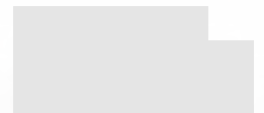
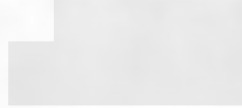
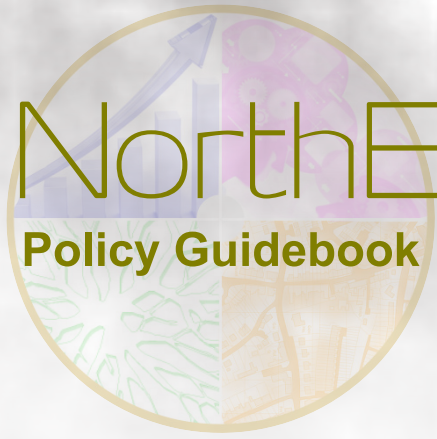


NorthEast Area Study

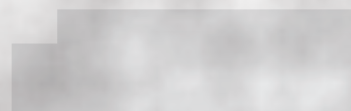
Policy Guidebook | January 2014



A recommended set of best practices on how to deal with the issues that are confronting the communities in the NorthEast Area.

Capital Area Metropolitan Planning Organization

prepared by Stantec Consulting Services Inc. and LandDesign





BEST PRACTICES
POLICY GUIDEBOOK 2013
CAMPO Northeast Area Study

Stantec

LandDesign

Alta Planning & Design

Kostelec Planning

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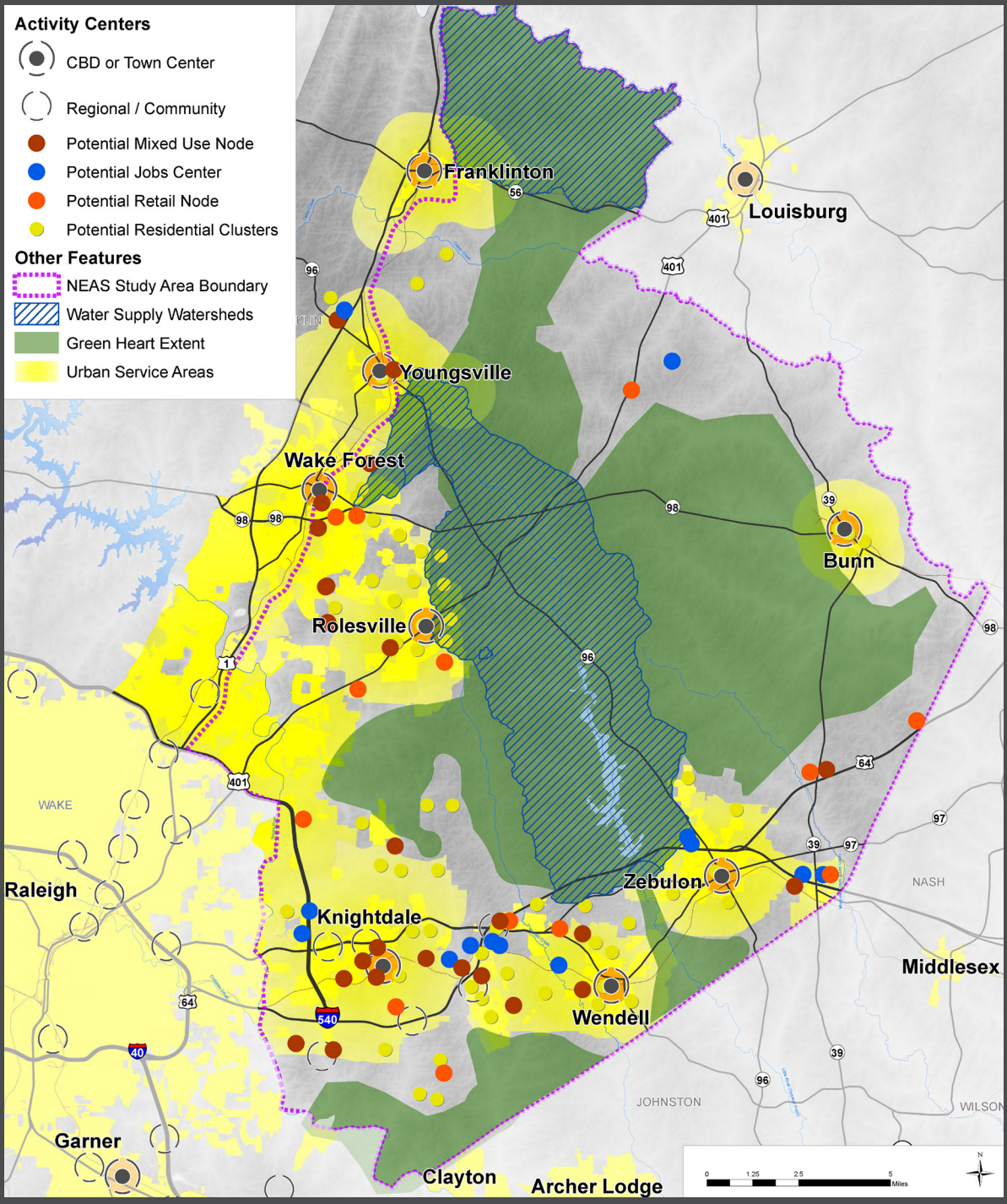
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Preferred Growth Concept Northeast Area Study

Project Overview

THE NORTHEAST AREA STUDY (NEAS)

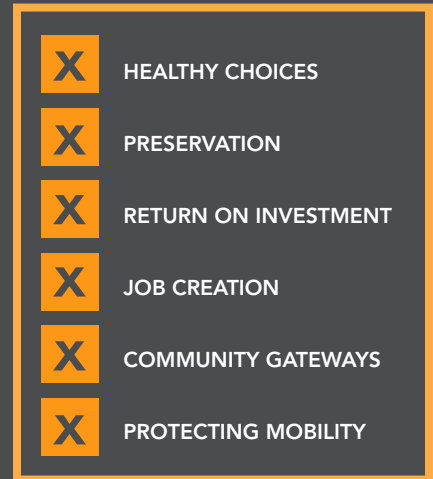
is a plan developed by the Capital Area MPO in conjunction with local governments to create a vision for the study area that outlines a pattern of land use and development which compliments infrastructure investment, improves transportation choice and maintains quality of life in northeastern Wake County and southwestern Franklin County.

The planning process included online and telephone surveys, focus group meetings and public workshops where local planners, elected officials, and members of the public discussed the current state of transportation and land use in the region and identified ways to improve their local communities. Throughout the process it became evident that most participants agreed the plan should identify policies that reduce congestion, reinvigorate downtowns, protect farmland and provide for more employment and shopping opportunities in the region.

Guidebook Organization

The **graphic to the right** will be displayed in each section. An “X” indicates that strategies in the section address the associated guiding principles. This is done to illustrate the interdependent nature of transportations and land use policies and decisions that impact the built environment. More information on the guiding principles is provided below:

- **Healthy Choices**—The health of a community and its citizens is intrinsically linked. The built environment plays a big role in determining health outcomes. This plan seeks to provide strategies that encourage better health outcomes.
- **Preservation**—The NEAS area is blessed with a plethora of natural and cultural resources. These resources include historic downtowns, valuable agricultural lands and state recognized natural heritage areas. Ideally, these resources will be preserved for future generations to enjoy.
- **Return on Investment**—In an age of limited budgets and increasing costs it is important to consider the long term fiscal implications of policies and funding decisions.
- **Job Creation**—Economic development and correcting the jobs to housing imbalance in the study area could have multiple benefits including reducing vehicle miles traveled and increasing tax revenues.
- **Community Gateways**—Maintaining the character of individual communities as well as the demarcation between towns and rural areas was noted as an important goal.
- **Protecting Mobility**—Accommodating growth without compromising mobility, defined as the ability to travel quickly and safely by car, foot, bike or bus, will be a key determinant of the success of the NEAS region.



Guidebook Purpose & Organization

This guidebook outlines the recommendations and strategies that connect the **Preferred Growth Concept** with the policies, programs, projects and plans needed at local, regional and state levels to achieve that vision. The guidebook introduces practical recommendations for local review and also provides innovative transportation and land use strategies that will result in a more efficient transportation network to support an improved quality of life in the NEAS region. Each recommendation is supported by best practices from communities to guide successful implementation.

The guidebook includes an introduction and organizes the policy recommendations into the following five chapters:

01 Fundamental Recommendations

02 Roadway Recommendations

03 Bicycle, Pedestrian & Transit
Recommendations

04 Parking Recommendations

05 Land Use Recommendations

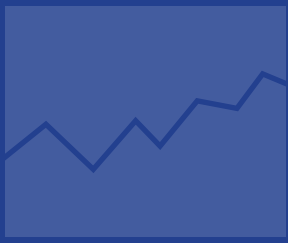
In addition, a Plan and Policy Review, conducted as a part of the NEAS project is included in Appendix 1 and referenced throughout the document.





FUNDAMENTAL RECOMMENDATIONS 01





Transportation Planning

FOCUS ON THE BASICS

Local governments should focus on the basics of transportation planning in order to ensure mobility is preserved within and between jurisdictions. These basic tasks are outlined below.

- Coordinate with adjacent jurisdictions and the Capital Area MPO during development of comprehensive plans and transportation plans.
- Keep local plans up-to-date. Transportation elements of local plans should be updated every 5-7 years.
- Ensure local roads are built following appropriate facility design guidelines.
- Preserve Right-of-Way for future roadways.
- Maintain capacity on major arterials by enforcing appropriate access management standards.
- Encourage a connected street network to reduce dependence on regional arterials.

ENCOURAGE ACTIVE TRANSPORTATION

The N.C. Department of Transportation adopted a “Complete Streets” policy in July 2009 which specifies that the design of almost all improvements and new location projects must consider the incorporation of facilities that support several modes of travel. Existing land development, zoning, and subdivision ordinances and technical standards have a significant effect on pedestrian and bicycle transportation and transit usage in the Northeast Area region. Existing policies should be strengthened to improve accommodations for active transportation facilities. Encouragement of biking, walking and transit as viable modes of transportation should be included in all transportation policies and development standards and technical specifications. Specifically the following concepts should be included in all bicycling and walking policies and development standards for both existing and proposed infrastructure:

- Safety
- Access
- Network connectivity
- Aesthetics
- Impact on health of community

MEASURE LONG TERM RETURN ON INVESTMENT

Local, state and federal budgets are tight and the economy is still recovering from the Great Recession. Increasingly it will be up to local governments to do more with less and find ways to leverage public investment to spur quality growth by partnering with private investors. During the development of the NEAS, participants emphasized the need to find ways to increase return on investment.

From a transportation perspective this means limited transportation funds need to be directed toward the types of projects that will have the biggest impact. In land use decisions, tax revenue estimates need to be balanced by analyzing expected expenditures in new infrastructure and services. Cost efficiency can be measured in a number of ways.

Traditionally transportation projects have been measured by how much congestion they will alleviate. There is growing evidence that communities need to measure the long-term impacts of transportation projects and land use decisions in new and different ways. In some cases investing in existing infrastructure upgrades can be more cost effective than building new facilities. Similarly, investing in multi-modal streetscape improvements may result in a healthier community or a more vibrant commercial district than a simple widening project.

These recommendations outline a basic set of policies to set the stage for long-term success in transportation planning.



ROADWAY RECOMMENDATIONS 02



Traffic Impact Assessment (TIA)

X	HEALTHY CHOICES
X	PRESERVATION
X	RETURN ON INVESTMENT
	JOB CREATION
X	COMMUNITY GATEWAYS
X	PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Every private development can be expected to produce (“generate”) or attract traffic. For several decades, traffic engineers have relied on trip generation equations or rates to tell them how many cars can be expected to enter and exit a development. But the final numbers reported to decision-makers can be skewed by tinkering with the paths that cars use to enter or leave the proposed development (the “distribution” of trips); how many cars can be expected to use the proposed development in a peak hour or peak 15-minute period; how many trips never leave the site in a multi-use environment (“internal capture”); and how many cars can be expected to already pass by the proposed development regardless of whether or not it the development ever appears.

Most of the attention given to the development of TIA ordinances and guidelines has therefore been dedicated to standardizing the analytic process to ensure a reasonable and consistent result. As a result, reporting these development impacts has become a fairly standardized process in order to reduce or eliminate tinkering to produce a more desirable result for the entity conducting the study. However, the practice is still very much focused on single-use developments, single modes of travel (cars), and a reliance on well-worn past practice that may or may not fit the context of the rural, small town, and urbanizing areas that we find within the Northeast Area Study boundary. By better fitting traffic impact assessments (TIAs) to their surroundings and all users of the transportation system, we can improve the way our built environment functions.

STRATEGIES

- Make the TIA a multi-modal review
- Make the TIA respect small developers or where site conditions make compliance infeasible (i.e. downtown areas)
- Make the TIA easier and simpler to understand by including simple checklists and document formats

Traffic Impact Assessment (TIA)

APPLICABILITY

As shown in Appendix 1 TIAs, in varying forms, are required in a number of jurisdictions in the NEAS study area. Existing TIA requirements could benefit from modification based on the strategies listed above. For fast growing towns and corridors where TIAs do not currently exist, they could be implemented as part of a corridor management policy, applicable to certain zoning codes, or as part of an overlay district.

BEST PRACTICES

Every TIA and report should have several common elements: a description of the levels of traffic congestion with and without the proposed development, current traffic conditions around the site, and the traffic conditions that are recommended based on the impact from the proposed development (pre-existing traffic deficiencies should not be the responsibility of the developer of the current, proposed action). However, there are a number of strategies to make the TIA a more robust document and process.

1. Generally, TIAs are strictly about the levels of service of a set of intersections and sometimes roadways – for automobile traffic only. To make the TIA a more multi-modal document, include the following:
 - > Require that the project area map include greenway, sidewalk, bicycle, crossing facilities, and transit access, both on the proposed site and within a ¼-mile of the proposed development.
 - > Similarly, important pedestrian and bicycle destinations need to be shown on the project vicinity map, destinations like schools, parks, shopping centers, higher-density or large single-family residential developments and office complexes should be considered for connections to and through the proposed development.
 - > Counts and summaries of impacts should include cyclists and pedestrians as well as automobiles.
 - > Connectivity is crucial for every mode of travel as well as improving emergency access and egress. The Town of Knightdale requires a second street connection for residential developments over 100 units and a third connection for developments over 500 units. Knightdale's [Unified Development Ordinance](#) has a good model for circulation and connectivity (Chapter 9) that includes a maximum block length of 660 to 1,000 feet generally. The purpose of block lengths is to create a pedestrian-scaled environment, particularly in downtown areas – new development would have to adhere to these same block length requirements. Building on this requirement is a minimum connectivity index, measured by dividing the number of streets by the number of intersections. Achieving a minimum connectivity index of 1.3 to 1.5 (the maximum possible is 2.0) is not unreasonable for towns inside the NEAS planning boundary.
2. Hardship cases are difficult to deal with on an individual basis, and smaller developers will be hard-pressed to make improvements that larger development projects could absorb into their profit margin or product pricing. Consistency in the application of development requirements is crucial for developers to understand what they can expect from the development review process, as well as setting a clear expectation

for adjacent residents and the development review staff. Setting a reasonable standard of hardship that is specific – such as crossing a stream – and may be eligible for participation from the local or state government is a useful addition to TIA guidelines, if not necessarily in the ordinance language. Establishing a maximum percentage of the final value of the property at build-out (note: requires independent assessment) for individual improvements – for example, 2% - would be a useful guideline for major (greater than 50 units) and commercial developments. Another example is the allowance of a reduction in the connectivity index described above in the case where more than 60% of any side of a development faces one or more insurmountable barriers (e.g., railroads or controlled-access roadways).

3. Most governmental agencies have, at one time or another produced a radical revision to their development policies. Often, the implementation and explanation of these changes is an afterthought, but to a private developer that is used to working under older guidance new rules can be frustrating and potentially expensive. Creating a TIA checklist that outlines the contents and even the figures required can be a useful compliment to significant changes in the TIA procedures. Releasing a “fact sheet” (summary) of the changes as well as conducting an in-house “lunch-and-learn” with members of the development community are other ways of promulgating new regulations and policy. The following pages provide a sample of a fact sheet and checklist produced recently (source: Stantec Consulting Services Inc./J S Lane Company, LLC) for an update to the Town of Morrisville’s TIA guidelines. In both cases, the multi-modal nature of the new review process is emphasized, as are changes to the previous process and documentation requirements.

For More Information:

<http://www.ci.morrisville.nc.us/>

Overview for Developers

Traffic Impact Analysis Ordinance Update

Town of Morrisville, NC | 2-2013

Morrisville relies on a traffic impact analysis (TIA) to help ensure that the transportation impacts from proposed development projects are understood, and that any mitigation of undue impacts presented by the proposed project is identified during the development review process. The following is a brief overview of the major changes in the TIA process; the text box at right lists the major steps (*note: refer to the TIA ordinance for important information*). Morrisville undertook these changes to make sure that all modes of travel are assessed during a TIA, that the costs realized to private developers to undertake a TIA are reasonably proportionate to the scale of the proposed development being studied, and simply to help make sure that the latest thought is going into the TIA process based on national and peer examples. Morrisville reviewed five peer governments and compared Morrisville's own TIA requirements to these peer municipalities as well as the most recent national guidance before validating the TIA ordinance with the private engineering community.

Please note that there may be some differences realized as a result of these changes; talk to your Morrisville staff if you are unsure of how to proceed.

- The development thresholds at which a TIA is required are generally 100 trips in any peak hour or 1,000 trips per day. There are factors that may determine if a full TIA is required or only an update; make sure to review these first before attending the scoping meeting.
- The updated TIA language emphasizes multiple modes of travel, including bicycle, pedestrian and transit opportunities. Make sure that these are represented in site plan sheets and in the TIA description of existing and future conditions.
- The new TIA language stipulates which kinds of software are preferred for various kinds of analyses.
- Carefully review the requirements for the signal analyses (Section 3.10) to ensure compliance with the operating assumptions.
- Make sure that the contents of the TIA report are complete, in accordance with Section 4. Morrisville staff can provide you with a checklist of the contents to aid in the production of a complete report and minimize delay to the development review process.

The Town of Morrisville still requires a Memorandum of Understanding (MOU) to be signed between the private developer and the Town. This MOU details the extent of the study area and contents of the TIA, and was revised slightly to reflect the revised ordinance language described previously.

Planning Department, Morrisville
260 Town Hall Dr., Suite B
Morrisville, NC, 27560

919.463.6194

Scampbell@townofmorrisville.org

Please contact the Planning Department at the Town of Morrisville for any questions regarding the TIA instructions or requirements.

*The following are the major steps to move through the TIA process in Morrisville. **Note that this description is basic; please refer to the full text of the TIA language for a complete listing of TIA requirements.***

1. Review the threshold requirements; do you need to prepare a full or updated TIA, and why?
2. Conduct a scoping meeting: Morrisville staff will review the study area, assumptions, internal/pass-by capture rates, known improvements, and phasing for your development with you.
3. Sign the MOU: This document stipulates the terms and assumptions of the analysis discussed at the scoping meeting.
4. Prepare analysis scenarios: existing, no-build, build, and build with improvements. Conduct new traffic counts to support the analysis.
5. The signal analysis should assume a peak hour factor of 0.90 with a Type III arrival rate. No right turns on red permitted.
6. Prepare the report, and have it sealed by a Professional Engineer.
7. The report should include a vicinity map, lane geometry, land uses in and around the site, average annual daily traffic (AADT) volumes, and a site plan, if applicable.
8. Future LOS for intersections for all scenarios should be presented.
9. Supplemental analyses may be required, including signal warrants, safety and / or queuing analyses.
10. Appendices for traffic counts, trip generation/distribution calculations, intersection analyses (or software output), bicycle/pedestrian network plan, signal plans/timing plans, and future volume considerations (e.g., phasing of development).

FIGURE 1: TIA DEVELOPER CHECKLIST (MORRISVILLE, 2013)

Preserve Roadway Capacity

X	HEALTHY CHOICES
X	PRESERVATION
X	RETURN ON INVESTMENT
	JOB CREATION
	COMMUNITY GATEWAYS
X	PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Our community has become intimately familiar with the cycle of building construction and roadway capacity increases necessary to accommodate the resulting traffic, and with just how disjointed those two things can become. Local governments work hard to ensure that new development opportunities are available, so that tax revenues, job opportunities (both during construction and afterwards), and a variety of housing choices are available. In North Carolina, the responsibility for addressing the impacts of successful areas falls largely to an entirely different organization, the state department of transportation. Our roadway and other accommodations usually lag far behind in their development with only the most urgent needs finally getting addressed, and even then only after decades of negotiating lengthy and often painful planning, design, and right-of-way acquisition challenges.

STRATEGIES

- Encourage Cross-Access
- Establish Driveway Spacing and Design Standards
- Adopt Median Controls, Spacing and Design Standards

APPLICABILITY

Entire Region, but especially in areas along state (NC) roadways likely to face additional pressure from new development.

BEST PRACTICES

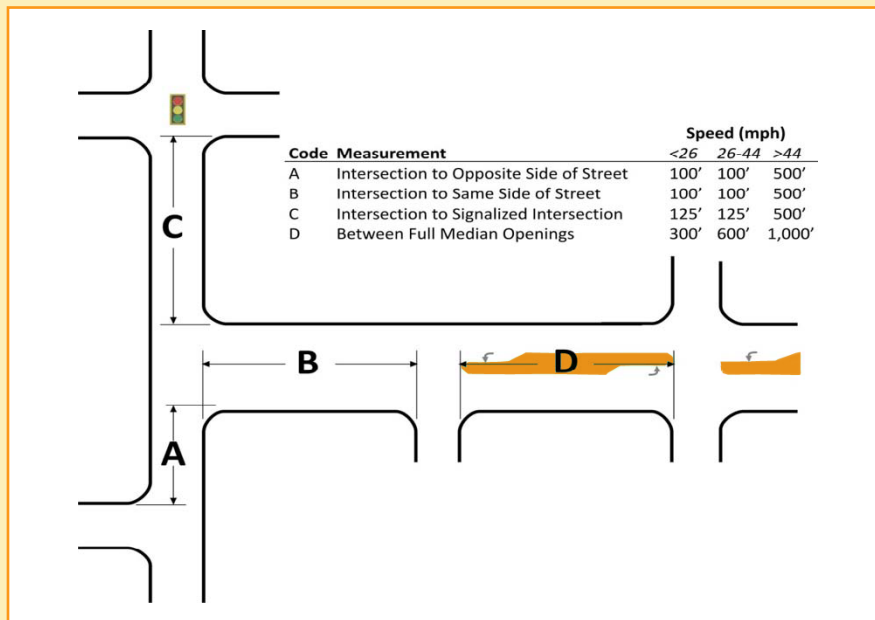
Access Connections

An ordinance that specifies minimum spacing requirements for signals, driveways and median openings is one way to reduce accidents and increase/preserve capacity. Below are some example requirements that could be incorporated into local policy documents:

- All connections shall meet or exceed the minimum connection spacing requirements as specified in the following table:

POSTED SPEED LIMIT	SIGNAL SPACING	FULL MEDIAN SPACING	DIRECTIONAL MEDIAN OPENING	ADJACENT DRIVEWAY SPACING	OPPOSITE STREET DRIVEWAY
≥ 45 mph	2,000	2,000	1,000	500	500
26-44 mph	1,200	1,200	600	100	100
≤ 25 mph	600	600	300	100	100

- Spacing between driveways or medians shall be measured along the right-of-way line between the tangent projection of the inside edges of adjacent driveways, opposite street driveways or median openings.



- The Town Engineer may reduce the connection spacing requirements for situations where they prove impractical, but in no case shall the permitted spacing be less than 85% of the standard. Spacing below 85% of the standard will require the issuance of a variance.
- For sites with insufficient road frontage to meet minimum spacing requirements, consideration shall first be given to providing access via connection to a side street; utilization of a joint or shared driveway with an adjacent property that meets the recommended spacing requirement, or development of a service road to serve multiple properties.
- The Town Engineer, in coordination with the North Carolina DOT, may grant access approval for a permanent use not meeting the spacing requirements of these guidelines on an interim basis if an access plan is submitted that demonstrates how spacing requirements will ultimately be set and appropriate assurances in the form of a recordable and enforceable easement of access agreement will be provided insuring future provision of a conforming access.
- Deviation from these spacing standards may be permitted at the discretion of the Town Engineer in cooperation with the North Carolina DOT where the effect would to enhance the safety and operation of the roadway. Examples might include a pair of one-way driveways in lieu of a two-way driveway, or alignment of median openings with existing access connections. Approval of a deviation or variance from the minimum spacing standards in this guideline may require the applicant to submit a study prepared by a registered engineer in the State of North Carolina that evaluates whether the proposed change would exceed roadway safety or operational benefits of the guideline standards.
- All road and driveway connections to a single parcel shall be brought into compliance with the minimum connection spacing requirements set forth in the guidelines when the land use(s) on the single parcel is / are modified or expanded.
- The North Carolina DOT may additionally prohibit, restrict, or modify the placement of any connection, at any time, to a single property in the interest of public safety and mobility on state-maintained streets.

Corner Clearances

Corner clearance is the distance between an intersection and the first point of ingress or egress to a corner property's driveway. The purpose of corner clearance is to remove conflicting movements from the functional area of intersections and provide sufficient stacking space for queued vehicles at intersections so that the driveways are not blocked. No driveway will be permitted to enter directly into an intersection. Driveways must turn traffic into the traffic stream of the highway and/or intersecting road or street before it is permitted to pass through the intersection. Unless an exception is granted, the minimum

corner clearance for entrances will be established by a queuing analysis or 100 feet for unsignalized intersections and 125 feet for signalized intersections, whichever is larger. If an exception is requested and approved at an intersection where no provision has been made for sight distance or clear vision areas (flared right-of-way), no part of a driveway entrance or exit may be permitted to connect with either the highway or crossroad or street within 50 feet from the outside shoulder line of the adjacent street and the access will be a right-in/right-out. Exceptions may be approved if, as a result of the Town or the North Carolina DOT action, the property would become landlocked. No part of a driveway entrance or exit may be permitted within a corner radius.

Near a signalized intersection, the location for a full movement driveway connection may be required to exceed the minimum spacing requirements set forth in the guidelines to avoid interference with the operations of the traffic signal and resulting traffic queues. The radius of a full movement driveway connection shall not encroach on the minimum corner clearance.

The minimum lot size for any new corner lot created through the subdivision process shall be of adequate size to provide for the minimum corner spacing as specified in the guidelines.

Joint and Cross-Access Non-residential and Mixed-Use Projects

- Adjacent land uses classified as major traffic generators shall provide a cross access drive and pedestrian access to allow circulation between sites.
- A system of joint use driveways and cross-access easements shall be established if deemed feasible by the Town Engineer and the building site shall incorporate the following:
 - > A continuous service drive or cross-access corridor extending the entire length of the property frontage and to provide driveway separation in order to provide the minimum spacing requirements as contained in the guidelines.
 - > A design speed of ten miles per hour and sufficient width to accommodate two-way travel aisles designed to accommodate automobiles, service vehicles, and loading vehicles.
 - > Stub-out connections and other design features that make it visually obvious that the abutting properties may be tied-in to provide cross-access via a service drive.
 - > A unified access and circulation system plan that includes coordinated or shared-use parking areas wherever feasible.
 - > The property owner shall record an easement with the deed for the property that allows cross access to and from other properties served by a joint use driveway, cross-access, or service drive.

- > The property owner shall record a joint maintenance agreement with the deed for the property defining maintenance responsibilities of the adjacent property owners.

Residential Projects

- Residential subdivisions with lots fronting along the Town Thoroughfare System shall be designed with joint access points to the highway. Normally a maximum of two access points shall be allowed regardless of the number of lots served.
- The property owner shall enter into a written agreement with The Town, recorded with the deed for the property, that pre-existing connections along the frontage will be closed and eliminated after construction of joint use driveways.
- The Town Engineer may modify or waive the requirements of this section where the characteristics or layout of abutting properties would make implementation of joint use driveways or development of a shared access circulation system impractical, provided that all the following requirements are met:
 - > Joint access driveways and cross access easements are provided wherever feasible.
 - > The site plan incorporates a unified access and circulation system.

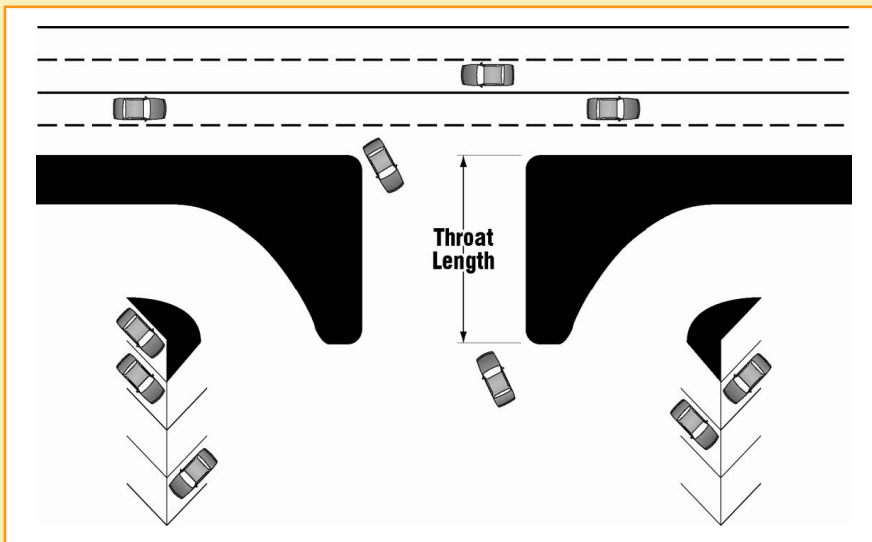
Median Openings

- No new median openings shall be allowed along roadways with an existing center median unless it is in conformance with the latest edition of “Median Crossover Guidelines for North Carolina Streets and Highways” published by the North Carolina DOT. In all circumstances, new median openings shall not encroach on the functional area of an existing median opening or intersection. Approval of any new opening lies ultimately with the North Carolina DOT Traffic Engineering and Safety Systems Branch.
- Minimum criteria for evaluating a request for a new median opening may include, but not be limited to, the following:
 - > Median openings shall not be located where intersection sight distance (both vertical and horizontal) cannot meet current design criteria required by the North Carolina DOT.
 - > Median openings shall not be placed in areas where the grade of the crossover will exceed five percent. Special consideration should be given to the vertical profile of any proposed new median opening that has the potential for future signalization.
 - > A median opening shall not be provided where the median width is less than sixteen feet.

- > Median openings that require a traffic signal, or where one may be expected in the future, should be avoided.
- > It is the responsibility of the property owner to provide the justification for new median openings.

Throat Length Distances

The connection depth of a driveway (throat length) as measured from the edge of the abutting roadway to the near edge of the internal circulation road or buffer area shall be of sufficient length to allow a driver to enter the site without interfering with the mainline of traffic. The figure on this page shows the minimum throat lengths based on the site activities; note that NCDOT may adhere to a “flat” 100’ minimum throat length.



SITE ACTIVITY	THROAT LENGTHS
Regional Shopping Centers (Malls)	250'
Community Shopping Center (Supermarket, Drug Store)	100'
Small Strip Shopping Center	30' *
Regional Office Complex	250'
Office Center	100'
Small Commercial Developments	30' *

**NCDOT may adhere to a 100' minimum.*

Sight Distance Requirements

Driveways shall not be permitted to connect with any highway, road, street or frontage road at a location if it does not meet the minimum stopping sight distance criteria, based on vertical or horizontal alignment or other reasons which will cause an undue hazard to the traveling public. Any driveway application that does not provide adequate sight distance as outlined in the above-listed design manual shall be denied. In order to provide adequate sight distance in both directions when entering the highway, driveway entrances and exits should be at a 90 degree angle. Angles less than 90 degrees should not be constructed unless justified by an engineering analysis and in no case shall be less than 60 degrees with the highway.

Additional Design Criteria

- **Offset Access Connections:** On undivided roadway segments, access connections on opposing sides of the highway shall be offset at an adequate distance to minimize overlapping left turns and other maneuvers that may result in safety hazards or operational problems.
- **Auxiliary Lanes:** Auxiliary lanes (left or right turn lanes) shall be required for new driveways where they meet the North Carolina DOT or ITE warrants.
- **Out-Parcel Access:** All access to an out-parcel shall be internalized using the shared circulation system of the principle development. Access to out-parcels shall be designed to avoid excessive movement across parking aisles and queuing across surrounding parking and driving aisles.

Minimum On-Site Vehicle Storage Area

Adequate storage must be provided within the internal circulation system for properties that include either a drop-off loop or drive-through facility so that vehicles do not queue onto the highway system. Specific storage areas will be determined by the Town Engineer in cooperation with the North Carolina DOT on a case-by-case basis during the development review process. However, the following minimum storage lengths are required for specific development types, as described in A-F.

- A) For single-lane drive-in banks, storage to accommodate a minimum queue of six vehicles will be provided. Banks having several drive-in service windows will have storage to accommodate a minimum of four vehicles per service lane.
- B) For single-lane drive-through full service car washes, storage to accommodate a minimum of twelve vehicles will be provided. Automatic or self-service car washes having a multi-bay design will have a minimum vehicle storage length of three vehicles per bay.

- C) For fast-food restaurants with drive-in window service, storage within the site to accommodate a minimum of eight vehicles per service lane from the menu board/ ordering station will be provided.
- D) For service stations where the pump islands are parallel to the pavement edge, a minimum setback of 35 feet between the pump islands and the public right-of-way will be provided. For service stations where the pump islands are not parallel to the pavement edge, minimum vehicle storage of 50 feet in length between the pump islands and the public right-of-way will be provided.
- E) For land uses that require an entry transaction or have service attendants, gates or other entry control devices, the vehicle storage will have an adequate length so that entering vehicles do not queue back on the adjacent right-of-way. No portion of a parking area, attendant booth, gates, signing or parking activity shall encroach on the public right-of-way.
- F) For schools, adequate storage for parental drop-off and pick up areas should be provided entirely on the school campus site; and provisions made for walking and cycling, including secure bike parking racks; high-visibility crosswalks at major street crossings and school entrances; and access to nearby trails and sidewalk connections.

Crossroad Access Spacing at Interchanges

Minimum access spacing on crossroads for freeway interchange areas is critical for avoiding traffic backups and providing safe maneuvering distances for turning and weaving vehicles to enter the appropriate lanes. No driveway, intersection, or median opening will be allowed less than 500 feet from the end of the taper of the ramp furthest from the interchange. If the proposed distances are less than the minimum spacing then a written justification demonstrating why the recommended distances cannot be met shall be submitted to the Town and NCDOT for review as an exception.

Right-of-Way Preservation

	HEALTHY CHOICES
	PRESERVATION
	RETURN ON INVESTMENT
	JOB CREATION
	COMMUNITY GATEWAYS
	PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Adopting right-of-way (ROW) preservation policies will assist all communities in keeping up with population shifts and the resulting shifts in demand for different transportation routes. Implementation of clear policy directives is a valuable tool that provides sound and cost-effective approach for avoiding and minimizing impacts associated with transportation projects. Corridor management programs should be tied to valid public purposes, and appropriate cross-sections, to promote orderly growth that supports their planned multi-modal transportation needs.

STRATEGIES

Communities that have been most successful in right-of-way preservation have assembled a variety of tools that they can mix and match to circumstances at hand. The following measures will enable the local governments in the NEAS study area to plan for future growth and balance the rights of property owners with the responsibility of providing adequate infrastructure:

- Adopt a long-range transportation plan with a broad community support,
- Set clear priorities and complete projects in a timely manner,
- Establish advance acquisition funding source,
- Provide a range of mitigation measures to address potential hardship on property owners and to preserve property rights,
- Determine desired cross-sections and associated right-of-way needs for transportation improvements, and
- Adopt a right-of-way data and map for each roadway with desired cross-section and design information.

Specific right-of-way related policy recommendations for implementation in the study area include:

Development review process – Enforce that all new development and/or redevelopment preserve or reserve the appropriate ROW setback per the adopted cross-sections if the parcel or development is located on a roadway that is designated on a CTP or MTP.

Official corridor map act – Develop and adopt an official map that identifies right-of-way needs for roadway and transit corridors as part of local comprehensive plans. Coordinate with CAMPO and NCDOT to ensure that local and regional plans reflect forecasted needs and alignments.

Setback requirements – Every road of a collector designation and higher should have an attached cross-section stipulating the required offset from the centerline of the ultimate roadway cross-section.

Density Transfer – Allow transfers of density for property dedicated to roadway, greenway, and transit stop facilities ROW.

Transit Stop ROW – Require ROW dedication for transit stop for major commercial developments, and as determined for future or current needs by staff.

Strategic Acquisition – Establish a municipal or joint municipal fund to acquire properties and driveway access points as they become available to save money and prepare a corridor for future widening/improvements.

Resources: Corridor Preservation Methods (LandDesign, 2004)

APPLICABILITY

Preservation policies should be adopted and implemented in all local jurisdictions. The benefits and applicability include:

- Land requirements met for future development according to vision and goals of community,
- Safe and efficient multi-modal infrastructure construction, and mobility, and
- Pro-active planning for the mobility of tomorrow.

BEST PRACTICES

The Corridor Preservation Best Practices developed through the Center of Urban Transportation Research includes multiple case studies and applicable standards for the NEAS study area (Corridor Preservation Best Practices, April 2003).

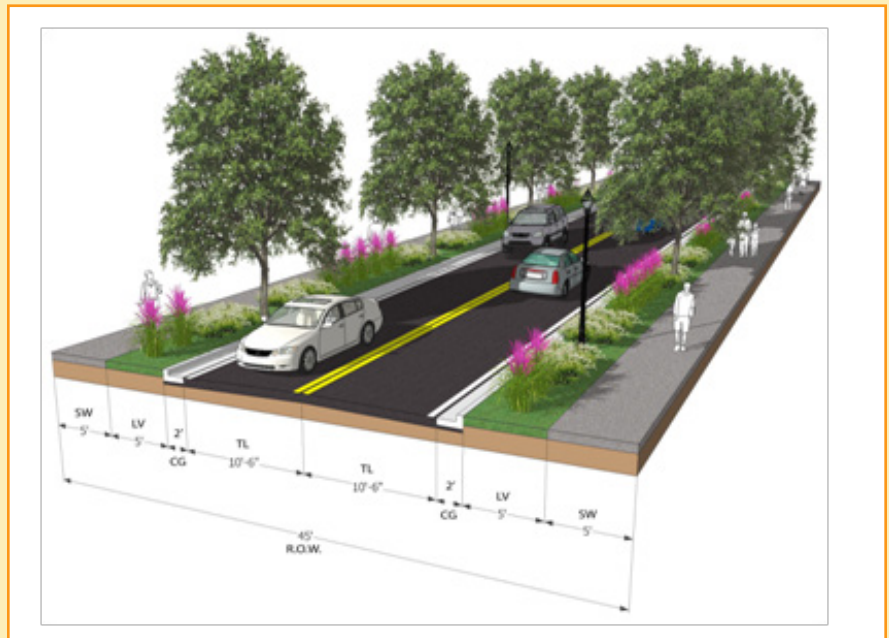
For More Information:

<http://www.nctr.usf.edu/pdf/77720.pdf>

The Transportation Corridor Official Map Act is a North Carolina law that NCDOT and local municipalities can use to preserve a highway's planned route until funds are available for construction. It limits certain types of development in its proposed path, such as construction that requires building permits.

For More Information:

www.ncga.state.nc.us/ENACTEDLEGISLATION/STATUTES/PDF/BYARTICLE/CHAPTER_136/ARTICLE_2E.PDF



Multi-modal Cross Section with ROW Width

Roadway Connectivity

X	HEALTHY CHOICES
	PRESERVATION
	RETURN ON INVESTMENT
	JOB CREATION
X	COMMUNITY GATEWAYS
X	PROTECTING MOBILITY

DESCRIPTION & BENEFITS

A connected road network emphasizes accessibility by accommodating more direct travel with traffic dispersed over more roads, while a hierarchical road network emphasizes mobility by accommodating higher traffic volumes and speeds on fewer roads. New Urbanism and Smart Growth land use policies support improved connectivity as a way to increase land use accessibility.

Collector streets serve a dual purpose to provide access and to link trips to the wider network of streets which connect with highways. Key benefits of collector streets are:

- Distribute neighborhood traffic across several streets,
- Offer route choice and minimize concentrations of traffic on a single street,
- Lower taxpayer costs since collector streets are public streets often built with private funds,
- Improve mobility by reducing the distance and travel time for emergency service providers, pedestrians, buses, parcel delivery, refuse and recycling collections,
- Improve bicycling and walking options, as well as connections to public transportation, and
- Interconnect public water systems under the street to create more efficient public water systems.

Interconnectivity with the local departments for utilities, refuse collection, and municipal affairs is essential for the collaboration of connectivity benefits and fiscally pro-active planning.

STRATEGIES

The following measures will enable the local communities in the study area to implement a balanced transportation system that collects traffic from neighborhoods and distributes it to the network of arterials:

- Develop an approved Collector Street plan with design standards and street spacing and access requirements,
- Actively look for opportunities to repurpose right-of-way to enhance connectivity for all modes of travel,

Roadway Connectivity

STRATEGIES (CONT.)

- Focus on connectivity to schools, parks, civic uses, regional connections and commercial uses, and
- Coordinate with other local policies to integrate connectivity of municipal infrastructure with roadway planning and connectivity.

It is important to note that best practices for collector streets must receive design approval prior to their implementation if they will be maintained by the NCDOT.

Policy recommendations for implementation in the NEAS study area include:

- **Connectivity Standards:** All new and infill developments during the design review (private development) and planning (public projects) phases must be approved and held to the local connectivity metric and design/spacing standards. See the figure on the opposite page for an example of a connectivity index metric. Block length averages or maximums can also help accomplish this goal.
- **Stub-out Street Connectivity:** Include language within the subdivision code that explains the need for stub-out streets to connect to adjacent communities and guidelines for how these should be effectively marked so that neighborhoods are aware that this street will be connected in the future.

APPLICABILITY

The application and classification criteria of collector streets (i.e. residential, commercial, or industrial) will be determined by the local community and should be clearly documented in a collector street plan with the appropriate classification criteria, spacing, and access guidelines; street connectivity guidelines; and quantitative/qualitative characteristics for the existing and proposed transportation system. Local jurisdictions should develop and maintain their local collector street plan and connectivity policy.

All jurisdictions, in particular, the rural areas of Franklin and Wake counties would greatly benefit from implementation of a collector street plan. The *Wake County Collector Street Plan* adopted in April 2004 provides a solid foundation for coordinating with the adjacent communities to ensure optimal connectivity and infrastructure planning. Collector street plans need to be updated in collaboration as changes are made to land use and zoning, jurisdictional boundaries, the built environment, cross-section and design standards, and policies.

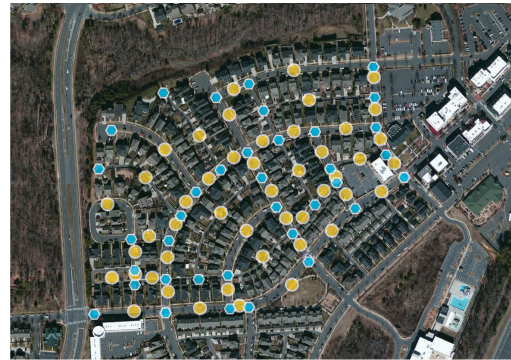
POOR CONNECTIVITY



- 17 Nodes
- 17 Links

Connectivity Index = 1.0




BETTER CONNECTIVITY



- 47 Links
- 36 Nodes

Connectivity Index = 1.31

The above graphics show two subdivisions (each of about 50 acres) with significant differences in connectivity. A connectivity index is measured calculating the ratio between the number of street links (road segments between intersections) divided by the number of street nodes (intersections and cul-de-sac heads).

LAND USE /TYPE OF COLLECTOR STREET	INTENSITY (DWELLING UNITS PER ACRE)	ACCESS FUNCTION	APPROXIMATE STREET SPACING
VERY LOW INTENSITY RESIDENTIAL	LESS THAN 2	HIGH	3,000 TO 6,000 FT
LOW INTENSITY RESIDENTIAL	2 TO 4	HIGH	1,500 TO 3,000 FT
MEDIUM & HIGH INTENSITY RESIDENTIAL	MORE THAN 4	HIGH	750 TO 1,500 FT
TOWN CENTER / ACTIVITY CENTER	MIXED-USE	MEDIUM	500 TO 1,500 FT
<u>LAND USE INTENSITY</u>	<u>VERY LOW INTENSITY</u>	<u>LOW INTENSITY</u>	<u>HIGH INTENSITY</u>
			
<u>STREET SPACING</u>	3,000 TO 6,000 FT	1,500 TO 3,000 FT	500 TO 1,500 FT

Collector Street Spacing Standards

BEST PRACTICES

A few jurisdictions in the NEAS Area have established connectivity requirements and serve as examples. Among these is:

Town of Wendell

http://files.wendell.gethifi.com/departments/planning/zoning/udo-unified-development-ordinance/Chapter_9_-_amended_092611.pdf

The Connectivity, Complete Streets, and Healthy Living Policy provide case study review and recommendations that support present-day best practices in street design and connectivity (Cockrell School of Engineering The University of Texas at Austin, December 2012).

For More Information:

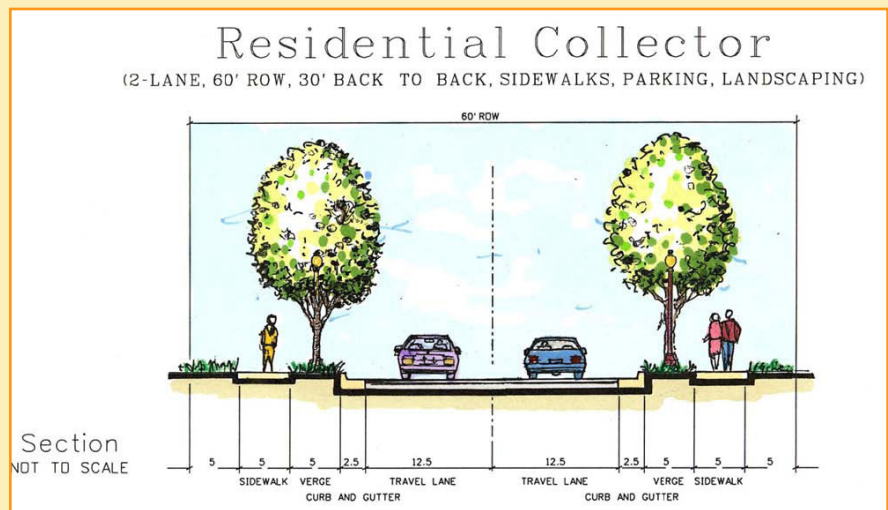
ftp://ftp.austintexas.gov/Subdivision_Regulations/Resources/CTR_Research_Report_Rev201212.pdf

The National Complete Streets Coalition provides guidance and a policy workbook to assist local communities in a collaborative effort to develop policy and implement connectivity (Complete Streets, local policy workbook, Spring 2013).

For More Information:

www.smartgrowthamerica.org/complete-streets/implementation/changing-procedure-and-process

www.smartgrowthamerica.org/documents/cs/resources/cs-policyworkbook.pdf



Collector Street Cross-Section



BIKE / PED / TRANSIT RECOMMENDATIONS 03





Pedestrian and Greenway Planning

X	HEALTHY CHOICES
	PRESERVATION
X	RETURN ON INVESTMENT
X	JOB CREATION
X	COMMUNITY GATEWAYS
X	PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Pedestrian-friendly communities and corridors begin with good planning. Standalone pedestrian and greenways plans are recommended to help communities identify specific pedestrian issues within the broader transportation system and come up with policy, programmatic, and infrastructure solutions to improve the pedestrian environment. Standalone plans also provide a means for local stakeholders to get involved through a plan’s Steering Committee and the general public to guide the town or county’s goals for pedestrian transportation and greenway development.

Town-based greenway and pedestrian plans establish the appropriate tools for each individual community. Once adopted, they also provided the necessary basis for many of the other policies recommended below. For example, greenway recommendations through undeveloped areas are more likely to be built with development if they are shown in an adopted plan.

Local bicycle and pedestrian plans that result in improvements to the sidewalk and greenway system add many benefits to a community, including the following:

- Improved physical, mental and social well-being resulting from outdoor places to relax, exercise and socialize.
- Safe and easy walking or bicycling connections between neighborhoods, schools, parks and trails.
- Increased property values, increased tourism and support for local businesses through increased foot traffic.
- Reduced traffic congestion, improved air quality.
- Improved overall quality of life.

STRATEGIES

- Complete or update pedestrian and greenway plans for each municipality in the region and for the region as a whole.
- Develop plans using an inclusive, community-led planning process that engages diverse stakeholders across the town.
- Update plans every 5 years to revisit the community’s vision, track progress against goals, and modify recommendations in accordance with changes in development patterns or resources as needed.

Pedestrian and Greenway Planning

APPLICABILITY

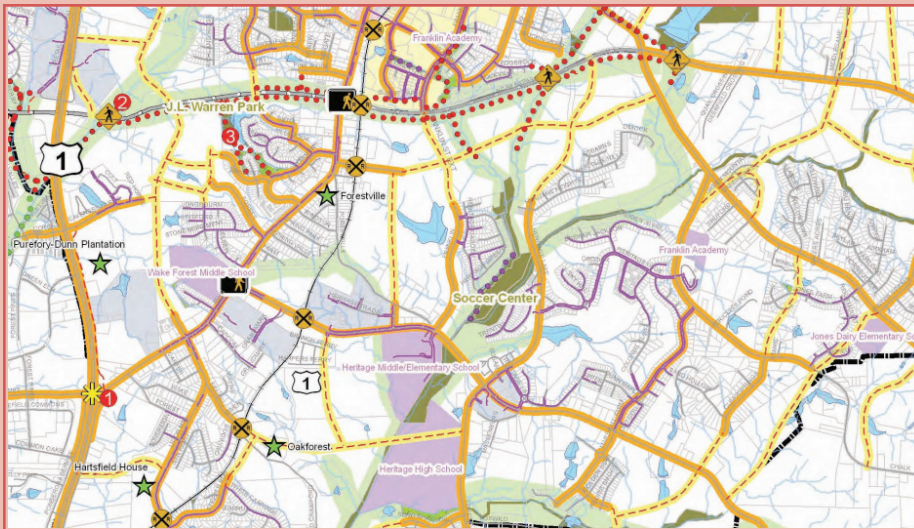
As summarized in the Plan and Policy Review Matrix included in the Appendix, several towns do not have pedestrian plans, including Wendell, Zebulon, Rolesville, Franklinton, Youngsville, and Bunn. Franklinton, Youngsville, and Bunn do not currently have greenway plans. Each of these towns would benefit from a pedestrian and/or greenway plan, and several existing older plans in the region could be updated, such as the Zebulon and Wendell Open Space and Greenways Master Plan.

BEST PRACTICES

NCDOT offers a planning guide to help local communities prepare a bicycle and pedestrian plan. Included in this guide are a number of case studies from local North Carolina communities.

For More Information:

connect.ncdot.gov/municipalities/PlanningGrant/Pages/Planning-Guide.aspx



Wake Forest Pedestrian Plan

Several communities in the NEAS region have completed pedestrian and greenway plans. Some links to effective plans are included below.

Pedestrian Plan Examples:

Wake Forest Pedestrian Plan (2006) :

www.wakeforestnc.gov/Data/Sites/1/media/departments/planning/pedestrian-plan-2006a.pdf

Knightdale Draft Pedestrian Plan (2013):

www.knightdalenc.gov/index.aspx?page=459

Greenway Plan Examples:

Wake Forest (2009):

www.wakeforestnc.gov/Data/Sites/1/media/departments/planning/open%20space%20&%20greenway%20plan.pdf

Rolesville (2002):

<http://rolesvillenc.gov/town-departments/planning/adopted-plans/>

Sidewalk Design

- HEALTHY CHOICES
- PRESERVATION
- RETURN ON INVESTMENT
- JOB CREATION
- COMMUNITY GATEWAYS
- PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Walking is the most fundamental form of transportation. Walking can also be a social activity, but facilities are needed to accommodate walking. Well-designed, context-sensitive sidewalks allow and encourage walking for transportation and recreation. Sidewalks should include a planted buffer called a ‘green zone’. In addition to the aesthetic and environmental value of a green zone, planting strips can slow traffic and improve safety and comfort for pedestrians.

Sidewalks are the most fundamental element of the pedestrian network. Sidewalks are typically constructed out of concrete and separated from the roadway by curb-and-gutter, and landscaped planting strip area. Pedestrians generally find sidewalks with a buffer more attractive and comfortable than sidewalks built right next to moving traffic. Buffer options include bioretention swales, rain gardens, tree box filters, plant materials, and pervious pavements (pervious concrete, asphalt and pavers). Bioswales provide multiple benefits by offering natural landscape elements that also manage water runoff from a paved surface.



Planting Strip

The width and design of sidewalks will vary depending on street context, functional classification, and pedestrian demand. Standardizing sidewalk guidelines for different areas of a Town ensures a minimum level of quality for all sidewalks. Adequate width along a sidewalk corridor allows two people

to walk side-by-side and pass a third comfortably. In areas of high demand, sidewalks should be wider to accommodate the high volumes and different walking speeds of pedestrians. The Americans with Disabilities Act requires a minimum 4-foot clear width in the pedestrian zone plus 5-foot passing areas every 200 feet.

STRATEGIES

- Sidewalks should be required on both sides of the roadway throughout the region, depending on density and use of the corridor. In rural areas, a sidepath with a green buffer may be appropriate as an alternative, and in low density suburban areas, one side may be sufficient.
- Sidewalks along thoroughfares, collector streets, or streets fronting commercial or multi-family uses should have a minimum width of 6 feet. Along some collector streets and minor arterials, 5' sidewalks may suffice, depending on land use and intensity of expected pedestrian use.
- A sidewalk "movement zone" at least 10- to 12-feet wide is recommended in mixed use commercial areas.
- Where right-of-way allows on existing streets, provide a 6-foot minimum-planting strip with native landscaping and mature trees.
- On newly constructed streets, require developers to provide 8-foot planting strips with native landscaping and mature trees.
- All sidewalks should be paved with broom-finished concrete, paving brick, or concrete pavers. Similar materials may be permitted on a case-by-case basis, in compliance with ADA standards.

APPLICABILITY

Many of the major commercial corridors in the region with high traffic volume would both feel more comfortable and be safer for pedestrians with improved planting strips and consistent sidewalks. Examples include segments of Knightdale Boulevard, Wendell Boulevard, and US 401 through Rolesville. Improvements could take place during new development along corridors or as sidewalks are replaced.

BEST PRACTICES

Raleigh's Street Design Manual includes updated street cross sections found in the Unified Development Ordinance (UDO) with specific design directions related to the engineering aspects of street typologies. With the exception of streets in "sensitive areas" all sidewalks have a minimum 6-foot width requirement on both sides of the roadway. See Section 4.

For More Information:

<http://www.raleighnc.gov/content/PlanDev/Documents/DevServ/UDO/PublicHearingDraftRaleighStreetManual.pdf>

Green Zone and Planting Strip Best Practices from Charlotte Urban Street Design Guidelines (USDG):

charmeck.org/city/charlotte/transportation/plansprojects/pages/urban%20street%20design%20guidelines.aspx

Wendell's Unified Development Ordinance requires minimum sidewalk widths of 5- 6ft on both sides of all roadways, depending on the context and with some exceptions. Planting strips are required with all sidewalks. See section 9.3 C for more details.

For More Information:

files.wendell.ghetifi.com/departments/planning/zoning/udo-unified-development-ordinance/Chapter_9_-_amended_092611.pdf



Complete street in Asheville, NC

Encourage Pedestrian-Scale Design

X	HEALTHY CHOICES
X	PRESERVATION
X	RETURN ON INVESTMENT
X	JOB CREATION
X	COMMUNITY GATEWAYS
X	PROTECTING MOBILITY

DESCRIPTION & BENEFITS

The encouragement of pedestrian activity across towns and counties requires coordinated land use and transportation planning. Successful pedestrian-oriented business districts, or nodes, as opposed to “commercial strips,” depend upon making pedestrian circulation more convenient and attractive than motor vehicular circulation, because the retail strategy for commercial districts is to encourage the customer to visit often and for more than one purpose at a time. Walkability requires origins and destinations within walking distance of each other, which is influenced by roadway connectivity, distribution of land uses, and streetscape design. This last element affects perceived distances between destinations, which influence the decision to walk as much as actual distances.

Many suburban and developing areas in the Northeast region have the opportunity to create more walkable environments through subtle changes to current development patterns. Development requirements for connected roadway networks and pedestrian-scale streetscape design will ensure that new development encourages and enables more walking.

Pedestrian-scale environments encourage residents to walk to destinations, sustain appealing retail and business districts, and enable residents without alternatives to access destinations safely on foot. There are low-income communities in the region where pedestrians are currently cut off from grocery stores, jobs, and other destinations because of disconnected networks and high-traffic roadway corridors. New developments that are planned with the pedestrian scale in mind, and retrofits to existing developments, will serve these residents.

STRATEGIES

- Establish a connectivity ordinance to avoid disconnected roadway networks that prevent pedestrian access to nearby destinations.
- Build safe pedestrian connections to transit stops.
- Establish block length maximums to improve both connectivity and perceptions of walkability along corridors.
- Include human scale elements such as site furniture, lighting, and other furnishings, and provide pedestrian weather protection.

Encourage Pedestrian-Scale Design

- Include “pedestrian-friendly” building fronts or other building facade elements that improve pedestrian conditions along the sidewalk.
- Mitigate blank walls and screen service areas, provide rich textures and transparent façade elements, and provide a sense of enclosure using street trees or awnings.
- Provide universal design. A regional CPTED Summit could provide a forum for kickstarting coordination between local planners, developers and law enforcement officials.
- Incorporate Crime Prevention Principles into Design. Crime Prevention through Environmental Design (CPTED) design qualities support most elements of walkable communities and provide an important link between law enforcement and planning actions.
- In addition to infrastructure recommendations, provide programmatic elements such as wayfinding, kiosks, public art, and events on open streets and along sidewalks such as walking tours, street festivals, and markets.

CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN (CPTED) is a multi-disciplinary approach to reducing the incidence and fear of crime through thoughtful design of the built environment.

APPLICABILITY

New activity centers across the region, as detailed in the Preferred Scenario, should seek to follow these guidelines to encourage pedestrian activity within these centers. Additionally, many of the existing activity centers around the region, such as town centers (Wendell, Zebulon, Wake Forest, Youngsville, Franklinton, etc) could benefit from walkability improvements.

BEST PRACTICES

Block Length Maximums and Stub Streets:

Raleigh, Wake Forest, Knightdale, Wendell, Zebulon and Franklinton all currently have block length or perimeter block length maximums that encourage pedestrian-friendly corridors. See Appendix 1 for more information on local governments with block length requirements.

Connectivity Index Policies:

Franklin County, Knightdale, and Wendell all currently require minimum connectivity ratios for new development. Section 29-5: (F) of Franklin County's Unified Development Ordinance requires a connectivity ratio of 1.4. See the Ordinance for more details. Required connectivity ratios in Knightdale vary by zoning category. See Appendix 1 for more information on local governments with connectivity index policies.

For More Information:

Franklin County UDO

[files.www.franklincountync.us/services/planning-and-inspections/current-planning-2/unified-development-ordinance/Article 27 General Provisions Article 28 Procedure for Review and Approval of Subdivision Plats Article 29 Required Improvements and Minimum Standards of Design.doc](http://files.www.franklincountync.us/services/planning-and-inspections/current-planning-2/unified-development-ordinance/Article%2027%20General%20Provisions%20Article%28%20Procedure%20for%20Review%20and%20Approval%20of%20Subdivision%20Plats%20Article%29%20Required%20Improvements%20and%20Minimum%20Standards%20of%20Design.doc)

Knightdale UDO

<http://www.knightdalenc.gov/modules/showdocument.aspx?documentid=1985>

Raleigh UDO

<http://www.raleighnc.gov/content/extra/Books/PlanDev/UnifiedDevelopmentOrdinance/>

Pedestrian Scale Design:

urbanland.uli.org/Articles/2013/Mar/EwingPedestrianOrientedDesign

CPTED:

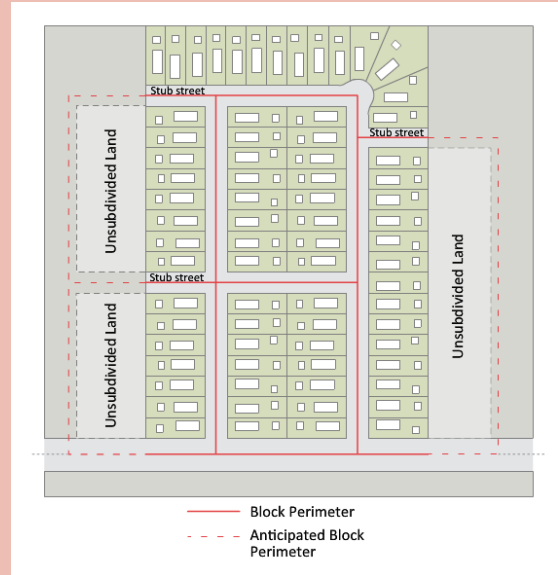
The National Institute of Crime Prevention (NICP) provides CPTED training resources for Law Enforcement Officers, City Planners, City Managers, City Council Members, Architects, Security Consultants, Educators or anyone involved in designing neighborhoods, schools, downtowns, buildings, or revitalization efforts.

For More Information:

Crime Prevention through Environmental Design:

www.cpted.ent and www.cptedtraining.net

Crime Prevention through Environmental Design, Third Ed., Fennelly/Crowe, 2013.



Stub street requirements are best when varied by land use and paired with block length or perimeter maximums. See the Raleigh UDO for an example.

Connectivity Index

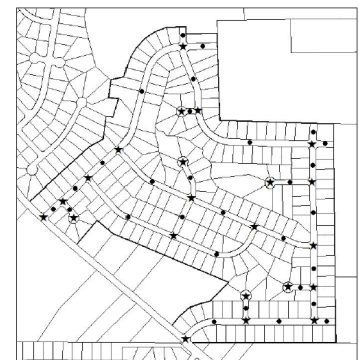
A Connectivity Index shall be used to determine the adequacy of street layout design. This is calculated as the ratio of the number of street **links** (road sections between intersections) in the project's street layout divided by the number of street **nodes** (intersections and cul-de-sac heads). For comparison purposes, a perfect grid has a Connectivity Index of 2.00 or higher, while a conventional cul-de-sac subdivision is often 1.00 or less.

The accompanying illustration exhibits a connectivity index of 1.32 (links are shown as circles and nodes are shown as stars). Street links on existing adjacent streets that are not part of the proposed subdivision are not included in the connectivity index calculation. The illustration has 29 links and 22 nodes for an index of $29 / 22 = 1.32$

Any development shall be required to achieve a Connectivity Index as shown in the following table.

	OSP	RR	GR-3 GR-8	UR-12 RMX	NMX	TC	HB MI
Connectivity Index (Min.)	n/a	1.30	1.40	1.40	1.50	1.60	n/a

Excerpt from Knightdale UDO specifying connectivity index requirements



Greenway Design

X	HEALTHY CHOICES
X	PRESERVATION
X	RETURN ON INVESTMENT
X	JOB CREATION
X	COMMUNITY GATEWAYS
X	PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Greenways can provide a desirable facility for pedestrians and cyclists of all types preferring separation from traffic, particularly for recreation. Greenways should generally provide directional travel and recreational opportunities not provided by existing roadways. Facilities should include amenities such as lighting, signage, and fencing (where appropriate).

Key features of greenways include:

- Frequent access points from the local road network.
- Directional signs to direct users to and from the path.
- A limited number of at-grade crossings with streets or driveways.
- Path termination where it is easily accessible to and from the street system.
- Separate trends for pedestrians and bicyclists when heavy use is expected.

Asphalt is the most common surface for greenways. Thicker asphalt sections and a well-prepared subgrade will reduce deformation over time and reduce long-term maintenance costs. Greenways in riparian areas or those susceptible to flooding should use concrete for durability and ability to withstand storm events.

State and local transportation budgets are tight, so creative approaches are necessary to get greenways funded and implemented. Many communities within this region have already found ways to get greenways built with private development to the mutual benefit of new and existing residents.

STRATEGIES

- Outline a maintenance policy to assure the protection of town and regional investments in greenways and to assure the upgrade of the facilities over time.
- Provide security policies to help create a safe, enjoyable system for the public that is also respectful of the privacy of adjacent property owners.
- Include greenway development policy in all transportation plans in the region, and greenway development requirements and development standards in County and municipal land development regulations.

-
- Require a dedicated greenway easement for all zoning renewals, mixed-use developments, and public open space projects where a project is along a proposed or likely greenway alignment.
 - Build partnerships and solicit funding from local private sector corporations, foundations, or conservation groups and land trusts.
 - Initiate a yearly appropriation for greenway and trail development in the capital improvements program.
 - Consider an aggressive education and awareness program for greenways and trails to be used for local bond referendums.



Typical Greenway Section

APPLICABILITY

Greenway design best practices should be incorporated into each town's policies to ensure that new greenways constructed by public or private entities are effective and sound long-term investments.

BEST PRACTICES

Raleigh's UDO includes language requiring greenway easements and dedication based on proposed greenway corridors designated in the Comprehensive Plan. Greenway easement standards are also in place that include floodplain areas and watercourse boundaries.

For More Information:

www.raleighnc.gov/business/content/PlanCurrent/Articles/NewRaleighCode.html

While more goal-oriented and objective-based, the **Town of Chapel Hill's Greenway Master Plan** provides good foundational policy ideas for greenway security, maintenance, and operations.

For More Information:

www.townofchapelhill.org/index.aspx?page=2230

Knightdale's Water Allocation Policy is an example of an innovative approach to funding greenways. A proposed development must obtain a certain number of points to receive water allocation if the proposal is over a minimum density. Points can be awarded for roadway improvements, gateway improvements, transit facilities, amenities (private greenways) and offsite (public) greenway improvements. See Knightdale's Ordinance for more details.

For More Information:

www.knightdalenc.gov/modules/showdocument.aspx?documentid=1661

CASE STUDY

A total of \$40,000 in donated construction materials and labor made the **Swift Creek Recycled Greenway** in Cary an award-winning demonstration project. (Some materials used in the "recycled trail" were considered waste materials by local industries.)

Funding Small Programs

X	HEALTHY CHOICES
X	PRESERVATION
X	RETURN ON INVESTMENT
	JOB CREATION
X	COMMUNITY GATEWAYS
X	PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Bicycle and pedestrian programs are a key complement to infrastructure and policy investments aimed at improving the walkability and bikeability of a town or region. Programs seek to increase pedestrian and bicycle activity and safety through encouragement, education, enforcement, and evaluation – often grouped with engineering and termed “The 5 E’s”. While many funding sources exist to fund programs, these sources are not set up to fund one-time programmatic events with low costs. Funding sources are organized to provide larger chunks of money to established groups because of the administrative requirements of funding providers. Non-profit groups or local advocates that seek to hold smaller events, like bicycle training classes for students or adults, often struggle to cover the small cost or equipment needed.

The recommended funding program will enable local advocates and non-profits without current access to bicycle & pedestrian funding to deliver bicycle and pedestrian programming. This programming will encourage and promote walking and bicycling across the region.

STRATEGIES

A programmatic fund should be set up to house and distribute funds to member governments and agencies or recognized non-profits, such as bike or pedestrian advocacy groups, interested in holding a series of bicycle and/or pedestrian education or encouragement events. Individual applicants and non-profit groups should demonstrate a capacity to carry out education and encouragement activities over a minimum period of time (e.g., three years). The following details may guide the program:

- The fund should be housed and administered by CAMPO
- Funding can be provided by an additional local match fund from area municipalities of 1 to 3 cents per capita. Federal funds cannot be used for the program, since they require a minimum project size,
- Local governments could help advertise the program and identify potential private/non-profit partners.
- Applications for funding should be simple and straightforward, allowing applicants to demonstrate need for the program and a means of measuring success in delivering the program. Applications may include:
 - > Target audience and marketing strategy
 - > Brief summary of the program itself and expected costs

Funding Small Programs

- > A description of how the proposal will advance goals of the CAMPO long-range transportation plan
- > Reason for the program (i.e. educate students to ride bicycles, encourage safe riding habits, etc.)
- > Outcome goals (i.e. number of participants or attendees, participant pledges to replace trips with biking and walking, etc.)

APPLICABILITY

Events could be held in towns, sponsored by advocates, local non-profits, or local businesses. Funding would be distributed either to recognized non-profits or local agencies in the location of interest. Those entities would pay for costs, equipment, or contract labor necessary to accomplish the event, while advocates or volunteers might staff the event.



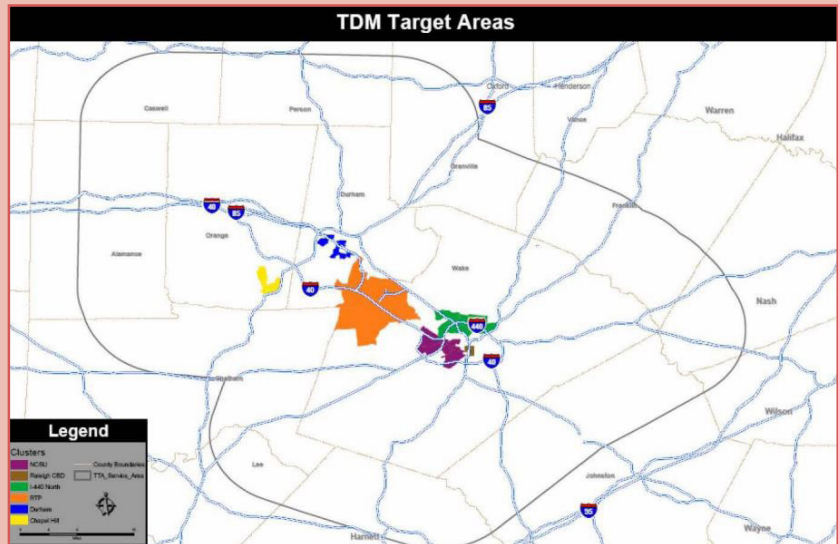
Bike Rodeo Event, www.pedbikeimages.org/ Mike Cynecki

BEST PRACTICES

Triangle TDM Grant Program – This program funds service providers who provide outreach to specific hotspots around the triangle with the goal of reducing automobile vehicle miles traveled by 25% by 2015. None of the hotspots are currently located in the northeast area. The program targets government agencies and other more sophisticated grantees – current grantees include NC State University, Triangle Transit, Downtown Raleigh, and many others.

For More Information:

www.tjco.org/triangle-transportation-demand-management-program.aspx



Triangle TDM Hot Spots

Rolesville’s annual bike rodeo - This event, sponsored by the police department, includes bike safety checks, a bike-safety obstacle course, and guided bike tours.

For More Information

<http://rolesvillenc.gov/wp-content/uploads/Bicycle-Rodeo.pdf>

Carrboro Safe Routes to School Programming – The Town of Carrboro has run many programs funded by a Safe Routes to School Non-Infrastructure Grant. These include Walk and Bike to School Days, Bike Safety Rodeos, and Bike Fix-It Days. The Town partners with existing groups to build on existing efforts and resources, including Carrboro Elementary, local bike shops, the Carrboro Transportation Advisory Board, the ReCYCLERY bike co-op, and Town staff.

For More Information

<http://www.townofcarrboro.org/pzi/Trans/transportation.htm>

A number of cities, including Toronto and Portland, have formal volunteer “ambassador” programs to engage volunteers in active outreach, education, and event planning and execution.

For More Information

<http://www.toronto.ca/cycling/ratsa/>

<http://www.portlandoregon.gov/transportation/article/88134>

On-Road Bicycle Facilities

X	HEALTHY CHOICES
	PRESERVATION
X	RETURN ON INVESTMENT
X	JOB CREATION
X	COMMUNITY GATEWAYS
X	PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Striking a balance in how communities consider the needs of bicyclists is critical to consider in the context of other non-motorized transportation and how more highway-based investments are made. Understanding that bicyclists, their abilities and their desired destinations can and do differ is an important element.

During the first Symposium for the NEAS, a participant noted he had ridden his bicycle seven miles per day on the previous three days. He was an older adult, so this was an impressive feat. When asked where he rode his bicycle, he noted that he did not have a way to get from his house in Wake Forest to the greenway; he could not lift his bicycle onto a car rack; therefore, he rode 21 miles over the course of three days by riding laps in the truck delivery area behind a home improvement warehouse store.

This story perfectly portrays the dilemma many people face in attempting to ride their bicycles. If older adults and families cannot get from their home to a greenway or park to recreate, they are not achieving maximum health impacts of our public recreational facilities will not achieve a desired return on investment if people cannot walk or bike to them. While the health impacts of bicycling have been well-chronicled and researched, other guiding principles of the Northeast Area Study are relevant to on-street bicycle facility investments and should not be overlooked.

- **Healthy Choices: It's more than the act of just riding a bicycle.** Physical activity is shown to increase mental health, address concerns in children related to ADHD, improve arthritis and joint conditions in older adults and promote family bonding when children and parents can bike together. All of this can be achieved by providing safe, connected on-street bicycle facilities.
- **Return on Investment:** The Outer Banks study conducted by NCDOT, "The Economic Impact of Investments in Bicycle Facilities", estimated the annual economic impact of bicycling to be \$60 million. Further, each dollar of investment in bicycle facility had a nine-to-one return on investment.
- **Job Creation:** The Outer Banks study estimated 1,400 jobs were supported annually by expenditures by bicyclists. Further, a 2012 study published by the American Association of State Highway Transportation Officials found that the average number of jobs created per million dollars of investment in active transportation facilities was 17.03—a job

creation rate almost 50% higher than average jobs per million dollar of expenditures on major highway projects.

- **Community Gateways:** While we tend to view community gateways as places to showcase the beauty of our towns, the facilities existing on our streets also send a message. On-street bicycle facilities along gateway routes tell motorists that this is a town where bicyclist safety is paramount and that they should share the road.
- **Protecting Mobility:** Mobility should be viewed as more than getting to work or to important destinations. Since 80% of vehicle trips are attributable to non-commute trips, there are opportunities to capture some of these trips via active modes. Connecting on-street bicycle facilities between neighborhood and greenways allow people to recreate via an active mode from their front door instead of driving to a trailhead. Making errands convenient to reach via on- and off-street bicycle facilities, in combination with strategic land use planning to make destinations attractive and convenient, can greatly enhance mobility options available to residents.



On-street Bicycle Facilities, in combination with designations such as Bicycle-Friendly Community signs at community gateways project a message to motorists and others about what the community values.

On-Road Bicycle Facilities

DESCRIPTION & BENEFITS (CONT.)

The 374-square mile Northeast Area Study’s evaluation of on-street bicycle facilities consisted of a field examination of current conditions, assessment of existing plans and policies and recommendations for the evolution of bicycle facilities in the study area. The vast geography of the study areas makes it difficult to specifically pinpoint a step-by-step project investment strategy; rather the emergence of an on-street bicycle network is likely to occur over several stages based on varying levels of facility investment by development, local communities and the North Carolina Department of Transportation (NCDOT)

Currently, a majority of the roads that connect communities within the study area are two-lane rural highways and state routes that traverse flat and rolling terrain east of the Neuse River. With so many small communities and few major activity generators, there are few current linkages in the system (not already addressed through municipal bicycle plans in Wake Forest and Rolesville) that are suitable to prioritize as primary commuting corridors. : State Bicycle Route 2 – Mountains to Sea (shown on the Regional Projects map below) bisects the study area and some of the roads on which it is designated are popular long-distance recreational bicycle routes.

Regional Network

State and Regional Tier Bicycle and Pedestrian Projects

Greenway Projects

- | | |
|-------------------------------------|-------------------------------------|
| 1. 98 Bypass Sidepath | 19. Mark's Creek Greenway |
| 2. Buffalo Creek Greenway | 20. Mingo Creek Greenway |
| 3. Buffalo Rd Park Connector | 21. Neuse River Trail Extension |
| 4. Cedar Creek Rd Sidepath | 22. North Dunn Creek Greenway |
| 5. Cedar Fork Greenway | 23. North Richard Creek Greenway |
| 6. Dunn Creek Greenway | 24. Outer Loop Trail |
| 7. East Wake High Trail | 25. Perry Creek Greenway |
| 8. East/West Greenway | 26. Richard Creek Greenway |
| 9. Franklinton/Louisburg Rail Trail | 27. Richardson/ Poole Sidepath |
| 10. Greenway Loop | 28. Sanford Creek Greenway |
| 11. Harris Creek Greenway | 29. Smith Creek Greenway |
| 12. K/R Greenway - Powerline | 30. Southeast High Speed Rail Trail |
| 13. Lake Myra Greenway Connector | 31. Southern Greenway |
| 14. Lake Neuse/Coa | 32. Spring Forest Trail |
| 15. Lake Royale Connector | 33. Tar River Trail |
| 16. Little River Greenway | 34. Tom's Creek Greenway |
| 17. Lower Buffalo Greenway | 35. Triangle Town Blvd |
| 18. Lower Moccasin Trail | 36. Upper Buffalo Trail |

Priority Proposed Network

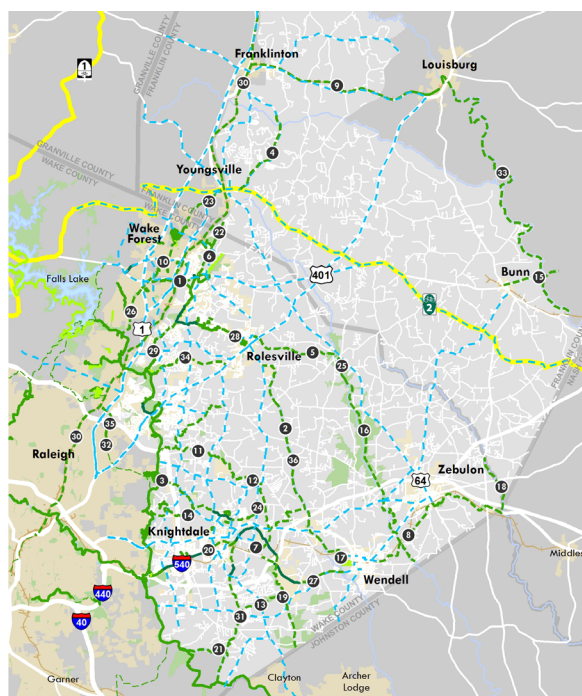
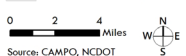
- Proposed Greenway
- Proposed On-Road Bikeway

Existing & Funded Facilities

- Funded Greenway
- Existing Paved Greenway
- Existing Unpaved Greenway
- Existing On-Road Bikeway
- Designated State Bike Route

Reference Locations

- Wake County Open Space & Parks
- Municipal Boundary
- County Boundary
- Northeast Area Boundary





A new Neuse River Trail access point along Poole Road in the western reaches of the Northeast Area Study boundary. On-street connections can link nearby neighborhoods to the new trail.

The most prominent bicycle facility in the study area is the Neuse River Trail, a 32.5-mile greenway that recently expanded along the western edge of the Northeast Area Study boundary. It is considered to primarily be a recreational trail that runs north-south through the west side of the Study Area. The towns of Rolesville and Wake Forest have developed some short greenway routes through their communities that connect newer neighborhoods to this facility. The Town of Louisburg, which is just outside the study boundary in southern Franklin County, has developed a short rail-to-trail route that links its downtown to Vance-Granville Community College. The planned US 401 re-routing around Rolesville is designed to include culverts along the four-lane divided highway to allow for future connectivity of the town's greenway system. On-street bicycle facilities that link these greenways to existing town centers, employment sites and other recreational opportunities should be considered a priority by Wake County, the towns and NCDOT.

Evolution of On-Street Bicycle Facilities

Given the rural nature of the Northeast Area, recommendations for on-street bicycle facilities are based on an evolutionary tract based on where pockets of new development emerge or where regional parks and greenways should be connected to existing towns, rural subdivisions, employment centers and schools.

On-Road Bicycle Facilities



Little River Park between Wendell and Zebulon is a recreational area along a rural road with no shoulders or bike lanes. Bicycle racks at the park go unused due to a lack of bikeable linkages to nearby towns and residential areas.

DESCRIPTION & BENEFITS (CONT.)

NCDOT's Complete Streets Planning and Design Guidelines include several conceptual cross-sections to guide the agency and communities in identifying the starting point for on-street investments in bicycle facilities. The cross-sections contained in the Guidelines are organized by the functional classification of the street or roadway and by prevailing community characteristics (main street, urban, suburban, rural).

Shoulder and Bike Lane Width. One element in NCDOT's Complete Street Guidelines that is not recommended for the NEAS Project is the recommended use of a minimum width of four feet for a bikeable shoulder in rural or transitional areas, or bike lanes in suburban locations. A five-foot width is preferred based on prevailing travel speeds greater than 35-mph on many rural roads inside the study area boundary. NCDOT's 1994 Bicycle Facilities Planning and Design Guidelines makes a similar recommendation for wider widths on high-speed facilities:

-
- **Shoulder Widths:** "If it is intended that bicyclists ride on shoulders, the paved surface must be at least 1.2 m (4 ft) in width...If motor vehicles speeds exceed 60 km/h (35 mph); if the percentage of trucks, buses and recreation vehicles is high; or if static obstructions exist at the right side, then additional [shoulder] width is desirable."

This is important to note in order to avoid communities and NCDOT making a 4-foot shoulder a default condition because:

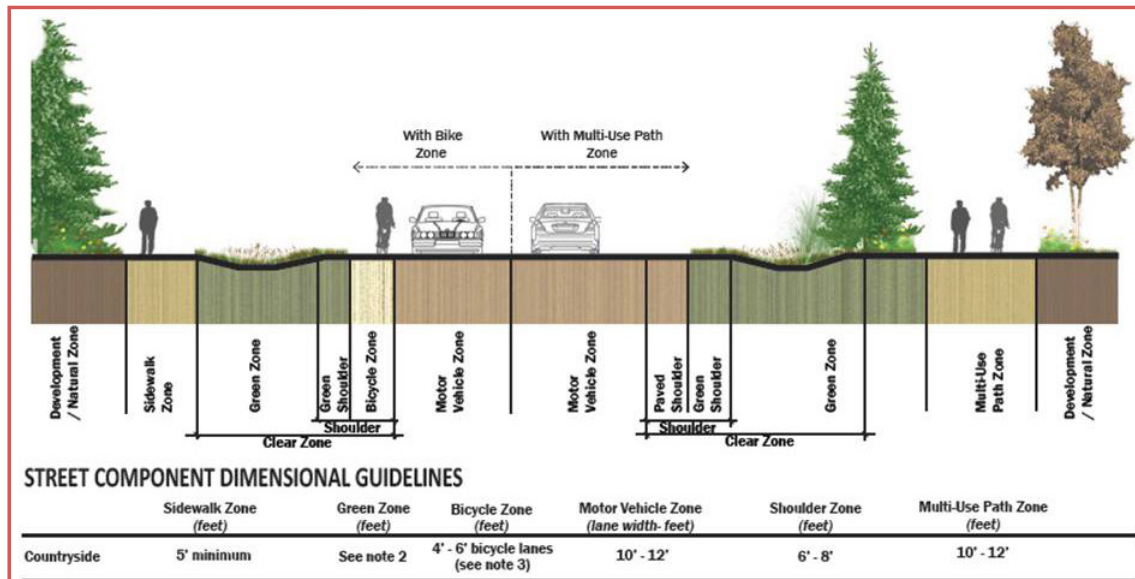
- A 4-foot shoulder (or bike lane) is barely wide enough to accommodate a bicyclist who is hauling a trailer, particularly a trailer intended for use by a child.
- Bicycle handlebar widths are becoming wider on new long-distance travel and mountain bikes, with handlebar widths approaching 36 inches. This reduces the amount of shy distance provided for a bicyclists if the default width is four feet for a shoulder or bike lane.
- Reductions in maintenance budgets for NCDOT divisions means that roadside vegetation control practices are not as frequent. Overgrowth from grass, weeds and other foliage can easily overcome the first 12 to 18 inches of a shoulder, rendering that space unusable for a bicyclist.

AASHTO's 2012 *Guide for the Development of Bicycle Facilities* also notes "Shoulder width of at least 5-feet is recommended from the face of a guard-rail, curb, or other roadside barrier...It is desirable to increase the width of shoulder where high bicycle usage is expected. Additional shoulder width is also desirable if motor vehicle speeds exceed 50 mph, if use by heavy trucks, buses or recreational vehicles is considerable, or if static obstructions exist at the right side of the roadway."

Rural Road - Shoulders. The cross-section contained the Guidelines document that is the best fit for current conditions in the Northeast Study area is the Rural Road, which is characterized by:

- Two vehicular travel lanes;
- A paved shoulder/bicycle zone adjacent to the travel lanes with a width that can comfortably accommodate a bicyclist;
- A green zone between either a multi-use path or a sidewalk.

On-Road Bicycle Facilities



Rural Road Cross Section from NCDOT's Complete Street Planning & Design Guideline

DESCRIPTION & BENEFITS (CONT.)

It is recommended that Rural Road cross-sections that contain bikeable shoulders (or bicycle lanes in some developing areas) are implemented via:

- **Requirements placed on major new development projects** (with greater than 1/3-mile frontage along a rural road) to construct shoulders along their frontage, not only to provide a space for bicyclists but to provide for additional motorist safety and a place for people to walk if they have to be on the road. These new developments will create more demand for use of shoulders and potentially more conflict at ingress/egress points.
- **Modernization projects through NCDOT's Division 5 office.** NCDOT routinely identifies rural highways (primarily US and State Highway routes as opposed to State Routes – SR) for modernization projects to add shoulders and/or additional lane widths to bring the routes up to modern design standards.
- **Standalone shoulder/bike lane projects** can be pursued by Wake County/ Franklin and towns through CAMPO's existing funding streams and the Transportation Alternatives Program. Such funding pursuits should be considered along routes where other large scale improvement (e.g. multi-lane widening) is not planned in the Transportation Improvement Program.

BEST PRACTICES

The *Complete Streets Planning and Design Guidelines* developed by NCDOT is a design-related document, not a treatise on funding policy. Therefore, it is likely that local jurisdictions, both counties and municipalities, will have to cost-share with the State Department of Transportation in the construction of wider shoulders or outside lanes. Two additional recommendations are also made in this document that pertain to this circumstance:

1. Towns and counties should set aside a small safety fund to be used as a contingency resource applied to renovation/reconstruction of roadways in their jurisdiction. These funds can be used for wider roadway shoulders, bicycle lanes, crossing treatments, and so forth at the time when the roadways are being planned and designed for rehabilitation. They can also be used to coordinate with developers to fill gaps in the system in conjunction with development-based on-site improvement.
2. Coordination with NCDOT's District and Division offices should be conducted regularly (every six months) to help ensure that opportunities for partnering are not lost. This includes reporting on the DOT's resurfacing list, which is an annual program conducted by NCDOT divisions to resurface streets. The program is fluid in that costs and other priorities can impact the order in which resurfacing occurs.
3. This Plan highlights sections of rural roadways that have horizontal and / or vertical curvatures that make seeing and reacting to cyclists (or tractors, slow-moving trucks, cars pulling out of driveways, etc.) challenging. If improving an roadway is beyond the resources of local and state governments, then these sections at least should be improved to safely accommodate slow-moving vehicles, including cyclists and pedestrians.



NCDOT Complete Streets Guidelines

Transit

X	HEALTHY CHOICES
	PRESERVATION
X	RETURN ON INVESTMENT
X	JOB CREATION
	COMMUNITY GATEWAYS
X	PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Currently the study area is largely suburban and rural nature, but if growth trends continue, parts of the region could become much more urbanized. The design and location of development will largely determine if transit (including bus, express bus, light rail or commuter rail) will be feasible in the future. High density, vertical mixed use development around transit facilities, also known as Transit Oriented Development (TOD), may be warranted in parts of the study area along rail or express bus lines. More importantly, land use and transportation policy should encourage development that is more walkable. This will make express bus, neighborhood bus, and the provision of other services more cost effective. Encouraging Transit Supportive Development or People Oriented Development (POD) is one way to do this. POD means encouraging vertical and horizontal mix of uses, at medium densities, near nodes of activity. This pattern of development can result in improved mobility options regardless if there is transit available.

Transit services and infrastructure provision is most cost effective when paired with compact land use planning to concentrate appropriate land uses around activity centers. In the NEAS area, transit stops and corridors could be co-located with neighborhood centers and areas of mixed residential densities. Increasing the number of homes within walking or biking distance of existing and new activity centers will increase transit ridership when transit is available and, in the meantime, it will provide residents with the option to walk or bike to destinations.

In rural areas transit programs should be pursued such as: ride-sharing/van-pool, and extended park-n-ride. Along corridors enhanced express bus should be pursued.

STRATEGIES

There are numerous innovative solutions that should be considered to ensure that sustainable transportation, such as transit, is considered to access key services such as employment, educational institutions and medical services. The following strategies assist in the planning and funding of transit:

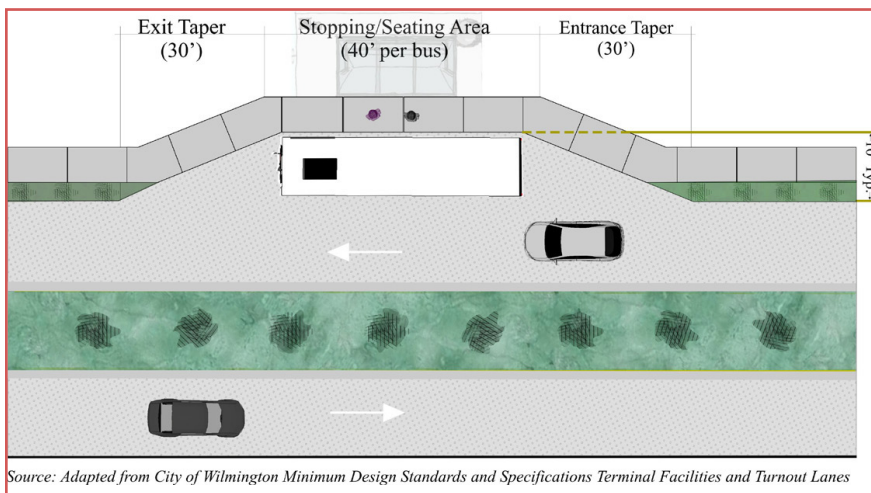
- Develop public-private partnerships,
- Incentive / vouchers for employers,
- Plan transit services targeted to grocery stores,
- Coordinate shuttle services for community employers and commercial

centers,

- Improve connectivity to transit hubs (Triangle Town Center and New Hope Road),
- Implement Welfare-to-Work Program, and
- Develop transit-oriented land use planning guidelines for interested communities.

Specific recommendations for implementation in the study area include:

- **Transit Design Standards** – Develop design standards for landscaping,



Bus Pullout Design Schematic



Transit Oriented Development

Source: Town of Morrisville Transit Oriented Development Plan

Transit

bus stop, shelters, bus pullouts, and adjacent pedestrian and bicycle amenities.

- **Transit-Supportive Development Policies** – Develop land use policies, design guides, and regulations to assist in the regional planning and funding of transit in rural/ suburban communities that include ROW reservation requirements for transit pull-outs and facilities on-site for major developments.

APPLICABILITY

Transportation options are essential to the health and vitality of citizens in all communities in the study area. Transit can provide critical access to basic needs for minority, elderly, and low-income populations, as well as mobility choices for more affluent populations. The benefits of transit and transit supportive development include:

- Mobility choices
- Safe and efficient transportation to all citizens
- Air quality emission reduction
- Improved roadway capacity
- Quality of life

Transit strategies and policies should be implemented in jurisdictions with current transit and those areas along key corridors (i.e. US 64, US 401, and US 1) where future transit service is possible.

BEST PRACTICES

Case studies of bus service programs in rural communities in both the United States and Canada are presented in the Urban Transportation Showcase (Transport Canada, Program Issue Paper 61, June 2006).

For More Information:

www.dot.ca.gov/newtech/researchreports/preliminary_investigations/docs/rural_smart_growth_preliminary_investigation_7-21-10.pdf

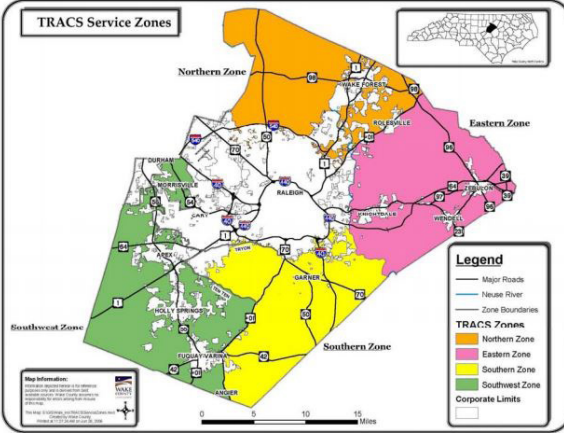
Best Practices and case studies for Rural Smart Growth are documented by the Caltrans Division of Research and Innovation (CTC & Associates LLC, July 21, 2010).

Best Practices and case studies for Rural Smart Growth are documented by the Transit Cooperative Research Program (TCRP) Guidebook for Change and Innovation at Rural and Small Urban Transit Systems (TCRP, Report 70, 2001).

For More Information:

onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_70a.pdf

TRACS Service Zones







TRACS Service Zones

Legend

- Major Roads
- Neuse River
- Zone Boundaries
- TRACS Zones
 - Northern Zone
 - Eastern Zone
 - Southern Zone
 - Southwest Zone
- Corporate Limits

Map Information:
Wake County Transportation and Rural Access (TRACS) is a public-private partnership between Wake County and the private sector. TRACS provides transportation services to the residents of the non-urbanized areas of the County. Service is offered by zone. Presently there are four zones of operation:
Northern Zone — Wake Forest, Rolesville and surrounding area
Eastern Zone — Knightdale, Wendell, Zebulon and surrounding area
Southern Zone — Garner and surrounding area
Southwest Zone — Fuquay-Varina, Holy Springs, Apex, Morrisville and surrounding area

Wake County Transportation and Rural Access



Wake County Transportation and Rural Access



PARKING STRATEGY RECOMMENDATIONS 04



Parking

X	HEALTHY CHOICES
X	PRESERVATION
X	RETURN ON INVESTMENT
	JOB CREATION
	COMMUNITY GATEWAYS
	PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Providing parking spaces for cars has become a standard part of not only the design of modern cities but is also viewed as either an attraction or, more often, a hindrance to economic development. However, up to one-third or more of urban areas are devoted now to servicing the automobile, and much of this space – especially parking – goes unused for long portions of each day. And parking is never free – parking lot construction and land costs are passed along to the consumer or homebuyer. An overage of parking hurts the design standards and attractiveness of communities, potentially reduces transit patronage, and produces more water runoff problems. For these reasons and others, a number of communities across the country and in the NEAS planning area have begun to re-think how they treat parking: not as a right without cost to developers or the community, but rather integrating it into an overall design strategy appropriate to the surrounding land uses and objectives of the community. Note that access management standards and requirements for on-site management of stormwater runoff go hand-in-hand with good parking lot design. Resources like the National Parking Association website (www.npapark.org) bring important information about parking to light, but considering some non-traditional sources like the Local Initiatives Support Corporation (LISC) for Comprehensive Community Development (<http://www.instituteccd.org>) can help focus thinking on how parking may influence corridor and community economic strategies.

STRATEGIES

- Describe clearly the parking requirements not only for new but for re-vi-sed developments
- Include considerations of pedestrian lighting, parking lot layout, bicycle parking racks, location relative to buildings, and strong aesthetics in core or high-activity areas of town
- Cross-access to other parking areas, parking maximums, and shared-use parking may be applicable for some combinations of land uses

APPLICABILITY

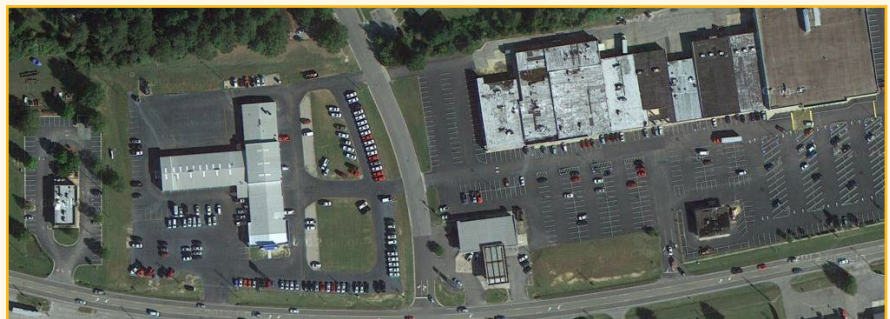
- The degree to which parking ordinances are detailed varies widely across the planning area; several towns already have fairly advanced ordinances but may want to review their thresholds and requirements periodically.

BEST PRACTICES

The strategies outlined above are sometimes present in several town ordinances in NEAS, but the following should provide a comprehensive listing of the best practice for parking requirements. The Town of Wake Forest has a very comprehensive and generally clear set of parking requirements (Chapter 9 of the Unified Development Ordinance), for example, and incorporates many of these concepts more specifically.

Minimum and Maximum Parking Standards

With the exception of downtown and historic areas, minimum parking requirements are generally accepted based on standard parking generation guidelines. Parking generation guidelines may be based on outdated studies of adequate parking and not provide sufficient consideration of on-street parking availability, design qualities desired for an area, cross-access to other lots, or simply aim for the “day before Christmas” in terms of accommodating the worst-case scenario. While the perception of available parking is correlated with more retail sales, too much parking in a corridor can actually depress real estate values in that corridor by making them less attractive to all shoppers and visitors; each additional parking space tends to yield a diminished return. Applying parking maximum values (accomplished in the aforementioned Town of Wake Forest ordinance) caps the number of spaces for many land uses, which are often overestimated based on retailer perceptions of need, particularly in downtown or mixed-use areas. Most importantly, look at the parking availability day by day in your town: are the spaces regularly being filled to even 50% capacity? How much more traffic and positive perceptions would be applied to the same space if it was occupied by one or more outparcels, additional streetscaping, or landscaping islands? Can pedestrians – including those emerging from their parked cars – safely and conveniently reach the front entrance without encountering an uninterrupted lane of traffic in front of the building?



Where are the opportunities to improve cross-access and shared-use parking arrangements?

Lighting is a critical element in parking areas for matters of personal safety and security. Lighting should be overlapping and under the tree canopy to avoid dark corners; entrances to buildings should have separate lighting; building numbers should be large and well-lit as well. The standards specified by the Illuminating Engineering Society (IES) should be followed closely, remembering that too much lighting can foil the objective of identifying trespassers and introduce light pollution to our small towns and rural areas.

For More Information:

<http://www.wakeforestnc.gov/Data/Sites/1/media/Residents/Planning/development%20services/currentudo.pdf>

<http://www.ies.org>



Bicycle Parking

Bicycle parking should be developed to accommodate a minimum of one rack (post-and-loop, inverted “U” or similar post-mounted construction preferred) for any commercial development, and additional racks per each 10 automobile spaces (less bicycle parking in areas anticipated to stay low-density is appropriate). Where there is covered automobile parking, bicycle parking should be covered, too, and given preferential locations that are easily visible from the main building entrance given that we generally want to encourage less automobile traffic in the area. Schools should adhere to similar standards and eschew the flimsy comb-style or “toast” racks that tend to damage wheels and bicycle frames. Separate bicycle spaces by at least 30” in hardship cases and make the standard separation 36” with each space at least 72” long.

For More Information:

Bicycle Parking Guidelines, 2nd Ed., 2010



LAND USE RECOMMENDATIONS 05



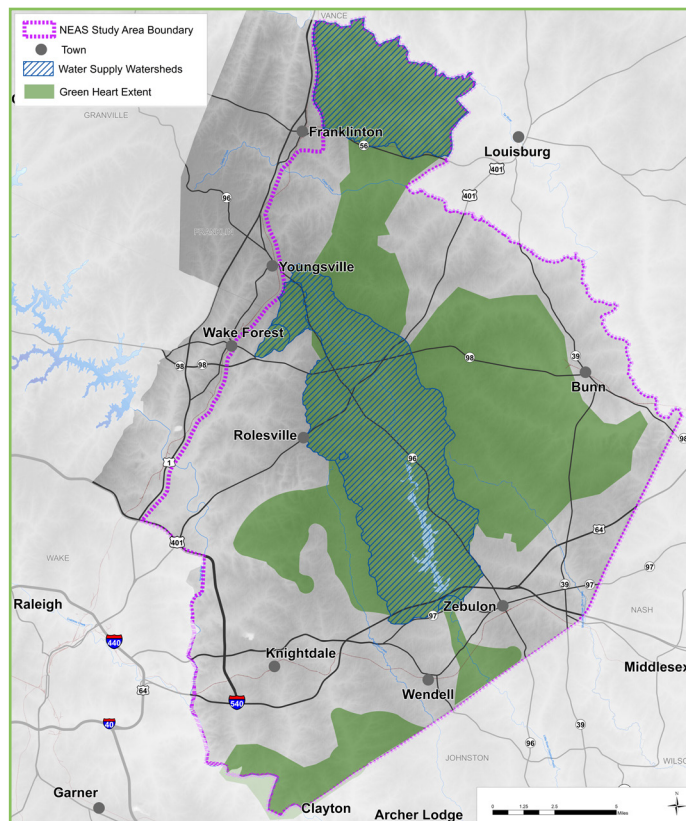
LAND USE RECOMMENDATIONS

Preserve the Green Heart

- X** HEALTHY CHOICES
- X** PRESERVATION
- X** RETURN ON INVESTMENT
- X** JOB CREATION
- X** COMMUNITY GATEWAYS
- X** PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Throughout the development of the Northeast Area Study participants said that it was important to protect the rural character of the agricultural areas between and surrounding towns. This feedback came from the public and through the scenario planning process. Protection of working farms contributes to quality of life by protecting water quality and providing fresh produce. Farmland also contributes significantly to the local economy by providing jobs and contributing local taxes. The Franklin County Cost of Community Services Study found that farmland contributed \$11 per acre in revenue to local governments while only requiring \$9 in expenditures. In addition, the agricultural lands surrounding towns help define the “edges” of communities, contributing to the character of each town.



NEAS Green Heart

Preserve the Green Heart

STRATEGIES

Specific recommendations for implementation in the study area include:

Limit Utility Extensions

- Establish utility service agreements between jurisdictions to limit the extension of public water and sewer infrastructure into the Green Heart and protect existing agricultural operations from encroachment of development, particularly new residential subdivisions.
- Many of the region's prime agricultural areas are located adjacent to expanding cities and towns. The extension of water and sewer to these areas can lead to more intense land uses that are not compatible with agricultural operations. In order to ensure the continuation of lower density land uses, utilities should not be extended to areas where there are concentrations of working farms and prime agricultural soils.



Encourage Compatible Residential Uses

- Keep residential density very low where agricultural land use predominates to reduce conflicts between neighborhood residents and common agricultural practices.



Cornfields Near Neuse River Greenway

- Effective agricultural zoning, also known as agricultural preservation zoning, is a land management tool that encourages farming while discouraging non-agricultural land uses that are incompatible with farm operations. This form of zoning promotes agriculture uses and structures while limiting the number of non-farm uses such as dwellings and other activities that can compete for productive farmland. This tool is most effective when it is used to protect areas where the local agricultural industry dominates the landscape and economy. Effective agricultural zoning is most appropriately used in the rural and agricultural landscapes, as well as in portions of natural landscapes that are being farmed.

Protect Rural Character of the Green Heart

- Cluster residential development to protect existing agricultural operations and the rural character of the area while still providing development opportunities. Clustered development practices group residential structures on a portion of the available development site and reserve a significant amount of the site as protected open space. The protected open space can act as a buffer between existing agricultural operations or significant natural areas.

Preserve the Green Heart



Conservation Subdivision That Preserves Existing Agriculture Lands

Implement Findings of the 2013 Wake County Agriculture Economic Development Plan

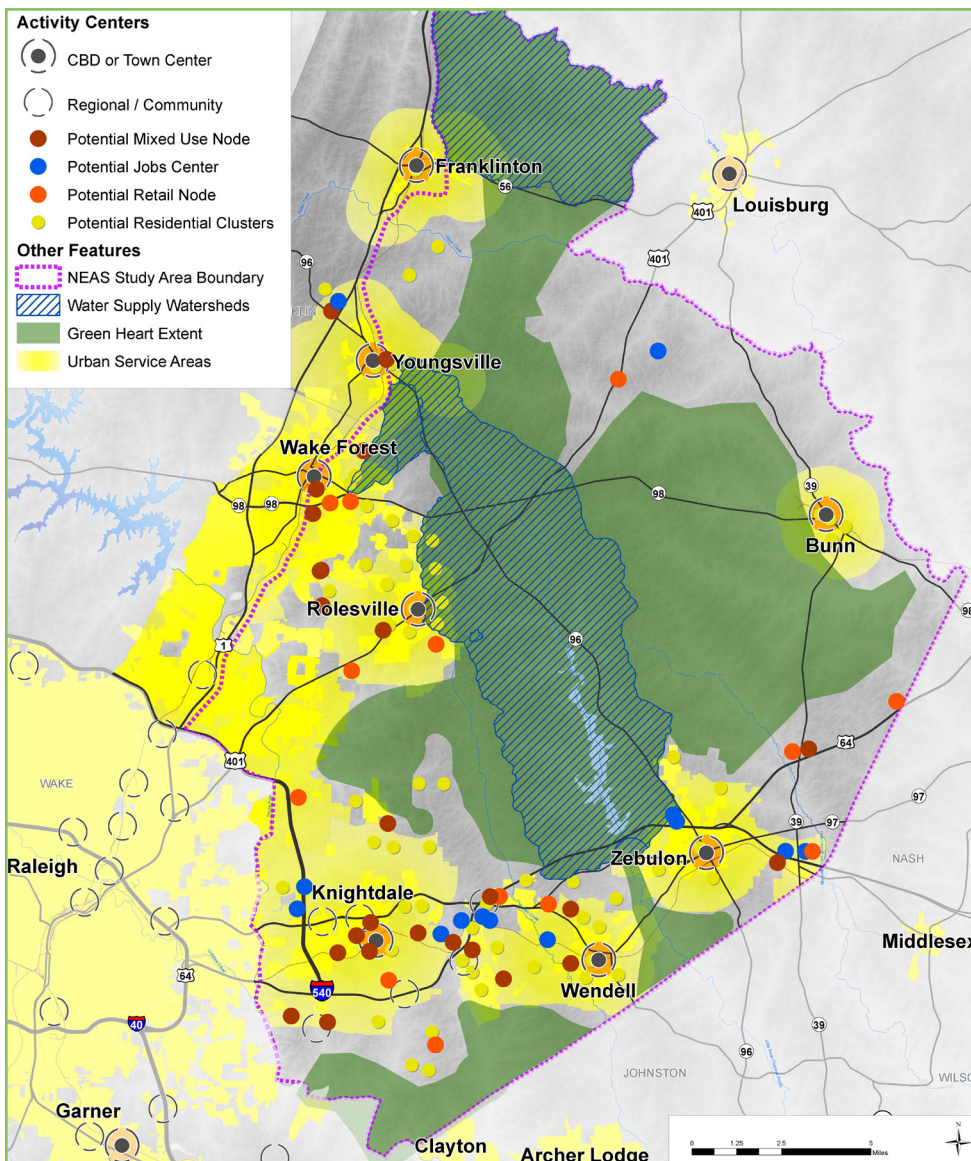
- The Wake County Agriculture Economic Development Plan (AEDC) outlines the following set of action steps to ensure economic viability of the county's agricultural community.
 1. Integrate economic development with farmland protection
 2. Expand County voluntary land preservation programs through conservation partnerships
 3. Promote understanding and appreciation of agriculture to the non-farm public
 4. Promote opportunities of profitability for Wake County family farms and agribusinesses

Use existing tools and partnerships to identify and protect key natural resources

- Use available conservation datasets and work with the Triangle Land Conservancy to update and refine the Greenprint in the NEAS boundary
- Use available conservation datasets and work with the Tar River Land Conservancy to identify key natural resources in Franklin County
- Evaluate the inclusion of conservation strategies from the Green Growth Toolbox in local comprehensive plans, development review processes and ordinances

APPLICABILITY

These policies are applicable in all areas of the region that border the Little River watershed and the conceptual Green Heart identified in the map below. By encouraging growth in and around activity centers rural lands on the edges of towns can be preserved. Potential activity centers, shown on the map below, were identified by consulting existing plans and through stakeholder involvement.



Preferred Scenario Growth Concept Highlights Green Heart

BEST PRACTICES

Wake County Agriculture Economic Development Plan

<http://friendsofwakeswcd.files.wordpress.com/2013/07/wake-county-agriculture-economic-development-plan-final-draft-may-2013.pdf>

The Green Growth Toolbox from the North Carolina Wildlife Resources Commission

<http://www.ncwildlife.org/Conserving/Programs/GreenGrowthToolbox/DownloadHandbook.aspx>

Southern Appalachian Highland Conservancy Farmland Access Service

The mission of SAHC's Farmland Access Service is to provide farmers with opportunities to purchase or lease affordable farmland so that they can initiate or expand agricultural businesses. Supporting local communities, local food production, and the long-term productive use of farmland are all goals of this initiative. Objectives include:

- Accelerate existing farm operations – Providing capital to farmers with the purchase of development rights on their land (agricultural conservation easements).
- Create farm ownership opportunities – Providing farm lands owned by the Conservancy for sale at agricultural value to farmers interested in purchasing land.
- Create farm leasing opportunities – Connecting farmers interested in leasing land with Conservancy landowners that may have land available for lease.
- Provide incubator program for beginning farmers – Supplying access to land and equipment, as well as support, training, and implementation tools for beginning farmers through an incubator program on SAHC's 103-acre farm in Alexander, NC.

For More Information:

www.appalachian.org/protected/farmland_access.html

Appalachian Sustainable Agriculture Project (ASAP)

ASAP's mission is to help local farms thrive, link farmers to markets and supporters, and build healthy communities through connections to local food.

We work to accomplish our mission by:

- Providing marketing support and training to area farmers
- Connecting area chef and foodservice buyers with the farmers who suit their needs
- Spearheading a Local Food Campaign, which includes our Local Food Guide, local food bumper sticker (have one on your car?), Get Local initiative, and more
- Certifying local products grown/raised in the Southern Appalachians as Appalachian Grown
- Running our Growing Minds Farm to School Program, which focuses on reconnecting children with where their food comes from
- Organizing Asheville City Market and coordinating the Mountain Tailgate Market Association

For More Information:

asapconnections.org/about-us/

Century Farm designation through the North Carolina Department of Agriculture and Consumer Services.

The long history of farming in the region is embraced and celebrated. There are already 23 designated Century Farms in the NEAS Study Area. The County Cooperative Extension, in association with many local partners, is working to identify additional farms that could qualify for Century Farm designation. (To be eligible for Century Farms, a farm must have had continuous ownership by a family for 100 years or more.) Identification of Century Farms promotes the understanding and appreciation of the historical importance of farming to the non-farm public.

For More Information:

www.ncagr.gov/paffairs/century/faqs.htm

Stormwater Control

- HEALTHY CHOICES
- PRESERVATION
- RETURN ON INVESTMENT
- JOB CREATION
- COMMUNITY GATEWAYS
- PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Adopting specific stormwater control standards, designs, and best management practices reduces the adverse effect of stormwater and improves the quality of groundwater, streams, rivers, and lakes in and around the region. Stormwater poses a threat to the public health, safety, and welfare if it is unmanaged. It is essential that the stormwater infrastructure is mapped, regulated, and funded through a utility fund or other stable means to ensure that flooding and erosion is limited and prevented.

There are four water supply watersheds located in the area: the Tar River, Little River, Smith Creek and Fantasy Lake that encompass approximately 94,000 acres of land. Protecting the watersheds through adaptation and implementation of Stormwater Best Management Practices (BMP) will ensure development and transportation infrastructure is properly designed and located.

Why the Need? There is an inherent interest in protecting the associated watershed area of the NEAS as expressed throughout the planning process. Many constituents of the study recognize the value of protecting this valued resource as well as the land area surrounding the “Greenheart”. Today, a Stormwater Ordinance for the three towns of Wendell, Rolesville, and Zebulon is governed and administered by Wake County. With this in mind, Wake County governs plan review (fee collected), permit issuance, construction inspections, enforcement, and post-construction maintenance inspections of



Tar River at Mitchell Mill Pond

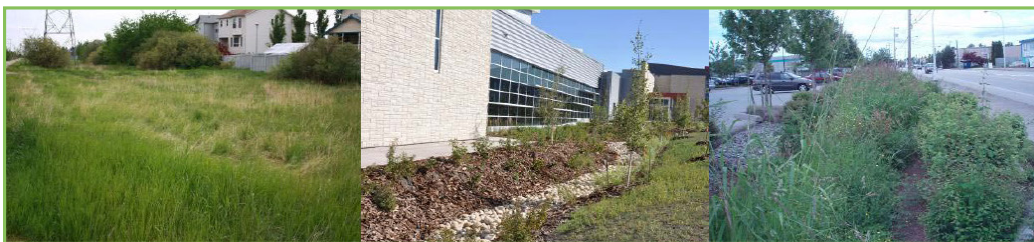
Stormwater management and requires the following:

- Downstream Impact Analysis
- Flood Protection Zones (100 Year Floodplain)
- Buffer Zones (50 foot buffer of perennial or intermittent waters)
- Volume Management
 - > Target Runoff volume for ultra low- and low-density development
 - > BMPs controlling the first 1" of runoff for high density development
- Peak Flow Management
- Incentives for Low Impact Development

For specific requirements, please refer to the Wake County water quality link.
www.wakegov.com/water/stormwater/management/program/Pages/default.aspx

Wake County is also a National Pollutant Discharge Elimination, Phase II Permit (NPDES II) County. The County must make stormwater management proposals to the State Division of Water Quality and receive a NPDES II permit. Wake County, the State, and cities (including Wake Forest as a Consensus Designee) have held meetings for County residents to review the new flood maps (<http://www.ncfloodmaps.com/>). Wake Forest, in particular, has taken proactive steps to help prevent erosion of the local drainage system.

Franklin County stormwater ordinance applies to the Tar-Pamlico River Basin and the Falls Lake Watershed area which is outside of the NEAS study area. Even though there is no consistent policy on Stormwater management throughout the NEAS study area, there is interest among participants of working together to employ best practices.



Bioswale and Rain Gardens from the Low Impact Development Best Management Practices, Design Guide, City of Edmonton, Alberta Canada Nov 2011.

Stormwater Control

STRATEGIES

As land is developed, new impervious surfaces increase the amount of runoff during rainfall events, disrupting the natural hydrologic cycle. The study area continues to experience significant growth and having a pro-active best management practices and policies in place will greatly facilitate the control of stormwater. Protecting the watershed areas will safeguard fish and wildlife habitat, human health, recreation, and drinking water supplies. The following measures are recommended:

- Establish a stormwater management advisory commission,
- Develop and adopt stormwater management policies for all communities in proximity to the Greenheart and other water supply watersheds,
- Encourage the use of Low Impact Development (LID) strategies
- Map all existing/planned stormwater control infrastructure and waterways, and
- Implement stormwater funding taxation and policy.

Policy recommendations for implementation in the study area include:

- **Stormwater Best Practices:** Review existing conditions, environmental concerns and develop community sensitive stormwater best practices for adoption. Educate and promote widespread use of the best practices.
- **Stormwater Management Capital Improvement Program:** Utility tax rates should be implemented based on the property's effort to implement Low Impact Development (LID) strategies on-site.

APPLICABILITY

Stormwater control policies should be adopted and implemented in all local jurisdictions. The benefits and applicability include:

- Public well-being and safety
- Protected watershed areas
- Reduced runoff, pollutants loading, flooding, and groundwater recharge

BEST PRACTICES

The Town of Wendell's UDO supports innovative stormwater management best practices by encouraging disconnected impervious surfaces and pervious pavement. Section 10-10 of the UDO specifies that when parking areas exceed the minimum parking requirements by a certain percentage (i.e. 150-200%) a percentage of parking spaces are required to be constructed of pervious pavement or other porous materials.



Pervious Pavers

Additional stormwater design techniques are detailed in Stormwater Best Management Practices Toolbox (NCDOT, Version 1, March 2008).

For More Information:

connect.ncdot.gov/resources/hydro/Stormwater%20Resources/Stormwater%20Best%20Management%20Practices%20Toolbox%20-%20March%202008.pdf

Stormwater best practices are detailed in Stormwater BMP Manual (NCDENR, July 2007).

portal.ncdenr.org/web/wq/ws/su/bmp-manual

Specific street standards for in-street stormwater retention in new or retrofitted collector streets can reduce overall construction and lifecycle costs of managing stormwater as compared to conventional underground piping systems, detailed in Charles River Watershed Association, "Low Impact Best Management Practices Information Sheet"

For More Information:

www.crwa.org/projects/docs/everett_task2.pdf

Design recommendations are detailed in Low Impact Development: A Guidebook for North Carolina

For More Information:

www.ces.ncsu.edu/depts/agecon/WECO/lid/documents/NC_LID_Guidebook.pdf

Gateways

■	HEALTHY CHOICES
X	PRESERVATION
■	RETURN ON INVESTMENT
■	JOB CREATION
X	COMMUNITY GATEWAYS
■	PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Gateways welcome residents home and invite visitors in. They define a community both in terms of geography and identity. Through signage, landscaping, art and structural elements gateways help create and communicate a unique sense of place. Well-designed gateways offer not only a glimpse into the community’s history but also an indication of its future direction. They are the first impression of a place. Individual communities should look to preserve and enhance key gateways as an economic development tool and a quality of life indicator.

STRATEGIES

Preserve defined edges between towns and countryside

The intensity and character of development should change or transition between rural areas, suburban areas, and downtown areas. Rural areas should be marked by low density land uses and design features that preserve the rural character of the region’s farms and forests. Incorporating design features such as fence rows, landscape buffers and the preservation of fields and tree stands can help mitigate negative aesthetic impacts. In some cases riparian forests can serve as a defining “edge.” Many towns in the Northeast Area are bordered by forests that provide a natural demarcation between the



Conceptual Gateway Sketch



town and the countryside. The character of these defining features should be preserved in tandem with development.

Integrated public space (i.e. pocket parks)

Pocket parks or trailheads for greenways can be strategically located to serve as gateway features as well as publicly assessable open space. They can be assembled from parcels with otherwise low development potential and provide buffers between less compatible uses.



Potential gateway features near Bunn, NC

Gateway Streetscapes and Monuments

The built environment should transition between rural and suburban areas. In addition, there is a need to mark the transition between rural areas or automobile oriented highway areas and more intimate neighborhood and downtowns. This can be accomplished by changes in street cross-sections and properly locating monuments or other structures to mark the perimeter of towns and communities.

APPLICABILITY

- Areas on major arterials leading into towns.
- Entryways into downtowns and historic communities

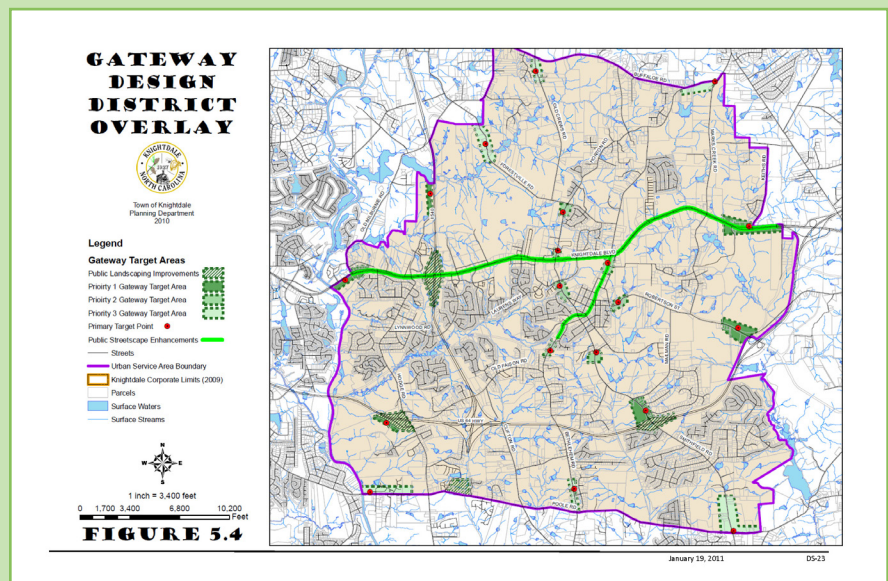
BEST PRACTICES

Knightsdale Gateway Overlay District

The Town of Knightsdale has established an overlay district that outlines areas where landscaping improvements and gateway features are encouraged to be constructed through public and private efforts.

For more information:

www.knightsdalenc.gov/modules/showdocument.aspx?documentid=684



Gateway Design District Overlay

Encourage Infill & Re-investment

- HEALTHY CHOICES
- PRESERVATION
- RETURN ON INVESTMENT
- JOB CREATION
- COMMUNITY GATEWAYS
- PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Each town in the study area has an established downtown which acts as a center of the community. This is typically the route of local parades. The downtowns are more walkable than most other parts of the region due to a mixture of uses, sidewalks and a connected street network. They have established retail areas, churches, schools, parks and smaller lot residential uses. Some are remnants from the railroad era when the towns were founded. Others, like Rolesville and Bunn, were cross-roads that grew into towns. Although some main streets no longer serve as the primary route through town, each has a unique character and set of attractions and activities that continue to draw visitors. Downtowns are critical to local culture and the economy; it is essential to support policies that contribute to vibrant downtowns. Public investment in downtowns, in the form of streetscape projects, façade grants, pocket parks and town facilities can spur private development that can lead to increased tax revenues.

STRATEGIES

Encourage flexible zoning that allows development that provides a balanced mix of commercial, residential, cultural and civic uses.

Places that feature a complementary mix of uses promote walkability and ensure that there are “eyes on the street” and patrons for businesses during all hours of the day. Each community should determine the appropriate density, intensity, range of uses to insure that new development is financially viable within the local market and compatible with, and connected to, existing developments.

Consider implementing streetscape improvement plans for major commercial corridors.

Improved streetscapes have a variety of environmental, economic and social benefits including providing safer environments for bicyclists and pedestrians, increasing the property values of homes and businesses and reducing water treatment costs by facilitating natural storm water filtration. Individual communities should identify areas where streetscape improvements could improve the vitality and prosperity of the area.

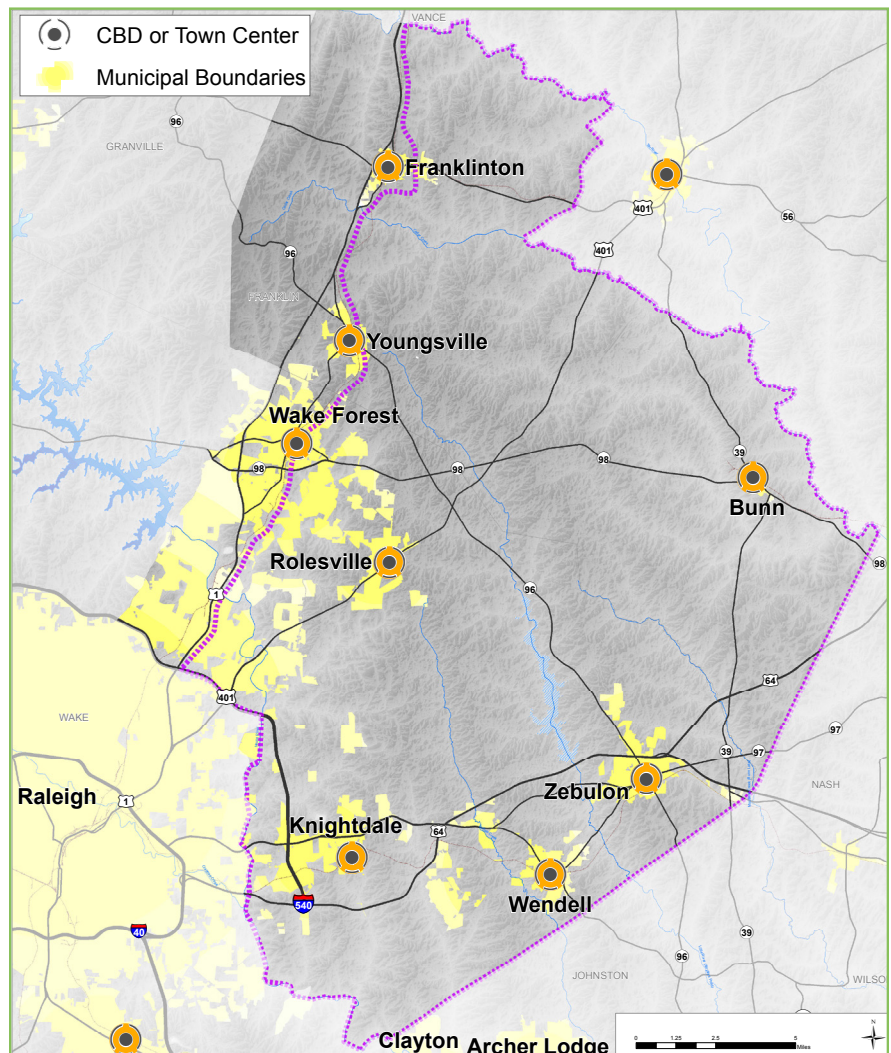
Encourage Infill & Re-investment

Façade Grants

A program that encourages local business owners to invest in improvements to buildings through matching grants can increase the attractiveness of downtowns and increase property values.

APPLICABILITY

All downtown areas in the NEAS Study Area.



Existing Town Centers in the NEAS Region

BEST PRACTICES

Apex Small Town Character Overlay District

The purpose and intent of the Small Town Character Overlay District is to repeat the spirit of traditional character rather than imitate style. The Overlay surrounds Apex's Historic District. The Overlay identifies the architectural qualities that define the downtown character and proposes design standards to maintain that character in new and infill projects.

For More Information:

files.www.apexnc.org/docs/plan/udo/sections/section006_003.pdf

Knightdale Downtown Streetscape Project

The Town of Knightdale recently implemented a streetscape project in "Old Town" which added parking spaces, pavers, crosswalks, landscaping and street furnishings. This project is a good example of investing in a historical center.



Knightdale streetscape project

Statesville, NC Streetscape Project

Statesville, NC initiated a streetscape project to replace gaining underground infrastructure and make downtown more pedestrian-friendly to encourage more visitors to frequent downtown businesses. The project includes the replacement of aging water pipes, storm drains and the installation of new electrical lines below ground. Above ground changes include paving, new sidewalks, curbs, crosswalks, street furnishing, lighting, plantings and traffic signals.

For More Information:

www.ci.statesville.nc.us/Departments/PublicWorks/StreetscapeProject/tab-id/347/Default.aspx

Town of Apex Facade Grant Program

Over the past several years the Town of Apex has directly impacted the revitalization of its downtown through a number of initiatives including the Façade Grant Improvement Program. Downtown merchants and business owners within the Historic District are able to apply to the Town to receive grant funding to improve their façade. The Façade Grant Program is designed to provide incentive funds to tenants/property owners to increase rehabilitation activity in the Central Business District. The grant can provide 50% of the cost of the exterior rehabilitation up to a maximum of \$1000.00 per façade.



Apex downtown before facade improvements



Apex downtown after facade improvements

Support New Activity Centers

	HEALTHY CHOICES
	PRESERVATION
	RETURN ON INVESTMENT
	JOB CREATION
	COMMUNITY GATEWAYS
	PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Participants conveyed a need for additional shopping and employment opportunities in the study area. The “jobs-to-housing balance” is one indication of return on investment since employment bearing land uses (i.e. commercial, office and industrial land uses) typically require less government services. Presently the jobs-to-housing balance in the study area is 0.45. This means that there is one job available for every 2 households. Most residents have to drive outside of the area to find work. This also results in longer driving trips for non-work purposes since some shopping needs cannot be fulfilled within the region. Identifying appropriate locations for office, industrial and retail development, investing in infrastructure and marketing development-ready sites can increase the jobs-to-housing balance, reduce trips and increase return on investment.

STRATEGIES

Identify areas where non-residential and mixed use development is appropriate.

Work with citizens, elected officials, county and regional entities to identify locations where transportation and utility infrastructure could support non-residential or mixed-use centers. These areas are best located inside existing urban service areas and where adjacent existing development is compatible with proposed uses.

Identify priority investment areas to target infrastructure investments to ensure an equitable distribution of job growth throughout the study area.

A priority investment area means an area where more significant development and redevelopment is preferred and where investment in infrastructure to support more significant development and redevelopment is encouraged. One step to facilitate an understanding of infrastructure needs is to establish an infrastructure coordination committee. The role of this committee would be to disseminate information regarding planned infrastructure improvements to participating members. The sharing of information could reveal partnership opportunities that would result in cost savings for participating jurisdictions.

Develop conceptual plans for existing and future activity centers.

An important part of gaining support for infrastructure investment and cultivating private partners is to have a clear vision and a plan of action. Whether for a downtown or a future mixed use area, a concept plan can help start the discussion.

Support New Activity Centers

Develop a supply of highly-marketable, development-ready sites to attract companies to the area.

Key to attracting new jobs to the study area is ensuring there is a supply of available sites with access to the main transportation corridors, water and sewer service, educated labor pools, and internet infrastructure. Through local land use policies, targeted infrastructure investments, site certification and redevelopment the region can provide a supply of prepared sites available to expanding and relocating businesses.



Mixed Use Development, Baxter, Ft. Mill, SC

APPLICABILITY

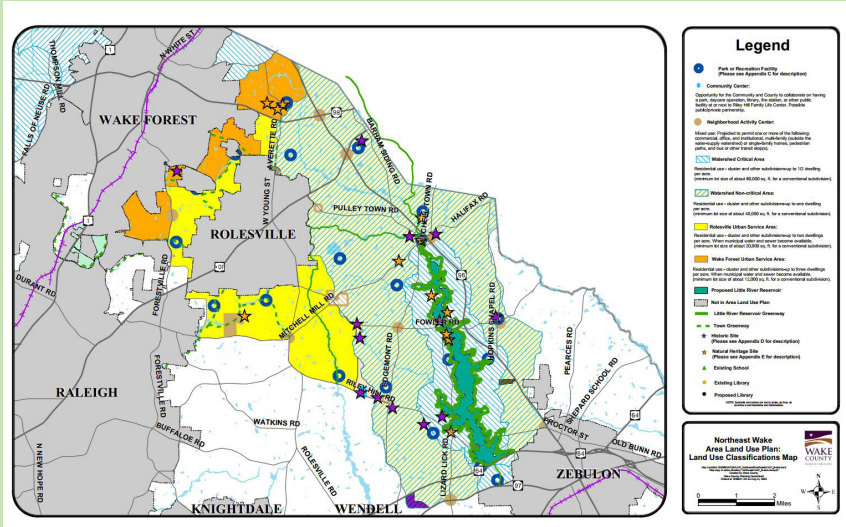
Many local governments have adopted plans that identify existing and potential activity centers. Those towns and counties that do not have plans that identify these locations should identify potential activity centers during the next land use plan update. Where activity centers are already identified, local governments should evaluate ways development can be encouraged in these areas and how ordinances can define design guidelines that can help create walkable areas with a mix of densities and uses.

BEST PRACTICES

Wake County Area Land Use Plans

Wake County has adopted area land use plans that identify future community and neighborhood activity centers. These centers are referenced in the Unified Development Ordinance, which encourages affordable housing and mixed use development in these areas.

For More Information:
www.wakegov.com/planning/growth/pages/lup.aspx

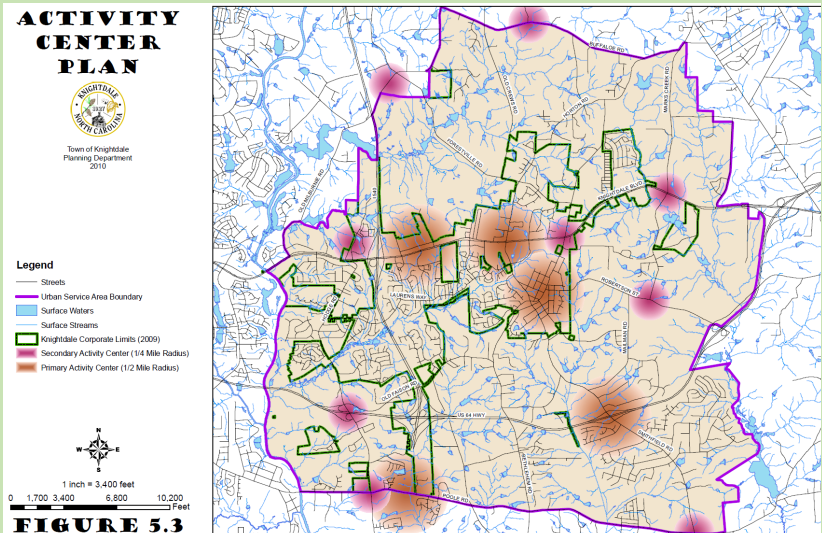


Wake County Northeast Area Land Use Plan

Knighdale Comprehensive Plan

The Town of Knightdale Comprehensive Plan identifies potential activity centers as areas where clusters of shops, services, and residential uses are appropriate.

For More Information:
<http://www.knightdalenc.gov/modules/showdocument.aspx?documentid=702>



Town of Knightdale Comprehensive Plan Activity Center Map

South Salem Street Small Area Plan

The Town of Apex has developed a plan for a transit oriented development node at the intersection of the Triangle Expressway and South Salem Street. The plan is used to guide development in the area.

For More Information:
http://files.www.apexnc.org/docs/plan/540-Salem_Brochure.pdf



Town of Apex South Salem Street Small Area Plan

Residential Density

- X HEALTHY CHOICES
- X PRESERVATION
- X RETURN ON INVESTMENT
- X JOB CREATION
- X COMMUNITY GATEWAYS
- X PROTECTING MOBILITY

DESCRIPTION & BENEFITS

Land use modeling during the Northeast Area study showed that by allowing a mix of medium density residential uses moderate increases in residential densities inside urban service areas can result in more efficient provision of services, increases in tax revenue, increases in walkability, lower housing costs and more vibrant downtowns.

STRATEGIES

Allow small residential lots

Identifying well located vacant tracts of land where “pocket neighborhoods” of small lot, cottage style homes could be built can provide incentives for infill and the creation of walkable communities.



Pocket Neighborhoods with Auxillary Units

Allow accessory dwelling units in single-family zones

Allowing the addition of secondary residences or “granny flats” in certain residential zoning districts can help accommodate changing demographics (aging baby boomers) and increase density with minimal visual disruption.

Encourage a mix of housing types inside urban service areas

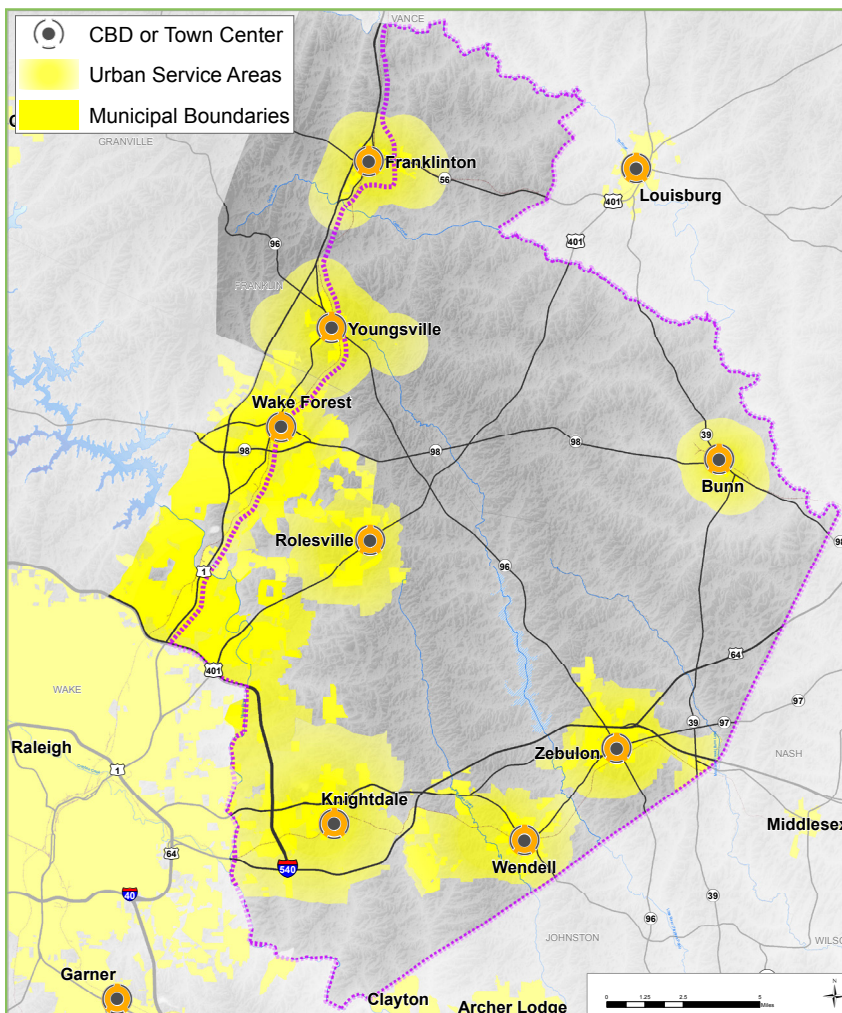
Allowing clustered residential development and encouraging a mix of



residential structures can provide more flexibility for developers while preserving the neighborhood feel of existing communities. In addition, mixed residential neighborhoods can be more visually appealing than traditional tract housing.

APPLICABILITY

Increases in allowable residential density should only be allowed where adequate infrastructure exists and where development can occur without disrupting the character of existing neighborhoods.



Existing Urban Service Areas in the NEAS Region

BEST PRACTICES

Wake County, Raleigh, Knightdale and Wendell have identified areas where single family lots can be under 5,000 square foot.

For More Information:

www.wakegov.com/planning/zoning/Documents/adoptedordinance.pdf

www.raleighnc.gov/content/extra/Books/PlanDev/UnifiedDevelopmentOrdinance/

www.knightdalenc.gov/index.aspx?page=164

www.townofwendell.com/departments/planning/development/zoning/udo-unified-development-ordinance

National organizations have a few publications that detail ways to encourage a mix of residential uses and compact development.

For More Information:

http://www.housingpolicy.org/toolbox/strategy/policies/compact_development.html?tierid=113428

<http://www.pocket-neighborhoods.net/>

<http://www.cohousing.org/>

<http://www.planning.org/pas/quicknotes/pdf/QN12.pdf>

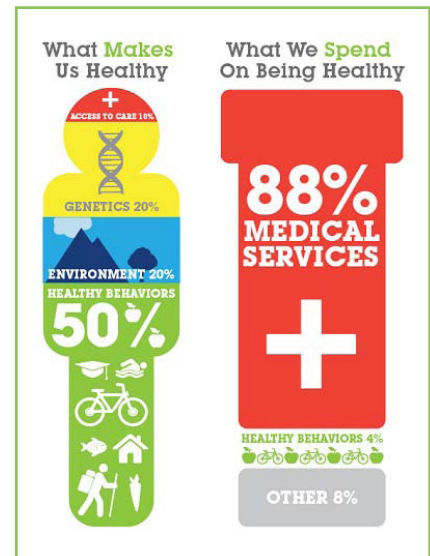
<http://www.planning.org/research/smartgrowth/pdf/section44.pdf>

Healthy Communities

- HEALTHY CHOICES
- PRESERVATION
- RETURN ON INVESTMENT
- JOB CREATION
- COMMUNITY GATEWAYS
- PROTECTING MOBILITY

DESCRIPTION & BENEFITS

The linkage between particular measures of community health and the built environment in which people live, work, and recreate is proving indivisible in light of a growing body of evidence. A community's transportation network is one of the more critical elements of the built environment. Its central role of accessing land uses as well as degree of connectedness, consideration of design, and level of use can dictate the modes of transport people select, distances they are willing to travel, regional economic activity and overall quality of life.



A disjoint between money spent on health and what really makes us healthy

By utilizing health and demographic data, decision makers responsible for improving transportation systems, land use planning and community health can be better informed on goal generation and implementation steps. As part of the Northeast Area Study, a health impact assessment (HIA) was determined to be a valuable element of the planning process to provide such information.

The relevance of the Health Impact Assessment to the NEAS is to explore how health is interwoven among many guiding principles:

- **Healthy Choices:** A key component of NEAS is creating choices so residents can choose to do healthy things, such as taking a bicycle ride along a greenway or going to a park. Planning for land uses that are interconnected via Complete Streets to promote active transportation and programs such as local farmers' markets that promote healthy eating and associated habits are efforts that can be undertaken by public agencies.
- **Preservation:** From a health perspective, preserving community identity and self-preservation through healthy choices are intricately linked. A healthier citizenry means they have more disposable income for investing in their community. Active transportation and recreation promote community identity.

Healthy Communities

- **Return on Investment:** There is a disproportionate emphasis in our health-related expenditures on providing healthcare, when in fact healthy behaviors and the environment in which we live have a much greater impact on creating healthier people. Healthy choices are easier to make when our built environment provides people with places to recreate and ways to reach them by active modes. The return on investment of built environment decisions is realized through both personal economic impacts and community impacts stemming from less expenditure on community health-related services.
- **Personal Health means Community Health:** While much of our national attention with regard to health is focused on provision of healthcare services, it's really the personal health of individuals through their own behaviors that have the greatest impact on health. Communities that provide places for people to recreate, places that are convenient to access via active modes, and programs that encourage healthy habits, such as healthy foods and tobacco-free living, are also communities that are proven to achieve financial success. Happy and healthy citizens are the best recruitment tools for sustained growth, whether its population or employment.

How a community grows in a healthy manner is oftentimes overlooked when it comes to planning and policy-making, but the essence of planning is to promote public health. In North Carolina, a city or county's authority to plan rests mainly in how it pursues consideration of growth through land use policy. City and county zoning regulations are required to be developed in accordance with a comprehensive plan. It is the comprehensive plan that is considered in developing zoning changes. The General Statutes also state that "zoning regulations shall be designed to promote public health, safety and the general welfare." (NC General Statutes §160A-383)

Language regarding a community's responsibility to promote public health through its built environment decisions is not insignificant. "Shall" and "substantially" have strong legal ramifications. Other general statutes where health is inter-woven among other county and city authorities are highlighted below (emphasis added). This is where the theme of transportation's relationship to these authorities is mentioned. The health-related language in the General Statutes is common to most states in the United States, as these authorities stem from the United States Constitution and many state constitutions. Over the course of decades, the health-related requirements placed upon new development have been relegated to six main considerations:

-
- Access to a clean water source;
 - Access to a sanitary sewer;
 - Setbacks to prevent overcrowding;
 - Subject to building permits to ensure structural integrity;
 - Open space requirements; and
 - Access by emergency services.

This means that when a community approves land use along a mile-long corridor to include big box stores, fast food restaurants and facilities that promote only motorized vehicle access, these communities are saying the decisions to approve this development “substantially” promotes public health.

The purpose of that last statement is not to suggest that we must deny such land uses, rather we should broaden our view of what public health means with regard to growth. We may not be able to deny a fast food restaurant, but we can offset the potential negative effects of the poor nutritional choices it provides by organizing a community farmers’ market.

Likewise for transportation, it is the high-speed, high-volume arterials that attract land uses that can have potentially negative effects on public health. Studies have indicated a demographic concern related to where major high-



Understanding the health needs of rural communities is critical for the NEAS region. Access to facilities is one such need.

Healthy Communities

way investments were placed. While older highway investment frequently bisected minority population neighborhoods, recent trends suggest lower residential property values adjacent to major, high speed, high volume transportation facilities.

The health assessment, undertaken as part of this study, is not meant to simply republish data and survey information gathered from both the Community Health Assessments undertaken by county health departments or the Census. Instead, the document is meant to use information to illustrate health conditions impacted by the built environment by isolating or combining sources and determine points of emphasis in the future.

STRATEGIES


Continue building a complete geographic picture.

While there is substantial county-level data that is available for a variety of health topics, there is little data available that allows planners, individual communities and others to obtain a snapshot of health conditions within a geographic area that is more refined than a county. Wake County data is skewed toward the existing developed areas and little is known about conditions within the NEAS area. CAMPO and its member agencies can work with state and local health officials to fine tune existing data and work to integrate more geographically-specific element into future data gathering efforts, such as the Community Health Assessment.

Surveys can be expensive and challenging to administer, especially in rural areas where reaching more isolated population segments can complicate the process. Despite these challenges, both technology applications and methods are permitting surveying to reach more people. Striving to reach more rural populations, higher minority concentrates areas, and older residents will only help strengthen future planning efforts.

Ensure planning efforts of all types consider health issues.

Information gathered by health agencies and organizations are invaluable. Most public involvement efforts consist of gathered opinions and loosely organized facts used to determine what people want in the future. Health



data tells planners both the results of past planning efforts and illustrates the perceptions of existing conditions. Public involvement will always be important in planning, but seeing the results first-hand based on health should be a powerful way for planners to learn what is or isn't working in a community. The Best Practices identified in this section identify some efforts that could be replicated by CAMPO and its member agencies, not just for the NEAS but elsewhere within CAMPO's boundaries.

Probe further into survey responses.

Health surveys can contain a tremendous amount of information, most of it very useful to either give specific information about or to illustrate broad conditions. Taking the subsequent step to explore answers with greater scrutiny is recommended so that planners and policy makers know the motivation behind selecting particular answers. When asked in a survey, a full one-third of responders were neutral about whether Franklin County is a good place to grow old. Combined with a 13% disagree segment, nearly half of residents do not see the region as a good place to grow old. Knowing why people feel this way is extremely helpful when trying to combat the very issues that may contribute to such an attitude.

Give a rural and urban perspective.

While Franklin County is largely a rural area with small towns, Wake County is a compilation of urban centers, suburban cities, and rural communities. At the very least, differentiating between urban and rural issues, data, and strategies will help decision makers to raise awareness for the two sets of circumstances and formulate responses sensitive and affective to land use context. Probing the communities with regard to public health as noted under the strategy on building a complete geographic perspective will help better define issues and potential solutions within these communities. For example, Wake County is listed as the healthiest county in North Carolina and one of the healthiest in the United States by the annual County Health Rankings conducted by the University of Wisconsin. This hampers efforts by health organizations in Wake County to obtain grants for pockets of the county that have a higher prevalence of poor health conditions (e.g. inner city neighborhoods in Raleigh and outlying rural areas primarily represented by the NEAS).

BEST PRACTICES

Below are five case studies of communities and organizations similar to those stakeholders in the NEAS who have taken steps to integrate health and built environment policy through a variety of planning, policy and program interventions. These case studies are intended to offer ideas to NEAS communities and agencies to better integrate health consideration into the land use and transportation decision-making process as they attempt to address health conditions, such as those summarized in this report. As broad state-wide or regional land use policies are difficult to change, these case studies offer solutions for CAMPO, cities, counties and NCDOT that can be instituted within the existing policy framework.

Atlanta Regional Commission – Livable Centers Initiative & Lifelong Communities

In the late 1990s, the Atlanta Regional Commission began developing its Livable Centers Initiative. ARC—as the MPO for the region—recognized that its most powerful force for change was the direct allocation of federal transportation funding that it was allowed to prioritize for funding throughout



the region. ARC began the process of funding planning grants to communities interested in pursuing land use and other development policies that conformed to the region's overall goal for increased livability. Since its inception, ARC has awarded millions of dollars to communities for these planning grants and now

prioritizes its direct allocation funding to go to those communities who have adopted and are implementing policies for growth and development that promote the region's vision for livability.

The Livable Centers concept morphed into another initiative in combination with the Area on Aging to assess Atlanta-area communities to determine how adaptable they were to someone who grew up in a community and wanted to live their entire life in that community. Can they live in the same neighborhood as a child, as an adult and as a senior citizen and still enjoy the same level of access to goods and services? The answer for many suburban Atlanta communities was: No, they could not. This has led to communities evaluating their land use, recreation, education, transportation and economic development strategies to create a community that allows it to bridge generations and continue to prosper.

For more information:

www.atlantaregional.com/land-use/livable-centers-initiative

Davidson, NC - Design 4 Life & Livability Board

Davidson (population 11,000) is viewed in North Carolina and the United States as a standard bearer for integration of health and built environment



decision-making. Davidson has the resources and demographic to implement progressive livability initiatives. But they have also put themselves at the forefront

of wanting to explore how to be a model community that is “Small Town Fit” —the title of a book edited by townspeople to illustrate the community’s “healthy people, places and policies.”

Davidson pursued and received a grant from the Centers for Disease Control and Prevention (CDC) to conduct nine health impact assessments over a three-year period. Through their Davidson Design 4 Life initiative, they are conducting health impact assessments for various state, local, and regional policy and planning efforts. These efforts have included:

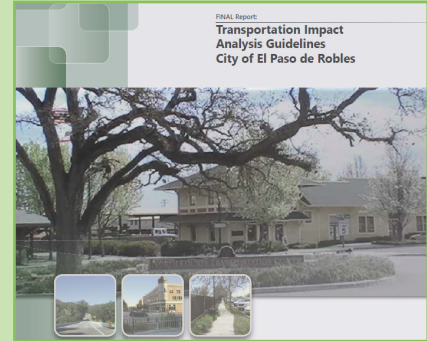
- Senate Bill 731, which proposed to amend zoning legislation
- Davidson’s Street Design Standards
- The Red Line Commuter Rail planned for the corridor between Charlotte and Mooresville
- Food System Planning
- Parks, Recreation & Public Spaces Planning
- Universal Design requirements within Davidson’s planning ordinance
- Davidson’s Pedestrian and Active Transportation Plan

Davidson has also organized a Livability Board that is called upon for advice and recommendations to the Town Board on matters related to quality of life, safety, healthy choices for transportation, food and energy use, and quality design and planning.

For more information:
www.healthimpactnc.com/

CA – Multimodal Transportation Impact Study Guidelines for New Development

In 2013, Paso Robles, CA, (population 30,000) adopted new standards to guide how transportation impacts studies were conducted on new development. In most communities and DOTS, traffic studies typically require analysis of vehicular traffic movement to identified operational and capacity issues that may be brought about



by new development. Such studies are not required to evaluate multi-modal transportation impacts and balance level of service findings with community goals for quality of life. Paso Robles' new Transportation Impact Study Guidelines require a "Circulation Element" be incorporated into the traffic study to evaluate personal mobility, reduction of vehicle miles traveled, and a balanced network for all transportation modes. Their policies state that "street widening and the consideration of additional lanes shall be evaluated in the context of potential impacts to community character, convenience to non-auto modes, safety and cost-benefit."

While the city's requirement still illustrates traffic impacts to streets, other study elements have evaluation criteria applied, including:

- Multimodal Level of Service, through the Highway Capacity Manual,
- Pedestrian Environmental Quality Index, at intersections and street segments,
- Bicycle Environmental Quality Index to determine how to protect bicyclists,
- Activity Connectedness, looking at travel times for each mode (walking, biking, transit, driving), and
- Speed Management, desired travel speeds for each mode.

From this, the development must identify deficiencies for each mode, not just automobiles, and make recommendations for correcting the deficiencies as part of the development review process.

For more information:

www.prcity.com/government/departments/commdev/



MountainWise – Health & Wellness Comprehensive Plan Integration

In Western North Carolina, the regional initiative of the CDC-funded Community Transformation Grant (known as MountainWise) is leading an effort to enhance county-level Comprehensive Plans to include a Health & Wellness Chapter that identifies policy gaps, “hot spots” of poor health conditions, and bridges health and built environmental planning and policies. The eight most western counties in North Carolina are part of this effort that will also generate a regional health impact assessment on built environment

planning and policy. An early finding of the effort is that existing health elements contained within town and county plans are mostly an inventory of existing conditions (e.g. The County has a 300-bed hospital and medical center) instead of a plan that integrates future health needs into decisions regarding future land use.

The Health & Wellness Comprehensive Plan effort will also identified success stories within the region and in similar communities nationwide to serve as a tool box or small town and rural area health considerations.

For more information:
mountainwise.org/

Nashville Area MPO – Health & Well-Being

Like Davidson, the Nashville Area MPO was the recipient of CDC-funding to explore how to better integrate regional planning, built environment policies and health impacts. With Tennessee ranked fourth-worst in the nation for obesity rates, the Nashville Area

MPO is weaving public health considerations throughout its various planning and policy efforts. The MPO’s 2035 *Regional Transportation Plan* effort brought about a significant shift in how transportation

projects are scored to emphasize outcomes for air quality, provision of active transportation facilities, injury reduction for all modes, improvement to personal health, and equity of transportation facilities in underserved communities. The Plan includes 70% of the adopted roadway projects that have active transportation infrastructure, which is an increase from the 2030 Plan, which included active transportation elements in only 2% of projects.

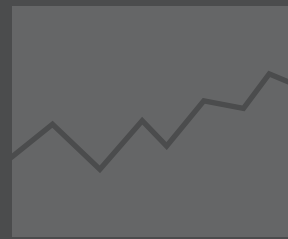
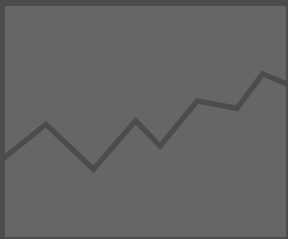


The MPO is also evaluating projects based on other factors not as directly related to transportation. Proximity to grocery stores, farmers markets and emergency food sources are also considerations in how staff evaluates projects. This has led to linking food desert analysis to transportation and a Health Impact Assessment on transit-oriented development tied to school siting.

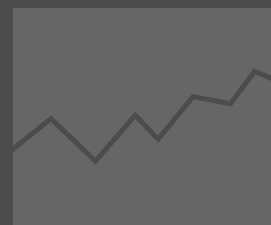
The Nashville Area MPO has found that how it frames these issues is critical to leveraging support for such initiatives. Like CAMPO for the NEAS, they began by integrating health themes into broader planning effort, which resulted in convening new stakeholders and offered opportunities for cross-pollination of professionals and agencies within the region. Nashville also cites issues with lack of data for populations with health disparities and high rates of chronic illnesses. This led to the MPO adding health data pursuits as part of its most recent household travel survey.

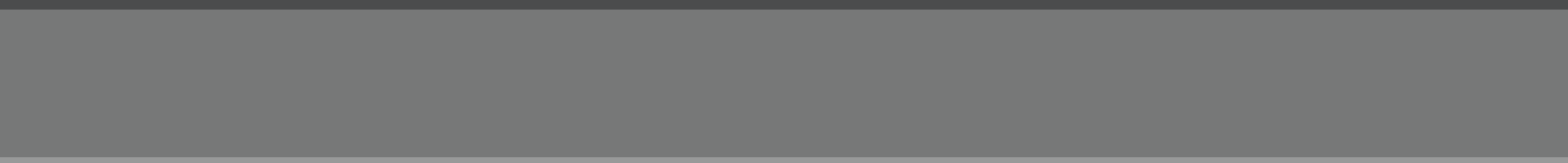
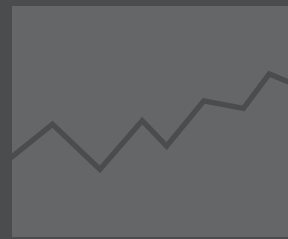
For more information:

www.nashvillempo.org/regional_plan/health/



APPENDICES





Plan and Policy Review

OVERVIEW

The Northeast Area Study includes all or part of eleven jurisdictions. Each of these jurisdictions, including two counties and nine municipalities, has locally adopted plans and ordinances that govern land use and transportation policy. As part of the Study locally adopted plans were evaluated for components that influence the form of the built environment, including recommendations for future land use patterns and transportation improvements to be completed in tandem with new developments. The Plan and Policy Review Matrix (included as Attachment A) that was developed outlines areas where local governments have similarities and differences regarding land use and transportation policy. In addition, the Matrix outlines areas where local governments could improve policies.

METHODOLOGY

Locally adopted plans and ordinances were collected and reviewed by the project team. Initial meetings with the Core Technical Team (CTT) provided insight regarding how the Northeast Area Study could evaluate the status of local planning efforts and provide direction on how they could be improved. Based on these discussions the project team developed a list of plans, policies, and ordinance components that are relevant to the goal of improving and preserving regional mobility across all modes of travel. A questionnaire was developed and distributed to CTT members. The questionnaire asked questions related to the existence of certain components of local plans and ordinances (i.e. a municipal Pedestrian Plan) as well as the perceived effectiveness of the implementing ordinances. Based on the review of local plans and ordinances and the results of the questionnaire, the project team assembled the Plan and Policy Review Matrix. Plans, policies and ordinances (and components thereof) are listed on the left hand side of the matrix. These items are organized under three themes: Documents, Transportation Facilities & Requirements, and Development Standards. The matrix values indicate whether a locally adopted plan, policy or ordinance exists for that jurisdiction. A "Needs Improvement" designation indicates that the plan, policy or ordinance component could be updated to incorporate best practices or existing regional plan elements. In some cases, Needs Improvement designations indicate that additional clarity or plan components are required to meet regional best practices or that the jurisdiction has adopted ordinance language that supports the plan component, but does not actually require its incorporation. Vague ordinance language such as "may be required," as

Plan and Policy Review

opposed to “shall be required where...” illustrates this distinction. A table is included as Attachment B, after the matrix that provides explanations of needs improvement designations.

APPLICABILITY

The Plan and Policy Review Matrix outlines plan components and policies that influence land use decisions and the long-term functionality of the transportation system in the Northeast Area. The Matrix is meant to be used as a guide for local governments and as a way to display the strengths and weaknesses of adopted policy, as well as to indicate areas where improvements could be made. Incidentally, the Matrix will also be used by the Northeast Area Study project team to inform the structure and content of the Best Practices Policy Guidebook that will be created as part of the Study.

DRAFT CAMPO NEAS Plan and Policy Review Matrix
11/27/2013

Plan/Policy/Ordinance	Counties		Municipalities								
	Wake County	Franklin County	Raleigh	Wake Forest	Knightdale	Wendell	Zebulon	Rolesville	Franklinton	Youngsville	Bunn
Documents											
Zoning Code	●	●	●	●	●	●	●	●	●	●	●
Land Use Plan	●	●	●	●	●	●	●	●	●	●	○
Local Transportation Plan	○	●	●	●	●	○	●	●	-	-	-
Collector Street Element/Plan	○	-	●	●	●	○	-	●	○	-	-
Bicycle Plan	●	○	●	●	●	-	-	●	-	-	-
Pedestrian Plan	-	-	●	●	●	-	-	-	-	-	-
Greenway Plan	●	-	●	●	●	●	●	●	-	-	-
Transportation Facilities & Requirements											
Sidewalk Policy (Requiring Sidewalks or Fee in Lieu)	○	○	●	●	●	●	●	●	○	●	-
Sidewalk Design Requirements (Minimum Width & Physical Separation Between Sidewalks and Street)	○	○	●	●	●	●	●	○	○	-	-
Bicycle Facility Requirements	○	-	●	●	●	●	-	○	-	-	-
Bicycle Parking Requirements	-	-	●	●	●	●	-	-	-	-	-
Complete Streets Policy Adopted	-	-	●	●	●	-	-	-	-	-	-
Connectivity Ordinance/Policy	●	●	●	●	●	●	○	○	○	○	-
Connectivity Index Policy	-	●	-	-	●	●	-	-	-	-	-
Access Management Policy on Arterials	●	●	●	●	●	●	○	●	●	○	-
ROW Preservation Policy	●	●	●	●	●	●	-	●	●	●	-
Transportation Impact Fee Rate	-	-	\$1,022-\$1,859 per unit	-	\$400 per SFD	-	-	\$450 per unit	-	-	-
Traffic Impact Analysis Required for Large Projects	●	●	●	-	●	●	●	●	-	-	-
Existing or Planned Park and Ride Lots	-	-	●	●	●	-	-	-	-	-	-
Current Bus Routes	●	-	●	●	●	●	○	-	-	-	-
Planned Bus Routes	●	-	●	●	●	●	○	-	-	-	-
Development Standards											
Gateway Regs/Overlay District	-	-	●	-	●	●	●	-	-	●	-
Mix of Uses and/or Density Promoted in Walkable Areas or Near Current and Future Transit	●	●	●	●	●	●	●	●	●	-	●
Minimum Lot Size for SF	3,000	5,000	4,000	5,000	None	2,400	8,000	11,250	6,000	15,000	8,000
Minimum Parking requirement for Retail (spaces per 1k gross floor area)	3.33	7.5	5	5	3	2	5	5.5	5.5	5	7.5
Parking Maximums	-	-	○	-	●	-	-	-	-	-	-
Maximum Cul-de-sac length (ft)	2,500	1,200	400-800	800	200-500	300-800	550	500	-	900	-
Maximum Block Length (ft)	-	-	660-1500	400-2600	660-1500	800-1200	1000	-	400-1800	-	-
Population Estimate*	185,175	52,925	412,311	30,152	11,904	5,967	4,493	3,976	2,027	1,170	344

Key

- = Existing (Plan, Policies, or Ordinances have been locally adopted and meet or exceed regional best practices)
- = Needs Improvement (Plan, Policies, or Ordinances need to be updated to incorporate best practices or existing regional plan elements)
- = Plan, Policy or Ordinance Does Not Exist

*Municipal Population Estimates from OSBM. County Estimates include only blocks in unincorporated Areas from 2010 Census.

DRAFT CAMPO NEAS Plan and Policy Review Matrix

Needs Improvement Explanations

11/27/2013

Jurisdiction	Plan/Policy/Ordinance	Explanation
Bunn	Land Use Plan	Needs to be updated
Franklin County	Bicycle Plan	Only the NCDOT CTP bicycle plan map exists. This map identifies where on-road facilities need improvement, but it does not provide an intended facility type which is necessary to determine ROW needs and improvements that should be made with development or during maintenance
	Sidewalk Policy (Requiring Sidewalks or Fee in Lieu)	Sidewalks shown in adopted cross sections, but based on response to Plan Review Questionnaire the County does not require construction (or fee in lieu) of sidewalks along arterials, collectors and major internal streets, or where shown on an adopted plan
	Sidewalk Design Requirements (Minimum Width & Physical Separation Between Sidewalks and Street)	Based on response to Plan Review Questionnaire: 6. Does your jurisdiction include streetscape requirements to provide physical separation between sidewalks and street? Only for certain types of residential development.
Franklinton	Collector Street Element/Plan	New location roads from Franklin County CTP need to be adopted locally (not sure if that has been done).
	Sidewalk Policy (Requiring Sidewalks or Fee in Lieu)	Sidewalks may be required by the BOC (Section 153.178), but no specified locational requirements
	Sidewalk Design Requirements (Minimum Width & Physical Separation Between Sidewalks and Street)	Minimum width of four feet specified (Section 153.178), but no separation required or recommended
	Connectivity Ordinance/Policy	Maximum block length specified, BOC can require stub outs to adjacent properties, maximum cul-de-sac length, but no specified requirements for when to connect or minimum connections. Also in other reqs (153.178) Through Traffic Discouraged on Residential Collector and Local Streets.
Raleigh	Parking Maximums	Maximums specified only in certain districts
Rolesville	Sidewalk Design Requirements (Minimum Width & Physical Separation Between Sidewalks and Street)	Based on response to Plan Review Questionnaire: 6. Does your jurisdiction include streetscape requirements to provide physical separation between sidewalks and street? Typically no...though we have occasionally in the past.
	Connectivity Ordinance/Policy	Comp Plan encourages connectivity, UDO limits culdesac length, but UDO specifies that residential collector and local streets shall be laid out in such a way that their use by through traffic is discouraged
	Bicycle Facility Requirements	Recently adopted bicycle plan needs to be referenced in UDO
Wake County	Local Transportation Plan	Plan has not been updated since 2006, should be updated to reflect latest CAMPO CTP and MTP
	Collector Street Element/Plan	Plan has not been updated since 2006, should be updated to reflect latest CAMPO CTP and MTP
	Sidewalk Policy (Requiring Sidewalks or Fee in Lieu)	Pedestrian and off-road trail improvements required on collectors and thoroughfares when criteria is met (i.e. within 1.5 miles of existing or proposed school, 1 mile of activity center, etc.). This criteria needs to be evaluated to see if it is adequate.
	Sidewalk Design Requirements (Minimum Width & Physical Separation Between Sidewalks and Street)	Minimum width specified but no separation required or recommended
	Bicycle Facility Requirements	Bicycle improvements required on collectors and thoroughfares when inside Short Range Urban Services area or required by Transportation Plan. Transportation plan needs to be updated and some roads outside USAs have higher bicycle usage.
Wendell	Local Transportation Plan	Plan has not been updated since 2006, should be updated to reflect latest CAMPO CTP and MTP
	Collector Street Element/Plan	Plan has not been updated since 2006, should be updated to reflect latest CAMPO CTP and MTP
Youngsville	Connectivity Ordinance/Policy	Max culdesac length, but access to adjacent properties may be required by the Planning Board. Too vague.
	Access Management Policy on Arterials	Standard 1,000 ft minimum distance between intersections on arterials, collectors, and thoroughfares, but no other language that limits access on US 1 or NC 96
Zebulon	Connectivity Ordinance/Policy	Max block length and culdesac length, but vague language: "Street system of subdivisions shall be coordinated with existing, proposed and anticipated streets"
	Access Management Policy on Arterials	Recommendations from Arendell Avenue Access Management Plan should be referenced in UDO and perhaps expanded to NC 97 and 64
	Current Bus Routes Planned Bus Routes	Wake County Transit Plan not locally adopted Wake County Transit Plan not locally adopted

