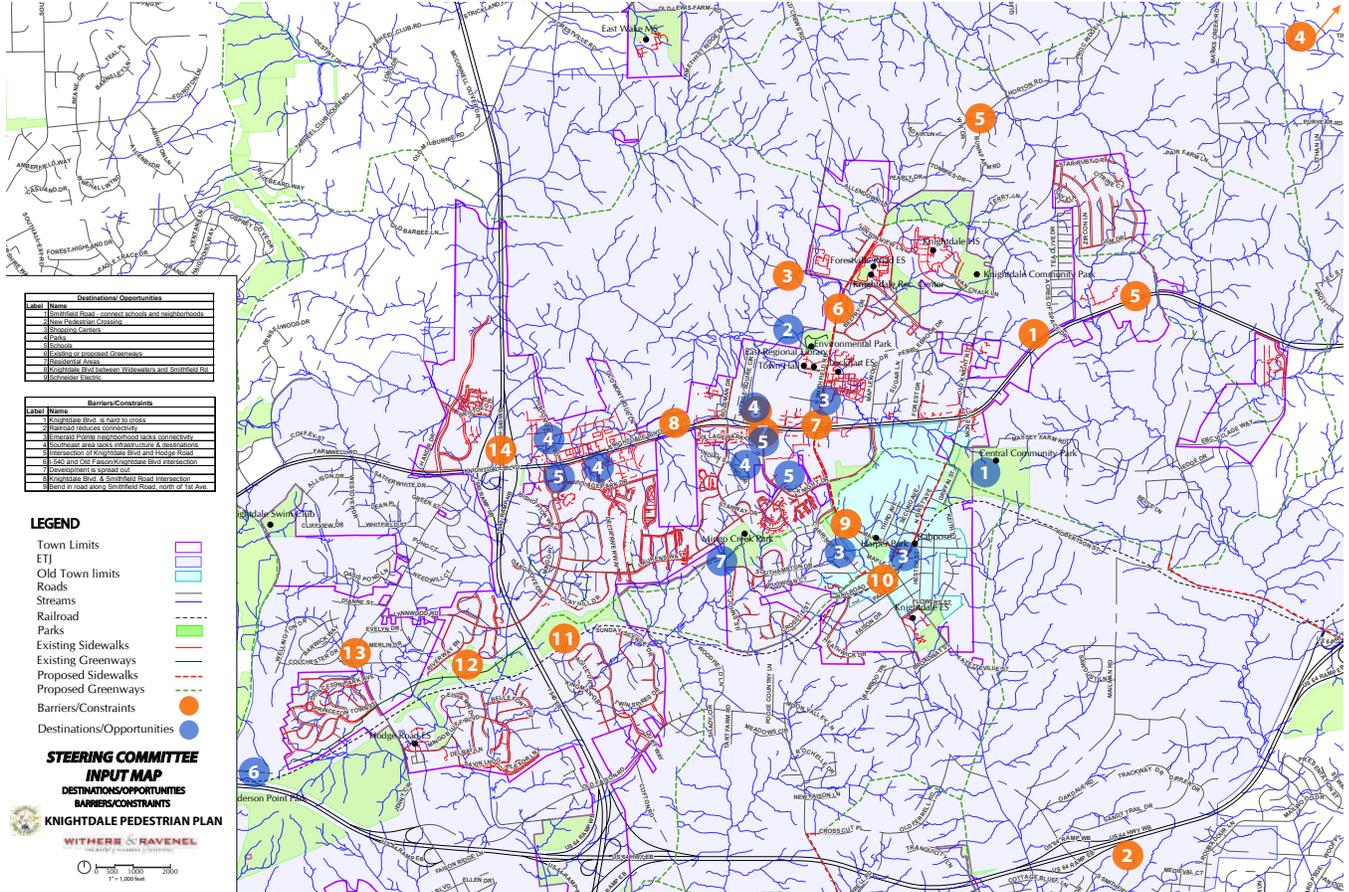
2.3-CURRENT USAGE

Several recreational sites within Town need better pedestrian access from neighborhoods, including a new 70-acre community park in Old Town off of First Avenue, a popular Environmental Park behind the Town Hall, and the Town recreation center off of Smithfield Road. Feedback from public workshops and surveys indicated that

many residents would appreciate better access from their neighborhoods to these facilities, as well as municipal facilities, such as the East Regional Library and the Town Hall. The possibility of walking to stores along Knightdale Boulevard seemed outside the realm of possibility to many residents, due to high traffic, unsafe walking conditions, poor connectivity from neighborhoods, gaps in the existing sidewalk network, and perceived distance. Another constraint identified by many residents is the railroad that cuts through the southern portion of Town, bisecting neighborhoods and preventing residents south of the railroad from safely walking north to nearby neighborhoods, businesses or greenway trails. Many people also identified Smithfield Road as a high priority road to receive



Existing Conditions Map, showing existing sidewalks in Town drawn in red, purple as the Town limits, and the ETJ shaded in blue.



Barriers and Opportunities Map as defined at Public Workshops



sidewalks, due to the number of residents who currently walk alongside the road from apartments to stores, bus stops, and parks. Finding safe ways to cross major streets, particularly Knightdale Boulevard, is of major concern and was listed as a barrier to a north/south pedestrian connection in Knightdale.

For a full inventory of barriers/constraints to walking and walking destinations/opportunities, see the maps and charts in the Appendix.

2.4-INVENTORY AND ASSESS EXISTING PEDESTRIAN FACILITIES

Knightdale Transportation System

Thoroughfares

- Business 64
- I-540
- US 264

Connectors

- Smithfield Road

- 1st Avenue/Old Knight Road
- Hodge Road
- Forestville Road

Knightdale Pedestrian System

The existing pedestrian system in Knightdale consists of a mixture of on-street sidewalks and limited off-street multi-use paths providing adequate and safe connection opportunities within neighborhoods, but with little connectivity to other destinations around Town. Crosswalks are limited throughout Knightdale, providing few opportunities for safe crossings.

Pedestrian Facilities Challenges:

- ◆ Many connector streets have no sidewalks or significant missing segments in the existing sidewalks.
- ◆ Safe pedestrian crossings along Business 64
- ◆ Railroad Tracks/Railroad Crossings.



- ◆ I-540 interchange has no accommodations for pedestrians.

It is also important to recognize the positive and promising conditions Knightdale’s pedestrian environment has to offer. The first step to improving the pedestrian environment includes identifying opportunities. Below is a brief listing of opportunities present in Knightdale.

Pedestrian Facilities Opportunities:

- ◆ Many existing neighborhoods and commercial developments have sidewalks which can be expanded upon.
- ◆ Many popular destinations are located in close proximity to one another, allowing for easy connectivity.
- ◆ New developments are required to provide pedestrian facilities.
- ◆ The Town is receptive to alternative transportation

and promoting pedestrian transportation.

- ◆ There is wide public and governmental support for pedestrian facilities.
- ◆ The Town’s Comprehensive Plan and Unified Development Ordinance encourage pedestrian facilities and pedestrian-friendly plans and designs.
- ◆ There are immediate plans and goals in place for implementing sidewalk improvements in two priority areas by utilizing NCDOT and CDBG money.

The maps in the Appendix show opportunities and constraints as identified by the public and by steering committee members.

These findings were instrumental in guiding the prioritization of short-term and long-term project areas.

2.5-EXISTING NETWORK- INVENTORY AND ANALYSIS

Although there are



approximately 67.87 miles of sidewalks in the Town, many of these sidewalks are disconnected and are primarily located in residential neighborhoods and private commercial developments.

The existing Greenway system is limited to three short segments: one near the high school, one behind the Princeton Manor subdivision on the southwest side of Town, and one in the Environmental Park located behind the Town Hall and East Regional library. The existing greenways add up to a little less than 1 mile. The Town has immediate plans to continue the greenway system east from Princeton Manor across Hodge Road to the I-540 overpass. A bridge is currently being built to connect the existing greenway at Princeton Manor west to the Neuse River Greenway at Anderson Point Park.

Knightdale Boulevard (Business 64) acts as a

barrier between the north and south areas of Town and the railroad creates another difficult barrier between neighborhoods on the southern side of Town. Currently, the Old Town area is under-going a road and sidewalk renovation which will improve pedestrian access along First Avenue, but will still provide limited connectivity from Old Town to the rest of Knightdale.

There are numerous shopping centers along Knightdale Boulevard with limited connectivity to each other and to nearby residential areas. Additional sidewalks along Knightdale Boulevard, clearly defined crosswalks, and pedestrian signalization will help improve safe pedestrian activity in these areas of high use and high traffic speed. Other safety and aesthetic considerations should be included where possible, such as traffic calming measures and landscaping



along sidewalks, to create a safer and more pleasant pedestrian experience. There is currently no safe crosswalk across Knightdale Boulevard from Old Town and no pedestrian facilities along Smithfield Road - a popular walking route.

In addition, the schools in Knightdale lack a complete sidewalk network to connect them safely to neighborhoods, parks, and other destinations.

For a detailed map of existing sidewalks, refer to the Town of Knightdale Existing Conditions map in the Appendix.



SECTION 3 - EXISTING PLANS, PROGRAMS & POLICIES

3.1-EXISTING PLANS

OVERVIEW

As mentioned earlier in the report, several Town and regional documents and maps provided insight about the Town's direction and focus for pedestrian planning. In particular, the Knightdale Comprehensive Plan provided a framework for understanding the Town's growth projections, focus areas of development, and development guidelines for **Form Based Code**. These elements combine to create a cohesive growth pattern for the Town consisting of a more inter-connected community, pedestrian friendly environment, node-based development with neighborhood destination points, and an effort to preserve the rural heritage of the Town through smart growth patterns and architectural vernacular that complements the area.

The following were reviewed and analyzed:

- Knightdale Comprehensive Plan
- Knightdale 2007 Town Council Vision Statement
- Knightdale Old Town Small Use Plan
- Knightdale Unified Development Ordinance
- Capital Area Metropolitan Planning Organization (CAMPO) regional maps
- CAMPO 2025 Long Range Transportation Plan
- CAMPO 2030 Long Range Transportation Plan
- CAMPO 2035 Long Range Transportation Plan
- Wake County GIS

Knightdale's Comprehensive Plan provided helpful direction to the Comprehensive Pedestrian Plan and acted as a benchmark for priority project areas within Town. The



Comprehensive Plan gives a vision on how the Town would like to grow, strategies to promote sustainable, smart growth, and guidelines on how to design new development. The following maps were studied in detail:

Design District Plan

Districts create nodes with different sets of design guidelines and allow for a variety of uses that conform to design guidelines, rather than land use designations that limit specific uses.

Activity Center Plan

Shows nodes that are designated as major destinations/activity centers.

Gateway Design District Overlay

Signifies major entrances/corridors into Town.

Parks, Recreation & Open Space Plan

Shows existing and proposed parks and facilities,

along with proposed greenway corridors

Arterial & Collector Street Plan

Shows major and minor streets as well as proposed road extensions and connections.

Functional Class Plan

Shows major and minor roads and right-of-ways.

Bicycle & Pedestrian Plan

Shows proposed wide sidewalks through Town and greenway trails, as well as proposed bicycle routes. Also indicates pedestrian destination areas and areas of pedestrian connectivity.

Mass Transit Plan

Shows destination areas for transit; future transit hub study area and desired regional transit connectivity

In addition, the following state and regional documents may directly affect the future of Knightdale’s pedestrian



system:

- North Carolina State Transportation Improvement Program Plan (2012)
- Capital Area Metropolitan Planning Organization (CAMPO) Project Lists

When transportation improvements are made, the pedestrian network should be considered as a critical element in the design and construction of these roads and corridors. This Comprehensive Pedestrian Plan will help to guide policy makers as they consider critical needs.

3.2-PROGRAMS AND INITIATIVES

State Transportation Improvement Program (TIP)

The purpose of the State TIP is to improve the quality and interconnectivity of thoroughfares within the state. The TIP recommends and prioritizes projects based on need and cost. Wake County currently has

many transportation projects planned, many of which will enhance the pedestrian system by providing sidewalks or wider shoulders that can accommodate pedestrians. Three projects are slated for TIP funding within Knightdale and will directly affect the pedestrian network:

1. Knightdale Boulevard

Request to construct a dedicated right turn lane along eastbound Knightdale Boulevard onto southbound Smithfield Road. This project is slated to begin by September 30, 2013, with a right-of way cost of \$50,000 and a construction cost of \$625,000 (TIP#C5167)

2. South of Buffaloe Road toward East US 64.

No start dates nor monies are allocated at this time and the scope of this project is unclear.(TIP#R-2000G)

3. Mingo Creek Greenway.

No start date nor monies are allocated as this time. (TIP# EB-5002)



Two projects that would have a huge influence on critical project priority areas of this Pedestrian Plan are “scheduled for reprioritization” for TIP funding. Both of these projects focus on Smithfield Road:

1. North Smithfield Road from Carrington Drive to Forestville Road. (projected cost of \$2,770,000 (TIP# U-3441 A)
2. Smithfield Road from Knightdale Boulevard to US 264. (projected cost of \$4,420,000 (TIP# U-3441 B).

These proposed projects would widen the road in this corridor, allowing the opportunity to include sidewalks and other pedestrian accommodations at that time.

CAMPO Recommended Priority Bicycle and Pedestrian Projects (2007-2013)

Several of the CAMPO

bicycle/pedestrian priority projects would have a direct influence on the pedestrian network in Knightdale. These are recommendations from CAMPO to NCDOT for TIP funding.

1. Mingo Creek Greenway – Phase I (estimated to cost \$525,000). *This project was funded and is about to begin construction.* (ranked #4 in priority in CAMPO list.)
2. Beaverdam Creek Greenway (estimated to cost \$377,000). (ranked #21 in priority)

CAMPO Top 40 Priority Roadway System Improvement Projects (2007-2013)

The top 40 roadway projects CAMPO recommended to NCDOT for TIP funding include two in Knightdale that would affect the pedestrian network in Town. These projects are:

1. Smithfield Road from Forestville Road to US 64 Business (TIP#U-3441).

The estimated total cost for



this project was listed as \$2,790,000. (ranked #30 in priority)

2. Bethlehem Road from Smithfield Road to Grasshopper Road. The estimated total cost for this project was listed as \$9,592,000. (ranked #40 in priority)

CAMPO Metropolitan Transportation Improvement Program (MTIP) (2009-2015)

The CAMPO FY 2009-2015 MTIP is a subset of the conforming 2030 Long Range Transportation Plan. Most of the projects listed in the Town of Knightdale were already complete or in-progress, as of August 20, 2008. These include:

1. Extensions of I-540 to US 64.
2. The construction south of Buffalo Road to US 64 East
3. An extension of US 264 to I-540.

These projects were listed

as unfunded:

- TIP# U-3441A
- North Smithfield Road from Carrington Drive to Knightdale Boulevard (estimated cost: \$1,950,000)
- TIP# U-3441B - Knightdale Boulevard to Forestville Road. (estimated cost: \$3,600,000)

Right of Way acquisition for the above projects was estimated at \$1,640,000.

The above projects were listed as using Surface Transportation Program (STP) funding.

The following projects were listed as scheduled for a Feasibility Study:

- EB-5002 – Mingo Creek Greenway – Phase I, 3.7 miles (construction about to begin)
- EB-2003 – Beaverdam Creek Greenway – 3.8 miles



Comprehensive Pedestrian Master Plan as well as additional guidelines and resources to aid in future planning and development.

The proposed pedestrian system identifies areas in immediate need of improvement - both existing **corridors** as well as locations in need of **“spot” improvements**. These two groups of applications have been classified as **“Short Term”** priorities. These short-term projects are classified and ranked into Tier 1 and Tier 2 priorities as shown in the criteria matrix in Section 4.3. Section 4.3 shows the Tier 1 and Tier 2 Projects, along with their Criteria Matrices and a map locating each project.

Additionally, the pedestrian system includes areas in need of future improvement that have been classified as **“Long Term”** priority development projects. These will be described in detail later in this chapter.

4.2-SHORT-TERM PROJECTS

Short-term improvement projects will improve connectivity and pedestrian access along roadways and off-street paths which are currently utilized by pedestrians. These projects provide connectivity to destinations such as schools, neighborhoods, businesses, and Town facilities. It is recommended that these projects receive first priority for improvements due to their ability to immediately impact the existing pedestrian infrastructure and access to various destinations.

As funding becomes available, the areas identified in this section should become priorities for the Town. These areas were identified during site visits, through the public input process, by reviewing previous planning efforts and through Steering Committee recommendations. Because these areas were highlighted



by public input, these “spot improvements” should be recognized as existing hazardous areas or those most in need of connectivity.

Short-Term Spot Improvements:

Spot improvements are those projects that can either be completed with limited funding or are small in scope. These smaller improvements can improve hazardous intersections, eliminate gaps in the existing sidewalk system, or upgrade existing facilities.

- Northside of Knightdale Boulevard - multiple locations where there are gaps in the sidewalk system.
- Southside of Knightdale Boulevard - multiple locations where there are gaps in the sidewalk system.
- 1st Avenue - connection in front of new park to Knightdale Boulevard.
- Hodge Road - from Princeton Manor to Lynwood Road; continue east to the existing sidewalk on Lynwood Road.
- Hodge Road, over railroad tracks.
- Intersection at Hinton Oaks Blvd. and Knightdale Blvd.
- Intersection at Smithfield Road and Knightdale Blvd. (*partly funded)
- Intersection at Hodge Road and Lynnwood Road
- Intersection at Smithfield Road and 1st Avenue
- Intersection at 1st Avenue/ Old Knight Road and Knightdale Blvd.
- Intersection at Smithfield Road and Main Street
- Intersection at Smithfield Road and Maple Street
- Northside of Knightdale Boulevard from the Shopping Center east of I-540, west across the interchange to the existing sidewalk west of the I-540 interchange.
- North side of Knightdale Boulevard - multiple locations where there are gaps in the sidewalk system



that are longer segments or not immediately connecting popular destinations.

- South side of Knightdale Boulevard - multiple locations where there are gaps in the sidewalk system that are longer gaps or not immediately connecting popular destinations.
- North side of Lauren’s Way - large gap in the sidewalk system between W Cameo Lane and Stanway Drive.
- Knightdale Boulevard - from Old Knight Road east to Schneider Electric.
- Brookfield Drive from Carrington Drive to the Town Limits
- Mingo Creek Greenway - from Mingo Creek Park to the park on 1st Avenue.
- Forestville Road between Smithfield Road and Old Knight Road - from existing sidewalk to Old Knight Road.

Short-Term Corridor Improvements:

Corridor improvements are longer projects along roadways that involve streetscape enhancements, such as lighting, long stretches of sidewalks, road improvements, landscape treatments or other large-scale improvements.

- Smithfield Road - from Knightdale High School to 1st Avenue.
- Knightdale Boulevard - from I-540 to Old Knight Road
- Hodge Road - from Lynwood Road to Hodge Road Elementary School
- Smithfield Road - from 1st Avenue to the Town limits at Broadway Street.
- Hodge Road - from Knightdale Boulevard to Lynnwood Road; from Hodge Road Elementary School to Kemp Drive.
- 1st Avenue/Old Knight Road
- Knightdale Boulevard - from I-540 west to the Town limits.



- Smithfield Road from Knightdale High School to the Town's proposed greenway system and Town limits.

All of the above short-term projects have been categorized and are described in detail in the following Section.



4.3-PROJECT PRIORITIES

Priorities for implementation of the Pedestrian Master Plan are the projects listed in the Short Term Improvements category, as described in Section 4.2.

The project areas were determined based upon public feedback, steering committee guidance, and site analysis. Each short-term project area was evaluated by using a “Project Priority

Criteria Matrix” (see below), to determine its priority level.

The priority matrix criteria represent the most heavily used pedestrian sections, those which provide links between destinations such as schools and commercial areas, and those that address the most immediate safety or functionality concerns in the Town. Safety concerns include locations where pedestrians currently walk

PROJECT PRIORITY CRITERIA MATRIX

	High	Medium	Low
Usage (How many people currently use this section or would likely use it if there were facilities.)			
Connections (The proposed facility would provide links to key destinations, such as schools, commercial areas, parks or Town amenities.)			
Safety Issue (The proposed facility would increase safety for pedestrians.)			
Functional Issue (The proposed facility would solve a functional problem in the pedestrian network, such as necessary ADA or other upgrades or completing a gap in the sidewalk system.)			



unsafely or where pedestrian facilities would greatly increase safety. Functionality concerns include upgrading existing facilities to meet ADA requirements, completing missing gaps in the sidewalk system, and/or making other needed upgrades.

Cost was not used as a criteria in this matrix. This gives the Town the flexibility to make project decisions based upon need instead of cost. The Town can then utilize the *Funding Sources* list in Section 7.3 to attain funding to complete the listed priority projects.

The next several pages show each Tier One project on a separate page, along with its criteria matrix and a close-up view of its location on the map.

After the Tier One projects, Tier Two projects are described in detail and their Criteria matrices are shown.

Following the Short Term improvements, the Long Term Projects listed

in Section 4.4 of this document should take place as soon as funding sources or capital expenditures become available. These improvements will provide a finer degree of connectivity throughout Knightdale and the region, promoting the vision for the Town, but may not be in immediate need of improvement.



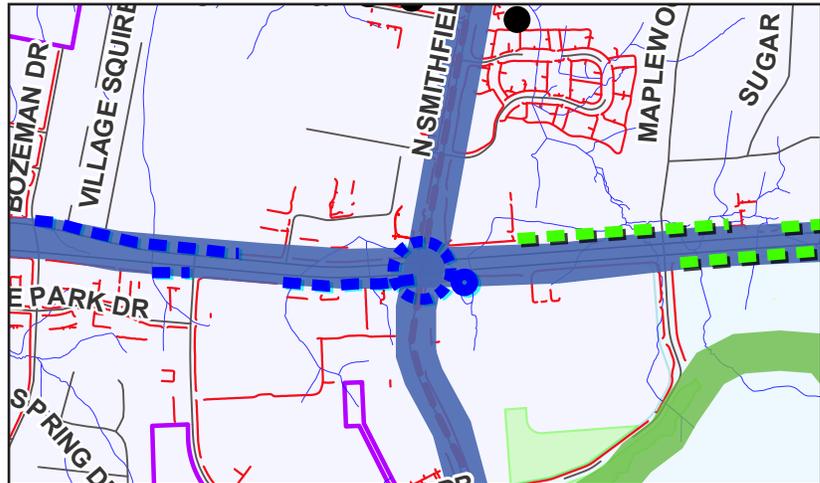
SHORT TERM PROJECTS- TIER 1

- Intersection Improvement at Smithfield Road and Knightdale Boulevard**

The Knightdale Boulevard corridor and the Smithfield Road corridor are both highlighted in the short-term corridor improvements below. The intersection of these two roads needs improved pedestrian facilities to encourage walkability and safety for residents as they travel from the southside of Town to the northside of Town. These facilities should include marked crosswalks, pedestrian push button signals and pedestrian refuge islands to cross the wide Knightdale Boulevard. This intersection has received funding in the 2012/2013 fiscal year from a Community Development Block Grant (CDBG) to complete one crosswalk on the east side

Intersection Improvement at Smithfield Road and Knightdale Boulevard **this project is partially funded*

	High	Medium	Low
Usage	X		
Connections	X		
Safety Issue	X		
Functional Issue	X		



of the intersection. The CDBG funds will also support the construction of a sidewalk along the east side of Smithfield Road from Main Street to Knightdale Boulevard.



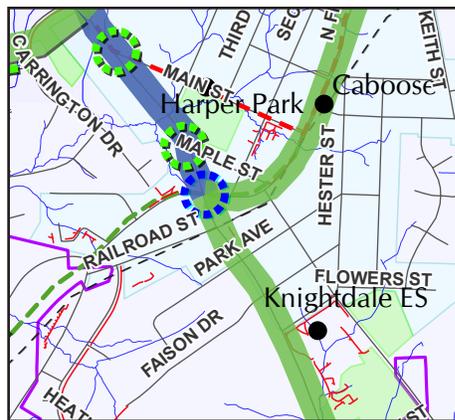
• **Intersection Improvement at Smithfield Road and 1st Avenue**

Smithfield Road and 1st Avenue was cited as a dangerous intersection with high pedestrian activity. This intersection is also the entrance to Old Town from the south and should provide an attractive and inviting welcome to residents and visitors. As sidewalks are added to Smithfield Road in this area, the intersection should be upgraded to include marked crosswalks and pedestrian push button signals.

Site analysis and the charrette “walking tour” have determined that installing a sidewalk along Smithfield Road near First Avenue may prove too difficult due to site constraints. A steep embankment on one side of the road and a narrow road right-of-way provide limited opportunities for sidewalk

Intersection Improvement at Smithfield Road and 1st Avenue

	High	Medium	Low
Usage	X		
Connections	X		
Safety Issue	X		
Functional Issue	X		



installation. However, if funding is acquired to widen Smithfield Road, (see list of TIP projects in Section 1) installing a sidewalk in this area may be feasible because right-of-way acquisition and significant grading will accompany a road widening project.

The intersection improvements suggested in this spot improvement project are still valid even

without sidewalk installation on Smithfield Road with the extension of a sidewalk on First Avenue to the intersection.

Intersection improvements at Smithfield Road and First Avenue may be included as part of an agreement with NCDOT that involves closing the railroad crossing at Fayetteville Street.

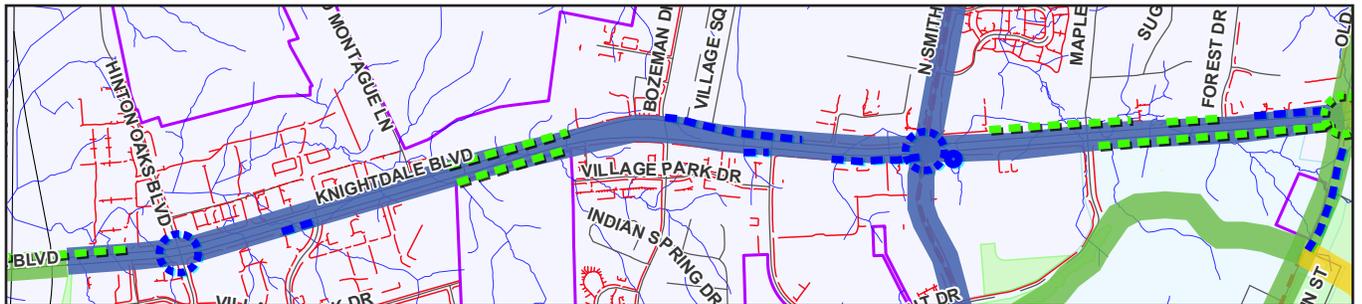


Knightdale Boulevard Corridor Improvements

• **Knightdale Boulevard
(Business 64)**

The Knightdale Boulevard corridor through Knightdale was identified in every public discussion and through site analysis as a critical

	High	Medium	Low
Usage	X		
Connections	X		
Safety Issue	X		
Functional Issue	X		



component to improving pedestrian connectivity in Knightdale. Knightdale Boulevard is a highly trafficked, highly visible corridor through Town. This corridor bisects the Town, attracts visitors and residents to the commercial businesses lining the road, and acts as a major obstacle to pedestrian connectivity. Improving the corridor through landscape treatments to soften walking along the busy highway, connecting commercial

strips with sidewalks, and adding signalized crosswalks and other pedestrian safety treatments for crossing the highway is critical to creating a more walkable Town.

The corridor should include certain traffic calming methods such as “bulb outs” or curb extensions in an effort to reduce high vehicular speeds by visually narrowing the roadway. Incorporating curb extensions will increase pedestrian visibility and safety at crosswalks by

reducing the crossing distance and slowing motorist speeds. The crosswalk should be highly visible and terminate at ADA compliant curb ramps. Correct areas of poor lighting by installing new pedestrian-level light fixtures in addition to the street lighting that is currently installed in some areas. This will provide a safer and more inviting walking experience.



• **Smithfield Road**

Smithfield Road, both north and south of Knightdale Boulevard, is in critical need of new sidewalks and upgrades to the existing sidewalk system. Correct areas of poor lighting by installing new pedestrian-level light fixtures.

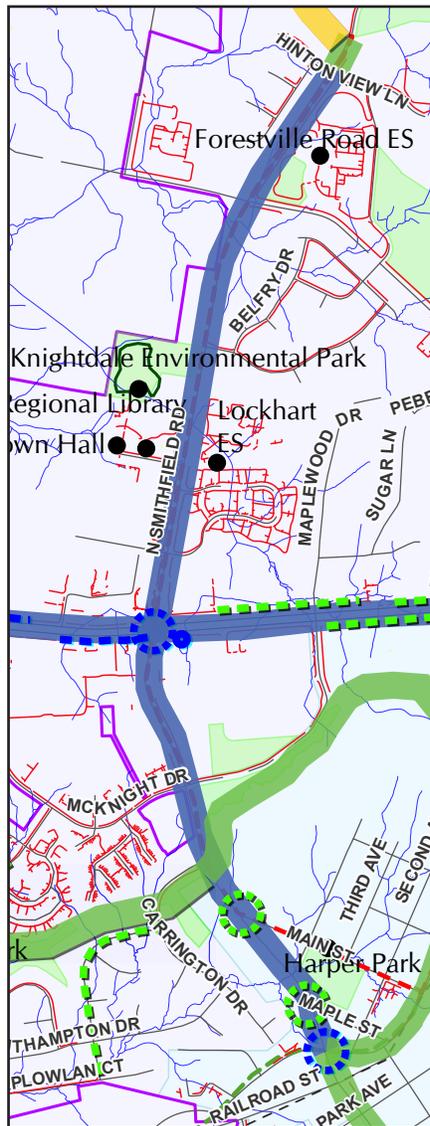
Several Town amenities and residential areas exist in this corridor, making it a prime candidate for pedestrian connectivity. The Knightdale Town Hall, Eastern Regional Library, Town Recreation Center, Forestville Middle School and Knightdale High School are all located in this segment of Smithfield Road. There are some existing sidewalks in this stretch of road along new developments, but gaps in the sidewalk system make walking between amenities

Smithfield Road Corridor Improvements (north)

	High	Medium	Low
Usage	X		
Connections	X		
Safety Issue	X		
Functional Issue	X		

difficult.

High school and middle school students can



be seen walking alongside the road in the swale after school to reach other destinations, such as the library, businesses along Knightdale Boulevard, and residences. Staff at Town Hall have expressed an interest in walking to businesses along Knightdale Boulevard or along Smithfield Road for exercise, but are forced to walk in the ditch alongside the road or through parking lots to reach destinations. Adding sidewalks to complete the sidewalk network in this corridor is critical and should be a relatively simple upgrade, making this section a high priority.



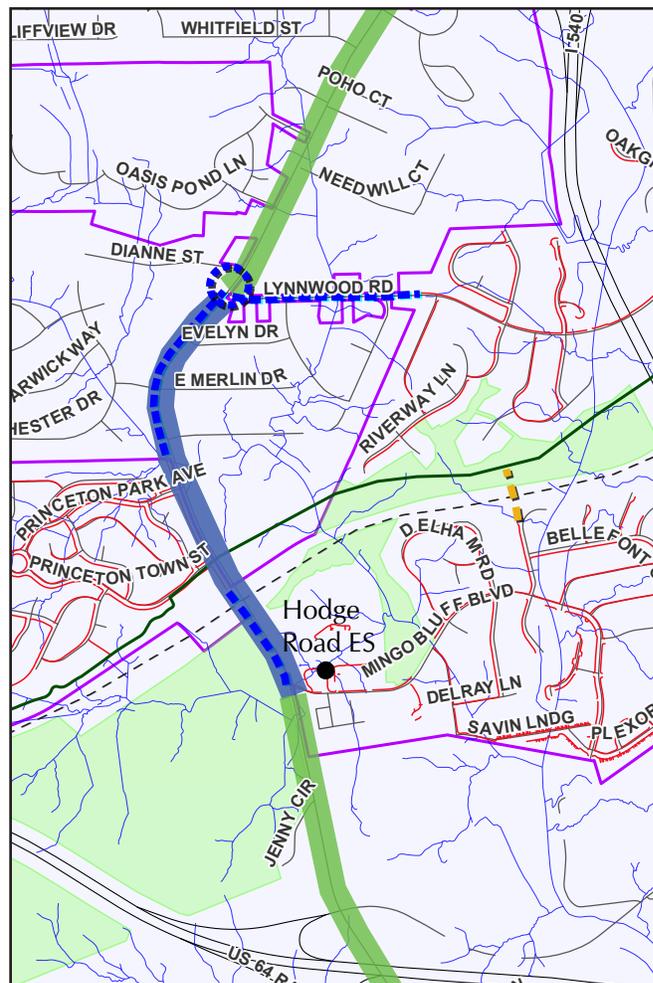
- **Roadway and Sidewalk Improvements at railroad crossing on Hodge Road**

The lack of a pedestrian connection over the railroad tracks proves to be a difficult design challenge and an obstacle in need of addressing to improve the quality of life of nearby residents. Provide a pedestrian railroad crossing from the Mingo Creek Subdivision and Hodge Road Elementary School to the neighborhood and greenway on the north side of the railroad along Hodge Road.

Designs and discussions at the charrette suggested a "Z" type crossing with fencing would be advantageous to encourage pedestrians and bicyclists to carefully cross the railroad in this area.

Roadway and Sidewalk Improvements at railroad crossing on Hodge Road

	High	Medium	Low
Usage	X		
Connections	X		
Safety Issue	X		
Functional Issue	X		



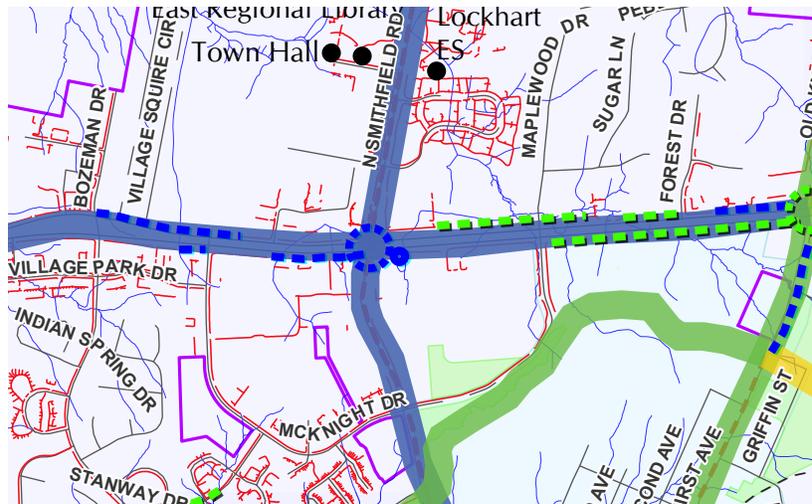


• **Sidewalk Construction on Knightdale Boulevard**

Construct a 5' minimum concrete sidewalk along portions of Knightdale Boulevard to complete the gaps in the existing sidewalk system that are smaller gaps or important connections. See the Proposed System Map in the Appendix for locations. Where possible, incorporate a minimum 3-foot wide planting strip between the edge of the roadway and the edge of the sidewalk.

Sidewalk construction of numerous small gaps or important connections along Knightdale Boulevard

	High	Medium	Low
Usage	X		
Connections	X		
Safety Issue	X		



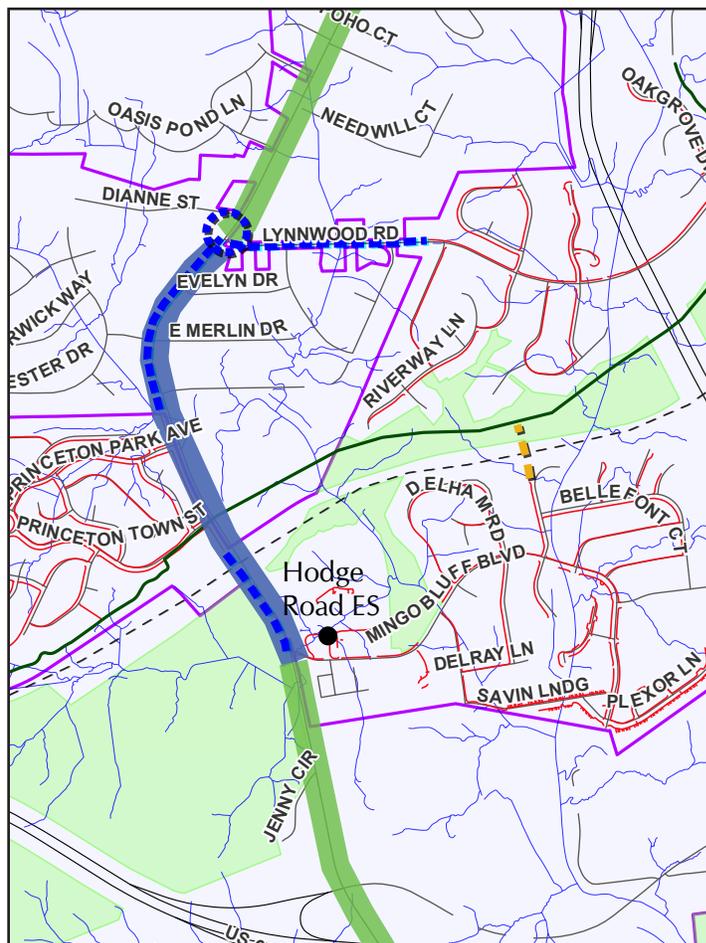


- Sidewalk construction on Hodge Road from Princeton Manor to Lynwood Road**

This sidewalk connection should be a minimum of 5 feet wide, if not wider along Hodge Road. The existing sidewalk on Hodge Road in front of the Princeton Manor subdivision is a wider 10 foot wide sidewalk as it connects to the Mingo Creek Greenway. The sidewalk should be extended northward on Hodge Road to Lynwood Road and then continued along Lynwood Road until connecting to the existing sidewalk system. This connection is important for residents of the subdivisions south of Lynwood Road, in addition to patrons of the greenway trail, to access the commercial strip on Knightdale Boulevard via Lynwood Road.

Sidewalk construction on Hodge Road from Princeton Manor to Lynwood Rd.

	High	Medium	Low
Usage	X		
Connections	X		
Safety Issue		X	
Functional Issue	X		



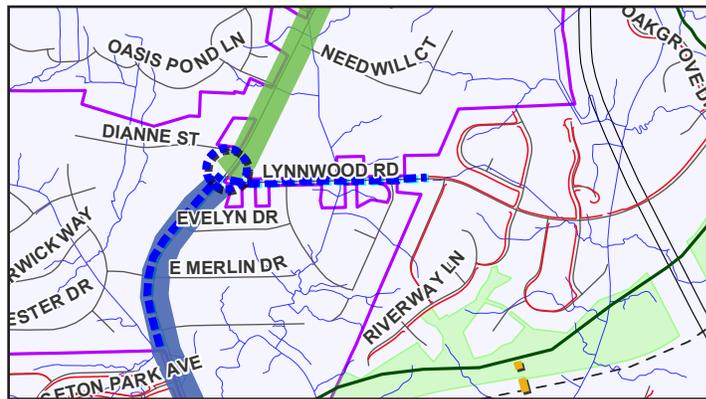


- **Intersection Improvement at Hodge Road and Lynwood Road**

In order to provide a safe connection, crosswalks should be added to the intersection at Hodge Road and Lynwood Road.

Intersection Improvement at Hodge Road and Lynwood Rd.

	High	Medium	Low
Usage	X		
Connections	X		
Safety Issue		X	
Functional Issue	X		





• **Intersection Improvements at Hinton Oaks Boulevard and Knightdale Boulevard.**

This intersection is a highly visible intersection connecting neighborhoods south of Knightdale Boulevard with shopping centers north of Knightdale Boulevard. In order to provide a safe crossing, crosswalks along with pedestrian push button signals should be installed.

Intersection Improvement at Hinton Oaks and Knightdale Boulevard

	High	Medium	Low
Usage	X		
Connections	X		
Safety Issue	X		
Functional Issue	X		

