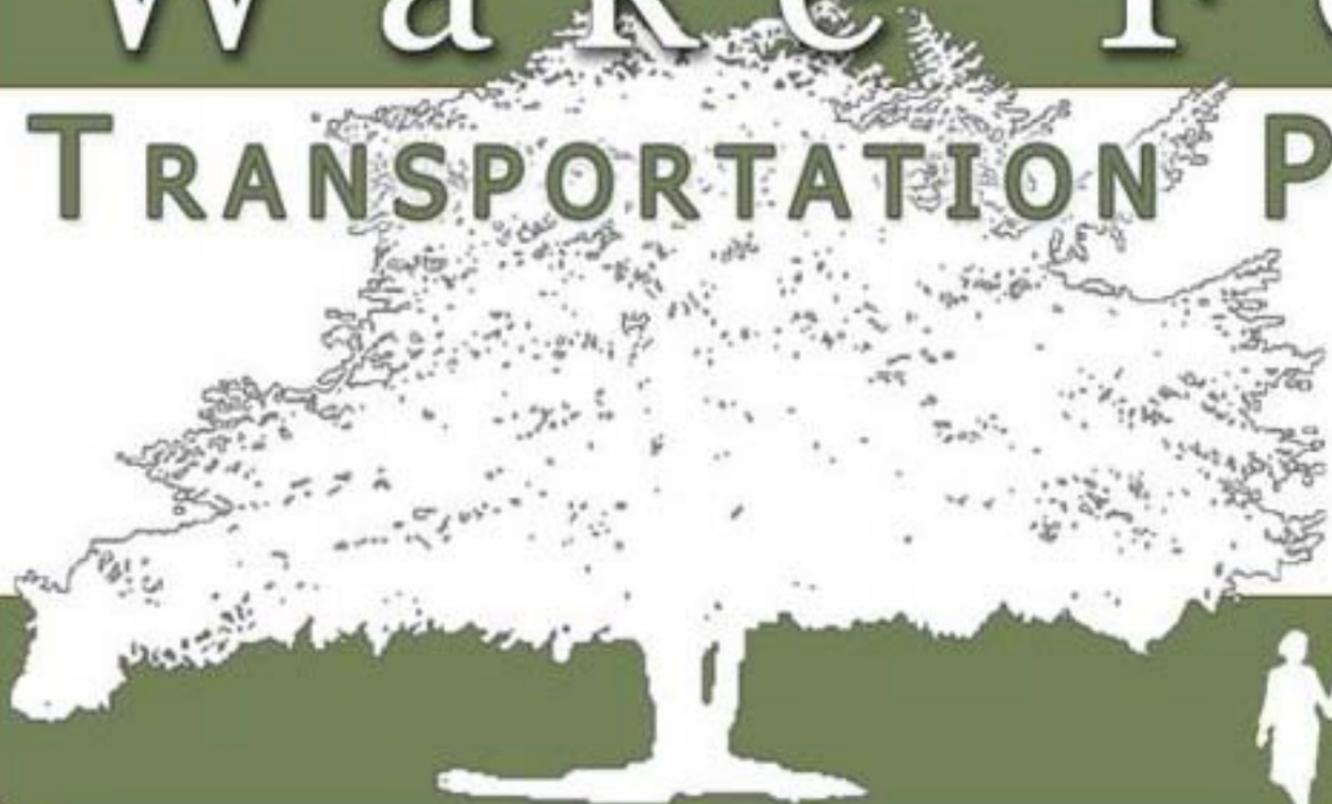


Wake Forest

TRANSPORTATION PLAN UPDATE

2010



Wake Forest

TRANSPORTATION PLAN UPDATE
2010



Final Report

July 2010





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and Associates, Inc.

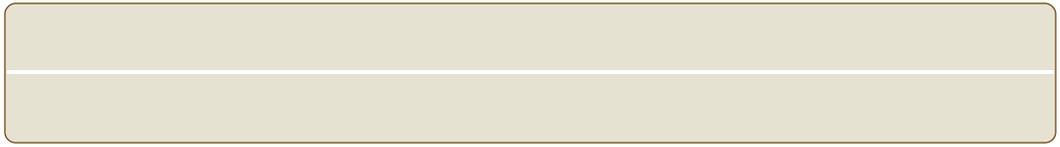


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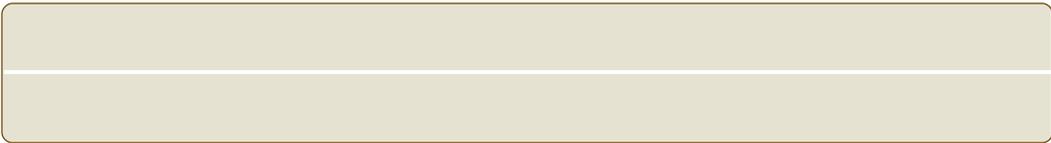
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Chapter 1

About the Plan

In January 2003, the Town of Wake Forest adopted the *Wake Forest Transportation Plan*, which recommended improvements and strategies to accommodate traffic growth and fulfill the desire for a diversified transportation system. The adopted transportation plan is shown in Figure 1.1. Much has changed in the years since the 2003 plan was adopted. The *Wake Forest Transportation Plan Update* amends the 2003 Plan to incorporate changes, reflect recent planning, and strengthen the town's vision for its future in the year 2035 and beyond.



Dr. Calvin Jones Highway

Aside from continued population growth and development in and around Wake Forest, the completion of the Dr. Calvin Jones Highway (NC 98 Bypass) — which was in the planning phase in 2003 — has been built and has created new travel patterns around downtown. (Note: As of March 2010, the Dr. Calvin Jones Highway west of US 1 is still under construction.) Further, Wake Forest adopted four new or updated plans of particular relevance: the US 1 Corridor Study (2006), the Pedestrian Plan (2006), the Bicycle Plan (2008), the Open Space and Greenways Plan (2009), and the Community Plan (2009). Each plan is the result of extensive data collection and public input gathering and reflects

equally important aspects of Wake Forest's transportation and sustainability goals. Similarly, the North Carolina Department of Transportation (NCDOT), the Capital Area Metropolitan Planning Organization (CAMPO), Wake County, and the City of Raleigh have produced various plans that include goals and visions affecting Wake Forest as it relates to regional transportation and land use objectives.

Given these numerous changes, now is the time to update the 2003 Transportation Plan and its recommendations. The *Wake Forest Transportation Plan Update (Plan Update)* expands upon key recommendations from the 2003 Plan and provides the Town of Wake Forest with new ideas and tools to effectively create and maintain a comprehensive transportation system. Much of this plan conforms with the 2035 Long-range Transportation Plan (LRTP) adopted by the Capital Area Metropolitan Planning Organization (CAMPO) in 2009. CAMPO will need to review and consider those areas where the Wake Forest Transportation Plan Update differs from the adopted 2035 LRTP when the LRTP is updated.

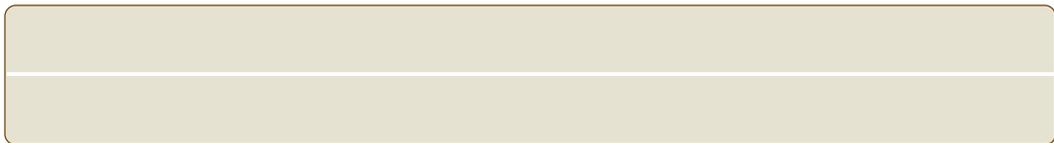
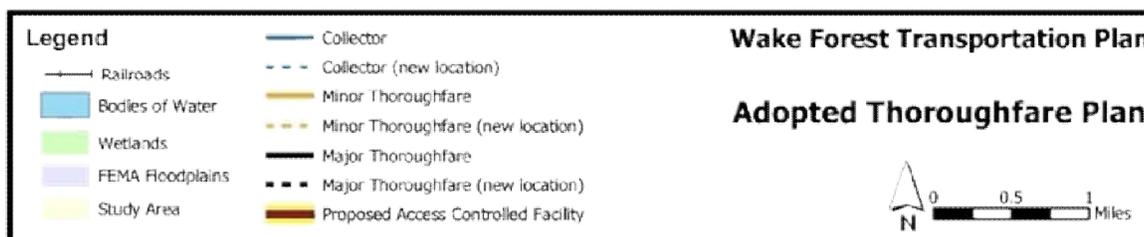
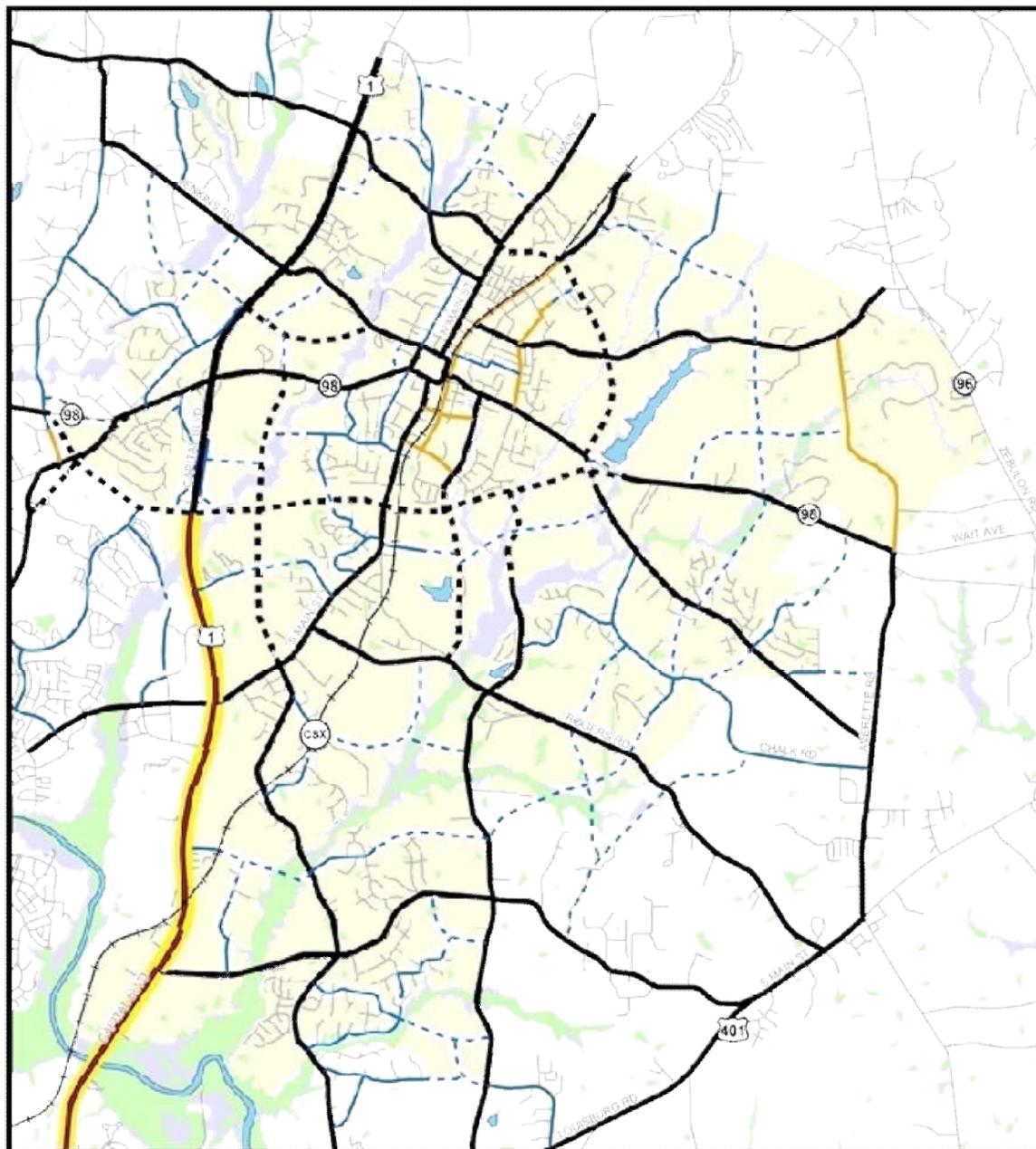


Figure 1.1 – Adopted Thoroughfare Plan



Source: Wake Forest Transportation Plan, Figure 2.1, January 2003

Transportation Plan Purpose

The goal of transportation planning is to meet anticipated transportation needs in the most efficient manner that blends with the character of the community and supports its overall goals. Planning now for future facilities minimizes impacts to homes, businesses, and environmentally sensitive areas when new roads, wider roads, or other transportation improvements are needed. Prior to construction of specific projects, a more detailed study will be required to reconsider development trends and to determine specific locations and design requirements.

The *Plan Update* is multi-modal. It includes elements for streets, highways, public transportation, pedestrians, rail, and bicyclists. It also serves as a Comprehensive Transportation Plan (CTP), which is a multi-modal long range vision plan depicting transportation infrastructure designed to address the area's travel demand for a minimum 20 year period. Publicly-funded transportation projects often take 20 or more years to plan, design, fund and construct. For example, the Dr. Calvin Jones Highway first appeared in the North Carolina Transportation Improvement Program (the state's seven-year "funded" plan) in 1981. It took 29 years since then to build the road.

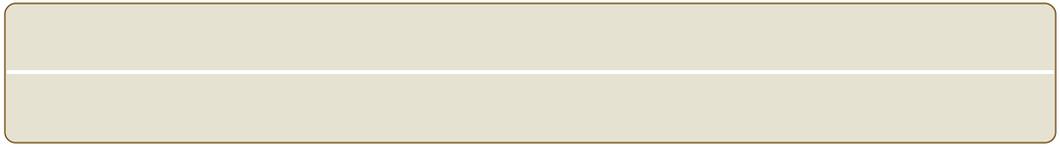
The purpose of the *Wake Forest Transportation Plan Update* is to:

- Work with the Board of Commissioners to pursue adequate funding to implement projects
- Work with the development community to implement spot improvements
- Work with the North Carolina Department of Transportation on projects along corridors of regional, statewide and interstate significance

The overarching goal is to establish a strategic plan that improves accessibility and mobility in Wake Forest while minimizing impacts to environmental, social, cultural, and historic resources and maintaining the integrity of existing neighborhoods.

Study Area

The study area — defined by the Wake Forest Urban Services Area — covers approximately 21 square miles of northern Wake County and southern portions of Franklin County. The existing corporate limits of Wake Forest encompass 15 square miles. Figure 1.2 shows the extent of the study area.



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See Figure 1.2 – Study Area.

Planning Process

The *Plan Update* represents a collaborative effort to determine the safety, connectivity, and access issues that contribute to the need for improved movement in Wake Forest. The analysis combines a projection of traffic volume on specific streets and highways with determinations of the facilities needed to accommodate that level of travel demand without undue congestion during peak travel periods. For more than 15 years, the community has documented its travel needs in adopted plans.

To succeed, transportation planning requires a cooperative process between multiple jurisdictions, key stakeholders, and citizens. Groups can share in the collective vision for a project even as they hold differing opinions on how this vision should be reached. The planning process was designed to create an open dialogue about the needs of Town residents.

The development of the Town's Comprehensive Transportation Plan has been a cooperative effort between Wake Forest, Rolesville, Raleigh, Youngsville, Wake County, NCDOT, and the Capital Area MPO. Given the overlap in the planning process for these plans as well as similarities in each plan's preferred vision for the Town, the results of public involvement, data collection, and analysis are shared.

Public Input

As is typical in the transportation planning process, local residents have an intimate understanding of existing conditions and a collective vision for the future. To incorporate that knowledge into the decision-making process, the *Plan* relied on public input through the involvement of an Advisory Committee and several public meetings.

Advisory Committee

The Advisory Committee (AC) was formed as a diverse group composed of planning staff, local officials, and citizens to provide informed guidance throughout the planning process. Beginning with a kick-off meeting on February 23, 2009, the AC met periodically to fulfill its mission of examining the existing deficiencies and potential solutions for driving, bicycling, walking, and transit use. The committee's duties included serving as a sounding board for project team ideas, participating in visioning and mapping exercises, providing feedback to the project team, and spearheading the promotion of other public involvement efforts.

Public Meeting – Findings and Preliminary Recommendations Session

A public meeting held at Town Hall on September 22, 2009 provided an opportunity for the project team to discuss with citizens a variety of transportation findings. These included current and anticipated traffic problems, areas of concern, future projects and expansion plans, and potential corridor alignments. Road, bicycle, pedestrian, bus, and passenger rail initiatives were mapped and presented to the public. In addition to discussing the *Plan's* potential impact on their respective interests, several themes emerged from the public meeting. These themes included:

- Blending bicycle improvement recommendations to ensure smooth, seamless transitions for cyclists riding between Wake Forest and surrounding cities, towns and counties. Providing wide, striped shoulders on roads would benefit bicyclists and motorists by creating a safe separation for road sharing. These and other bicycling initiatives should lead to a coveted designation of Wake Forest as a bicycle-friendly community by the League of American Bicyclists.
- Additional traffic signs at various locations in Wake Forest informing motorists of posted speed limits as well as lane assignments (left, through, right) were suggested.
- Angled curbs at intersections were identified as a suggestion by a motorist who frequently hits them when turning right.

The first public meeting served as a forum to present initial recommendations and gauge public support and interest.

Public Hearing – Feedback on Recommendations

At a public hearing in May 2010, the project team presented recommendations and results of the public outreach meetings to obtain Board of Commissioners and public input regarding the recommendations. A draft report and corridor profiles were available for review and comment on the Town website beginning in September 2009.

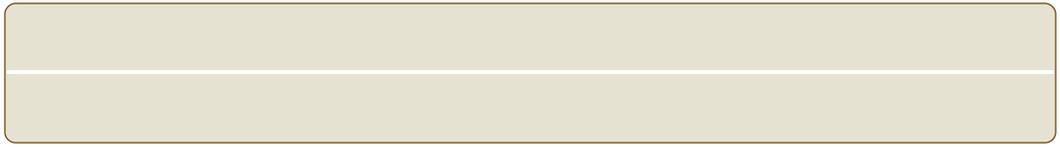


Report Organization

The *Plan* outlines analysis, findings, recommendations, and public input. Guiding Principles influenced the study recommendations.

The report includes the following chapters:

- About the Plan: introduction to the planning process
- Designing Our Future: guiding principles, vision, Community Plan Update, and summaries of other planning studies
- Area Growth Dynamics: existing and projected demographics
- Existing and Future Conditions: current and recent travel trends
- The Plan: recommendations
- Implementation





Chapter 2

Designing Our Future

Community pride prevails in Wake Forest. It's been that way for a long time. The history of the community is intertwined with good location and transportation, but it's the people who have made the real difference. To provide context, transportation typically is considered a means to an end. In other words, it's a necessity but not what the community is all about. With this philosophy firmly embedded, the citizens of Wake Forest have worked extensively to define and design their future. This chapter begins with a summary of the current effort to update the *Community Plan*, followed by a review of various planning efforts in the Town.

Wake Forest Community Plan

Growth in Wake Forest in the last 20 years has created numerous opportunities for long-time residents and newcomers. Growth has introduced to the area new businesses, new shopping opportunities, more jobs, and more ways to relax. But growth also has placed new demands on roads, parks and open space, utilities, and municipal services. The Wake Forest Community Plan, led by a Steering Committee of 11 citizens, aims to guide difficult decisions about the Town's future. From January 2007 to September 2009, the Community Plan Steering Committee met frequently to review, revise, and refine draft policy chapters.

Adopted September 15, 2009, the policies proposed in 24 draft chapters will become the officially adopted positions of the Town of Wake Forest government. The 24 policy chapters are grouped into 5 major headings:

- Town Areas
- Town Transportation
- Town Appearance
- Growth Management
- Quality of Life

In January 2009, the draft Growth Strategies Map and Action Agenda were presented at a public open house. The Growth Strategies Map (Figure 2.1) is a visual tool that identifies growth areas where various forms of development and redevelopment would best occur and where natural and cultural resources should be conserved. The Action Agenda is a to-do-list of actions to support the Vision Statements and Policies.

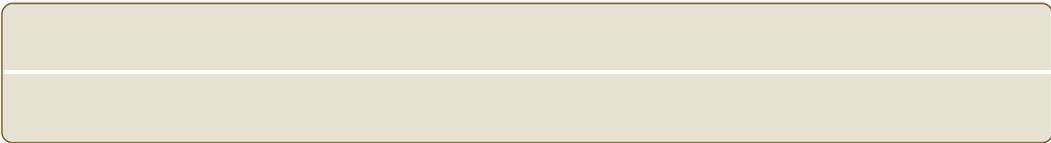
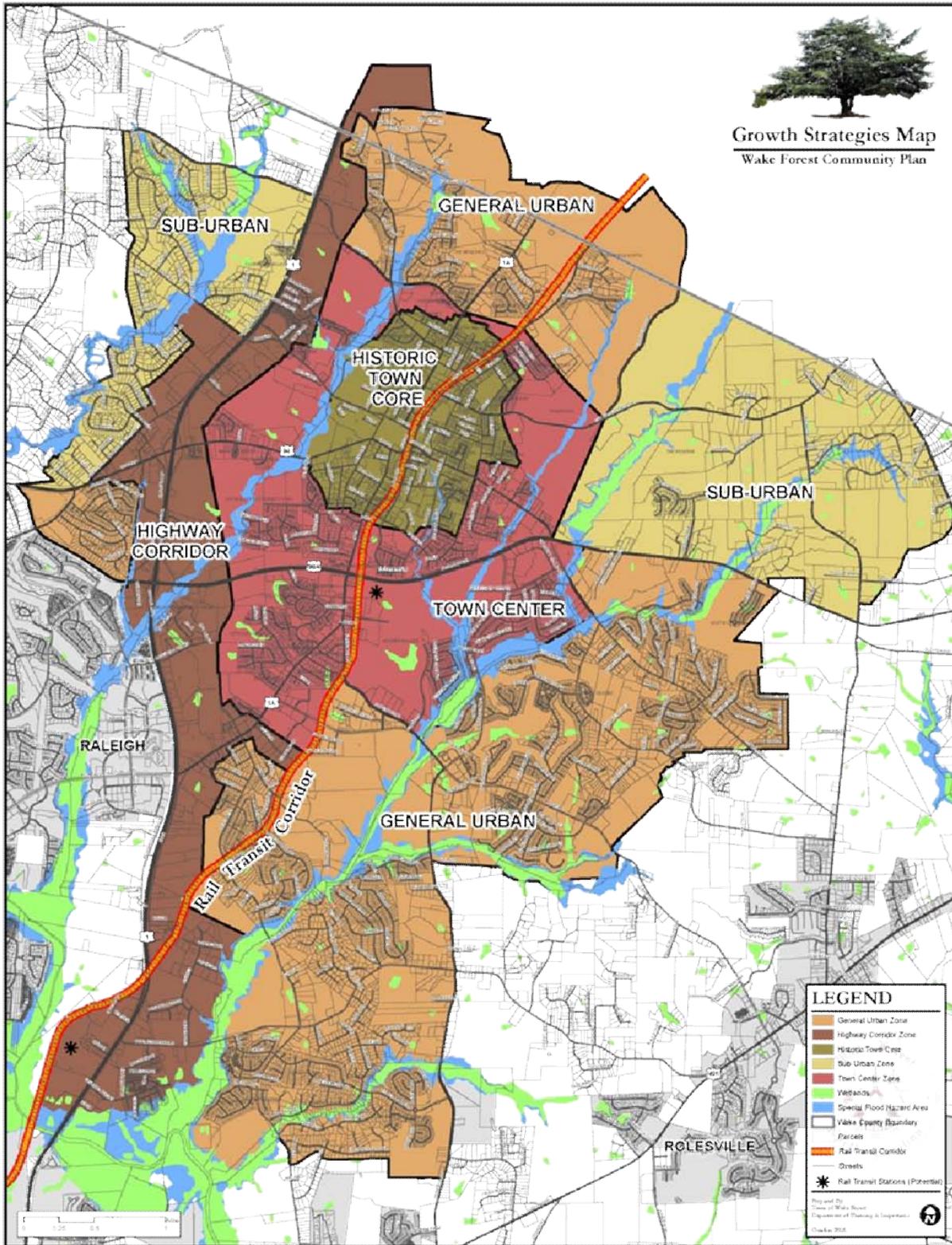
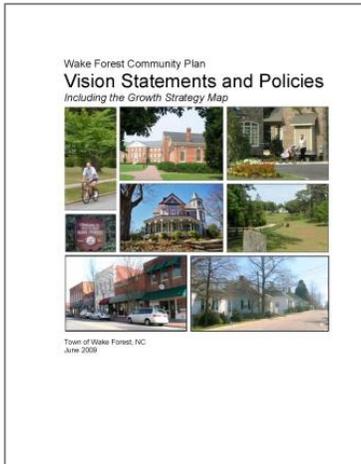


Figure 2.1 – Wake Forest Community Plan – Growth Strategies Map



Source: Wake Forest Community Plan

Vision Statements



The vision for the *Wake Forest Community Plan* was developed based on public feedback, discussions with area stakeholders, and input by the advisory committee. Vision statements were developed for 15 categories and provide a clear picture of where the Town of Wake Forest would like to be in the year 2025 (plan horizon year). The vision statements are written as if now is 2025 and we are looking back at what has transpired as a result of actions identified in the *Community Plan*. For the purposes of the *Wake Forest Transportation Plan Update*, transportation-related ideas are underlined for emphasis.

1. Small Town Character, Attractive Appearance
2. Vibrant, Revitalized Downtown
3. Well Planned and Timed Infrastructure
4. Growth That Pays its Own Way
5. Efficient Multi-Modal Transportation System
6. Walkable and Bikeable Community
7. Open Space and Environmental Quality
8. Expanded Park and Recreation System
9. Neighborhood Schools and Lifelong Learning
10. Balanced, Compatible Commercial Development
11. Affordable Housing and Quality Neighborhoods
12. Support for Arts and Culture
13. Better Jobs, Larger Tax Base, Local Businesses
14. Community Dedicated to Public Safety
15. Leadership, Communication, and Involvement

Vision Statement 1 — Small Town Character, Attractive Appearance

Wake Forest has kept its small town feeling and identity, while continuing to grow. Attractive, walkable neighborhoods, a thriving historic downtown, excellent community services, and an outstanding quality of life have made Wake Forest among the most desirable locations in the Triangle region. Streets in Wake Forest exude a welcoming, small town charm—overarching street trees, lush landscaping, understated signage, and wide, shaded sidewalks combine to create a truly inviting community character. Even road signs and traffic signals exhibit a quality design. Greenery is



everywhere. Small parks and natural areas are within walking distance of most parts of town. Office and retail parking lots, once viewed as “seas of asphalt”, are now tree-shaded and landscaped. Wake Forest has minimized “anywhere USA” development. Instead, buildings, old and new, honor the 100-year-plus heritage of the community. New two and three story buildings are finished in wood, brick and other traditional materials, and relate well to the street and their surroundings.

Vision Statement 2 — Vibrant, Revitalized Downtown

Wake Forest has a healthy, vibrant downtown with a unique mix of restaurants, shops, offices, entertainment and housing. Downtown streets are filled with people of all ages day and night, drawn by the historic character and beauty of the area, the human scale of its buildings and public spaces and a diverse offering of special concerts, festivals and cultural events. Storefronts and sidewalks exhibit a colorful, inviting mixture of merchandise, flower-filled planters, benches and other amenities. Additional parking is provided on the interior of blocks or at perimeter parking lots, so as not to detract from the tightly woven, pedestrian character of the area. Downtown buildings, new and old, have retained and respected the modest architectural scale and design detail that is so much a part of the heritage of Wake Forest. An upgraded Farmer’s Market has found a permanent home and a full service grocery store provides convenient shopping for the increasing numbers of downtown area residents. The Renaissance Plan for the heart of Wake Forest has become a reality.



Vision Statement 3 — Well Planned and Timed Infrastructure

The Town has planned ahead for necessary infrastructure, including adequate roads, water, sewer, schools, open space and greenways, sidewalks, and drainage. These services must be in place prior to the occupancy of the new development they serve. Infrastructure has, in many cases, been strategically employed to encourage development where it can best be accommodated. Advanced planning has allowed future school and park sites to be located and acquired ahead of their need. Planned highway and transit corridors have been identified to ensure their protection during the development process. Similarly, future greenway corridors have been mapped so that they may be incorporated into the design of new developments. An area-wide stormwater management plan has anticipated necessary drainage and retention facilities as development has occurred.

Vision Statement 4 — Growth That Pays its Own Way

Growth and development pays its own way in Wake Forest. Impact fees and infrastructure improvements, paid for as part of the development process, have been successful in offsetting the costs of additional schools, fire stations, parks and roads brought about by growth. This has lessened reliance upon existing property tax payers to finance the growth-induced expansions of these facilities. By encouraging efficient development patterns, Wake Forest has continued to deliver quality municipal services for a tax rate below regional averages. In addition, compatible commercial and light industrial development have continued to expand the town's non-residential tax base, helping to offset the costs of town services associated with new residential growth.

Vision Statement 5 — Efficient, Multi-Modal Transportation System



The Town of Wake Forest has worked proactively with the State DOT toward a balanced, efficient, multi-modal transportation system. Enhanced planning and technological advances in traffic management have resulted in a more efficient system of major and minor thoroughfares. US-1 and 1A have especially benefited and are better able to serve patrons of businesses along these routes as well as commuters. A new area-wide mass transit system serves Wake Forest, providing a stress free commute to and from Raleigh and the Research Triangle Park (RTP). The new transit service has been effective in helping to keep traffic counts and congestion below previously projected levels. The Town's policies on compact growth have reduced automobile dependency; compared to other communities, many residents of Wake Forest are able to walk, bike, or take the bus to most daily activities.

Vision Statement 6 — Walkable and Bikeable Community

Wake Forest continues to work toward becoming a very walkable and bikeable community. Mixed use developments encourage walking from home to work, shopping and transit services. New streets, as well as improvements to existing streets, are designed for multiple users (motorists, bicyclists, and pedestrians) –according to the level of traffic intended. Most streets have sidewalks on both sides; many larger streets have bike lanes. Designated crosswalks are evident throughout Wake Forest, but especially in the downtown area. In general, there is a high level of connectivity between neighborhoods and developments by a well-integrated network of streets, sidewalks, bikeways, walking trails, and greenway trails. This continuous system provides for a multitude of driving, walking, bicycling and transit alternatives. Cul de sacs are employed sparingly, in favor of fully connected neighborhood streets.

Vision Statement 7 — Open Space and Environmental Quality

In managing its growth, Wake Forest has worked to preserve open space and minimize adverse impacts to the region's air and water quality. The Town's walkable neighborhoods and nearby services are designed to create less traffic congestion and require shorter commutes. Streams and drainage ways passing through Wake Forest receive less storm water runoff and pollution due, in part, to policies on dedicated open space, tree preservation, landscaped parking areas, compact two and three story buildings, and vegetated buffer strips along streams and roadsides. Infill development and the adaptive reuse of vacant buildings has reduced the need for land clearing and sprawl. Solid waste levels have been substantially reduced through good participation in community-wide recycling efforts.

Vision Statement 8 — Expanded Park and Recreation System

As the community has grown, Wake Forest has steadily added to its system of parks and open space. Many smaller parks have been created through the Town's routine development approval process. Some larger park areas have come about through advanced planning and property acquisition by the Town. An extensive system of greenway trails, primarily adjoining area streams, is enjoyed by hikers, bicyclists, and others. These greenways also serve as natural corridors for the movement of wildlife in Wake Forest. The Reservoir has been protected and enhanced as an outstanding outdoor recreation area with walking paths, picnic areas and other low impact recreation facilities. A major new community recreation center has been completed, featuring an excellent indoor swimming pool.



Vision Statement 9 — Neighborhood Schools and Lifelong Learning

The Town and Wake County Schools have worked cooperatively to plan for schools well in advance of growth to avoid overcrowding and the need for mobile classrooms or constant redistricting. Traditional school buildings, whether new or rehabilitated, are located and designed to serve and be accessible to the neighborhoods around them. Rather than functioning as single purpose "factories to educate children", schools in Wake Forest serve as true neighborhood centers, providing space for community gatherings, recreational events and other functions. Increased diversity within the Town's neighborhoods has reduced the need for bussing to assure social and economic diversity in the schools. In addition, a new, large, state of the art library located at the center of the community serves as a flagship for education in Wake Forest, where an attitude of life long learning has become second nature to most residents of the town.

Vision Statement 10 — Balanced, Compatible Commercial Development

Town officials have navigated a careful course, balancing the need for sustained economic development against the threats to the community from over-commercialization. Small, locally owned shops and restaurants have been favored over big box retailers, chain stores, and “asphalt intensive” shopping centers. Various incentives have been employed, including a zoning and regulatory environment conducive to small business.

Vision Statement 11 — Affordable Housing and Quality Neighborhoods

Wake Forest neighborhoods display a wide variety of housing types and values, including attractive, affordable housing in many forms and locations. New and old neighborhoods alike are attractive and well maintained, having benefited from the town’s shared economic prosperity, and overall quality of life.

Walkable, mixed use neighborhoods are favored over automobile-dependent, cookie-cutter subdivisions and gated communities. An open system of pedestrian and bicycle friendly streets work together with a network of greenways to connect neighborhoods with the rest of the town. Most residential areas are convenient to neighborhood services, as well as public transit.



Vision Statement 12 — Support for Arts and Culture

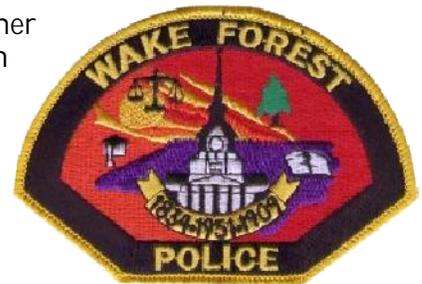
Wake Forest has emerged as a destination for arts and culture in the Triangle area. Appreciation for the arts and culture begins with value placed on the unique heritage of the town, exemplified by the preservation of historic buildings and landmarks throughout the community. Public art graces many public spaces. Cultural activities include a broad selection of traditional and contemporary art forms, festivals, fairs, concerts, plays, seminars, and cross-cultural events. Young and old, as well as people from many ethnic backgrounds, are drawn to a constantly changing array of indoor and outdoor events. All of these activities are facilitated by the addition of a new performing and cultural arts center of outstanding design and utility.

Vision Statement 13 — Better Jobs, Larger Tax Base, Local Businesses

Wake Forest is a community dedicated to the creation and prosperity of small businesses. As a result, Wake Forest's business sector has seen steady growth and diversification. New and expanding businesses, as well as some post-industrial industry, have provided for a favorable tax base, holding property taxes down. Those who wish to make Wake Forest their permanent home can find well-paid, lifelong career opportunities without having to leave the community. While workers in services, retail trade and some types of manufacturing continue to be an important part of the local economy, other kinds of work have expanded, including health care, information services, and professional and technical services. A significant tourism base has taken root, as visitors are drawn by the preservation and enhancement of Wake Forest's historic, pedestrian-oriented, small town charm.

Vision Statement 14 — Community Dedicated to Public Safety

Wake Forest is a community of neighbors, business owners, police, firemen and other public safety personnel committed to working together for a safe and secure town. Highly visible police officers may be seen on a regular beat, oftentimes on foot or bicycle, getting to know the neighborhood kids, and their parents. Fire fighters are out in the community more than ever, teaching fire safety in schools and conducting courtesy fire inspections of homes and businesses. Our citizens and our public safety officers continue to support a safe and secure community free of drugs, gangs, vandalism, violence and crime.



Vision Statement 15 — Leadership, Communication, and Involvement

Residents of Wake Forest show a keen interest in the affairs of their town government. There is a can-do spirit driven by civic pride and revealed through broad community involvement. The Town Board and various Town committees have no shortage of interested, qualified people willing to serve. Area citizens are heavily involved in civic clubs and organizations; volunteerism is a constant source of energy as it is poured into the institutions and organizations that work to improve the community. Town Commissioners routinely seek the views of their constituents on important decisions through personal contacts as well as enhanced information sharing and technology. A renewed focus on timely, effective communication between town government and town residents has greatly enhanced decision making in Wake Forest. Intergovernmental cooperation among local governments and state government agencies has done much to improve regional planning throughout Wake County.

Public Participation and Input



The *Wake Forest Community Plan* included many avenues for public participation and input in order to develop a plan that genuinely reflects the attitudes and viewpoints of the citizen-base as a whole. The outcome of the public participation for the Community Plan is relevant to the planning process of the *Wake Forest Transportation Plan Update*.

Ranked Guiding Principles

The guiding principles were framed by citizens in terms of their “likes and dislikes” and then ranked as part of the *Wake Forest Community Plan*. The top picks for “desired future” and “unwanted future” reveal the community’s desire for a proactive approach to transportation, ensuring the efficient implementation of a multimodal transportation network.

Desired Future (in ranked order)

1. Vibrant, Revitalized Downtown
2. Efficient, Walkable, Bikeable Transportation System
3. Small Town Character, Attractive Appearance

Unwanted Future (in ranked order)

1. Inadequate Transportation Not Keeping Up
2. Incompatible Commercial Development
3. Community Character and Identity Lost

Other Comments

Multimodal Considerations

Citizens suggested ways to define an efficient, diverse transportation system: high speed passenger rail, regional public transit, mass transit-trains, light rail, buses, sidewalks, greenways, crosswalks, bike lanes on big roads, commuter rail, vans, and rideshares. Destinations desired by public transit include Raleigh Durham Airport, Downtown Raleigh, Triangle Town Center Mall, events, and the rest of the Triangle region.

Roadway Considerations

Citizens offered the following list of roads to be widened or improved:

- US 1 (close driveways on US 1)
- South Main Street
- Falls of Neuse Road
- Rogers Road over Smith Creek
- Heritage Lake Road
- Ligon Mill Road
- Forestville Road
- Burlington Mills Road



Most of these roads have been or are slated to be widened subject to the availability of funds. Each road is a state facility and all are listed on the regional Long-Range Transportation Plan, indicating some level of agreement that improvements are needed.

Land Use, Transportation, and Urban Design Considerations

Citizens' dislikes most often had to do with infrastructure, specifically transportation, not keeping up with the pace of land development.

Other Planning Studies

Given the influx of planning efforts in the last several years, it follows that the *Wake Forest Transportation Plan Update* should be coordinated closely with other state, regional, county, and local plans and/or policies that impact planning efforts within Wake Forest. This section summarizes a general review of plans prepared within the region and highlights issues, policies, and/or directives that may influence potential recommendations for the *Plan Update*. Studies and reports reviewed include the following.

- Wake Forest Open Space and Greenways Plan (2009)
- Wake Forest Pedestrian Plan (2006)
- Wake Forest Bicycle Plan (2008)
- NC Transportation Improvement Program 2009-2015
- Metropolitan Transportation Improvement Program
- Metropolitan 2035 Long-Range Transportation Plan
- Special Transit Advisory Commission (STAC) Plan
- Southeast High Speed Rail Initiative (2007)
- US 1 Corridor Study (2006)
- Wake Forest Capital Improvement Program (CIP)
- Wake County (unincorporated areas) Transportation Plan (2003)
- Raleigh Comprehensive Plan (2009)
- Imagine Rolesville Transportation Plan (2002)
- Franklin County Comprehensive Transportation Plan (ongoing)

Overlapping Recommendations

Several recommendations in the Pedestrian Plan, Bicycle Plan, and Open Space & Greenways Plan overlap. These trends are discussed below, some of which already are being implemented by the Town.

Developer Responsibility: Nearly all of the plans cite the need to strengthen policies that require or encourage developers to increase connectivity between new development and surrounding destinations:

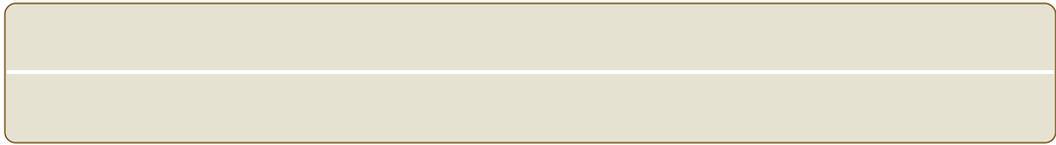
- “It is recommended that the Town establish a program to work with developers and homeowners to ensure that greenways are built, and that a suitable agreement for both parties is reached which guarantees long-term maintenance and security responsibilities.” (Town of Wake Forest Bicycle Plan, 2008, 3-11)
- “Local ordinances should be amended to require pedestrian facilities be built as part of a subdivision project to be extended beyond the limits of the subdivision boundaries to connect to nearby trip attractors and developments” (Town of Wake Forest Pedestrian Plan, Nov. 2006, 6.3.1)

Encouragement and Education Programs: Another aspect of developing and maintaining a successful network of greenspace is public support. While residents of Wake Forest have expressed a strong desire for more open spaces and greenways, various programs can contribute to increasing awareness and support of greenways and their many benefits. Some commonly cited programs and policies include:

- Safe Routes to School programs
- Regularly scheduled bicycle- and pedestrian-related events with promotions, contests, and/or education programs (annual or monthly, or for designated days, weeks, or months throughout the year)
- Publish and distribute a brochure with maps of bicycle and pedestrian routes, safety tips, event schedules, etc.
- Environmental education and interpretive facilities

Increased Connectivity: Connectivity represents good policy that encourages access between neighborhoods and to open spaces and other destinations.

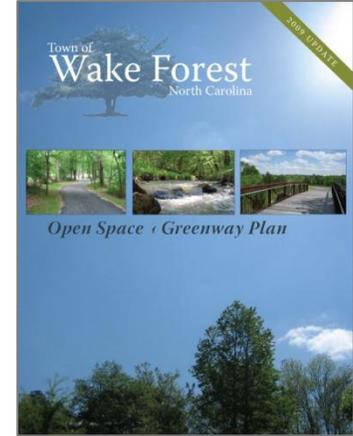
- According to the Bicycle Plan Survey, all of the respondents indicated they would like to see more greenways in town, specifically:
 - Between neighborhoods;
 - From neighborhoods to downtown, parks, and schools; and
 - As connections to the Raleigh greenway system and the Falls Lake Greenways.
- According to the Pedestrian Plan, concepts derived from the interests of the Town, steering committee, and public include:
 - Pedestrians should be able to access Downtown Wake Forest from all parts of the community.



Wake Forest Open Space and Greenways Plan (2009)

Wake Forest grew along a relatively flat ridgetop separating two creeks: Smith and Richland. South Main Street (US 1-A) generally follows the ridgetop, the dividing line between watersheds. Like its terrain, travel in the community is dominant along a north-south axis; along the railroad, US 1, US 1-A, Ligon Mill Road, Forestville Road, and many minor roads. Major east-west travel follows NC 98, Durham Road, Wait Avenue, and Rogers Road.

The Open Space and Greenways report cites parcels and strategies to preserve land that together will form an interconnected “necklace of parks, recreation, and public open space”. Travel on foot and bicycle are key elements of the Wake Forest transportation system and benefit from an intact network of greenways. Twin priorities in Phase One include a north-south corridor along Smith Creek and an east-west corridor along Wait Avenue and Durham Road. Together, these corridors will link downtown Wake Forest, the Seminary, the retail center at the intersection of Capital Boulevard and Durham Road, the Heritage neighborhoods, and residents in-between. The town was advised to pursue 80 percent grant funding from the U.S. Department of Transportation (Enhancement Funds), various State environmental resource agencies, and general obligation bonds passed in 2000 by the voters of Wake County to acquire open space.



Wake Forest Pedestrian Plan (2006)

The following framework was approved as an implementation strategy:

- Use the base of pedestrians to expand the awareness of the benefits of a walkable community.
- Expand and modify the existing pedestrian route network to a comprehensive, connected, safe system so it better meets the needs of the community, provides access to all, and enhances the current transportation infrastructure.
- Begin making the critical connections between destination points that will allow for continuous growth of, and improvement in, the pedestrian transportation network.

These three steps represent the core of the *Pedestrian Plan* implementation strategy. As individual policy and physical recommendations are addressed, each should fit with one of these three primary strategies. Priority pedestrian corridors are listed in *The Recommended Plan* section of this report (Chapter 5) and shown in Figure 2.2.

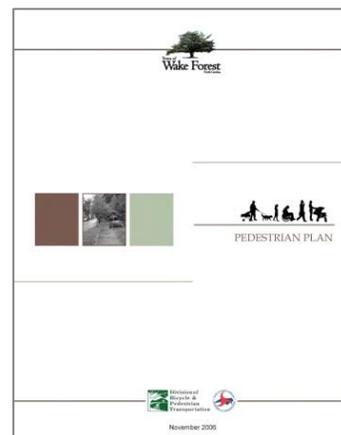
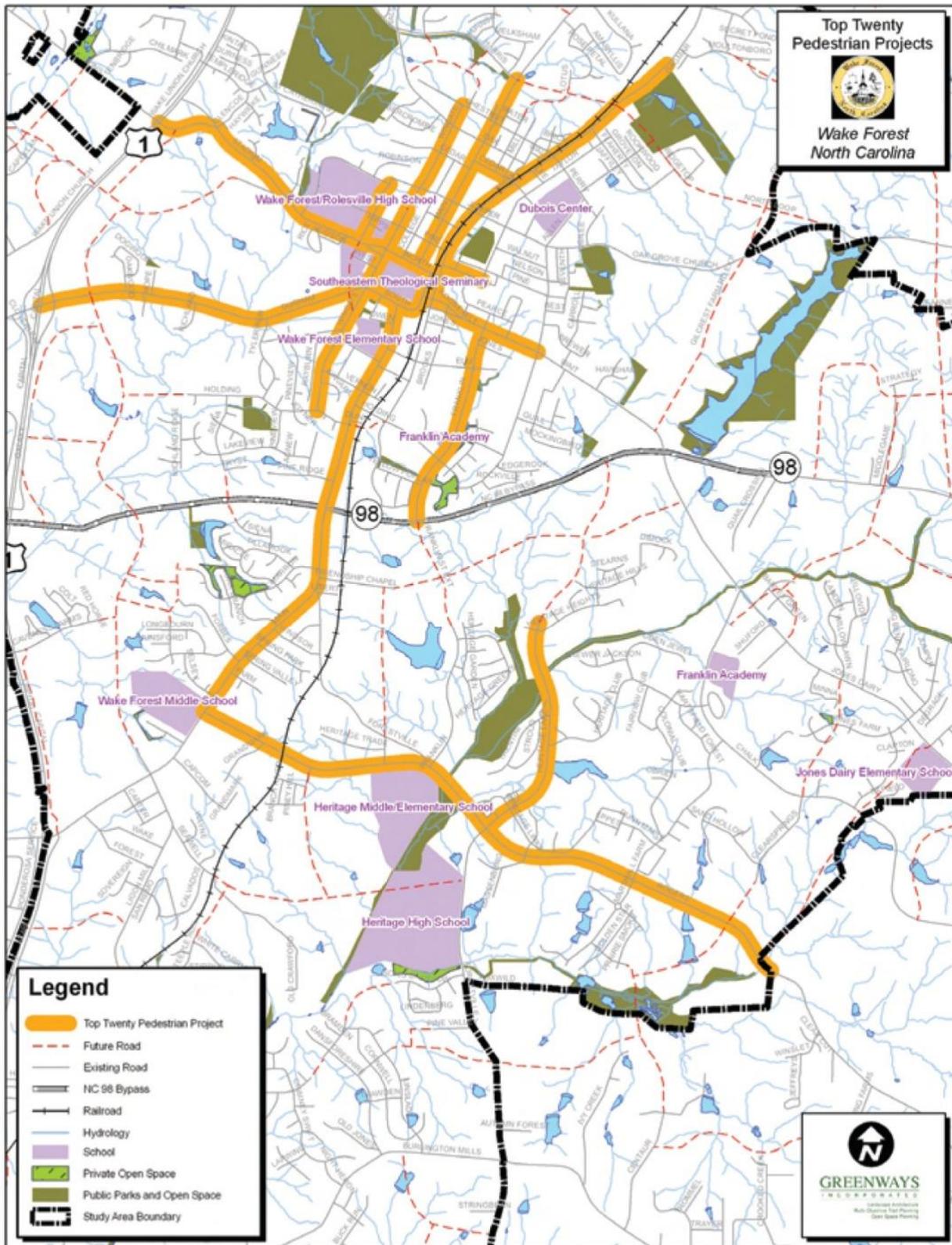
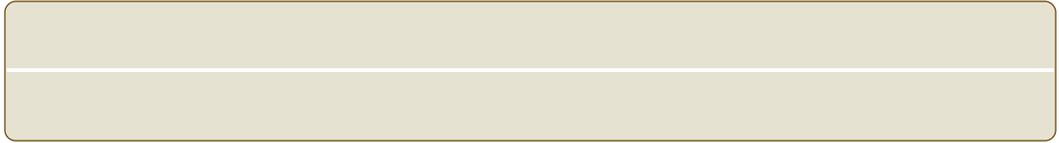


Figure 2.2 – Wake Forest Pedestrian Plan Priority Pedestrian Corridors



Source: Wake Forest Pedestrian Plan, Figure 7.1, November 2006



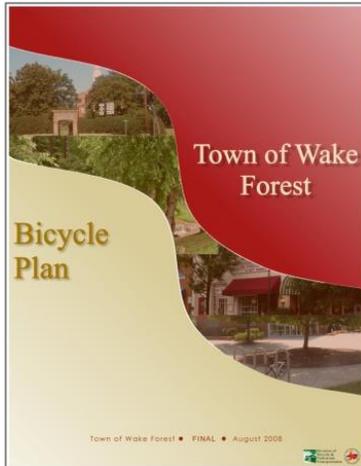
In February 2009, the Greenway Advisory Board recommended the following 5 priority goals.

1. Construct trails starting with Dunn Creek, Neuse River Bridge and trails to it, and Reservoir Trail.
2. Finalize Open Space & Greenway Plan Update
3. Greenway funding recommendations for the 2009 Town budget and Capital Improvement Plan.
4. Identify areas for type 1, 2 & 3 greenways, and fine tune argument for implementation of these types.
5. Long-range strategy for trail construction and greenway acquisitions with a spreadsheet status/priority list coordinated with maps.

The Greenway Advisory Board also recommended to the Wake Forest Board of Commissioners that all of the following priorities be funded to bring the community together with an interconnected system of sidewalks:

- Wait Avenue: North Allen Road to Dr. Calvin Jones Highway (NC 98 Bypass)
- Stadium Drive: North Wingate Street to US 1
- Rogers Road: Forestville Road to South Main Street
- Oak Avenue: Harris Road to North Main Street
- Heritage Lake Road, west side: Rogers Road to Soccer Center
- Forestville Road: Rogers Road to Song Sparrow Drive
- Durham Road: Retail Drive to North Wingate Street
- S Wingate Street: West Holding Avenue to Stadium Drive
- Ligon Mill Road: Song Sparrow Drive to South Main Street
- Rogers Road: Marshall Farm Road to Forestville Road
- South Main Street: Dr. Calvin Jones Highway to Rogers Road

Wake Forest Bicycle Plan (2008)



Short distances between destinations, conveniently located public schools, climate, and topography are favorable factors for riding bicycles in Wake Forest. The small town appeal of Wake Forest suggests that discretionary trips (e.g. shopping, school, social, recreational) may be a good target market. Preliminary survey results and stakeholder input indicate residents do not feel comfortable cycling in town except on a few residential streets. A self-selected citizen survey conducted in 2006 received 193 responses. Of those respondents, 82% had ridden a bicycle in the last six months, usually on weekends. Most respondents indicated they ride for recreation, exercise, and a family event. Top destinations included the park, neighborhood, and into town.

Nearly all respondents indicated they would like to ride more, and most indicated they would ride more if there were more clearly marked trails, better places to which to ride, wider roads, and better and safer road conditions. All survey respondents indicated they would like to see more greenways in the Town, and 95 percent indicated they would like to see more bike lanes.

Survey results indicated the following locations for future greenways:

- Connections from one neighborhood to another
- From neighborhoods to downtown, parks, and schools
- From downtown to the "Factory" on South Main Street and from downtown to Capital Boulevard
- Around parks, especially Flaherty Park
- Connections to the Raleigh greenway system and the Falls Lake Trail

Respondents also suggested the following locations for future bike lanes:

- | | |
|-------------------------|---|
| ▪ Burlington Mills Road | ▪ Star Road (frontage road parallel to Capital Boulevard) |
| ▪ Durham Road | ▪ South Main Street |
| ▪ Franklin Street* | ▪ Stadium Drive |
| ▪ Jenkins Road | ▪ Thompson Mill Road |
| ▪ Jones Dairy Road | ▪ Wait Avenue |
| ▪ Ligon Mill Road | ▪ Wake Union Church Road |
| ▪ Purnell Road | |
| ▪ Rogers Road | |

* Bike lanes are now provided on Franklin Street

Note that not all of the roads listed above are recommended for widening, so bike lanes are not necessarily recommended either, due to the scarcity of state and federal transportation funds.

Sixty-two percent (62%) of respondents felt that Wake Forest needs more bike parking. Recommended locations for bike racks include the following areas: downtown, parks, shopping areas, schools, libraries, at trail heads, in parking areas, and at public gathering places.

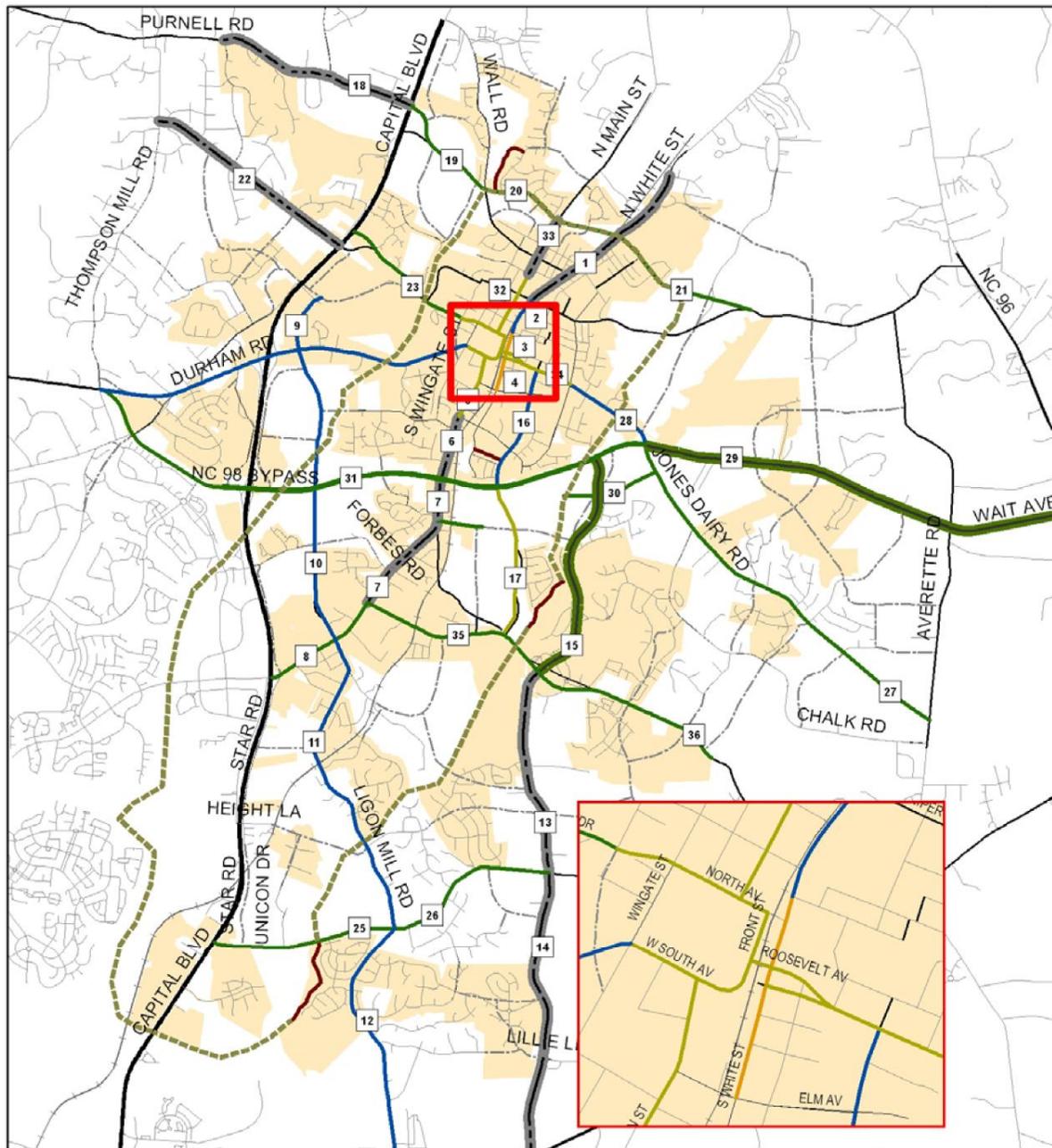
Many comments indicated Wake Forest needs safer bicycling routes to schools, parks, tennis courts, and shopping centers. Respondents often discussed their wish to ride with their children, but they felt that they were unable to because the roads were too dangerous. These statements, along with a demand for connections to Raleigh's greenway and bicycle system, are fairly consistent with the issues identified by the Stakeholder Committee that the Town needs an improved and safer cycling network for children.

The major conclusions drawn from the survey results are as follows:

- Recommendations in the Plan should work to increase cyclist's safety and comfort on existing roadways. This also will attract more cyclists to ride in Wake Forest.
- The Plan should emphasize building more greenways as a way to promote family-friendly cycling in Wake Forest.
- Major roads that should be improved include: Main Street, Forestville Road, Ligon Mill Road, and Durham Road.

Specific recommendations from the Bicycle Plan are presented in *The Recommended Plan* section of this report (Chapter 5) and on Figure 2.3.

Figure 2.3 – Wake Forest Bicycle Plan – Recommendations Map



Source: Wake Forest Bicycle Plan, Figure 4.2, August 2008

Legend

Ultimate Treatment

- Bike Lanes
- Wide Striped Shoulder
- Sharrows
- Shared Lanes
- Multi-Purpose Path
- Multi-Purpose Path, Wide Striped Shoulder
- Greenway (new location)

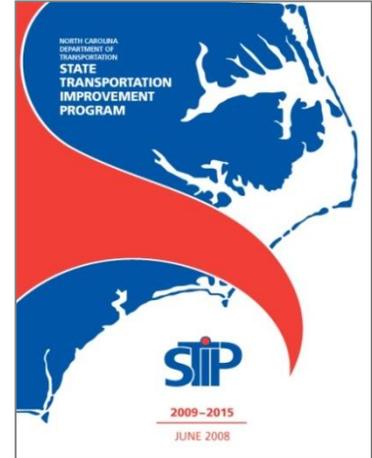
- Existing Greenway
- Future Road on New Location
- Town Limits



NC Transportation Improvement Program 2009-2015

The Transportation Improvement Program (TIP) provides a financially constrained list of the most immediate priority transportation improvements for an area. The seven-year document adopted by the North Carolina Board of Transportation includes provisions for highway, bicycle, pedestrian, rail, and public transportation projects. The statewide TIP contains funding information and schedules for multiple transportation divisions including highways, aviation, enhancements, public transportation, rail, bicycle and pedestrians, and the Governor's Highway Safety Program.

Actual implementation schedules are subject to the readiness of projects including securing necessary permits and the timeliness of construction contractors. Projects of interest to Wake Forest in the current TIP are summarized in Table B.1 in Appendix B.



Metropolitan Transportation Improvement Program

The Capital Area Metropolitan Planning Organization (CAMPO) includes elected and staff representatives from the Town of Wake Forest and all other municipalities in Wake County plus portions of Franklin, Granville, Johnston, and Harnett counties. A consensus-list of projects is prepared and submitted to NCDOT for consideration in allocating state and federal transportation funds in the State TIP. The Wake Forest request for 2011-2015 include:

- Widen South Main Street to three lanes from Forbes Road north to Forestville Road, a half-mile stretch that is the main gateway from the south into Wake Forest. It is operating at capacity and has numerous driveways and street entrances. Backups frequently occur and there have been rear-end collisions. The construction of a center turn lane with curb, sidewalk and bicycle lanes will increase safety and improve capacity. Design and right-of-way acquisition are substantially complete. This project currently ranks 12th on the MPO priority list and it's also on the STIP. An estimate of cost (STIP) is \$10.4 million.
- Widen and extend Ligon Mill Road between South Main Street and Dr. Calvin Jones Highway, a distance of 0.40 miles, to provide a multi-lane section with bike lanes at a cost of \$2.7 million. This project ranks 20th on the MPO priority list.
- Interchange and roadway improvements to US 1 from Gresham Lake Road to Burlington Mill Road. This is a joint request of the US 1 Council of Planning members.
- Replace obsolete and deficient bridges on the following state-maintained secondary roads:

- Rogers Road over Smith Creek – the bridge is a traffic bottleneck because it is only two lanes wide, but needs to be five lanes wide. An estimate of cost is \$700,000.
- Forestville Road over Sanford Creek. An estimate of cost is \$1.2 million.
- Ligon Mill Road over Smith Creek. An estimate of cost is \$1.3 million.
- Oak Avenue / Harris Road over Richland Creek. An estimate of cost is \$800,000.

Other projects prioritized by the Town of Wake Forest for the 2009-2015 Metropolitan Transportation Improvement Program include:

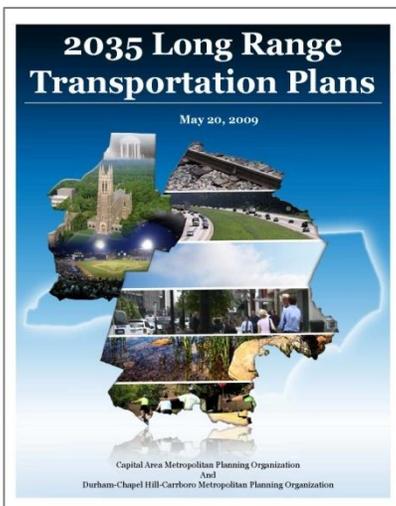
- Northside Loop
- South Franklin Street Extension
- Burlington Mills Road Widening
- Bicycle lanes on South Main Street (US1A)
- Wake Forest Bypass Greenway (MTIP # E-4708)
- Flaherty Park Greenway

Metropolitan 2035 Long Range Transportation Plan

The Metropolitan 2035 Long Range Transportation Plan seeks to preserve the infrastructure, improve safety, provide system connectivity, improve mobility, increase access, protect air quality, and support economic growth in Wake County and adjacent areas. Projects must be listed in the Long Range Transportation Plan in order to receive state and federal transportation funding through the North Carolina State Transportation Improvement Program (STIP). The cost of the program must fit anticipated revenue to create a fiscally-constrained plan. From 2009 through 2035, the CAMPO area (all of Wake County plus portions of adjoining counties except Durham and Orange), expects to receive \$10 billion divided as follows by mode of travel:

- Non-toll roads (including pedestrian and bicycle facilities) = \$5.4 billion
- Toll road subsidies = \$1.6 billion
- Passenger rail = \$1.6 billion
- Bus transit = \$1.6 billion

Additional passenger rail funds have been requested from the federal government for high-speed intercity passenger rail service enhancements between Raleigh and Petersburg, Virginia. Wake Forest projects included in the fiscally-constrained plan are shown in Table 2.1:



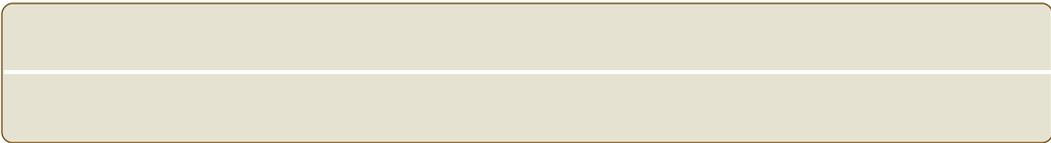


Table 2.1 – Wake Forest LRTP Projects

Year	Project Description	Cost
2015	South Main St — widen between Forbes Rd and Rogers Rd	\$1.7 million
2015	US 401 Rolesville Bypass — complete bypass and widen to Louisburg	\$81 million
2025	Heritage Lake Rd — widen and extend to Rogers Rd	\$7.1 million
2025	Ligon Mill Rd — widen to 3 lanes south of South Main St and build 4 lanes median-divided north to Stadium Dr	\$31.5 million
2025	Franklin St — extend to Rogers Rd	\$11 million
2035	Forestville Rd — widen south of Rogers Rd to Horton Rd	\$83.2 million
2035	US 1 — upgrade to an 8-lane freeway between I-540 and Burlington Mills Rd with interchanges at Durant Rd and Burlington Mills Rd	\$143 million

Special Transit Advisory Commission (STAC) Plan

The Special Transit Advisory Commission (STAC) was formed through a cooperative regional effort to recommend a plan for major transit investments throughout the Triangle area. The Commission met in 2007 and 2008 and formulated recommendations contained in a final report entitled "Regional Transit Vision Plan: Recommendations for North Carolina's Research Triangle Region". These recommendations are included in the Long Range Transportation Plan as numerous bus service enhancements (Figure 2.4) and rail investments (Figure 2.5).

Rail service is envisioned as electric powered light rail transit and diesel-powered commuter rail service. Light rail would be provided by 2035 from downtown Durham through RTP, Cary, NC State University, downtown Raleigh and then along the CSX rail corridor parallel to US 1 as far north as Durant Road. Wake Forest passengers would change trains and connect to diesel-powered commuter rail trains taking them to Wake Forest. Station locations in Wake Forest have not been identified. The frequency of commuter trains to and from Wake Forest would be limited to perhaps four in the morning and four in the afternoon. The commuter trains likely would extend south of Durant Road to downtown Raleigh.

Analysis conducted for the Town of Wake Forest and CAMPO (during the US 1 Corridor Study) concluded limited rail right-of-way (only 80 feet wide) in the CSX corridor through downtown Wake Forest combined with the need for additional tracks adjacent to the current freight tracks precludes extending regional rail service to downtown Wake Forest without significant loss of property. Therefore, terminating regional passenger rail service south of downtown Wake Forest should be considered, ideally in the vicinity of Dr. Calvin Jones Highway crossing of the CSX corridor. At this location, some provision for park-and-ride as well as fixed-route bus access and circulation should be provided. A second regional rail station in the corridor should be developed in the vicinity of the US 1 and Burlington Mills Road intersection. At this location, CSX tracks are close to US 1 and highway traffic from the north easily can be diverted to a park-and-ride serving a regional rail station at this location.

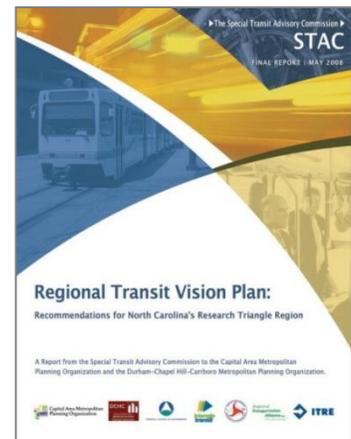
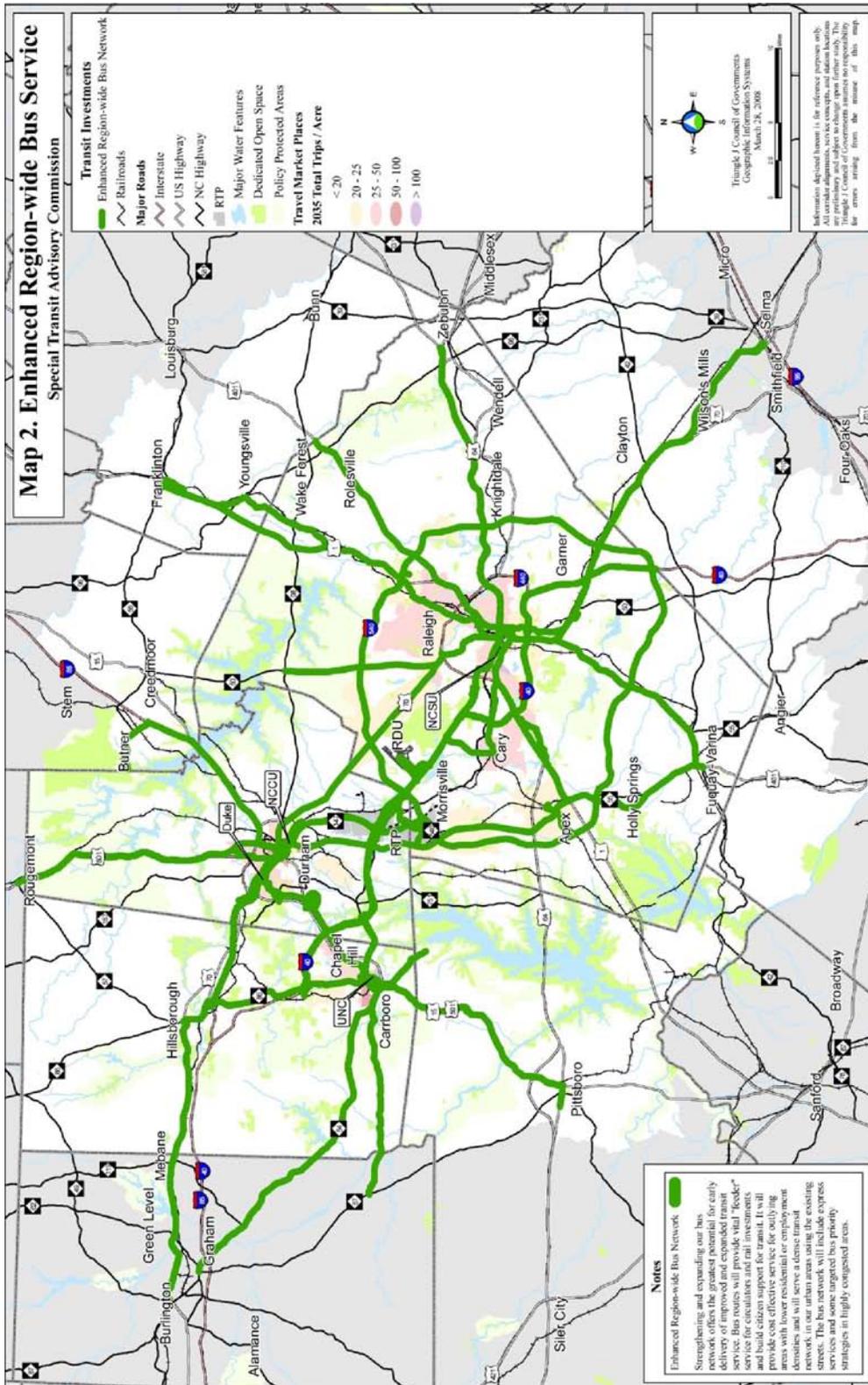
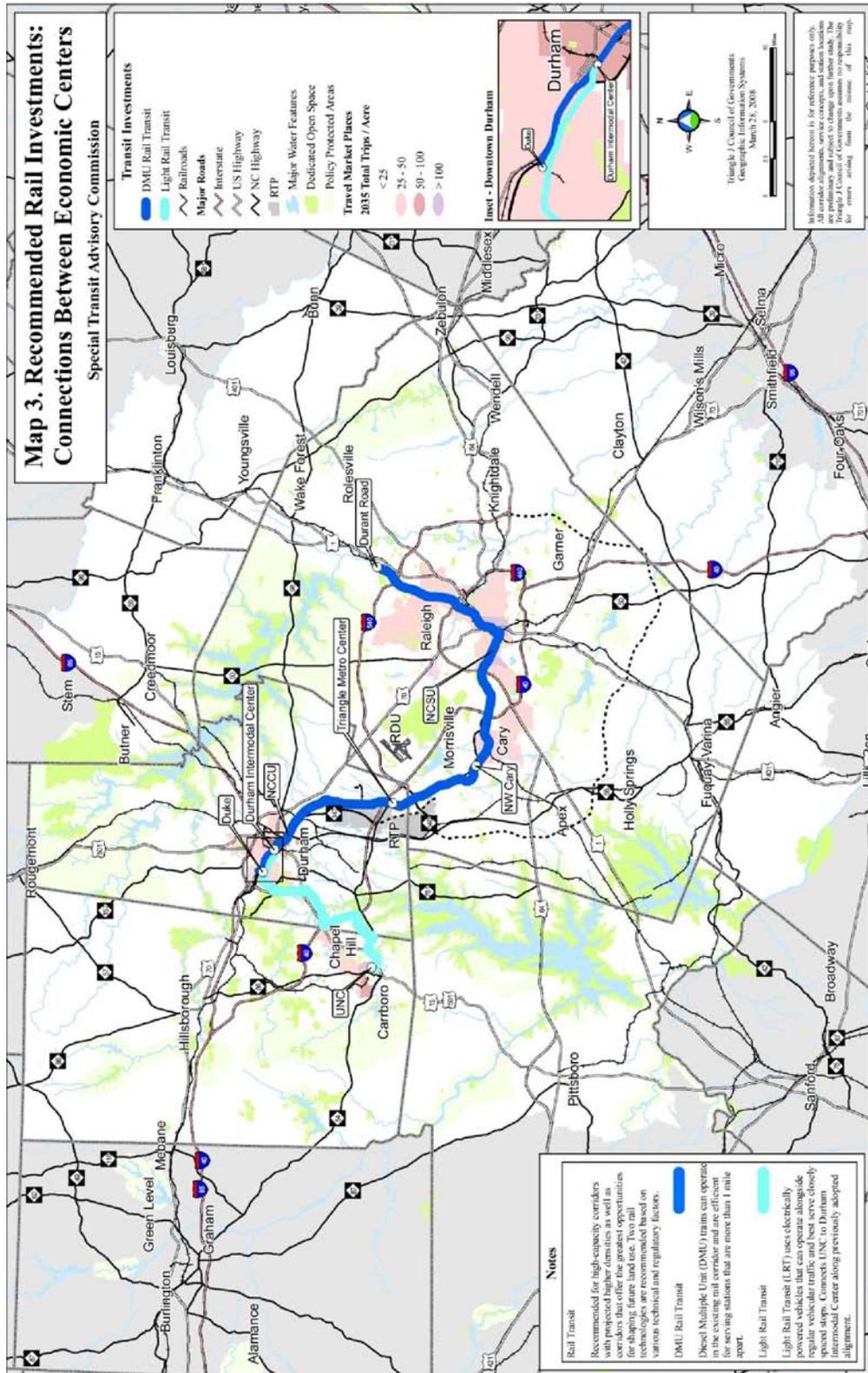


Figure 2.4 – Regional Transit Vision Plan – Enhanced Region-wide Bus Service



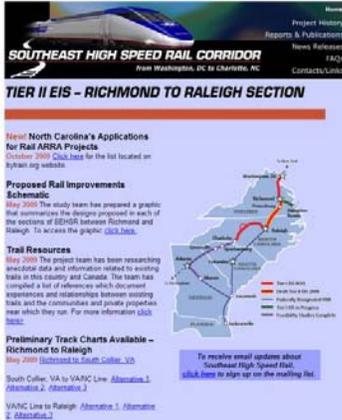
Source: Regional Transit Vision Plan, Map 2, May 2008

Figure 2.5 – Regional Transit Vision Plan – Recommended Rail Investments



Source: Regional Transit Vision Plan, Map 3, May 2008

Southeast High-Speed Rail (SEHSR) Initiative



High-speed rail initiatives throughout the nation have received added support through the American Recover and Reinvestment Act of 2009. Fortunately, a coalition that includes North Carolina and Virginia has been planning at a detailed level for a decade or more. With tremendous economic and population growth, the Southeast will benefit from high-speed rail service to provide business and leisure travelers with a competitive alternative to air and auto for trips between 100 and 500 miles. High speed rail in the southeast will reach top speeds of 110 mph and average speeds between 85-87 mph.

Virginia, North Carolina, South Carolina, and Georgia have joined the business communities in each state to form a coalition to plan, develop, and implement high speed rail in the Southeast. The system will be developed incrementally by upgrading existing rail rights-of-way. Rail stations are planned for cities that currently have AMTRAK stations. The station closest to Wake Forest will be in downtown Raleigh. Existing bus service between downtown Wake Forest and downtown Raleigh should be modified to include a stop at the rail station. A workshop to discuss the SEHSR initiative was held June 4, 2009 at the Wake County Northern Regional Center on Holding Avenue. Visit www.sehsr.org for more information.

The Town of Wake Forest provided the Southeast High-Speed Rail Commission with comments on their draft environmental report. These comments included:

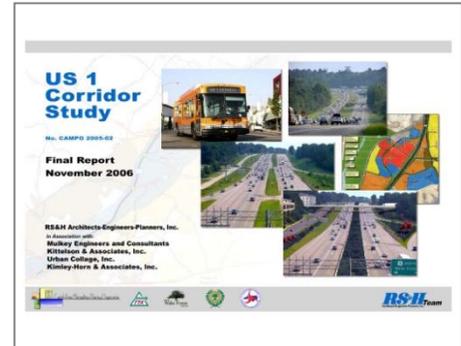
- Bridge work to accommodate SEHSR should anticipate future TTA rail, future road widening, and sidewalk needs.
- Acceptable closures include Brick Street, East Cedar Avenue (already closed), and Forestville Road (already closed).
- Unacceptable closures include Friendship Chapel Road, Seawell Drive, Height Lane/Unicorn Drive, and US 1 service road extension.
- Favor sealed crossings instead of closure at East Elm Street and Northside Loop.
- Favor bridge over realigned East Holding Avenue

These issues and more detailed plans are to be addressed by the Commission. Their schedule is to hold public hearings in 2010 and finalize the environmental document late in 2010. Permits would be obtained in 2011 followed by construction and inaugural service.

The growth strategies map (Figure 2.1), developed with the Comprehensive Plan Update, shows two potential rail stations to serve Wake Forest. The northernmost location is shown east of the railroad between Dr. Calvin Jones Highway and Friendship Chapel Road. The other location is in the Riverplace Commerce Center near Circle Drive and Capital Boulevard (US 1).

US 1 Corridor Study (2006)

Capital Boulevard (US 1) is a critically important corridor in Wake Forest and in Wake and Franklin Counties. Population and employment growth has occurred without major capacity increases on US 1 so the Capital Area Metropolitan Planning Organization and NC Department of Transportation funded a study. A proactive public involvement program provided opportunities for the public, stakeholders, and interest groups to participate in the investigation of corridor alternatives and ultimately provided guidance in forming the locally preferred alternative. The report is available at www.ncdot.org/projects/US1corridor.



Corridor Dynamics

The US 1 study corridor extended 14 miles from just south of I-540 through Wake Forest to the Park Avenue (US 1A) intersection in Franklin County. The towns of Wake Forest, Franklinton and Youngsville participated in the study, as did the City of Raleigh, Wake County, CAMPO, and NCDOT. US 1 is a major four-lane divided highway within the study area with interchanges at I-540, NC 98, and Durham Road. The right-of-way varies between 200 and 450 feet; however, the majority is 200 feet wide. Some non-continuous two-way frontage roads exist in the corridor. The median is generally 30 feet wide. When the study began, 13 signalized intersections and more than 100 access points existed along US 1 in the study area.

Year 2005 traffic counts provided by NCDOT and the City of Raleigh indicated traffic demand either approaches or exceeds roadway capacity (Level of Service E or F) during peak hours on US 1 between Gresham Lake Road and South Main Street (US 1A South). The section of US 1 between South Main Street in Wake Forest and the entrance to Sprint Headquarters in Franklin County has four travel lanes, lower traffic volumes, and greater signal spacing. This section functions at Level of Service D. Crash histories from 2002 through 2004 show an average of one crash per day in the corridor. The section between Durham Road and Stadium Drive had a crash rate 16% higher than the statewide average for similar types of highways. Most crashes (57%) were left-turn, right-turn, or angle crashes, with the next highest (31%) type being rear-end crashes. No other section of US 1 in Wake Forest exceeded the statewide average crash rate.

Locally Preferred Alternative — Overview

The “locally preferred alternative” requires a typical right-of-way of 350 feet and will accommodate projected 2030 travel demand south of South Main Street. This alternative was supported by 45 percent of citizens who

attended a public workshop on either of two consecutive evenings in July 2006. No other alternative received more than 25 percent level of support. The locally preferred alternative includes:

- Three general-purpose lanes in each direction from I-540 to US 1A North, Franklin County, plus auxiliary lanes where appropriate
- Either one special use high-occupancy vehicle (HOV) lane or one additional general purpose lane in each direction from I-540 to Durham Road
- Two-way, three lane frontage roads paralleling US 1 or backage roads in each direction to provide access to adjacent properties
- Sufficient right-of-way to accommodate an ultimate eight-lane freeway facility, three-lane frontage roads and raised landscaped planting beds
- Ten interchanges (three of which exist now) at major cross-streets
- Nine grade separations (two of which exist now) to provide east-west multimodal connectivity
- Wide outside traffic lanes for shared motorized vehicles and cyclist use for the proposed frontage and backage roads
- Sidewalks along the frontage or backage roads, adjacent to the development
- Park and ride lots and transit stops along the frontage or backage roads

Locally Preferred Alternative — Transit Accommodations

The locally preferred alternative for transit in the US 1 corridor focuses on the initial development of limited premium bus service (in the form of commuter bus service) to downtown Raleigh and the Research Triangle Park. As development density increases in the US 1 corridor over time, the commuter bus service could be transformed into more of a bus rapid transit operation, still with limited stops given the conversion of US 1 to a freeway facility south of NC 98, but with improved service frequency and hours of operation. Over time, added fixed-route bus service on cross streets in the US 1 corridor would be provided as development density increases and the street network develops. Continued paratransit service will be provided to serve lower density areas and to serve the elderly and handicapped that can't use regular fixed-route service. The plan calls for the development of key transit stations along the US 1 corridor south of NC 98, with smaller park-and-ride facilities developed initially to support the commuter bus service and to encourage added formation of carpools and vanpools. With development increases in the future, these park-and-rides would be expanded as needed, potentially becoming structured facilities perhaps tied to adjoining transit-oriented development.

In the long-term, the configuration of the transit system in the US 1 corridor will be influenced by whether or not regional rail is extended into the corridor. If regional rail is extended north of Spring Forest Road, a logical terminus would be at Dr. Calvin Jones Highway on the south side of Wake Forest, with an intermediate station at Burlington Mills Road to intercept US 1 traffic from the north. With regional rail service, the bus service along US 1 should be viewed as a support service to regional rail, serving areas between the regional rail stations, with greater service frequency and hours of operation. This could take the form of bus rapid transit service along US 1 and/or local bus service on the US 1 frontage roads. These proposed transit improvements should be coupled together with the highway conversion to a freeway.

Locally Preferred Alternative — Funding and Implementation

The cost of the locally preferred alternative in 2006 dollars was \$487 million (\$35 million per mile) —\$383 million for construction and \$104 million in right-of-way acquisition. A total of 296 acres and 37 parcels would need to be acquired, and a total of 343 parcels would be affected.

The planning process focused on ensuring that the US 1 corridor would accommodate multiple modes of transportation and a set of land uses that would enable people and goods to move through the corridor efficiently. The following implementation sequence was proposed:

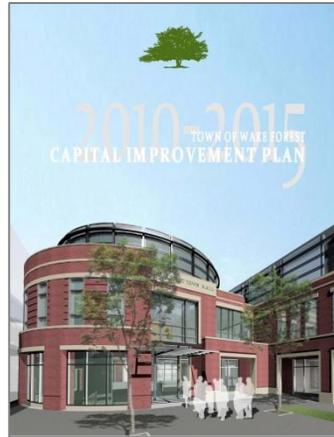
- Adoption by the Capital Area MPO Transportation Advisory Committee
- Local jurisdictions execute the Memorandum of Understanding
- NCDOT manage access, traffic signal systems and traveler information
- NCDOT prepare schematic designs and environmental documentation
- TTA and CAT conduct transit planning
- NCDOT prepare design plans, specifications, and cost estimates
- NCDOT oversee construction

Interim measures to support ongoing land development in the US 1 corridor that desire access are reviewed by NCDOT. Recent decisions by NCDOT require a high degree of consistency with the ultimate corridor vision. For example, recent requests by developers to convert US 1 at Starr Road into a super street have been denied by NCDOT Access Management Committee because the site plan did not illustrate how the super street would fit with the ultimate CAMPO plan for US 1. The developer can resubmit a revised site plan with appropriate changes. Interim measures assume the following:

- No direct access to US 1 unless no other reasonable and feasible options exist. If direct US 1 access must be provided, agreements should be negotiated for future closure dependent on provision of alternate access via frontage or backage roads.
- Preserve and, if possible, dedicate future right-of-way for the full corridor section including frontage roads and interchange ramps. CAMPO, NCDOT, Raleigh, and Wake Forest should collaborate on design drawings that will pin-down ultimate right-of-way lines on a map.
- Preserve corridors for future overpasses with sufficient width to provide full sections that include facilities for pedestrians and bicyclists.
- Protect and, if possible, acquire land for future rail stations. Consider interim use as park-and-ride lots for the WFX and Circulator bus routes.
- Extend and interconnect frontage and backage roads to systematically close unsignalized median openings on US 1. Put a priority on median openings that carry more truck traffic to keep trucks out of the inner travel lanes.
- Synchronize traffic signals.
- Convert uncontrolled median openings into paired leftovers with nearby provision for increased U-turn movements. Installation of traffic signals at the U-turn intersections likely will not be approved by NCDOT.
- Through a Memorandum of Understanding, the Town of Wake Forest, City of Raleigh, CAMPO and NCDOT formed the US 1 Council of Planning. The Council serves as an advisory group and meets periodically to:
 1. Review all land use developments and transportation projects of regional significance, working in tandem with the NCDOT District Engineer. [The term "regional significance" in the Memorandum of Understanding refers to land-use and highway projects that will have a major impact on congestion and travel movements (i.e. interchange construction, "big box" retail, single-family subdivisions of or above one-hundred lots, etc)].
 2. Review changes to the US-1 Corridor Plan, and coordinate community involvement activities when necessary to ensure the integrity of the Plan.
 3. Develop and/or update a Land Use Plan that covers the corridor which shall include but is not limited to: (a) proposed land uses along the corridor which are consistent and compatible with the transportation recommendations (b) a local collector road plan, and (c) a series of best practice access management and development standards.

Wake Forest Town CIP 2009-2013

The Capital Improvements Plan (CIP) is a five year plan that identifies the Town's capital outlay and improvement needs. It reflects the Town's policy regarding long range physical and economic development, outlines present and future public needs and priorities, and provides a planned schedule for improvements. In this instance, a capital improvement is defined as any expenditure for equipment, buildings, infrastructure, land acquisition, plan, or project in which the cost exceeds \$10,000 and the estimated useful life is greater than 1 year. The Town of Wake Forest 2010-11 CIP is approximately \$12.4 million.



Planning capital projects is an ongoing process with updates to the CIP occurring every year. Once the need or idea for capital improvements is proposed by the Mayor, Board, Citizens or Town staff, these items are compiled into the CIP and presented to the Board of Commissioners. The Board prioritizes the first-year expenditures during a series of work sessions. Once approved, the CIP officially details the Town's commitment to fund the expenditures in the upcoming budget. The first-year projects are refined during the annual budget process.

Given shifting needs and priorities, unexpected emergencies, cost adjustments, and improved technology, the required annual update to the CIP makes sense. The annual review of capital outlay and improvement needs ensures the financial strength of the Town is not compromised. Since 1985, the Town of Wake Forest has updated its CIP each year based on a keen understanding of local needs and priorities. Today, the CIP achieves the following objectives as a component of the Town's budget and financial planning process:

- Reduces the need for "crash programs" to finance the construction of Town facilities.
- Focuses attention on community goals, needs and capabilities.
- Achieves optimum use of taxpayer dollars.
- Guides future community growth and development.
- Advance planning ensures that projects are well thought out in advance of construction.
- Provides for the orderly replacement of capital expenditures.
- Encourages a more efficient governmental administration as well as maintains a sound and stable financial program.

The current CIP covers the five fiscal years 2010-11 through 2014-15 and includes a description of the prioritization system, a summary by funding level for the fiscal year 2010-11, and a summary by department/division and fund for each of the five fiscal years. The CIP includes a prioritization system that combines a measure of priority with four criteria categories. The system was developed because all requests for funding cannot be granted in a given year. Highlights from the top two priority levels include:

Priority Level "A" (highest consideration for funding):

Total \$8.8 million

- Downtown Streetscape - \$1,965,000
- Greenways and Bike Paths - \$381,000
- Chalks Road Realignment - \$1,650,000
- Unpaved Roads - \$262,500
- Street Resurfacing/Maintenance - \$2,000,000
- Pedestrian Plan-Top 10 Priority – \$995,000
- Safe Route to School Sidewalks (grant) – \$300,000
- Bus Service and Shelters – \$239,000

Priority Level "B" (moderate consideration for funding):

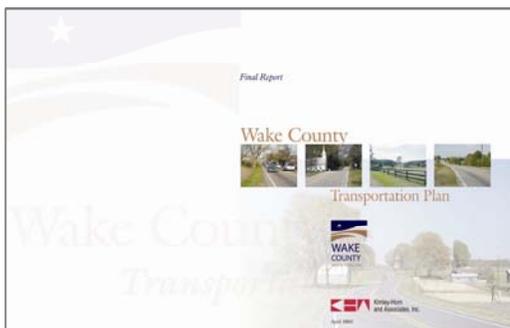
Total \$3.2 million

- Juniper Avenue Sidewalk - \$500,000
- Gateway Landscaping - \$60,000
- Jones Diary Road Bridge - \$350,000

Wake County Transportation Plan (2003) (unincorporated areas)

The *Wake County Transportation Plan* was completed in April 2003 and addresses mobility needs in the county's unincorporated areas. The plan initially was expected to plan future collector streets but grew to encompass thoroughfares, public transit, bicycle, and pedestrian needs. The plan encourages the transformation of rural roads into multimodal corridors. The following recommendations relate to corridors linking Wake Forest with neighboring areas:

- Ligon Mill Road south of Wake Forest: 3 lanes with wide outside lanes
- Forestville Road south of Wake Forest: 4 lanes, median-divided with wide outside lanes





- Burlington Mills Road east of Forestville Road: 3-lane with wide outside lanes
- Rogers Road between Rolesville and Wake Forest: 3 lanes with wide outside lanes
- Chalk Road: 2 lanes
- Jones Dairy Road between Rolesville and Wake Forest: 3 lanes with wide outside lanes
- Averette Road south of NC 98: 2 lanes undivided
- NC 98 east of Wake Forest: 4 lanes, median-divided with wide outside lanes
- Purnell Road between US 1 and Jackson Rd: 2 lanes undivided
- Purnell Road west of Jackson Rd: 3 lanes with wide outside lanes
- Jenkins Road west of US 1: 2 lanes undivided with multi-use path on one side
- Thompson Mill Rd north of NC 98: 3 lanes with wide outside lanes and multi-use path on east side between Jenkins and Purnell Roads
- NC 98 west of Thompson Mill Rd: 4 lanes, median-divided with paved shoulders

“Imagine Rolesville” Transportation Plan (2002)

Through the 2002 Imagine Rolesville Transportation Plan, the Town of Rolesville adopted design criteria, a thoroughfare plan, and renderings as way to manage growth in the town and surrounding areas. Recommendations for corridors that link Rolesville and Wake Forest include:

- Upgrade West Young Street to 3 lanes: Main Street to Jones Dairy Road
- Upgrade Rogers Road between Rolesville and Wake Forest as follows:
 - Jeffreys Lane to Wellspring Farms Lane: two lanes with left-turn lanes at key intersections in a 90-foot wide right-of-way with ditch sections, a sidewalk behind the ditch on one side and a ten-foot multi-use path on the other side.
 - Wellspring Farms Lane to Main Street in Rolesville: five lanes in a 90 to 100 foot wide right-of-way with curb and gutter sections and sidewalk on both sides.
- Upgrade Forestville Road and link to Jones Dairy Road north of Sanford Creek to serve as a western bypass (of downtown Rolesville)
- Work with Triangle Transit and Wake County Transportation Services to provide transit service linking Rolesville to other communities when demand warrants

Youngsville Plan / DOT Transportation Plan

Youngsville is one area of focus for an update of the Comprehensive Transportation Plan (CTP) underway by the North Carolina Department of Transportation. The Franklin County CTP process is expected to continue until its scheduled adoption in Summer 2010. At this time, NCDOT has developed working drafts of CTP maps for highways, bikeways, and public transportation. The working draft highway map shows “needs improvement” on the US 1 and NC 98 but no other roadways linking Franklin County with Wake Forest. The US 1 corridor in southern Franklin County is projected to exceed its existing four-lane capacity. Other north-south corridors linking Wake Forest with Franklin County are projected to be at capacity during peak periods in 2035.

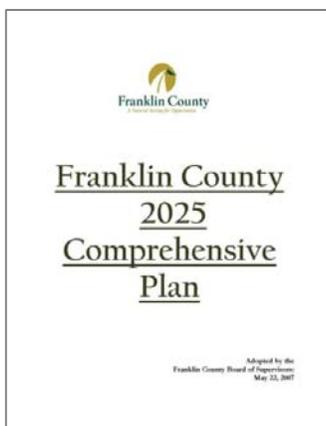
The following future corridors are shown needing bicycle improvements according to the draft Franklin County CTP map.

- US 1 frontage/backage roads in both counties, per the US 1 Corridor Study report
- Richland creek (future) greenway extended to Youngsville vicinity
- US 1A (shown in CAMPO’s draft CTP)
- Gilcrest Farm Road (in both counties)
- Moore’s Pond Road (in Franklin County) connecting with Wait Avenue (Wake County)
- US 401

Franklin County Comprehensive Plan

Adopted in 2007, the Franklin County Plan relies on a 1990 Thoroughfare Plan adopted by the North Carolina Department of Transportation (NCDOT). The document states the County’s intent to prepare an updated transportation plan. It goes on to state that “It will be difficult for NCDOT to keep construction projects on course with demand as fast as the county is experiencing growth. The improvements that are currently taking place to US 401 should greatly improve commutes from Franklin County to Raleigh. Franklin County specifically supports the construction of the following highway improvement projects:

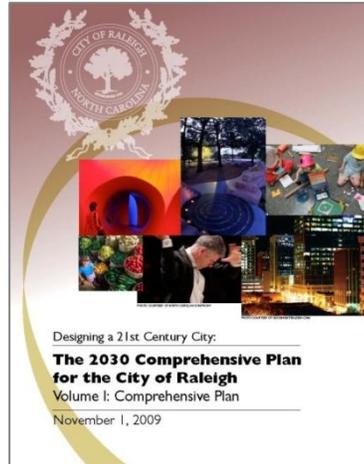
- NC 56 from Franklinton to Louisburg.
- US 401 from Louisburg to Rolesville.
- NC 96 Youngsville by-pass.





Raleigh Comprehensive Plan

“Planning Raleigh 2030” was adopted in 2009 as the official long range policy statement by formal resolution of the City Council. The Plan Framework provides an explanation of Comprehensive Plan goals, objectives, policies, and guidelines as well as a discussion of the urban form principals upon which the plan is based. The Systems Plans include goals and policies for public infrastructure systems such as the water and wastewater systems, stormwater management, parks and recreation, and transportation systems. An Economic Development Strategy as well as a Housing Plan and Historic Preservation Plan also are included in the Systems Plans.



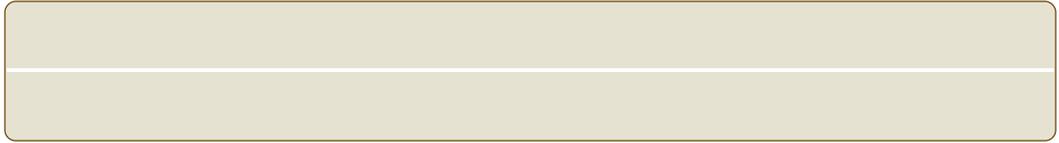
For each of ten designated planning districts within the City of Raleigh jurisdiction there is a district plan that provides details on existing conditions including land use, zoning, and demographic projections. The system plans and urban form guidelines also are provided in greater detail for each district and include district based maps. Within defined areas of each planning district, detailed plans have been prepared to address specific issues such as in Corridor Plans along the major roadways entering Raleigh, Neighborhood Plans, Watershed Plans, and Small Area Plans. The Key Map to Plans provides an inventory and geographic location for specific plans within each planning district. The North and Northeast districts abut Wake Forest.

The City of Raleigh recognizes the importance of developing a balanced, efficient, multi-modal transportation network that minimizes impacts to the environment and reinforces the livability of neighborhoods. The Transportation Element is meant to guide future development of the City's roads and highways for motorized and non motorized transportation including public transit systems, bicycle and pedestrian networks. The transportation network is developed in a sustainable pattern that supports the City's future land uses and urban form, minimizes vehicle miles traveled and single occupancy vehicles, and reduces air pollution and greenhouse gas emissions. The Transportation Element contains policies that will create a well-connected, multi-modal transportation network, support increased densities, help walking become more practical for short trips, support bicycling for both short- and long-distance trips, improve transit to serve frequented destinations, conserve energy resources, reduce greenhouse gas emissions and air pollution, and do so while maintaining vehicular access and circulation. Achieving a balanced and effective

transportation system will require a greater investment in transit, pedestrian, and bicycle infrastructure. Detailed information concerning the underlying issues and background information can be found in the City of Raleigh Community Inventory Report.

The current classification system is deeply embedded in the transportation planning framework promoted by CAMPO and NCDOT, making wholesale changes difficult at present. As an alternative, the Raleigh Comprehensive Plan updates the traditional Thoroughfare Map and further applies a new system of street overlays as part of the Growth Framework Map. Four types of corridors are identified on the Urban Form Map: highway, multi-modal, urban, and parkway. These types have been applied to all existing and proposed streets in Raleigh classified as minor thoroughfares or higher. It modifies the existing thoroughfare map in the following ways:

- **Highways:** These are limited-access, grade separated roadways providing little to no direct access to adjacent land uses. Such streets are classified as primary arterials on the Thoroughfare Plan and no changes are proposed to how these are planned and developed.
- **Multi-modal Streets:** Transit and non-motorized modes are anticipated to provide a significant share of the total capacity of these streets, and the street right-of-way should be managed accordingly. Where bus is the transit mode, these streets should be targeted for improvements such as turn-out lanes, shelters and benches at every stop. Queue jump lanes, signal priorities, and exclusive lanes for transit may also be appropriate. Some transit streets may eventually convert to streetcar service, and for all such streets, a high level of pedestrian facilities and amenities should be provided. Land uses are expected to directly connect to and address the street. Bicycles should be accommodated. Alternative cross-sections may be employed to meet these goals.
- **Urban Streets:** These are like multi-modal streets but are not anticipated to have the same level of transit service. Urban streets can be narrower than other streets in the same classification, and should include on-street parking (where appropriate) and enhanced pedestrian facilities.
- **Parkways:** These streets are suburban in nature and more likely to be framed by landscaping rather than buildings. More traditional cross-sections can be employed on these streets. Landscaped medians are encouraged.



Of interest to Wake Forest, the Raleigh Comprehensive Plan shows a future extension of Thornton Road – included as a collector street in the draft Plan. The extension would be built to the east of existing Thornton Road, as far as Forestville Road. Also of interest to Wake Forest is the adoption of the following preferred cross-sections for roads that connect the communities:

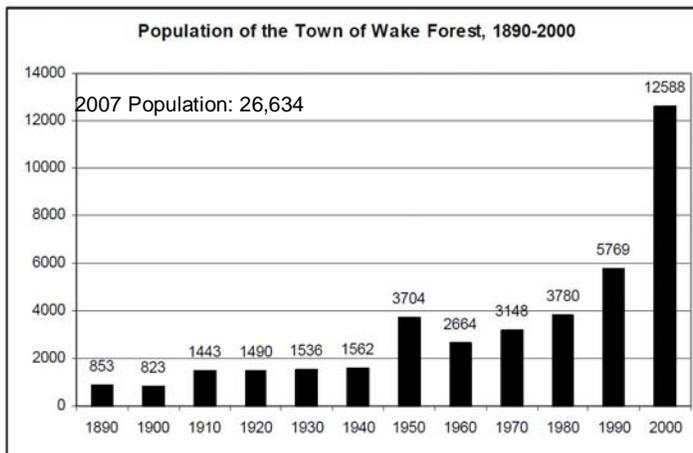
- Ligon Mill Road south of Wake Forest: Raleigh is planning a four-lane divided roadway, but city staff understand the complexity of obtaining sufficient right-of-way under constrained conditions that include single-family residential lots facing both sides of Ligon Mill Road. A strategy of showing Ligon Mill Road south of US 1A as a 2 or 3 lane road within a 100-foot right-of-way may allow for some flexibility in corridor planning in the future. If redevelopment occurs along Ligon Mill Road south of US 1A the plan would support acquiring the additional right-of-way.
- Forestville Road south of Wake Forest: Raleigh is planning a four-lane divided road.

Future Outlook

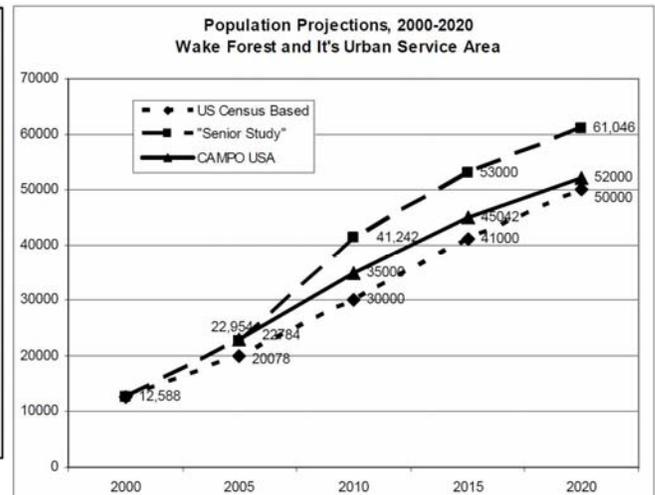
The history of Wake Forest began in earnest in 1832 when the North Carolina Baptist Convention purchased a 615-acre plantation to build a college to educate future ministers. The college and small community evolved over the next century and a half. When the rail depot relocated from Forestville to the Wake Forest community in 1874, the town took shape as a drug store, a hotel, a collection of businesses, and homes. Slow growth prior to World War II gave way to a surge in population. Another period of slow growth occurred following the relocation of Wake Forest College to Winston-Salem in the summer of 1956. But in the last several decades, Wake Forest has experienced significant growth corresponding to rapid growth in Wake County as people moved to the region to enjoy its high quality of life and strong job market in Research Triangle Park. These trends are illustrated in the charts below (“Measures of Population Change and Composition”).

Today, the Town of Wake Forest encompasses approximately 15 square miles (9,427 acres), with another 4,359 acres falling within the Extraterritorial Planning Jurisdiction (ETJ) that suggests a likely 46 percent increase in land area that will be incorporated.

Measures of Population Change and Composition



Source: US Census, Capital Area Metropolitan Planning Org., Senior Center Expansion Study, 2007



Population Outlook

The trend in the town's population growth, according to data published in the Wake Forest "Senior Center Expansion Study (August 2007), suggests substantial population increases by the year 2020 (see "Population Projections 2000-2020 Wake Forest and Its Urban Service Area" chart). Three different forecasts produce a 2020 population of between 50,000 and 61,000 in Wake Forest. The 2007 population was estimated at 26,634. The Town forecasts a municipal population of 47,770 by the year 2025, representing a 79 percent increase over the 2007 estimated population.

The number of dwelling units in Wake Forest increased from 5,582 in 2000 to 10,845 in 2007, an increase of 94 percent. Over 70 percent of dwelling units are single-family. 2005 was the peak year for issuing single-family dwelling unit building permits in Wake Forest with 1,006 issued that year. That dropped to 215 in 2008. Just over 212 acres were annexed into Wake Forest in 2008, according to the "Town of Wake Forest Development Report", dated December 31, 2008 prepared by the Town Planning Department. The report includes a map showing the location of active developments (i.e. residential, non-residential, and public projects). A digital version can be found online at <http://www.wakeforestnc.gov/residents/planningzoning.aspx>.

According to the same report, the Town approved residential and subdivision developments in 2008 totaling 1,127 dwelling units on 627 acres. The weighted average of all these residential developments is 1.795 dwellings per acre.

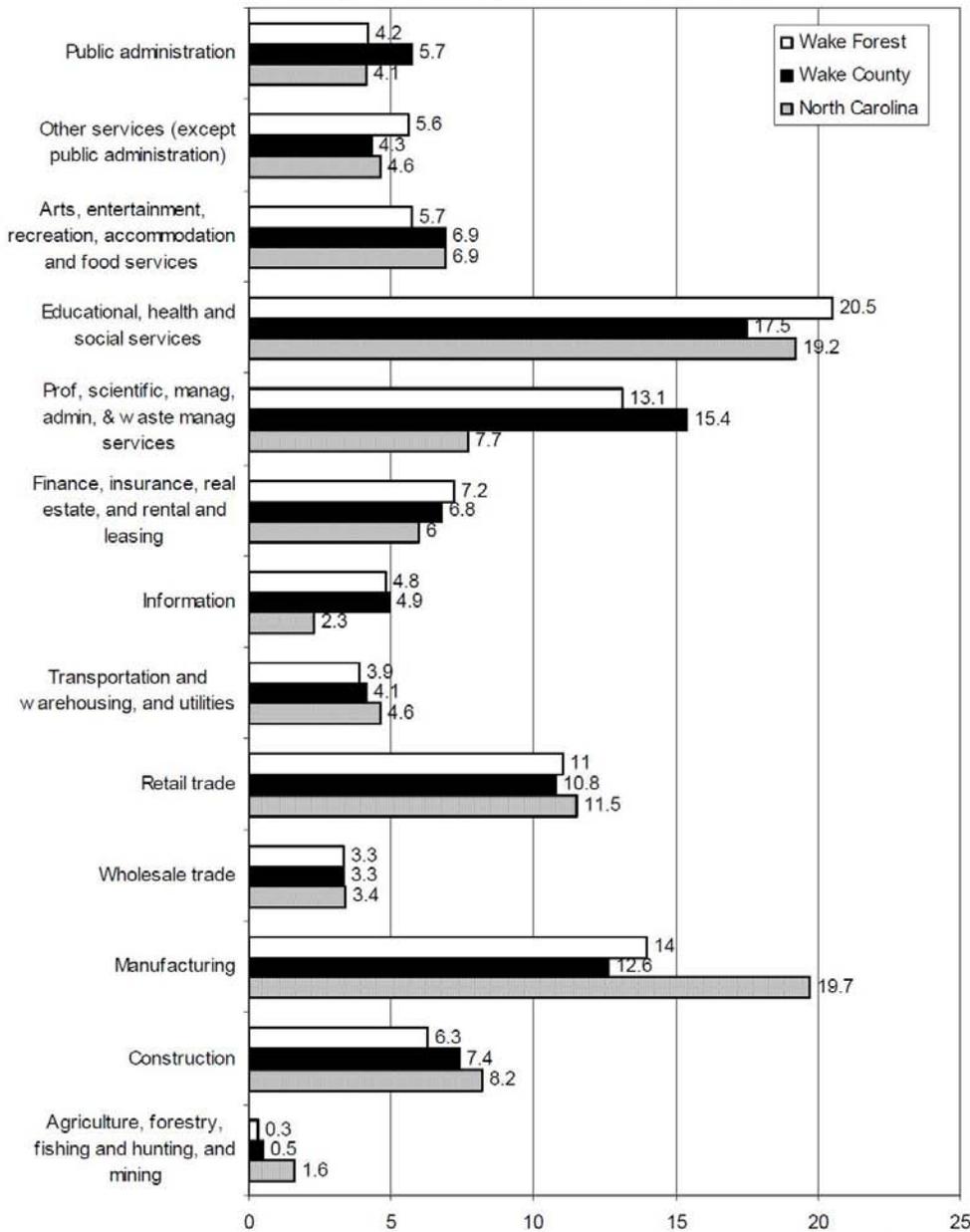
Employment Outlook

Wake Forest is better positioned for the technical, professional and information age jobs in the future than the state of North Carolina as a whole. The town and Wake County are alike in terms of the employment patterns of their workers with significantly more workers in professional, scientific, and management and information industries (see "Percent of Total Employment by Industry Wake Forest, Wake County and North Carolina" chart).

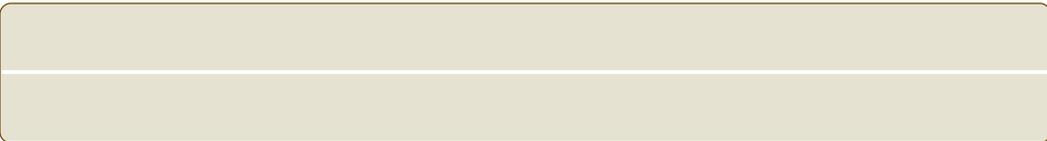
As a percentage of the overall workforce, the town and Wake County have more workers in management, professional, and related occupations compared with the state of North Carolina as a whole. Wake Forest has slightly more private sector salaried workers as a percentage of the total than either Wake County or the state and slightly less self-employed persons and government workers (see "Percent of Total Employment" and "Class of Worker" charts).

Percent of Total Employment by Industry

Wake Forest, Wake County and North Carolina 2000

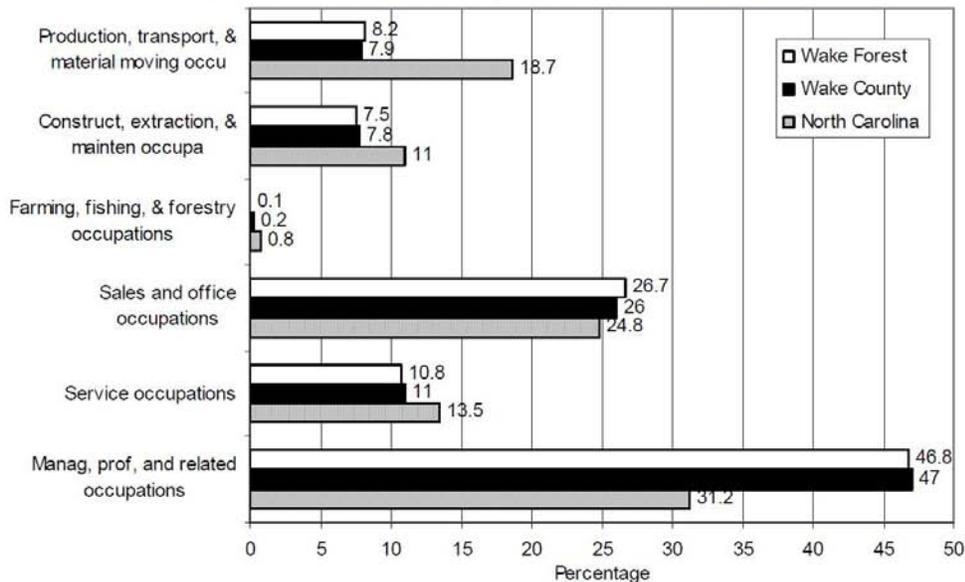


Source: North Carolina State Data Center, US Census Bureau



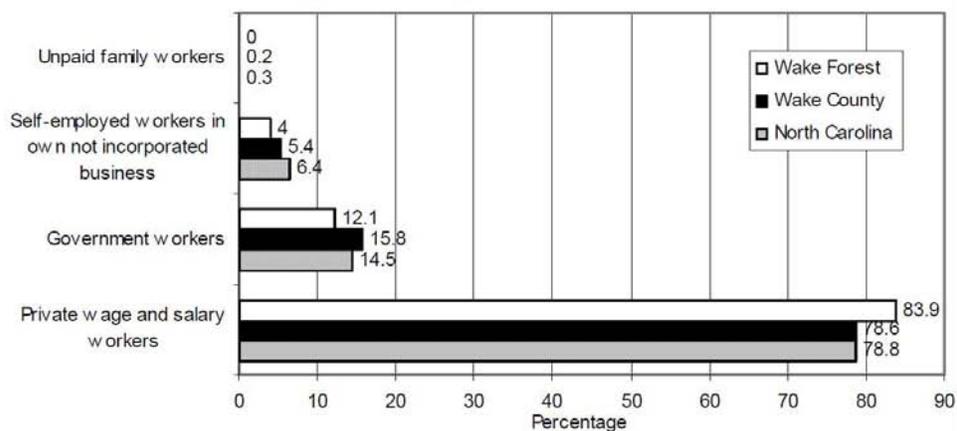
Percent of Total Employment by Occupation

Wake Forest, Wake County and North Carolina 2000



Class of Worker

Wake Forest, Wake County and North Carolina 2000



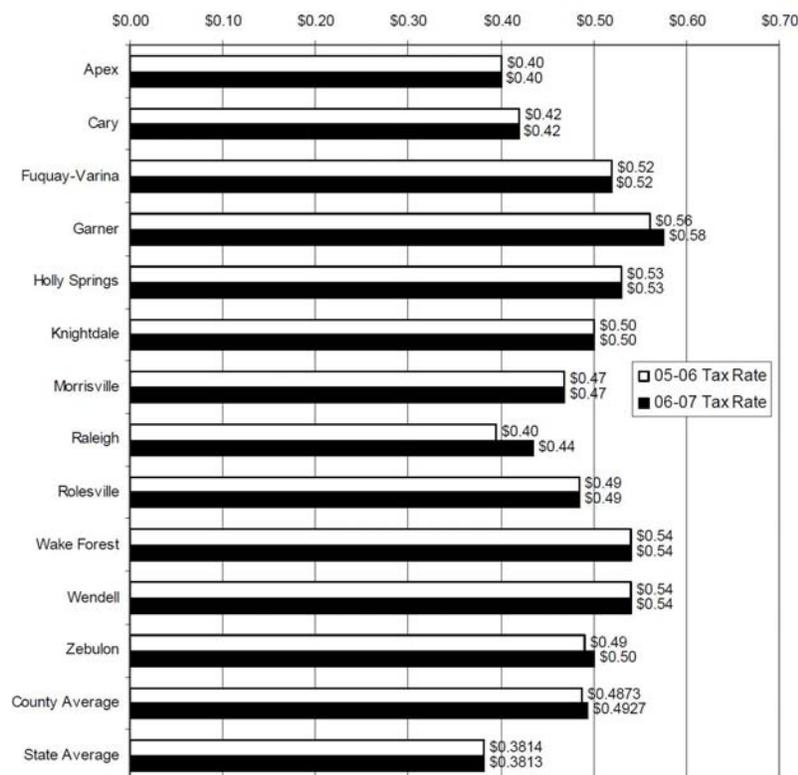
Source: North Carolina State Data Center, US Census Bureau

Income and Tax Revenue Outlook

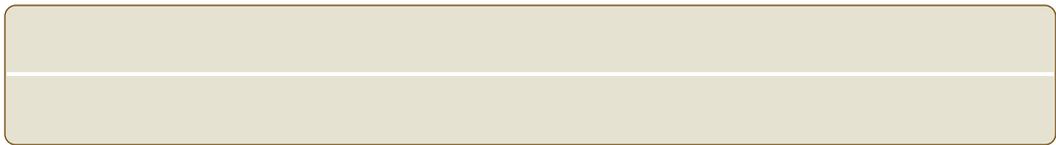
When compared to Wake County, the town has a larger percentage of upper middle income (\$50,000 to \$99,000) households and families, a slightly larger percentage of lower income (less than \$15,000) households and families, and a slightly smaller percentage of upper income (\$100,000 and up) households and families. According to housing market data published on the Wake Forest Chamber of Commerce website, the 2007 median household income was about \$75,000. According to the same report, the 2007 median home value in Wake Forest was about \$204,000 while the average value was \$241,000.

Recent property tax rates for the twelve municipalities in Wake County were compared (see "Property Tax Rates for Wake County Municipalities" chart). The highest tax rate in Wake County was in Garner at \$0.58 while the lowest rate was in Apex at \$0.40. Only Garner had a higher tax rate than the \$0.54 charged in Wake Forest (note that Wendell charges the same tax rate as Wake Forest). For the 2007 median home value of \$204,000 in Wake Forest, the annual tax assessment would be \$1,101. The difference in tax assessment between the highest and lowest rates in Wake County, if applied to the median home value in Wake Forest, would be \$367 per year.

Property Tax Rates for Wake County Municipalities, 2005-06 and 2006-07



Source: NC League of Municipalities



Land Use and Transportation Connection

The sprawling nature of many land development patterns often leaves residents and visitors with no choice but to drive, even for short trips. In fact, nearly two-thirds (62.7%) of all trips we make are for a distance of five miles or less. Surveys by the Federal Highway Administration show Americans are willing to walk as far as two miles to a destination and bicycle as far as five miles. A complete trail network, as part of the local transportation system, will offer effective transportation alternatives by connecting homes, workplaces, schools, parks, downtown, and cultural attractions.

According to the U.S. Bureau of Transportation Statistics, it cost the average American \$7,800 per year in 2006 to own and operate a private vehicle (car or truck) assuming 15,000 miles per year. Of this amount, \$2,250 (15 cents per mile) is for variable costs such as regular unleaded fuel, maintenance, and tires. The remainder includes fixed costs such as insurance, license, registration, taxes, depreciation, and finance charges.

Table 3.1 – Commute Cost Comparison for Resident Workers in Wake Forest

Workplace	Roundtrip Distance (mi)	Annual Operating Cost to Commute by Private Vehicle
Downtown Raleigh	35	\$1,260
Research Triangle Park	55	\$1,980
Wake Forest	7	\$250

Thus, the variable cost of commuting beyond Wake Forest is typically \$1,000 or more per year for each resident worker in Wake Forest. The household savings can be enhanced by foregoing a second or third vehicle and commuting or traveling within Wake Forest by bus, bicycle, carpool or walking.

The “state of the town” from a transportation perspective can be characterized by the word “expanding”. Examples of how streets and services are expanding range from new bus service in town to road widening, trail building and safer routes to schools. The following description of existing conditions is organized by mode of travel.

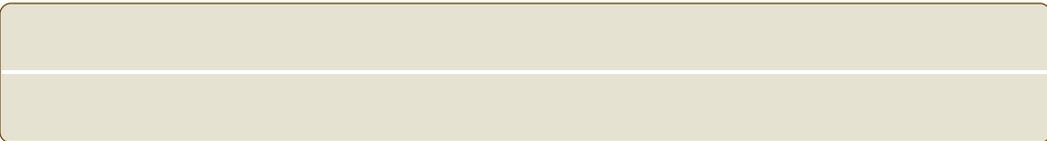
Walking



Wake Forest is situated among gently rolling hills and moderately forested land. There are pleasant places to walk in Wake Forest. Most residents enjoy the small town quality of life, while still having convenient access to downtown Raleigh and the Research Triangle Park. The central core of Wake Forest is the downtown business district, which contains an array of local businesses, homes and the campus of the Southeastern Baptist Theological Seminary. This quaint area of town is filled with tree-lined streets and historic buildings dating to the 19th century.

The *Wake Forest Pedestrian Plan* (adopted 2006) cites more than one dozen neighborhoods that are not conveniently connected by continuous sidewalk with downtown Wake Forest. Neighborhoods and schools are the types of places most often identified as walking destinations. Wake Forest Elementary School participates in the national Walk to School Day in October each year. The town is seeking federal funds to expand sidewalks serving all public schools. Typically, Wake Forest spends at least \$100,000 of local funds each year to build sidewalks, not including the cost of building sidewalks when new roads are built or widened. It is much more efficient to build sidewalks as a part of a road construction or land development project.

The Town has a limited system of existing paved greenways (trails) but with aggressive plans to pave more and expand the system. Figure 2.2 in Chapter 2 shows the location of priority pedestrian corridors in Wake Forest. Eight public schools are located in Wake Forest, as listed in Table 4.1. The availability of sidewalks to each school varies by location.



Various ordinances, maps, and adopted plans are available on the Town's website (www.wakeforestgov.com). These documents include additional information about existing and future pedestrian conditions as presented in the *Wake Forest Pedestrian Plan* and the *2009 Open Space and Greenway Plan Update*.

Table 4.1 – Existing and Planned Sidewalks near Schools

School	Existing Sidewalks		Planned Sidewalks
	Primary Entrance	Secondary Entrances	Priority Corridors Planned?
Dubois Campus / Forest Pines	North Allen Rd (sidewalk both sides)	N Franklin St E Cedar Ave (no sidewalk on either street)	No
Jones Dairy Elementary School	Jones Dairy Rd (no sidewalk)	Winter Spring Dr (sidewalk east side)	Jones Dairy Rd - No Ridgemont Rd - Yes Jones Farm Rd – Yes
Heritage Elementary School	Rogers Rd (school frontage only; no connections)	S Franklin St (no sidewalk, but Holding Village will build partial)	S Franklin St – No Rogers Rd – Yes
Heritage Middle School	Rogers Rd (school frontage only; no connections)	S Franklin St (no sidewalk, but Holding Village will build partial)	S. Franklin – No Rogers Rd – Yes
Heritage High School	Forestville Rd (no sidewalks)	Rogers Rd (no sidewalk)	Rogers Rd – Yes Forestville Rd – No Greenway planned on west side of HS
Wake Forest Elementary School	S Main St (sidewalk both sides)	W Sycamore Ave (sidewalk both sides) S Wingate St (no sidewalk)	S. Wingate St – Yes
Wake Forest-Rolesville Middle School	West side of S Main St (sidewalk on west side)	Rogers Rd (short sections of sidewalk that do not connect)	Rogers Rd – Yes
Wake Forest-Rolesville High School	Stadium Dr	N Rock Springs Rd (sidewalk one side)	Stadium Dr – Yes N Rock Springs Rd – No

Table 4.2 – Roads Rated by Bicyclists

	Posted Speed Limit	2007 Traffic Volume	Travel Lanes (Width)
Roads rated as "safe and frequently used for cycling"			
Averette Road	45 mph	1,400	2 (21')
Oak Grove Church Road	35 mph	900	2 (21')
North Main Street	35-45 mph	5,700	2 (53')*
Harris Road	45 mph	2,400	2 (21')
Purnell Road	45 mph	4,500	2 (22')
Thompson Mill Road	45 mph	4,800	2 (21')
Roads rated as "uncomfortable for cycling"			
Ligon Mill Road	45 mph	7,000	2 (21')
North White Street	35-45 mph	3,600	2 (21')
Durham Road	35-45 mph	8,700	Primarily 2 (24')
Falls of Neuse Road, north of Wakefield Plantation Drive	45 mph	11,000	3 (est. 36')

Source: *Wake Forest Bicycle Plan* (August 2008). A questionnaire was completed by 193 residents who responded online or at a public meeting.

* North Main Street from North Avenue to just south of Oak Avenue has two travel lanes, a wide raised-curb median, and on-street parking on both sides of the street.

"Motorists think I'm in their way, but I can only get over so far before I feel scared."

"Wake Forest would be an ideal town if there were more places to ride on the roads."

Wake Forest. Transportation safety research shows that riding bicycles on sidewalks is up to twenty-five times less safe than riding on a major street that has no bike lanes. The research also shows that adding bike lanes on major streets improves safety.

Activity centers are where shopping centers, downtown commercial areas, and community places such as libraries are clustered together. In Wake Forest, much of the shopping is located along South Main Street and Capital Boulevard (US 1). Bicycling to these locations will be improved when slower-speed collector streets are built to and within these activity centers. Figure 4.1 shows the location and listing of major activity centers in Wake Forest.

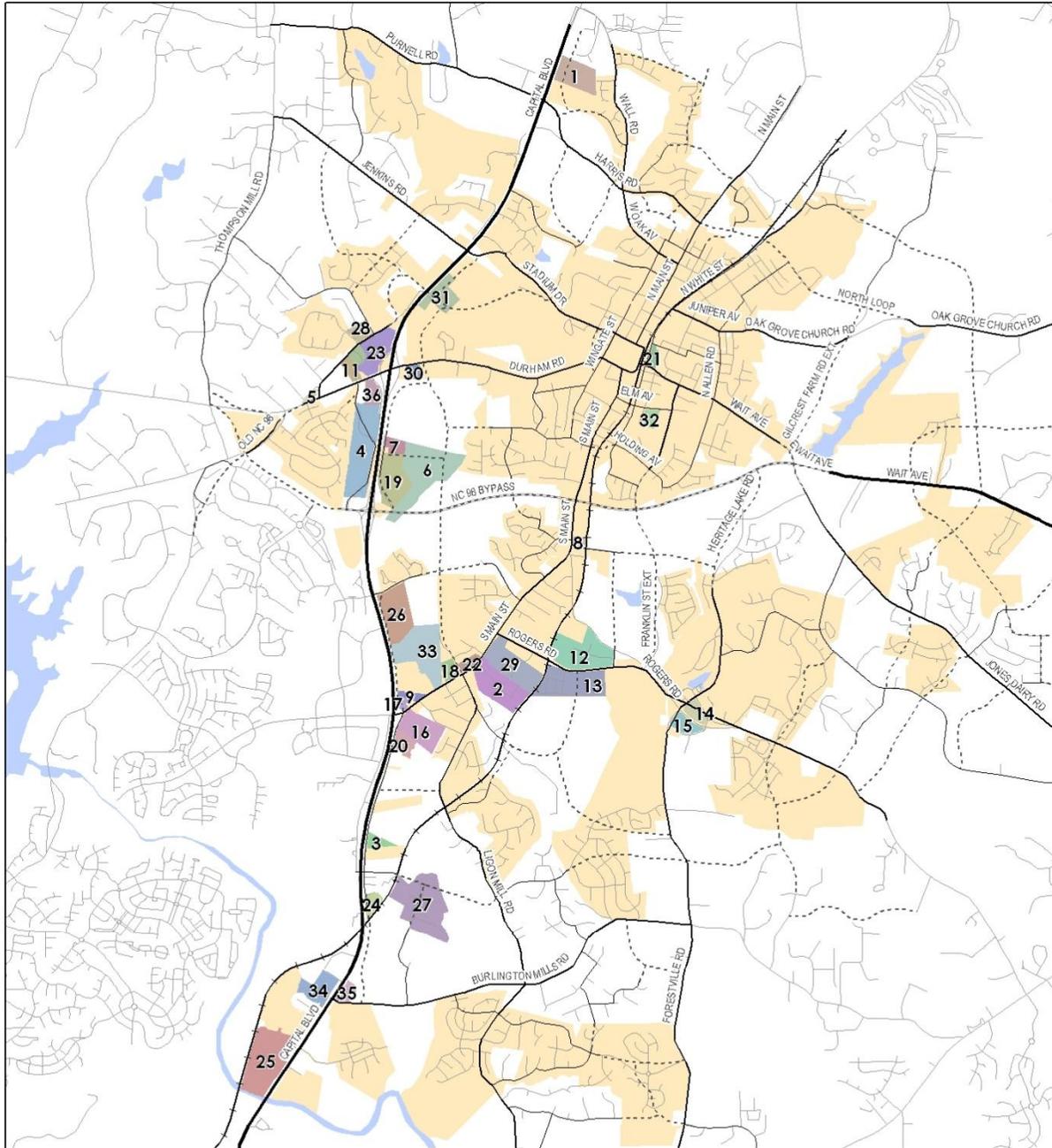
Bicycling

North Carolina state law considers bicycles as vehicles and therefore lawful for cyclists to ride on any public road unless it is designated as a limited or controlled-access highway. However, some roads are more suitable than others. A survey of 193 residents conducted in February 2007 for the *Wake Forest Bicycle Plan* reported road ratings shown in Table 4.2.

Higher cycling skill levels are expected on South Main Street, Durham Road, and Burlington Mills Road. By observation, it is surmised that a significant proportion of current bicycle ridership occurs on lower-speed residential neighborhood streets rather than major thoroughfares in Wake Forest. Ordinances prohibit bicycling on sidewalks in

Additional information about bicycling is presented in the *Wake Forest Bicycle Plan* available at: www.wakeforestnc.gov/client_resources/residents/planning/bike_plan_executive_summary.pdf

Figure 4.1 – Wake Forest Bicycle Plan – Major Activity Centers



Legend

- | | | |
|----------------------------------|--------------------------------------|--|
| 1. Capital Blvd. Business Center | 13. Heritage Commons | 25. Riverplace Commerce Center |
| 2. Capital Commerce Center | 14. Heritage Square | 26. Shoppes at Caviness |
| 3. Capital Pines | 15. Heritage Station Shopping Center | 27. South Forest Business Park |
| 4. Capital Plaza | 16. Leith Chevrolet & Dodge | 28. Tarlton Park Office Center |
| 5. Crenshaw Pointe | 17. Leith Kia | 29. The Factory |
| 6. Crenshaw Village | 18. Ligon Mill Business Center | 30. Wake Forest Business Park |
| 7. Crescente Pointe | 19. Lowe's Home Improvement | 31. Wake Forest Crossing Shopping Center |
| 8. Friendship Chapel Center | 20. Luck Stone | 32. Wake Forest Plaza Shopping Center |
| 9. Golden Corral | 21. Lyon Shopping Center | 33. Wake Pointe Shopping Center |
| 10. Hampton Commons | 22. Main Street Station | 34. Wakefield Ford |
| 11. Hampton Park | 23. Market of Wake Forest | 35. Wakefield Junction |
| 12. Heritage Business Park | 24. North Wake Business Center | 36. Winn-Dixie Plaza |

- Future Road
- Local Streets
- Railroads
- Lakes
- Town Limits



Source: Town of Wake Forest Bicycle Plan, August 2008

Bus Riding

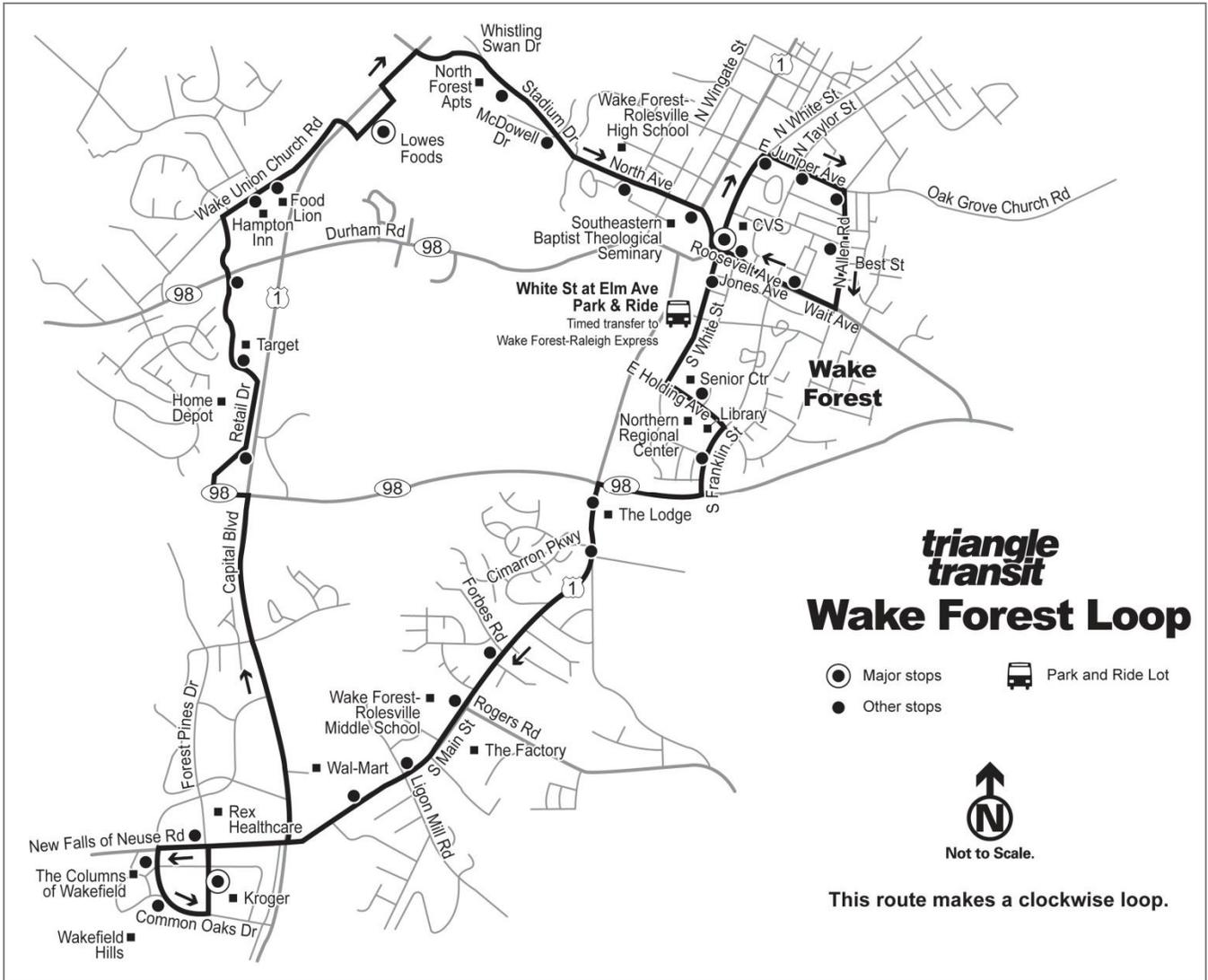
Two public bus routes serving Wake Forest launched in November 2008, as illustrated in Figure 4.2a and Figure 4.2b. The “Loop” route circulates clockwise around town, completing one loop in about 50 minutes with a vehicle smaller than a standard city bus. Service runs from 6 am to 8 pm weekdays. Many major community facilities are served with nearly 30 stops along the way including the library, senior center, post office, Wake County Northern Regional Center, Wal-Mart, historic downtown business district, apartments, Southeastern Baptist Seminary, Wake Forest-Rolesville High School, other public and private schools, and hundreds of businesses including several grocery stores. Perhaps the most important bus stop is downtown on South White Street south of Elm Avenue where there is a park-and-ride lot and a bus stop for the “Loop” and the Wake Forest Express (WFX) bus to Triangle Town Center Mall or downtown Raleigh. Monthly ridership on the “Loop” route averaged more than 2,500 passenger rides in early 2010.

The WFX bus route connects downtown Wake Forest with the Orvis parking lot at Triangle Town Center shopping mall and the Moore Square Transit Station in downtown Raleigh. The ride to the mall takes about 25 minutes each way. Riders must transfer to another bus (CAT Route 1) for the trip to downtown Raleigh. A full hour is scheduled each way between downtown Wake Forest and downtown Raleigh. The round-trip fare is \$4, increasing to \$5 during peak periods. Service is from 5 a.m. to 8 p.m. weekdays only. Monthly ridership on the WFX route averaged more than 2,100 passenger rides in early 2010.

Both bus routes run on a schedule and stay along a fixed route. The fare is free on the “Loop”. Both routes are operated by Raleigh’s CAT system under an operating agreement with the City of Raleigh, the Town of Wake Forest, and Triangle Transit.



Figure 4.2a – Wake Forest Loop Map



Source: http://www.wakeforestnc.gov/client_resources/residents/wake%20forest%20loop%20draft%20brochure.pdf

Driving

As the region's economy expands and more and more permanent residents relocate to the area, the frequency and length of trips on the current system of highways and streets in Wake Forest can be expected to increase. This increase in traffic volume will create new deficiencies on the existing transportation network. Traffic bottlenecks may become evident in places that currently function adequately and existing deficiencies will be magnified. Prior to anticipating future traffic problems, it is helpful to gain an understanding of the existing conditions of driving in Wake Forest. This discussion includes Corridors and Activity Centers, Functional Classification, Corridor Operations, and Traffic Safety and Crash History. The section concludes with a brief description of future traffic conditions.



Corridors and Activity Centers

As development occurs and more vehicles take to the road, roadway improvements are needed to reduce traffic congestion. These roadway improvements often enhance access, thus raising land values and attracting more development. The interaction between activity centers and the transportation corridors that link them to other centers is important, as are the mobility choices provided within the center. Often neighborhoods and activity centers rely on a small number of transportation corridors to provide essential links between home, school, employment, shopping, social, and recreational destinations. The extent to which these origins and destinations blend into multi-purpose activity centers has a dramatic effect on a person's ability to choose between modes for their trip. In many cases, the range of trip alternatives (walk, bike, drive, or transit) also can influence the overall perception of a community.

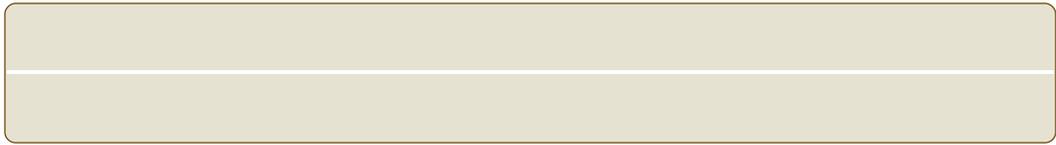
Downtown Wake Forest is an example of a well-connected activity center. Many streets connect to and through the area. Crossings of the railroad at Roosevelt Avenue, Elm Avenue, and Holding Avenue are critical to the success of downtown, precisely because of the connectivity. The choice in routes allows people to walk or bicycle to and within the downtown area, and the restraint shown in avoiding overly wide streets contributes to the walkability of downtown Wake Forest. The recent location of a major bus hub on South White Street provides additional multimodal choices for living, working, shopping, and playing in downtown Wake Forest.

On-street parking often is discussed in activity centers including downtown Wake Forest. A recent presentation in Raleigh by Dr. Donald Shoup highlighted the following three basic principles from his book "The High Cost of Free Parking".

1. The supply and price of on-street parking should be set and managed with the goal of inducing turnover (one vehicle departs, another arrives to fill the vacant parking spot) that is high enough so that at the peak parking demand period no less than 15 percent of parking spaces are available. This results in an available spot every 7 parking spaces; thus appearing customer friendly.
2. The price of on-street parking (meters) should be set at the same or higher rate as the nearest available public parking garage. On-street spaces are prime in terms of location and typical customer preference, so the price should reflect the higher preference. Parking garage rates are often set based on the revenue return needed to pay off debt service incurred by the owner during construction. This rate should influence the rate charged for nearby on-street parking.
3. On-street parking in residential neighborhoods that are walking distance to activity centers are a public asset. Residential parking permit programs should be used for nighttime parking, but daytime use should produce revenue for the local agency with a portion of the proceeds returned to the neighborhood in the form of public realm (streetscape, parks, etc.) improvements or maintenance (litter clean-up, additional security patrols).

The level of success for corridors within and between activity centers depends in large part on the intended function of the street. A unique challenge for the future will be to balance the Town's mobility needs with other priorities. Often traffic mobility has taken priority without regard for other considerations such as the function of the street, corridor relationship to land use, urban design, and the promotion of alternate modes.

A unique challenge in creating a successful transportation system for the Town is blending connectivity and access functions while preserving the small town charm and unique character of Wake Forest. Neighborhoods and activity centers throughout the Town may have different needs and priorities. While recognizing these differences, it is important not to lose focus of the practical concept of overall connectivity. This concept is particularly relevant as it relates to people's desires to make safe and efficient trips not only by driving, but also by walking, bicycling, or using public transportation. For this reason, the recommendations detailed in Chapter 5 include enhancements to the pedestrian, bicycle, transit, and roadway networks.

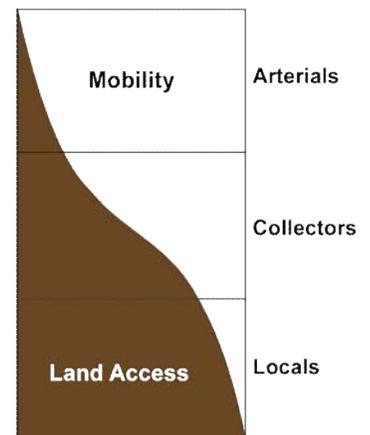


Functional Classification

The classification of streets into several “functional” categories aids in communication among policy makers, planners, engineers, and citizens for expanding the transportation system. The functional classification system groups streets according to the land use served (or to be served) and provides a general designation of the type of traffic each street is intended to serve. The street functional classification system primarily defines the street in terms of roadway design and character as well as operational features for the movement of vehicles.

Two major considerations that distinguish thoroughfares from neighborhood streets are access and mobility. The primary function of local or neighborhood streets is to provide access. These streets are intended to serve localized areas or neighborhoods, including local commercial land uses and mixed-use areas (i.e. low speeds, low volumes, and short distances). Local streets are not intended for use by through traffic. The primary function of thoroughfares is mobility. Limiting access points (intersections and driveways) on thoroughfares enhances mobility. Too much mobility at high speeds limits access by pedestrians and bicyclists. The thoroughfare is designed to carry more traffic than is generated within its corridor (i.e. higher speeds, higher volumes, and longer distances). The existing public street network in Wake Forest uses the NCDOT thoroughfare classification system including freeways, expressways, boulevards, other major thoroughfares, and minor thoroughfares. The NCDOT system also includes collectors and local streets. Each type is described below.

Portion of Service



Thoroughfares

Thoroughfares provide high mobility, operate at higher speeds (45 mph and above), provide significant roadway capacity, have a great degree of access control, and serve longer distance travel. These facilities can be subdivided into categories that include facilities with full access control such as freeways and expressways, as well as major and minor thoroughfares. They usually connect to one another or to collector streets and very few connect to local streets.

Expressways and Freeways

Expressways and freeways provide the most mobility and least access (since access is only available at interchanges). Expressway/freeway facilities typically serve longer distance travel and support regional mobility. The state funds roadway improvement and maintenance on these facilities. I-540 is an example of a freeway.

Boulevards

Boulevards provide a moderate level of mobility for traffic traveling at medium speeds. Access is managed including the use of medians and shared-access driveways by adjacent parcels of land. Driveways mostly are right-in/right-out only. A mix of intersections and interchanges may exist. Multi-modal elements include bus stops, bicycle lanes (urban) or wide paved shoulders (rural) and sidewalks (urban).



Capital Boulevard (US 1)

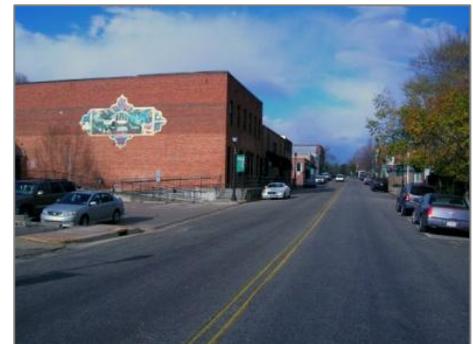
Major Thoroughfares

Major thoroughfares typically have tightly controlled access and few, if any, individual site driveways. These facilities serve medium to longer distance travel and typically connect minor thoroughfares and collector streets to freeways and other higher type roadway facilities. Generally, roadway improvements and maintenance on major thoroughfares are funded by the state, but it typically takes more than a decade to secure the necessary funding. Major thoroughfares in Wake Forest include Capital Blvd (US 1).

Minor Thoroughfares

Minor thoroughfares primarily serve a mobility function but often have more closely spaced intersections, some individual site driveways, and generally lower design and posted speeds compared to other thoroughfares. The minor thoroughfare network primarily serves local traffic and connects to other minor thoroughfares, major thoroughfares, and collector streets. Minor thoroughfares provide a higher level of access to adjacent land uses than major thoroughfares and typically have lower traffic volumes. For the most part, minor thoroughfares are maintained by the state but the cost may be the responsibility of local governments. These roads typically are widened at developer or municipality's cost.

In general, minor thoroughfares in the study area have two-lane undivided cross sections with little or no paved shoulders and an occasional left-turn lane at intersections and major driveways. Posted speed limits range from 35 mph to 45 mph. White Street, Elm Avenue, and Holding Avenue are examples of a minor thoroughfares in Wake Forest.



North White Street

Collectors

Collectors typically provide less overall mobility, operate at lower speeds (less than 35 mph), have more frequent and greater land use access flexibility, and serve shorter distance travel than arterials. Collectors provide critical connections in the roadway network by bridging the gap between thoroughfares and locals. Thus, the majority of collector streets connect with one another, with local streets, and with minor thoroughfares.

The primary purpose of the collector street system is to collect traffic from neighborhoods and distribute it to the system of major and minor thoroughfares. In general, collector streets have two lanes and often have exclusive left-turn lanes at intersections with major and minor thoroughfares and less frequently at intersections with other collector streets. While many existing collector streets in Wake Forest are state owned and maintained, new collector streets are rarely constructed and funded by the state. Responsibility for collector streets usually falls to the local government and the development community for funding, design, and construction. As a result, these streets often are built by developers in conjunction with land planning and development of private property.

Wake Forest has maintained a collector street plan since the mid-1990's, updating it periodically and implementing it wherever practical. The community benefits from spacing of connected streets (collectors and thoroughfares) every quarter-mile on average. New roads must adhere to the physical terrain and minimize or avoid human and environmental impact, so the quarter-mile guideline should be adjusted accordingly but not ignored. Existing collector streets in Wake Forest include Heritage Club Avenue, Wingate Street, and Cimarron Parkway.

In Wake Forest, typical standards for residential collector streets are 35' back of curb to back of curb within a 60' right-of-way. Typical standards for commercial collector streets are 41' back of curb to back of curb within a 70' right-of-way.

Locals

Local facilities provide greater access and the least amount of mobility. These facilities typically connect to one another or to collector streets and provide a high level of access to adjacent land uses/development (i.e., frequent driveways). Locals serve short distance travel and have low posted speed limits (25 mph to 35 mph). Most roadways in Wake Forest are classified as locals. These warrant infrequent repaving and, if necessary, sidewalk construction.



Commercial Collector Street

Corridor Operations



US 1 / Dr. Calvin Jones Highway Interchange (source: Bing.com)

Regional Mobility

Regional mobility in the Wake Forest area is provided by three major thoroughfares — US 1 (Capital Boulevard), NC 98, and US 401 (Louisburg Road). Capital Boulevard (US 1) is a primary north/south corridor for the Triangle. Through Wake Forest, it is a four-lane divided highway with a mixture of unsignalized and signalized intersections, including interchanges at NC 98 and Dr. Calvin Jones Highway (NC 98 Bypass). The posted speed limit on Capital Boulevard throughout the study area is 55 mph.

NC 98 is a four-lane major thoroughfare that runs east/west and passes south of downtown Wake Forest on its way between Nash County and Durham. US 401

(Louisburg Road) is a rural two-lane highway with posted speeds of up to 55 mph that runs along the southeastern edge of Wake Forest's ETJ. US 401 is a popular route for commuters traveling to Raleigh.

Congested Corridors

Congested corridors result from several factors (often because of bottlenecks located primarily at intersections) along the corridor. Aside from individual bottleneck locations in corridors, congestion frequently results from too many people trying to use a route that already operates at or over-capacity. Motorists generally do not have the option to take alternative corridors.

Traffic Volumes

Traffic volumes signify the total number of vehicles traveling along a roadway segment on an average day. Figure 4.3 illustrates 2007 average daily traffic (ADT) volumes in Wake Forest as provided by NCDOT. The road carrying the highest traffic volume in the study area in 2007 was Capital Boulevard (US 1) ranging from 34,000 vehicles per day (vpd) at the Franklin County line to 63,000 vpd near Durant Road / Perry Creek Road. Other roads with high traffic volumes in 2007 are listed in Table 4.3. Table 4.4 compares traffic volumes in 2007 with volumes on the same segments in 1997-1999.

Table 4.3 – Roads with Highest Traffic Counts in 2007

Road	Location	2007 AADT*
Capital Blvd (US 1)	North of Durant Rd / Perry Creek Rd	63,000
US 401	North of Perry Creek Rd	40,000
Capital Blvd (US 1)	Franklin / Wake county line	34,000
S Main St (US 1A)	North of Capital Blvd	25,000
Falls of Neuse Rd	North of Neuse River bridge	20,000
Durham Rd	West of Capital Blvd	17,000
Burlington Mills Rd	East of Capital Blvd	11,000
Dr. Calvin Jones Highway	West of Wait Ave / Jones Dairy Rd	11,000^

* 2007 Average Annual Daily Traffic Volume (vehicles per day)
^ estimated from peak hour count

Table 4.4 – Largest Change in Traffic Volume, 1997 to 2007

Road	Location	1997-1999 AADT	2007 AADT*	Percent Change
Capital Blvd (US 1)	Harris Rd to Stadium Dr	26,000 ('99)	45,000	Increased 73%
Capital Blvd (US 1)	South of S Main St	32,000	46,000	Increased 44%
S Main St (US 1A)	US 1 to Ligon Mill Rd	11,000	25,000	Increased 127%
Roosevelt Ave	White St to Franklin St	13,000	6,500	Decreased 50%
Ligon Mill Rd	South of S Main St	1,900	7,000	Increased 268%

* 2007 counts conducted prior to opening Dr. Calvin Jones Highway between Capital Blvd and S Main St

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See Figure 4.3 – 2007 AADT on previous page.

Volume-to-Capacity Ratios

However, traffic volumes alone should not be used to determine congested corridors because this measurement does not take into account different functional classifications and roadway capacity. A better measurement for this comparison is volume-to-capacity (V/C) ratios. V/C ratios are calculated by dividing the traffic volume of a roadway segment by the theoretical capacity of the roadway. The result is a universal measurement.

These ratios can be compared to roadway Level of Service (LOS), which places roadways into six letter grade levels of the quality of service to a typical traveler on a facility. An "A" describes the highest level (least congestion) and level "F" describes the lowest level (most congestion). The Levels of Service (and V/C ratios) shown in Figure 4.4 are grouped into one of the following categories. The level of service analysis for this plan was based on the Triangle Regional Model, which is administered by the Institute for Transportation Research and Education (ITRE). The Levels of Service (and V/C ratios) shown in the figure are grouped into one of the following categories.

- LOS A or B — *Well Below Capacity* (V/C = less than 0.8) — Roadways operating with a V/C ratios less than 0.8 operate at optimal efficiency with no congestion during peak travel periods. These corridors are not shown in the congested corridors map due to the relative ease of travel during most time periods.
- LOS C — *Approaching Capacity* (V/C = 0.8 to 1.0) — As the V/C nears 1.0, the roadway becomes more congested. A roadway approaching capacity may operate effectively during non-peak hours, but may be congested during morning and evening peak travel periods.
- LOS D or E — *At or Slightly Over Capacity* (V/C = 1.0 to 1.2) — Roadways operating at capacity are somewhat congested during non-peak periods, with congestion building during peak periods. A change in capacity due to incidents impacts the travel flow on corridors operating within this V/C range. On the upper end of this category, corridors experience heavy congestion during peak periods and moderate congestion during non-peak periods. Changes in capacity can have major impacts on corridors and may create gridlock conditions.
- LOS F — *Well Over Capacity* (V/C = greater than 1.2) — Roadways in this category represent the most congested corridors in the study area. These roadways are congested during non-peak hours and most likely operate in stop-and-go gridlock conditions during the morning and evening peak travel periods.

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See Figure 4.4 – Congested Corridors on previous page.

Throughout the Triangle, rapid growth has made it difficult if not impossible for local decision-makers to construct enough road lanes to handle increases in traffic. The result is peak hour traffic congestion on several major area roadways. Although the commute between Wake Forest and Raleigh via Capital Boulevard (US 1) typically is congested, traveling around Wake Forest normally can take place at the posted speed limit. Delay occurs due to left-turning vehicles where no left-turn lanes exist and bus stops with insufficient space for vehicles to pass a stopped bus. Delays continue to occur near the Southeastern Baptist Seminary, particularly on Front Street and Roosevelt Avenue, however the time delay decreased when Dr. Calvin Jones Highway opened to traffic east of Capital Boulevard.

Congested corridors were mapped in the Wake Forest Transportation Plan (adopted 2003) including:

- Capital Boulevard (US 1) between Durant Road / Perry Creek Road and South Main Street
- South Main Street (US 1A) between Capital Boulevard and South Avenue
- Roosevelt Avenue / Wait Avenue (NC 98 then) between Jones Dairy Road and Franklin Street
- Front Street between North Avenue and South Avenue
- North Avenue between Front Street and Rock Springs Road
- Stadium Drive between Rock Springs Road and Capital Boulevard
- Durham Road (NC 98 then) between Tyler Run Drive and South Main Street
- Durham Road (NC 98 then) between Capital Boulevard and Wake Union Church Road
- Falls of Neuse Road between Garden Hill Drive and Wakefield Plantation Drive
- Burlington Mills Road between Ligon Mill Road and US 401

There were four congested intersections all of which were located along the roadways listed above. Conditions on the old NC 98 route (Wait Avenue / Roosevelt Avenue / Front Street / South Street / Durham Road) have improved considerably. It is estimated that more than 6,000 vehicles per day have diverted to other routes, mostly to Dr. Calvin Jones Highway. Congested corridors in 2005 indicate that Capital Boulevard, South Main Street, and a segment of Durham Road continue to experience peak hour congestion.

Traffic Safety and Crash History

Traffic safety is a key component to any successful transportation plan. Examining the crash history and traffic patterns usually can predict locations where improvements in traffic safety will benefit both motorists and the community as a whole. A traditional approach to determining locations for safety countermeasures involves studying the number and type of crashes in a location as well as the associated crash rate for the location.

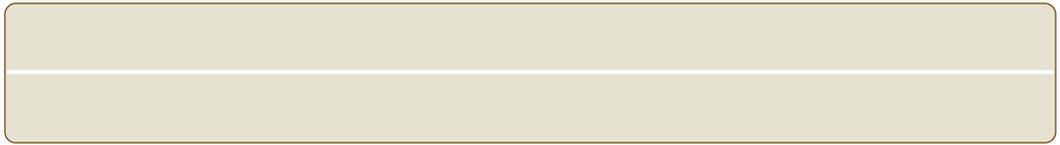
NCDOT maintains a database of reported crashes statewide. The summary of crash data shown in the table represents reported crashes at specified locations in Wake Forest from October 1, 2005 through September 30, 2008. The crashes are ranked by Equivalent Property Damage Only Rate, which represents a measure of severity. The worst-case crash locations in Wake Forest are shown in Table 4.5. These locations also are identified in Figure 4.5. The top five crash locations in terms of frequency are shown in Table 4.6. This table also lists the most frequent crash type at each intersection.

Contributing factors to a location's high crash frequency include intersection design, access considerations, and traffic congestion. Many of the locations identified with high crash frequency were also locations where congestion often exists. A direct relationship exists between traffic congestion and crash frequency, which justifies the ongoing efforts to provide adequate funding for transportation projects that minimize traffic congestion. Driveway access in proximity to intersections can also contribute to crash frequency by increasing the unexpected conflict points near the intersection.

Table 4.5 – Crash Locations Ranked by Crash Severity

Rank	Street 1	Street 2	Total Crashes	Fatal	Injury	Class			PDO Crash	EPDO Rate
						A	B	C		
1	US 1 / Capital Blvd	S Main St / New Falls of Neuse Rd	77	0	20	0	5	15	57	225.0
2	US 1 / Capital Blvd	Wake Union Church Rd	28	0	11	1	3	7	17	177.5
3	US 1A / S Main St	NC 98 Bypass	36	0	16	0	8	8	20	154.4
4	Durham Rd	Wake Forest Market / Cloverleaf Park	20	0	8	1	4	3	12	147.3
5	US 1 / Capital Blvd	Jenkins Rd	26	0	13	0	2	11	13	122.2

Note: Crashes ranked by Equivalent Property Damage Only (EPDO) Rate, which represents a measure of severity. Data provided by NCDOT for crashes occurring 10/2005 through 9/2008.



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See Figure 4.5 – Crash Locations.

Table 4.6 – Crash Locations Ranked by Crash Frequency

Rank	Street 1	Street 2	Total Crashes	Top Crash Type	
				Type	Number
1	US 1 / Capital Blvd	S Main St / New Falls of Neuse Rd	77	Rear End, Slow or Stop	43
2	US 1A / S. Main St	NC 98 Bypass	36	Left Turn, Different Roadways	11
3	US 1A / S Main St	Ligon Mill Rd	30	Angle	14
5	US 1 / Capital Blvd	Wake Union Church Rd	28	Rear End, Slow or Stop	14
4	US 1 / Capital Blvd	Jenkins Rd	26	Rear End, Slow or Stop	11

Note: Crashes ranked by crash frequency. Data provided by NCDOT for crashes occurring 10/2005 through 9/2008.

Safety Watch List

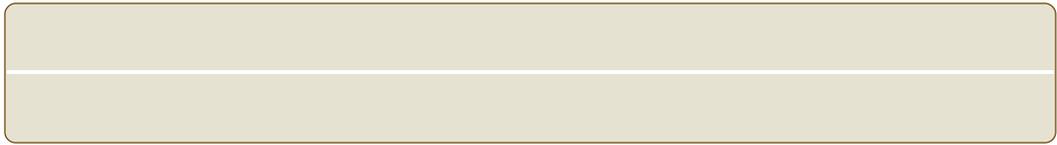
Crash statistics show that two corridors have high crash frequencies at many intersections — South Main Street (between Capital Boulevard and Dr. Calvin Jones Highway) and on Capital Boulevard throughout the entire study area. A total of 8 intersections in a two-mile stretch on South Main Street have a pattern of crash occurrences, and 65 injuries were reported on South Main Street in the three-year analysis period. On Capital Boulevard, six intersections exhibited a pattern of crash occurrences, resulting in 59 injuries. On average, an injury occurs every two weeks at the intersection of South Main Street and Capital Boulevard.

On a positive note, three intersections topping the list of high crash locations in the *2003 Wake Forest Transportation Plan* showed a decrease in crashes per year in the most recent analysis period:

- US 1 at Burlington Mills Rd— decreased from 18 to 5 per year
- US 1 at Jenkins Rd / Stadium Dr— decreased from 25 to 8 per year
- US 1 at Purnell Rd / Harris Rd— decreased from 15 to 3 per year

High Priority Crash Locations

A preliminary review of the crash history was performed for the top five intersections based on the severity rankings. Field investigation and a review of planned projects were performed to confirm existing conditions, identify design features, and observe driver behavior. Field observations provided insight to potential patterns and revealed conditions that could be enhanced through geometric changes or enhancements to traffic control.



US 1 and South Main Street / New Falls of Neuse Road

Since the crash data was compiled for the *Wake Forest Transportation Plan Update*, this intersection was modified to include a longer eastbound left-turn lane on the approach to Capital Boulevard. Additional modifications should be considered that would lengthen the westbound right-turn lane. The majority of crashes were rear-end type collisions, some of which may be eliminated when a grade-separated interchange is built. The project is not funded at this time.

US 1 and Wake Union Church Road

The signalized intersection of US 1 and Wake Union Church sits less than a quarter mile north of the entrance/exit ramps to the US 1/Durham Road interchange. The prevalence of rear end collisions may be a factor of poor sight distance, excess speeds, and driver inattention. Improvements to this intersection likely will depend on decisions by the Wake Forest Town Board regarding the development of adjacent land. Ultimately, Wake Union Church Road may be extended over US 1 via a bridge that would connect with the northern extension of Ligon Mill Road.]

South Main Street and Dr. Calvin Jones Highway

This intersection is the first signalized intersection eastbound Dr. Calvin Jones Highway motorists approach after exiting Capital Boulevard. Motorists on Dr. Calvin Jones Highway are afforded offset left turn lanes to improve visibility when turning left. Heavy traffic volumes on South Main Street may contribute to an increase in crash occurrences. The signal timing should be analyzed to ensure adequate time for protected left turns from all approaches.

Durham Road and entrance to the Market of Wake Forest

The traffic signal heads at the intersection of Durham Road at the entrance to the Market of Wake Forest shopping center may be mistaken with signal heads for the nearby intersection of Durham Road at the southbound US 1 ramps. The resulting confusion of some motorists may lead to slower reaction times and crashes. Selective re-programming of the direction of signals may reduce driver confusion. Furthermore, a reduction in traffic volumes on Durham Road following completion of Dr. Calvin Jones Highway may reduce the crash frequency at this location.

US 1 and Jenkins Road

The signals and westbound approach to Capital Boulevard recently were modified. As a result, conditions should be monitored over time to assess any change in crash frequency. Another issue to monitor is the relatively high vehicle speed of southbound traffic approaching this intersection.

Future Travel Conditions

The challenges facing the future of the transportation network in Wake Forest are the collective result of sustained growth, continued reliance on the automobile for even short trips, and increasing competition for limited transportation funds. As mentioned in Chapter 3, various projections forecast substantial employment and population growth in Wake Forest over the next several decades. If this growth coupled with the recent surge of commuters in single-occupancy vehicles continues, few projects will do little to address deficiencies in the roadway network and gaps in the multimodal system.

The Triangle Regional Model mentioned previously was used to test the operation of the future roadway network. Population and employment projections prepared by each municipality in the Triangle were provided to the Capital Area Metropolitan Planning Organization (CAMPO) to forecast traffic in the horizon year. The resulting congestion is shown in Figure 4.6. A brief description of the Triangle Regional Model is presented in Appendix B.

As shown in Table 4.7, traffic can be evaluated based on a comparison of volume and capacity for individual roads. It also can be evaluated for parallel roads crossing an imaginary line called a “screenline”. As shown in Table 4.7, five screenlines in the study area are listed; one each at the eastern, northern, western, and southern gateways to Wake Forest plus another in the middle of the town.

Some roads are forecast with vehicular volumes that exceed planned capacity, suggesting congested conditions will exist. In some instances, motorists may choose to exit the congested road and use an alternate route. For example, congestion on Capital Boulevard (US 1) south of Wake Forest may lead some motorists to exit on US 401 and then enter Wake Forest via Ligon Mill Road or Forestville Road. Table 4.7 shows each screenline has sufficient planned roadway capacity to accommodate forecasted demand.

The Corridor Profiles presented in Appendix A provide additional information. Each corridor profile includes a photograph, information on traffic volumes, and relevant roadway characteristics. When feasible, the illustrative cross sections include bicycle and pedestrian amenities. Recommendations for the Wake Forest transportation system are presented in Chapter 5.

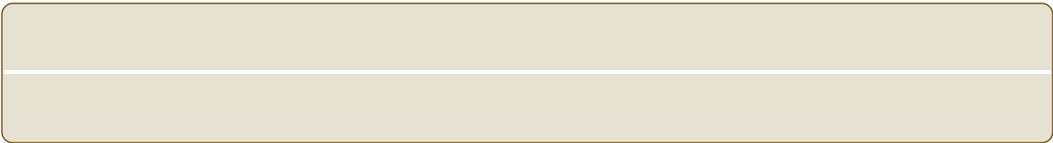


Table 4.7 – Future Volumes by Screenline

Road	Existing 2007-2009		Future (2035)		
	No. Lanes	AADT	No. Lanes	AADT	Capacity*
North-South Roads: south of Burlington Mills Road - Screenline "South Gateway"					
US 1	4	55,000	6	101,900	175,000
Falls of Neuse Rd	2	20,000	6	56,400	64,900
Ligon Mill Rd	2	7,900	2	15,900	25,900
Forestville Rd	2	5,800	4	21,200	41,400
East-West Roads: at eastern planning boundary - Screenline "East Gateway"					
NC 98	2	11,000**	2	48,500	51,800
Oak Grove Church Rd	2	920	2	7,700	17,300
Jones Dairy Rd	2	8,100	4	20,700	26,300
Rogers Rd	2	1,440	2	10,100	26,300
Burlington Mills Rd	2	2,800	4	23,700	51,800
North-South Roads: north of Purnell Road/Stadium Drive/North Avenue/Roosevelt Avenue/Wait Avenue - Screenline "Northside"					
US 1	4	34,000	4	31,100	26,600
Bud Smith Rd / Thompson Mill Rd	2	2,600	2	13,600	26,300
Jackson Rd	2	n/a	2	n/a	
Wall Rd	2	n/a	2	n/a	
N Main St	2	3,100	2	17,800	26,300
N White St	2	3,600	2	12,500	17,300
Gilcrest Farm Rd	2	n/a	2	n/a	
East-West Roads: west of US 1 (Capital Boulevard) - Screenline "Westside"					
NC 98	0	0	4	21,900	26,600
Purnell Rd / Harris Rd	2	4,500	2	8,900	26,300
Jenkins Rd / Stadium Dr	2	4,200	2	6,900	17,300
Durham Rd	3-5	17,000	4	22,100	17,300
New Falls of Neuse Rd	4	n/a	4	40,500	43,200
North-South Roads: south of NC 98 Bypass - Screenline "Southside"					
US 1	4	43,000	6	72,700	53,200
Ligon Mill Rd	0	n/a	4	21,400	34,700
S Main St	3	20,000	4	24,500	17,300
S Franklin St	0	n/a	4	11,800	42,840
Heritage Lake Rd	4	6,500**	4	15,900	34,700
Jones Dairy Rd	2	8,100	4	20,700	26,300

* Capacity for future conditions defined as Level of Service (LOS) D

** estimated by extrapolating 2007 PM peak hour turning movement counts to represent 24-hour ADT volumes

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See Figure 4.6 – 2035 Congested Corridors on previous page.

Complete Streets

The previous description of projects, programs and policies for each mode of transportation in Wake Forest can be encapsulated in a single interrelated map and policy for Complete Streets. Figure 4.7 at the conclusion of this chapter shows existing and future complete streets identified during the planning process for the *Plan Update*. The following policy (presented verbatim) was adopted by the North Carolina Board of Transportation on July 9, 2009:

A. Definition

Complete Streets is North Carolina's approach to interdependent, multi-modal transportation networks that safely accommodate access and travel for all users.

B. Policy Statement

Transportation, quality of life, and economic development are all undeniably connected through well-planned, well-designed, and context sensitive transportation solutions. To NCDOT, the designations "well-planned", "well-designed" and "context-sensitive" imply that transportation is an integral part of a comprehensive network that safely supports the needs of the communities and the traveling public that are served.

The North Carolina Department of Transportation, in its role as stewards over the transportation infrastructure, is committed to:

- providing an efficient multi-modal transportation network in North Carolina such that the access, mobility, and safety needs of motorists, transit users, bicyclists, and pedestrians of all ages and abilities are safely accommodated;
- caring for the built and natural environments by promoting sustainable development practices that minimize impacts on natural resources, historic, businesses, residents, scenic and other community values, while also recognizing that transportation improvements have significant potential to contribute to local, regional, and statewide quality of life and economic development objectives;
- working in partnership with local government agencies, interest groups, and the public to plan, fund, design, construct, and manage complete street networks that sustain mobility while accommodating walking, biking, and transit opportunities safely.

This policy requires that NCDOT's planners and designers will consider and incorporate multimodal alternatives in the design and improvement of all appropriate transportation projects within a growth area of a town or city unless exceptional circumstances exist. Routine maintenance

projects maybe excluded from this requirement; if an appropriate source of funding is not available.

C. Purpose

This policy sets forth the protocol for the development of transportation networks that encourage non-vehicular travel without compromising the safety, efficiency, or function of the facility. The purpose of this policy is to guide existing decision-making and design processes to ensure that all users are routinely considered during the planning, design, construction, funding and operation of North Carolina's transportation network.

D. Scope and Applicability

This policy generally applies to facilities that exist in urban or suburban areas, however it does not necessarily exclude rural setting; and is viewed as a network that functions in an interdependent manner.

There are many factors that must be considered when defining the facility and the degree to which this policy applies, e.g., number of lanes, design speeds, intersection spacing, medians, curb parking, etc. Therefore, the applicability of this policy, as stated, should be construed as neither comprehensive nor conclusive. Each facility must be evaluated for proper applicability.

Notwithstanding the exceptions stated herein, all transportation facilities within a growth area of a town or city funded by or through NCDOT, and planned, designed, or constructed on state maintained facilities, must adhere to this policy.

E. Approach

It is the Department's commitment to collaborate with cities, towns, and communities to ensure pedestrian, bicycle, and transit options are included as an integral part of their total transportation vision. As a partner in the development and realization of their visions, the Department desires to assist localities, through the facilitation of long-range planning, to optimize connectivity, network interdependence, context sensitive options, and multimodal alternatives.

F. Related Policies

This policy builds on current practices and encourages creativity for considering and providing multi-modal options within transportation projects, while achieving safety and efficiency.

Specific procedural guidance includes:

- Bicycle Policy (adopted April 4, 1991)

- Highway Landscape Planting Policy (dated 6/10/88)
- Board of Transportation Resolution: Bicycling & Walking in North Carolina, A Critical Part of the Transportation System (adopted September 8, 2000)
- Guidelines for Planting within Highway Right-of-Way
- Bridge Policy (March 2000)
- Pedestrian Policy Guidelines –Sidewalk Location (Memo from Larry Goode, February 15, 1995)
- Pedestrian Policy Guidelines (effective October 1, 2000 w/Memo from Len Hill, September 28, 2000)
- NCDOT Context Sensitive Solutions Goals and Working Guidelines (created 9-23-02; updated 9-8-03)

G. Exceptions to Policy

It is the Department's expectation that suitable multimodal alternatives will be incorporated in all appropriate new and improved infrastructure projects. However, exceptions to this policy will be considered where exceptional circumstances that prohibit adherence to this policy exist. Such exceptions include, but are not limited to:

- facilities that prohibit specific users by law from using them,
- areas in which the population and employment densities or level of transit service around the facility does not justify the incorporation of multimodal alternatives,

It is the Department's expectation that suitable multimodal alternatives will be incorporated as appropriate in all new and improved infrastructure projects within a growth area of a town or city.

As exceptions to policy requests are unique in nature, each will be considered on a case-by-case basis. Each exception must be approved by the Chief Deputy Secretary.

Routine maintenance projects maybe excluded from this requirement; if an appropriate source of funding is not available.

H. Planning and Design Guidelines

The Department recognizes that a well-planned and designed transportation system that is responsive to its context and meets the needs of its users is the result of thoughtful planning. The Department further recognizes the need to provide planners, designers and decision-makers with a framework for evaluating and incorporating various design elements into the planning, design, and construction phases of its

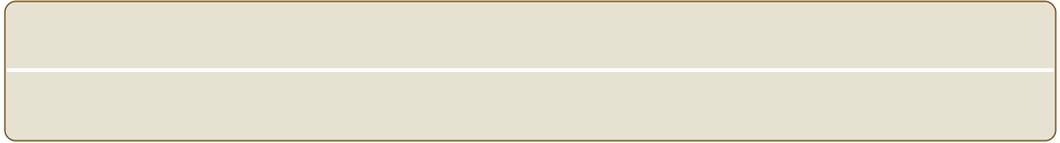
transportation projects. To this end, a multi-disciplined team of stakeholders, including transportation professionals, interest groups, and others, as appropriate, will be assembled and charged with developing comprehensive planning and design guidelines to support this policy.

These guidelines will describe the project development process and incorporate transparency and accountability where it does not currently exist; describe how (from a planning and design perspective) pedestrians, bicyclists, transit, and motor vehicles will share roads safely; and provide special design elements and traffic management strategies to address unique circumstances.

An expected delivery date for planning and design guidelines will be set upon adoption of this policy.

I. Policy Distribution

It is the responsibility of all employees to comply with Departmental policies. Therefore, every business unit and appropriate private service provider will be required to maintain a complete set of these policies. The Department shall periodically update departmental guidance to ensure that an accurate and up-to-date information is maintained and housed in a policy management system.



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See Figure 4.7 – Complete Streets Plan.



Chapter 5

The Recommended Plan



As we evaluate the Town's transportation network over the next 25 years, it is evident that increasing demands will be placed on the existing road network. With limitations to new construction including natural and man-made barriers it will become even more important to protect the integrity of the existing system and balance the transportation network with strategic investments in pedestrian, bicycle, and transit projects.

Successful implementation of the *Wake Forest Transportation Plan Update* will be goal-driven; that is, with a purpose. Here are the stated goals:

- Create a safe and efficient multimodal transportation system
- Coordinate transportation and land use planning to ensure that growth pays its own way
- Plan, design, and construct transportation facilities that contribute to Wake Forest's small town character and attractive appearance
- Provide safe and convenient facilities and services for people who choose not to use an automobile
- Ensure serviceable operation of existing facilities and services
- Proactively plan, in conjunction with other agencies, for well-planned transportation linkages to other parts of the Triangle region
- Identify sufficient, timely, and equitable financing mechanisms for well-timed transportation services and improvements

Successful implementation of the updated *Wake Forest Transportation Plan* will depend to a great extent on the ability of local, state, and private entities to work together. Given the scarcity of funds and competition to secure it, the Town cannot rely solely on state and federal transportation funds to implement projects. To fully implement the plan, the town will have to identify stable, timely, and equitable methods of funding the program. Wake Forest already has regulations that require development to fund certain roadway improvements that are rational and proportional to the impact created by additional traffic generated by that development. The town will continue to require developers to fund roadway improvements while seeking state and federal transportation funds through cooperative planning with the Capital Area Metropolitan Planning Organization (CAMPO) and North Carolina Department of Transportation (NCDOT).

2003 Wake Forest Transportation Plan — Updates and Amendments

The following items address necessary updates and/or amendments to the 2003 Wake Forest Transportation Plan.

- Adopt a resolution by the Wake Forest Board of Commissioners to amend the official *Wake Forest Transportation Plan*.
- Notify CAMPO of Wake Forest's resolution to amend the official plan with the following changes, noting that these changes already are consistent with the 2035 CAMPO Long Range Transportation Plan:
 1. Capital Boulevard – interim roadway modifications must be consistent with the long-range plan to convert to a freeway through the study area. The 2003 WFTP shows a 6-lane freeway throughout Wake Forest. Since then, the regional long-range transportation plan shows building an 8-lane freeway from I-540 to Burlington Mills Road with interchanges at Durant Road and at Burlington Mills Road. Converting to an 8-lane freeway north of Burlington Mills Road is anticipated to occur after 2035. The plan should be changed to 8-lanes.
 2. Burlington Mills Road – change the 2003 WFTP from a 5-lane section (Capital Boulevard to Ligon Mill Road) to a 4-lane median-divided section with wide striped shoulders. Change the 2003 WFTP from a 3-lane section (Ligon Mill Road to Forestville Road) to a 4-lane median-divided section.
 3. Durham Road – change the 2003 WFTP (Wake Union Church Road to Tyler Run Drive) to a Complete Street with bicycle lanes and sidewalks on both sides. One 10-foot multi-use path buffered by an 8-foot wide landscape strip should be built.
 4. Franklin Street – change the 2003 WFTP from a 5-lane section (Roosevelt Ave. to Holding Ave.) to a 2-lane median-divided section with bike lanes to reflect the new street.
 5. Rogers Road – east of Clear Springs Drive – change to 3 lanes with bike lanes and sidewalks.
 6. Jones Dairy Road – change the 2003 WFTP from a 5-lane section (Wait Avenue to Averette Road) to a four-lane median-divided road.
 7. Juniper Avenue – change the functional classification from a major to a collector street.



Franklin Street

8. Oak Avenue – change the 2003 WFTP classification from a major street to a minor street. Consider building a one-lane roundabout at the intersection of Oak Avenue and Harris Road.
9. North Main Street – change the 2003 WFTP from a 2-lane section (Chestnut Avenue to Oak Avenue) to a 3-lane section with the addition of wide striped shoulders, curb, gutter, landscape strips, and sidewalks.
10. East Wait Avenue – change the 2003 WFTP from a 3-lane section (Allen Road to Jones Dairy Road) to a 2-lane section with left-turn lanes at intersections.
11. South Main Street – change the 2003 WFTP from a 2-lane section (Holding Avenue to Dr. Calvin Jones Highway) to a 3-lane section. Change the 2003 WFTP from a 5-lane section (Dr. Calvin Jones Highway to Rogers Road) to a 3-lane section.
12. North White Street – change the 2003 WFTP from a 2-lane section (Juniper Avenue to Roosevelt Avenue) to a 2-lane section with left-turn lanes at intersections.
13. Wingate Street – change the functional classification from a major to a minor street. Changing the functional classification to a minor street recognizes the need to maintain balance between access and mobility. For example, Wingate Street between Durham Road and Stadium Drive balances these needs by providing two lanes of traffic for mobility and on-street parking, driveways and pedestrian crosswalks for access.



East Wait Avenue

Recommended Plan

In general, the recommendations of the *Wake Forest Transportation Plan Update* support connectivity throughout the transportation network and between modes. The plan also encourages complete streets and advocates for doing more with less through access management improvements and working within the existing public right-of-way when possible. The list of recommendations includes projects listed in previous plans such as the *Wake Forest Pedestrian Plan* and *Wake Forest Bicycle Plan* as well as projects that emerged during discussions with area stakeholders, local officials, the Advisory Committee, and the general public.

Roadway Recommendations

The development of roadway projects required extensive reviews of existing congestion and safety problems, consideration of forecasts for future travel conditions given projected growth in the area, and examination of previous planning efforts. The evaluation of the existing transportation system helped identify needs and priorities. In particular, the transportation network was

placed in the context of transportation corridors and activity centers, functional classification, congestion, and traffic safety.

The challenges facing the future of the transportation network in Wake Forest are the collective result of sustained growth, continued reliance on the automobile for even short trips, and competing agendas for scarce transportation funds. As discussed in Chapter 3, the Town of Wake Forest is expected to continue to attract residents and employees due to its small town charm and location within the Triangle region. As a result, vehicles miles traveled and overall congestion will increase over the next 25 years.

Table 5.1 details the roadway recommendations according to expected implementation schedule. Recommendations are illustrated in Figure 5.1. For recommendations in NCDOT's CTP format, please see Appendix C.

Corridor Profiles

To provide additional information, a profile of strategic corridors throughout the planning area is presented in Appendix A. Included for each corridor is information on traffic volumes and relevant roadway characteristics as well as an illustrative cross section depicted the future of the roadway. The cross sections include a variety of roadway features designed to make the corridor safer for all users. On-street bicycle facilities are denoted on the cross sections with the following symbols:

- Bike Lane () — Provides exclusive-use area adjacent to the outermost travel lane; Includes pavement markings and signage to designate area for bicycle use only
- Wide Striped Shoulders (wss) — Provides greater level of safety and comfort for bicyclists; Similar to bike lanes but without the pavement markings and signage
- Sharrow () — Offers a compromise between dedicated bicycle lanes and unmarked outside lanes; Directs cyclists to the preferred area to cycle in order to avoid roadway debris, doors from parked vehicles, and passing vehicles

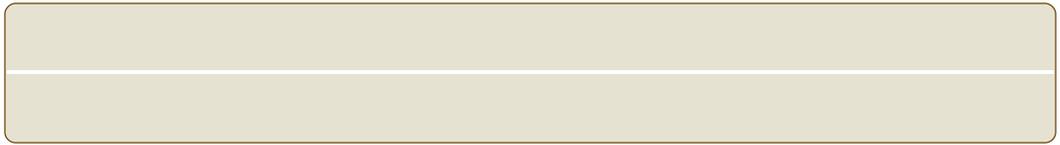
3-Dimensional Cross Sections

To further illustrate the features to be included along the community's strategic corridors, six 3-dimensional cross sections were developed. The selection is not to emphasize these corridors as the community's most important corridors. Instead, the corridors were selected because they contain features common to other strategic corridors, such as landscaped medians, two-way left-turn lanes, various on-street bicycle facilities, sidewalks, multi-use paths, and planting strips. The six 3-D cross sections follow Table 5.1 and Figure 5.1.

Table 5.1 – Recommended Roadway Projects

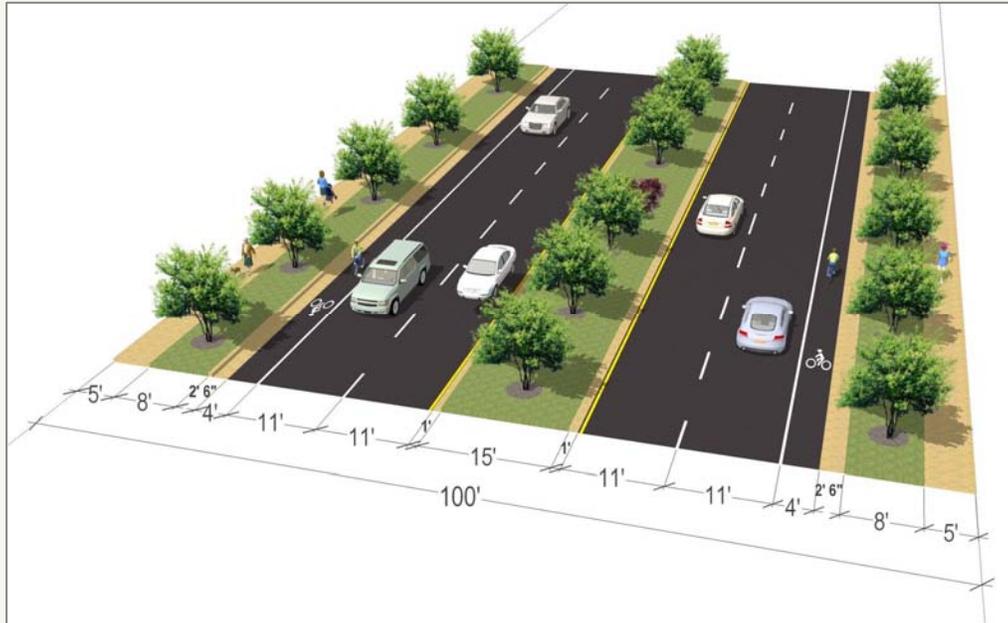
Road	Segment	Schedule	Cost	Description
Short-Term Actions (2015)				
Dr. Calvin Jones Highway	US 1 to NC 98	Under construction. Complete by 2010.	15.1 million	4 lanes, no sidewalk or multi-use path.
S Main St	Rogers Rd to Forbes Rd	Designed. Build by 2015.	1.7 million	3 lanes, wide-striped shoulders, Top 20 sidewalk priority list.
N White St	County line to Roosevelt Ave	2015	TBD	Widen to provide left-turn lane and wide striped shoulders.
Rogers Rd	S Main St to Heritage Lake Rd	2015	TBD	Bridge replacement. Widen to 5-lane section with wide striped shoulders, sidewalk and multi-use path. Top 20 Sidewalk Priority List.
Stadium Dr	Capital Blvd to Rock Springs Rd	2015	TBD	Widen to provide 2-lanes with left-turn lanes at intersections. Include wide striped shoulders and a multi-use path on the south side. Top 20 Sidewalk Priority List.
Ligon Mill Rd	S Main St to Burlington Mills Rd	2015	TBD	Bridge replacement. Widen to 4-lane median-divided with bike lanes and sidewalks.
Long-Term Actions (2025 or 2035)				
Heritage Lake Rd	Rogers Rd to Heritage Heights Ln	By 2025 per LRTP	7.1 million	Widen to 3 lanes. Top 20 sidewalk priority list.
Ligon Mill Rd	Stadium Dr to Burlington Mills Rd	By 2025 per LRTP	31.5 million	Bridge replacement. Widen/Build 3 lane road with bike lanes and sidewalk both sides.
S Franklin St	Rogers Rd to Dr. Calvin Jones Highway	By 2025 per LRTP	11.4 million	Bridge replacement. Widen to 3 or 4 lanes. Top 20 sidewalk priority list.
Forestville Rd	Buffaloe Rd to Rogers Rd	By 2025 per LRTP	57.3 million	Bridge replacement. Widen to 4 lanes median-divided with sidewalks both sides.
NC 98	Jones Dairy Rd to US 401	By 2025 per LRTP	40.3 million	West of NC 96, widen to 3 lanes with bike lanes.
Capital Blvd (US 1)	Thornton Rd to Burlington Mills Rd	By 2025 per LRTP	60.5 million	Widen to 8 lane freeway with interchange at Burlington Mill Rd.
Burlington Mills Rd	Capital Blvd to Forestville Rd	Post 2035	TBD	Widen to 4 lane median-divided road with wide striped shoulders and multi-use path both sides.

Note : LRTP refers to the CAMPO 2035 Long Range Transportation Plan adopted in 2009.

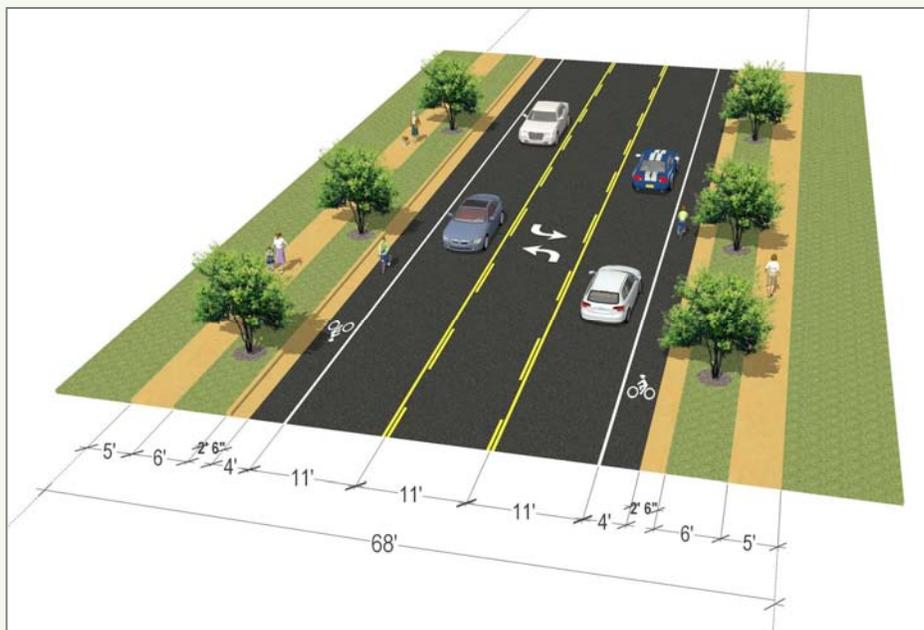


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See Figure 5.1 – Highway Plan.

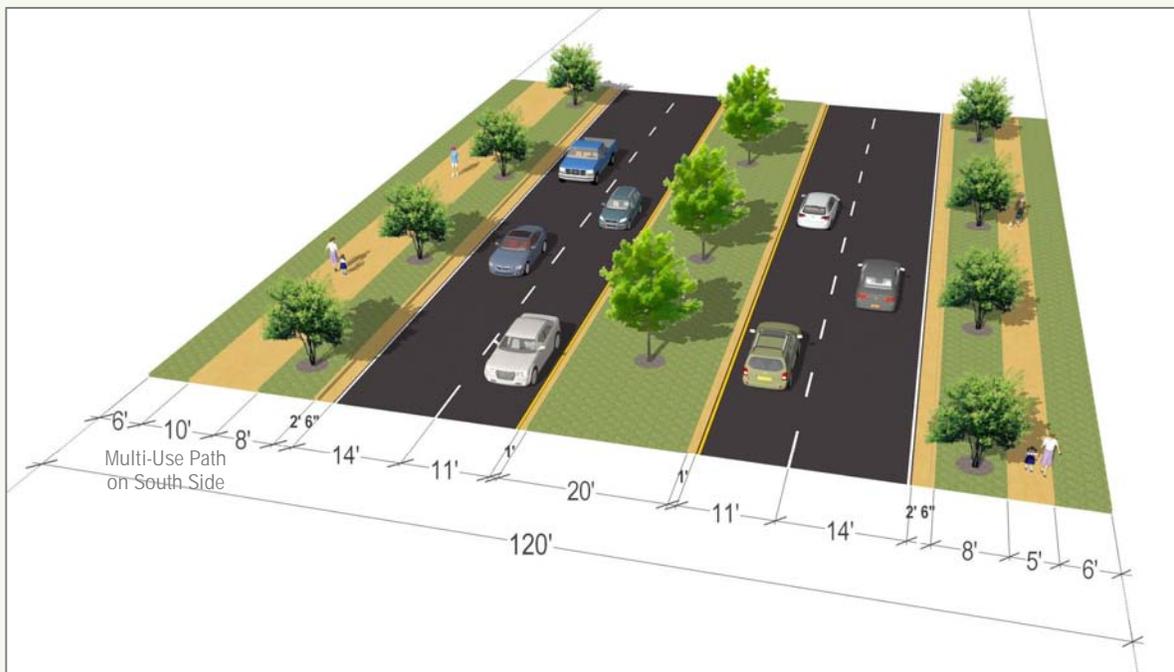
Ligon Mill Road — Dr. Calvin Jones Highway to South Main Street



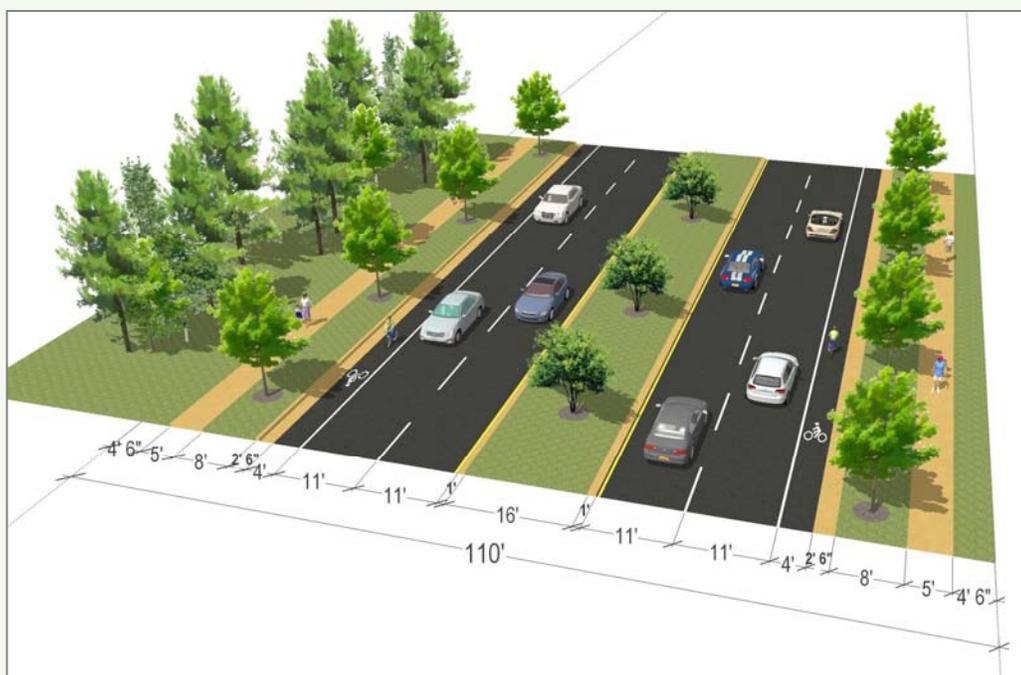
Ligon Mill Road — South Main Street to Toms Creek Bridge



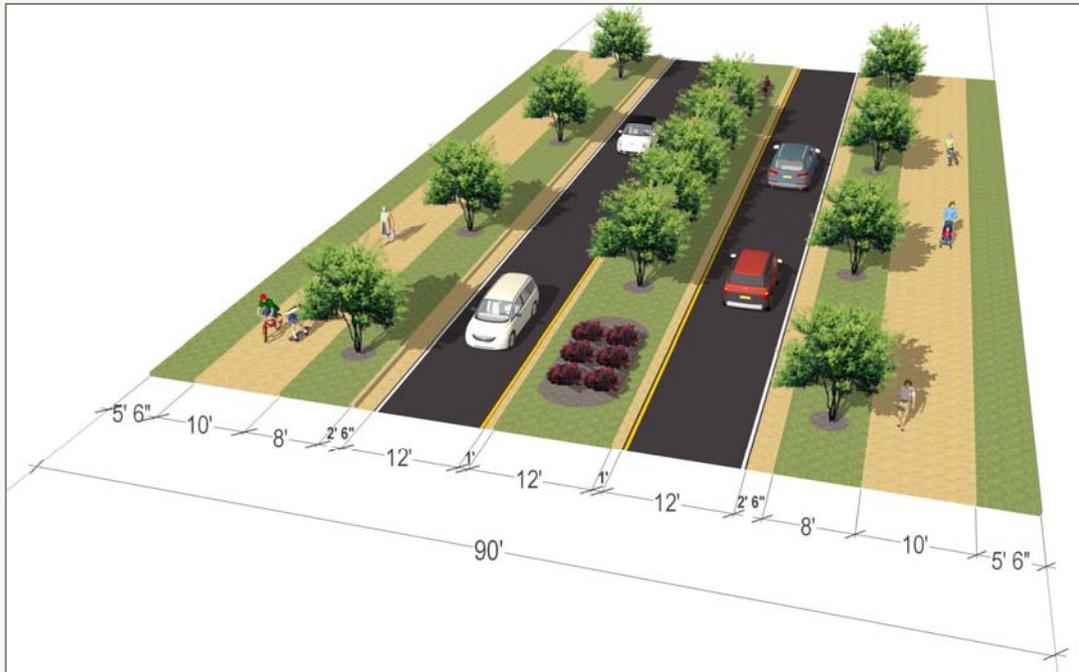
Durham Road — Dr. Calvin Jones Highway to Wake Union Church Road



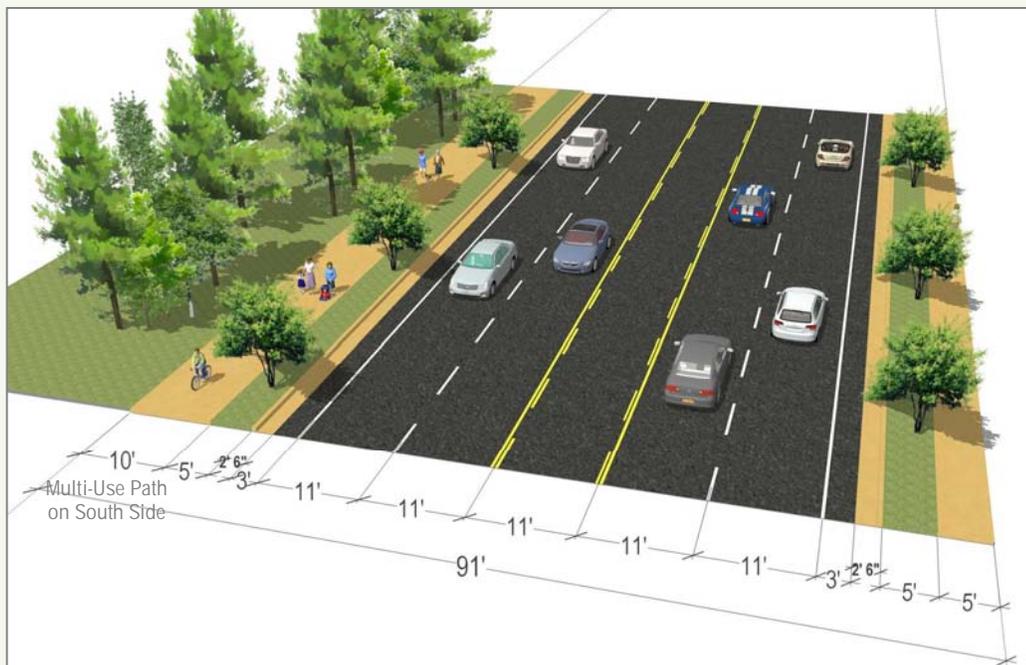
Forestville Road



North Loop — North Main Street to East Wait Avenue



Rogers Road — South Main Street to East of Heritage Lake Road



Bicycle and Pedestrian Recommendations

As described in Chapter 2, recent plans have provided a foundation — both in vision and in specific recommendations — to meet the community's desire for a balanced, multimodal transportation system. The bicycle and pedestrian recommendations include projects as well as program and policy recommendations that aim to:

- Support economic vitality
- Increase safety and security of the transportation system
- Increase accessibility and mobility of people
- Protect and enhance the environment
- Foster connectivity across and between modes
- Emphasize preservation of the existing transportation system

The projects and programs recommended for Wake Forest rely on the Four E's of Bicycle and Pedestrian Planning — Engineering, Education, Encouragement, and Enforcement. Addressing these interrelated components helps create a transportation network that balances the needs of bicyclists, pedestrians, and motorists.

- **Engineering** – Engineering refers to the network of pathways that must be planned, designed, and constructed. A well-planned bicycle and pedestrian system can enhance user safety and enjoyment while increasing the attraction of each mode.
- **Education** – Once the pathways are in place, new and experienced cyclists and pedestrians must be made aware of their locations and the destinations that can be reached by using them. Bicyclists, pedestrians, and motorists must be educated on the “rules of the road” to ensure everyone's safety while operating on and adjacent to the bicycle and pedestrian facilities.
- **Encouragement** – People need to be encouraged to bicycle and walk. Encouragement should become easier as the network of pathways makes the Wake Forest area more bicycle- and pedestrian-friendly. Encouragement becomes more critical as these facilities are constructed to justify their investment.
- **Enforcement** – To ensure the safety of all users and the long-term sustainability of the bicycle and pedestrian system, the formal and informal “rules of the road” must be heeded by all.

Safe Routes to Schools Recommendations

The NCDOT Safe Routes to School Program is a federally funded program initiated through the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005. The legislation establishes a national SRTS program to distribute funding and institutional support to implement SRTS programs. SRTS programs facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools. The Division of Bicycle and Pedestrian Transportation at NCDOT distributes SRTS funding through a competitive application process.



The state of North Carolina has been allocated \$15 million in Safe Routes to School funding for fiscal years 2005 through 2009 for infrastructure or non-infrastructure projects. Non-infrastructure projects include education or encouragement programs to increase walking and biking to school.

Infrastructure projects include the construction of pedestrian facilities within 2 miles of an elementary or middle school. Wake Forest applied to NCDOT for four SRTS grants and will be fully funded for two projects. If successful, the town will serve as the lead agency. These grants include:

- The first grant is a Community Grant for “non-infrastructure” to fund two community-wide bicycle safety rodeos. CycleSafe.org would be retained to facilitate the rodeos, conduct demonstrations, and provide helmets, bike lights, and safety literature. Target groups include fourth graders at Wake Forest and Heritage Elementary Schools and sixth graders at Wake Forest and Heritage Middle Schools. Safety tip cards would be printed and distributed to all Kindergarten through eighth-grade schools as well as the Town’s Police Department.
- The second grant request is a “non-infrastructure” grant to create a Walk-and Bike-to-School Safety Awareness Program for sixth graders at Wake Forest Middle School involving the production of a video and t-shirt design contest. The video also could be shown at other schools in Wake County and statewide.
- A third grant is a “non-infrastructure” grant for Wake Forest Elementary School to have monthly pedestrian and bike activities, coordinate the walking school bus program, a t-shirt design contest, and a “We walk and roll” pedestrian challenge for fourth graders. Wake Forest will receive a \$48,000 grant award for this project.
- The fourth grant is an “infrastructure” grant to build and extend sidewalks within a one-mile radius of Wake Forest Elementary and Middle Schools and provide bike racks on school grounds. At Wake Forest-Rolesville Middle School, the grant would fund a ten-foot wide



multi-use path from South Main Street onto the schoolgrounds to connect with the front entrance, with lighted bollards to enhance early morning safety. At Wake Forest Elementary School, the grant would fund pedestrian signals at South Main Street and Elm Avenue with high visibility crosswalks, more signs, a wheelchair ramp at the school driveway, and radar-feedback speed warning signs. Parking would be prohibited on South Main Street between Elm Avenue and Holding Avenue and the centerline will be repainted to create four-foot wide bicycle lanes in each travel direction. On South Wingate Street near Wake Forest Elementary School, a sidewalk will be installed on the east side between Sycamore Avenue and the northernmost driveway serving the Boys and Girls Club. Radar-feedback speed warning signs also will be installed on South Wingate Street. Wake Forest will receive a \$300,000 grant award for this project.

For more information, visit www.ncdot.org/programs/safeRoutes/ or contact Sarah O'Brien at (919) 807-0774.

Smith Creek/Sanford Creek Greenway and Sidewalk Projects

The Town has applied for \$3.42 million in federal funds through the Congestion Mitigation Air Quality (CMAQ) program. If approved by NCDOT, the funds will be used to extend a ten-foot wide paved Smith Creek Greenway south to the confluence of Smith Creek and Sanford Creek, a distance of nearly two-thirds of one mile. Connections also would be made to Heritage Elementary, Middle, and High School (a shared school and park campus). Additionally, the proposed improvements extend the trail 1.75 miles to the west along Sanford Creek to connect to a recently completed section of trail adjacent to the Heritage South neighborhood. Sidewalk construction is necessary along 1.25 miles of Heritage Lake Road and Rogers Roads to complete the connection to major portions of Heritage Phase I-IV and Heritage North. All new facilities will be operated and maintained by the town.

The proposed 2.4 miles of greenway trail and 1.25 miles of sidewalk will provide an alternative transportation network connecting development along Heritage Lake Road and Rogers Road. This area is the subject of repeated requests for alternative transportation facilities with every indication that the existing 7,000 residents and employees will alter their behavior to reduce congestion with increased mobility and air quality.

Pedestrian Recommendations

The *Wake Forest Pedestrian Plan* assessed the existing conditions and developed a list of facilities in need of improvement. As part of the implementation plan, these facilities were phased into one of three time-frames: short-term (0-3 years), medium-term (4-7 years), and long-term (8-10 years).

In February 2009, the Wake Forest Greenway Advisory Board recommended to the Town Board of Commissioners the following priorities be funded to bring the community together with an interconnected system of sidewalks:

- Wait Avenue: North Allen Road to Dr. Calvin Jones Highway
- Stadium Drive: North Wingate Street to US 1
- Rogers Road: Forestville Road to South Main Street
- Oak Avenue: Harris Road to North Main Street
- Heritage Lake Road, west side: Rogers Road to Soccer Center
- Forestville Road: Rogers Road to Song Sparrow Drive
- Durham Road: Retail Drive to North Wingate Street
- S Wingate Street: West Holding Avenue to Stadium Drive
- Ligon Mill Road: Song Sparrow Drive to South Main Street
- Rogers Road: Marshall Farm Road to Forestville Road
- South Main Street: Dr. Calvin Jones Highway to Rogers Road

The top priority pedestrian corridors represent the top ranked short-term projects according to the facility's ability to serve key destinations, address safety concerns, and expand connectivity. While acknowledging the immediate benefits of improving these corridors, the plan also recommends the Town evaluate cost and feasibility of each project when determining order of construction.

As design plans are finalized for construction of the Northside Loop at Dr. Calvin Jones Highway and Jones Dairy Road, NCDOT has expressed concern for pedestrians safely crossing the large intersection. Pedestrians will not be allowed to cross Dr. Calvin Jones Highway at this intersection. Instead, they will be directed to cross Northside Loop at a realigned Wait Avenue intersection just north of Dr. Calvin Jones Highway. Sidewalks will be built on both sides of Northside Loop, with the west side walkway continuing along Wait Avenue and the east side walkway connecting with a tunnel (actually a culvert) under Dr. Calvin Jones Highway.

The recommended pedestrian map includes on-street, off-street, and multi-use paths as recommended in the *Wake Forest Pedestrian Plan*. Figure 5.2 illustrates the pedestrian recommendations. For recommendations in NCDOT's CTP format, please see Appendix C.

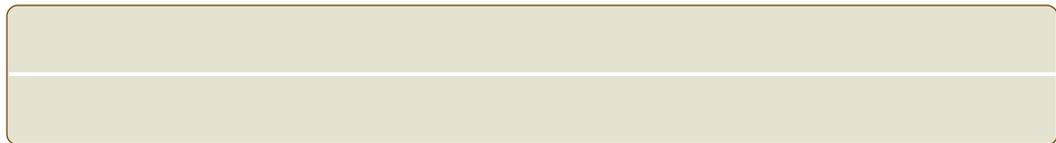
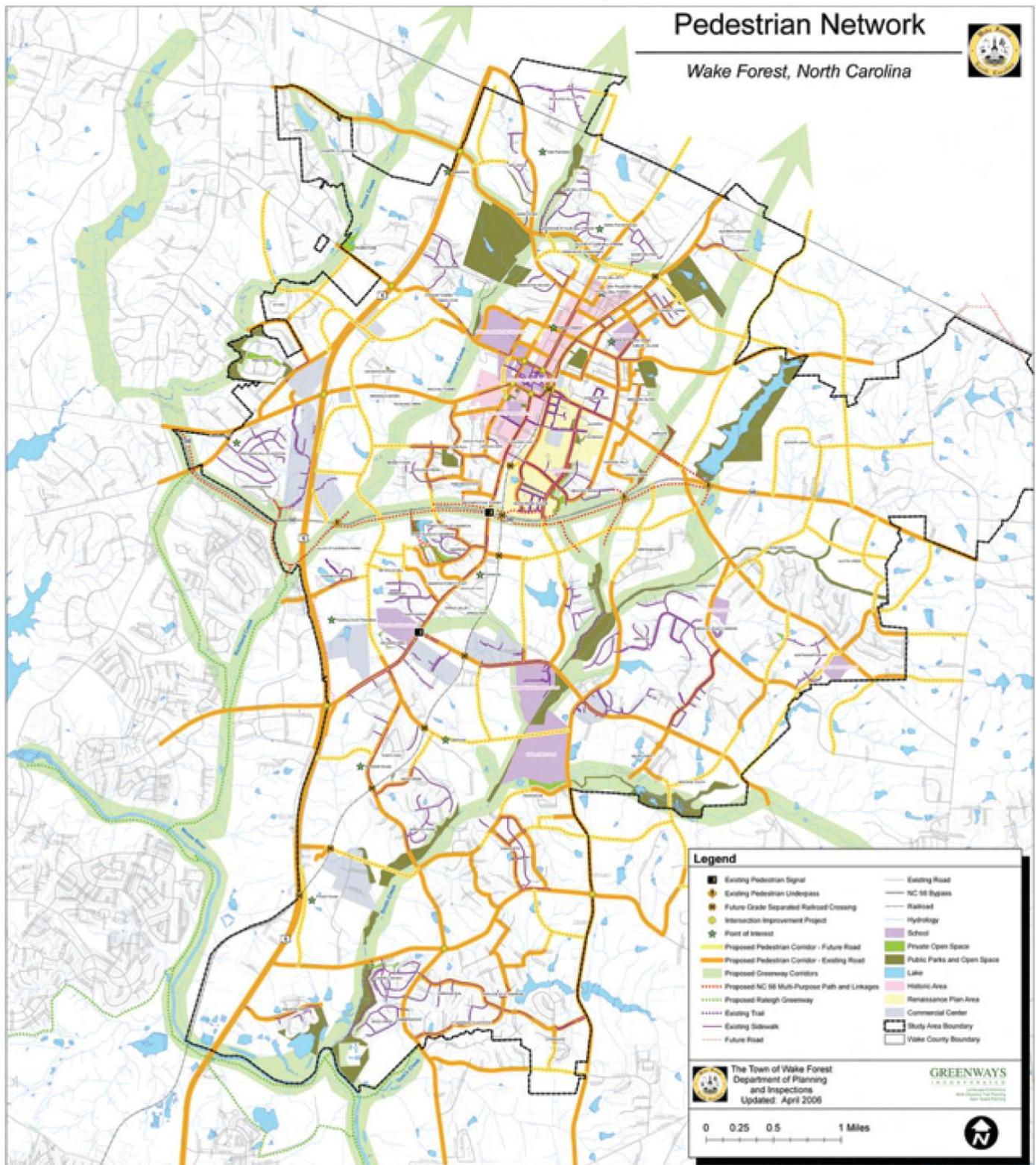


Figure 5.2 – Wake Forest Pedestrian Plan – Pedestrian Network



Bicycle Recommendations

All citizens and visitors should be able to bicycle and walk safely and conveniently to their chosen destinations with reasonable access to roadways. To this end, on-street facilities such as bicycle lanes, paved shoulders, and wide curb lanes should be carefully located depending upon the intended character of the street and anticipated experience level of cyclists. These facilities should be supplemented with multi-use paths where appropriate.

The construction of on-street bicycle facilities – as well as sidewalks – can occur as stand-alone enhancement projects or be incorporated into public and private infrastructure projects. The second option may be more time- and cost-effective. Infrastructure projects that may involve bicycle and pedestrian improvements include roadway widening, regular street maintenance, utility work, and new road construction.

The bicycle recommendations that follow include carefully planned facilities supplemented by program, and policy recommendations.

Facility Recommendations

In 2008, the Town completed the *Wake Forest Bicycle Plan*. The facilities identified by this plan are incorporated in the *Wake Forest Transportation Plan Update*. The Town and Advisory Committee input indicated that while cost and constructability should be a consideration, need and demand for a facility should have greater priority. Thus, many of the projects listed below will require additional study, design, and possibly right-of-way acquisition which may prolong their implementation. However, they are the first projects that should be addressed due to need and demand.

The recommended bicycle facilities are introduced in Table 5.2 and illustrated in Figure 5.3. The Bicycle Map is shown in the approved Comprehensive Transportation Plan (CTP) format in Appendix C. In addition to these recommendations, special attention should be given to improving the safety and mobility for bicyclists at the intersection of South Main Street and Capital Boulevard. When necessary, the NCDOT Division of Bicycle and Pedestrian Transportation should be consulted prior to initiating these recommendations.

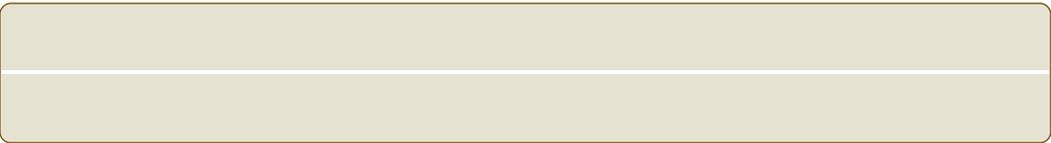


Table 5.2 – Recommended Bicycle Projects

Road	Segment	Improvement Type
Short-Term Actions		
N White St	County line to Juniper Ave	Wide Striped Shoulder
N White St	Juniper Ave to Spring St	Bike Lanes
N White St	Spring St to Roosevelt Ave	Wide Striped Shoulder
S White St	Roosevelt Ave to Elm Ave	Sharrows
S Main St	South Ave to Holding Ave	Sharrows
S Main St	Holding Ave to Dr. Calvin Jones Highway	Wide Striped Shoulder
S Main St	Dr. Calvin Jones Highway to Rogers Rd	Wide Striped Shoulder
S Main St	Rogers Rd to Capital Blvd	Bike Lanes; Multi-Use Path
Ligon Mill Rd	S. Main St to Burlington Mills Rd	Bike Lanes
Stadium Dr	Capital Blvd to Rock Springs Rd	Wide Striped Shoulders; Multi-Use Path
Stadium Dr	Rock Springs Rd to Wingate St	Sharrows
Rogers Rd	Main St to Heritage lake Rd	Wide Striped Shoulders; Multi-Use Path
Long-Term Actions		
Ligon Mill Rd	Agora Dr to Durham Rd	Bike Lanes
Ligon Mill Rd	Durham Rd to S. Main St	Bike Lanes
Rogers Rd	Heritage Lake Rd to Town Limits	Wide Striped Shoulders; Multi-Use Path
Harris Rd	Capital Blvd to Oak St	Multi-Purpose Path
Burlington Mills Rd	Capital Blvd to Ligon Mill Rd	Wide Striped Shoulder; Multi-Use Path
Burlington Mills Rd	Ligon Mill Rd to Forestville Rd	Wide Striped Shoulder; Multi-Use Path
E Wait Ave	Allen Rd to Jones Dairy Rd	Bike Lanes
Roosevelt Ave / Wait Ave	Front St to Allen Rd	Sharrows; Bike Lanes

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See Figure 5.3 – Bicycle Plan on previous page.

Program and Policy Recommendations

The facility recommendations must be supplemented with coordinated education, enforcement, and encouragement programs. Some programs instruct and encourage bicyclists and pedestrians in the full and proper use of the non-motorized transportation network. Other programs ensure the safety of the system is upheld by enforcing rules and regulations.

Program Recommendations

Near-Term

- Apply for Bicycle-Friendly Community designation from the League of American Bicyclists. Display Bicycle-Friendly Signs when permitted.
- Establish a Safe Routes to School Program
- Participate in Bike-to-Work Week
- Establish a Multi-modal Advisory Committee to recommend town action on matters relating to pedestrian, bicycle, greenway and transit

Long-Term

- Strengthen the connection with Triangle Transit and Triangle J Council of Governments to promote the Regional Travel Demand Management (TDM) Program in Wake Forest
- Develop & Distribute Educational Pamphlets
- Launch Bicycle Parking Installation Program
- Create a Bike Rodeo Event
- Create a Helmet-to-Go Program
- Conduct Monthly Bike Day
- Develop and distribute a Bicycle Facilities Map

Policy Recommendations

Near-Term

- Establish policy that requires bicycle facilities and their impacts to be included in Traffic Impact Analyses for new private development and roadway projects
- Establish school zones around all schools
- Strengthen Greenway Ordinance Requirements
- Require striped bicycle lanes and appropriate signage where called for in the Bicycle Plan
- Use the Design Guidelines section of the *Bicycle Plan* to determine the appropriate bicycle facility treatment for roadways in Wake Forest
- Require all new public facilities to have bike parking and bicycle access

Long-Term

- Require intersections to have bicycle-sensitive signals as part of development requirements and public works engineering standards
- Create an annual budget for bicycle-related improvements
- Develop a Greenways Maintenance and Safety Policy

Greenway Recommendations

Greenways, or multi-use paths, can accommodate bicyclists and pedestrians while providing a high-quality experience protected from traffic. Wake Forest completed the *Open Space and Greenway Plan* in 2002, and updated it in 2009.

The update expands upon key recommendations from the 2002 Plan and provides the Town of Wake Forest with new ideas and tools to effectively create and maintain a comprehensive open space and greenway network. The Plan Update also incorporates new design standards for trails and trail amenities, trail operations and management guidelines, and current trail construction cost estimates.

Phase One

The Smith Creek / Dunn Creek Greenway is the top priority. This greenway links downtown Wake Forest with the Neuse River Trail, thus connecting to the statewide Mountains-to-Sea Trail. The Town has built one mile of trail south of Burlington Mills Road and a section at the Smith Creek Soccer Center. A critical connection is needed at Dr. Calvin Jones Highway once Franklin Street is extended south of Dr. Calvin Jones Highway.

First, the Spring Branch spur trail is the second priority, ultimately connecting downtown Wake Forest with the Heritage North subdivision via Miller Park. Pedestrian improvements will be needed at the Dr. Calvin Jones Highway / Franklin Street intersection when the southern leg is built, including pedestrian refuge islands, countdown pedestrian signals, advance warning signs, and high visibility crosswalks.

Second, starting from the Dunn Creek underpass at Dr. Calvin Jones Highway, a spur trail could extend west to the Spring Branch corridor via a short section of sidewalk along Ledgerock Road and South Allen Road. The sidewalk connection would change back to a multi-use trail at the intersection of South Allen Road and East Holding Avenue, then continue north to Miller Park downtown.

Third, sidewalks, bicycle lanes, and shared lane markings (sharrows) are planned along Wait Avenue. The section of Wait Avenue between Dunn Creek and downtown Wake Forest should be a top priority to connect seamlessly with the trail system.

Phase Two

The second priority is Richland Creek Greenway and its connection to downtown Wake Forest via sidewalks and bicycle lanes on Stadium Drive and North Avenue. This route would serve the Wake Forest-Rolesville High School and, via connections, Joyner Park and the Old Mill Stream Greenway.

Dr. Calvin Jones Highway creates a new east/west corridor through Wake Forest. Pedestrian and bicycle facilities outlined in the adopted Corridor Plan should be pursued. Phase Two also will help establish a trail connection to Rolesville along Sanford Creek.

Greenway Priorities

The Town's Greenways Advisory Board maintains a listing of priority greenway segments. These priority greenway segments are critical to making connections in the future with Raleigh's greenway system and providing links between the Town's various major park facilities. In addition to local trails prioritized by the Town, several Wake County municipalities have begun planning for a 28-mile paved regional "Neuse River Trail" from the Falls Lake Dam to the Wake & Johnston County lines. The City of Raleigh has committed \$13 million or nearly half of the funds needed to complete the trail. The first eight miles of the trail will extend from Falls of Neuse Road to the CASL Soccer Complex, with construction slated to begin by late summer/early fall 2009. The final section will extend to the Johnston County line four years later in 2013. The available funding and regional support for this trail creates a unique opportunity for Wake Forest to connect to a regionally significant trail and provide access to many miles of trail for citizens to enjoy.

Public Transportation and Rail Recommendations

Public Transportation Enhancements

Transit riders typically fall into one of two categories – captive or choice. Choice transit riders choose to leave their vehicle at home to save time and money or for other reasons. Captive transit riders use transit because they have no other choice. This may be because they lack access to a personal vehicle or because they have a physical impediment. Captive riders also include those too young to drive, the elderly, persons with disabilities, and those without the financial means to own and operate a personal vehicle.

Wake Forest has illustrated a commitment to attracting transit riders to the local and regional public transportation system by launching the Loop and WFX express routes. The recommendations that follow recognize the need to enhance existing service to meet the needs of both choice and captive transit users. An underlying goal is to encourage further dialogue regarding the benefits of transit for choice riders and the critical role transit plays in the life of captive users. A CTP map illustrating the existing and proposed public transportation and rail network in Wake Forest can be found in Appendix C.



Public Transportation Recommendations

Initial recommendations to enhance public transportation in Wake Forest include:

- Print and display route schedules / maps on each vehicle in service.
- Add a stop (e.g. Food Lion in Wakefield community) to reduce layover time at the transfer point (South White Street south of Elm Avenue). The layover should be no more than ten minutes. Drivers should be trained to communicate with passengers at the beginning of layovers as to the scheduled time of departure and the reason for the layover.
- Implement additional park-and-ride lot agreements along the "Loop" route.
- Perform pavement maintenance in the curb lane to reduce the bumpiness of the ride on the "Loop" route. In particular, the crossing of Capital Boulevard (US 1) on South Main Street is jarring.
- Add benches and shelters to more bus stops, based on demonstrated ridership at specific locations.

Additional Options:

- Extend weekday hours of service
- Run on holidays and/or weekends
- Add a run along the same Loop route, traveling in the opposite direction of the existing Loop, to prevent passengers from having to take the entire loop when they only want to make a short trip

Southeast Trail and High Speed Rail

The Southeast High Speed Rail Corridor (SEHSR), using existing trackage through Wake Forest, is one of five originally proposed high speed passenger rail corridors designated by the US Department of Transportation (USDOT) in 1992. The corridor was designated as running from Washington, DC through Richmond, VA and Raleigh to Charlotte with maximum speeds of 110 mph. It is part of an overall plan to extend service from the existing high speed rail on the Northeast Corridor (Boston to Washington) to major cities in the Southeast.

The USDOT in 1996 extended the SEHSR to Hampton Roads, VA. In 1998, the USDOT created two more extensions:

- from Charlotte through Spartanburg and Greenville, SC to Atlanta, GA and on through Macon, GA to Jacksonville, FL, and
- from Raleigh through Columbia, SC and Savannah, GA to Jacksonville, FL and from Atlanta to Birmingham, AL.

The highways of the region and the airports along the Eastern seaboard simply cannot handle the present traffic volumes, let alone accommodate future travel needs. An affordable, modern, timely alternative to driving crowded interstates or flying short distances is the purpose of this initiative.

The SEHSR is being designed as a passenger and freight corridor. Freight service already exists in most sections, and will be reinstated in the currently discontinued section between Petersburg and Norlina in NC. The SEHSR is being designed with curve spiral lengths that will allow passenger trains and freights to operate on the same track, and 5 mile-long passing sidings every 10 miles on average will allow the faster passenger trains and the slower freights to meet and pass with minimal conflict. The operating efficiency for both passenger and freight service will increase dramatically as a result of SEHSR corridor improvements.

Initial environmental studies and public hearings were completed in Fall 2001 examining the need for the project and considering potential impacts on both natural and man-made environments along nine possible routes. A recommendation report was completed in early 2002, indicating that the route with the best potential for high-speed rail service and the fewest environmental impacts would run from Richmond, through South Hill, VA to Norlina, Raleigh, Greensboro (with a connection to Winston-Salem) and Charlotte, NC. The route follows a combination of existing railroads and preserved rail corridors. Travel time is expected to be about two hours from Raleigh to Richmond and another two hours to Union Station in Washington D.C. Considering recurring highway traffic congestion in Petersburg, Richmond, northern Virginia and Washington D.C. a time of four hours would be time competitive. Considering terminal time, typical airline flight delays, and travel time near Washington area airports, a time of four hours would be time competitive with air travel too.



Railroad at South Elm Street

The Federal Railroad Administration and the Federal Highway Administration issued a Record of Decision on the initial environmental studies in 2002, confirming and approving the route for the SEHSR. The project currently is in the second environmental study phase that includes more specific analysis along the preferred route between Richmond, VA and Raleigh, NC. This environmental study should be completed in early 2011, with a Record of Decision by the middle of 2011. Studies are considering an adjacent hike-bike trail within the same right-of-way.

The SEHSR project now includes a parallel multipurpose trail concept, a unique opportunity to provide additional economic and quality-of-life value for most all the towns and communities along the corridor. The trail concept would be a separate project, parallel to and outside the rail right of way, but within the SEHSR study corridor. As such, all environmental work being collected and analyzed for the rail project would be available for evaluation of the trail concept. The environmental clearance of the trail would allow trail proponents in each state to apply for state and federal funds for the eventual completion of the trail.

Incorporation of the trail concept into the SEHSR project was requested and funded by the Virginia Department of Conservation and Recreation and the

North Carolina Department of Environment and Natural Resources. The trail concept would run from just south of Petersburg to the Neuse River, north of Raleigh. It likely would become part of the East Coast Greenway, a proposed trail traversing the east coast states from Maine to Florida.

The construction and operation of the SEHSR will have a positive impact on the economies of the regions and towns it passes through. In North Carolina alone, it has been estimated the SEHSR will bring:

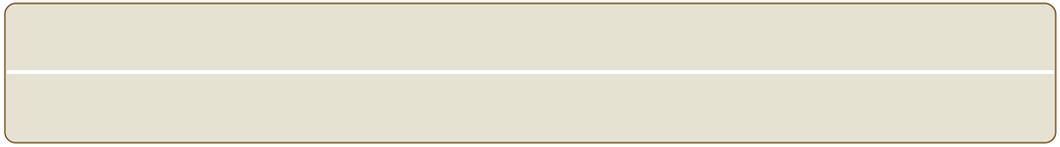
- \$700 million in new state and local tax revenues
- \$10.5 billion in employee wages over 20 years
- More than 31,400 new one-year construction jobs
- more than 800 permanent new railroad operating positions
- nearly 19,000 permanent full-time jobs from businesses which choose to locate or expand in North Carolina because of the SEHSR.

It reasonably can be assumed that similar positive benefits will accrue to Virginia from SEHSR's implementation.

Additional Benefits:

- New and/or improved freight access, especially for those segments with no currently active freight service.
- Decreased rate of congestion growth on the major interstate highways that parallel the rail system, benefiting local travelers who use the interstates.
- Opportunity for new or increased conventional passenger service and/or commuter service that could serve smaller communities.

The Town of Wake Forest communicated its concerns about the specifics of the rail design with the appropriate officials. Responses to town concerns are anticipated in the next major release of project documents in 2010 or 2011.





Chapter 6

Implementation

Overview

To fulfill the vision of the *Wake Forest Transportation Plan Update (Plan Update)*, a well-crafted implementation plan is essential. Some of the implementation steps identified in this chapter seek to provide conditions under which the plan vision can be achieved through public investments and the development of appropriate programs, policies, projects, and other actions.

Controlling Factors

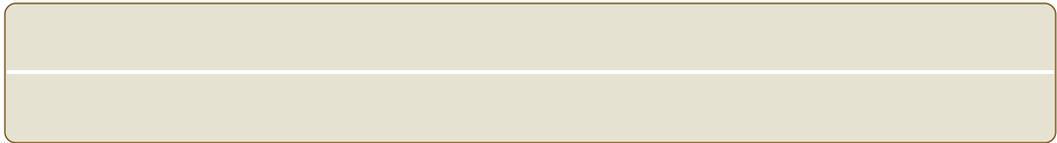
The implementation of the *Plan Update* will depend on action being taken to:

- Revise existing Town regulations.
- Undertake more detailed studies to resolve and explore the cost, constraints, and opportunities identified by this plan.
- Influence incorporation of projects in the next update of the CAMPO Long Range Transportation Plan (LRTP).
- Work with the Board of Commissioners to balance the benefits of transportation improvements with the cost, both actual and perceived in terms of community impact. Work with the Board to pursue adequate funding to implement projects and programs.
- Work with the development community to implement spot improvements.
- Work with the North Carolina Department of Transportation on projects along corridors of regional, statewide, and interstate significance and to pursue adequate funding.



The implementation steps identified in this chapter will be executed in phases and will be subject to a variety of factors that will determine their timing. These factors include:

- The degree of control or influence the Town has, relative to its desire to implement changes. Specifically, as shown in the Corridor Profiles (Appendix A), a majority of streets are owned by the State of North Carolina.
- The availability of the personnel and financial resources necessary to implement specific proposals.
- Whether an implementation step is an independent project or program, an incidental part of a larger project, or a component of the rational evaluation of a new development project.



- The interdependence of various implementation items, in particular the degree to which implementing one item is dependent on the successful completion of another item.
- The relative severity of the problem that a particular implementation item is designed to remedy.

Schedule

Because of the factors listed above, it is not possible to put forward a precise timetable. Table 6.1 lists the principal implementation tasks for the *Plan Update*, indicating both the timing and the agency expected to implement each task. The timing designation falls into one of three categories:

- Near-Term. These tasks should be considered when the Town prepares the next General Capital Project Appropriations for Fiscal Year 2010-'11 and subsequent appropriations in 2012 through 2015. Near-term tasks are considered in a five-year plan.
- Mid-Term. Begin implementation between 2015 and 2020.
- Long-Term. Begin implementation between 2020 and 2035.

Studies Required

Roadway

- Conduct traffic speed studies (Wait Avenue and Durham Road).

Bicycle

- Study the use of "sharrows" and complete a demonstration project funded by CAMPO STPDA funds. Study the use of painted (with color) bicycle lanes.
- Study ways to supplement existing bike route signage to offer time and distance information.
- Study and test methods to improve bicycle detection at traffic signals.

Transit

- Study the effect of a mix of transit options including expanded circulator bus service, increased frequencies of express bus service, introduction of commuter rail or light-rail, and through movement of high-speed rail without a stop in Wake Forest.
- Conduct short-term Transit Plan including evaluation of cost and ridership potential with a reverse circulator route to complement existing service.



Sharrow Examples
Portland, Oregon (top)
NC State University (bottom)



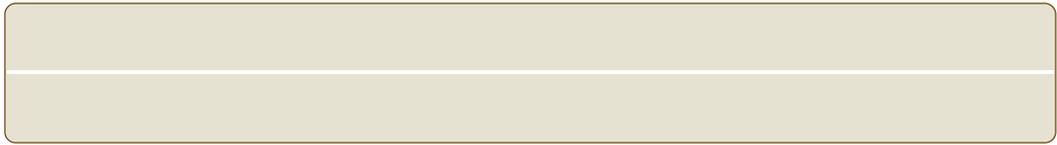
Wake Forest Town Hall
Rendering

Capital Expenditures

- Increase annual funding for the greenways, pedestrian and bicycle programs.
- Accelerate repaving and restriping of roads to create new bikeways.
- Provide funding to install bike parking at sites not subject to the Zoning and Subdivision ordinances.
- Install bike lockers at or near the new Wake Forest Town Hall.

Promotion, Assistance, and Operating Expenditures

- Increase the frequency of street sweeping to once a month for corridors with on-road bike facilities.
- Organize quarterly bike rides with Town staff to assess conditions.
- Add bicycle and pedestrian information to the Town's website.
- Integrate an interactive Bike & Hike Map on the Town's website to aid users with route selection.
- Expand the bicycle web page to include request forms for bike rack placement and bike route maintenance.
- Create a web-based "Ride Anytime" site to match groups of riders.
- Sponsor a bicycle mentor program.
- Launch free adult bicycle safety courses including web-based short courses.
- Run a public service message campaign on the Town's newsletter and in neighborhood newsletters
- Partner with the Chamber of Commerce and the Downtown Revitalization Corporation to develop a business outreach program to encourage bicycle commuting.
- Implement a local bike event in conjunction with the Triangle "Bike to Work Week" in the month of May.
- Install a kiosk and provide pamphlets at the Wake Forest Town Hall.
- Establish within the Police Department a bicycle education program.
- Make a fleet of bikes available at Town Hall for Town employees to use as a workplace demonstration.
- Continue active enforcing traffic safety laws for bicyclists and motorists.
- Consider a new Police program to distribute "coupons" to Wake Forest youth for demonstrating responsible bicycling in a "Catch 'em Biking Right" campaign.
- Create a design guide for pedestrian, greenway, bikeway, and bus stop improvements.



- Study the cost and feasibility and map the location of potential future inter-neighborhood paths that would allow non-motorized travel.
- Modify signal timing at US 1A/NC 98 Bypass and on Durham Road west of US 1.
- Prepare Action Plan and form staff inter-departmental team to regularly review crash statistics and develop appropriate response to trends.
- Study bus-rapid transit on the US 1 Corridor.
- Utilize trip generation rates appropriate to mixed-use developments (discounts relative to typical ITE rates).

Table of Recommendations

Table 6.1 organizes the recommendations developed in this plan by the goals and objectives set forth in Chapter 5. Not all goals and objectives are listed in the table, but most of them are covered because many recommendations apply to more than one category. For the sake of concise presentation, each recommendation has been assigned to its most closely related goal.

Following is a list of the order of goals:

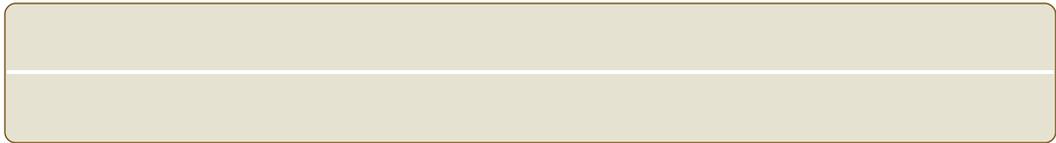
- Goal A: Create a safe and efficient multimodal transportation system.
- Goal B: Coordinate transportation and land use planning to ensure that growth pays its own way.
- Goal C: Plan, design, and construct transportation facilities that contribute to Wake Forest’s small town character and attractive appearance.
- Goal D: Provide safe and convenient facilities and services for people who choose not to use an automobile.
- Goal E: Ensure serviceable operation of existing facilities and services.
- Goal F: Proactively plan, in conjunction with other agencies, for well-planned transportation linkages to other parts of the Triangle region.
- Goal G: Identify sufficient, timely, and equitable financing mechanisms for well-timed transportation services and improvements.

Table 6.1 Abbreviations:

- Agency: WF (Town of Wake Forest)
- NCDOT (North Carolina Department of Transportation)
- CAMPO (Capital Area Metropolitan Planning Organization)
- TT (Triangle Transit)
- USDOT (United States Department of Transportation)
- CoC (Chamber of Commerce)

Table 6.1 – Comprehensive List of Recommendations

No.	Recommendation	Agency	Timing	Comments
GOAL A: Create a safe and efficient multimodal transportation system.				
Pedestrian Element Recommendations				
P.1	Update town ordinances to clarify design guidance for sidewalk, greenways, and multi-use paths.	WF	Near-term (2010-2015)	Strengthen existing regulations to promote conditions for safe and efficient walking, cycling, and transit patronage.
P.2	Pursue connectivity for pedestrians and cyclists with pathways in places where street connections are not feasible or acceptable.	WF Developers	Ongoing	Pursue block lengths that are 600 to 800 feet (up to 2,600 feet if crossing a stream or creek).
P.3	Review land development and redevelopment applications to identify opportunities to connect bikeways, greenways, and sidewalks with adjacent neighborhoods, parks, schools, offices, shops, and public spaces.	WF	Ongoing	Adhere to the town ordinances, applicable design guidelines, and adopted transportation plan system maps.
P.4	Build pedestrian facilities according to the priorities established by the Town Board of Commissioners and in conjunction with street projects built by others.	WF Developers NCDOT	Ongoing	Routinely update the priority list with research and findings of feasibility studies and land development applications.
Bicycle Element Recommendations				
B.1	Request an increase in annual funding for on-road bikeways such as wide striped shoulders and striped bike lanes.	WF	Near-term (2010-2015)	Use Powell Bill funds supplemented with Town bond or general funds for re-striping projects.
B.2	Seek approval from NCDOT and Town Board of Commissioners to conduct demonstration projects using "sharrows".	NCDOT WF	Near-term (2010-2015)	Suggested demonstration roads include sections of street with on-street parking.
B.3	Accelerate repaving and restriping of roads on the Bicycle Plan to accelerate the creation of new on-road bikeways.	NCDOT WF	Near-term (2010-2015)	For roads without bikeways, repaving and restriping it with bikeways (e.g., wide striped shoulders or bike lanes) is a cost-effective way to extend bikeways.
B.4	Supplement existing bike route signs with time and distance signs along on- and off-road bikeways and greenways.	WF	Near-term (2010-2015)	Destination-oriented signs enhance the ride and users' knowledge of Wake Forest.
B.5	Provide bicycle facilities according to the priorities established by the Town Board of Commissioners and in conjunction with street projects by others.	WF Developers NCDOT	Ongoing	Routinely update the priority list with Powell Bill projects, research and findings of feasibility studies and land development applications.



Street Element Recommendations				
S.1	Balance the Town's mobility needs with other priorities such as the function of the street, corridor relationship to land use, urban design, and the promotion of alternate modes.	WF NCDOT	Ongoing	Communicate to citizens the desire to maintain small town character that favors interconnected two-lane streets over a network of high-speed, multi-lane major streets.
S.2	Support connectivity throughout the street network to create an efficient multimodal network of slow streets.	WF NCDOT	Ongoing	Connect streets to create a hybridized grid network with connections spaced no farther than 800 feet (up to 2,600 feet if stream or creek crossings are required).
S.3	Adopt a complete streets policy and use it to ensure all future transportation projects incorporate safe and efficient facilities and services for users of all ages and abilities.	WF NCDOT	Ongoing	Some projects already in the design and construction pipeline may not be complete streets due to the cost and schedule implications of changes.
S.4	Analyze the signal timing to ensure adequate time for protected left turns from all approaches at South Main Street and NC 98 Bypass.	NCDOT	Near-term (2010-2015)	This intersection is one of the Top 5 crash locations for frequency and severity (see Chapter 4).
S.5	Selectively re-program the direction of signals on Durham Road west of US 1. Furthermore, a reduction in traffic volumes on Durham Road following completion of the NC 98 Bypass may reduce the crash frequency at this location.	NCDOT	Near-term (2010-2015)	This intersection is one of the Top 5 crash locations for frequency and severity (see Chapter 4).
S.6	Monitor conditions to assess change in crash frequency/severity at South Main Street and Capital Boulevard (US 1) that may result from the recent modifications to the signals and westbound approach to Capital Boulevard. Also monitor the relatively high vehicle speed of southbound traffic approaching this intersection.	NCDOT	Near-term (2010-2015)	This intersection is the highest ranked intersection in terms of crash frequency and severity (see Chapter 4).
Transit Element Recommendations				
T.1	Create new route traveling the same streets as the existing Circulator route but in the opposite direction.	WF	Near-term (2010-2015)	This route will reduce delays for patrons on return trips by preventing them from traveling the complete length of the circulator.
T.2	Provide route maps with departure/arrival times.	WF TT	Near-term (2010-2015)	Providing accurate information increase ridership.
T.3	Install bus shelters and improve passenger safety at stops.	WF	Ongoing	Prioritize bus stop enhancements based on ridership studies and customer surveys.

GOAL B: Coordinate transportation and land use planning to ensure that growth pays its own way.

Street Element Recommendations

S.7	Revise the collector street portion of the thoroughfare plan with alignment and classification changes outlined in Chapter 5 to provide guidance to development community on proposed street network.	WF	Near-term (2010-2015)	Alignments can be shifted based on more detailed land suitability studies if the intent of the interconnections between streets is met.
S.8	Continue to require developers to fund roadway improvements that are rational and proportional to the impact created by development.	WF NCDOT	Ongoing	State laws regulate limits on shifting too much of the cost of new roadways to developers, but the Town should continue to shift as much as practical so that growth pays its own way.
S.9	Utilize the Corridor Profiles (Appendix A), which provide key information on traffic volumes and roadway characteristics. Where feasible, the illustrative cross sections include bicycle and pedestrian amenities.	WF NCDOT Developers	Ongoing	Appendix A and the street alignment map are key tools in the land development process in Wake Forest.
S.10	Install additional posted speed limit for westbound Wait Avenue just west of Jones Dairy Road.	NCDOT	Near-term (2010-2015)	Citizen request at September 2009 public meeting.
S.11	Consider revising the posted speed limit on Durham Road between US 1 and Wingate to 40 mph.	NCDOT	Near-term (2010-2015)	Citizen request at September 2009 public meeting.

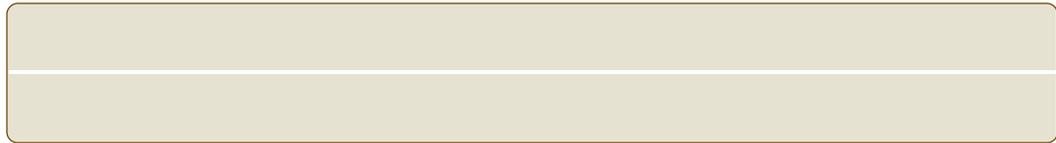
GOAL C: Plan, design, and construct transportation facilities that contribute to Wake Forest's small town character and attractive appearance.

Street Element Recommendations

S.12	Plan, design, build and maintain landscaped medians along designated thoroughfares (Appendix A) that will manage access, improve safety and add to visual attractiveness of the area.	WF NCDOT	Ongoing	The location of median openings typically is controversial. Proactive (early and continuous) engagement with adjacent property owners is helpful.
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Transit Element Recommendations

T.4	Work with CAMPO, the Triangle Transit and NCDOT Rail Division to plan high-quality, high-frequency passenger rail or bus-rapid transit in Wake Forest.	CAMPO TT NCDOT Rail WF	Long-term (2020 to 2035)	CAMPO, Capital Area Transit, and Wake County will launch a CAMPO-wide transit planning effort in 2010. The Town should engage in a vocal and effective way to promote expanded transit connections for citizens.
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GOAL D: Provide safe and convenient facilities and services for people who choose not to use an automobile.

Pedestrian Element Recommendations

P.5	Build sidewalks and crosswalks to connect near neighborhoods with downtown Wake Forest.	WF	Near-term (2010-2015) Mid-term (2015-2020)	Nearby neighborhoods that are connected by sidewalks and crosswalks will be an effective economic development tool to support downtown Wake Forest.
P.6	Use federal and state grants to implement infrastructure-related and non-infrastructure projects and programs associated with walking and bicycling to all 8 public schools in Wake Forest. <ul style="list-style-type: none"> Conduct in-school training for fourth-grade students about bike and pedestrian safety Train the Trainers with adult training in bike and pedestrian safety Create a User's Manual to train adults how to teach bike and pedestrian safety to fourth-grade students. Produce and distribute a bicycle/pedestrian poster of Wake Forest to show destinations, routes and safety information. Conduct a "Walking School Bus" and "Bicycle Train" with fourth-grade students. Conduct a bike rodeo with fourth-grade students. 	USDOT NCDOT WF	Near-term (2010-2015) Mid-term (2015-2020)	The Town recently announced receipt of a federal grant to conduct training and awareness of Safe Routes to Schools with a focus on fourth-grade students. Research shows fourth-grade aged students are at a prime age to apply school-based lessons in bicycle and pedestrian safety in their own travels. These lessons are widely supported by parents and the general public.
P.7	Update Subdivision Ordinance to allow reduction in trip generation for trips diverted to alternate modes of transportation, provide incentives, reduce parking requirements, strengthen connectivity, establish sidewalk maintenance policy, and implement traffic calming program	WF	Mid-term (2015-2020)	As more pedestrian and bicycle facilities and transit service are available to areas of Wake Forest that will be developed, the town should allow developers to adjust their estimates of site-based vehicle traffic based on an allowance for some to choose other modes.
P.8	Continue to fund sidewalk construction using Town funds.	WF	Ongoing	The Town budgeted \$70,000 for sidewalk construction in fiscal year 2009-2010.
P.9	Build greenways consistent with priorities established by the Town Board of Commissioners.	WF	Ongoing	Routinely update the priority list with research and findings of feasibility studies, land availability and development applications.

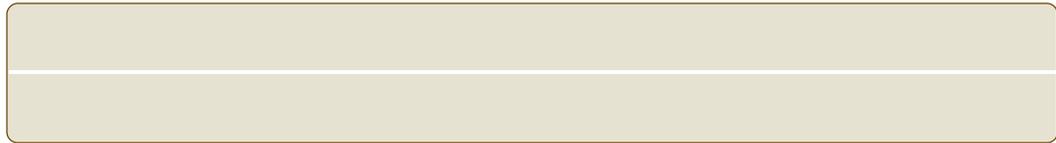
Bicycle Element Recommendations

B.6	Conduct public awareness campaign to educate citizens of the danger in riding bicycles on sidewalks.	WF CAMPO	Near-term (2010-2015)	Too many motorists do not anticipate and therefore do not see cyclists (young and adult) until it is too late.
B.7	Consider a new Police program to distribute "coupons" to Wake Forest youth for demonstrating responsible bicycling in a "Catch 'em biking right" campaign	WF	Near-term (2010-2015)	Police enjoy connecting with people in positive teaching situations. Young cyclists riding correctly with the proper equipment enjoy the interaction too, especially when it comes with a coupon for ice cream.
B.8	Complete the collector street network through and to 36 activity centers in Wake Forest to provide slower-speed, lower-volume streets suitable for many cyclists. See Figure 4.1.	WF Developers	Near-term Mid-term Long-term (2010-2035)	Figure 4-1 shows 36 activity centers in Wake Forest. Collector street connections to and through each activity center serves all modes, increases commercial sales and adds value to neighborhoods.

GOAL E: Ensure serviceable operation of existing facilities and services.

Bicycle Element Recommendations

B.9	Organize quarterly bike rides with Town staff to assess bike route conditions.	WF	Near-term (2010-2015)	Inaugural ride may be with a select group to test the practicality, but consider public rides.
B.10	Designate space to permit interested organizations to create valet bike parking at Town.	WF	Near-term (2010-2015)	Close-in parking that results in shorter walks than for motorists would be motivation to leave cars at home. Bike parking should be sheltered and secure. An attendant would be a customer-oriented touch.
B.11	Encourage formation of web-based "Ride Anytime" site to match groups of riders.	WF	Near-term (2010-2015)	Town support may consist of safe riding tips, cyclist-friendly businesses, and maps.
B.12	Sponsor a bicycle mentor program.	WF	Near-term (2010-2015)	People starting to bicycle again like advice from friends who cycle regularly. The Town can facilitate volunteer-driven online efforts to offer League of American Bicyclists-trained mentors.



B.13	Launch free adult bicycle safety courses including web-based and television-based short courses.	WF	Mid-term (2015-2020)	Begin with adult training that teaches how to teach our youth, then transition to adults training other adults.
B.14	Run a public service message campaign in the Town's newsletter and in neighborhood newsletters.	WF	Mid-term (2015-2020)	Safety tips are widely available through NCDOT and UNC Highway Safety Research Center websites.
B.15	Develop a corporate outreach program to encourage bicycle commuting.	CoC WF	Mid-term (2015-2020)	Such outreach could double as a corporate retention and recruiting strategy.
B.16	Implement a local bike event in conjunction with the Triangle "Bike to Work Week" in the month of May.	WF	Near-term (2010-2015)	Promote bicycling by holding events for citizens. Engage police assistance to manage conflicts at key intersections.
B.17	Install a kiosk and provide pamphlets at Wake Forest Town Hall.	WF	Near-term (2010-2015)	Promote the pedestrian- and bicycle-friendliness of Wake Forest.
Street Element Recommendations				
S.13	Protect the integrity of the existing system and balance the transportation network with strategic investments in pedestrian, bicycle, and transit projects.	WF CAMPO NCDOT	Ongoing	Roadway widening projects are expensive, disruptive, and intrusive to adjacent property owners. Extend the useful life of existing roads by doing everything practically reasonable to shift short trips out of cars and into other modes.
S.14	Introduce new project selection factors at CAMPO to reinforce the importance of maintaining existing systems.	WF CAMPO	Near-term (2010-2015)	Existing project prioritization procedures do not give enough bonus points to level the playing field when sidewalk, transit and bicycle projects are compared with major highway and roadway projects. Too much emphasis currently is placed on travel time savings. These savings are fleeting.
S.15	Monitor intersection operations to determine LOS deficiencies; implement engineering, policy, transit, and multimodal improvements to extend the life of intersection for acceptable operations.	WF	Near-term Mid-term (2010-2020)	Routine monitoring should measure delays to all modes at major intersections and report trends to the Board of Commissioners.
Transit Element Recommendations				
T.5	Develop a corporate outreach program to encourage transit use.	CAMPO WF	Mid-term (2015-2020)	Such outreach could double as a corporate retention and recruiting strategy.

GOAL F: Proactively plan, in conjunction with other agencies, for well-planned transportation linkages to other parts of the Triangle region.

Street Element Recommendations

S.16	Work cooperatively with CAMPO during the next update of their transportation plan to incorporate the recommendations of the Wake Forest Plan.	WF	Near-term (2010-2015)	An iterative process is underway with this Plan updating the prior Wake Forest Transportation Plan based on the latest CAMPO Plan.
S.17	Review development applications for sites along Capital Boulevard and parallel frontage roads and require roadway modifications consistent with the long-range plan to convert to a freeway with continuous two-way frontage roads on both sides.	WF	Ongoing	The planned incremental conversion of US 1 to a freeway requires conformity with the Plan over time. Land access decisions consistent with the US 1 Corridor Plan are important.

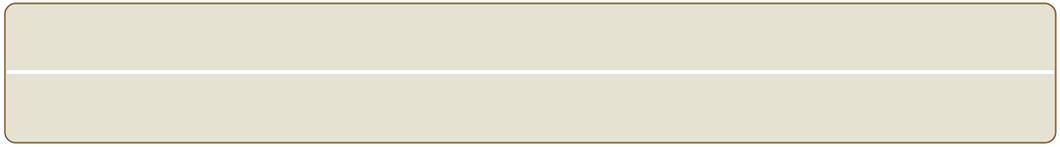
Transit Element Recommendations

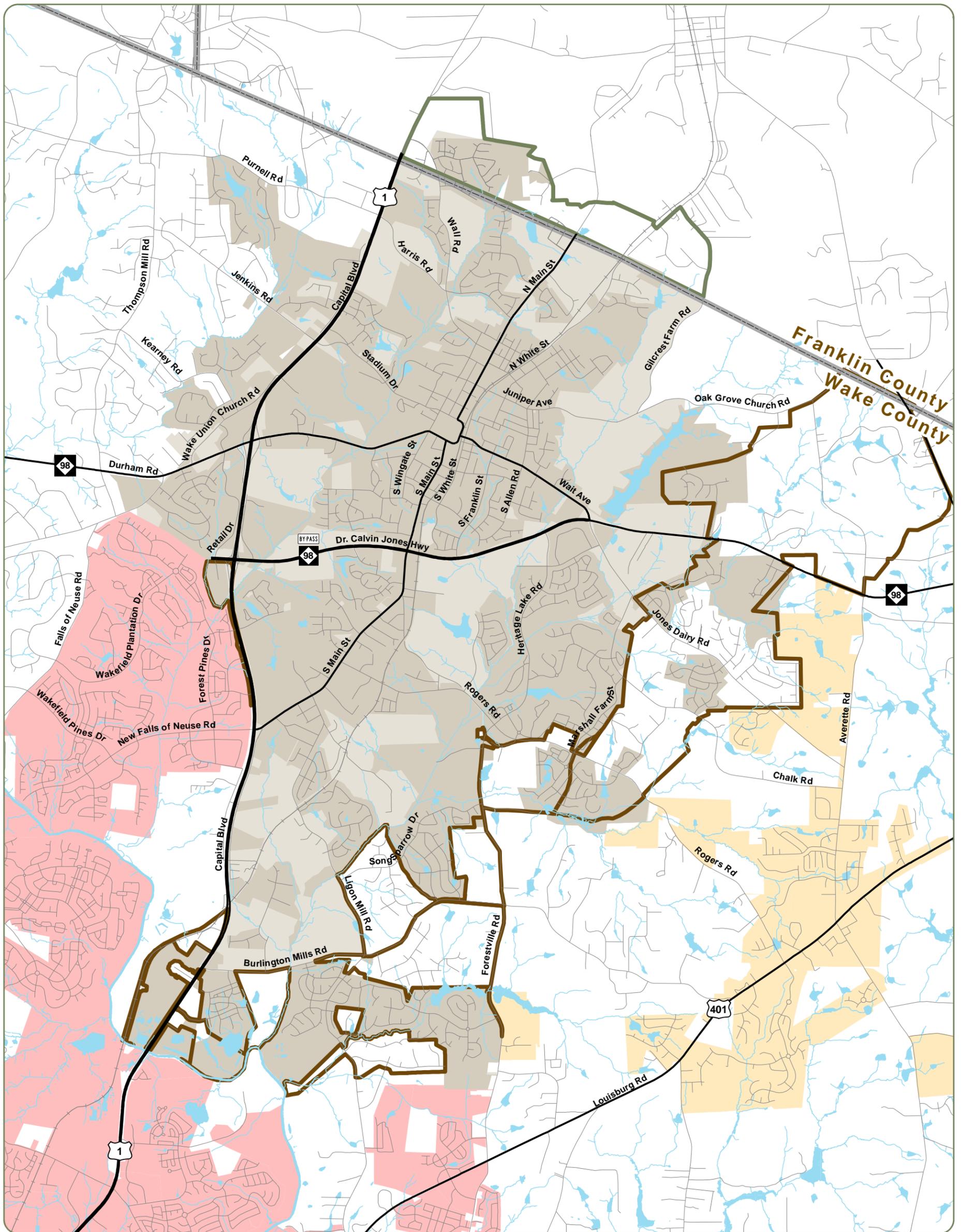
T.6	Pursue CAMPO funding opportunities for transit improvements.	CAMPO WF	Near- term Mid- term Long-term (2010-2035)	Coordinate with CAMPO.
T.7	Host transit events targeted to a range of cultural groups.	WF	Mid-term (2015-2020)	As transit service in Wake Forest matures, customer-based outreach will be important.

GOAL G: Identify sufficient, timely, and equitable financing mechanisms for well-timed transportation services and improvements.

Street & Transit Element Recommendations

S.18	Continue to seek state and federal transportation funds through cooperative planning with CAMPO and NCDOT.	WF	Ongoing	Staff and elected leader participation is important.
S.19	Form a staff Safety Committee and hold periodic meetings to share information among the Police, Engineering, Parks & Recreation, and Planning departments to review crash data and create an Action Plan.	WF	Near-term (2010-2015)	The meetings should include a report from engineering staff who have personally visited crash sites following injury crashes.
S.20	Develop an Action Plan to address streets and intersections that exceed statewide crash rate averages. Review the Action Plan in committee.	WF	Near-term (2010-2015)	Coordinate with NCDOT.
S.21	Implement intersection safety improvements at top crash locations.	NCDOT WF	Near-term (2010-2015)	Coordinate with NCDOT.

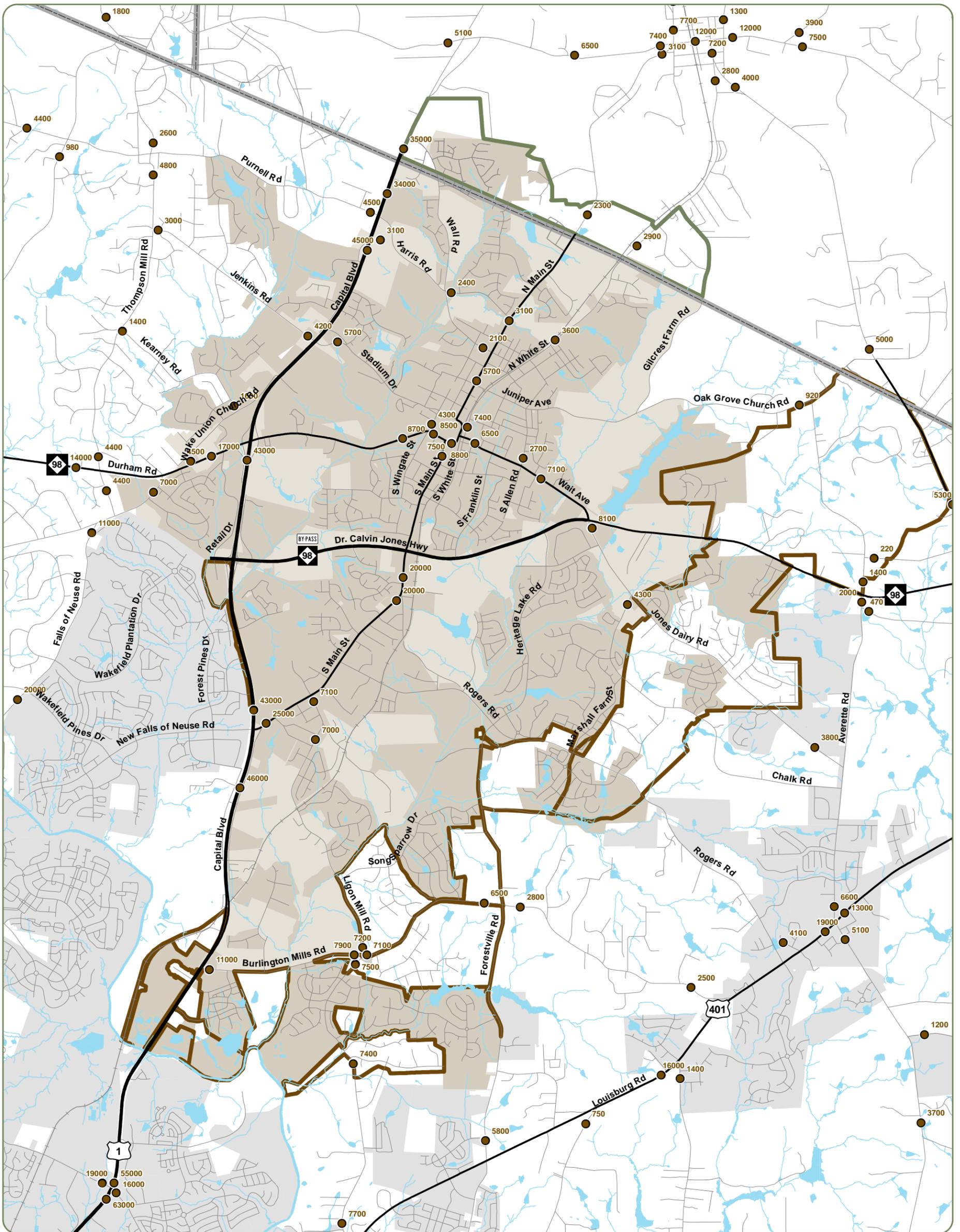




- Highway
- Street
- Railroad
- Body of Water
- Stream/River
- Wake Forest
- Rolesville
- Raleigh
- Wake Forest ETJ
- ▭ County Boundary
- ▭ Wake Forest Urban Service Area
- ▭ Proposed Youngsville Annexation Line

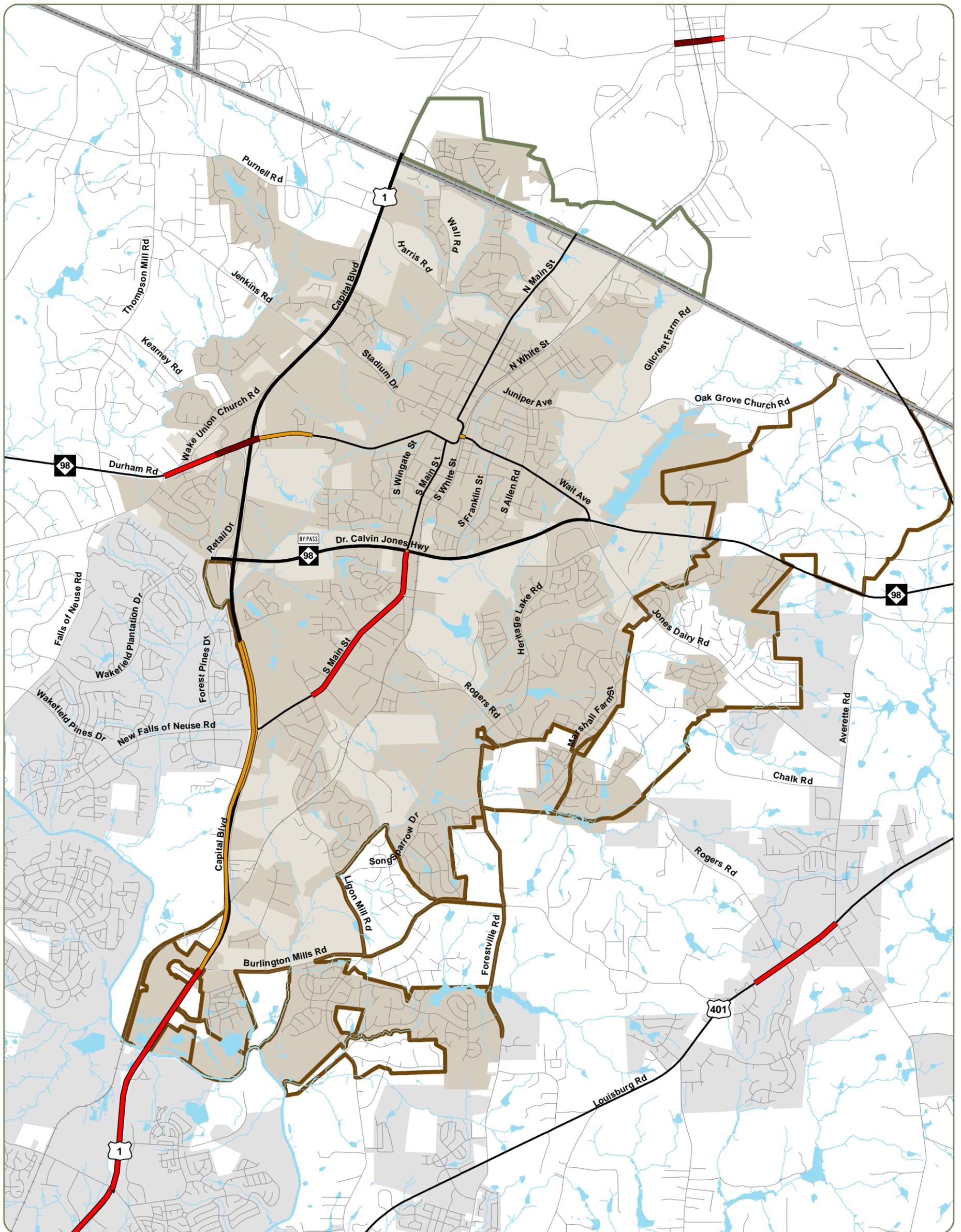
Figure 4.3

2007 Average Annual Daily Traffic Volumes



- Highway
- Street
- Railroad
- Body of Water
- Stream/River
- Wake Forest ETJ
- County Boundary
- Wake Forest
- Other Municipality
- Wake Forest Urban Service Area
- Proposed Youngsville Annexation Line

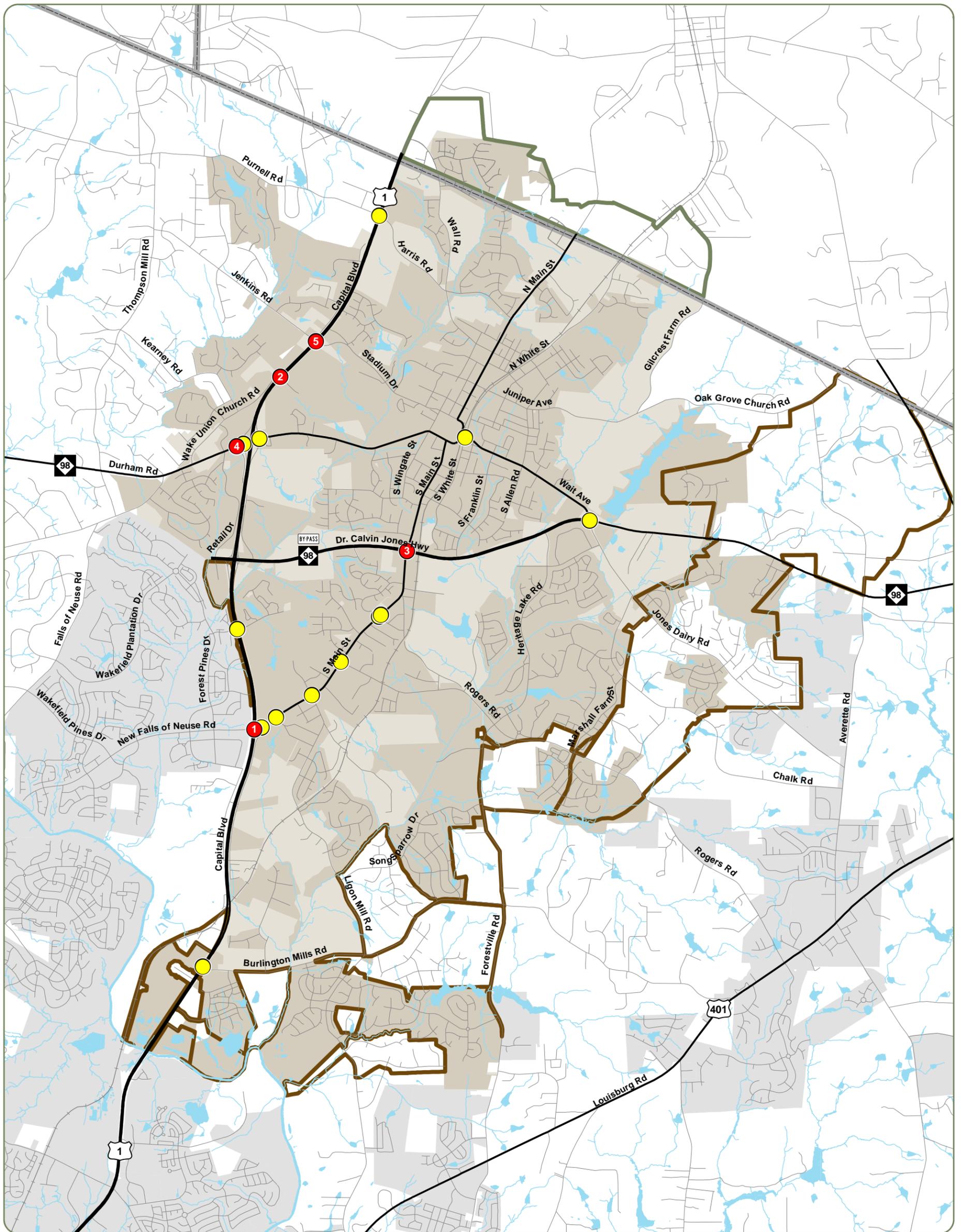
● AADT Volumes (2007)
 Note: Average Annual Daily Traffic (AADT) Volumes provided by NCDOT for 2007.



- | | | | |
|------------|--------------------|--------------------------------------|-----------------------------------|
| — Highway | Body of Water | Wake Forest ETJ | 2005 Congested Corridors (V/C) |
| — Street | Stream/River | County Boundary | Approaching Capacity (0.8 to 1.0) |
| — Railroad | Wake Forest | Wake Forest Urban Service Area | At Capacity (1.0 to 1.2) |
| | Other Municipality | Proposed Youngsville Annexation Line | Over Capacity (Greater than 1.2) |

Figure 4.5

High Priority Crash Locations

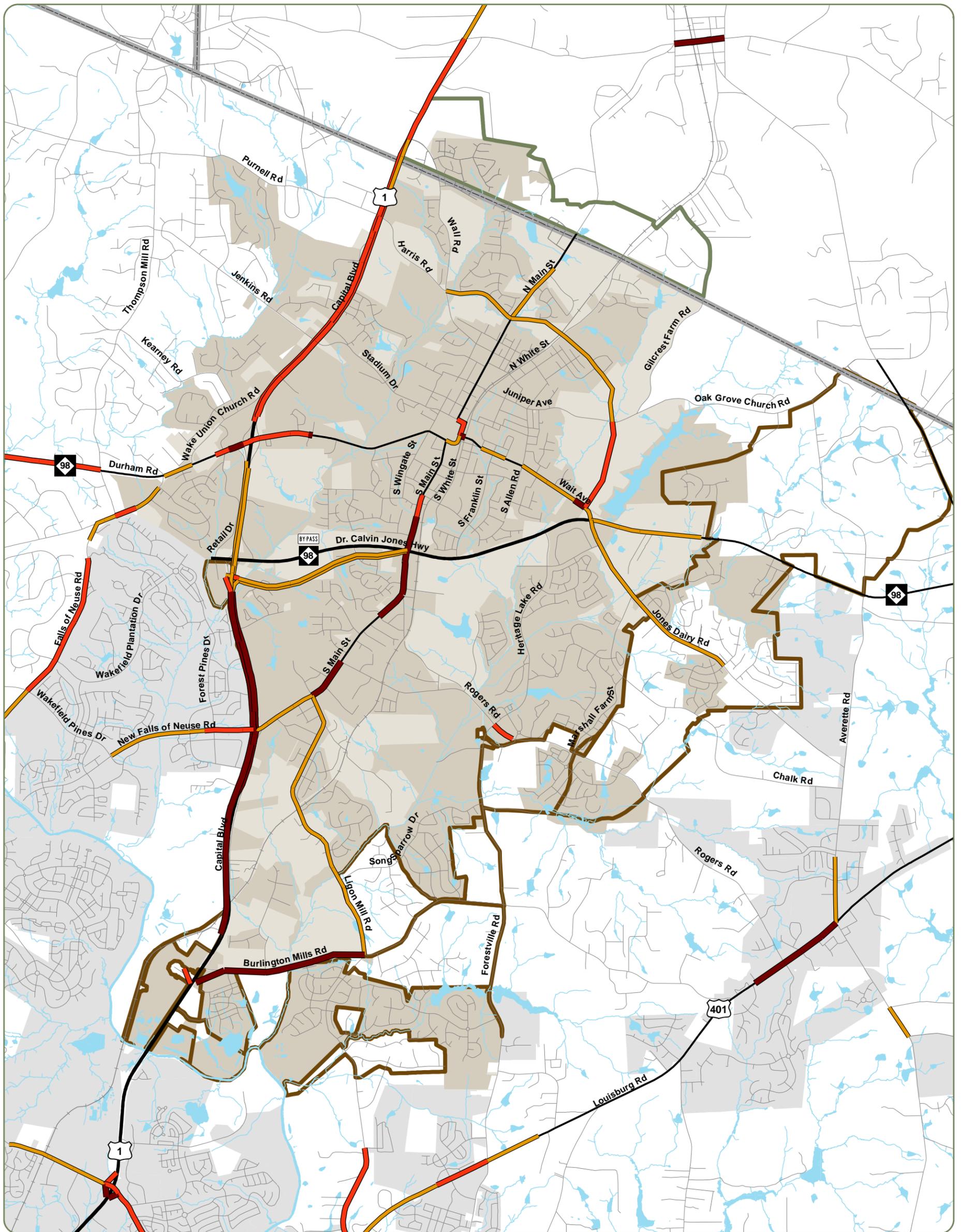


- Highway
- Street
- Railroad
- ▨ Floodplain
- ▨ Body of Water
- ▨ Stream/River
- ▨ Wake Forest ETJ
- ▨ County Boundary
- ▨ Wake Forest
- ▨ Wake Forest Urban Service Area
- ▨ Proposed Youngsville Annexation Line
- ▨ Other Municipality

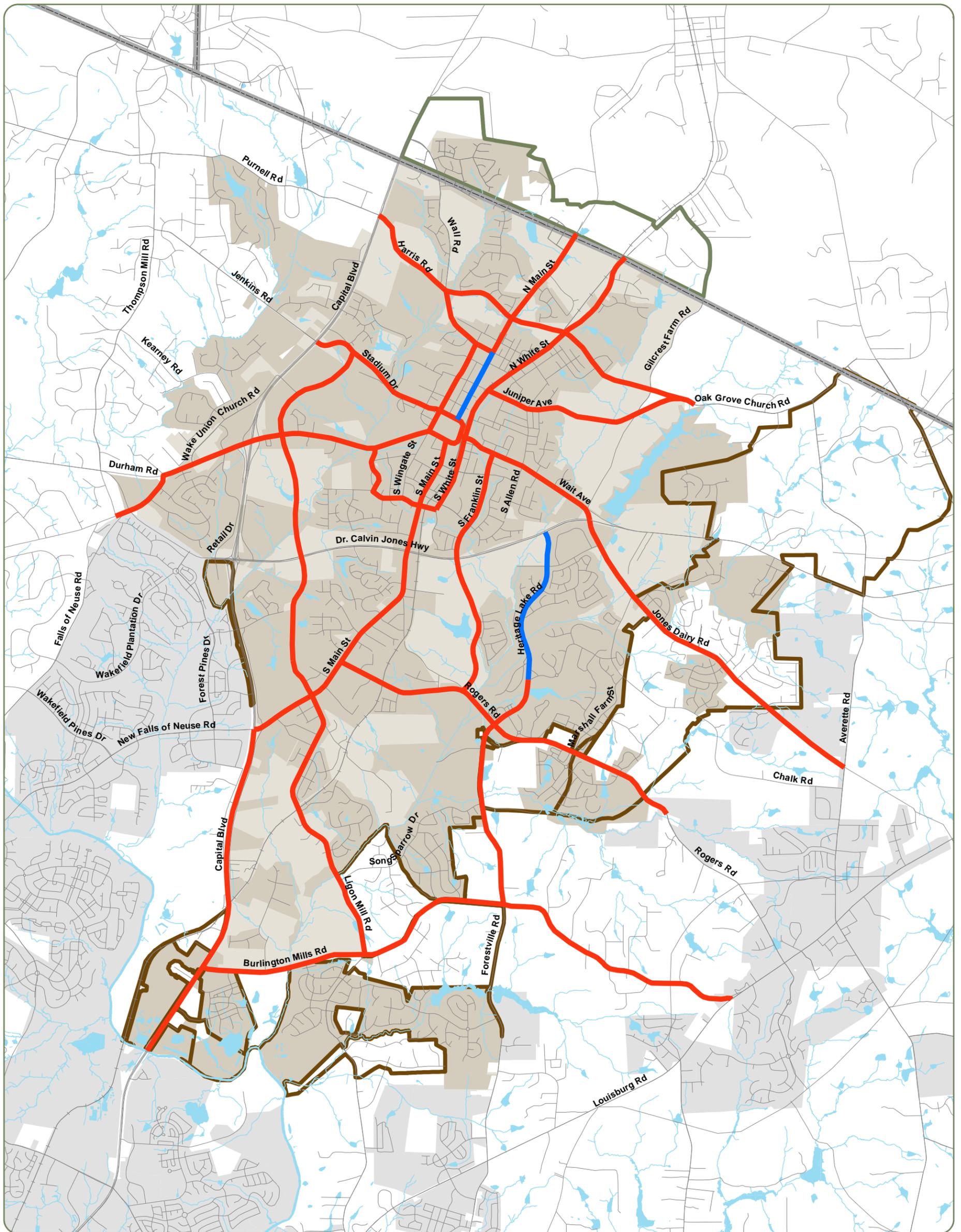
Crash Analysis Intersection

- Top 5 (with Rank)
- Other Intersection

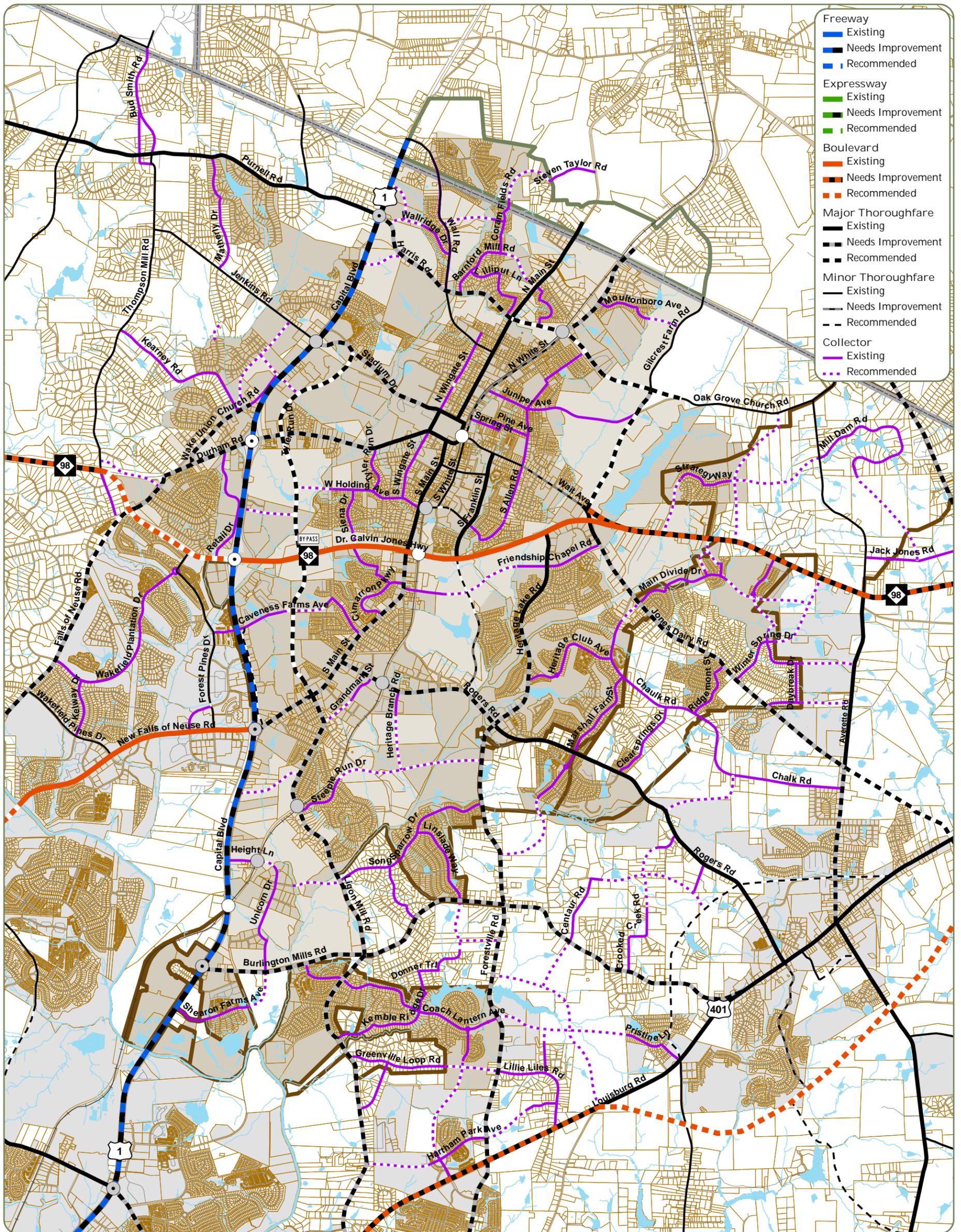
Note: Crashes ranked by Equivalent Property Damage Only (EPDO) Rate. Data provided by NCDOT for crashes occurring 10/2005 through 9/2008.

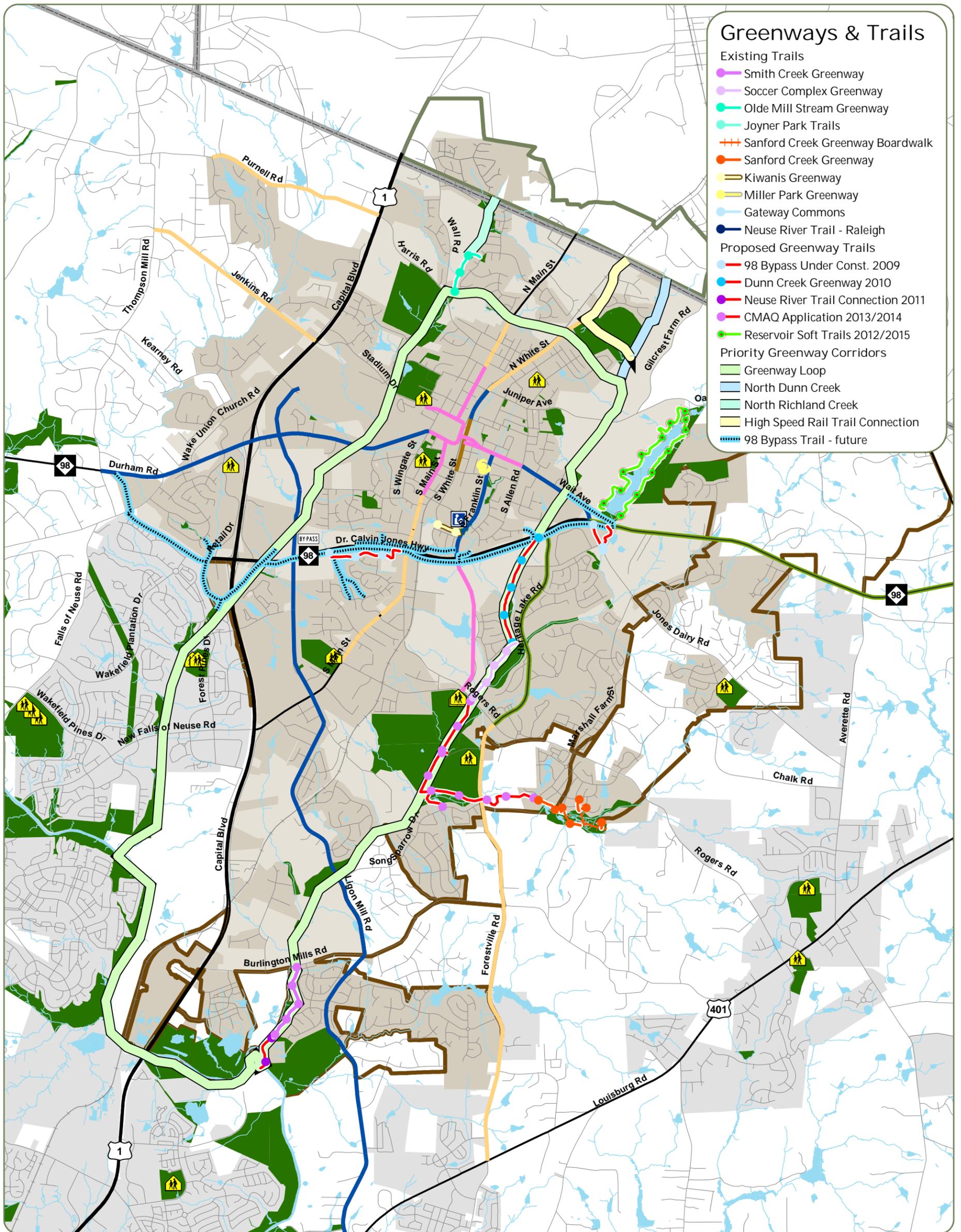


- | | | | |
|------------|--------------------|--------------------------------------|-----------------------------------|
| — Highway | Body of Water | Wake Forest ETJ | 2035 Congested Corridors (V/C) |
| — Street | Stream/River | County Boundary | Approaching Capacity (0.8 to 1.0) |
| — Railroad | Wake Forest | Wake Forest Urban Service Area | At Capacity (1.0 to 1.2) |
| | Other Municipality | Proposed Youngsville Annexation Line | Over Capacity (Greater than 1.2) |



- | | | | |
|--------------------------------|--------------------|--------------------------------------|------------------|
| — Street (Existing and Future) | Body of Water | Wake Forest ETJ | Complete Streets |
| — Railroad | Stream/River | County Boundary | Existing |
| | Wake Forest | Wake Forest Urban Service Area | Future |
| | Other Municipality | Proposed Youngsville Annexation Line | |





Greenways & Trails

Existing Trails

- Smith Creek Greenway
- Soccer Complex Greenway
- Olde Mill Stream Greenway
- Joyner Park Trails
- Sanford Creek Greenway Boardwalk
- Sanford Creek Greenway
- Kiwanis Greenway
- Miller Park Greenway
- Gateway Commons
- Neuse River Trail - Raleigh

Proposed Greenway Trails

- 98 Bypass Under Const. 2009
- Dunn Creek Greenway 2010
- Neuse River Trail Connection 2011
- CMAQ Application 2013/2014
- Reservoir Soft Trails 2012/2015

Priority Greenway Corridors

- Greenway Loop
- North Dunn Creek
- North Richland Creek
- High Speed Rail Trail Connection
- 98 Bypass Trail - future

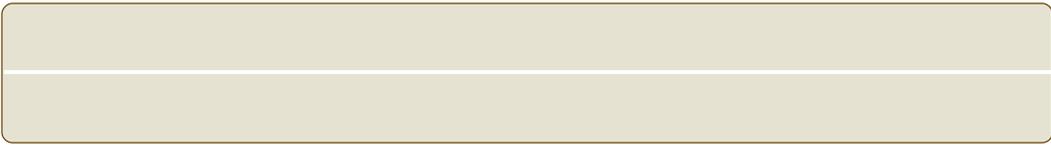
— Highway	Body of Water	Wake Forest ETJ	Library	Recommended Bicycle Facility
— Street	Stream/River	County Boundary	School	Multi-Purpose Path, Wide Striped Shoulder
— Railroad	Wake Forest	Wake Forest Urban Service Area	Park	Bike Lane
Other Municipality	Proposed Youngsville Annexation Line			Wide Striped Shoulder
				Sharrow
				Shared Lane



Appendix A

Corridor Profiles

Burlington Mills Road — Capital Boulevard (US 1) to Ligon Mill Road	A-3a
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South Main Street — Elm Avenue to Holding Avenue	A-19b
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Wingate Street — North Avenue to South Avenue	A-35b
Zebulon Road (NC 96) — Oak Grove Church Road to Wait Avenue (NC 98)	A-36a

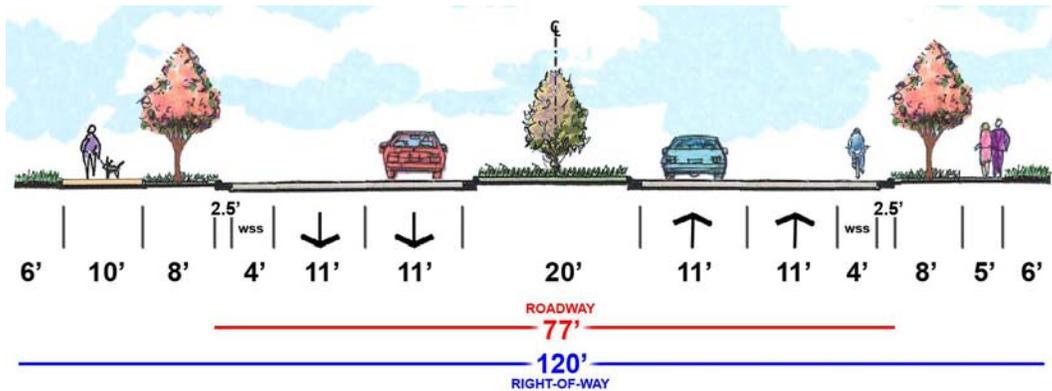
Burlington Mills Road – Capital Boulevard (US 1) to Ligon Mill Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	24 to 36 ft	60 ft	2	None	45 mph	Major	11,000	17,500	—
2035	75 ft	120 ft	4	Landscaped Median	45 mph	Major	36,400	41,400	D

Typical Cross Section

NCDOT Road

4-Lane Divided with Wide Striped Shoulders and Multi-Use Path



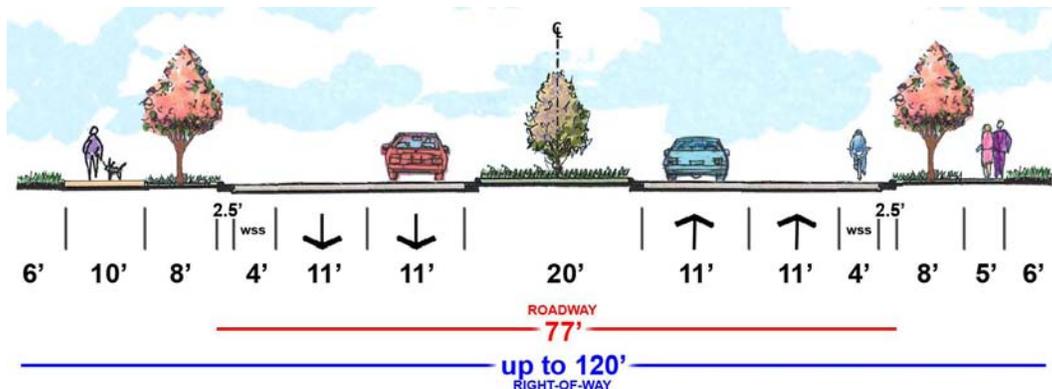
Burlington Mills Road – Ligon Mill Road to Forestville Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	24 to 36 ft	60 ft	2	None	45 mph	Major	7,100	12,000	—
2035	75 ft	100 to 120 ft	4	Landscaped Median	45 mph	Major	36,000	41,400	D

Typical Cross Section

NCDOT Road

4-Lane Divided with Wide Striped Shoulders and Multi-Use Path



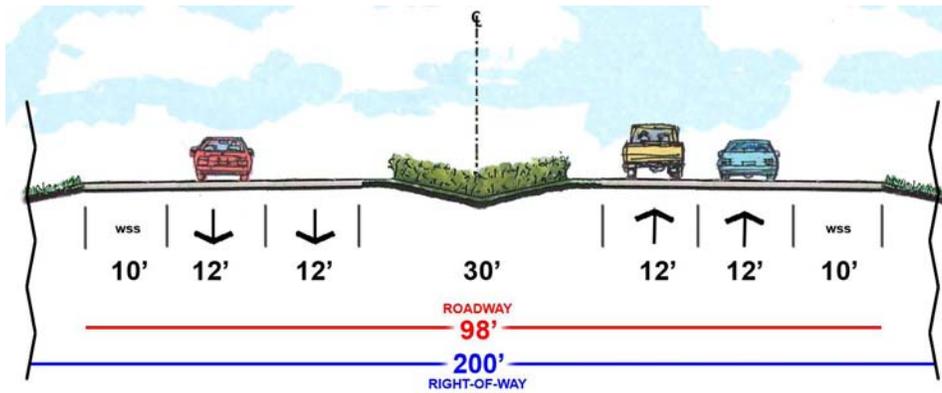
Note: When right-of-way constraints preclude the construction of the cross sections as shown, alternatives will be considered on a case by case basis (including placement of trees, paths, or sidewalks in easements adjacent to the ROW, narrowed lanes, or reduced verge areas).

Capital Boulevard (US 1) – Wake County Line to Purnell Road/Harris Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	n/a ft	200 ft	4	Landscaped Median	55 mph	Major	n/a	38,000	—
2035	n/a ft	200 ft	4	Landscaped Median	55 mph	Major	55,600	53,240	E

NCDOT Road

Typical Cross Section
4-Lane Divided Freeway

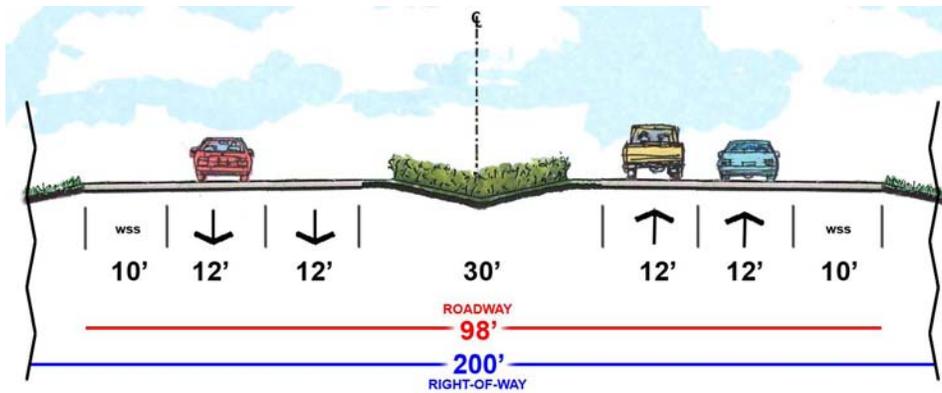


Capital Boulevard (US 1) – Purnell Road/Harris Road to Durham Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	n/a ft	200 ft	4	Landscaped Median	55 mph	Major	28,400	38,000	—
2035	n/a ft	200 ft	4	Landscaped Median	55 mph	Major	59,100	53,300	E

NCDOT Road

Typical Cross Section
4-Lane Divided Freeway

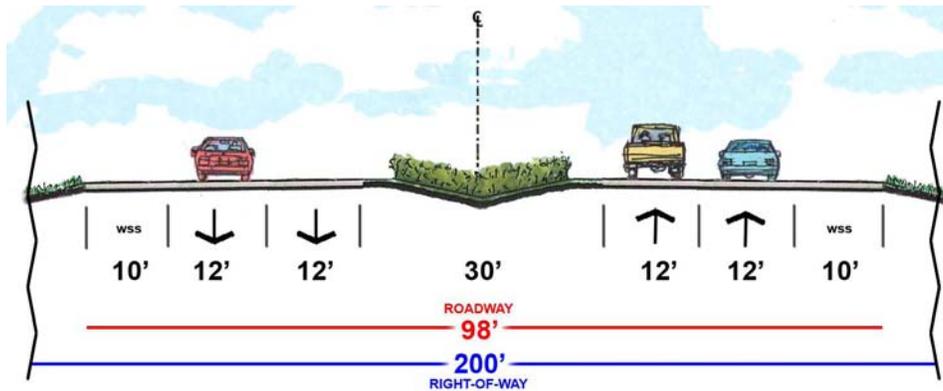


Capital Boulevard (US 1) – Durham Road to South Main Street

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	n/a ft	200 ft	4	Landscaped Median	55 mph	Major	43,000	38,000	—
2035	n/a ft	200 ft	4	Landscaped Median	55 mph	Major	50,800	53,300	D

NCDOT Road

Typical Cross Section
4-Lane Divided Freeway

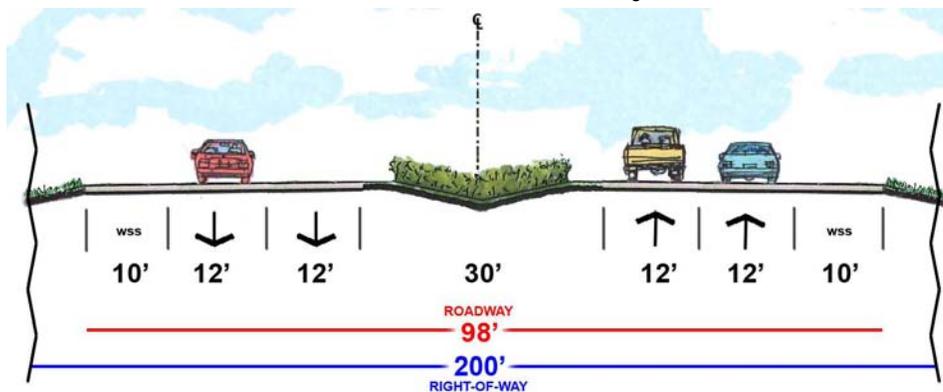


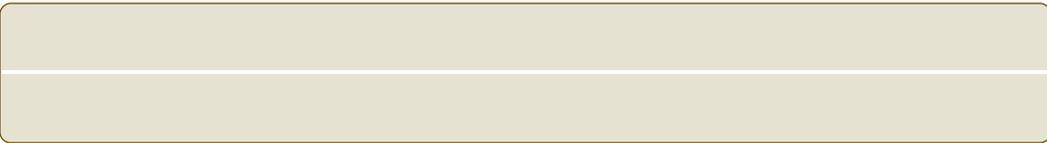
Capital Boulevard (US 1) – South Main Street to Burlington Mills Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	n/a ft	250 ft	4	Landscaped Median	55 mph	Major	35,000	46,000	—
2035	n/a ft	250 ft	4	Landscaped Median	55 mph	Major	73,200	53,300	F

NCDOT Road

Typical Cross Section
4-Lane Divided Freeway

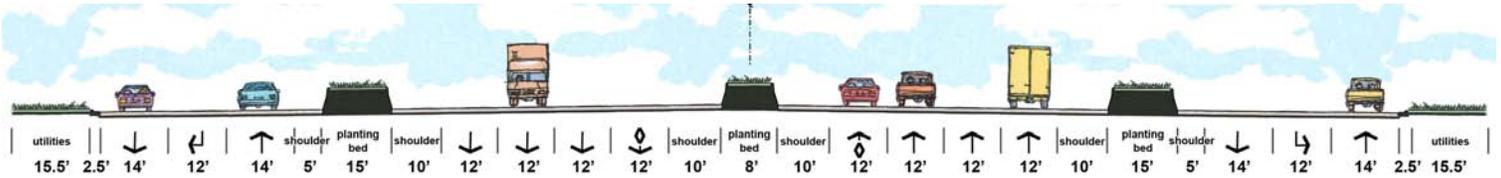




Capital Boulevard (US 1) — Ultimate Cross Section

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
Post 2035		350 ft	8 freeway 3-lane frontage	22' with barrier and shoulders; no openings	65 mph	Freeway	102,000	88,000	F

Typical Cross Section
6-Lane Freeway with HOV Lanes and 3-Lane Frontage Roads

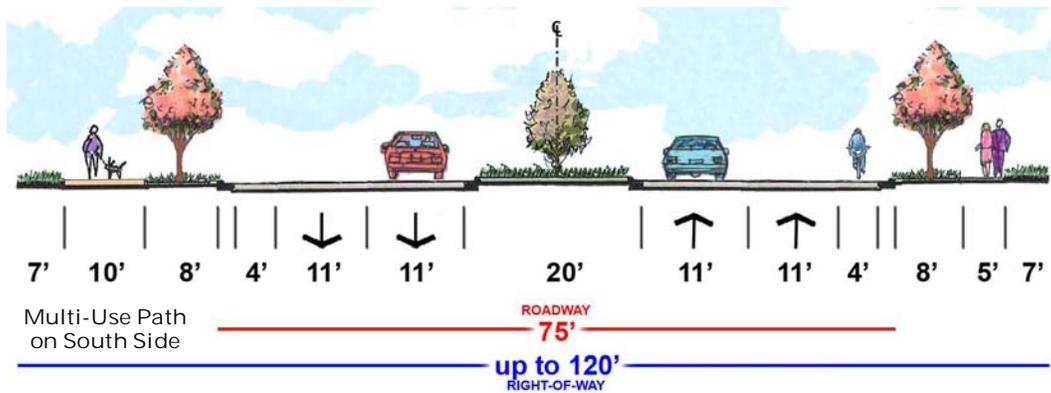


Durham Road — Dr. Calvin Jones Highway to Wake Union Church Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	32 ft	100 ft	2	None	55 mph	Major	n/a	17,500	—
2035	75 ft	100 to 120 ft	4	Landscaped Median	45 mph	Major	17,200	35,000	B

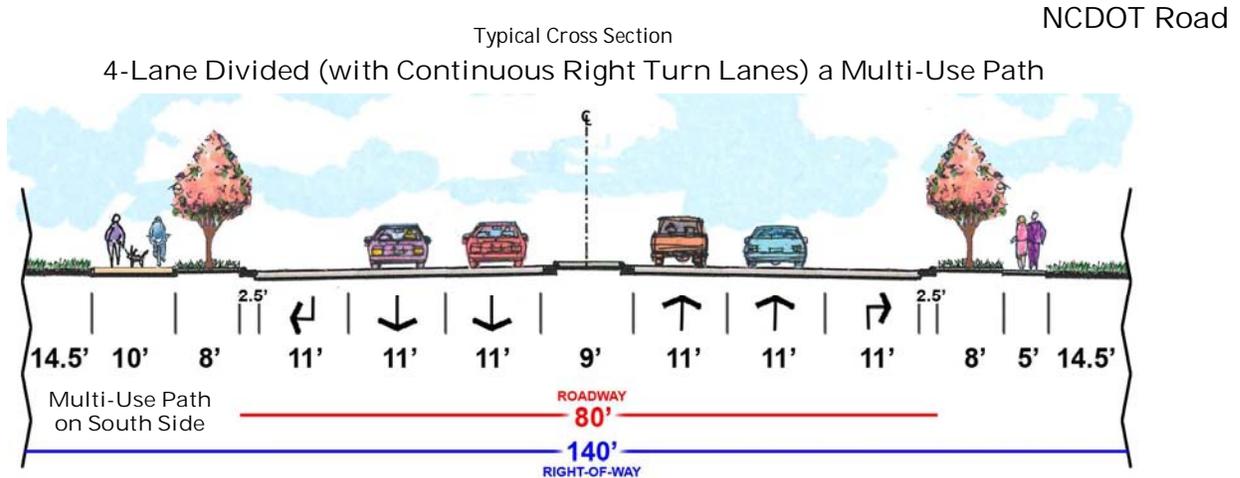
Typical Cross Section
4-Lane Divided with Wide Outside Lanes and a Multi-Use Path

NCDOT Road



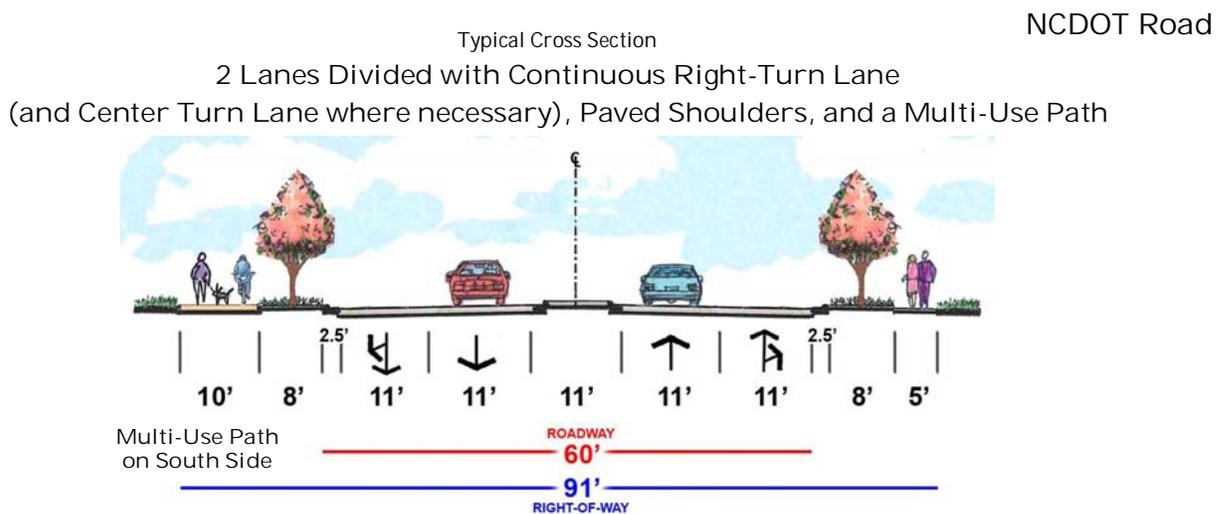
Durham Road — Wake Union Church Road to US 1 Northbound Ramps

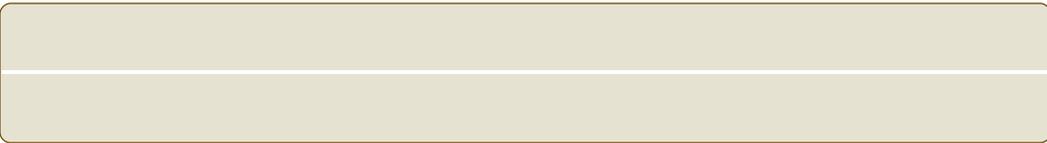
Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	70 to 80 ft	140 ft	2	Left-turn Lanes at Intersections and Driveways	45 mph	Major	19,700	18,000	—
2035	80 ft	140 ft	4	Concrete Median	35 mph	Major	22,100	41,400	B



Durham Road — US 1 Northbound Ramps to Ligon Mill Road Extension

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	40 ft	65 ft	2	Left-turn Lanes at Intersections and Driveways	35 mph	Major	n/a	18,000	—
2035	60 ft	91 ft	2	Left-turn Lanes at Intersections and Driveways	35 mph	Major	20,500	21,400	D

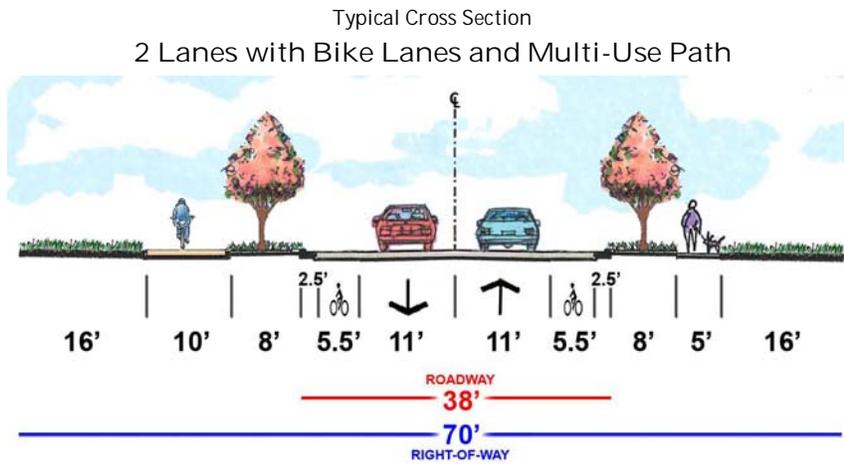




Durham Road – Ligon Mill Road Extension to Tyler Run Drive

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	24 ft	60 ft	2	None	35 mph	Major	n/a	14,500	—
2035	38 ft	70 ft	2	Left-turn Lanes at Intersections and Driveways	35 mph	Major	17,300	21,400	D

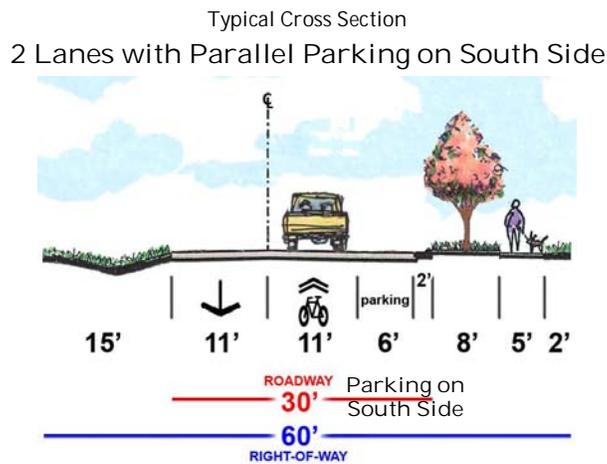
NCDOT Road



Durham Road – Tyler Run Drive to Wingate Street

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	30 ft	60 ft	2	None	35 mph	Major	14,200	14,500	—
2035	30 ft	60 ft	2	None	35 mph	Major	8,700	14,500	C

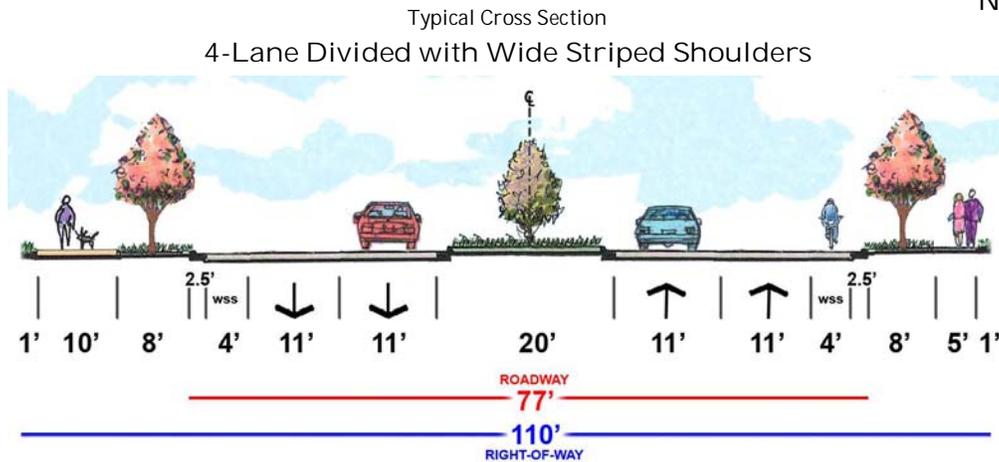
NCDOT Road



Forestville Road — Rogers Road to Toms Creek

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	19 ft	60 ft	2	None	50 mph	Major	n/a	12,000	—
2035	77 ft	110 ft	4	Landscaped Median	45 mph	Major	31,700	41,400	C

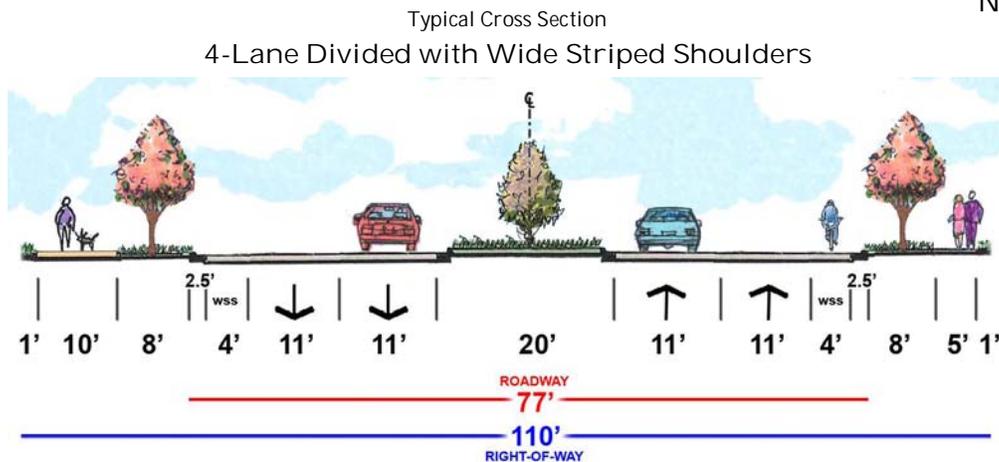
NCDOT Road

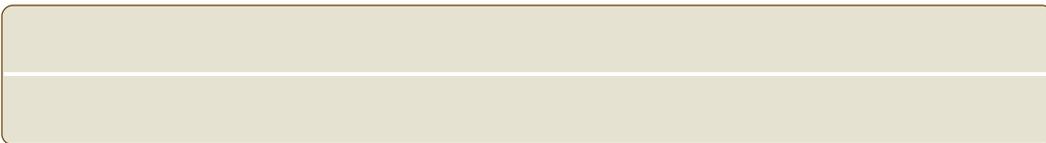


Forestville Road — Toms Creek to Louisburg Road (US 401)

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	20 to 36 ft	60 ft	2	None	45 mph	Major	n/a	12,000	—
2035	77 ft	110 ft	4	Landscaped Median	45 mph	Major	22,000	41,400	B

NCDOT Road

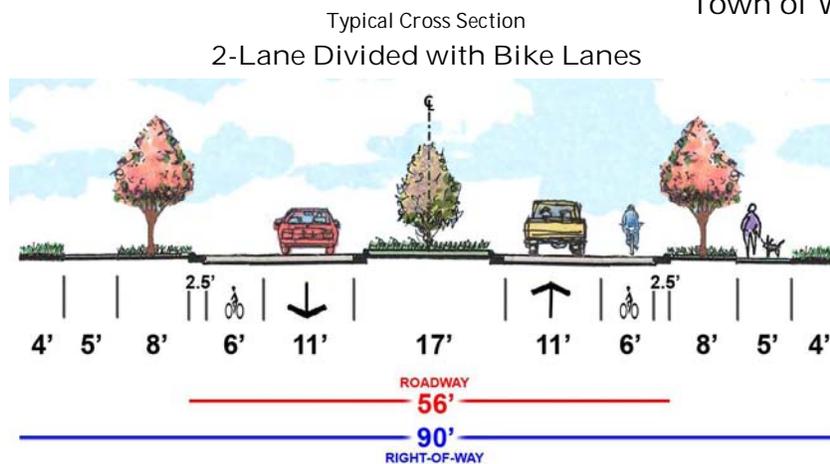




Franklin Street — Wait Avenue to Dr. Calvin Jones Highway

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	50 ft	90 ft	2	Two-way Left-turn Lane	35 mph	Minor	n/a	32,000	—
2035	56 ft	90 ft	4	Landscaped Median	35 mph	Major	n/a	21,400	n/a

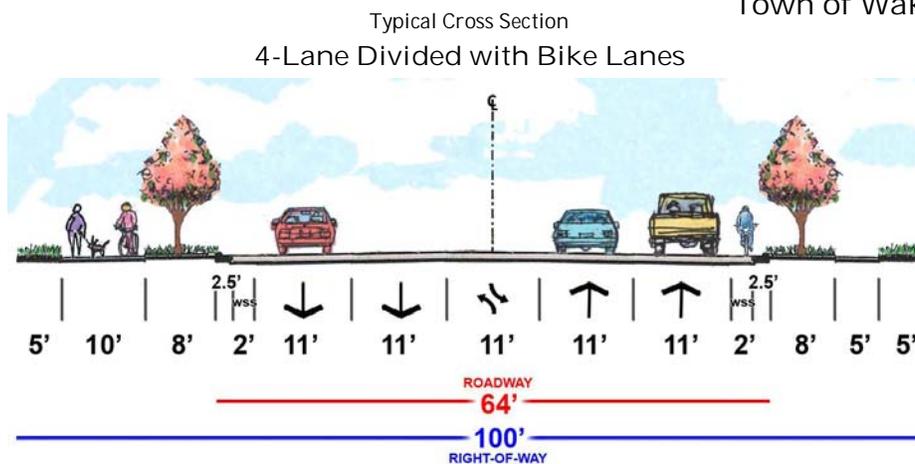
Town of Wake Forest Road



Franklin Street Extension — Dr. Calvin Jones Highway to Rogers Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	24 ft	90 ft	2	Not constructed	35 mph	Major	n/a	14,600	—
2035	73 ft	100 ft	4	Left-turn Lanes at Intersections and Driveways	35 mph	Major	11,800	32,000	A

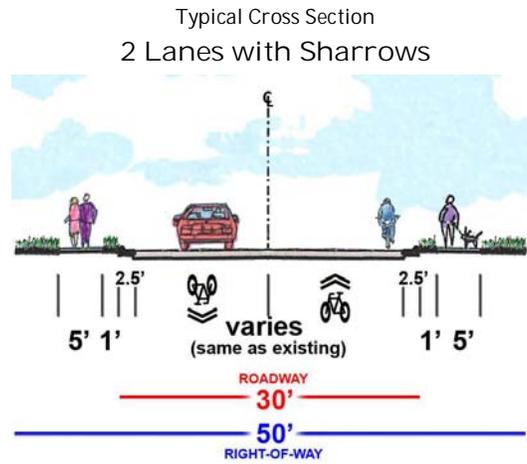
Town of Wake Forest Road



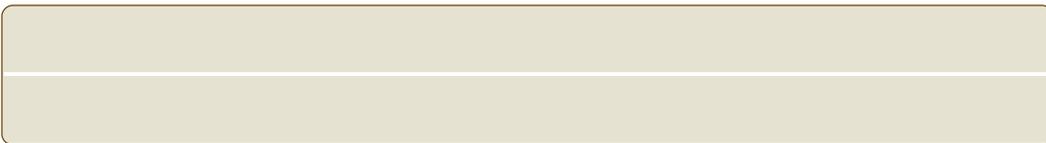
Front Street — North Main Street to South Main Street

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	30 ft	50 ft	2	None	25 mph	Major	13,000	17,500	—
2035	30 ft	50 ft	2	None	25 mph	Major	20,500	17,300	E

NCDOT Road



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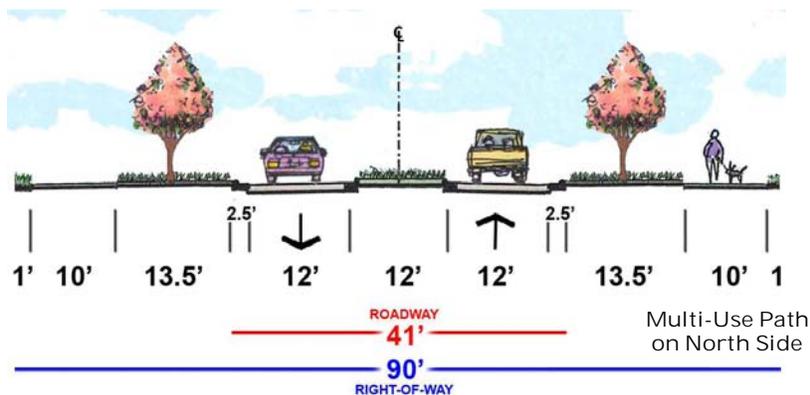


Harris Road — Capital Boulevard (US 1) to Oak Avenue/Wall Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	21 ft	60 ft	2	None	45 mph	Major	2,100	12,000	—
2035	36 ft	90 ft	2	Left-turn Lanes at Intersections and Driveways	45 mph	Major	16,300	18,000	D

NCDOT Road

Typical Cross Section
2-Lane Divided with Multi-Use Paths

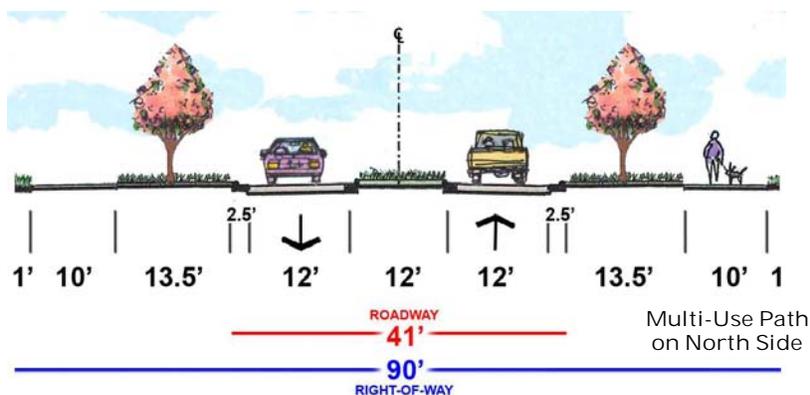


Harris Road — Oak Avenue/Wall Road to North Main Street

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	24 to 40 ft	90 ft	2	None	45 mph	Major	n/a	17,500	—
2035	36 ft	90 ft	2	Left-turn Lanes at Intersections and Driveways	35 mph	Major	17,900	20,700	D

NCDOT Road

Typical Cross Section
2-Lane Divided with Multi-Use Paths

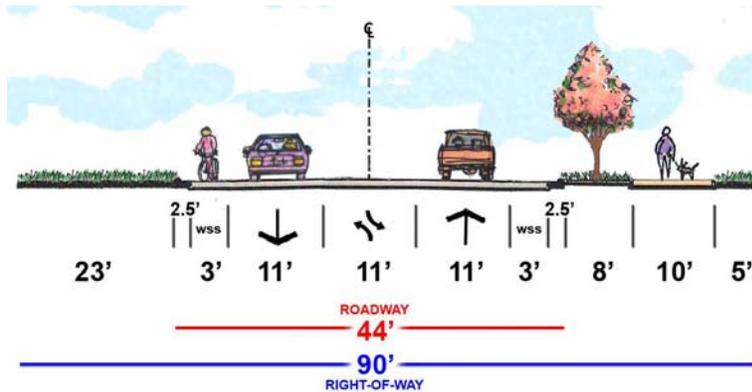


Heritage Lake Road — Dr. Calvin Jones Highway to Rogers Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	28 to 40 ft	90 ft	2	None	35 mph	Major	6,500	14,600	—
2035	44 ft	90 ft	2	Left-turn Lanes at Intersections and Driveways	35 mph	Major	20,100	20,700	D

NCDOT Road

Typical Cross Section
3 Lanes with Wide Striped Shoulders and a Multi-Use Path

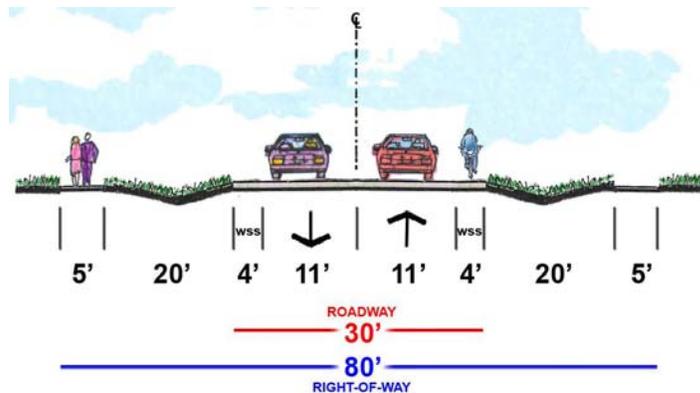


Jenkins Road — Thompson Mill Road to Capital Boulevard (US 1)

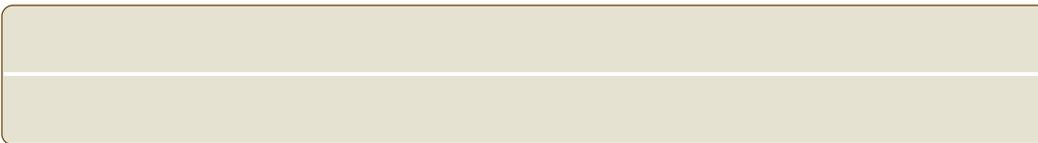
Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	21 ft	60 ft	2	None	45 mph	Major	3,000	12,000	—
2035	30 ft	70 ft	2	None	45 mph	Major	6,000	17,300	A

NCDOT Road

Typical Cross Section
2 Lanes with Wide Striped Shoulders



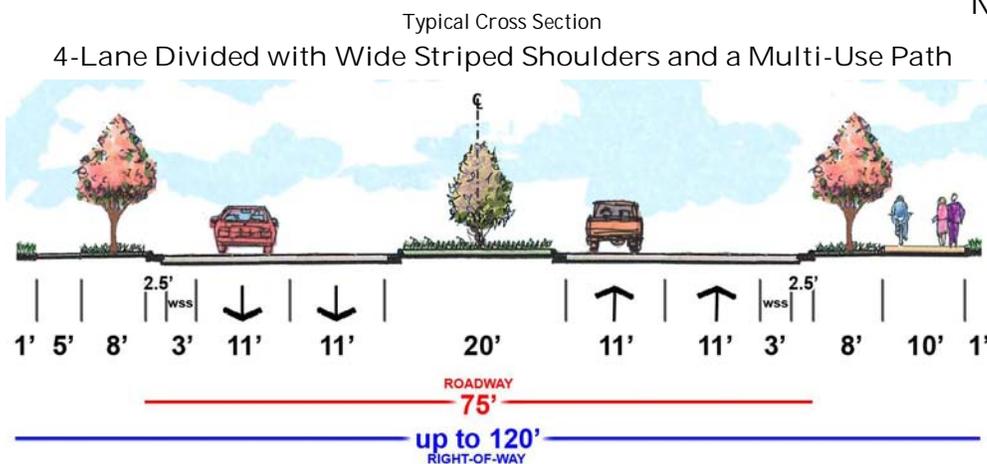
Note: Add left-turn lanes where needed.



Jones Dairy Road — East Wait Avenue (NC 98) to Averette Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	22 to 26 ft	60 ft	2	None	50 mph	Major	5,500	12,000	—
2035	75 ft	100 to 120 ft	4	Landscaped Median	45 mph	Major	21,500	41,400	B

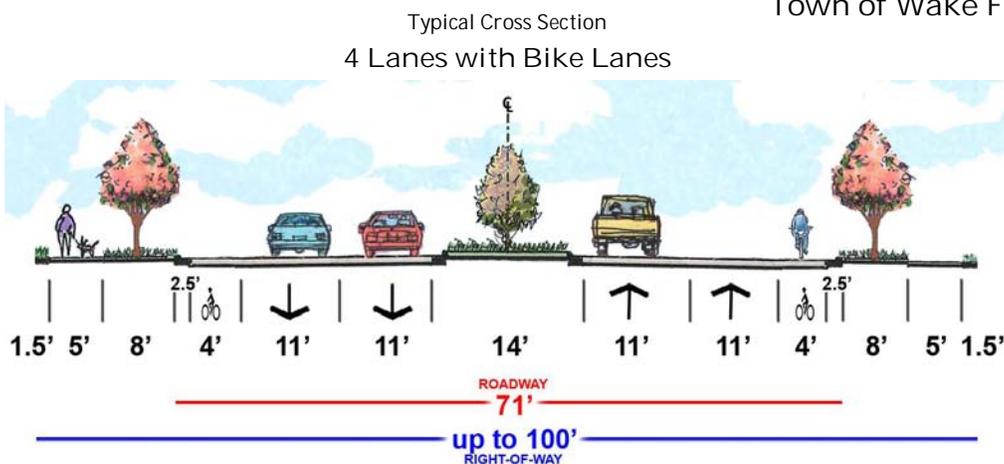
NCDOT Road



Ligon Mill Road Extension — Stadium Drive to Durham Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	n/a ft	0 ft	0	Not constructed	0 mph	n/a	n/a	0	—
2035	50 ft	90 ft	4	Left-turn Lanes at Intersections and Driveways	45 mph	Major	4,700	41,400	A

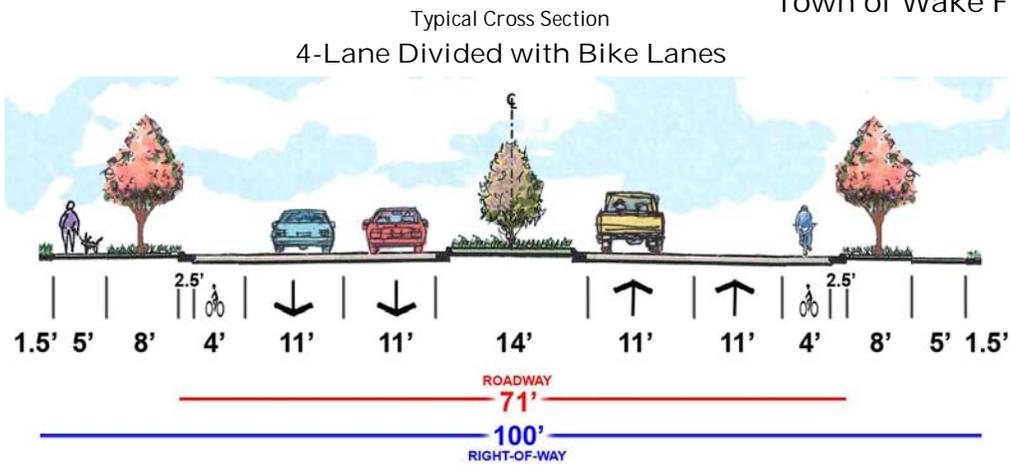
Town of Wake Forest Road



Ligon Mill Road Extension — Durham Road to Dr. Calvin Jones Highway

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	—
2035	71 ft	100 ft	4	Landscaped Median	45 mph	Major	5,700	41,400	A

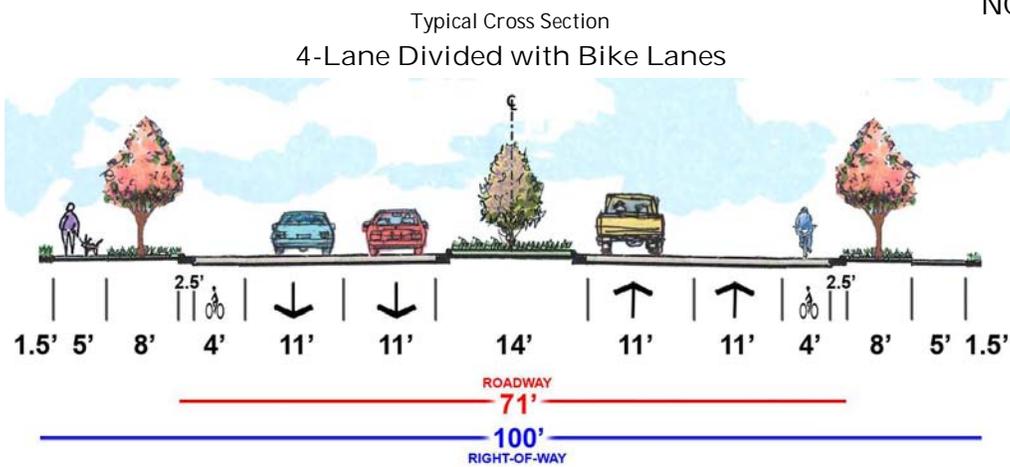
Town of Wake Forest Road

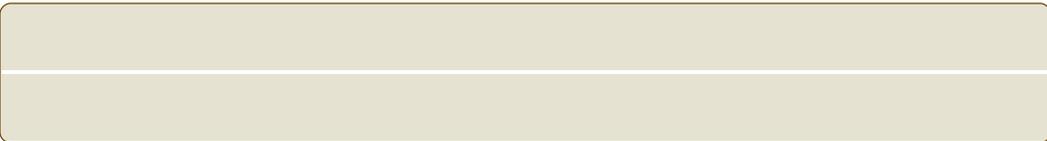


Ligon Mill Road — Dr. Calvin Jones Highway to South Main Street

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	24 to 46 ft	60 ft	2	None	35 mph	Major	2,100	12,000	—
2035	71 ft	100 ft	4	Landscaped Median	45 mph	Major	19,600	34,700	B

NCDOT Road

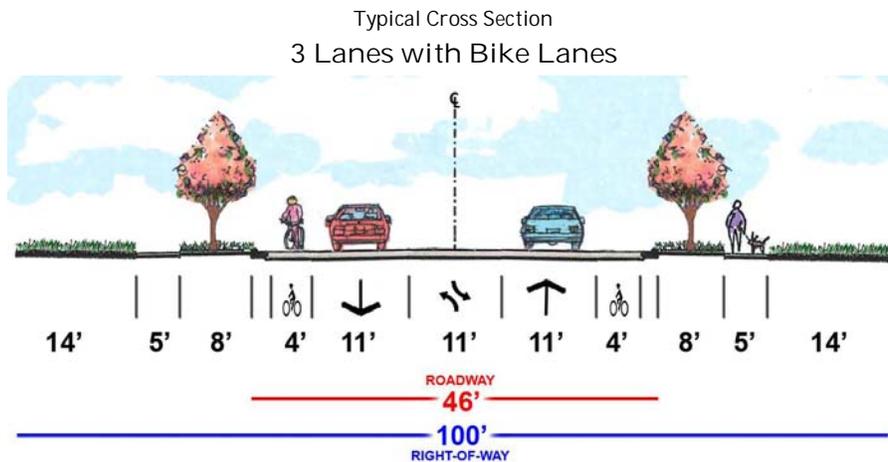




Ligon Mill Road — South Main Street to Toms Creek

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	24 to 46 ft	60 to 100 ft	2	Left-turn Lanes at Intersections and Driveways	35 to 45 mph	Major	7,900	14,600	—
2035	46 ft	100 ft	2	Left-turn Lanes at Intersections and Driveways	45 mph	Major	23,400	25,900	D

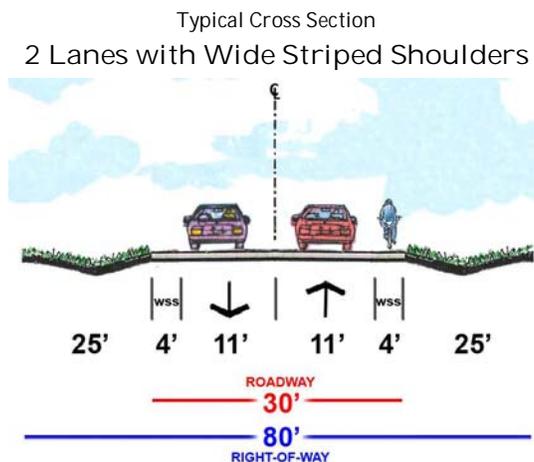
NCDOT Road



Ligon Mill Road — Toms Creek to Louisburg Road (US 401)

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	20 to 24 ft	60 ft	2	None	45 mph	Major	n/a	12,000	—
2035	30 ft	90 ft	2	Left-turn Lanes at Intersections and Driveways	45 mph	Major	22,700	21,600	E

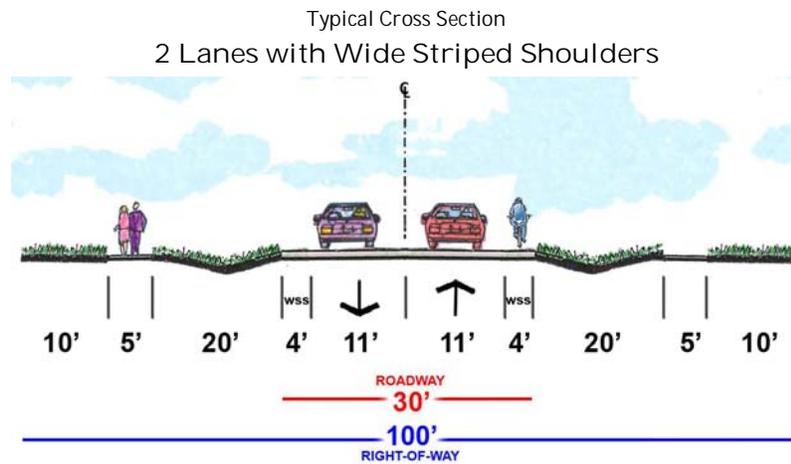
NCDOT Road



North Main Street — Wake Forest Planning Jurisdiction to Harris Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	22 ft	100 ft	2	None	45 mph	Major	2,400	12,000	—
2035	30 ft	100 ft	2	None	45 mph	Major	17,800	17,300	E

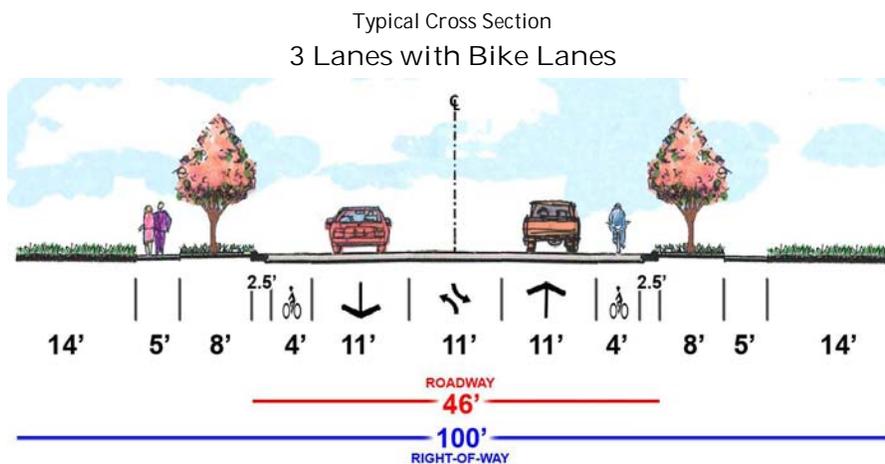
NCDOT Road

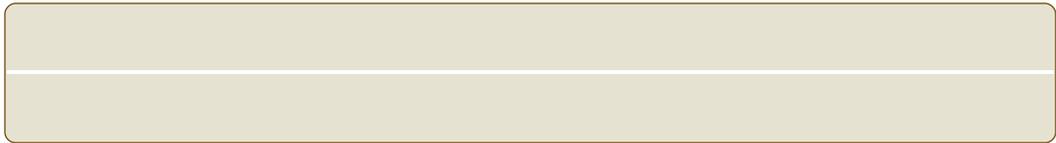


North Main Street — Harris Road to Chestnut Avenue

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	30 ft	100 ft	2	None	35 mph	Major	n/a	17,500	—
2035	46 ft	100 ft	2	Left-turn Lanes at Intersections and Driveways	35 mph	Major	15,100	21,400	C

NCDOT Road





North Main Street — Chestnut Avenue to Oak Avenue

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	30 ft	60 ft	2	None	35 mph	Major	n/a	17,500	—
2035							15,100		

Typical Cross Section
To Be Determined

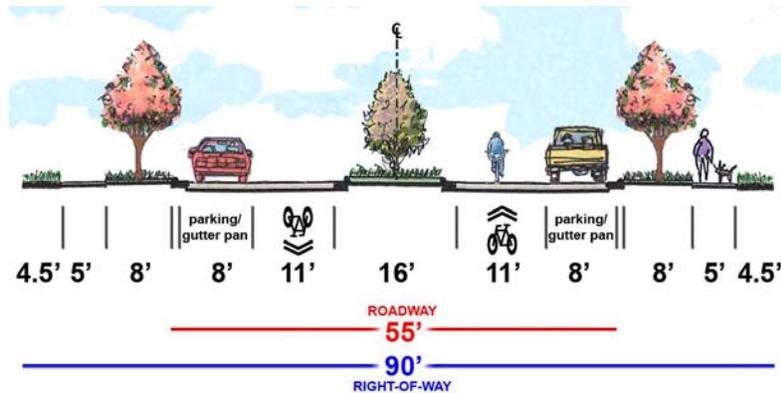
NCDOT Road

North Main Street — Oak Avenue to North Avenue

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	55 ft	90 ft	2	None	35 mph	Major	5,800	17,500	—
2035	55 ft	90 ft	2	None	35 mph	Major	15,200	21,400	C

Typical Cross Section
2-Lane Divided with Sharrows and Parallel Parking

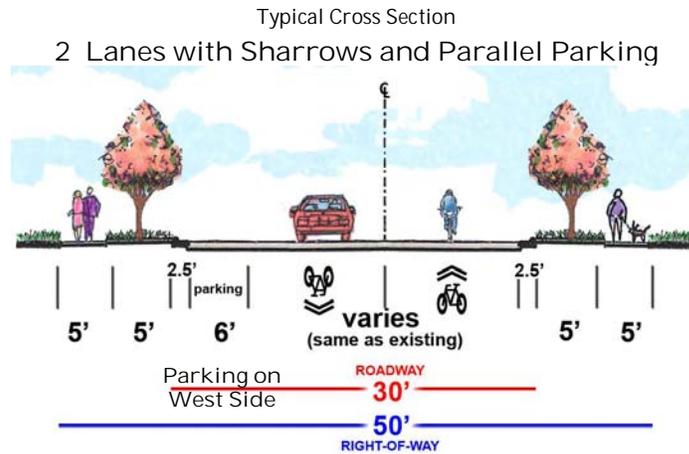
NCDOT Road



South Main Street — South Avenue to Elm Avenue

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	30 ft	50 ft	2	None	35 mph	Major	7,400	17,500	—
2035	30 ft	50 ft	2	None	35 mph	Major	10,300	17,300	B

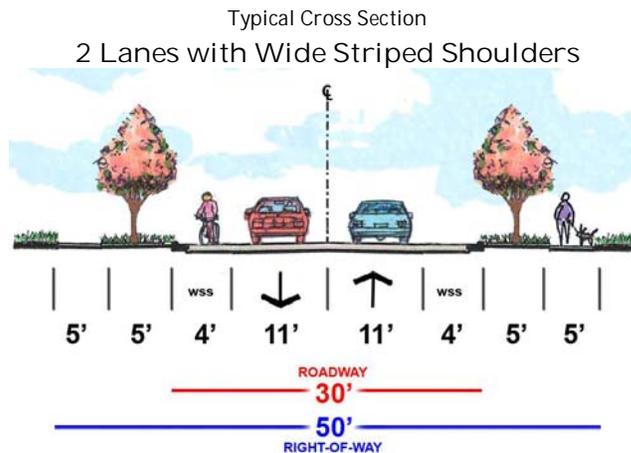
NCDOT Road

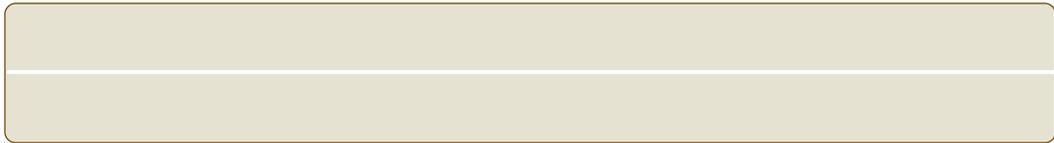


South Main Street — Elm Avenue to Holding Avenue

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	30 ft	50 ft	2	None	35 mph	Major	7,400	17,500	—
2035	30 ft	50 ft	2	None	35 mph	Major	10,300	17,300	B

NCDOT Road



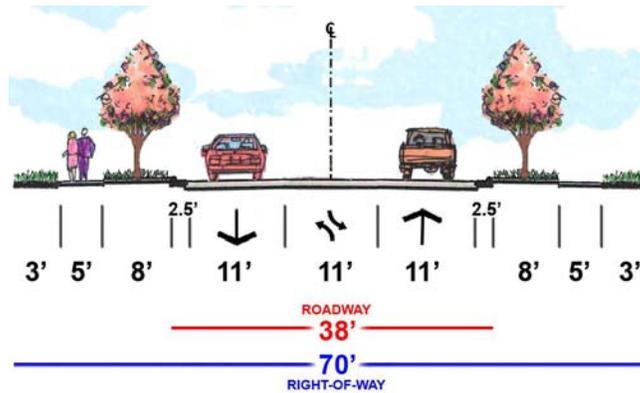


South Main Street — Holding Avenue to Dr. Calvin Jones Highway

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	30 to 40 ft	60 ft	2	Two-way Left-turn lane	35 mph	Major	14,200	18,000	—
2035	38 ft	70 ft	2	Two-way Left-turn lane	35 mph	Major	21,000	21,400	D

NCDOT Road

Typical Cross Section
3 Lanes

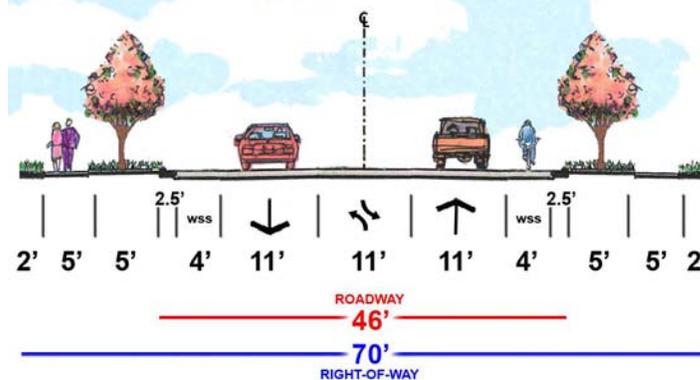


South Main Street — Dr. Calvin Jones Highway to Rogers Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	41 to 50 ft	70 ft	2	Two-way Left-turn lane	45 mph	Major	20,000	17,300	—
2035	41 to 50 ft	70 ft	2	Two-way Left-turn lane	45 mph	Major	25,000	17,300	F

NCDOT Road

Typical Cross Section
3 Lanes with Wide Striped Shoulders

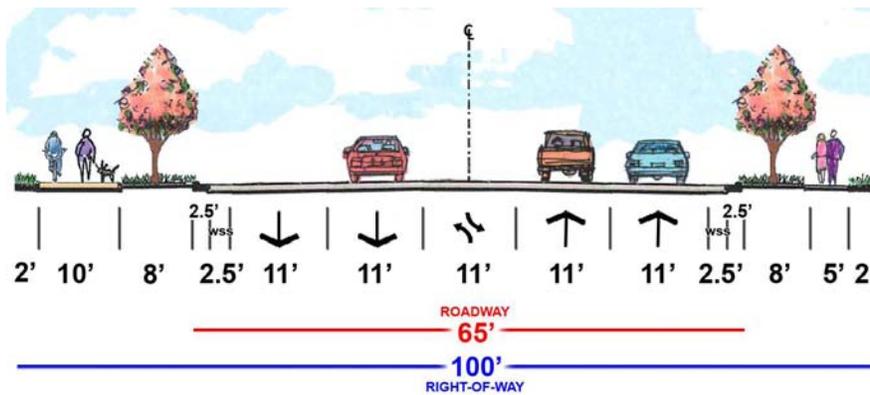


South Main Street — Rogers Road to Capital Boulevard (US 1)

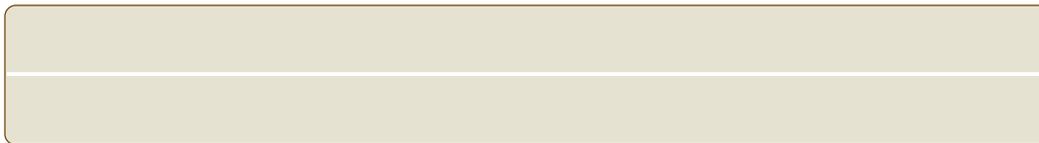
Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	65 ft	100 ft	4	Two-way Left-turn Lane	45 mph	Major	12,000	32,000	—
2035	65 ft	100 ft	4	Two-way Left-turn Lane	45 mph	Major	27,000	32,000	D

NCDOT Road

Typical Cross Section
5 Lanes with Striped Shoulders



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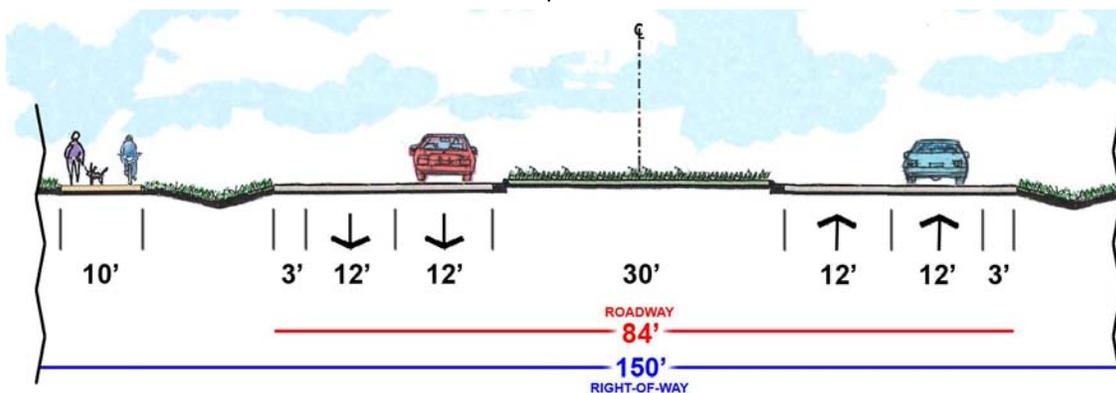
Dr. Calvin Jones Highway — Durham Road to Capital Boulevard (US 1)

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	—
2035	75 ft	150 ft	4	Landscaped Median	45 mph	Major	39,700	53,240	C

Typical Cross Section

NCDOT Road

4-Lane Divided with Wide Striped Shoulders and Multi-Use Path



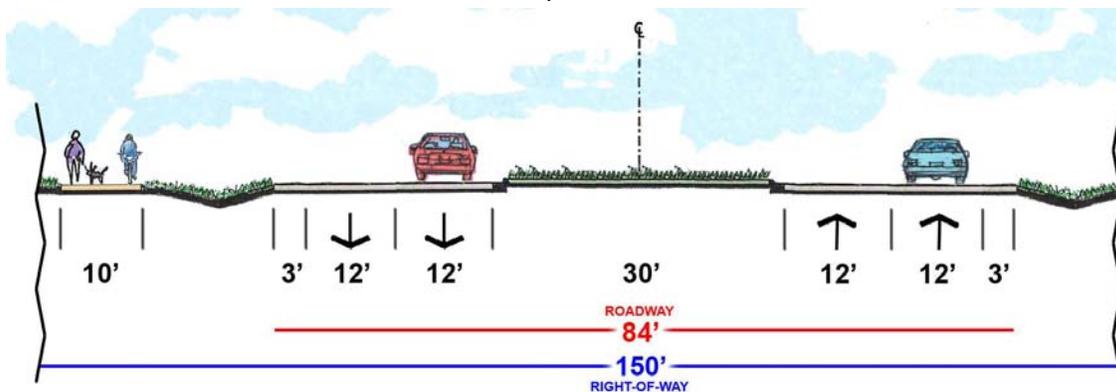
Dr. Calvin Jones Highway — Capital Boulevard (US 1) to South Main Street

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	75 ft	150 ft	4	Landscaped Median	45 mph	Major	n/a	43,200	—
2035	75 ft	150 ft	4	Landscaped Median	45 mph	Major	41,000	43,200	D

Typical Cross Section

NCDOT Road

4-Lane Divided with Wide Striped Shoulders and Multi-Use Path

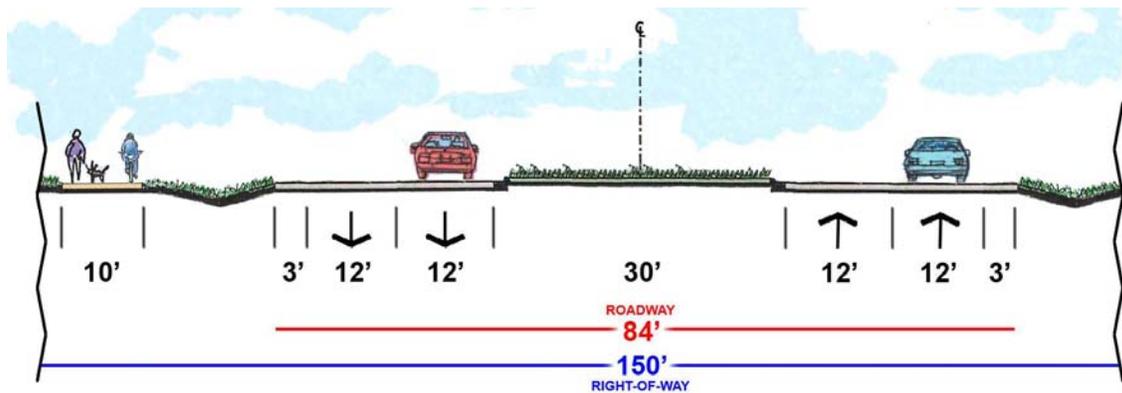


Dr. Calvin Jones Highway — South Main Street to East Wait Avenue

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	75 ft	150 ft	4	Landscaped Median	45 mph	Major	18,700	53,240	—
2035	75 ft	150 ft	4	Landscaped Median	45 mph	Major	52,000	53,240	D

NCDOT Road

Typical Cross Section
4-Lane Divided with Wide Striped Shoulders and Multi-Use Path

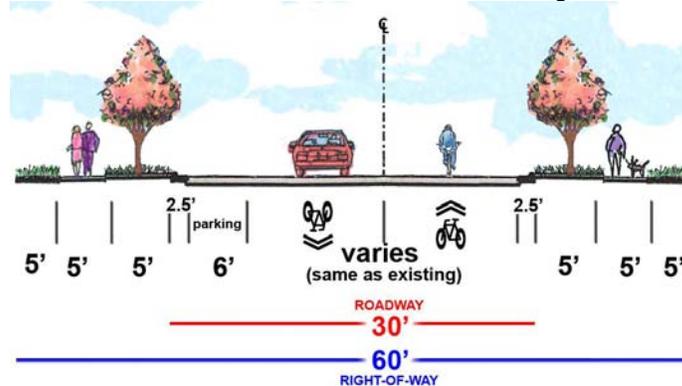


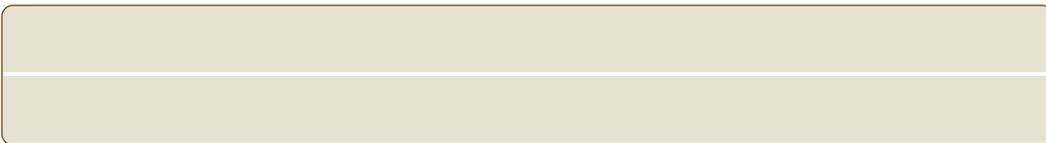
North Avenue — Wingate Street to North Main Street

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	30 ft	60 ft	2	None	25 mph	Major	n/a	17,500	—
2035	30 ft	60 ft	2	None	25 mph	Major	16,500	14,600	E

NCDOT Road

Typical Cross Section
2 Lanes with Sharrows and Parallel Parking on One Side

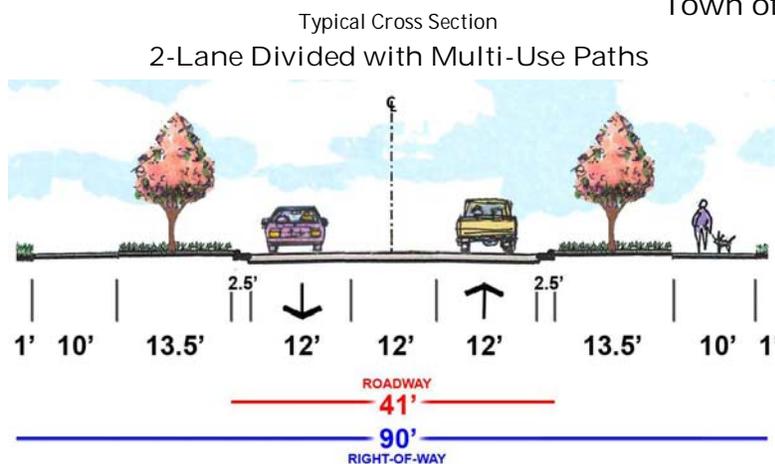




Northside Loop — North White Street to Oak Grove Church Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	—
2035	36 ft	90 ft	2	Left-turn Lanes at Intersections and Driveways	35 mph	Minor	19,000	21,560	D

Town of Wake Forest Road

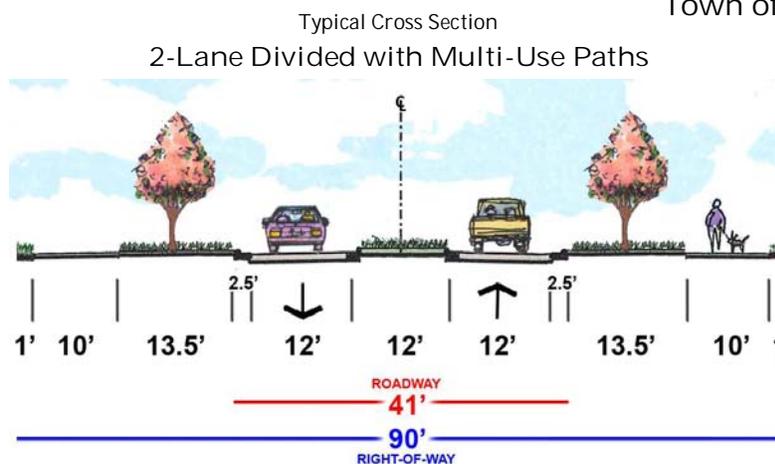


Note: Short sections of raised median may be built.

Northside Loop — Oak Grove Church Road to East Wait Avenue (NC 98)

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	—
2035	36 ft	90 ft	2	Left-turn Lanes at Intersections and Driveways	35 mph	Minor	22,700	21,560	E

Town of Wake Forest Road

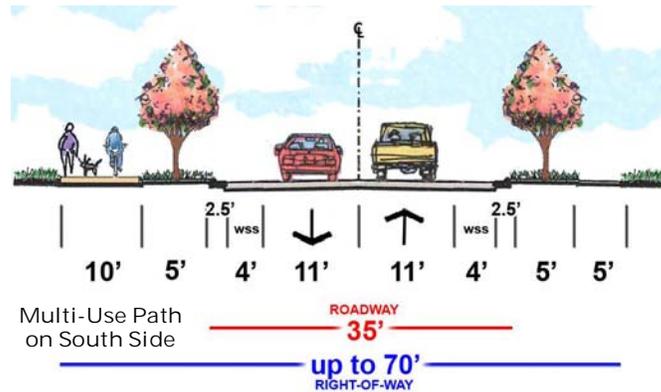


West Oak Avenue — Harris Road to North Main Street

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	18 to 40 ft	60 ft	2	None	35 mph	Major	2,400	12,000	—
2035	35 ft	60 ft	2	Left-turn Lanes at Intersections and Driveways	35 mph	Minor	6,510	17,300	A

NCDOT Road

Typical Cross Section
2 Lanes with Wide Striped Shoulders and a Multi-Use Path

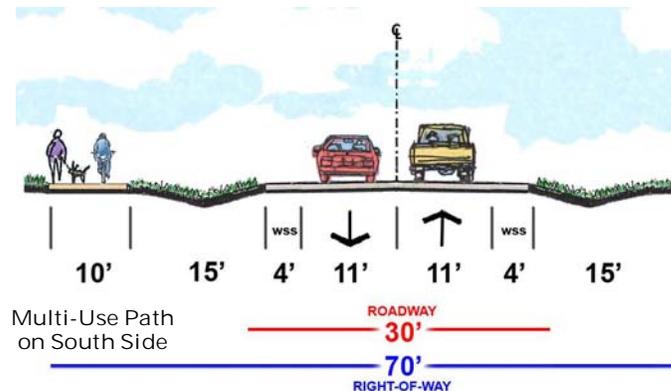


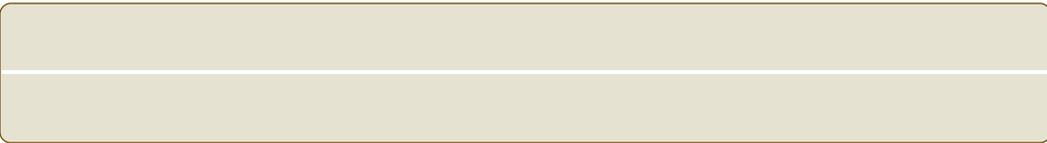
Oak Grove Church Road — Northside Loop to Zebulon Road (NC 96)

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	21 ft	60 ft	2	None	45 mph	Major	n/a	12,000	—
2035	30 ft	70 ft	2	Left-turn Lanes at Intersections and Driveways	35 mph	Minor	13,500	26,300	B

NCDOT Road

Typical Cross Section
2 Lanes with Wide Striped Shoulders and a Multi-Use Path



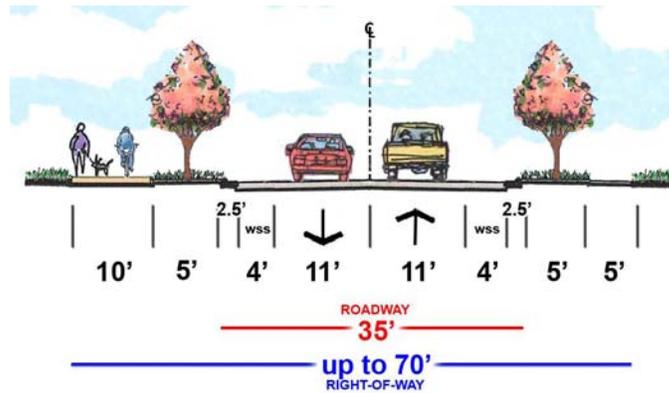


Purnell Road — Jackson Road to Capital Boulevard (US 1)

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	24 ft	60 ft	2	None	45 mph	Major	4,500	17,500	—
2035	35 ft	60 ft	2	None	45 mph	Major	11,000	26,300	B

NCDOT Road

Typical Cross Section
2 Lanes with Wide Striped Shoulders and a Multi-Use Path

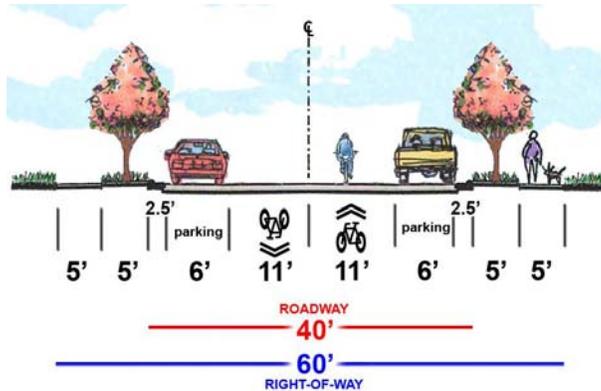


Rock Springs Road — Stadium Drive to Southeast Baptist Seminary Campus

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	—
2035	41 ft	67 ft	2	None	25 mph	Collector	n/a	10,000	n/a

Town of Wake Forest Road

Typical Cross Section
2 Lanes with Sharrows and Parallel Parking



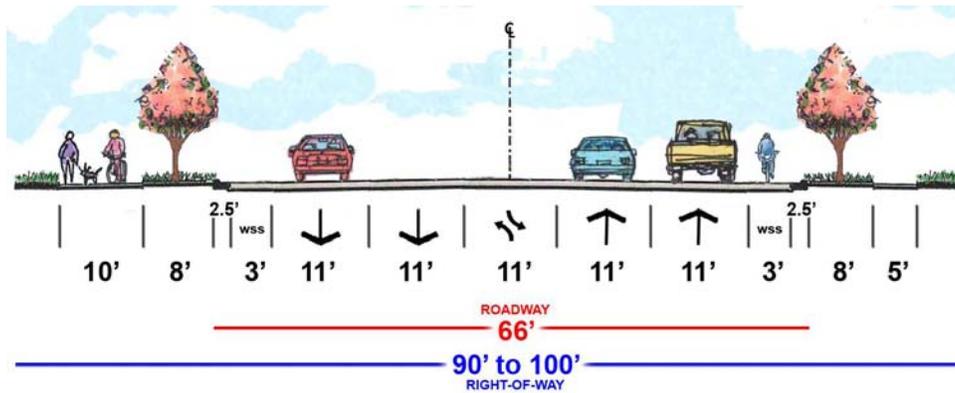
Rogers Road — South Main Street to South Franklin Street

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	65 ft	90 ft	2	Two-way Left-turn Lane	45 mph	Major	14,000	18,000	—
2035	66 ft	90 ft	4	Two-way Left-turn Lane	35 mph	Major	11,600	32,000	A

NCDOT Road

Typical Cross Section

5 Lanes with Wide Striped Shoulders and a Multi-Use Path



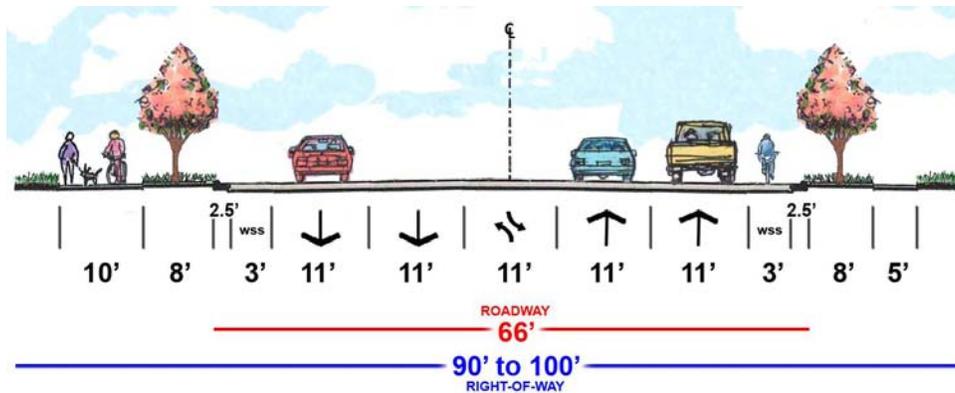
Rogers Road — South Franklin Street to Clear Springs Drive

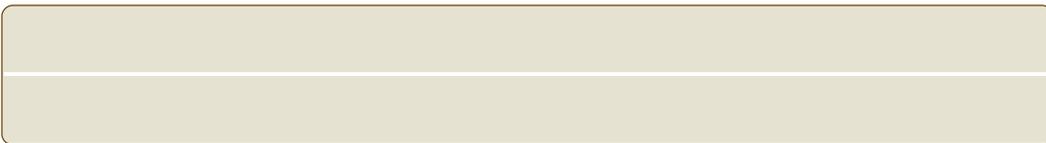
Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	36 ft	90 ft	2	Two-way Left-turn Lane	45 mph	Major	n/a	18,000	—
2035	66 ft	90 ft	4	Two-way Left-turn Lane	35 mph	Major	20,500	32,000	C

NCDOT Road

Typical Cross Section

5 Lanes with Wide Striped Shoulders and a Multi-Use Path

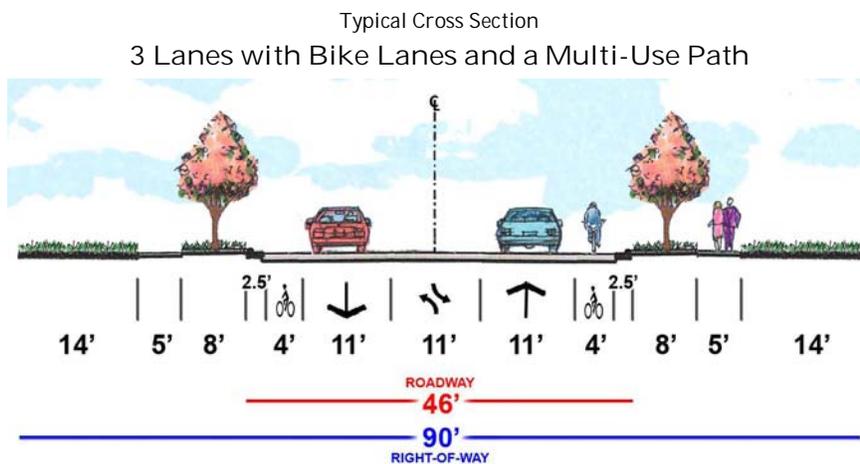




Rogers Road — Clear Springs Drive to Eastern Edge of Planning Boundary

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	19 ft	60 ft	2	Two-way Left-turn lane	45 mph	Major	n/a	17,300	—
2035	71 ft	90 ft	4	Two-way Left-turn lane	45 mph	Major	10,600	26,300	B

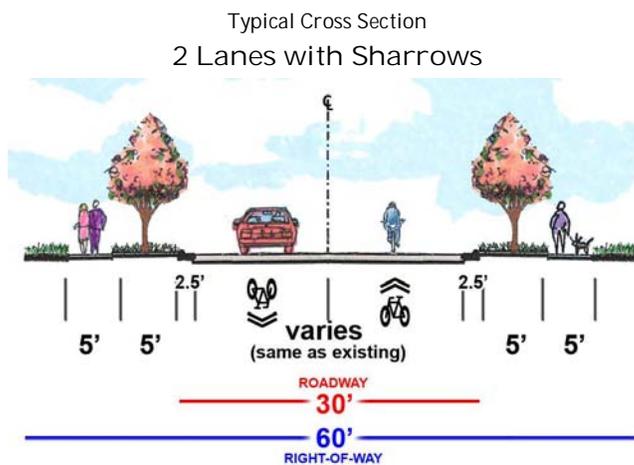
NCDOT Road



South Avenue — Wingate Street to South Main Street

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	38 ft	50 ft	2	None	25 mph	Major	14,200	17,500	—
2035	41 ft	60 ft	2	None	25 mph	Major	10,200	14,600	C

NCDOT Road

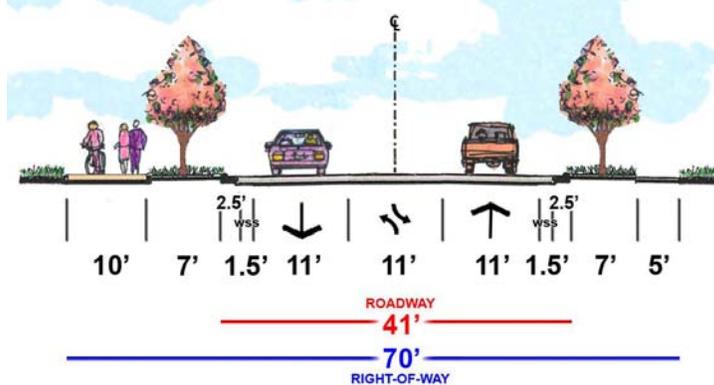


Stadium Drive — Capital Boulevard (US 1) to Wingate Street

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	24 to 41 ft	60 ft	2	Left-turn Lanes at Intersections and Driveways	35 mph	Major	5,700	18,000	—
2035	41 ft	70 ft	2	Left-turn Lanes at Intersections and Driveways	35 mph	Major	11,900	17,300	C

NCDOT Road

Typical Cross Section
3 Lanes with Striped Shoulders and a Multi-Use Path

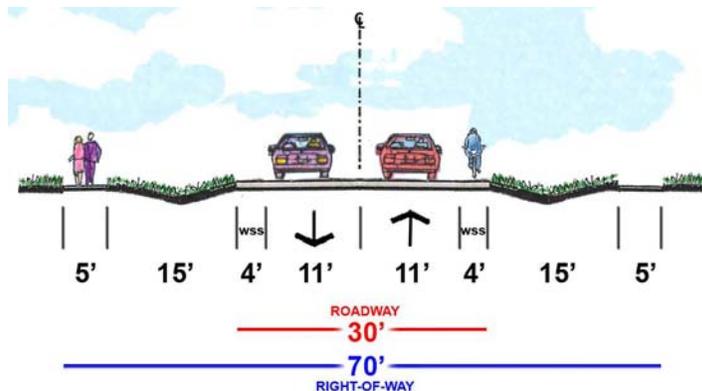


Thompson Mill Road — Jenkins Road to Durham Road

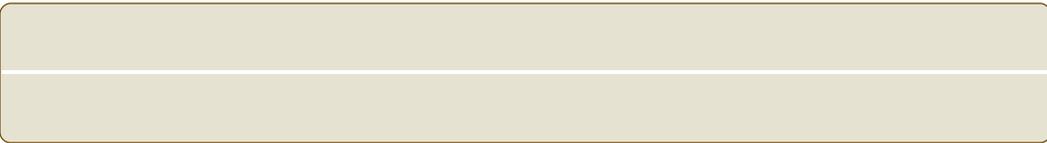
Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	21 ft	60 ft	2	None	40 mph	n/a	n/a	12,000	—
2035	30 ft	70 ft	2	None	40 mph	Minor	13,100	26,300	B

NCDOT Road

Typical Cross Section
2 Lanes with Wide Striped Shoulders



Note: Add sharrows from Rock Springs Road to Wingate Street.

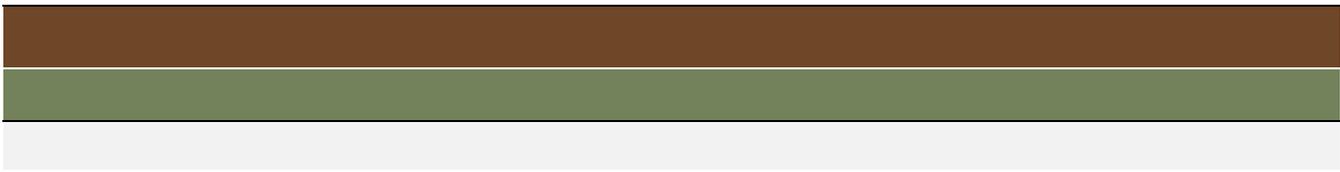
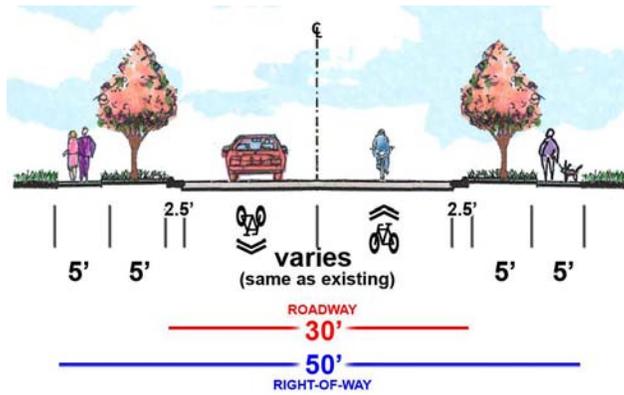


Roosevelt Avenue/Wait Avenue — Front Street to Franklin Street

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	35 ft	45 ft	2	Two-way Left-turn lane	25 mph	Major	17,500	18,000	—
2035	35 ft	50 ft	2	None	25 mph	Major	14,000	17,300	D

NCDOT Road

Typical Cross Section
2 Lanes with Sharrows



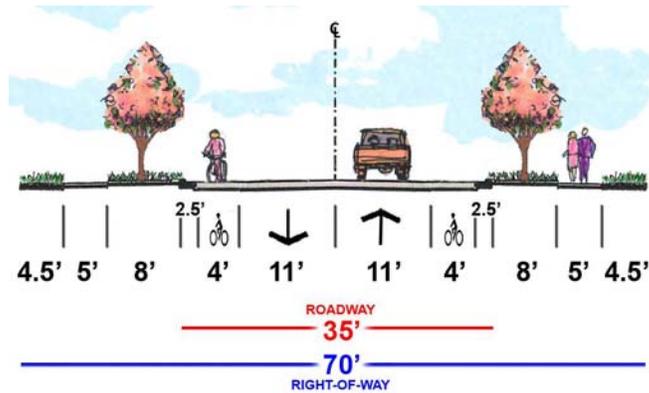
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Wait Avenue (NC 98 Business) — Franklin Street to Jones Dairy Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	22 to 32 ft	60 ft	2	None	35 mph	Major	14,200	17,500	—
2035	35 ft	70 ft	2	Left-turn Lanes at Intersections	35 mph	Major	15,400	17,300	D

NCDOT Road

Typical Cross Section
2 Lanes with Bike Lanes

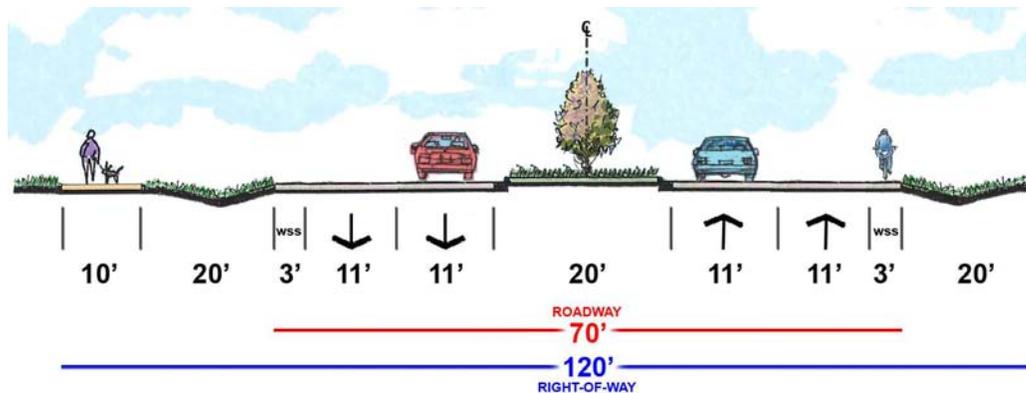


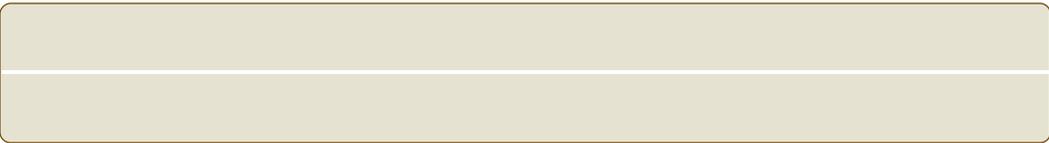
Wait Avenue (NC 98) — Jones Dairy Road to Zebulon Road (NC 96)

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	20 ft	60 ft	2	None	35 mph	Major	8,400	12,000	—
2035	70 ft	100 to 120 ft	4	Landscaped Median	45 mph	Major	21,600	41,400	B

NCDOT Road

Typical Cross Section
4-Lane Divided with Wide Striped Shoulders and Multi-Use Path



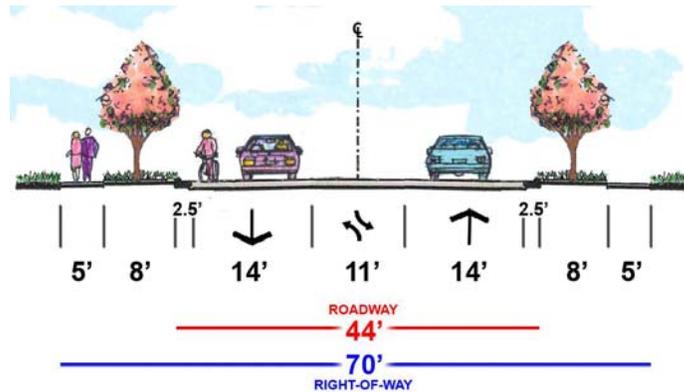


Wake Union Church Road — Durham Road to Capital Boulevard (US 1)

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	18 to 21 ft	60 ft	2	None	45 mph	n/a	n/a	12,000	—
2035	44 ft	70 ft	2	Left-turn Lanes at Intersections and Driveways	45 mph	Major	4,400	20,700	A

NCDOT Road

Typical Cross Section
3 Lanes with Wide Outside Lanes

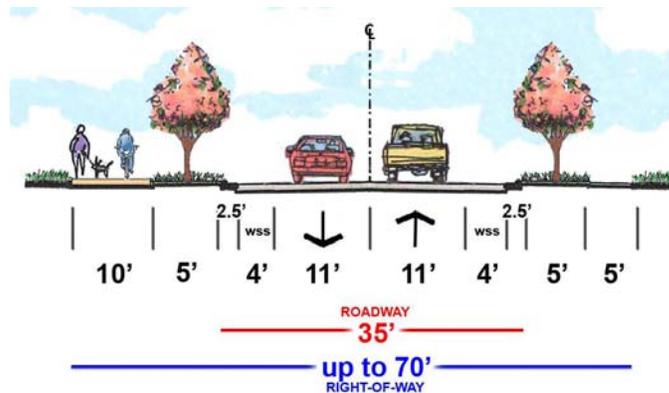


Wall Road — Wake Forest Planning Jurisdiction to Harris Road

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	18 to 22 ft	60 ft	2	None	45 mph	Major	n/a	12,000	—
2035	35 ft	60 ft	2	None	45 mph	Major	n/a	17,300	n/a

NCDOT Road

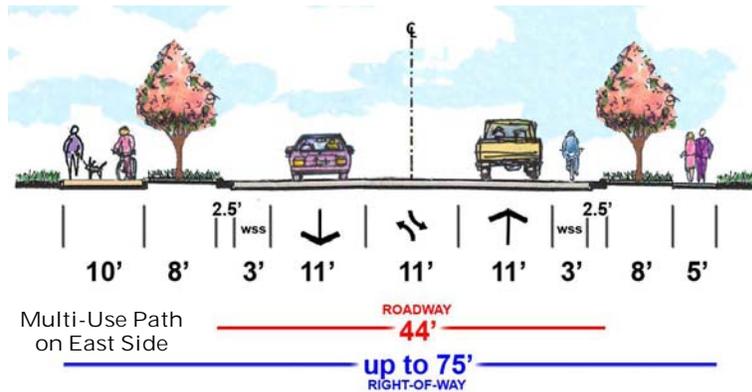
Typical Cross Section
2 Lanes with Wide Striped Shoulders and a Multi-Use Path



North White Street — Wake Forest Planning Jurisdiction to Northside Loop

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	24 ft	60 ft	2	None	45 mph	Minor	5,400	12,000	—
2035	44 ft	75 ft	2	Left-turn Lanes at Intersections and Driveways	35 mph	Major	11,800	17,300	C

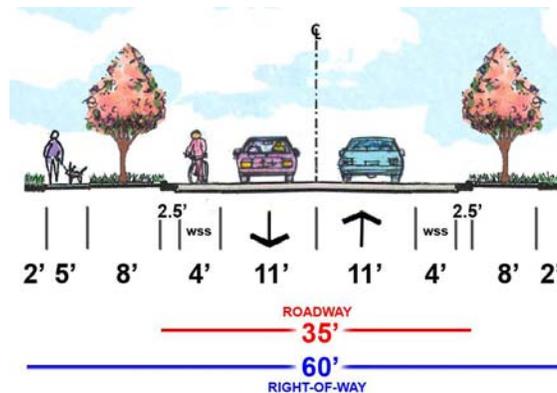
Typical Cross Section Town of Wake Forest Road
 3 Lanes with Wide Striped Shoulders and a Multi-Use Path

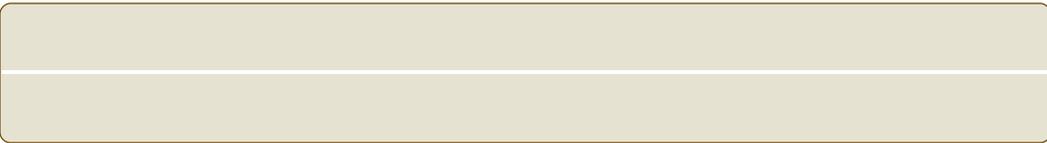


North White Street — Northside Loop to Spring Street

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	24 to 40 ft	45 ft	2	None	35 mph	Minor	n/a	12,000	—
2035	35 ft	60 ft	2	None	35 mph	Minor	12,100	17,300	C

Typical Cross Section Town of Wake Forest Road
 2 Lanes with Wide Striped Shoulders and a Sidewalk

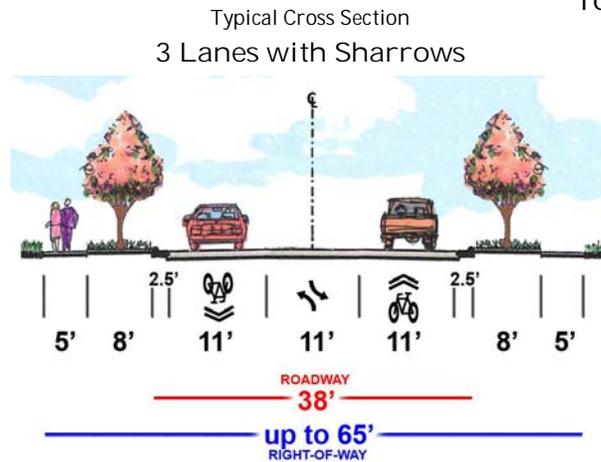




South White Street — Spring Street to East Roosevelt Avenue (NC 98 Business)

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	24 to 40 ft	45 ft	2	None	35 mph	Minor	n/a	12,000	—
2035	38 ft	65 ft	2	Left-turn Lanes at Intersections and Driveways	35 mph	Minor	12,100	17,300	C

Town of Wake Forest Road



South White Street — East Roosevelt Avenue (NC 98 Business) to Elm Avenue

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007									
2035									

Town of Wake Forest Road

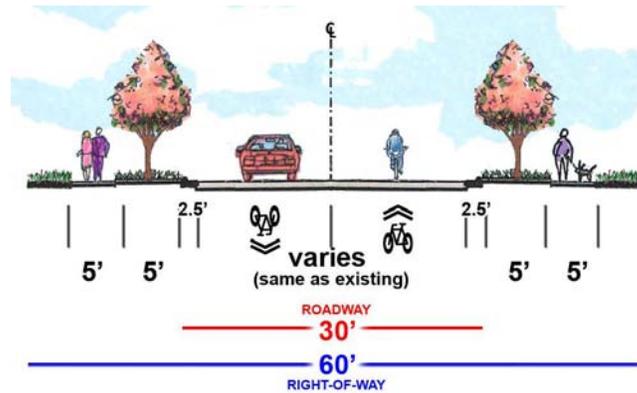
Typical Cross Section
To Be Determined

South White Street — Elm Avenue to Holding Avenue

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	31 ft	50 ft	2	None	25 mph	Minor	3,500	17,500	—
2035	42 ft	50 ft	2	None	25 mph	Minor	11,300	17,300	C

Town of Wake Forest Road

Typical Cross Section
2 Lanes with Sharrows

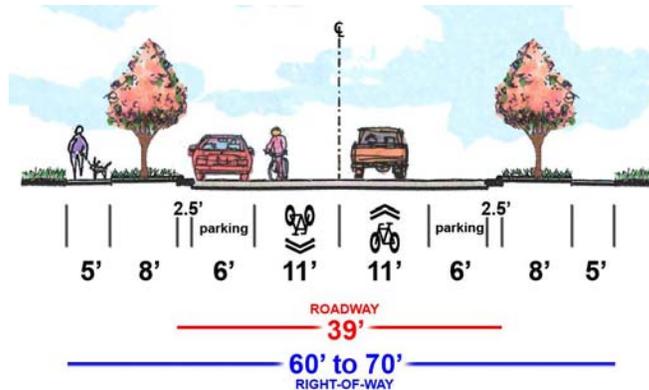


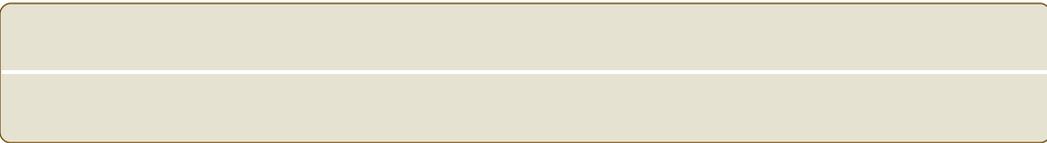
Wingate Street — North Avenue to South Avenue

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	39 ft	60 ft	2	Left-turn Lanes at Intersections and Driveways	25 mph	Minor	4,300	14,600	—
2035	39 ft	60 to 70 ft	2	Left-turn Lanes at Intersections and Driveways	25 mph	Major	10,900	14,600	C

Town of Wake Forest Road

Typical Cross Section
2 Lanes with Sharrows and Parallel Parking



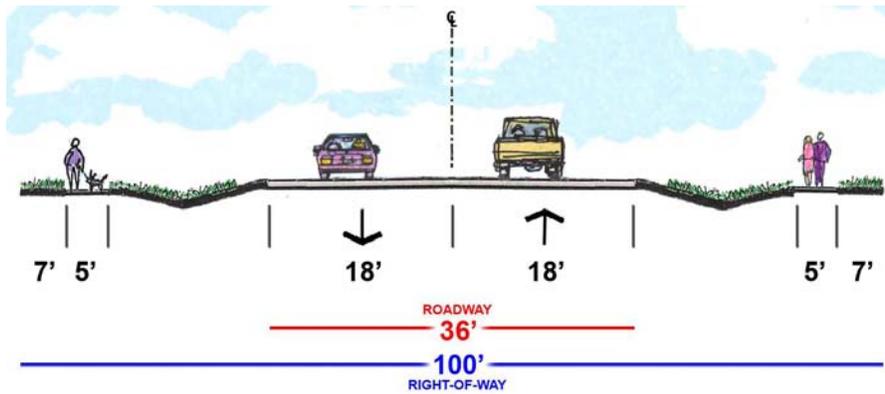


Zebulon Road (NC 96) — Oak Grove Church Road to Wait Avenue

Year	Roadway Width	ROW	Lanes	Median / Left-Turn Treatment	Speed Limit	Street Type	ADT	Capacity	Future LOS
2007	21 ft	100 ft	2	None	45 mph	Major	5,300	12,000	—
2035	36 ft	100 ft	2	Left-turn Lanes at Intersections and Driveways	45 mph	Major	18,600	26,300	C

NCDOT Road

Typical Cross Section
2 Lanes



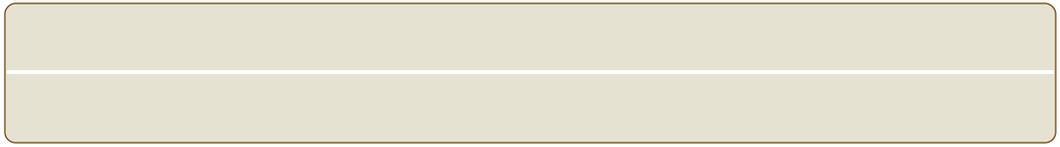


Appendix B

Additional Data

Table B.1 – Wake Forest TIP Projects

TIP #	Project Description	Status
R-2809	NC 98 Bypass from US 1 to Durham Road	In progress, complete construction in 2009
E-4928	White Street streetscape from Roosevelt Avenue to Jones Street	In progress
R-3600	South Main Street from Capital Blvd to NC 98 Bypass — Widen to multi-lanes with bike lanes	Begin construction in 2016 or later
SF-4905B	US 1 / South Main Street / New Falls of Neuse Road — Add left-turn lane	Under construction
E-4708	NC 98 Bypass greenway	Scheduled for feasibility study
B-3705	Burlington Mills Road replace bridge over Smiths Creek include bike facilities	Under construction
B-3919	Jones Dairy Road replace bridges over Austin Creek and Smiths Creek include bike facilities	Complete 2010
B-5113	Oak Grove Church Road replace bridge over Smith Creek	
C-4924 and C-5102	Regional Travel Demand Management Program by Triangle J Council of Governments	Ongoing
C-4902	Clean Fuels Program by NC State University	Ongoing
	Triangle Transit Authority and City of Raleigh (CAT system) – replacements for buses, vanpools, paratransit vehicles	Ongoing
EB-4829	Smith Creek Greenway Trail connection to the Neuse River Trail	In progress





Appendix C

Comprehensive Transportation Plan

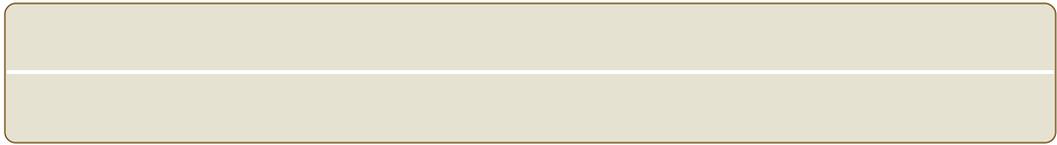
CTP Overview

North Carolina requires municipalities or Metropolitan Planning Organizations to develop a Comprehensive Transportation Plan (CTP) in cooperation with NCDOT. The CTP should serve existing and expected travel demand within the planning area. The CTP consists of a series of five sheets:

- Sheet 1: Adoption Sheet
- Sheet 2: Highway Map
- Sheet 3: Public Transportation and Rail Map
- Sheet 4: Bicycle Map
- Sheet 5: Pedestrian Map

This appendix to the *Wake Forest Transportation Plan Update (Plan Update)* provides the five sheets comprising the Wake Forest CTP. The CTP will be considered for adoption by the Town of Wake Forest, Wake County, and NCDOT.

The CTP provides an official guide to providing an efficient, safe, and economical transportation system for the town. Local officials charged with planning transportation facilities will utilize this document to ensure new facilities reflect the needs of the public while minimizing impacts to residents, businesses, and the natural environment. The CTP consists of a vision plan for the MPO. In other words, the recommended facilities on this map are not financially constrained and represent all needs identified as a part of the planning process. A brief description of each of the five sheets follows as well as a more detailed explanation of the elements within the Highway Map.



CTP Sheets

1 — Adoption Sheet

The Adoption Sheet (Sheet 1) serves as a cover page for the modal elements that follow in Sheet 2 through 5. The Adoption Sheet includes the dates that municipalities or regional planning organizations adopt or endorse the plan. In addition, it introduces the base map to be used in subsequent sheets. Features on the base map include roads, railroads, rivers/streams, administrative boundaries, and schools.

2 — Highway Map

Recommended highway improvements of the CTP are illustrated on Sheet 2. The highway facilities fall into five categories: freeways, expressways, boulevards, other major thoroughfares, and minor thoroughfares. Existing and proposed interchanges and grade separations also are illustrated. A more detailed description of each category follows the series of maps. Recommendations are based on the planning process and analysis conducted as part of the *Plan Update*.

3 — Public Transportation and Rail Map

Recommended improvements to the public transportation and rail network are illustrated on Sheet 3. Improvements to public transportation and rail in the area ensure local residents, employees, and visitors will have additional travel options. The Public Transportation and Rail Map shows existing facilities as well as locations for enhancements.

4 — Bicycle Map

Recommended improvements to the bicycle network are illustrated on Sheet 4. The map places bicycle facilities into one of three categories — on-road, off-road, and multi-use paths. Like the Highway Map, each facility is identified as existing, needs improvement, or recommended. The Bicycle Map mirrors the facility recommendations presented in the *Wake Forest Bicycle Plan*.

5 — Pedestrian Map

Recommended improvements to the pedestrian network are illustrated on Sheet 5. Like the Bicycle Map, this map places facilities into one of three categories — sidewalks, off-road, and multi-use paths. Each facility is identified as existing, needs improvement, or recommended in order to guide decision-makers. The Pedestrian Map mirrors the facility recommendations presented in the *Wake Forest Pedestrian Plan*, which also includes information on programs and policies designed to educate, encourage, and enforce.



Appendix D

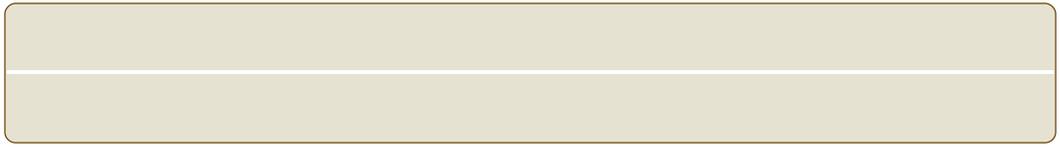
Neighborhood Traffic Calming Policy

Policy Overview

The Town of Wake Forest's *Neighborhood Traffic Calming Policy* directs staff and residents on the implementation of traffic calming for residential streets. Under this policy, the Town Engineering Department works with residents to identify traffic problems in their neighborhoods and seek appropriate solutions.

The policy, adopted October 21, 2009, outlines how citizens can request traffic calming devices for their neighborhood and describes how the Town will evaluate the need for the traffic calming device. Procedures also are outlined to develop and implement a plan for the selection and installation of traffic calming projects.

The *Neighborhood Traffic Calming Policy* is provided on the following pages.



Town of Wake Forest

Neighborhood Traffic Calming Policy



Adopted: October 21, 2009

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*Town of Wake Forest, NC
Neighborhood Traffic Calming Policy
Adopted: October 21, 2009*

Purpose

The Town of Wake Forest's *Neighborhood Traffic Calming Policy* has been developed to guide Town staff and inform residents about the process and procedures for implementing traffic calming on residential streets as they relate to quality of life. Under this policy, the Town Engineering Department will work with residents to identify traffic problems in their neighborhoods and seek appropriate solutions.

First, the policy outlines how citizens can request traffic calming devices for their neighborhood. Second, the policy describes in detail how the Town will evaluate the need for traffic calming device. Finally, procedures are outlined to develop and implement a plan for the selection and installation of traffic calming projects.

Successful Implementation of this policy requires a combination of several parallel strategies, "the Five E's".

- Education – Neighborhood receive the necessary information and tools to be active participants in addressing their traffic concerns.
- Engineering – Traffic calming strategies that address community – identified traffic issues, traffic calming measure(s) are developed and applied.
- Evaluation – The applied traffic calming measure is evaluated for effectiveness. The policy criteria and standards should be regularly updated to reflect the results.
- Economics- Support implementation of the least restrictive and least expensive traffic calming methods to stay within budget.
- Enforcement – Police enforcement supports the traffic calming plan developed by residents, town staff, and public officials.

Traffic Calming Definitions

Neighborhood – The Webster's International Dictionary defines a neighborhood as "The region near where one is or resides." A neighborhood can be as small as one street or a network of homes and small businesses with shared streets, parks, and people.

Traffic Calming – The Institute of Transportation Engineers defines traffic calming as "the combination of mainly physical measurements that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users" (ITE Journal, January 1997).

Affected Residents – An affected resident is a resident that lives on the street under study within the limits of the block or blocks being considered for traffic calming.

Affected Street – A roadway section of 3 blocks or a minimum of 1000' in length with residential land use having more than 75% of the properties that are directly fronting the roadway section.



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Neighborhood Traffic Calming Policy
Adopted: October 21, 2009*

Direct Fronting – A property is considered direct fronting when its address and driveway are oriented to the roadway section.

Request Petition – Petition for traffic calming measures submitted by 75 percent of the property owners on the affected.

Procedure for Applying for Traffic Calming Devices

The Flow Chart on the next page shows the recommended process and timeline for the implementation of a traffic calming device.

Initiation – Resident(s) of the proposed traffic calming project area may initiate the process via a letter, phone call, or email from the neighborhood contact person(s) to the Town Engineering Department. A Traffic Calming Request packet is then mailed, e-mailed, or made available for pick up to the resident(s) consisting of a copy of Town of Wake Forest Neighborhood Traffic Calming Policy and a copy of Traffic Calming Petition Form (see Appendix A for form).

The petition must have a minimum of 75 percent of the resident signatures in the affected area in favor of the traffic calming device, including 100 percent of those property owners who are located within 100 feet of proposed traffic calming device. Only one signature per household is counted to determine the 75 percent approval. The town staff will verify the signatures match the tax records. If the required signatures are not obtained, the process is stopped. If the resident signature requirement is met, a letter from the Town Engineering Division is sent to Neighborhood contact.

Qualifying Criteria for Traffic Calming Devices

The town will review the request against preliminary qualifying criteria for traffic calming devices. There are many factors taken into consideration when reviewing residential traffic concerns to determine the most feasible traffic control measure. These factors include:

- Speeds and /or volume of traffic
- The surrounding roadway network
- Accident history
- Resident network and access
- Neighborhood response and
- Budget considerations.

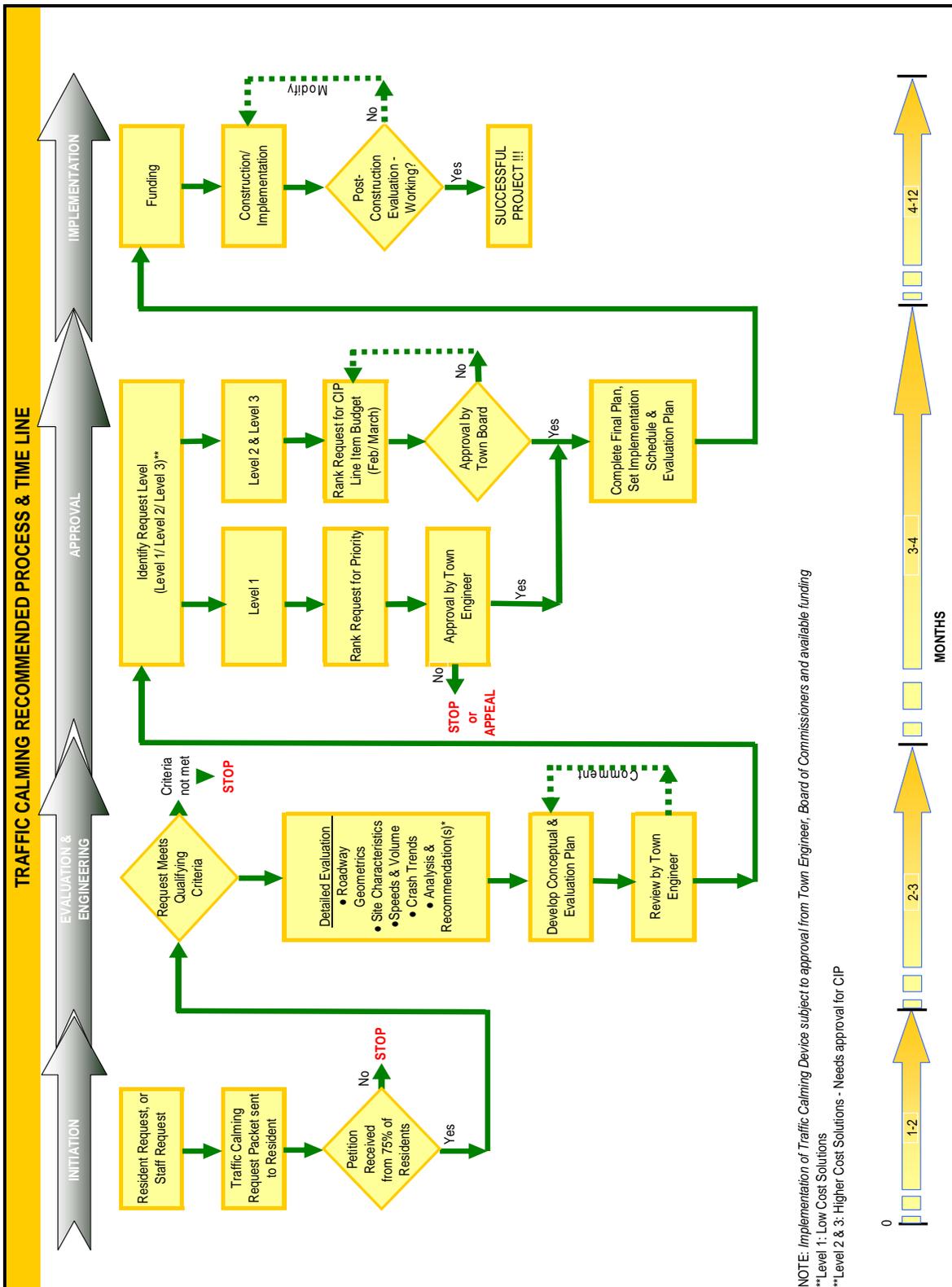
In order to qualify for traffic calming devices under the Town of Wake Forest Neighborhood Traffic Calming Program, the roadway being considered for the traffic calming device(s) should meet some or all of the following:

- A town-maintained public street classified as residential local or residential collector streets. To be considered under this Policy, a collector street must be primarily residential. “Primarily residential” means that at least 75% of the properties with frontage on the street are in residential zoning or have existing land use that is residential.



Town of Wake Forest, NC
 Neighborhood Traffic Calming Policy
 Adopted: October 21, 2009

Flowchart 1



NOTE: Implementation of Traffic Calming Device subject to approval from Town Engineer, Board of Commissioners and available funding

***Level 1: Low Cost Solutions

***Level 2 & 3: Higher Cost Solutions - Needs approval for CIP



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Adopted: October 21, 2009*

- A posted speed limit of 35 mph or less.
- 15% of the traffic speed exceed the posted speed limit by at least 5 mph. (85th percentile speed exceeds 5 mph over posted speed limit)
- Traffic volume on the affected street less than 4000 vehicles per day (vpd) regardless of its classification.
- Roadway width of less than or equal to 41 feet (back of curb to back of curb).
- 6 accidents in last 3 years.
- Not a primary run route for emergency services such as Fire and Ambulance.
- A score of at least 30 using scoring system (see Table 1)
- Application must not have been denied or become void within last 12 months.

The town staff will perform site study and determine if the request meets the preliminary qualifying criteria for traffic calming. A letter or email is sent to the neighborhood contact person(s) notifying them of the outcome of the study. If the data does not meet the qualifying criteria, alternative measures are offered for discussion. If the data meets the criteria, the traffic calming process is taken to further evaluation.

Evaluation & Engineering – After the request meets qualifying criteria, a detailed study performed by a Professional Engineer will conclude and include the following:

- A detailed field review studying closely roadway geometrics such as road alignment, road grade, sight distance problems, distance to nearest intersection, driveways, curb height etc. and site characteristics such as sign inventory, pavement markings inventory, on-street parking, school, emergency services, and transit route/schedule information to identify any other conditions of concern for traffic safety.
- Collection of traffic speed and volume data as needed for more detail or to get updated data with respect to peak hour volume, traffic violations, pedestrian/bicycle volumes, cut-through traffic volume and origin-destination survey.
- A review of crash history for the prior three years to determine the total number of collisions and to identify any significant crash trends (i.e. type of collisions, locations, time of day, and days of the week).
- The data will be used to rank projects as shown on following Table 1. Projects with the most total points are ranked the highest and will be selected for further action based on budget availability and compatibility with other transportation projects.



Table 1 : Scoring System

CRITERIA	BASIS FOR POINT ASSIGNMENT	POINTS
Speed	0 to 50 points: 5 points assigned for every 1 mph of the 85 th percentile speed that exceeds the posted speed limit (example: 28 mph for 20 mph posted speed limit = 40 points)	
Pedestrian Activity	0 to 20 points: 5 points assigned for each school, church, bus stop, public park, community center, senior center, senior living facility or shopping center that is likely to generate a significant number of pedestrians crossing on the traffic calmed street.	
Crash History	0 to 10 points: 2 points for every reported crash occurring on the project segment during the last 3 years of a type that is deemed correctible by traffic calming measures.	
Volume	0 to 10 points: 1 point assigned for every 400 vehicles per day	
Other Factors	0 to 10 points: 5 points assigned for each road condition (such as Sight Distance problems) that can be improved with traffic calming measures.	
TOTAL POINTS	100 Points Maximum Score	

- Traffic Calming Device recommendation(s) are made based on severity of the problem – scores between 30 and 60 are identified as low priority projects and scores above 60 are high priority projects.
- Further on each priority list, the recommendation(s) are identified as Level 1/ Level 2/ Level 3. (See *Types of Traffic Calming Devices* section of this Policy for description of each level). Level 1 recommendation(s) such as pavement markings and enforcement will be approved by Town Engineering staff on ongoing basis and in accordance with the priorities for each project to the limit of the approved funding each year. Level 2 and Level 3 recommendation(s), because of their budgetary impacts, must be complete and submitted by February 15th of each year for the request to be considered as Line Item in Capital Improvement Program.
- All designs for a proposed traffic calming device shall follow ITE or other national recommended guidelines, if available.
- The town staff prepares a conceptual plan consisting of traffic calming device(s) selection, implementation schedule and a cost-estimate. A cost estimate of recommended traffic calming device(s) will be presented in form of cost/benefit matrix. **Approval of a petition does not guarantee that a device(s) will be placed. The implementation is dependent on approval from the Town Engineer, Town Planning Board, Board of Commissioners and funds available for the program in a fiscal year.**
- Also, the staff will prepare a plan to evaluate the effects on the neighborhood one year from the time of implementation. The 1-year evaluation plan should note what changes



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Neighborhood Traffic Calming Policy
Adopted: October 21, 2009*

should be expected for the traffic calming to be considered a success. Lessons learned from evaluation should be used to update the policy.

It is critical that at least the following appropriate agencies be contacted and included in the development of conceptual plan.

- Police Department
- Fire Department
- Wake County EMS (Stat.# 10)
- Public Works (Sanitation Dept.)
- Planning and Inspections Department
- Wake County Public Schools – Transportation

Approval – Upon completion of a conceptual plan, Level 1 recommendation(s) such as pavement markings and enforcement will be approved by Town Engineering staff on ongoing basis and in accordance with the priorities for each project to the limit of the approved funding each year. Stop sign requests must be approved by the Town Board as an ordinance change. Multi-way stops are typically used for capacity concerns (high volume intersections) and not for traffic calming. The use of stop signs must meet MUTCD warrants. (See *Types of Traffic Calming Devices* section of this Policy for detailed discussion of Stop Signs).

The Town Engineering staff will submit Level 2 and Level 3 recommendation(s) annually as a Line Item in its budget submission for Capital Improvement Program which shall be considered in accordance with normal budget practices and procedures. Following approval of a budget for submitted traffic calming projects, the town engineering department is authorized to install such devices in accordance with the priorities of each project to the limit of the approved funding each year.

Appeal Process: The Town Engineering staff has authority to reject a traffic calming device(s) request based on detailed engineering evaluation and lack of problem severity. The resident(s) may appeal the Town Engineer’s decision to the Board of Commissioners. The Board of Commissioners, at its regular meeting on third Tuesday of the month may consider this request and may, in its discretion, choose to approve it. If the request plan is not approved by the Board of Commissioners, the process is completed.

Implementation - The proposed schedule in conceptual plan must consider the availability of funding. In the event that the traffic calming devices are very costly to install, or if the potential effectiveness of the devices is unknown, the town may elect to break up the final plan into phases to allow the most immediate needs to be addressed while lesser needs or more expensive measures wait for funding. Phasing the project should be done with caution to ensure that partial implementation does not create new problems or exacerbate the existing problems.

If in any project, residents are responsible for any portion of the cost, an agreement or agreements must be signed between town and the residents that state residents share of project cost. Any cost owed to Town will need to be paid in full by check to the Town Engineering Department prior to construction.



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Many traffic calming measures offer significant opportunities for landscaping. Urban Forestry staff of the Planning & Inspections Department will be invited to participate in the implementation process in order to help address landscaping issues per town ordinances. The town will bear the initial cost of installing landscaping by a contractor hired and funded by the town. Responsibility of ongoing maintenance and plant replacement can be done by neighborhood residents or by a licensed contractor hired by the Town, but funded by neighborhood residents.

One year after the traffic calming device is installed; the Town Engineering Department will complete an evaluation of the effects on the traffic calming device. Comments will be solicited from residents in the affected area by the use of a formal survey or through press releases. If implementation of plan is phased, a post implementation evaluation should be performed prior to starting work on each subsequent phase to determine if the measures already installed have had the desired effectiveness and to ensure that there is still a need for the subsequent phases and/or to determine if subsequent phases should be modified. The lessons learned from traffic calming projects should be used to revise the standards and criterias set in the policy.

Budget & Funding

On a yearly basis, depending on revenues and expenses, the Town will include a line item in the Capital Improvement Program (CIP) budget for Level 2 and Level 3 projects to be completed within that fiscal year (July 1 – June 30). Level 1 project(s) are proposed to be funded with a different source. All traffic calming projects will also include budgetary responsibility from the residents who reside on the affected street(s). The residents will pay for 25% of the installation cost for each traffic calming measure. A payment must be made in full by the residents prior to the commencement of the installation. Yearly maintenance costs will be incurred by the Town. Landscaping to be installed as part of any traffic calming project will be maintained by the residents. If the landscaping is within the public right-of-way, a landscape easement will be created and the residents (or representative Homeowners' Association) will sign a maintenance agreement with the Town to perform maintenance services within the right-of-way.

The number of projects per year will be limited by the line item budget. The Town's Engineering Department will review the line item budget on a yearly basis to determine the exact amount for new projects and maintenance.

Due to limited resources, some areas may not be identified and funded for a project for significant periods of time. In addition, developing a traffic calming project can take months, adding to the delay experience by residents. Therefore, interim strategies may be used to provide citizens with some improvement of their traffic problems.

A sample budget is shown to give perspective of what a budget can accomplish in a year.



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For a Fiscal Year Budget Opinion:

Example budget: \$75,000 (NOTE: 2009 Costs)

Type of Request	No. of Requests	Cost
Multi-way stop sign	3	\$1,200
Speed Humps	10	\$25,000
Traffic Circle	1	\$10,000
Pavement Markings (3-D images)	4	\$1,000
Median/ Center Island Narrowing	1	\$15,000
Pedestrian Crosswalk & Bulb-out	1	\$20,000
TOTAL COST		\$72,200

Residents or a home owners association may elect to pay for 100% of the construction and maintenance cost to implement an interim strategy or recommended traffic calming device(s). Even if the petition meets the required level of area-wide support for a traffic calming device(s) and the residents are willing to bear the full costs of construction and implementation, the traffic calming device(s) must be approved by the Town Engineer by going through the traffic calming process in this policy. The traffic calming device(s) implementation must have no significant adverse impacts associated with implementation.

Removal of Traffic Calming Devices

A petition for the removal of traffic calming device must meet the following conditions:

- The request for a removal petition must be signed by at least five separate property owners in the neighborhood of the original petition area.
- The new petition must include the same affected area as the original petition.
- The removal petition must be approved by 75 percent of the property owners in the original affected area and follow the same procedures outlined above for the installation of a device.
- The traffic calming device to be removed must be in place for a minimum of one year period.
- The cost of removal of traffic calming device must be incurred in same ratio as installation cost distribution.

If a removal petition fails to meet majority in 90 day signature period, the location shall not be reconsidered for a period of 1 year from the date the signature period expires unless significant changes warrant it otherwise.



Types of Traffic Calming Devices

The list of traffic calming devices mentioned in this policy is not meant to exclude other measures that may be available to solve the problem. For purpose of this policy, traffic calming measures are separated into three levels. Level 1 is the least restrictive meaning ease of implementation and low cost options while Level 3 is the most restrictive requiring prior planning and high cost.

- **Level 1:**

- Police Enforcement – The speed and volume data can be used to identify locations with speeding problems. The data can be utilized by Police Officers to focus their efforts on the most serious offenders. This measure may be implemented immediately with little planning.
- Neighborhood Awareness/ Education – This effort is important for successful implementation of any traffic calming. Education is intended to remind neighbors to pay attention to their driving habits and their mutual responsibilities to the residents – particularly the children – living in the community.

- Radar Trailer – The speed data available on various streets can be used by town to place these signs more effectively. Many drivers speed in neighborhoods without realizing how fast they are traveling. Reminding these drivers that they are exceeding the speed limit on a street can encourage them to drive more slowly.



Photo 1: Radar Trailer

- Signage: Placing appropriate warning and information signs and additional regulatory signs remind motorists of the various roadway conditions and hazards of the area. Restrictions such as “No Trucks” can also help reduce cut-through traffic.



Photo 2: “No Trucks” Prohibition Sign

- Pavement Markings – On flat terrain, removing a centerline can encourage drivers to drive more slowly. Centerlines should be maintained around curves, over hills, and on approaches to railroad crossings, bridges and intersection approaches. Or



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pavement markings also can be used to visually narrow travel lanes in a given area. The three dimensional marking of speed hump can be used as cheaper alternative to actual speed hump. The cost of 3-D speed hump can be \$60-\$80 a piece versus \$2000 of actual speed hump. These are successfully implemented in Philadelphia.



Photo 3: 3D image of speed humps



Photo 4: Pavement Markings to visually narrow travel lanes



Photo 5: Special Pavement Markings on crosswalks

- On-Street Parking – Removing on-street parking restrictions can reduce speeds. Altering parking from side to side along the length of the street to break up the visual continuity of long, straight streets. On streets with volumes over 1500 vehicles per day, a queuing analysis that considers traffic volume and the density of on-street parking may be necessary before allowing parking that would narrow the street down to one lane.



Photo 6: Alternate on-street parking

- Stop Signs: Stop signs may be used to calm traffic; however, their use is not encouraged strictly as a traffic calming device. Research shows that :
 - Unwarranted stop signs installations require regular police enforcement
 - When stop signs are overused and/or unwarranted, compliance may decrease
 - When stop signs are unwarranted, vehicle speeds at mid-block locations may increase as motorists try to make up for lost time.



Photo 7: Multi-way Stop Sign



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- Safety of pedestrians is decreased at unwarranted multi-way stops, especially small children.

For the above mentioned reasons, this measure can be considered provided it meets the MUTCD warrants.

- One-way Street Conversion: In some situations, turning two-way streets to one-way can improve traffic problems in neighborhoods. Such conversions must be analyzed for capacity.



Photo 8: One-way Street Sign

- **Level 2:**

- Speed Humps: Most commonly used traffic calming device for speed control. Street should not be primary emergency service route.



Photo 9: Speed Hump

- High Visibility Crosswalks: A wirelessly activated solar-powered in-roadway warning light, like the one shown here, can provide energy-efficient, in-pavement lighting for crosswalks. They are great option for pedestrian safety at uncontrolled crosswalks. They activate when a pedestrian is crossing, enabling drivers to learn to associate them with a need to yield or slow down for pedestrians in crosswalks. Also in-pavement flashers delineate the crosswalk and draw the driver's attention to the roadway.



Photo 10: High Visibility Crosswalks



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- Bulbouts/Neckdowns/Chokers: These designs can be modified to accommodate the bicyclist/pedestrian as shown below.



Photo 11: Bike/Ped accommodated Choker



Photo 12: Bulb-outs at the intersection

- Chicanes: One lane chicanes can significantly reduce cut-through traffic. But it may lead to increase in head-on collisions.



Photo 13: Chicanes

- Median/ Center Island Narrowing: This measure can be easily modified to include bicyclist & pedestrians.



Photo 14: Center Island Narrowing



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- **Level 3:**

- Traffic Circles: May significantly reduce speeds on the “thru” street. It may impede large vehicles.



Photo 15: Traffic Circles

- Roundabouts: They are used on higher volume streets (collector type) to allocate rights-of-way among competing movements. They are often used to substitute traffic signals or all-way stop signs. Roundabouts are often safer and more efficient than signals or all-way stops when traffic volumes are moderate to heavy and flows are balanced at the cross streets. Prior to implementing roundabout as traffic calming, a detailed operation analysis is highly recommended.



Photo 16: Roundabouts with Bike Lane

- Street Closures: Fire or emergency vehicles may oppose to this traffic calming device as it can lengthen response routes. To accommodate such emergency vehicles, motorized gates can be installed at street closures. While closed to private vehicles, these gates can be activated by emergency vehicles via radio control.



Photo 17A & 17B: Street Closure with Motorized Gate (Coral Gables, FL)

Whenever implementing a traffic calming device, emergency vehicle access and response time must be carefully considered. Emergency vehicles, particularly ambulances and fire vehicles have more difficulty with “vertical” measures such as 14-foot long speed humps than with “horizontal” measures such as “neck-downs”. Longer fire vehicles and equipment such as ladder trucks may have trouble negotiating some “horizontal” measures.



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Likewise, bicyclists, pedestrians and other expected street users must be kept in mind when developing a traffic calming strategy, as some measures can obstruct their movement. Many measures can be modified to allow bicyclists and pedestrians to bypass them. For instance, a choker can be fitted with a bicycle / pedestrian path to allow for those users' particular access needs as shown in picture in Level 2.

The following table (Table 2) summarizes where the devices included in this section may be used and their effectiveness at resolving typical traffic calming issues.



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Table 2 : Summary of Traffic Calming Devices
(Note: costs shown in table are 2009 costs)

	TRAFFIC CALMING DEVICE	DEFINITIONS	PHOTOS	DESIGN WARRANTS/ CONSIDERATIONS	TRAFFIC/ VOLUME REDUCTION	SPEED REDUCTION	CHANGE IN % TRUCKS	IMPACT ON ADJACENT STREETS	USE ON BUS ROUTE	USE WITH DRIVEWAYS ON STREET	USE WITH CURBS & GUTTER	IMPACT PARKING	SAFETY			IMPACT ON POLLUTION (NOISE/AIR)	EMERGENCY VEHICLE ACCESS/DELAY	DEPENDENT ON POLICE ENFORCEMENT	LEVEL OF VIOLATIONS	MAINTENANCE PROBLEMS/ COST	AESTHETICS/ LANDSCAPING POTENTIALS	COST	USEFUL FOR SPOT OR AREA-WIDE PROBLEMS	
													VEHICLE	PEDESTRIAN	BICYCLE									
LEVEL 1	Enforcement (visible & active police presence)	Extensive traffic enforcement, "emphasis patrols"		• May be implemented with little planning	Not Likely	Temporary	Not Likely	Yes	Yes	Yes	-	-	-	Improved	Improved	Possible Reduction/ No change	-	High	Low	High cost for extended	-	\$100/hour	Both	
	Neighborhood Awareness/ Education	Distribute Safety Information		-	No	Not Likely	Not Likely	-	-	-	-	No	-	Possible Improvement	Possible Improvement	No change	-	-	-	-	-	Varies	Both	
	Radar Trailer	Providing the posted speed limit on the device reminds drivers to slow down if they are travelling to fast		• May be implemented immediately with little planning • In the long term, less expensive than police enforcement	Not Likely	Temporary	Not Likely	Yes	Yes	Yes	-	-	-	-	-	No change	-	Self enforcing				\$3000-\$4500	Site	
	Signage	Place appropriate warning signs, information signs & regulatory signs		• Must meet MUTCD warrants	No	Temporary	Possible	No	Yes	Yes	-	-	-	Possible Improvement	Possible Improvement	Possible Improvement	No change	No effect	-	Varies	High	No	\$100-\$200 per sign	Spot
	Pavement Treatments Class I (Marking, Striping & Color)	Special pavement markings at entries, hazard locations or crosswalks to alert drivers of special conditions		• May be implemented with little planning	No	Possible	Not Likely	No	Yes	Yes	-	No	-	Possible Improvement	-	No change	-	-	-	Low Problem/ High Cost	Yes	\$0.15/ft - \$1.00/ft (paint)	Both	
	Pavement Treatments Class II Texture/Composition, Patterns, Color)	Special pavement compositions and markings to alert drivers of special conditions		• May be implemented with little planning	Not Likely	Possible	Possible	No	Yes	Yes	-	No	-	Possible Improvement	Varies	Possible Reduction/ No change	No Constraint	-	-	-	Yes	\$1.00-\$5.00 /ft (plastic)	Both	
	Parking Variants Class I (Zones, Signs, Striping, Timed, Resident Restricted)	Parking Areas create narrower roadways & increased activity leading to increased attention by drivers				Possible	Likely	Likely	Yes	Yes	Yes	-	High	Possible Improvement	Possible Improvement	-	Possible reduction/no change	No effect	Low	Varies	Low	-		Spot
	Parking Variants Class II (Shifting Traveled Way)	Altering parking from side to side along the length of the street to break up the visual continuity of long, straight streets				Possible	Likely	Not Likely	No	No	Yes	Yes	High	Increased Conflicts	Possible Improvement	Varies	Possible reduction/no change	No effect	-	-	Low	Yes		Spot
	Stop Signs	Stop signs, 2-way or 4-way, used to assign right-of-way at intersections		• Must meet MUTCD warrants		Seldom	Varies	Not Likely	No	Yes	Yes	-	No	Varies	Varies	Varies	Increase	No Constraint	Low	Varies	High	No	\$50-\$200 per sign	Spot
LEVEL 2	Speed Humps	Raised sections of pavement across the travelled way with curved transitions		• Appropriate for local streets • Posted Speed limit ≤ 25-30 mph • Traffic Volume 300- 4000 vpd • Max. grade < 8% • Most effective if used in series; spaced 300' - 500' apart	Possible	Yes	Possible	Yes	Yes	Yes	Yes	No	-	Improved	Plan with care	Possible Increase/No change	Minor Constraint	Self enforcing	-	Low - Moderate	Yes	\$1500 - \$2500	Both	
	High Visibility Crosswalks	Place at uncontrolled crosswalks to provide pedestrian safety & increase crosswalk visibility to drivers			No	Likely	No	No	Yes	Yes	Yes	-	-	Improved	Improved	No change	No effect	Self enforcing	-	10% of initial install cost	No	\$10K-\$15K	Spot	
	Bulbouts/Neckdowns/Chokers	Curb extensions at intersections and mid-block points that reduce curb-to-curb roadway travel lane widths		• Design can be modified to include Bicyclists and Pedestrians	Possible	Yes	Possible	Yes	No	No	Yes	Yes - Gain	Varies	Improved	Plan with care	No change	Severe effect	Self enforcing	-	High	Yes	\$7K-\$10K	Both	
	Chicanes	Curb extensions that alternate from one side of the roadway to the other, forming s-shaped curves			Possible	Yes	Likely	Yes	No	No	Yes	High Loss	Increased Conflicts	Varies	Varies	No change	Severe effect	Self enforcing	-	High	Yes	\$5K-\$10K	Both	
	Median/Center Island Narrowing	Raised islands located along the centerline of a roadway that narrow the width at that location		• Design can be modified to include Bicyclists and Pedestrians	Possible	Yes	Possible	Yes	No	No	Yes	Low	-	Improved	Plan with care	No change	Minor Constraint	Self enforcing	-	High	Yes	Varies on length & material used	Both	
LEVEL 3	Traffic Circles	These geometric design features force traffic at intersections into circular maneuvers			Possible	Near Circle	Yes	Yes	Plan with care	Yes	Yes	High	Improved	Varies	Varies	No change	Minor Constraint	Self enforcing	-	Moderate	Yes	\$5K-\$15K	Both	
	Roundabouts	Barriers placed in the middle of an intersection, directing all traffic in the same direction		• Are used on higher volume streets (collector type) to allocate rights-of -way among competing movements.	Not Likely	Near Circle	Possible	Yes	Plan with care	No	Yes	High	Improved	Increased Conflict	Increased Conflict	No change	Minor Constraint	Self enforcing	-	High	Yes	\$20K - \$120K	Spot	
	Street Closures	Barriers placed across roadways to completely close through vehicle traffic			Possible	Yes	Possible	Yes	No	Yes	Yes	Low	Varies	Improved	Improved	No change	Severe effect	Self enforcing	-	Moderate	Yes	\$10K-\$20K	Spot	



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Appendix A

Citizen Traffic Calming Petition

We, the undersigned residents, do respectfully petition the Town of Wake Forest for traffic calming devices in the neighborhood/intersection of _____

_____.

The reasons for the petition are:

*****Please note any additions, corrections, or vacancies to the attached map*****

Neighborhood Contact Person: _____

Phone Number: _____ **Email Address:** _____

NOTE: Persons residing on affected street of approved traffic calming device will participate in financing of the implementation.

Signature	Name Printed	Address	Apt. No.



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Any questions related to the Town of Wake Forest Neighborhood Traffic Calming Policy may be directed to:

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