# TRANSPORTATION RECOMMENDATIONS

*[Note: Portions of this section were provided by Kimley-Horn and Associates, Inc. as transportation subconsultants on this project.]*

## GUIDING PRINCIPLES FOR TRANSPORTATION POLICY

Five guiding principles for Leland's transportation policies are:

1. *Coordinate land use and transportation as a means to preserve the quality-of-life cherished by the residents of the Town.* It is imperative that evaluations of the transportation impacts of land use decisions continue to be made, as well as the land use impacts of transportation decisions. Both sets of factors must be considered together to create a balance between land use development and transportation facilities; one without the other would be harmful.
2. *Ensure street interconnectivity.* The Town of Leland should update its land development ordinances including the subdivision ordinance to require a pedestrian system that connects all new developments with nearby destinations.
3. *Use "context-sensitive" street design techniques.* Make sure the design of each street fits its location, in terms of environmental conditions, urban, suburban or rural settings, and the balance between pedestrian and vehicle uses.
4. *Enhance Leland as a walkable community.* The Town should adopt a capital improvement program (CIP) that contributes local funds each year to sidewalk construction and maintenance. The Town could accelerate sidewalk construction on existing high-priority streets—especially collector and thoroughfare streets—through the CIP.
5. *Create the infrastructure for bicycling as a viable means of transportation.* A leisurely speed of 10 mph puts even the farthest reaches of what will be future Leland within a 30-minute cycling time of downtown. For these reasons, designing to accommodate pedestrians and cyclists at key destinations in Leland and along connecting corridors is strongly recommended.

To reduce congestion and protect the environment, new and existing roadways should provide for more efficient movement of vehicles while better accommodating transit, walking, and bicycling. Likewise, all new and improved transportation options should respect the land use and transportation connection by supporting established neighborhoods while anticipating new growth and changing travel patterns.

These policies are further explained and elaborated on in the body of this section.


Source: KHA; adapted from Wisconsin DOT

## LINK LAND USE AND TRANSPORTATION DECISIONS

The Master Plan represents the Town's collective vision for a safe, efficient, walkable, and interconnected transportation system that harmonizes with the natural, historic, and social resources that create Leland's community character.

An efficient transportation system is one that connects neighborhoods and activity centers via a network of streets, paths and trails that are safe and supportive of pedestrians, bicyclists, transit patrons, cars and trucks. Such a system offers choice for short and long trips and promotes convenient movement of people and goods. This is not to suggest that all streets are created alike; in fact, parallel streets may serve different functions.

The history of street building shows patterns of original farm-to-market roads being bypassed over time. Leland School Road was bypassed by Village Road which was later bypassed by US 74/76 which itself will be bypassed by Interstate 140. This series of bypasses builds a useful redundancy in the street network, therefore creating opportunities for community redevelopment and renewal.

Streets contribute significantly to the form of a town or city. To be specific, narrow two-lane streets with on-street parking and safe pedestrian crossings lead to visibly different building form and even land use compared with a high-speed, multi-lane divided highway. Both types of streets are needed in most cities and towns; therefore, the question becomes: how much of each and where do they belong? The Town of Leland is meeting this challenge by evaluating and considering land use and transportation decisions simultaneously, within the context of this Plan.

For a growing area like Leland, linking land use and transportation can reduce capital and operating costs for the transportation system, ensure consistent economic growth, and protect the social and environmental resources.

Leland will benefit from an adopted comprehensive plan as it responds to forthcoming land development applications. The process allows a growing municipality to fill-out its transportation system by leveraging public funds with developer exactions. The combination of public and private funding is essential, for there will be gaps along corridors between developments that should be filled in a timely manner using public funds. Improvements along the frontage of new developments—e.g., sidewalks, street trees, and other streetscape enhancements—can be exacted from developers. In some instances, off-site improvements can be exacted, too.

### *RECOMMENDATIONS*

*Coordinate Land Use Planning Regionally*
One of the town's greatest contributions toward improving the transportation system will be to continue to coordinate responsible land use planning with other towns in Brunswick County and local, regional, and state agencies, including the Metropolitan Planning Organization (MPO).

*Require Transportation Impact Analyses*
As the community develops, it is imperative that continual evaluations of the transportation impacts of land use decisions be made, as well as the land use impacts of transportation decisions. Both sets of factors must be considered together to create a balance between land use development and transportation facilities; one without the other would be harmful. The *Grow Greener in Leland* report and the *Collector Street Plan* recommend that traffic impact analyses be required for developments that generate 1,000 to 3,000 or more new motor vehicle trips per day (see Section 6 for more information on traffic impact analyses).

# IMPROVED STREET CONNECTIVITY

As part of  balancing land use and transportation, implementing and updating the provisions of the 2005 *Town of Leland Collector Street* Plan should be important priorities for Leland's elected officials and staff.

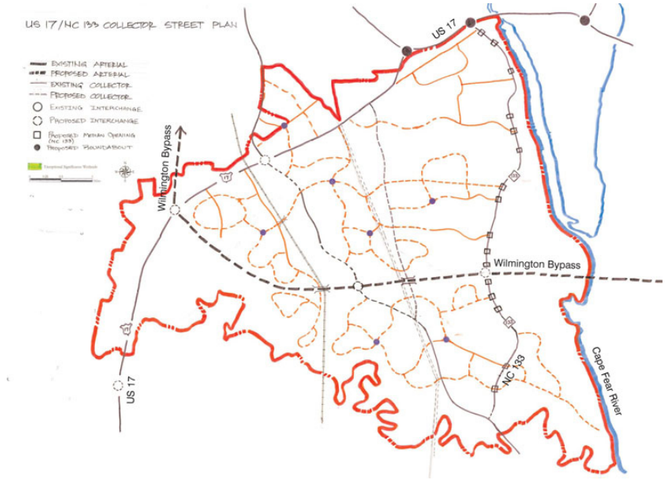
Two basic philosophies exist in American street planning. Traditionally, networks of streets, paths and trails were interconnected along some reasonable pattern such that connections were provided on most, but not all streets. However, in recent decades, a less traditional approach has become conventional across America that connects fewer streets in favor of much wider corridors we call arterials.

The conventional philosophy is predicated on sufficient State DOT funding to keep up with the widening schedule while at the same time assuming municipalities with land-use authority will require developers to provide street connections as land is developed.  In actuality, most state DOTs have not kept up with road widening and many municipalities have failed to require street connections. The result has been increased traffic congestion, which has stirred up anti-sprawl sentiment across the country and public interest in ways of handling growth in a more efficient manner.

Furthermore, the relative safety record of our interstate highway system has lulled many American road planners into a mindset that higher speeds and wider streets contribute to safety.  However, that safety record is much worse on our non-interstate system. (For example, on a single weekend in May, 2007, eleven people were killed and ten seriously injured on roads in multiple accidents in the Charlotte, NC, area).

In fact, the widespread construction of five-lane roads, with the center lane available to left-turning traffic even in opposing directions, has all-but-been-abandoned by the North Carolina Department of Transportation due to high crash rates. Instead, DOT prefers four-lane arterials with divided medians that allow for evenly-spaced median openings with well-designed left-turn lanes.

Leland is realizing land development pressures at a time of unprecedented stress and strain on the ability of the State of North Carolina to widen roads.  For this reason, the traditional philosophy of street planning is embodied in this plan; that is, an interconnected network of community-friendly streets that provides for the safe, effective and efficient movement of all modes of travel including walking, strollering, jogging, rollerblading, cycling, riding and driving.




▲ **RECOMMENDED COLLECTOR STREET NETWORK FROM *US17/NC133 AREA COLLECTOR STREET PLAN***

▼ **RECOMMENDED COLLECTOR STREET SPACING**

Source: Kimley-Horn Associates

**Low Intensity**

**Medium Intensity**

**High Intensity**

| Land Use/Type of Collector Street | Intensity | Access Function | Approximate Street Spacing |
|---|---|---|---|
| Low Intensity Residential | Less than 2 dwelling units per acre | High | 3,000 to 6,000 ft apart |
| Medium Intensity Residential | 2 to 4 dwelling units per acre | High | 1,500 to 3,000 ft apart |
| High Intensity Residential | More than 4 dwelling units per acre | High | 750 to 1,500 ft apart |
| Activity Center | Mixed-use residential/commercial | Medium | 750 to 1,500 ft apart |

## RECOMMENDATIONS

*Apply The Collector Street Plan Principles*
The *Town of Leland Collector Street Plan* — prepared by Kimley-Horn and Associates and adopted by the Wilmington Area Metropolitan Planning Organization (MPO) in December, 2005 — established two fundamental principles:

1. A connected network of town streets should be constructed by developers and assembled as areas of the town are developed.

2. Decisions about transportation planning MUST be integrated with equivalent considerations of land use planning and urban design.

The plan included conclusions from a previous collector street plan, the *US 17/NC 133 Area Collector Street Plan* by Kimley-Horn for the area between US 17 and NC 133, completed in May, 2005. Both plans were conceptual in that they did not indicate precise alignments of individual streets, which need to be determined by detailed site studies based on surveys and accurate wetlands delineation. They did, however, suggest an appropriate grain of connectivity required for efficient patterns of circulation as the town grows, as shown in the graphics at left.

In particular, the *US 17/NC 133 Area Collector Street Plan* provided a sliding scale of spacing dimensions for collector streets that remains a good guide for this and future town plans. (See the graphic and table at lower left.)

However, despite previous collector street planning efforts, approved plans for new residential development south of US 17 show that even this modest grain of connectivity is not being adequately achieved and that greater adherence needs to be paid to the principles of the collector street plans.

# IMPROVED STREET CONNECTIVITY

*Revise The Collector Street Network Plan*
The drawing opposite shows a conceptual pattern of new development south of US 17 as a series of neighborhoods based on the traditional neighborhood model (see Focus Areas section), where close attention is paid to the walkability of streets within a quarter-mile radius (equivalent of a five-minute walk) focused around some central communal feature, a building, a public space or both. This conceptual settlement pattern of half-mile diameter neighborhoods is generally defined along its edges by local collector streets and/or parks and conserved green space.

These collector streets define the overall pattern of connectivity at the town scale with a pattern of linkages similar to the 2005 Town of Leland *Collector Street Plan*, while the smaller local streets within each neighborhood create the conditions of community connectivity and walkability. As connectivity increases, so travel distances decrease and route options increase, leading to a more efficient transportation system.

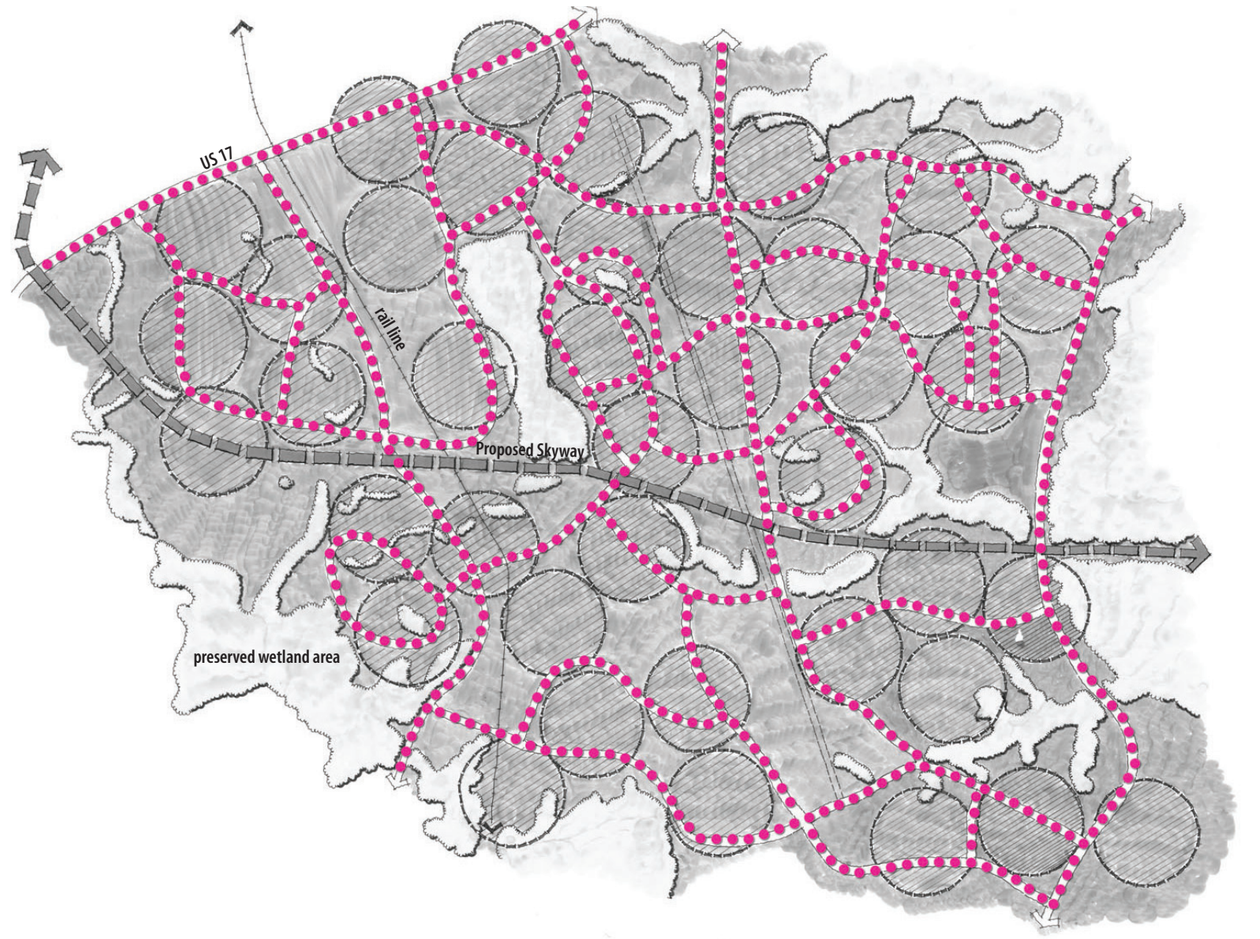
In keeping with the adopted *Collector Street Plan*, the Brunswick Forest area is shown as bisected east-west by the anticipated route of the future Skyway to Wilmington, and north-south by at least one, preferably two arterials. (The *US 17/NC 133 Collector Street Plan* identified the need for such road(s) parallel to NC 133 as very important to reduce pressure on NC 133, which has reached its traffic capacity.)

The plan illustrated opposite relates the pure form of the neighborhood model to the reality of specific site conditions, preserves open space and wetlands as a community resource, and generally locates collector streets at the periphery of each neighborhood.

*Develop and Enhance the Collector Street Network*
The main strategy is to disperse traffic rather than relying on a few wide streets to carry higher traffic volumes. Accordingly, the Town of Leland should continue to develop an interconnected network of collector streets that balance accessibility with mobility and contribute to the Village's unique sense of place.

*Space Collector Streets Based on Land Use Context*
The proper dispersal of traffic should be accomplished based on the following recommendations: In general terms, the spacing of these collector streets should ideally be at approximately half-mile (2,640 feet) centers throughout new development. This dimension can increase to a maximum of 6,000 feet in low-density residential areas (2 dwellings per acre or lower), but should decrease to 3,000 to 1,500 feet in areas where the residential densities are between 2 – 4 dwellings per acre. Where residential densities exceed 4 units per acre, collector streets should be spaced between 750 and 1,500 feet apart.

*Update Collector Street Requirements*
Leland's Subdivision Ordinance should be updated to adopt stronger language for interconnectivity. The ordinance should "require" instead of just "encourage" street interconnectivity. Every effort should be made towards assuming ETJs to ease the objective of connectivity. Gated roads would be permissible as long as connectivity thru the entire developmentis not interupted. The collector street plans and the *Grow Greener in Leland* report provide good recommendations on revising the connectivity requirements. The requirements should be based, as stated above, on the land use context of development.

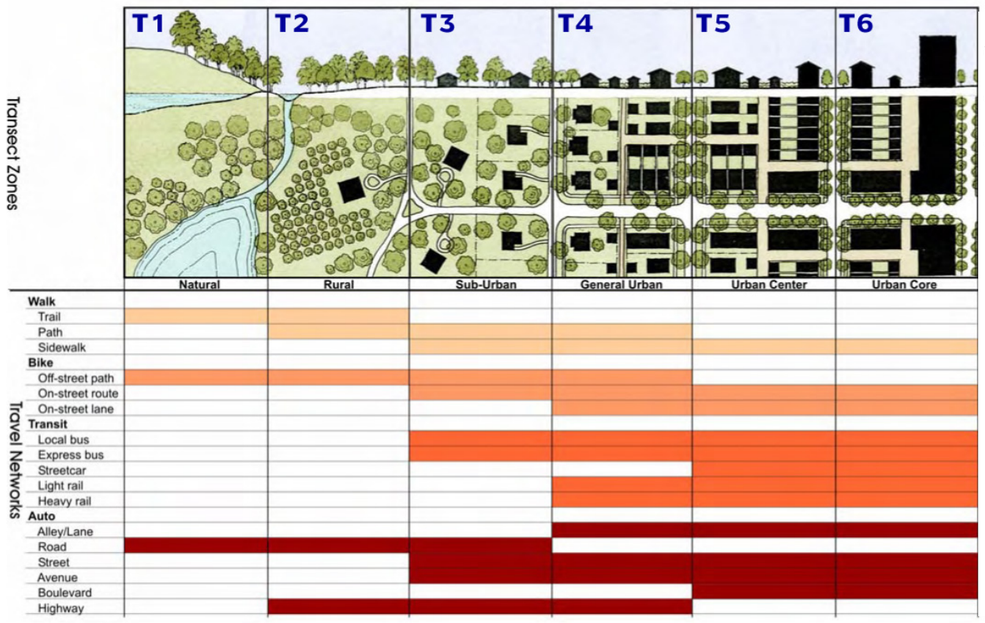



▲ **PROPOSED REVISIONS TO COLLECTOR STREET NETWORK**
*Revisions to and reinforcement of the adopted* Town of Leland Collector Street Plan *are shown as purple lines, marking conceptual locations for collector streets and establishing once again the necessary grain of connectivity for efficient circulation. The circles represent 1/4 mile radius (5-minute walk) neighborhood locations. The need for efficient circulation applies to everyday conditions including freedom from congestion, economical school bus routes, and provision for speedy fire, police and ambulance service, but also to more severe emergency situations where fast evacuation may be necessary due to extreme weather. This level of connectivity should be maintained in any new development.*

# CONTEXT SENSITIVE STREET DESIGN

Building on the connection between land use and transportation, it is helpful to consider context-sensitive street design; that is, making sure the design of each street fits its location, in terms of environmental conditions, urban, suburban or rural settings, and the balance between pedestrian, bicycle, and motor vehicle users. There are several different types of natural and built contexts in Leland, and these are summarized and defined by the "transect mapping" sector classifications noted in the Framework Plan section. Each of these general land categories is accompanied by unique design elements, and while some elements overlap, there cannot be a "one size fits all" solution for street design.

Much of the modern American landscape has been developed for automotive transportation to the exclusion of other modes of travel. However, as auto-dependant development has grown and the consequences of lackluster planning have become apparent, a shift has taken place to realign development to human needs. A return to the concept of natural, rural, suburban and urban distinctions demands that each context carries visual cues and functional features pertinent to its land condition. In transportation corridors, these distinctions lie in context-sensitive design through elements such as street widths, on-street parking, wide sidewalks, informal landscape treatments or disciplined rows of shade trees, and curb-and-gutter or natural drainage systems.




Source: Criterion Planners

*Appropriate transportation infrastructure for Transect zones.*

## RECOMMENDATIONS

As noted in the *Collector Street Plan* and the *Grow Greener* report, Leland's codes and ordinances should be updated to include more inclusive street design recommendations where urban design, land use, and transportation can come together to create a desirable sense of place within the public right-of-way. Later in this section are specific examples of context-sensitive street design for Village Road and Old Fayetteville Road, including elements such as narrower travel lane width, pedestrian-scale lighting, street trees, on-street parking, and traffic calming devices. Detailed information on pedestrian and bicycle circulation below emphasizes the shared relationship between modes. The Focus Area section provides examples of different urban design and land use contexts within which proper street design plays a vital role.

*Allow On Street Parking*

One of the most important context-sensitive design elements is on-street parking. At a time when developers are increasingly building parking lots behind buildings, screened from the public realm to enhance an area's appearance and walkability, it is still important to consider the role of on-street parking in creating a comfortable and attractive streetscape.

Within Sectors S-4, S-5, and S-6 areas, in higher-density urban districts or Traditional Neighborhood Developments (TNDs), on-street parking is appropriate and may be used to give definition to a more urban context. It may also be used in this context to define the boundary between the realms of pedestrian and automotive transportation, and may serve as a physical and visual buffer for pedestrians on the sidewalk. In increasingly low density and rural areas, on-street parking is not appropriate, as narrower streets are preferred.

Currently, on-street parking is not allowed to count towards required parking for new development. Allowing on-street parking to count towards minimum parking requirements has many benefits including reducing on-site pervious surface and slowing motor vehicle traffic.

*Require Sidewalks*

Sidewalks are an essential element in areas where a mix of land uses encourages people to walk from building to building. In this case, it is appropriate to have sidewalks fronting buildings on both sides of the street. As density increases, the sidewalks become a primary point of activity, and should be up to 12 feet wide and accompanied by street furniture such as benches, waste receptacles, media kiosks, and appropriate lighting to serve the needs of the pedestrian and to provide a sense of order.

In suburban and rural areas, as building density decreases, pedestrian traffic can be served by a sidewalk on one side of the street, and in some cases, by multi-use paths constructed as part of a greenway system. Rural and natural areas are also appropriate locations for trails, which can meander alongside roadways or wind through the landscape. As land use shifts from high-density to lower-density, the appropriate street furnishings will be placed less frequently. Appropriate lighting is necessary wherever pedestrian traffic is anticipated as a safety provision. (See the Implementation and Regulatory Recommendations section for further discussion of streetscape requirements.)

*Require Street Trees*

Street trees are an excellent tool in the definition of place, and can be used to narrow the perceived width of an otherwise wide road. This perceived narrowing has the useful effect of slowing down traffic. It is achieved by planting trees that will mature to heights of at least 12 feet as close to the edge of pavement as practical. In mixed-use and commercial areas, trees may be placed along the street in sidewalk grates, and can be used to create a sense of enclosure, and a buffer to pedestrians on the sidewalks. Placement of trees between the sidewalk and the street helps distinguish the automotive realm from the pedestrian realm, and allows for shade in sun-baked concrete or asphalt environments.

As land uses transition from urban to suburban areas, planting strips with evenly placed trees indicate the change from a dense mixed-use environment to a less urban residential surrounding. These trees may still serve as a buffer to adjacent sidewalks or multi-use paths, and may be larger in scale than urban street trees. The suburban to rural transition may be supported with informal planting, which can provide ample spatial definition while presenting a less ordered appearance. The transition from rural to natural landscape is marked by more naturally occurring tree buffers or agrarian landscapes.

*Allow Appropriate Drainage Infrastructure*

An additional context-sensitive element for consideration is surface water drainage. While the curb-and-gutter method is appropriate for urban contexts, it is often more appropriate to incorporate swale drainage systems into the rural and natural environments, and sometimes in lower-density suburban developments, where more advanced goals for environmental preservation can be met by doing so.

# WALKABLE COMMUNITY

Walking is a cornerstone and key to a community's transportation system. Every trip begins and ends with walking; yet it is most often the first forgotten mode of travel. If the proper pedestrian environment is provided, walking offers a practical transportation choice that provides benefits for both individuals and their communities. The potential for increased walking is enormous since 25% of all trips in the United States are less than one mile in length, which is a 20 minute walk at a average pace.

In addition to the presence of sidewalks, features that contribute to making communities more walkable include:

- a mix of land uses in compact, walkable settings
- buffers between the edge of pavement and the sidewalk (typically planting strips, but on-street parking, and bike lanes also help)
- trees to shade walking routes
- slow traffic speeds
- reduced pedestrian crossing distances of streets and intersections
- pedestrian infrastructure (i.e. signage, crosswalks, medians, and adequate pedestrian phasing at signals) in roadway designs

The availability of pedestrian facilities and amenities plays an important role in encouraging people to replace driving trips with walking. Benefits associated with walking include the ability to ease traffic congestion, improve air quality, reduce the need for automobile parking facilities, and contribute to healthier citizens through active living. The success of transit service is also highly dependent on the state of pedestrian facilities and amenities. To be considered a realistic transportation alternative, however, land uses and infrastructure need to be favorable for pedestrian use.

The existing pedestrian network within Leland is a mix of streets with adequate sidewalks and streets with provide substandard sidewalks or no sidewalks altogether. These sidewalk deficiencies and an inhospitable pedestrian environment contribute to a reliance on the automobile even for short trips. The most walkable areas in Leland are in some new developments. Beyond the new developments, sidewalks are few and far between.

The Town's Subdivision Ordinance currently states that:

> "Sidewalks *may* be required by the planning board on one or both sides of the street in areas likely to be subject to heavy pedestrian traffic such as near schools and shopping areas. Such sidewalks shall be constructed to a minimum width of four feet . . ." (Sec. 22-145(o)).

These requirements are not sufficient to create the kind of coherent and connected pedestrian network necessary for an efficient and attractive walkable community.

## RECOMMENDATIONS

*Complete a Pedestrian Master Plan*
The Town should complete a pedestrian facilities plan for a network that will connect local residents and visitors with area destinations (including schools, shopping areas, parks, and civic uses). Recommendations from the plan should be implemented through the Town's Capital Improvement Plan (CIP) and through State and local transportation projects. Such a plan can be partially funded through an NCDOT grant.

*Make Changes to the Development Ordinances*
Recognizing the importance of the pedestrian environment, the Town of Leland should update its land development ordinances including the subdivision ordinance to require an interconnected pedestrian system. Sidewalks should be required in new developments based on a combination of land use factors and street type as noted on the previous page.

- In general, sidewalk widths should be a minimum of 5 feet — the space required for two adults to walk side by side —in residential neighborhoods.
- Sidewalks adjacent to the street without a buffer (planting strip) should not be allowed because of the discomfort for pedestrians. An eight-foot wide planting strip is preferred between the sidewalk and the street since it supports the growth and maturation of shade trees. In higher density and commercial areas, sidewalks should be at least 6 to 12 feet wide.
- In low density areas, a network of sidewalks on at least one side of the street, or multi-use paths and trails should serve pedestrians.

*Fund Pedestrian Facilities through the CIP*
Concurrently, the Town should adopt a CIP that contributes local funds each year to sidewalk construction and maintenance above and beyond sidewalks that will be built and improved by developers in the near term. The Town could accelerate sidewalk construction on existing high-priority streets—especially collector and thoroughfare streets—through the CIP.

High priority streets would be identified through a pedestrian master plan, but should include: portions of the Village Road Phase I project not funded by NCDOT; and sections of thoroughfares or collector streets within 1/2 mile of schools or commercial areas.

*Overly wide subdivision street with no sidewalks or street trees*

*Overly narrow sidewalk (less than 4 feet)*

*Pedestrian-hostile infrastructure on Village Road*

# ENHANCED BICYCLE INFRASTRUCTURE

The companion transportation mode to walking is bicycling, which provides transportation and recreational opportunities for the citizens, employees, and visitors of Leland. Bicyclists can use greenways and multi-use paths with pedestrians or choose to mix with vehicular traffic on roadways (except access-controlled roadways such as US 74/76 and I-140).

The encompassed by this Plan includes places that are up to four miles from the center of Leland, a distance easily traversable by bicycle if safe and comfortable conditions are in place. A leisurely bicycling speed of 10 mph puts even the farthest reaches of Leland's future town limits within less than a 25-minute cycling time of the Village Road commercial area. Therefore, designing to accommodate cyclists downtown and along connecting corridors is strongly recommended.

Currently, most of the streets in Leland are primarily designed for motorized vehicles at the expense of non-motorized modes of travel (bicycling and walking). A review of the existing bicycle network finds that the combination of missed opportunities and rapid development surrounding the Town threatens its ability to maintain a safe and convenient transportation system for bicycles. In particular, safe crossings of the major highways that bisect Leland are needed, including US 17 and US 74/76.

Using a combination of funding from NCDOT and the Town of Leland general fund, a Town-wide bicycle plan is currently (as of 2007) being developed for Leland. The plan includes a citizen outreach program to gauge interest and ideas. The plan will also incorporate an engineering analysis of existing and alternative future conditions for bicyclists.

## RECOMMENDATIONS

*Include Bicycle Facilities in Transportation Plans and Projects*
Once the bicycle plan is adopted, the Town of Leland should work with the Wilmington Area MPO and NCDOT ensure bicycle facilities are included in the regional Long-range Transportation Plan (LRTP) and programmed transportation projects. The Town can secure improvements to the bicycle environment with funds programmed in the Metropolitan Transportation Improvement Program (TIP) and the Town's CIP.

*Improve Connectivity*
To create the necessary conditions that encourage walking and cycling, a factor of most critical importance is improving connectivity. More connections between neighborhoods and destinations provide safer route options for cyclists and pedestrians.

### *BICYCLE FACILITY TYPES*

The 'toolbox' for implementing bicycle improvements usually contains at least four facility types: wide travel lanes, on-street bicycle lanes, and multi-use paths (or trails), and bicycle routes. These facilities are generally characterized as follows:


Source: Kimley-Horn Associates

**Wide Travel Lanes**: A wider outside travel lane allows a motorist to safely pass a bicyclist while remaining within the same lane of travel. This improvement is considered a significant benefit for experienced and basic cyclists. Fourteen feet is typically recommended for the width of a travel lane meant for use by both motorists and bicycles. Continuous stretches of pavement wider than fifteen feet may encourage the undesirable operation of two motor vehicles in one lane. Wide outside lanes are most appropriate on arterial streets. If prevailing vehicle speeds exceed 40 mph, consideration should be given to paving a wide shoulder or building a parallel multi-use path.


Source: pedbikeimages.org/Burden

**On-Street Bicycle Lanes:** On-street bicycle lanes form the portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential or exclusive use by bicyclists. Bicycle lanes make the movements of both motorists and bicyclists more predictable. State and national design manuals for the construction of on-street bicycle lanes generally recommend a minimum of four feet of pavement measured from the edge of gutter for a bicycle lane (that is, not including the width of the gutter pan). Adjacent to on-street parking, the width of a bicycle lane should be increased to six feet. Striped bicycle lanes are most appropriate on arterial and collector streets. Street sweeping is essential for bike lanes so that debris that is normally swept away by motor vehicle traffic can be removed for cyclists.


Source: Kimley-Horn Associates

**Multi-Use Paths:** Shared multi-use paths (or trails) can serve bicycles and pedestrians in one "non-motorized" transportation corridor either adjacent to, or completely independent of the street system (such as a greenway). One path usually accommodates two-way travel and is constructed eight to twelve feet in width to facilitate passing and mixing of modes. These facilities are typically separated from a motor vehicle travel lane by five feet or more. One drawback to multi-use paths parallel to a roadway is the number of safety conflicts at intersections and driveways presented by the two-way path. Multi-use paths are most appropriate on sides of streets that have few driveways since driveway conflicts can lead to high crash rates involving bicyclists.


**Bicycle Routes:** A large portion of the community's existing street system may be fully adequate for efficient bicycle travel without bike lane signing and striping. The most common example of this is in residential neighborhoods where low traffic volumes and low travel speeds allow bicyclists to comfortably ride in the roadway. Typically, the posted speed limit on these streets should be 25 miles per hour or less. Where appropriate, trail-blazing signage may be installed to designate "bicycle routes" on some streets to alert bicyclists to certain advantages of the particular route. This is most appropriate when hoping to provide continuity with other bicycle facilities and designate preferred routes through high-demand corridors. Signed bicycle routes are most appropriate on residential collector and local streets plus short stretches of arterial streets as needed to maintain continuity of a bicycle route.

# EXPANDED PUBLIC TRANSIT

Across the nation, public transportation is increasingly being recognized by local and regional planning agencies as an important tool for focusing new development in patterns that are more clustered and more efficient for providing public services. Residents of transit-supportive municipalities reap the benefits of alternative modes of transportation, which result in significant savings in cost and time, and reduction in stress associated with traffic congestion. Public transportation is viewed as a popular short and intermediate term strategy to avoid congested highways. Transit and other alternatives to private motor vehicle travel will also become increasingly important as the Baby Boom generation ages and becomes a predominant demographic, as is likely to be the case in Leland. The presence of supportive pedestrian and bicycle networks is also very important for the success of transit since every trip begins and ends with walking.

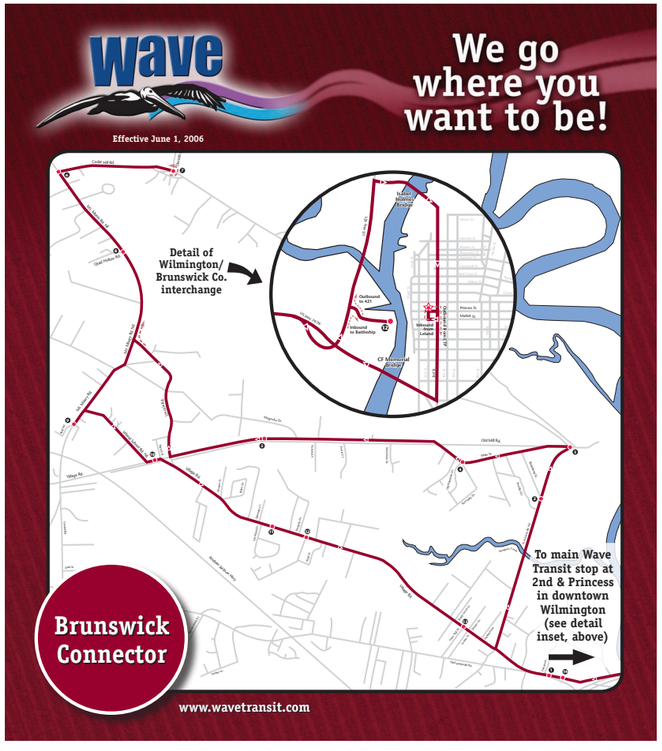
Public transportation offers various advantages, including:

- A choice to avoid roads congested with traffic;
- A viable transportation option to citizens with limited access to or ability to operate private vehicles;
- Improving overall health of the citizens by increasing walking and reducing stress associated with driving;
- Creating a balanced transportation system by providing mobility options for people through multiple modes of transportation; and,
- Enhancing economic development efforts by attracting a greater mix of residents and employers who seek an area that offers multiple transportation options.

Public transit relies upon a complete transportation system to operate effectively. Major roads and highways must be suitable for bus traffic, and sidewalks must provide adequate access between transit stops, popular destinations, and homes. Therefore, the existing state of the transportation network often determines the suitability of transit. While the existing road network in Leland could support transit, the lack of concentrated residential and employment centers limits the feasibility of most forms of public transportation.

Currently, the Town has limited fixed route transit service. The Wilmington Area Transit Authority provides a shuttle service called the Brunswick Connector that provides hourly service through the Village Road area and Navassa before connecting with the main bus transfer facility in downtown Wilmington. The route does not currently serve the developing residential and commercial centers along the US17 corridor. However, in the future, one or more activity centers in Leland will likely contain sufficient density of residents to support a larger and more frequent bus route.

An emerging concept for communities without sufficient density to support transit is "transit-ready development." In this concept, communities prepare for future transit expansion by developing a mix of uses in a pedestrian-friendly layout at locations appropriate for future transit service. Transit-ready developments rely on a street pattern that provides abundant connections and dense nodes of employment and residential development. This type of development is proposed in key locations in the Framework Plan and in the Focus Areas section.




**BRUNSWICK CONNECTOR SHUTTLE ROUTE ▲**

*The Wilmington Area Transit Authority provides a shuttle service called the Brunswick Connector that provides hourly service through the Village Road area and Navassa before connecting with the main bus transfer facility in downtown Wilmington. The route does not currently serve the developing residential and commercial centers along the US17 corridor.*

## RECOMMENDATIONS

Transit is a viable option when it is fast, frequent, dependable, easy to use, and when it serves destinations to which people want to travel. Transit service to and through Leland is part of a larger debate ensuing in the Wilmington region. Leland should work with its neighbors to ensure that its vision for transit service is considered in the debate.

Specifically, the following recommendations should be addressed:

*Require Transit Appropriate Land Development*
Require development in locations appropriate for future transit service — such as the town center, neighborhoods and employment centers identified in this plan — to have a mix of uses and higher density.

*Determine Appropriate Future Routes and Stops*
Determine future destinations of bus connections in consultation with Navassa, Belville and other regional partners. In particular, sites adjacent to US 17 as well as on Village Road may be good locations for park-and-ride lots that could facilitate a turnaround place for buses to and from the City of Wilmington and other popular destinations. Providing a park-and-ride lot that is associated with a vibrant activity center could accelerate the provision of bus service.

*Expand Transit Service*
Develop expanded local service in incremental steps as density and land uses warrant. Work with the Wilmington Area Transit Authority, the MPO, Brunswick County, and NCDOT to develop paratransit service for persons with disabilities in Leland.

# MAJOR ROADWAY NETWORK

## ROADWAY LEVELS OF SERVICE (EFFICIENCY)

The private automobile is the most widely-used form of transportation within Leland and its impacts on the urban environment are evident everywhere. Data from the 2000 Census shows the importance of the automobile for Leland's workers. For workers 16 year and older that did not work at home, 94.2 percent (807 of 857) used an automobile to commute. And of those using an automobile, 81.6 percent (699 of 857) drove alone.

*Table 5.1 – Journey to Work*

| Mode to Work | Number | Percent |
|---|---|---|
| Car, truck or van: | 807 | 94.2 % |
| Drove alone | 699 | 81.6 % |
| Carpooled | 108 | 12.6 % |
| Public Transportation (including taxicab) | 12 | 1.3 % |
| Walked | 11 | 1.3 % |
| Other means | 11 | 1.3 % |
| Worked at home | 16 | 1.9 % |
| Total | 857 | 100% |

*Source: 2000 US Census*

Not surprisingly, the Town's transportation system is predicated almost solely on the needs of the automobile, and improvements to the transportation system over the last forty years have been focused almost exclusively on reinforcing the dominance of the automobile.

The North Carolina Department of Transportation and the Wilmington MPO regularly collect traffic counts (referred to as Average Daily Traffic or ADT) information for state routes throughout North Carolina. The development of the Master Plan included a review of these counts within the study area to determine if any roads are experiencing unusually heavy traffic. Table 5.2 details the road type, speed limit, and traffic volume for several important corridors within the study area. The table also details maximum service volumes and current level of service for these roadways.

The roadways shown in Table 5.2 were evaluated on the basis of their Level of Service (LOS). Roadways were ranked on a lettered scale of A to F, with level of service 'A' representing the best operating conditions for motor vehicles and level of service 'F' the worst. (It must be remembered that these criteria focus on travel speed for motor vehicles only. They are not a measure of the "civic efficiency" of a street in more holistic terms, such as the ability of the street to support businesses and other development by virtue of its accessibility to pedestrians, cyclists, residents, and/or shoppers; its aesthetic contribution to the community; and overall safety for roadways users—merchants, shoppers, pedestrians, cyclists, transit riders, etc. The faster vehicle speeds and traffic flow on roadways and streets, the more potentially deadly streets are for pedestrians and cyclists.)

Following is a description of the various levels of service categories as outlined in the Highway Capacity Manual 2000 (HCM 2000).

**Level of Service A:** Primarily free flow operations at average speeds, usually about 90 percent of free flow speed. Motor vehicles are completely unimpeded in their ability to maneuver within the traffic stream.

**Level of Service B:** Reasonable unimpeded operations at average travel speeds. The ability to maneuver within the traffic stream is only slightly restricted.

**Level of Service C:** Stable operations. Ability to maneuver and change lanes may be more restricted than in LOS B.

**Level of Service D:** Borders on a range on which a small increase in flow may cause substantial increases in the approach delay and hence decreases in travel speed.

**Level of Service E:** Significant delays and average travel speeds of one-third the free flow speed or slower.

**Level of Service F:** Traffic flow at extremely low speeds. Intersection congestion is likely at critical signalized locations with high approach delays.

Levels of service for the corridors in Table 5.2 were evaluated using Wilmington MPO data. A "traffic volume" number less than the figure in the "capacity" column indicates that segments operate at a level of service of E or better. Table 5.2 shows all but three segments operate at LOS C or better.

Table 5.2 indicates the 2006 Average Daily Traffic volumes for key roadways in Leland. Traffic congestion on US 17 in the vicinity of the Village Road interchange is reflected by Level of Service F where 51,000 vehicles per day (vpd) are using a roadway with a typical capacity of only 40,000 vpd. Observations and anecdotal evidence indicate this congestion on US 17 extends over the causeway and bridge into Wilmington at peak times. Level of Service E conditions persist along NC 133 (River Road) south of Leland and Belville where the 12,000 vpd count is matched by a typical capacity of 12,000 vpd for a two-lane roadway. The busiest section of Village Road, near US 17, carries 25,800 vpd which equates to a Level of Service D for the section with five lanes.

*Table 5.2 Roadway Levels of Service*

| Corridor | Road Type | Cross Section | Range in Existing Traffic Volumes (vehicles/ day) | Capacity | Current LOS |
|---|---|---|---|---|---|
| US 17 | Major | 4-lane divided | 27,000 to 51,000 | 40,000 | C - F * |
| US 74/76 | Major | 4-lane divided freeway | 24,000 | 63,000 | A |
| NC 133 | Minor | 2-lane undivided | 12,000 | 12,000 | E |
| Lanvale Rd | Collector | 2-lane undivided | 4,900 to 8,700 | 12,000 | A - C |
| Navassa Rd | Collector | 2-lane undivided | 4,300 | 12,000 | A |
| Old Fayetteville Rd | Collector | 2-lane undivided | 3,400 to 5,000 | 12,000 | A |
| Village Rd | Minor | 2 to 5 lanes undivided | 9,400 to 25,800 | 12,000 to 33,000 | D |

*Source: Wilmington MPO 2006 Annual Traffic Count Report and 2030 LRTP*

** congested in certain areas only, i.e. the causeway section towards the Cape Fear River after US 17 merges with US 74/76*

# MAJOR ROADWAY NETWORK

## ROADWAY SAFETY AND CRASH HISTORY

Eight corridors within the study area were analyzed using crash data obtained from the NCDOT over a three-year period (October 1, 2003 to September 30, 2006). Table 5.3 shows the crash rates and total number of crashes. A crash "rate" is defined as the number of crashes per 100 million vehicle-miles traveled. The crash rate comparison with the statewide average crash rate for similar types of roadways is the key to ranking problem locations since a crash rate considers the probability that roads carrying more traffic are likely to have more crashes.

*Table 5.3. Roadway Crash History*

| Corridor | Section | Crash Rate * | Statewide Average Crash Rate** | Total Number of Crashes | Severity Index | EPDO Rate *** |
|---|---|---|---|---|---|---|
| Village Road | Mt Misery Rd to US 17 | 553 | 308 to 480 | 239 | 4.03 | 2227 |
| Lanvale Road | Village Rd to US 17 | 481 | 370 | 85 | 5.66 | 2723 |
| Old Fayetteville Rd | Bluff Rd to Village Rd | 283 | 370 | 46 | 5.22 | 1477 |
| River Road (NC 133) | Ocean Hwy to Daws Creek | 185 | 191 | 121 | 4.96 | 918 |
| Navassa Rd | Village Rd to Old Mill Rd | 95 | 370 | 6 | 4.7 | 449 |
| Old Mill Rd | Village Rd to Navassa Rd | 91 | 370 | 4 | 2.85 | 260 |
| Ocean Hwy (US 17) | River Rd to Sloan Rd | 63 | 97 | 137 | 4.66 | 292 |
| Andrew Jackson Hwy (US 74/76) | Stella Dr to US 17 | 56 | 87 | 89 | 4.87 | 271 |

*Source: North Carolina Department of Transportation*
** Crash Rate is the number of crashes for every one million vehicle miles traveled*
*** Statewide Average Crash Rate is for comparable rural roads throughout North Carolina (based on number of lanes and highway route type such as US Highway with signals, US Highway with interchanges, NC route, primary or secondary routes).*
**** EPDO Rate normalizes fatalities, injuries and reported property damage into a rate indicating the cost per crash. The higher EPDO rates indicate a higher financial impact.*

Crashes on North Carolina roadways are monitored by NCDOT and when crash rates exceed the expected levels — that is, when the crash rate exceeds the statewide average for similar types of roadways — plans should be developed for countermeasures. Funding for safety-related improvements, just like for all transportation improvements, is scarce relative to the demand for projects.

### *RECOMMENDATIONS*

*Monitor Crash Problem on Lanvale Road*
One particular danger zone is Lanvale Road, where the crash rate is 30 percent higher than the statewide average for two-lane secondary roads in rural area. Monitoring of crash reports along with more detailed site investigations of Lanvale Road crash locations are recommended. Applications to NCDOT for spot-safety funds and/or discretionary funds may be appropriate. Sight distance reviews and updates of traffic-regulatory signs and markings may be insightful.

*Improve Safety Conditions on Village Road*
Plans are also underway to widen Village Road in an attempt to improve its safety. This roadway has a crash rate more than 15 percent higher than the statewide average for four-lane undivided primary roads in urban areas (based on data gathered between October 2003 and September 2006). Other safety measures for Village Road should also be explored, including diverting some traffic onto Old Fayetteville Road at a new more southerly intersection (see section on Old Fayetteville Road below).

*Implement Other Traffic Management Techniques*
At a general level, several traffic management techniques should be applied along Village Road and other busy town streets as appropriate. Techniques to manage access to properties along the street, such as medians and driveway improvements may be necessary if turning traffic contributes significantly to the crash history. Conversion to right-in, right-out only access is also a proven method for reducing turning conflicts that lead to turning type crashes.

## PLANNED ROAD PROJECTS

In terms of supply side strategies, the recommendations contained in the Town of Leland *Collector Street Plan*, and reinforced in this document, set forth the design requirements for a network of new streets that will be adequate for Leland's future needs. Additionally, and at a more regional scale, the Wilmington Metropolitan Planning Organization 2030 Long Range Transportation Plan (LRTP) identifies priorities for Brunswick County over the next 23 years, separating them into fiscally-constrained or unfunded categories. The MPO addresses transportation needs at a regional level, so the recommended projects are based on regional benefits. MPO recommendations are forwarded to the NCDOT for evaluation as the State determines projects that will be funded over the ensuing seven years. Table 5.4 lists the Leland area projects included in the State's latest 2007-2013 State Transportation Improvement Program (STIP).

*Table 5.4 – Programmed Projects*

| Roadway | Section | Project | Construction Start Year |
|---|---|---|---|
| Village Road (Phase I) | Old Fayetteville Rd to US 17 | Widen to 4-5 lanes | 2008 |
| Village Road (Phase II) | Old Fayetteville Rd to Lanvale Rd | Widen to 4-5 lanes | 2013 |
| US 17 | Various locations | Access management | 2010 |
| US 17 & 74/76 | Causeway to Cape Fear River | Add one lane each way | 2012 |
| Old Fayetteville Road | At US 74/76 bridge | Build ramps to 74/76 | After 2013 |

*Source: NCDOT State Transportation Improvement Program 2007 to 2013*

The State Transportation Improvement Program (STIP) is the official list of upcoming transportation investments anticipated with State and federal funds. It is an extremely competitive process to add a project to this coveted list. Local and regional efforts over the years have resulted in several projects in and near Leland, including the planned widening of Village Road. Funds and timing for Village Road are separated into two projects with the southern segment expected to be widened first. Environmental studies are underway on the northern segment.

### *RECOMMENDATIONS*

*Revise Village Road Phase I Plans*
Consistent with the goals of Leland's citizens, alternative details developed at the charrette to the roadway design by NCDOT for the Phase 1 Village Road project are proposed later in this section. As recommended there, every effort should be made to work with the NCDOT to create a more attractive, walkable, low-speed street condition in order to support the Master Plan's recommendations for the redevelopment of a town center along that length of Village Road.

*Study/Revise Village Road Phase II Plans*
The 2035 travel demand forecasts recently completed by the Wilmington Urban Area MPO for the section of Village Road between Old Fayetteville Road and Lanvale Road shows 10,000 to 13,000 vehicles per day, which is enough traffic for two very busy lanes. That is, the traffic forecast does not seem to justify road widening to a full four or five lanes north of Old Fayetteville Road, as suggested by the Long Range Transportation Plan.

Further study is warranted to determine if a narrower roadway section is capable of meeting travel demand, particularly given that there are wetland crossings in this section of Village Road.

# MAJOR ROADWAY NETWORK

*Frontage road with new development along US17 at Wal-Mart site*

*US 17 Access Management: Extend Frontage Roads and Collector Streets*
As part of the project noted in Table 5.4 above as "access management projects" to US 17, a secondary street system is needed in the vicinity of US 17 between the future I-140 and the existing US 74/76 interchanges. Direct highway access via driveways to large-scale commercial development on both sides of the highway supports the need for an interconnected and well-planned network of secondary streets so shorter vehicle trips would not be reliant on US 17. These new secondary streets built parallel to US 17 would incorporate the existing fragments of frontage road currently evident in the Wal-Mart development, but should be extended into a network behind the commercial buildings as reliance on frontage roads only can create traffic congestion when intersections are close together. This new street pattern relates closely to the ideas for the progressive urbanization of the large commercial developments along US 17 described in the Focus Area section.

*Study Old Fayetteville/US 74/76 Interchange*
The Regional Transportation Plan prepared by the Wilmington MPO includes a future interchange on Old Fayetteville Road where it now bridges over the US 74/76 freeway. Traffic forecasts prepared by the MPO representing the year 2035 suggest that with a new interchange on Old Fayetteville Road at US 74/76, traffic volumes would increase to 5,000 to 7,000 vehicles per day on Old Fayetteville Road (compared to 3,500 to 5,000 vehicles per day currently). These traffic volumes are typically too low to justify building an interchange. In depth study of traffic volumes and dynamics along this corridor will be warranted as development in the area continues and in light of the recommended roadway network changes in this plan.

*Implement Demand-side Congestion and Access Strategies*
Traditionally, congestion problems are addressed with either supply-side or demand-side strategies. Supply side strategies may include tactics such as building more roads to increase capacity. Demand-side strategies include tactics such as encouraging more ridesharing among commuters and creating more compact patterns of land development that stimulate walking, cycling and public transit options. The Town of Leland should be proactive in addressing mobility needs within the community using both supply-side and demand-side strategies.

## JURISDICTIONAL RESPONSIBILITY FOR THE TRANSPORTATION SYSTEM

The transportation network within the Town of Leland should provide mobility for automobiles, public transit, bicycles, and pedestrians in one comprehensive system. The responsibility for maintaining and/or enhancing the transportation system is divided among local, regional, and state entities depending on the location and type of improvement and its stage in the implementation process.

The actions of the Town and those of other agencies significantly impact all facets of life in and around Leland. Intergovernmental coordination of town and regional planning has grown increasingly important. The Master Plan focuses on the interdependent transportation systems within the Town's corporate limits; however, it also recognizes that they function as part of a larger regional network serving the area. To this end, the Town of Leland should continue working with regional transportation authorities to implement sustainable transportation solutions (i.e. options for personal mobility that do not rely solely on private cars). Strategies are identified throughout the Master Plan that reduce vehicle miles traveled and congestion levels on the major roadway network. These include greater focus on walking and cycling; mixing uses within buildings and within developments so that several destinations can be combined into one trip; and greater connectivity so that citizens have more choices of routes to and from their destinations.

One of the most pressing hurdles for Leland toward linking land use and transportation planning is the context in which decisions are made. In the State of North Carolina, land use planning is regulated on the local level and memorialized in adopted Comprehensive Plans. Conversely, transportation planning in Leland is primarily the responsibility of the North Carolina Department of Transportation (NCDOT) and the Wilmington Area Metropolitan Planning Organization (MPO). The disconnect between land use and transportation planning in North Carolina often places local and state government agencies at odds over single critical issues — each with their own political agendas and implementation schedules. Often, the MPO is called upon to create forums to resolve disagreements between municipalities and NCDOT over transportation issues. For example, the recent efforts of the MPO and the North Carolina Board of Transportation member representing the area, Mr. Lanny Wilson, secured new funding for a high-priority project to widen the US 17 causeway that was requested by Brunswick County municipalities including Leland.

Private developers have an increasing responsibility for the transportation system, especially as competition increases for the limited public funds available for new projects. Progressive municipalities understand private developers can offer excellent opportunities to complete projects very quickly. Meanwhile, private developers benefit from improved circulation within and beyond the limits of their development. To maximize the potential for partnerships with private developers, the Town of Leland must continue to review the transportation provisions and impacts of new development on a case-by-case basis. Appropriate exactions that accurately assess developers for the proportionate share of transportation impacts are fair.

Overall, a combination of publicly- and privately-funded sources will be necessary in order to construct the kind of transportation system that Leland will need over the next two decades. Such a well-planned and multi-modal system would enable the Town to retain its quality of life, attract new investment and minimize harm to the natural environment.

Finally, while individual communities' transportation solutions will be important, the Town's greatest contribution towards improving the transportation system will be to coordinate responsible land use planning within the area covered by the Master Plan with other towns in Brunswick County and with local, regional, and state transportation agencies.

# VILLAGE ROAD FUTURE VISION (PHASE I)

## NCDOT PROPOSED CROSS-SECTION

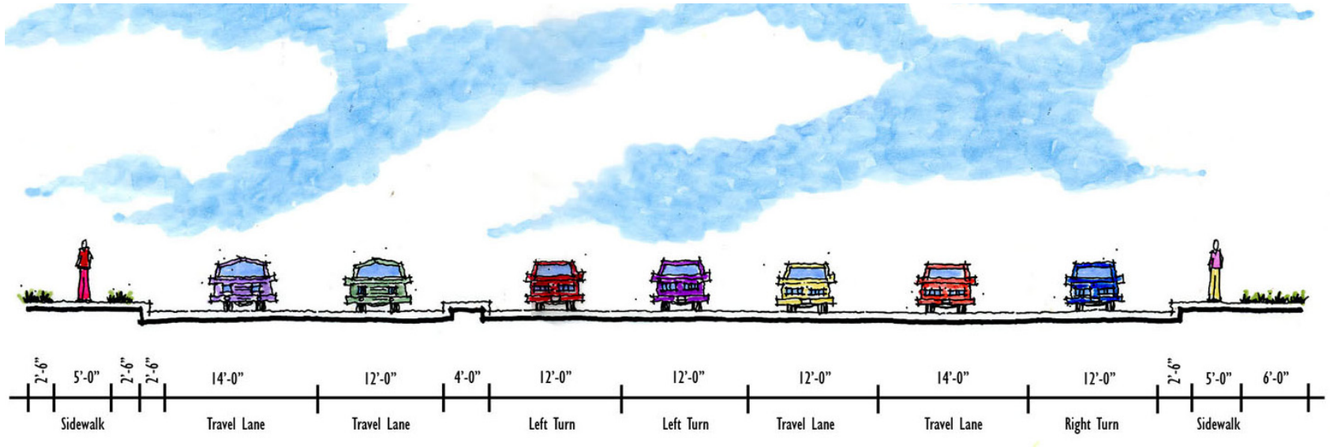
The North Carolina Department of Transportation (NCDOT) is currently preparing detailed plans to widen the southeastern portion of Village Road between Town Hall Drive and the US 17/74/76 interchange. These plans originally called for the State's generic five-lane highway cross section, increasing to seven lanes at some street intersections. The project is funded and is programmed to commence in 2008. The proposed design's lack of pedestrian, bicycle, and streetscape amenities would severely compromise the future redevelopment potential of this key portion of the proposed new mixed-use town center that will rely heavily on the creation of a good pedestrian environment for its economic success. The NCDOT design, shown at right, utilizes 12-foot and 14-foot travel lanes, thus making usable and attractive pedestrian and bicycle facilities impossible within the right-of-way.

## ALTERNATIVE TO NCDOT CROSS-SECTION

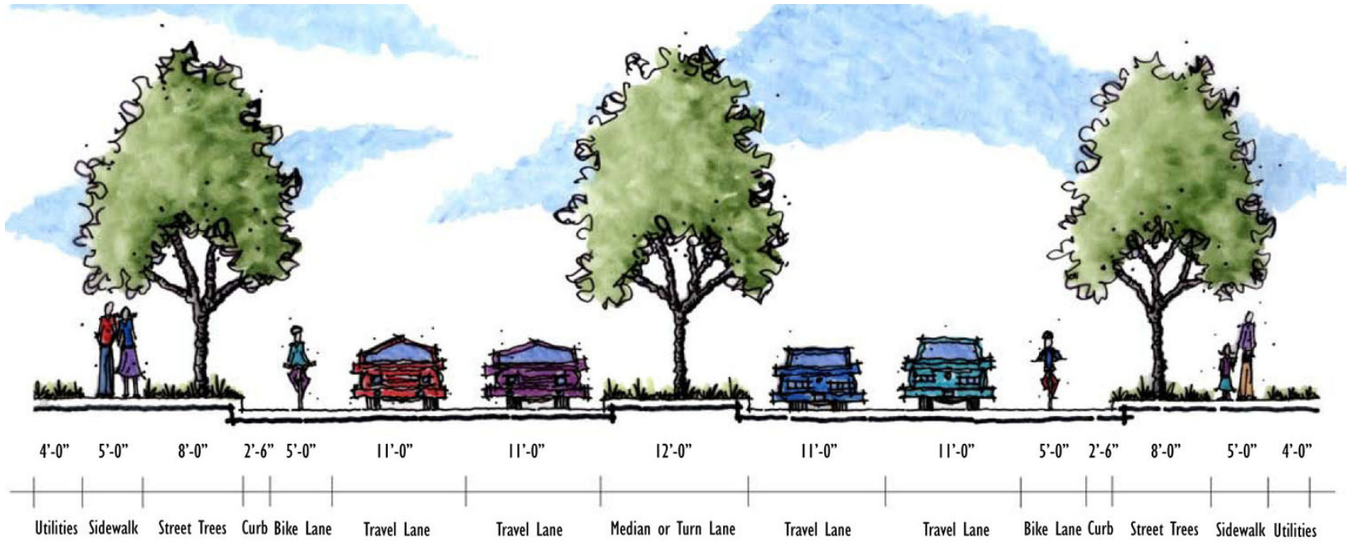
The revised design proposed by this plan and vetted by community stakeholders at the Master Plan charrette and in previous discussions during the *Collector Street Plan* process fits within NCDOT's right-of-way dimensions and provides a more "urban" and pedestrian-friendly alternative. This alternative design handles an increased traffic capacity while providing a much improved streetscape that is compatible with future pedestrian-oriented redevelopment of parcels flanking the roadway. This alternative design is consistent with the public's stated desire for more and improved accommodation for pedestrians and bicyclists.

Based on community input from this plan and previous planning efforts, the redesigned cross-section fits within the 105-foot right-of-way established by the NCDOT and reflects the vision for Village Road established in the 2005 collector street plan processes. This alternative provides 5-foot sidewalks, 8-foot tree planting strips, 5-foot bicycle lanes, and 11-foot travel lanes throughout.

Every effort should be made to work with NCDOT to incorporate this revised design into their planning and design schedule so that this improved infrastructure will support Leland's future development visions for this important part of town. Any generic widening scheme for Village Road would destroy much of the potential for this roadway corridor to remain the historic backbone of the Leland community. These alternative street design proposals for the eastern end of the corridor within the proposed redeveloped "town center" provide the potential for greater economic development and longer-term prosperity for property owners and citizens alike.




**NCDOT PROPOSED VILLAGE ROAD CROSS-SECTION** ▲ *This design focuses primarily on vehicle movement with little in the way of usable facilities for pedestrians and cyclists. For example, sidewalks are separated from fast moving traffic by a minimal grass strip or no grass at all, thus minimizing the level of comfort and convenience for pedestrians and eliminating opportunities for street trees.*

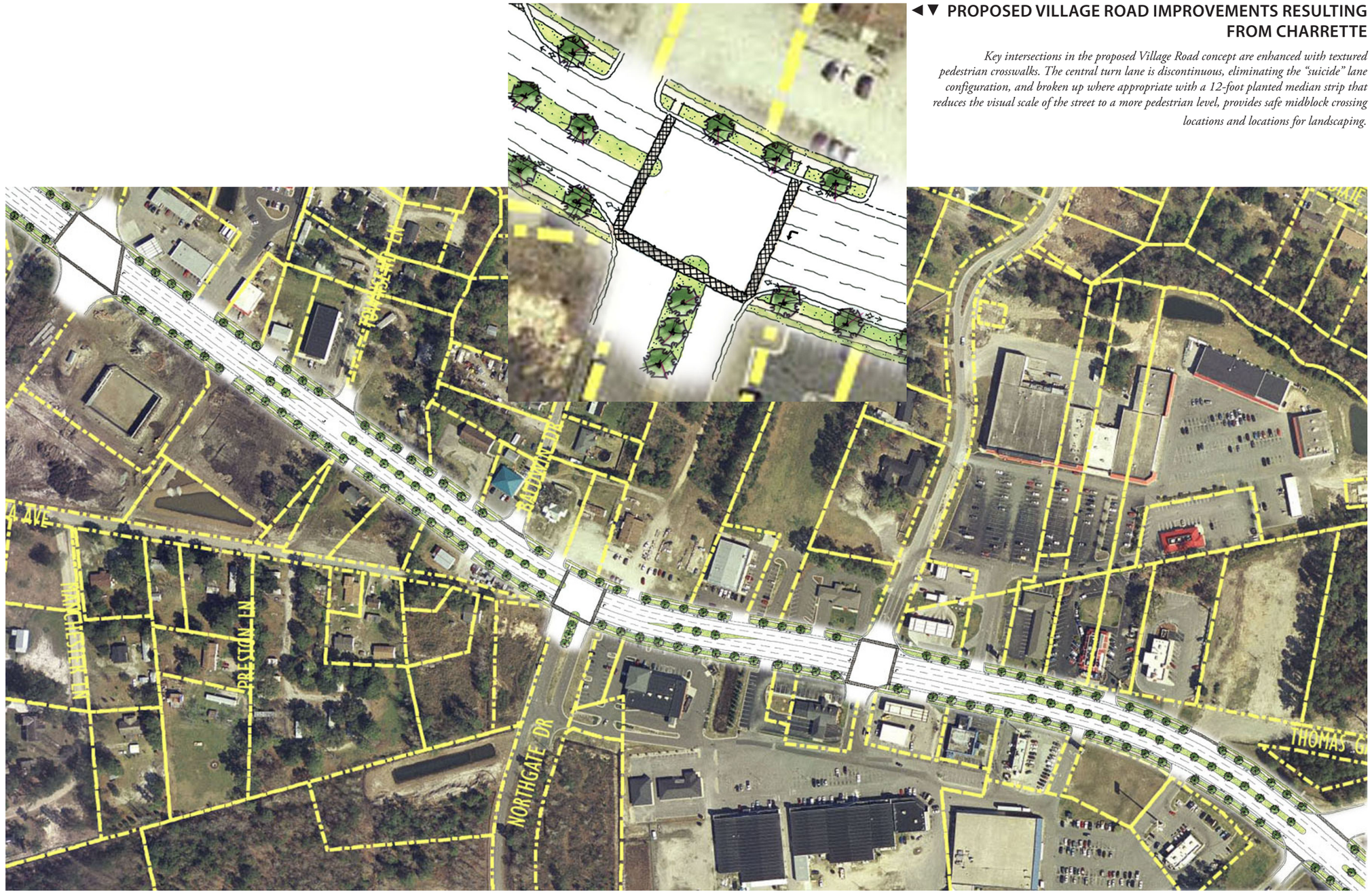



**PROPOSED CROSS-SECTION FROM CHARRETTE** ▲ *In contrast to the NCDOT design, this alternative provides 5-foot sidewalks, 8-foot tree planting strips, 5-foot bicycle lanes, and 11-foot travel lanes. The concept also provides for a median, which provides safety benefits for motorists and pedestrians (who can use the median when crossing the street), and allows room for landscaping. This improved street infrastructure creates the conditions for enhanced and safer spaces for pedestrian activity, leading to increased redevelopment opportunities for new mixed-use or residential buildings lining the streets and creating a distinctive sense of place.*

*Existing conditions on Village Road. Note the lack of sidewalks. (Image Source: KHA)*

*Photo transformation of the same section of Village road showing planted median, bike lanes, street trees, sidewalks, and additional travel lanes. This image represents Leland's vision for Village Road. (Image Source: KHA, Leland Collector Street Plan)*

# VILLAGE ROAD FUTURE VISION (PHASE I)




## ◀▼ PROPOSED VILLAGE ROAD IMPROVEMENTS RESULTING FROM CHARRETTE

*Key intersections in the proposed Village Road concept are enhanced with textured pedestrian crosswalks. The central turn lane is discontinuous, eliminating the "suicide" lane configuration, and broken up where appropriate with a 12-foot planted median strip that reduces the visual scale of the street to a more pedestrian level, provides safe midblock crossing locations and locations for landscaping.*

# OLD FAYETTEVILLE ROAD FUTURE VISION

As part of this redesign of the Old Fayetteville Road corridor (further detailed in the Focus Areas section), new street cross sections provide opportunities to improve the infrastructure along the street to suit three different sets of conditions: Rural, Suburban and Urban. The three different cross-section details for this single roadway corridor provide an excellent example of context-sensitive design. The details of each cross-section reflect the various land use, transportation and environmental conditions on different parts of the corridor.

*Existing conditions of perspective below: looking east on Carolina Avenue at Old Fayetteville Rd intersection. Walgreens store is in the background (lower left side of picture).*

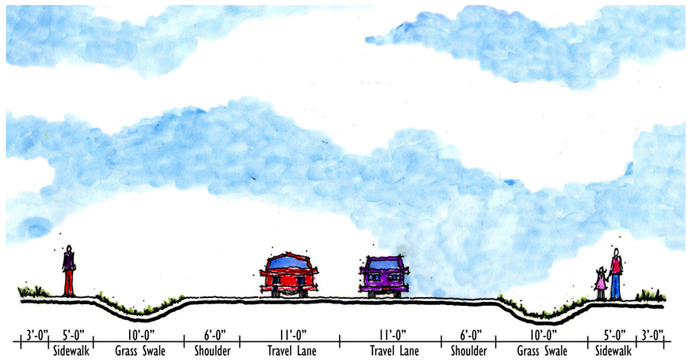
**OLD FAYETTEVILLE ROAD PERSPECTIVE WITH ON-STREET PARKING, NEW STREETSCAPE DESIGN AND INFILL DEVELOPMENT ▼**

*Existing Conditions on Old Fayetteville Rd*

# OLD FAYETTEVILLE ROAD FUTURE VISION

**OLD FAYETTEVILLE FUTURE VISION ▼**

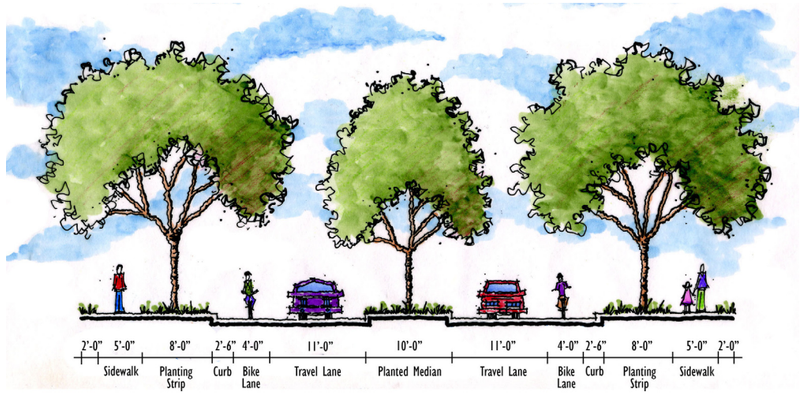
**RURAL/SUBURBAN SECTION OF OLD FAYETTEVILLE ▲**




## RURAL/SUBURBAN SECTION ▲

This street design concept relates to the portion of Old Fayetteville Road from Lanvale Road to Sturgeon Creek. The design is for a "low-impact design" cross section with drainage swales to retain and infiltrate surface water runoff on site versus the more urban curb and gutter. This on-site infiltration helps cleanse the surface water naturally prior to its gradual release into the natural ecosystem to reduce the environmental impact of the road in this sensitive location close to Sturgeon Creek. This simplified cross section fits within a 70-foot right-of-way and provides on both sides a 3-foot grassed utility strip, a 5-foot sidewalk, a 10-foot grassed drainage swale, a 6-foot shoulder that doubles as a bike lane, and an 11-foot travel lane in both directions. This cross section would need to be supplemented by turn lanes at key locations such as the two school entrances to take account of increased traffic loads at those points. This portion of the road is intended to have a lower density residential character, markedly different from the more urban settings further east nearer Village Road and the mixed-use core of the town center.

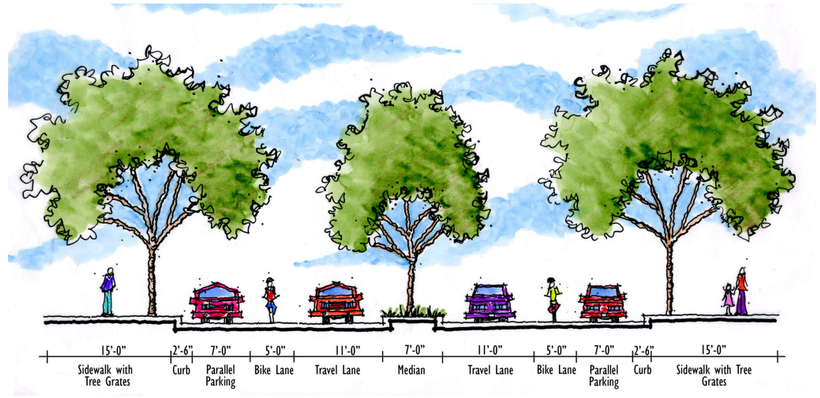
**MIDTOWN URBAN SECTION OF OLD FAYETTEVILLE ▲**




## MIDTOWN URBAN SECTION ▲

From Perry Street as far as the junction with the Navassa Road extension, the character of Old Fayetteville Road is proposed to change and become more urban. Public open space and some town homes would define a more informal northern side to the street frontage while the linear urban character of small mixed-use and apartment buildings line the southern frontage, providing continuity with the more urban area to the east. The symmetrical street section fits within a 75-foot right-of-way and provides a 2-foot utility easement, a 5-foot sidewalk, an 8-foot tree planting strip, a two feet six inches wide curb zone, and 4-foot bike lane with an 11-foot travel lane in both directions all separated by a 10-foot planted median (or turn lane where appropriate).

**MIXED USE URBAN CORE SECTION OF OLD FAYETTEVILLE ▲**




## MIXED-USE/URBAN CORE SECTION ▲

Between the extension of Navassa Road and the connection of Old Fayetteville Road with mixed-use core on Village Road, the proposed street section becomes even more urban, and fits within an 88-foot right-of-way to create a pedestrian-oriented environment. The symmetrical section has 15-foot sidewalks on both sides with street trees in tree grates, a two feet six inches wide curb zone, plus a 7-foot parallel on-street parking lane on both sides, a 5-foot bike lane, and an 11-foot travel lane in both directions either side of a 7-foot planted median. This design creates a generous pedestrian zone protected from through traffic by on-street parking that is necessary to accommodate the levels activity required for commercial success of retail and restaurant businesses in the town center.

# VILLAGE ROAD-US 17/74/76 INTERCHANGE

The recommendations in this section are consistent with the Regional Transportation Plan and the *Belville Town Plan*.

## EXISTING CONDITIONS

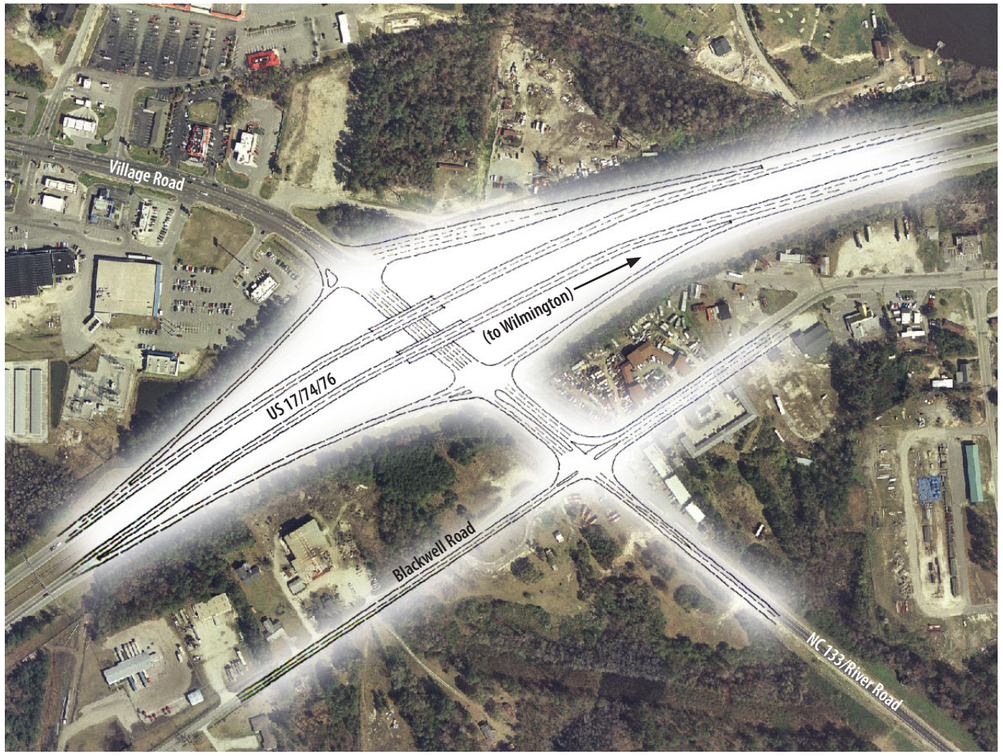
The existing Village Road interchange with US 17/74/76 generates concerns for public safety and traffic congestion. The interchange has the highest traffic volume and crash rate of intersections in the plan area. Peak hour congestion continues to increase and become more problematic. Issues of traffic congestion and safety at this location were raised by several participants in the charrette.

The diamond-shaped configuration of ramps requires left-turn movements across several lanes of Village Road traffic. It also produces some motorist confusion trying to maneuver into the appropriate lane of traffic on Village Road. This leads to crashes, near-crashes and inefficient traffic movement. To enhance safety and reduce congestion in the interchange area, the following actions are recommended:

## RECOMMENDATIONS

*Adjust the signal timing and phasing around the interchange.*
In the short term, the existing traffic signals need to have their timing and phasing updated based on movement volumes and crash data. It appears that it has been some time since the current signal programming was last updated and it is long overdue for a significant upgrade.

*Complete the improvements to Village Road north of the interchange.*
The current free movement into driveways close to the interchange increases the risk of crashes and reduces the efficiency of the traffic signals. A landscaped median is strongly preferred to a simple concrete median or a two-way-left-turn lane for two reasons: First, the median will eliminate the free left turn lanes making Village Road a safer corridor. Second, the landscaping will help to visually enclose the area, thereby lowering overall speeds along the corridor.




**EXISTING CONDITIONS ▲**
**US 17/74/76 INTERCHANGE WITH VILLAGE ROAD**


*Existing Conditions on Village Road looking northeast from US74/76 interchange*

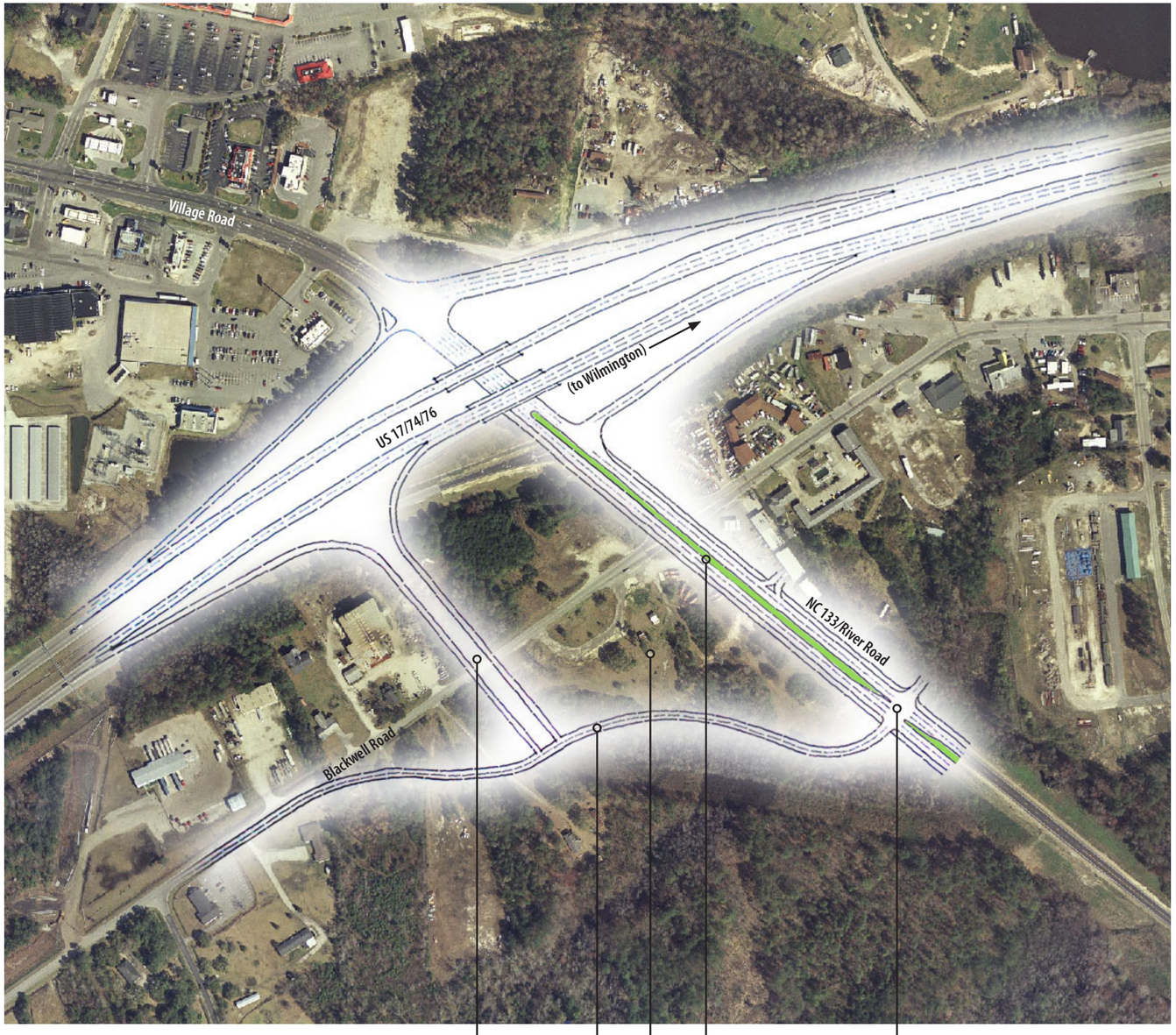
# VILLAGE ROAD-US 17/74/76 INTERCHANGE

*Realign Blackwell Road approximately 650 feet south of the current intersection with NC 133 to provide adequate separation between the southbound ramps.*
Currently, it is quite difficult to turn left from Blackwell Road onto NC 133/River Road. Because of the signals for the on- and off-ramps from US 17/74/76, the spacing is too constrained to permit the installation of another signal at its present intersection. Realigning it further south would meet adequate spacing standards.

*Construct a "square loop" ramp for northbound ingress and egress in combination with Blackwell Road.*
Finally, as part of a longer term solution, Leland and Belville should advocate for the removal of the existing northbound off-ramp for NC 133 and installation of a new northbound on- and off-ramp that is separated from the current interchange. This ramp would be connected to the realigned Blackwell Road. The proposed "square-loop" resembles a freeway loop in operation, but permits greater access to the surface road and allows for the surrounding property to develop/redevelop more feasibly, with the economic benefits of that development accruing to the surrounding communities.

By eliminating the left turns required for southbound (NC 133) to northbound (US 17/74/76), the entire interchange works more efficiently. The elimination of the left-turns needed for the northbound on-ramps (and the signal that controls them), increases the overall signal spacing for the interchange to 1500 feet, a more acceptable spacing based on NCDOT design standards.

The proposed configuration appears to be satisfactory to the needs of the US 17 corridor. Though there is some desire to convert US 17 to a freeway, this conversion is not likely in the next 20+ years given the number of driveways and street intersections.



# FOCUS AREAS: OVERVIEW

The detailed design provisions discussed in the sections on the Framework Plan and on Transportation clearly illustrate the interrelationship between land use planning, urban design and transportation planning. In this section of the report two "focus areas" of the plan are described in more detail. These focus areas are:

I. The Village Road Area
II. The US17 Corridor, and

These distinct geographical areas are organized and categorized in relation to the six "sector" classifications noted in the Framework Plan section.

The plans shown in this section are intended to be conceptual build-out visions for significant and prototypical areas of Leland. The purpose of these conceptual plans is not to require strict conformance to each building or parcel as drawn, but to show general patterns and intensities and potential development/redevelopment opportunities. Care was taken in the design process to envision development alternatives based on property boundaries or known opportunities for parcel consolidation as well as the market feasibility for the scale, amount, and type of development.

While the illustrations shown in this section are preferred build-out alternatives created with public input and review during the charrette process, the conceptual plans are not intended to preclude site-specific modifications. It is assumed that any modifications will be the result of specific programmatic and market analysis. However, development and redevelopment proposals are expected to: maintain and protect the general street network; street connections and rights-of-way; open space areas and usable public spaces; general intensity of development; urban pattern (relationship of buildings to the streets and adjacent properties); massing; street and pedestrian circulation patterns; and, to mix uses both horizontally (within sites) and vertically (within buildings), where appropriate.

The conceptual development plans laid out in this section and in the document were generally created with the assumption that their implementation would be accomplished primarily through private investment, with willing buyers and willing sellers and not through eminent domain. Although there will certainly be a role for government investment — in infrastructure improvements and public facilities; and developing and enforcing regulatory standards — the primary mechanism for accomplishing the physical vision embodied in these conceptual plans will be the initiative of private property owners, developers, and business owners in concert with the Town's adopted policy and regulatory processes.

▼ EXISTING VILLAGE ROAD AREA

# VILLAGE ROAD CONCEPT PLAN

For the Village Road area, the Framework Plan proposes a mix of S-4 Controlled Growth (Traditional Neighborhood Development and neighborhood commercial centers) at the northwestern end of the roadway corridor; S-3 Restricted Growth (small-scale, low density residential infill development) in the mid-portion of the corridor; and denser S-6 Infill/Redevelopment (built-up areas with underdeveloped land or outdated uses) at the southeastern end, close to its intersection with US 17/74/76.

The conceptual build-out plan reflects the types of development intended by the Framework Plan and appropriate to the market conditions, geography, and the property ownership configurations for the area. The transportation recommendations for this area are discussed in detail in the Transportation section.

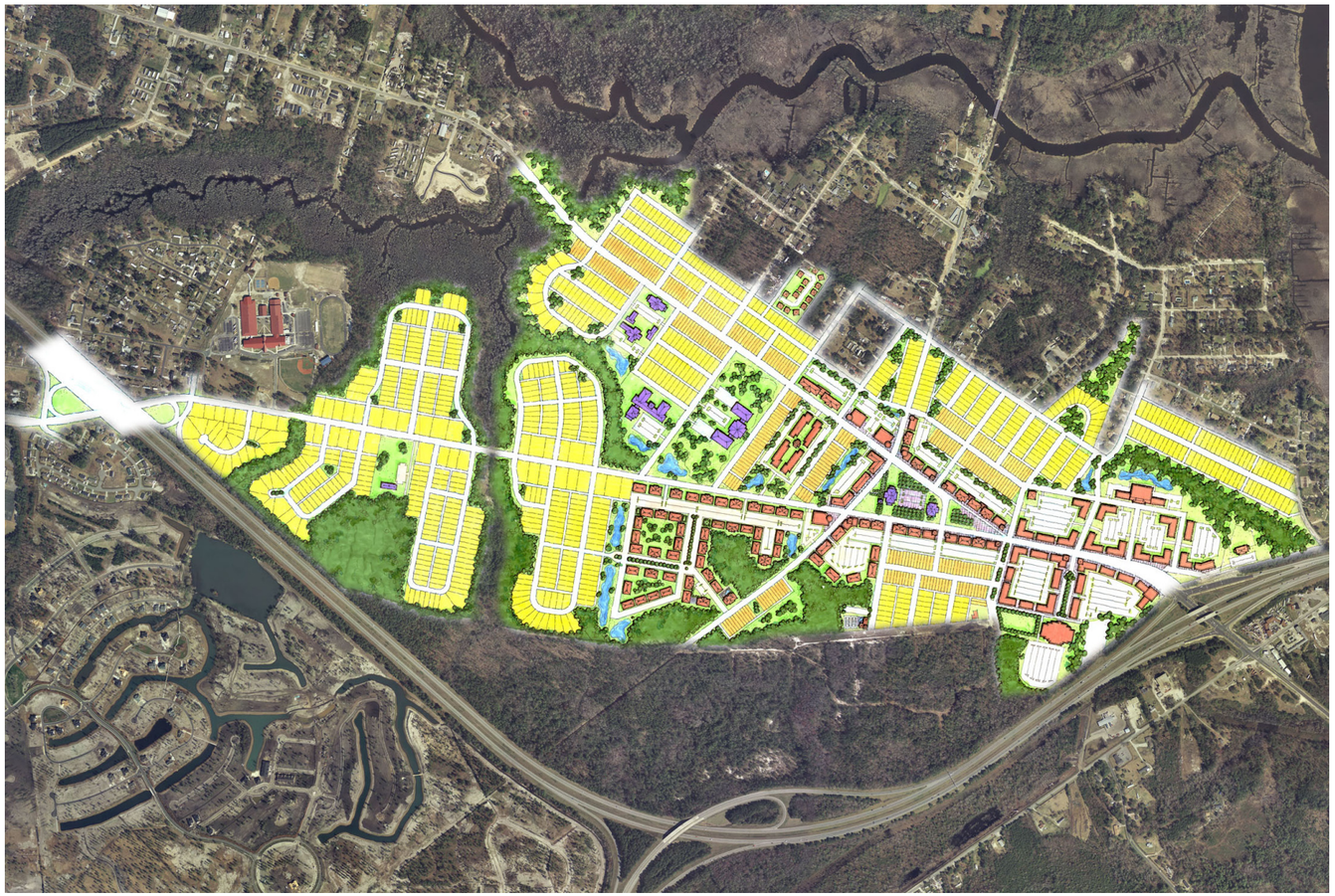
The plan divides the town center area into three basic zones of development intensity:

1. The mixed-use Town Center area nearest the highway at the southeastern end of Village Road;

2. A medium-density zone with mixed housing, civic and some commercial uses in the middle portion around the junction with Navassa Road and extending west as far as Forest Hills, Perry and Division Streets; and

3. A fringe area comprising medium- to lower-density single-family housing along Village Road from Perry Street as far as Sturgeon Creek, and up Old Fayetteville Road from its junction with Perry Street as far as the high school and the proposed new interchange with US 74/76.

The main change in the spatial configuration of the proposed redeveloped town center from the present condition is the extension of Old Fayetteville Road as a main spine of development, linking the proposed new interchange on US 74/76 with the existing one at Village Road. This enables Old Fayetteville Road to become a secondary circulation route to relieve some traffic pressure from Village Road, thus helping to safeguard Village Road's primarily residential character along substantial portions of its length to the north. The relation of this proposed new street alignment with the forthcoming widening of Village Road between the US 17/74/78 interchange and Navassa Road is discussed in the Transportation section. In the concept plan shown here, Village Road and Old Fayetteville Road converge at the entry point into the higher-density mixed-use core area.



▲ **VILLAGE ROAD/DOWNTOWN CONCEPTUAL MASTER PLAN**

**VILLAGE ROAD AREA DEVELOPMENT POTENTIAL**

Commercial Space - 1,000,000 sf
(Retail/Office)

Housing - 2,500 Units
(single family homes, townhomes, mixed-use condo/ apartments)

Civic Uses - 163,000 sf
(new Town Hall, library, school, community center)

# VILLAGE ROAD RIPE & FIRM ANALYSIS

A "ripe and firm analysis" comprises an appreciation of the development potential of land within a study area. This analysis enabled the project team to focus efforts on specific, high-priority areas. This analysis was the starting point for in developing the Village Road concept plan. It also helps to protect areas in the community considered to be special for their civic value or worthy of preservation for some other reason.

## FIRM AREAS

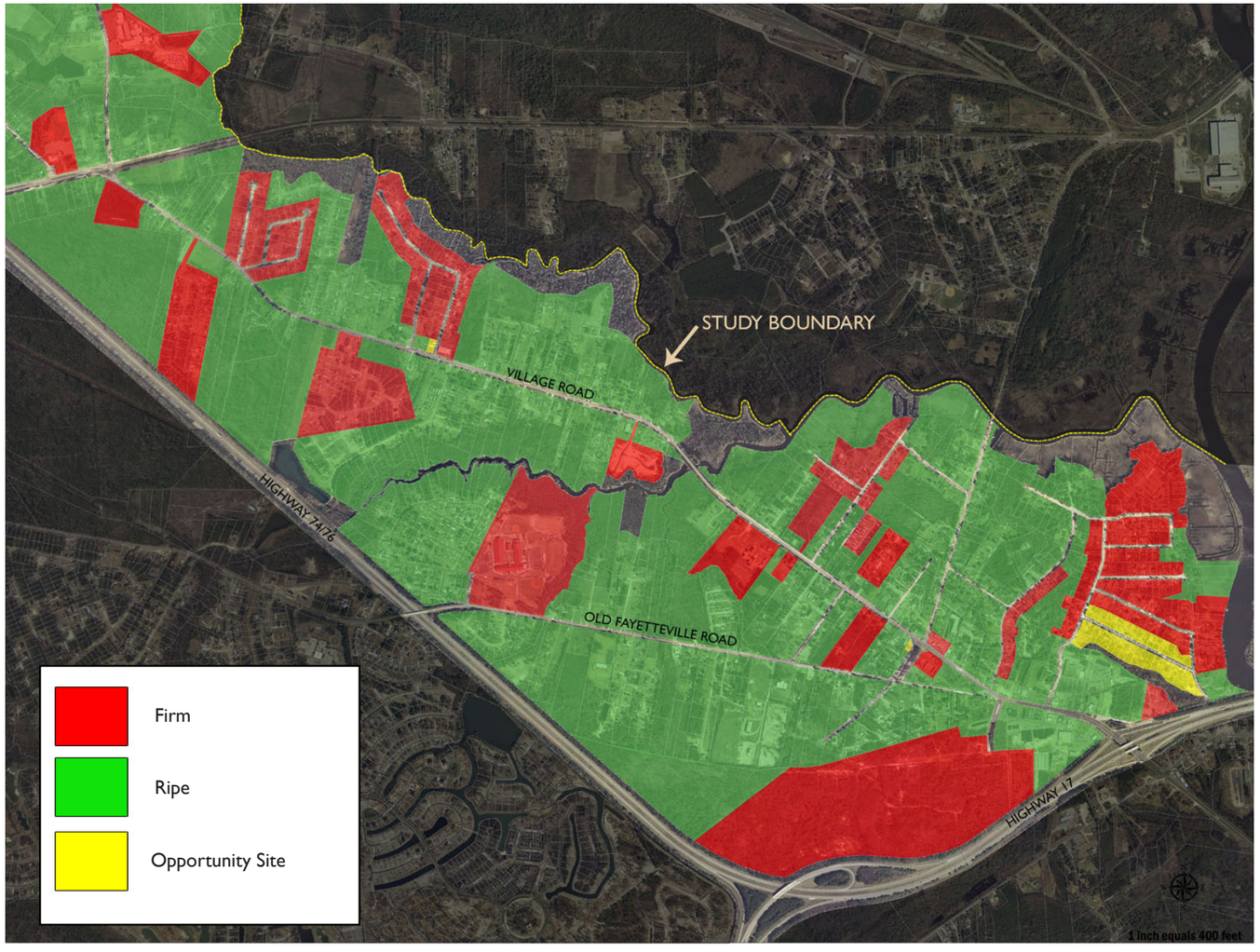
Parcels determined to be "firm" generally demonstrate stable conditions of building and land use and reflect the "highest and best use" according to real estate and appraisal forecasts. Such parcels typically require very little or no intervention or are unlikely to change in the near term. These properties also include important civic sites such as schools, churches, and parks; and new developments, or approved developments.

## RIPE AREAS

By contrast, "ripe" areas are those that typically offer significant development or redevelopment opportunities. These include parcels that are vacant, underdeveloped (that is, able to accommodate additional on-site expansion or new development), or in need of redevelopment. The potential for denser development at Leland's commercial core is particularly notable adjacent to Village Road's interchange with US 74/76. The presence here of two aging strip shopping centers with generic outparcel developments on either side of the roadway provides opportunities for land assembly to support extensive redevelopment with a distinctive urban character. This would capitalize on its prime commercial location and access and also create a distinctive gateway into the civic and community core of Leland.

## OPPORTUNITY SITES

A minority of sites may fall into an intermediate condition, classified as "opportunity sites," shown in yellow. Generally, these are properties that have reasonably stable uses but which hold considerable potential for redevelopment, either because of their physical condition or their location adjacent to sites with significant development potential.




**▲ VILLAGE ROAD RIPE AND FIRM ANALYSIS**

*The ripe and firm analysis for the Village Road area illustrates that the majority of land along the corridor is "ripe" for redevelopment (shown in green), with several "firm" areas (shown in red), both large and small, sprinkled throughout the area. Along the corridor, this redevelopment potential is evidenced by the new residential infill projects that are already occurring, including the clearing of former mobile home parks.*

# MIXED-USE TOWN CENTER AREA

The mixed-use Town Center zone comprises developments on either side of Village Road, as far as its junction with Northgate Drive, using consolidated patterns of land ownership to create comprehensive redevelopment plans for each side. Each potential project includes a major anchor, for example, a large grocery store on the north and a multiplex cinema on the south. The areas currently occupied by outparcel developments are consolidated into new urban blocks with street fronts lined with three-storey mixed-use buildings, generally with retail at sidewalk level and offices and/or apartments above.

Existing uses, such as fast-food restaurants, can be accommodated within the ground floors of some buildings with ample short-term parking on-street or within the block. The center of each block provides parking for all uses, supplemented by extensive on-street parking along the new network of smaller, local streets that crate the new block structure.

Related to these redevelopment visions for the town center is the work necessary to create Old Fayetteville Road as a primary street. This would involve rebuilding one short section of Carolina Avenue (the former alignment of Old Fayetteville Road) with the street itself turned to connect with Village Road. In the master plan, a public plaza is lined by new buildings and linked with a larger civic open space, with a new town hall and library buildings to create a functionally and symbolically important civic core at the heart of the revived town center.

### ▼ EXISTING CONDITIONS

### ▼ TOWN CENTER AREA PROPOSED DEVELOPMENT PATTERN

# PHASING OF IMPROVEMENTS

This 20-year build-out plan for the Village Road is conceived as having several phases, with the timetable related in large measure to the timing of street improvements. The most significant of these street improvements is the immediate proposed widening of Village Road from its junction with US 17/74/76 to just past Navassa Road and this plan's suggested improvements to that widening scheme (see Transportation section).

The development of new buildings along the corridor will occur incrementally after street improvements are complete. The form of buildings—their height and relationship to the street and architectural detailing—will be as important to the successful implementation of placemaking in the town center area as the streetscape improvements. The perspective along Village Road (shown at right), looking west from its junction with Baldwin Avenue shows the new, improved urban character of this town center area, with predictable traffic movements and enhanced pedestrian spaces more clearly defined by new buildings lining the streets.

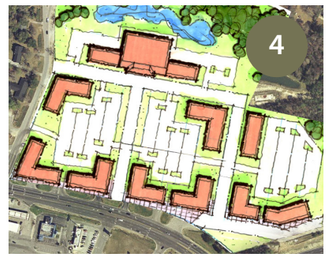
Private development and redevelopment can and will happen in a phased approach as well, as shown in the graphics on this page for the redevelopment of the northwest quadrant of the Village Road interchange with US17/74/76 (site of the Piggly Wiggly shopping center). The phased redevelopment is based on existing property lines and shows how existing undeveloped land could be developed in a first phase that would not affect existing businesses. Over time, as leases run out, existing buildings become obsolete, and land values increase, additional phases, along with new street infrastructure, could be built to create a new, mixed-use center with retail and office development with a definitive block structure, internal parking, and street-fronting buildings.




▶ **PHASED REDEVELOPMENT CONCEPTS FOR VILLAGE ROAD (AT BALDWIN AVE) WITH STREETSCAPE IMPROVEMENTS**

▼ **PHASED REDEVELOPMENT CONCEPT FOR VILLAGE RD NW QUADRANT**




**NORTHWEST QUADRANT DEVELOPMENT POTENTIAL**

Existing Development: 112,500 sf (primarily retail)

Redevelopment Concept: 286,200 sf (retail, office, residential)