FINAL REPORT

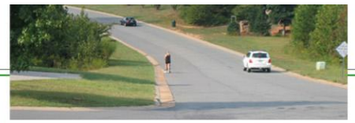
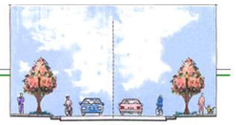
Peace Haven Road/Styers Ferry Road
CONNECTOR STUDY

Winston-Salem

THE VILLAGE OF CLEMMONS
FOUNDED 1908 INCORPORATED 1996
FORSYTH CO., N.C.

Kimley-Horn
and Associates, Inc.

September 2008

Acknowledgements

The development of the *Peace Haven Road/Styers Ferry Road Connector Study* was a collaborative process that involved local residents, numerous stakeholders, the Advisory Committee, the Village of Clemmons, Winston-Salem, Forsyth County, and the North Carolina Department of Transportation.

Advisory Committee

Wendy Miller – Winston-Salem Department of Transportation
Greg Errett – Winston-Salem Department of Transportation
Margaret Bessette – Winston-Salem/Forsyth County Planning
Megan Ledbetter – Village of Clemmons
Gary Looper – Village of Clemmons
Brett Abernathy – North Carolina Department of Transportation

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Jonathan Whitehurst
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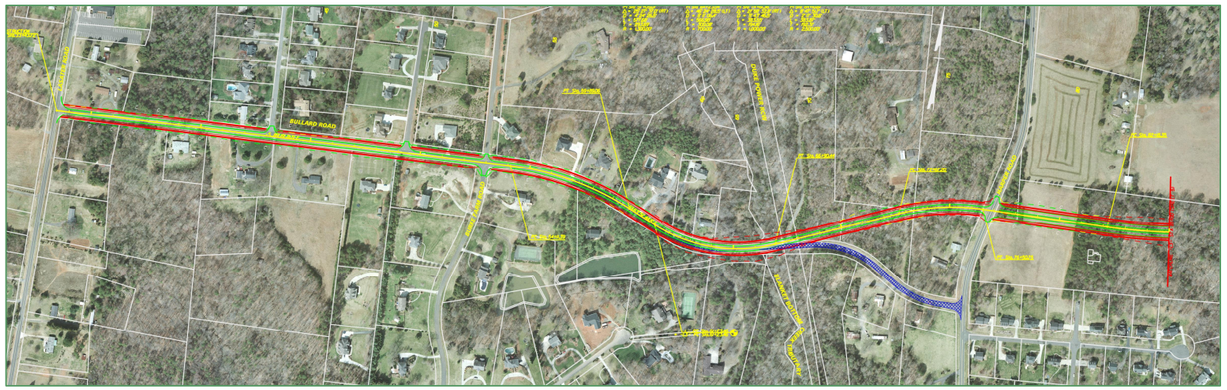
Matt West
Lauren Plettner

A special thanks to the local community for providing the foundation for this plan



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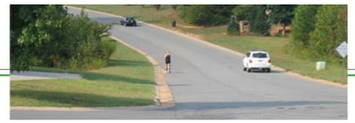
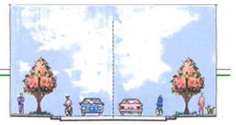

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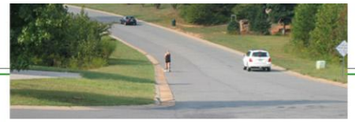
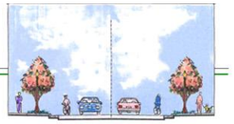



Chapter 1 — Introduction and Project Background

Project Introduction

The *Peace Haven Road/Styers Ferry Road Connector Study* represents a collaborative effort to determine the safety, connectivity, and access issues that contribute to the need for improved east-west connectivity in Clemmons, western Forsyth County, and portions of Winston-Salem. The analysis combines a feasibility study with the development of conceptual designs for the proposed connector. For 20 years, the community has documented in its thoroughfare plan the need for such a road. The *Peace Haven Road/Styers Ferry Road Connector Study* considers the preliminary alignment established in these previous plans as well as information provided by residents and stakeholders through a series of public outreach events. The purpose of the plan is to:

- Identify the preferred corridor
- Dedicate and reserve needed right-of-way
- Work with development community to implement corridor improvements
- Work with the North Carolina Department of Transportation and Winston-Salem Metropolitan Planning Organization to fill gaps in the corridor

The overarching goal is to establish a cost-effective corridor that improves east-west accessibility and mobility in the area while minimizing impacts to environmental, social, cultural, and historic resources. The corridor also should maintain the integrity of existing neighborhoods.

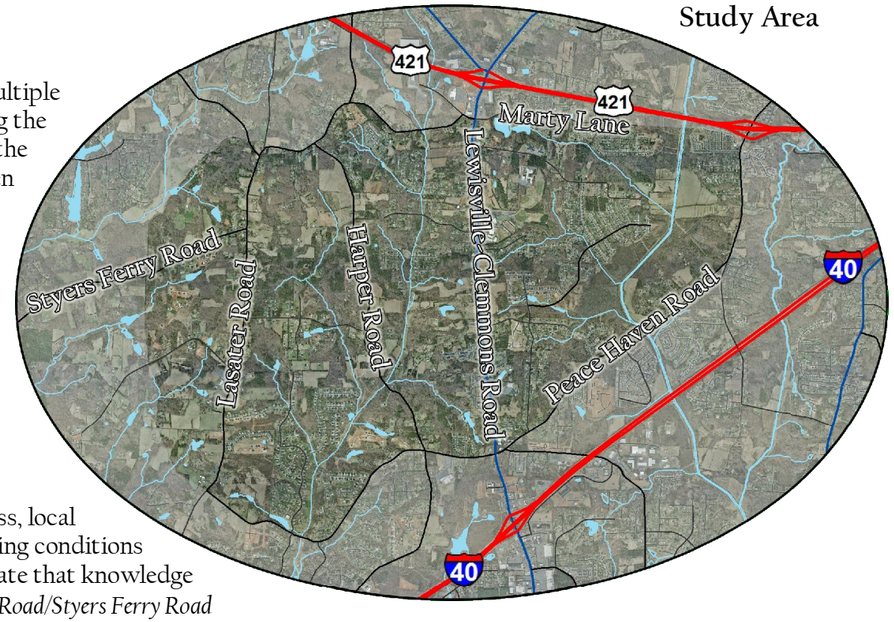
Study Area

The Peace Haven Road/Styers Ferry Road Connector study area covers approximately 7.5 square miles of western Forsyth County and northern portions of the Village of Clemmons. The entire area falls west of the interchange of US 421 and I-40. Peace Haven Road provides the southern and eastern boundary, while the northern boundary is formed by Styers Ferry Road, Marty Lane, and an arbitrary line extending east to Peace Haven Road. The western boundary is loosely based on property lines and allows enough distance from Lasater Road to encourage multiple alternatives for a proposed terminus. Lewisville-Clemmons Road, an important north-south route for local and regional traffic, bisects the study area.

Planning Process

Transportation planning, whether considering multiple improvements throughout a region or determining the potential alignment of a specific corridor such as the Connector, requires a cooperative process between multiple jurisdictions, key stakeholders, and citizens. Groups can share in the collective vision for a project even as they hold differing opinions on how this vision should be reached. The planning process for the *Peace Haven Road/Styers Ferry Road Connector Study* was designed to create an open dialogue about the needs of area residents.

Study Area



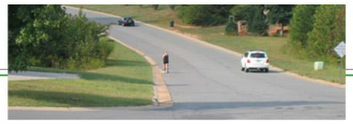
Public Outreach

As is typical in the transportation planning process, local residents have an intimate understanding of existing conditions and a collective vision for the future. To incorporate that knowledge into the decision-making process, the *Peace Haven Road/Styers Ferry Road Connector Study* relied on public input through a variety of small- and large-group meetings.

Advisory Committee

The preferred corridor and conceptual design is the result of detailed analysis and the guidance of an Advisory Committee (AC) composed of local and regional planning staff, local officials, and representatives from the North Carolina Department of Transportation. The committee was tasked with representing the broad base of local interests so numerous viewpoints and concerns could be incorporated into the selected corridor. The AC provided guidance throughout the development of the plan by serving as a sounding board for technical work and recommendations, describing and mapping their own ideas and suggestions, and promoting public workshops. The AC also selected the preferred alternative based on public input at the first workshop and a review of the potential impacts and benefits.

Advisory Committee hard at work.

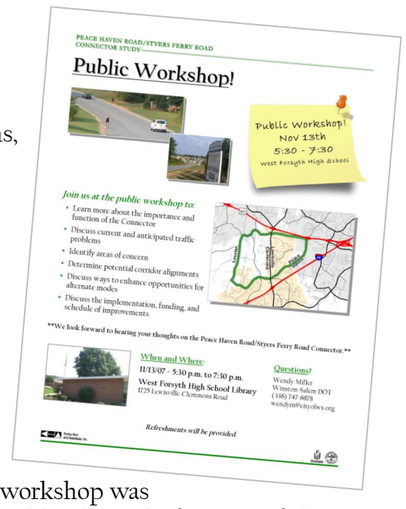

Stakeholder Meeting #1 – Visioning Session

On the day of the first public workshop, the project team met with a diverse group of stakeholders to discuss current and anticipated traffic problems, areas of concern, future projects and expansion plans, and potential corridor alignments. The stakeholders also discussed with the project team the implementation, funding, and schedule of improvements. The list of stakeholders, which included local land owners and real estate developers, fire and rescue personnel, and representatives from the school system, YMCA, and NCDOT was developed by the Advisory Committee. In addition to discussing the Connector's potential impact on their respective interests, several themes emerged from the stakeholder meeting. These themes included:

- Connectivity is great, particularly for fire and rescue vehicles and school buses
- Project needs to be coordinated with other projects such as the widening of Lewisville-Clemmons Road and potential construction of the western section of the Northern Beltway

Public Workshop #1 — Visioning Session

Citizens understand the strengths and weaknesses of the area's transportation system and are affected by transportation decisions on a very personal level. To tap into the special knowledge of local citizens, the project team hosted a visioning workshop. The workshop was designed to help facilitate public participation, generate and share ideas, and build consensus.


PEACE HAVEN ROAD/STYERS FERRY ROAD
CONNECTOR STUDY

Public Workshop!

Public Workshop!
Nov 13th
5:30 - 7:30
West Forsyth High School

Join us at the public workshop to:

- Learn more about the importance and function of the Connector
- Discuss current and anticipated traffic problems
- Identify areas of concern
- Determine potential corridor alignments
- Discuss ways to enhance opportunities for alternate modes
- Discuss the implementation, funding, and schedule of improvements

**We look forward to hearing your thoughts on the Peace Haven Road/Styers Ferry Road Connector. **

When and Where:
11/13/07 - 5:30 p.m. to 7:30 p.m.
West Forsyth High School Library
1725 Lewisville-Clemmons Road

Questions?
Wendy Miller
Winston-Salem DOT
(336) 747-6878
wendym@cityofws.org

Refreshments will be provided.

The first public workshop was held during the evening of November 13, 2007 – the same day as the first stakeholder meeting. More than 30 people attended the workshop held in the library of West Forsyth High School. Like the stakeholder meeting that preceded it, the workshop was designed to educate stakeholders and the public about the function of the Connector within the larger transportation network as well as to translate ideas and values into shared and concrete goals.

After an informal open house, the evening opened with an overview presentation of the area's transportation system, including discussions of the current and anticipated traffic problems. Following a large-group question and answer session, a series of interactive small group sessions allowed participants to document areas of concerns, offer feedback on local development and roadway projects, identify potential corridor alignments, and discuss ways to enhance opportunities for alternate nodes. At the end of the workshop, the results of each small group were reported to the large group.

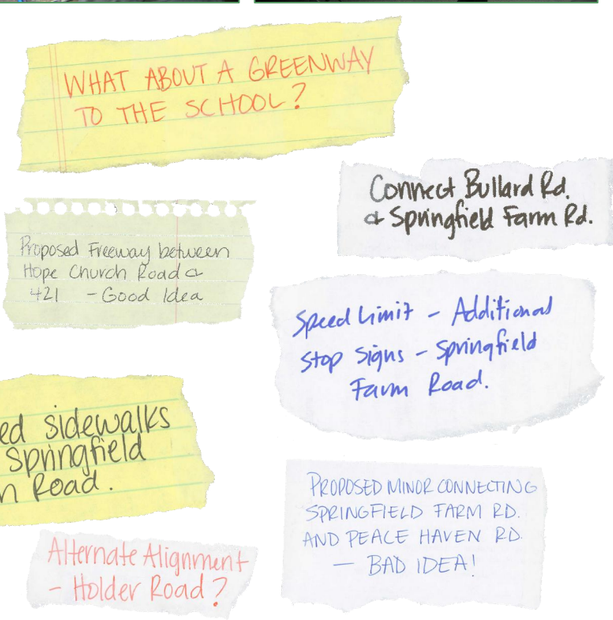


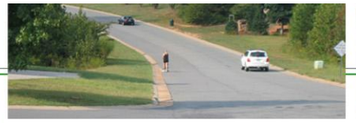
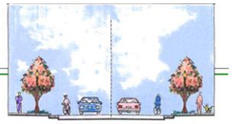



Several issues and concerns were identified at the public workshop, pertaining not only to the proposed Connector but also the transportation network in the Clemmons area. The Springfield Farms community was well represented at the workshop. While acknowledging safety problems for bicyclists and pedestrians within the study area and the need for improved access to their community, residents of Springfield Farms also expressed concern regarding increased through traffic and safety concerns associated with potential connections to Peace Haven Road.

Comments and suggestions were gathered at a variety of scales – ranging from connectivity concerns beyond the limits of the study area to local school ingress and egress to specific intersection recommendations. Several comments focused on travel conditions within existing neighborhoods, such as traffic calming, safety, lighting, access, and bicycle and pedestrian impacts.

Specific comments from the workshop included:



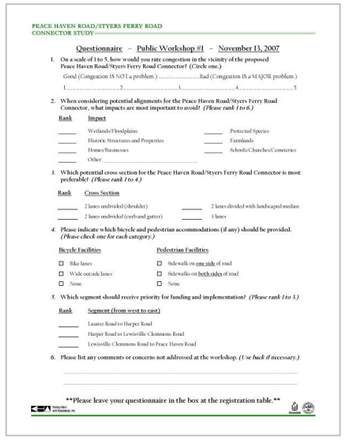
Public Questionnaire

In addition to the feedback received by the Advisory Committee and during the public workshops, a public questionnaire was created to gather specific information on existing conditions, preferred cross sections and design elements, and implementation strategies.

The questionnaire asked respondents to assess congestion in the vicinity of the proposed Connector. While the results were somewhat mixed, additional comments written on the questionnaires indicated congestion problems near West Forsyth High School and surrounding the intersections of Lewisville-Clemmons Road with Peace Haven Road and Styers Ferry Road.

Because potential alternative alignments were to be evaluated based on their impact to environmental, social, cultural, and historic resources, the survey asked respondents to rank which impacts should be avoided when considering potential alignments for the Connector. The highest ranked, indicating the resource that should be most avoided, were homes and businesses followed by schools, churches, and cemeteries.

The questionnaire also asked participants to choose a preferred cross section and the type — if any — of pedestrian and bicycle facilities. The majority of responses (approximately 75%) identified the preferred cross section as 2 lanes divided with a landscaped median. Two lanes undivided with curb and gutter received the second highest ranking. Nearly everyone who responded indicated a desire for bicycle and pedestrian facilities. As shown in the image to the right, the preferred cross section includes bike lanes and sidewalks on both sides of the road.


PEACE HAVEN ROAD/STYERS FERRY ROAD
CONNECTOR STUDY

Questionnaire – Public Workshop #1 – November 13, 2007

1. On a scale of 1 to 5, how would you rate congestion in the vicinity of the proposed Peace Haven Road/Styers Ferry Road Connector? (Circle one.)
Good (Congestion IS NOT a problem.) ..... Bad (Congestion IS a MAJOR problem.)
1 ..... 2 ..... 3 ..... 4 5

2. When considering potential alignments for the Peace Haven Road/Styers Ferry Road Connector, what impacts are most important to avoid? *(Please rank 1 to 6.)*

Rank	Impact		
____	Wetlands/Floodplains	____	Protected Species
____	Historic Structures and Properties	____	Farmlands
____	Homes/Businesses	____	Schools/Churches/Cemeteries
____	Other: _____		

3. Which potential cross section for the Peace Haven Road/Styers Ferry Road Connector is most preferable? *(Please rank 1 to 4.)*

Rank	Cross Section		
____	2 lanes undivided (shoulder)	____	2 lanes divided with landscaped median
____	2 lanes undivided (curb and gutter)	____	3 lanes

4. Please indicate which bicycle and pedestrian accommodations (if any) should be provided. *(Please check one for each category.)*

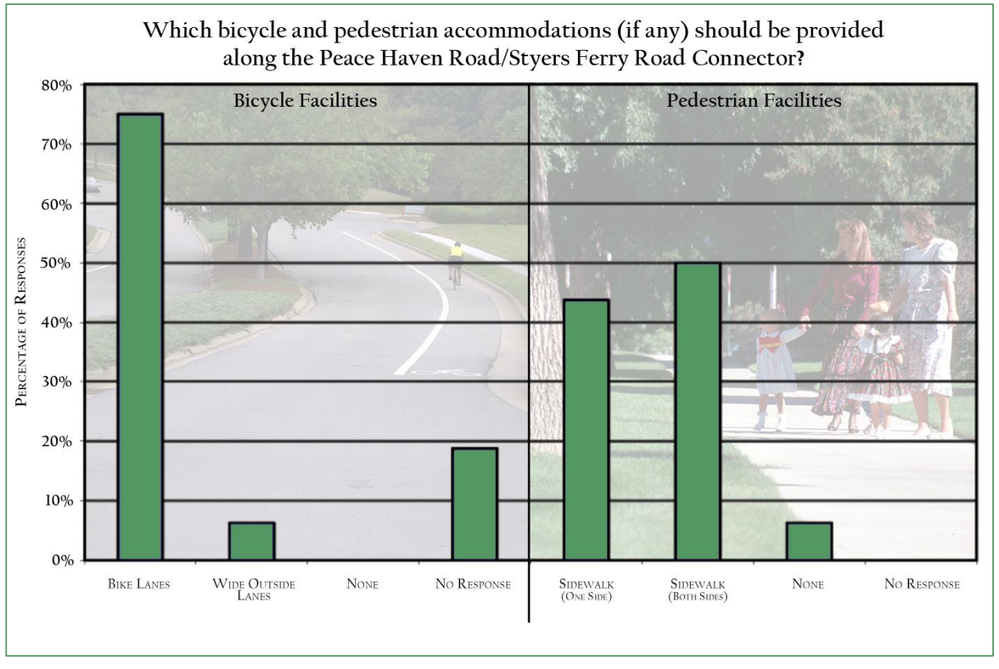
Bicycle Facilities	Pedestrian Facilities
☐ Bike lanes	☐ Sidewalk on one side of road
☐ Wide outside lanes	☐ Sidewalks on both sides of road
☐ None	☐ None

5. Which segment should receive priority for funding and implementation? *(Please rank 1 to 3.)*

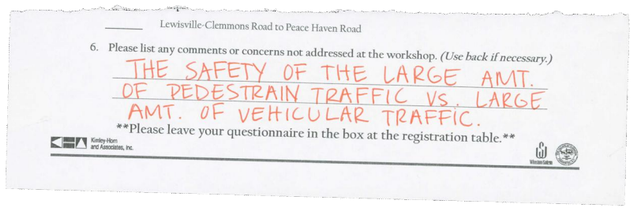
Rank	Segment (from west to east)
____	Lasater Road to Harper Road
____	Harper Road to Lewisville-Clemmons Road
____	Lewisville-Clemmons Road to Peace Haven Road

6. Please list any comments or concerns not addressed at the workshop. *(Use back if necessary.)*

Please leave your questionnaire in the box at the registration table.

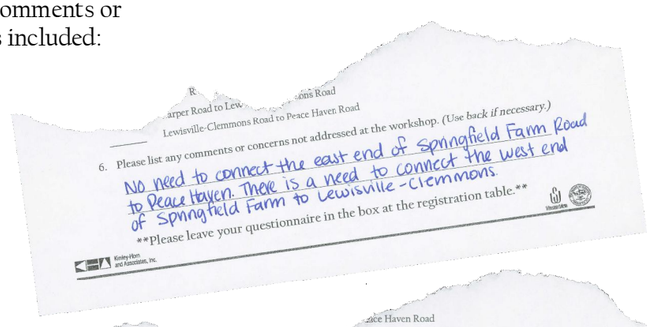


The questionnaire concluded by allowing respondents to list comments or concerns regarding the proposed Connector. These comments included:


Lewisville-Clemmons Road to Peace Haven Road

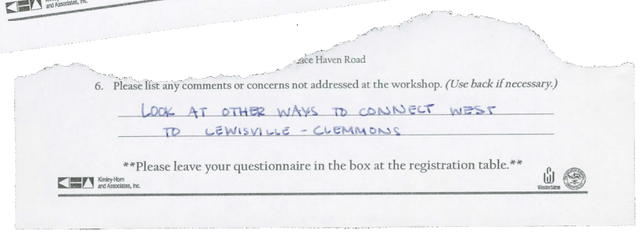
6. Please list any comments or concerns not addressed at the workshop. *(Use back if necessary.)*
THE SAFETY OF THE LARGE AMT. OF PEDESTRAIN TRAFFIC VS. LARGE AMT. OF VEHICULAR TRAFFIC.

Please leave your questionnaire in the box at the registration table.


...arper Road to Lew... ...ons Road
Lewisville-Clemmons Road to Peace Haven Road

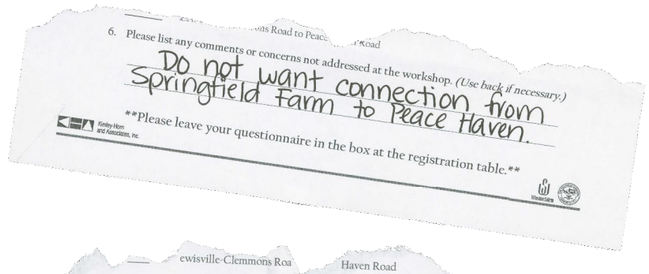
6. Please list any comments or concerns not addressed at the workshop. *(Use back if necessary.)*
No need to connect the east end of Springfield Farm Road to Peace Haven. There is a need to connect the west end of Springfield Farm to Lewisville-Clemmons.

Please leave your questionnaire in the box at the registration table.


...ace Haven Road

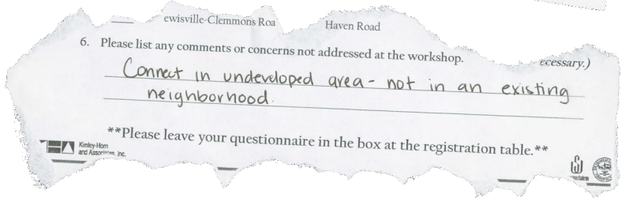
6. Please list any comments or concerns not addressed at the workshop. *(Use back if necessary.)*
LOOK AT OTHER WAYS TO CONNECT WEST TO LEWISVILLE-CLEMMONS

Please leave your questionnaire in the box at the registration table.


...os Road to Peac... ...Road

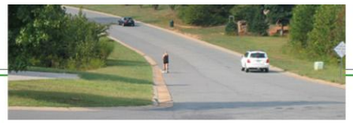
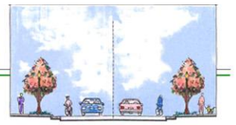
6. Please list any comments or concerns not addressed at the workshop. *(Use back if necessary.)*
Do not want connection from Springfield Farm to Peace Haven.

Please leave your questionnaire in the box at the registration table.


...ewisville-Clemmons Roa... Haven Road

6. Please list any comments or concerns not addressed at the workshop. ...ecessary.)
Connect in undeveloped area - not in an existing neighborhood

Please leave your questionnaire in the box at the registration table.

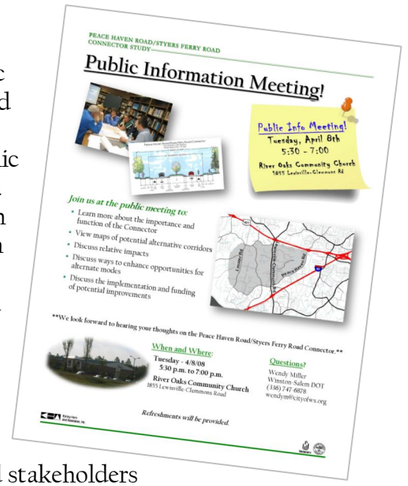
Stakeholder Meeting #2 – Feedback

A second stakeholder meeting was held April 8, 2008 prior to the second public workshop. At the second meeting, the project team engaged a similar set of stakeholders to obtain input regarding the recommended alignment, technical design issues, and project status moving forward. Among the concerns raised were how median breaks will accommodate emergency vehicles, how u-turns will impact school bus safety, whether to design for sidewalks on both sides of the road, and how to communicate the cross-section for a given segment of the Connector.

In addition to the technical comments regarding the preferred alignment, several stakeholder groups spoke out in support of the project and how the Connector will improve east-west connectivity through western Forsyth County. In particular, the school system expressed strong support for the connection from Lewisville-Clemmons Road to Springfield Farm Road.

Public Workshop #2 — Recommended Corridor

Following the development of the preferred alignment, a second public workshop was conducted April 8, 2008 at which the public viewed first-hand the benefit, trade-offs, and impacts associated with the proposed alignment. The workshop allowed the public to review all alternatives and offered them a final opportunity to engage the project team in a more formal environment. Presentation materials at this workshop included maps with all alternatives considered, conceptual drawings of the preferred alternative, and typical cross sections. The project team conducted a brief presentation highlighting the feedback received from the first public workshop and previous meetings with the Advisory Committee and stakeholders (see "What We Heard" to the right), the benefits of the projects, alternatives studied, and the details of the preferred alternative. Attendees provided feedback by speaking in front of the group or recording their comments on forms provided by the project team.


PEACE HAVEN ROAD/STYERS FERRY ROAD
CONNECTOR STUDY

Public Information Meeting!

Public Info Meeting!
Tuesday, April 8th
5:30 - 7:00
River Oaks Community Church
1855 Lewisville-Clemmons Rd

Join us at the public meeting to:

- Learn more about the importance and function of the Connector
- View maps of potential alternative corridors
- Discuss relative impacts
- Discuss ways to enhance opportunities for alternate modes
- Discuss the implementation and funding of potential improvements

We look forward to hearing your thoughts on the Peace Haven Road/Styers Ferry Road Connector.

When and Where:
Tuesday - 4/8/08
5:30 p.m. to 7:00 p.m.
River Oaks Community Church
1855 Lewisville-Clemmons Road

Questions?
Wendy Miller
Winston-Salem DOT
(336) 747-6878
wendy@cityofws.org

Refreshments will be provided.

Among the issues raised by attendees were the location of sidewalks in respect to property, homes, and right-of-way and excessive speeds on Springfield Farm Road and how roadway design and bike lanes can calm traffic. The advantage and disadvantage of other traffic calming techniques also were discussed.

While the large group portion of the meeting provided a good opportunity to both educate the public and learn from them, the majority of the evening was dedicated to small, informal discussion around the roadway design maps. These conversations allowed individual property owners and interested citizens to talk about direct impacts to their homes and properties.



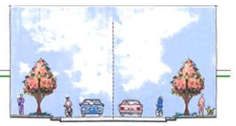
During both the Visioning Workshop in November and the Presentation in April, several comments were received that were beyond the scope of the *Peace Haven Road/Styers Ferry Road Connector Study*. Some of these comments referred to minor street connections while others referred to multimodal connections beyond the study area. These comments were forwarded to planning team responsible for the Village Transportation Plan – a multimodal, long-range transportation planning process that occurred concurrently with the Connector planning process.

"What We Heard"

The second public workshop held April 8, 2008 at River Oaks Community Church attracted residents and business owners who attended the first workshop as well as those who were being introduced to the project. To ensure everyone was on the same page and to validate the questions and concerns heard during the public involvement process to that point, the project team presented an inventory of previous discussion items. These items included:

- Extending Springfield Farm Rd to Lewisville-Clemmons Road – Good idea
- Lewisville-Clemmons Rd at Peace Haven Rd – Safety Issues
- Pedestrian Barriers
- Connect Bullard Rd and Springfield Farm Rd
- Traffic Calming Needed on Springfield Farm Rd
- Springfield Farm Rd to Peace Haven Rd – Bad idea
- Alternate Alignment – Use Holder Rd
- Need Bike/Ped Facilities
- Enhance East/West Connectivity
- Questionnaire – Bike Facilities (75%); Sidewalks (94%)
- Schools & Emergency Vehicles want connectivity
- Who will fund?





Guiding Principles

The guiding principles for the *Study* were developed based on public feedback, discussions with area stakeholders, and input by the advisory committee. The following goals attempt to balance the vision and objectives expressed by committee members *and* comments received at the public workshops.

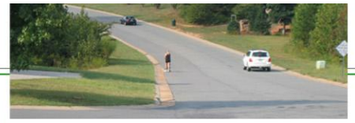
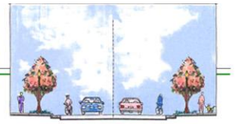
- Enhance east-west connectivity
- Improve safety for motorists, pedestrians, and bicyclists
- Protect surrounding neighborhoods
- Minimize environmental, social, and cultural impacts
- Minimize impacts to land owners
- Coordinate corridor analysis with associated transportation (Village Transportation Plan), future land use, and zoning plans
- Integrate with planned development projects
- Identify policies for corridor protection
- Develop design concepts that identify the "footprint" of the Connector

Report Organization

The *Peace Haven Road/Styers Ferry Road Connector Study* outlines the analysis and public input that has resulted in the conceptual design of the proposed alternative. The public outreach efforts represented an integral part of the planning process. Together with the Guiding Principles, the public outreach outcomes guided the project coordination efforts.

The report organization provides insight into the steps taken to reach the preferred alternative. Each chapter represents the cumulative effort to identify the new roadway location that improves connectivity, maintains the integrity of existing neighborhoods, and respects the area's resources. The report includes the following chapters:

- **Introduction and Planning Process**
- **Area Dynamics** (Existing and Future Conditions)
- **Alternative Corridor Analysis** (Alternative Description, Assessment, and Selection)
- **Preferred Alternative and Design**
- **Implementation and Action Plan**

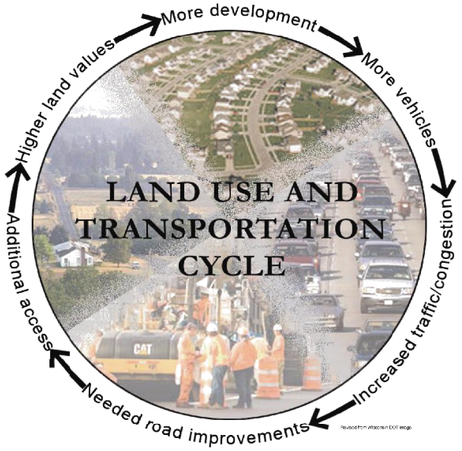
Chapter 2 — Area Dynamics

The land use and transportation dynamics surrounding western Forsyth County and the portion of the Village of Clemmons in the vicinity of the Peace Haven Road/Styers Ferry Road Connector study area results from its rural heritage and access to regional roadways. The area continues to grow, and as a result, continues to transform from its agricultural roots to a collection of residential neighborhoods of varying age surrounded by service retail, schools, and churches.

Balancing the transportation needs of such an area requires a thorough understanding of what has been accomplished in the past, what the conditions are today, and what needs to be achieved in the future. The following chapter presents an overview of the current land use considerations and a summary of the environmental, historic, and social resources within the study area. The chapter also reviews the existing transportation network and assesses its performance based on safety and mobility. Analysis by the project team and information provided through public outreach and the involvement of the Advisory Committee all served as the basis for this chapter. These existing conditions directly inform the future conditions detailed in Chapter 3 and provide a base level of measure from which to the alternative corridors and selected conceptual design.

Land Use Considerations

The cyclical influence of land use patterns and transportation systems is well documented. Elements of transportation – including roads, sidewalks, and bicycle facilities – can impact how land is developed in terms of type and density. Further, where land uses fall and how they are distributed inevitably impact decisions regarding where people travel and how transportation facilities are prioritized. For instance, residents have expressed concern that the eventual completion of the Connector will attract commercial uses along the corridor.



Because of this relationship between land use planning and transportation systems, the *Peace Haven Road/Styers Ferry Road Connector Study* must forward appropriate strategies that protect the residential integrity of the land along the preferred corridor. While the design of the roadway as a minor thoroughfare and access management restrictions will go a long way in ensuring the corridor remains residential at heart, certain land use tools may need to be employed that protect the mobility, safety, and development integrity of the corridor.

Existing Land Use

Existing land use within the study area is characterized by residential uses, including newer neighborhoods such as Springfield Farms, older neighborhoods, and rural homes not within an existing subdivision. These residential uses are surrounded by working farms and open fields. Commercial land uses have located where transportation access is greatest (near interchanges with US 421 and I-40) as well as near strategic crossroads (intersection of Lewisville Clemmons Road and Peace Haven Road). Commercial land uses also extend south along Lewisville-Clemmons Road from US 421.

Residential and commercial land uses in the study area are complemented by a variety of civic land uses, including numerous churches and cemeteries as well as West Forsyth High School, Southwest Elementary School, the Montessori School, and the West Forsyth Family YMCA. In addition, a few properties in the vicinity of the study area have been surveyed for potential historic significance. These properties are detailed later in this chapter.

The extensive growth in Clemmons and western Forsyth County is well documented. The North Carolina Center for Statistics reports population growth in Clemmons of 130% between 1990 and 2000. The growth is evident in both the number of new homes in the area and in the stores and restaurants that line the commercial corridors. Zoning in the area has laid the framework residential growth. As shown in **Figure 2.1**, most of the study area is zoned for residential homes on large lots, including areas west of Lewisville-Clemmons Road. Locations east of Lewisville-Clemmons are zoned to accommodate relatively more dense detached homes. Zoning in the area supports the County's growth management plan, which except for areas south of I-40 along Lewisville-Clemmons Road and in the vicinity of Village Hall, calls for suburban neighborhoods.

New Neighborhoods

Working Farms and Open Fields

Figure 2.1

Zoning Map

September 2008

- Freeway/Expressway
- Major Thoroughfare
- Minor Thoroughfare
- Collector Street
- Local Street
- Study Area
- Body of Water

Zoning

- Residential Single Family Districts
- Residential Multifamily Distrcits
- Manufactured Housing Districts
- Commercial Zoning Districts
- Industrial Zoning Districts
- Mixed Use Zoning Districts
- Institutional Zoning Districts
- Historic Zoning Districts
- Agricultural Districts
- Yadkin River Conservation

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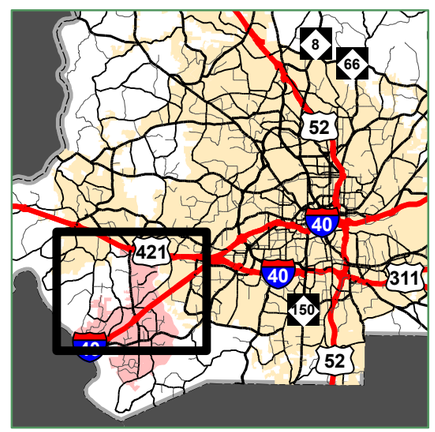


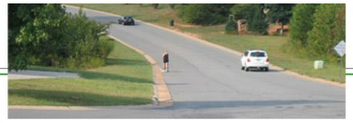


Preliminary Environmental and Cultural Screening

Transportation projects can impact the natural environment and disrupt communities even as they improve traffic mobility. Only through early awareness and responsible planning can these impacts be minimized or avoided. Environmental and social issues must be addressed early in the planning process in order to avoid inefficient use of time and resources. The result is a corridor plan that is respectful of the environment, avoids potential sensitive areas, and is cost-effective in its implementation.

The following section examines the environmental, cultural, and social conditions in the study area. It also includes maps that illustrate the results of the environmental and cultural screening. These maps include elements such as water features, threatened or endangered species, schools, churches, and historic properties. Other maps display socioeconomic distributions in the study area. When overlaid with the potential alternative alignments developed using public feedback, these maps provide a useful tool in assessing each alternative's relative impact to the environment.

Natural and Environmental Resources

With the development of a new roadway, it will be important to manage and minimize environmental impacts. Some natural amenities, such as clean water and open spaces must be maintained to satisfy not only residents' desires for a high quality of life but also to comply with state and federal environmental policies.

Figure 2.2 depicts important natural features within the study area. Two creeks traverse the study area, both of which flow into the Yadkin River to the south. Blanket Bottom Creek enters the study area from the south along Peace Haven Road between North Lakeshore Drive and Lasater Road. The creek meanders northeast through the study area before exiting along Styers Ferry Road between Chardale Road and Immanuel Road. The larger Muddy Creek and its floodplain carve a swath across the eastern portion of the study area, following the proposed alignment of the Western Section of the Northern Beltway. Both creeks have tributaries that are impacted to varying degrees by the alternative alignments considered for the *Peace Haven Road/Styers Ferry Road Connector Study*.

The North Carolina Department of Environment and Natural Resources (DENR) manages the Natural Heritage Program. One product of this program is a statewide database of Natural Heritage Element Occurrences, which identifies the location of rare and endangered animals and plants and exemplary natural communities. Current data does not indicate the presence of any rare or endangered species within the study area, as shown in **Figure 2.2**.

Figure 2.3 depicts the slope intensity of the elevation change which helps determine the planning level alignments for potential alignments. The slope intensity is considered because building roadways in relatively flat areas can reduce costs by limiting earthwork.

Historic Properties and Places

The North Carolina State Historic Preservation Office (SHPO) maintains databases of nationally registered historic sites. SHPO resources indicated a historic home — the Cos Blackburn House — located west of the intersection of Peace Haven Road and Lewisville-Clemmons Road. The information contained in the statewide database was supplemented with information provided by City-County planning staff during an ongoing update to Forsyth County's 1981 Architectural Survey. Discussions with the consultant assisting with the survey update indicated that the Cos Blackburn House had been demolished.

Several properties within or near the study area were identified during the Architectural Survey update process as having potential historic significance. Because the inventory and assessment is not complete, this list does not indicate a final assessment of any properties eligibility for historic designation. The properties – shown in **Figure 2.4** – include:

- Union Hill Baptist Church
- Johnathon Lewis Lowder House
- Frederick Binkley House
- Harmony Grove Methodist Church Cemetery
- Sapp House
- Walter Harper House
- Luette Harper House
- Watkins House #1 & #2
- Harper-Bullard Farm
- Jack Boyer House
- Dobson House
- Warner House
- House at 6611 Styers Ferry Rd
- House at 8174 Hawkins Rd

Luette Harper House

Frederick Binkley House

Dobson House

Hawkins Road House

Peace Haven Road/Styers Ferry Road Connector Study

Figure 2.2

Natural and Environmental Resources

September 2008

- Freeway/Expressway
- Major Thoroughfare
- Minor Thoroughfare
- Collector Street
- Local Street
- Study Area
- Body of Water
- Wetland
- 100-Year Floodplain
- Park

Natural Heritage Element Occurences*

- Non-Vascular Plant
- Vascular Plant
- Vertabrate Animal
- Invertabrate Animal
- Specific Animal Habitat
- Natural Community

*Source: N.C. Dept of Environment & Natural Resources

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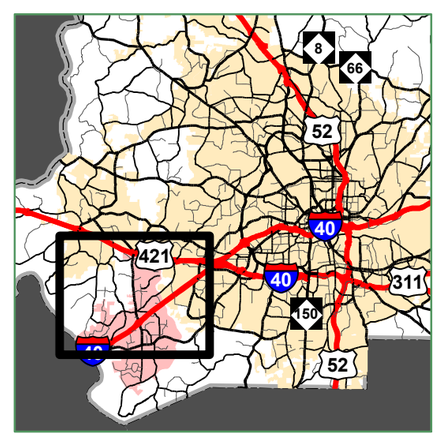

0 0.5 Miles

Figure 2.3

Slope Intensity

September 2008

- Freeway/Expressway
- Major Thoroughfare
- Minor Thoroughfare
- Collector Street
- Local Street

Slope

- Less than 5%
- 5 to 10%
- 10 to 25%
- More than 25%
- Body of Water

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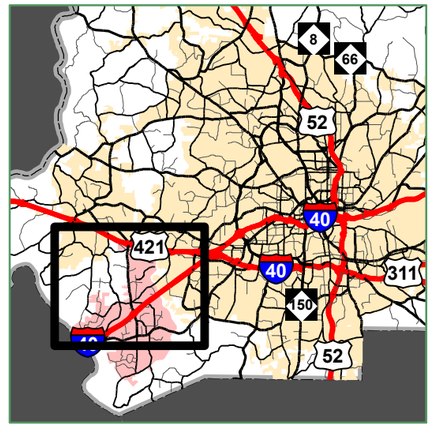
0 0.5 Miles



Peace Haven Road/Styers Ferry Road Connector Study

Figure 2.4

Historic and Cultural Resources

September 2008

Map ID	Inventoried Site
1	Union Hill Baptist Church
2	Jonathan Lewis Lowder House
3	Frederick Binkley House
4	Harmony Grove Methodist Church Cemetery
5	Sapp House
6	Walter Harper House
7	Luette Harper House
8	Watkins House 1
9	Watkins House 2
10	Harper-Bullard Farm
11	Jack Boyer House
12	Dobson House
13	Warner House
14	House at 6611 Styers Ferry Road
15	House at 8174 Hawkins Road

- Freeway/Expressway
- Major Thoroughfare
- Minor Thoroughfare
- Collector Street
- Local Street
- Study Area
- Body of Water
- 100-Year Floodplain
- Parks
- School
- Fire Station
- Church
- Inventoried Structure (Potentially Historic)
- Cos Blackburn House Site (Demolished)

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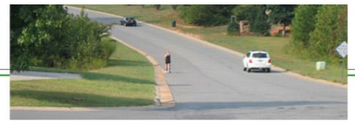
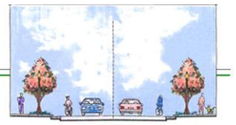
0 0.6 Miles

Cultural and Community Resources

Cultural and community resources identified include schools and churches located within the study area. These locations are civic destinations for residents of all ages, and in some cases, community landmarks. As alternative alignments were evaluated, the project team considered potential impacts that might affect these important community features. **Figure 2.4** shows the location of schools, churches, fire stations, and the YMCA.

Public schools in the study area include Southwest Elementary School (grades kindergarten through 5) and West Forsyth High School (grades 9 through 12). Several private schools also are located in the study area, including the Montessori School, Agape Faith Christian Academy, and Center Grove Christian Academy.

Planning level alignment alternatives also must respect the location of cemeteries. Aerial photography and field analysis proved ineffective in determining the location of cemeteries. The cemetery shown in **Figure 2.4** was identified through the historic inventory underway by City-County planning staff. Tax data provided by the Village of Clemmons also was reviewed to identify cemeteries, though none were determined to be impacted by potential alignments of the Connector.



Environmental Justice

Environmental justice is a law intended to avoid the use of federal funds for projects, programs, or other activities that generate disproportionate or discriminatory adverse impacts on minority or low-income populations. This effort is consistent with Title IV of the 1964 Civil Rights Act, and is promoted by the U.S. Department of Transportation as an integral part of project planning and design. While federal funding is not expected to be the funding source of the Connector, the environmental justice assessment was based on three basic principles derived from USDOT guidelines as a best practices planning effort:

- The planning process should avoid, minimize, or mitigate economic, social, and human health impacts that affect minority and low-income populations with disproportionate severity.
- Transportation benefits should not be delayed, reduced, or denied to minority and low-income populations.
- Any community potentially affected by outcomes of the transportation planning process should be provided with the opportunity for complete and equitable participation in decision-making.

The assessment used 2000 Census Data to identify the geographic distribution of minority, Hispanic, and low-income populations within the study area. As shown in **Figures 2.5 to 2.7** the presence of these populations within the study area is relatively minor. The assessment of minority, Hispanic, and low-income populations within the study area also was compare with overall rates for Forsyth County. The study area populations mostly fall below the countywide threshold for minorities (31.5% of total county population), Hispanics (6.4%), and persons living below poverty (11.0%).

It should be noted that the environmental justice assessment does not attempt to quantify specific impacts to the populations of interest. Rather, the assessment guides the selection of the preferred alternative by ensuring potential impacts — if any — are noted and the benefits and impacts of the proposed roadway are evenly distributed among the study area population.

Peace Haven Road/Styers Ferry Road Connector Study

Figure 2.5

Percent Minority

September 2008

- Freeway/Expressway
- Major Thoroughfare
- Minor Thoroughfare
- Collector Street
- Local Street
- Study Area
- Body of Water

Percent Minority

- Less than 10%
- 10% to 25%
- 25% to 50%
- More than 50%

Source: 2000 Census (Data at Census Block Level)

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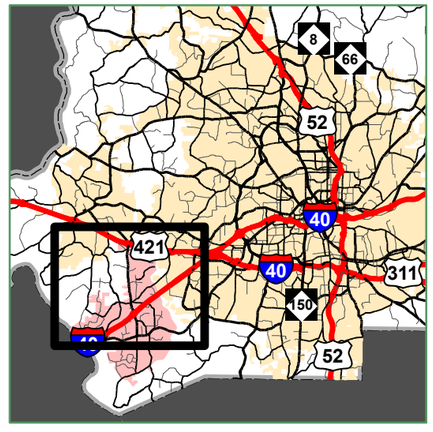

0 0.5 Miles

Figure 2.6

Percent Hispanic

September 2008

- Freeway/Expressway
- Major Thoroughfare
- Minor Thoroughfare
- Collector Street
- Local Street
- Study Area
- Body of Water

Percent Hispanic

- Less than 5%
- 5% to 10%
- 10% to 25%
- More than 25%

Source: 2000 Census (Data at Census Block Level)

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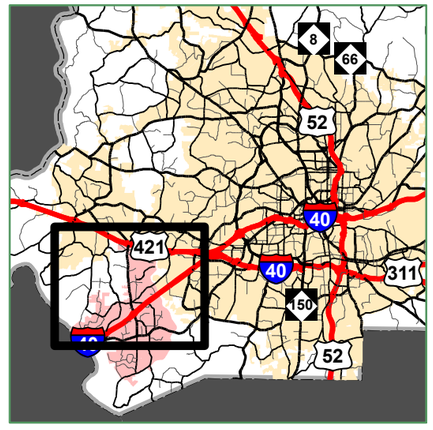

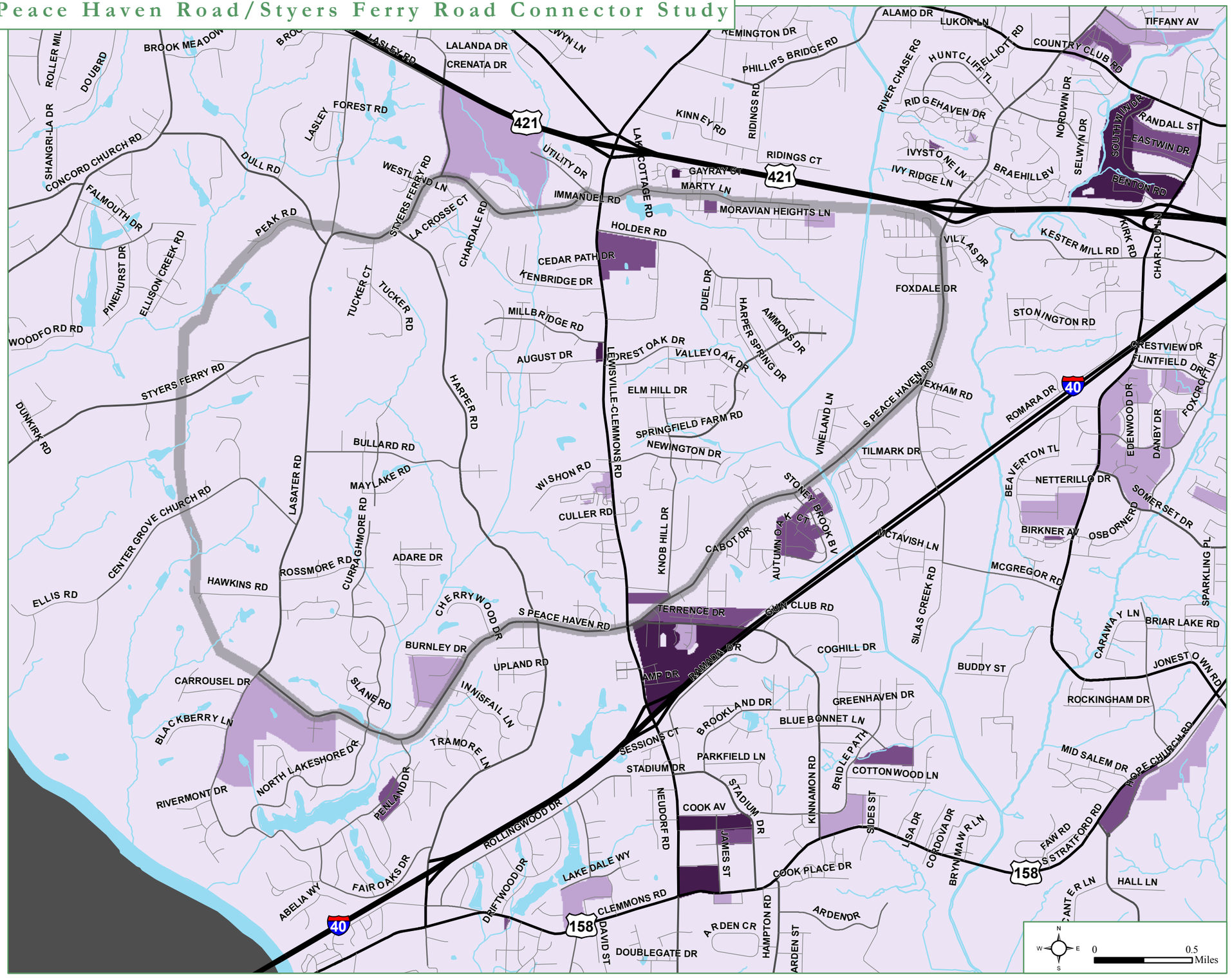

Figure 2.7

Percent Below Poverty

September 2008

- Freeway/Expressway
- Major Thoroughfare
- Minor Thoroughfare
- Collector Street
- Local Street
- Study Area
- Body of Water

Percent Below Poverty

- Less than 10%
- 10% to 25%
- More than 25%

Source: 2000 Census (Data at Census Tract Level)

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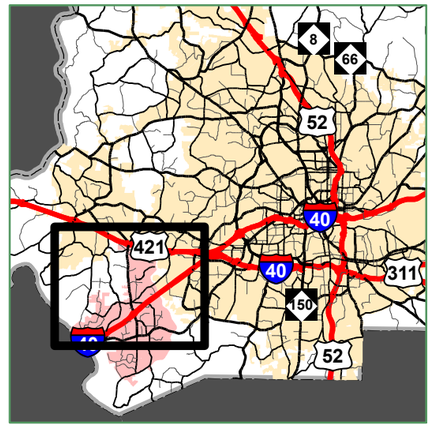


0 0.5 Miles

Planned Development and Future Land Use

While land use has traditionally been planned for as a stand-alone entity, it does not exist in a vacuum. Transportation systems and land use patterns traditionally influence each other in a cyclical pattern. Elements of transportation — including roads and pedestrian, bicycle, and transit facilities — can impact how land is developed. Further, where land uses fall and how they are distributed inevitably impacts decisions regarding where people travel, what means of travel they choose, and how transportation facilities are prioritized. If land continues to develop in a rural/suburban form, residents will rely almost entirely on automobiles to get from one location or use to another. However, the construction of a connected network of sidewalks and bicycle facilities will go a long way in ensuring that those people walk or bicycle — whether or not they have other options — will be afforded the same safety and efficiency considerations extended to motorists.

As these two elements are combined and their relationship enhanced, the *Peace Haven Road/Styers Ferry Road Connector Study* must strike a delicate balance. Plans, policies, and programs not only must preserve mobility through effective transportation but also must reinforce the area's "sense of place" through land use that reflects the true community.

Transportation Considerations

A high-quality transportation system balances the needs of all users by operating safely and efficiently while supporting the community and enhancing its character. Two regionally significant roadways bookend the study area to the north (US 421) and south (I-40). Both roadways provide east-west connectivity, though via controlled access facilities. Other significant roadways in the study area include Lewisville-Clemmons Road, which accommodates north-south travel and provides the main access to the commercial areas south of I-40 and the Village Hall area.

Functional Classification

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

Two major considerations for classifying arterials from local streets are access and mobility. The primary function of local or neighborhood streets is to provide access. These streets are intended to serve localized areas or neighborhoods, including local mixed-use and commercial land uses (i.e. low speeds, low volumes, short distances). Local streets are not intended for use by through traffic. On the other hand, the primary function of arterials is mobility. Limiting access points (intersections and driveways) on arterials enhances mobility. Too much mobility at high speeds limits access by pedestrians and bicyclists. The arterial is designed with the intent to carry more traffic than is generated within its corridor (i.e. higher speeds, higher volumes, longer distances).

The existing street network in the vicinity of the proposed connector is divided into several functional classifications, including thoroughfares (i.e. arterials), collectors, and locals. **Figure 2.8** illustrates the functional classifications for existing study area roadways.

Freeways and Expressways

Freeways and expressways provide the most mobility and least access (since access is only available at interchanges). Freeway/expressway facilities typically serve longer distance travel and support regional mobility. The state funds roadway improvement and maintenance on these facilities. I-40 and US 421 are classified as freeways/expressways.

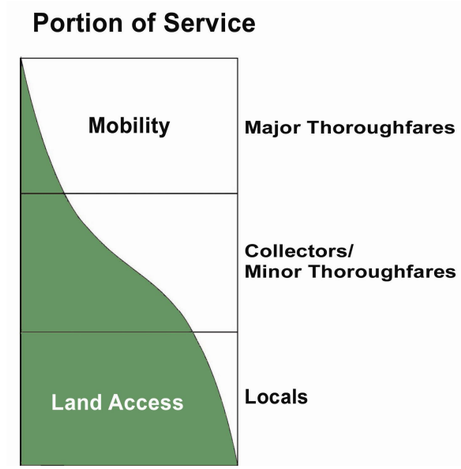
Thoroughfares (Arterials)

Thoroughfares provide high mobility, operate at higher speeds (45 mph and above), provide significant roadway capacity, have a great degree of access control, and serve longer distance travel. These facilities usually connect to one another or to collector streets, and very few thoroughfares connect to local streets.

Major Thoroughfares

Major thoroughfares typically have tightly controlled access and few, if any, individual site driveways. These facilities serve medium to longer distance travel and typically connect minor thoroughfares and collector streets to freeways and other higher type roadway facilities. Generally, roadway improvements and maintenance on major thoroughfares are funded by the state.

Major thoroughfares in the area include Lewisville-Clemmons Road and Clemmons Road/Stratford Road (US 158).



Lewisville-Clemmons Road (Major Thoroughfare)

Figure 2.8

Existing Functional Classification

September 2008

- Freeway/Expressway
- Major Thoroughfare
- Minor Thoroughfare
- Collector Street
- Local Street
- Study Area
- Body of Water
- Wetland
- 100-Year Floodplain

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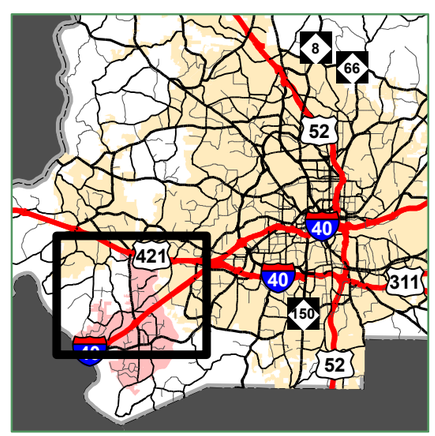
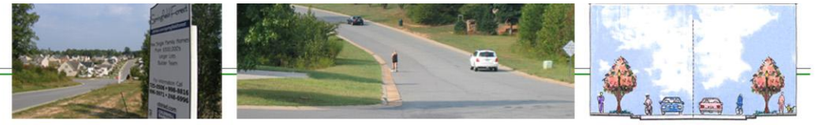
0 0.5 Miles





Minor Thoroughfares

Minor thoroughfares primarily serve a mobility function but often have more closely spaced intersections, some individual site driveways, and generally lower design and posted speeds compared to other arterials. The minor thoroughfare network is primarily intended to serve travel demand within the local area. These roadways connect to other minor thoroughfares, to major thoroughfares, and to collector streets. Minor thoroughfares provide a higher level of access to adjacent land uses than major thoroughfares and typically have lower traffic volumes. For the most part, minor thoroughfares are maintained by the state, but the cost of improvement may be the responsibility of local governments or private developers.

In general, minor thoroughfares in the study area have two-lane undivided cross sections with little or no paved shoulders and an occasional left-turn lane at intersections and major driveways. Posted speed limits on minor thoroughfares range from 35 mph to 45 mph.

Minor thoroughfares in the study area include Peace Haven Road, Harper Road, Styers Ferry Road, and Springfield Farm Road. The proposed Peace Haven Road/Styers Ferry Road Connector will be designated as a minor thoroughfare.

Collectors

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

The primary purpose of the collector street system is to collect traffic from neighborhoods and distribute it to the system of major and minor thoroughfares. In general, collector streets have two lanes and often have exclusive left-turn lanes at intersections with major and minor arterials and less frequently at intersections with other collector streets. Collector streets are rarely constructed and funded by the state. Responsibility for collector streets usually falls to the local government and the development community for funding, design, and construction.

Examples of collector streets in the study area include Bullard Road, Knob Hill Drive, and Holder Road.

Locals (Neighborhood Streets)

Local facilities provide greater access and the least amount of mobility. These facilities typically connect to one another or to collector streets and provide a high level of access to adjacent land uses/development (i.e., frequent driveways). Locals serve short distance travel and have low posted speed limits (25 mph to 35 mph). Examples of local streets in the study area include Moravian Heights Lane, May Lake Road, as well as most of the roads in the Springfield Farms community.

Existing Roadway Conditions

Many factors go into the assessment of existing roadway conditions for the purpose of evaluating the potential benefit of a new roadway such as the Connector. Two general categories of particular interest to transportation planners and decision-makers are congestion and travel safety. The existing roadway conditions described below are illustrated in **Figure 2.9**.

Peace Haven Road (Minor Thoroughfare)

Congestion

Congestion along corridors is related to a number of factors but often is the result of bottlenecks — primarily at intersections — along the corridor. Aside from individual bottleneck locations in corridors, congestion frequently results from too many people trying to use a route that is already at or over-capacity.

Determining the level of congestion on area roadways often can be limited by the amount of information available. While the Piedmont Triad Regional Travel Demand Model typically is a good place to start, imperfections in the model as it relates to the proposed Connector rendered the tool ineffective for evaluating existing and future travel conditions in the study area. Analysis of 2005 average annual daily traffic volumes provided by NCDOT and 24-hour tube counts completed in October 2007 coupled with public feedback proved to be the most effective way to evaluate the real and perceived levels of congestion on roadways in the study area.

Traffic volumes signify the total number of vehicles traveling along a roadway segment on an average day. **Figure 2.9** illustrates in red the 2005 average annual daily traffic (AADT) volumes on study roadways in the study area. As expected, US 421 and I-40 carry the most vehicles, with an average of 54,000 vehicles traveling on the segment of US 421 east of Peace Haven Road and 57,000 vehicles traveling on I-40 east of Harper Road.

Congestion on Holder Road

Lewisville-Clemmons at Styers Ferry

Total Crashes: 44
Crashes with Injuries: 21
Most Frequent Crash Type: Left Turn, Same Roadway (22 crashes)

Lewisville-Clemmons at Forest Oaks/August

Total Crashes: 12
Crashes with Injuries: 3
Most Frequent Crash Type: Rear End, Slow or Stop (8 crashes)

Peace Haven at Harper

Total Crashes: 12
Crashes with Injuries: 5
Most Frequent Crash Type: Angle (7 crashes)

Peace Haven at McGregor

Total Crashes: 10
Crashes with Injuries: 5
Most Frequent Crash Type: Rear End, Slow or Stop (5 crashes)

Lewisville-Clemmons at Peace Haven/Kinnamon

Total Crashes: 49
Crashes with Injuries: 12
Most Frequent Crash Type: Left Turn, Same Roadway (10 crashes)

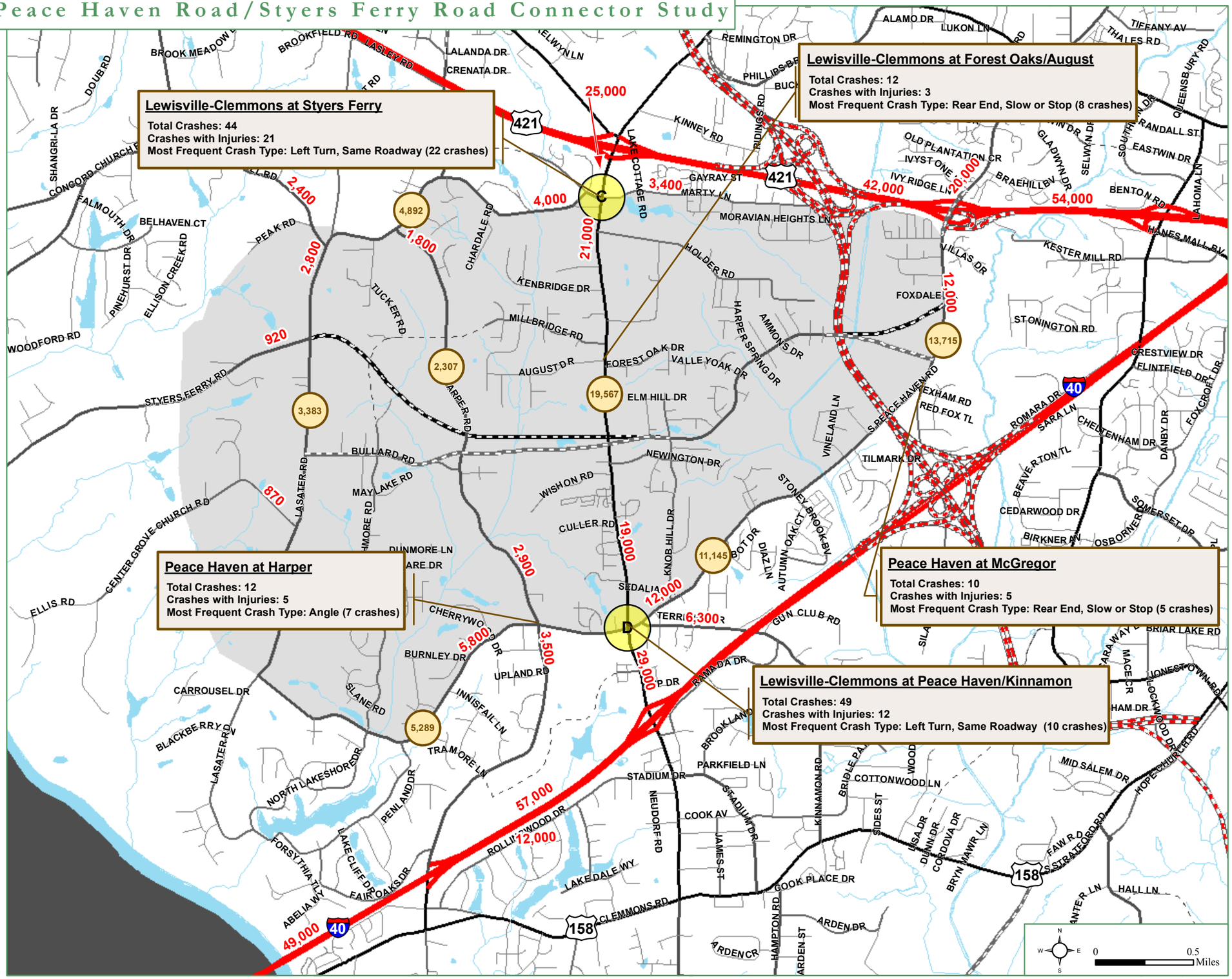


Figure 2.9

Existing Roadway Conditions

With Thoroughfare Plan as Adopted

September 2008

- Freeway/Expressway
- Major Thoroughfare
- Minor Thoroughfare
- Collector Street
- Local Street
- Proposed Freeway/Expressway
- Proposed Major Thoroughfare
- Proposed Minor Thoroughfare
- Proposed Collector Street
- Study Area
- Body of Water
- Intersection Level of Service (October 2007)
- ## 24-hour Tube Counts (October 2007)
- Text Crash Summary (6/1/04 to 5/31/07, NCDOT)
- ## 2005 Average Annual Daily Traffic Volumes

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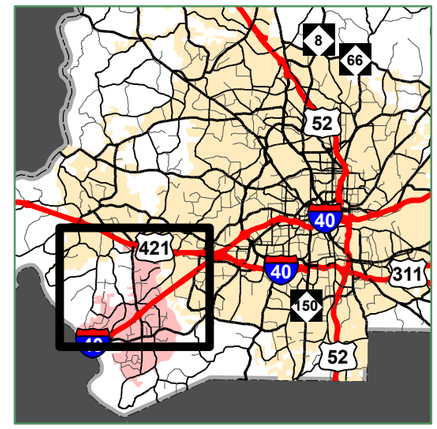
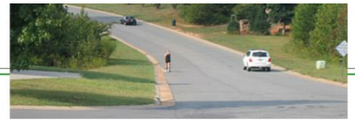
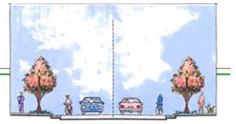
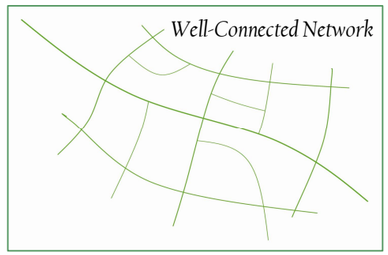


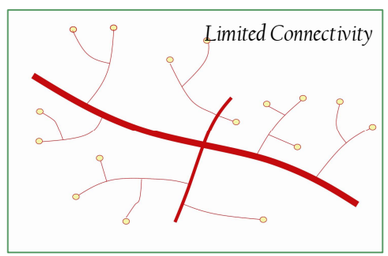




Other locations with noticeably high traffic volumes include Lewisville-Clemmons Road, which carries 25,000 vehicles just south of the US 421 interchange and 29,000 vehicles between I-40 and Peace Haven Road. Despite these higher volumes, Lewisville-Clemmons Road is aided by the on-going widening of the roadway and the presence of additional options for north-south travel (Harper Road). Peace Haven Road, despite its two-lane cross-section, carries upwards of 19,000 vehicles per day. The lack of other east-west travel options puts pressure on this roadway. At the first workshop, several members of the public commented on the congested conditions plaguing Peace Haven Road, particularly in the vicinity of Lewisville-Clemmons Road.

Level of Service analysis was calculated for two intersections identified by the Advisory Committee as experiencing congestion and safety-related problems. Much like corridor level of service, the study involved a capacity analysis to assign a letter grade based on vehicle delay — LOS A representing the shortest average delay and LOS F representing the longest. Based on the analysis, the intersections of Lewisville-Clemmons Road at Styers Ferry Road and at Peace Haven Road operates at LOS C and LOS D, respectively.

Much of the congestion can be attributed to a lack of connectivity throughout the study area, particularly east-west. The lack of connectivity was evident during a review of the existing roadway network and acknowledged by the public at the workshops. Besides the limited access facilities of US 421 and I-40, the only option for east-west travel through the study area is Peace Haven Road. More connectivity is provided for north-south travel, including Lewisville-Clemmons Road, Harper Road, and the Lasater Road/Styers Ferry Road corridor.





Other issues brought forth at the workshop identified areas for connectivity improvement at locations beyond the scope and area studied as part of the Peace Haven Road/Styers Ferry Road Connector. These opportunities for connectivity improvements – including ideas for bicycle and pedestrian improvements – were forwarded to the project team conducting the Village Transportation Plan.

Travel Safety and Crash History

Traffic safety is a key component when assessing the existing transportation conditions in a defined area such as the Peace Haven Road/Styers Ferry Road Connector study area. A thorough examination of crash history and traffic patterns can usually predict key locations where improvement in travel mobility and safety will be beneficial to both motorists and the community as a whole.

Segment Analysis

NCDOT crash records provided the base measurement of traffic safety for roadway segments and intersections in the study area. The analyzed crashes occurred between June 2004 and May 2007. The type and frequency of crashes were analyzed along four roadways, as summarized in **Table 2.1**.

Lewisville-Clemmons Road from I-40 to US 421

Of the 345 total crashes, 1 involved a fatality and 101 involved non-fatal injuries. The lone fatality occurred near the intersection of Lewisville-Clemmons Road and Millbridge Road. The vehicle was traveling approximately 90 miles per hour when the driver lost control and ran off the road, striking a fixed object. Along this segment, the highest crash location occurred at the ramp termini for I-40. At this intersection, 44 crashes occurred, including 11 injury crashes. Other intersections with high crash occurrences include Peace Haven Road (49 crashes, 12 injuries), Forest Oak Drive (12 crashes, 3 injuries), Styers Ferry Road (44 crashes, 21 injuries), and US 421 (26 crashes, 6 injuries).

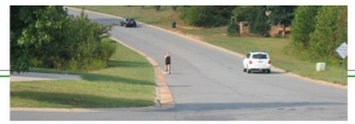
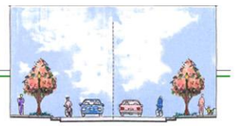
Table 2.1 – Crash Rates

Segment	Length	ADT	Crashes			EPDO Rate*	Crash Rate**	NC Average Crash Rate
			Total	Fatal	Injury			
Lewisville-Clemmons Rd I-40 to US 421	3.05	25,100	345	1	101	4.37	411.56	189.57
Peace Haven Rd Lasater Rd to US 421	5.24	10,800	130	0	43	3.45	209.78	370.44
Harper Rd Styers Ferry Rd to Peace Haven Rd	2.37	2,300	26	0	8	3.43	435.59	370.44
Lasater Rd Peace Haven Rd to Styers Ferry Rd	1.76	2,200	6	0	0	1	141.51	370.44

* EPDO (Equivalent Property Damage Only) Rate = (76.8*(F+A)+8.4*(B+C)+PDO)/Total Crashes

** Crash Rate is the number of crashes per hundred million vehicles miles travelled

Source: NCDOT for crashes occurring 6/1/04 to 5/31/07

Peace Haven Road from Lasater Road to US 421

A total of 130 crashes occurred along Peace Haven Road, 43 of which resulted in some type of injury (no fatalities). The intersection with the highest crash occurrence was Lewisville-Clemmons Road, with 49 crashes and 12 total injuries. Other intersection with high crash occurrences include Harper Road (12 crashes, 5 injuries), McGregor Road (10 crashes, 5 injuries), and US 421 (29 crashes, 9 injuries).

Harper Road from Styers Ferry Road to Peace Haven Road

A total of 26 crashes occurred on Harper Road, 8 of which involved an injury. The intersection with the highest crash occurrence was Peace Haven Road, with 12 crashes and 5 injury crashes.

Lasater Road from Peace Haven Road to Styers Ferry Road

The analysis segment with the fewest crashes was Lasater Road, which saw 6 crashes with no injuries.

Intersection Analysis

In addition to the segment analysis, intersection crash data was reviewed to determine intersections with the highest safety concerns. As shown in **Figure 2.9**, the Lewisville-Clemmons Road intersections with Styers Ferry Road and Peace Haven Road had the highest frequency of crashes over the three-year period, with 44 and 49 crashes, respectively. Together, these two intersections alone accounted for 33 crashes with injuries.

Peace Haven Road at Lewisville-Clemmons Road

Contributing factors to a location's high crash frequency include intersection design, access considerations, and traffic congestion. Many of the segments and intersections identified with high crash frequency also were locations where congestion often exists. A direct relationship exists between traffic congestion and crash frequency, which justifies the ongoing efforts to enhance connectivity by offering alternative corridors. The Connector should improve connectivity and provide some measure of safety improvement throughout the study area.

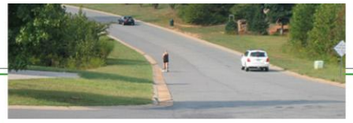
Future Roadway Considerations

Changes in land use, whether an increase in land use mix and intensity or the conversion of farmland and open space to neighborhoods, shops, and businesses can greatly impact the functionality of roadways in the future by placing more demand on the area's roads. As mentioned previously, most of the land within the study area is zoned for rural residential use. If current trends in land development persist without improvements to roadway connectivity, congestion will grip the study area, and specifically, the region's key mobility corridors.

Improvements are underway or planned for some existing roadways in the study area. Other new roadways lie in various stages of the planning, design, and construction process. Improvements to Lewisville-Clemmons Road are underway, and once complete, it will operate as a four-lane divided roadway between US 421 and I-40. South of I-40, a feasibility study is underway to determine options for conversion of the commercial corridor into a four-lane divided street.

The Winston-Salem Northern Beltway is a proposed multi-lane freeway facility on 34.2 miles of new location around the northern portion of Winston-Salem. Environmental studies for the project are complete, and design is underway. The Western Section (TIP Project R-2247) stretches from US 158 east of Clemmons to US 52 north of Winston-Salem and is expected to relieve congestion by improving north-south connectivity in western Forsyth County with direct connections to I-40 and US 421. This corridor was selected in 1993 after reviewing eight alternatives. Final environmental studies and engineering designs for the segment were completed in 1996 and right-of-way acquisition began. Following a lawsuit in 1999, a combined environmental impact statement for the entire Northern Beltway was launched in 2001.

Today, the potential positive and negative impacts of the Western Section of the Northern Beltway remain. The alignment of the Beltway was considered when analyzing the eastern section of the Peace Haven Road/Styers Ferry Road Connector. Given the necessary redesign of the Beltway and its uncertain funding reality, two alternatives of this segment of the Connector were designed — an at-grade option and an above-grade option. These options are detailed in **Chapter 4**. As discussed in **Chapters 3 and 4**, the environmental issues and high cost in constructing the eastern link of the Connector combined with a general unsuitability for private development east of the proposed alignment of the Beltway will make the construction of this segment difficult .

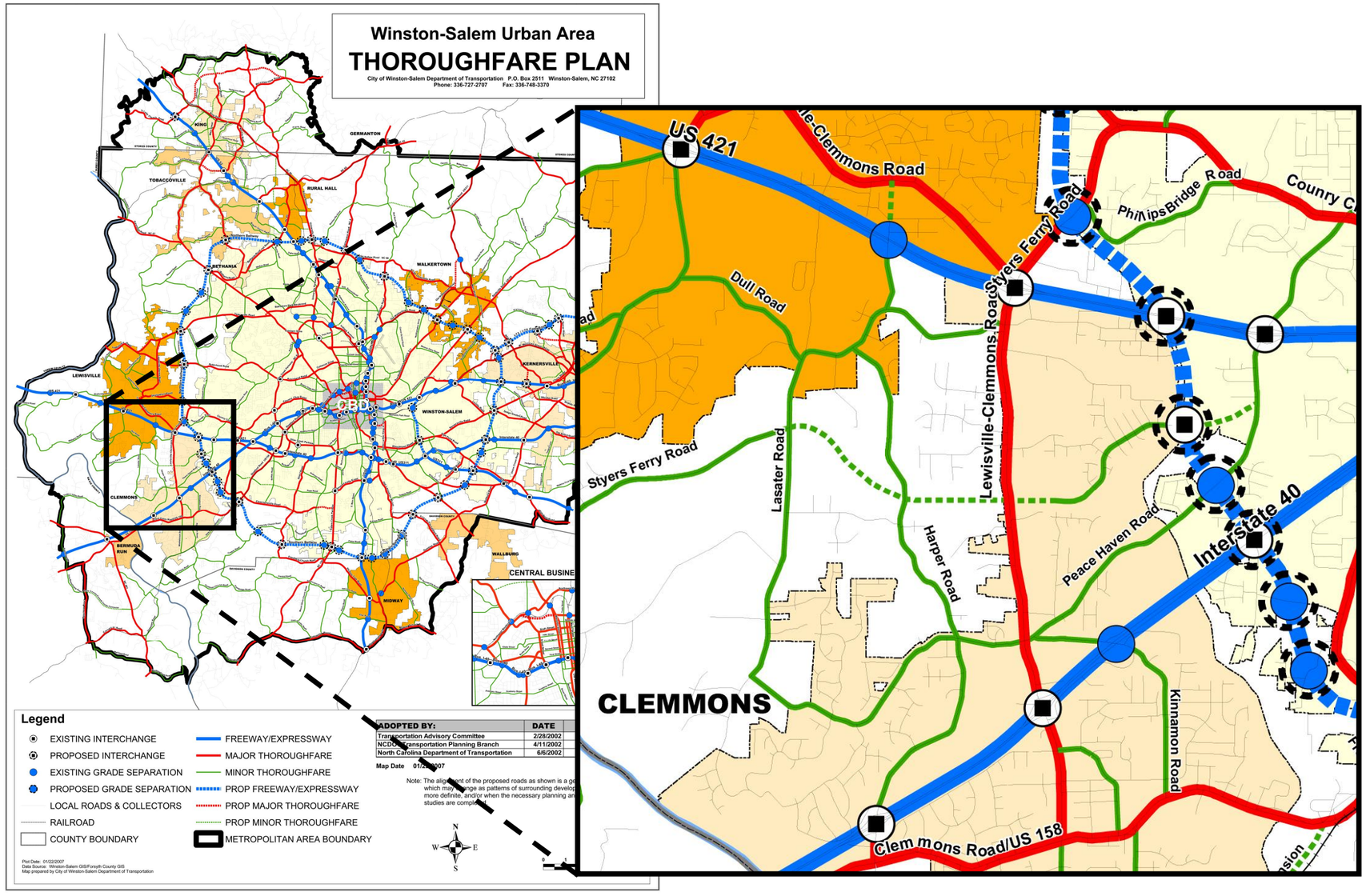



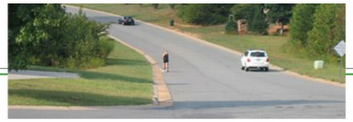
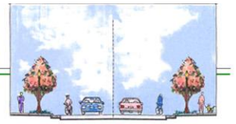

Thoroughfare Plan

In North Carolina, a thoroughfare plan is an official plan that outlines the development of the major street system for a defined area. The plans are adopted by NCDOT and the local government. Thoroughfare plans have been a key element of roadway planning in Winston-Salem and Forsyth County for decades. The Peace Haven Road/Styers Ferry Road Connector has appeared on the Winston-Salem Urban Area Thoroughfare Plan since 1987. As such, local planners and elected officials have acknowledged the need for additional east-west connectivity by way of the Connector for more than two decades.

Based on the thoroughfare plan, the corridor represented is identified as a three-lane minor thoroughfare with 11' to 12' lanes, curb and gutter, and 5' sidewalks at the face of the curb. The thoroughfare plan suggests the Connector will provide "access to the Northern Beltway for the residential development in the area" and will provide a bypass to the "heavily traveled US 421, Country Club Road, I-40, and Peace Haven Road."

The *Peace Haven Road/Styers Ferry Road Connector Study* adjusts not only the corridor as identified in the Thoroughfare Plan but envisions — and through roadway design and implementation actions — ensures a much different look and functionality to the corridor. The study classifies the connector as a minor thoroughfare, with a main focus on serving neighborhood traffic as well as bicyclists and pedestrians. As discussed in **Chapter 4**, the Connector will include a landscaped median and safe accommodation for non-motorized transportation.



Chapter 3 — Alternative Corridor Analysis

Based on discussions with the Advisory Committee, stakeholders, and the general public as well as a review of the area dynamics, three potential alternative alignments were developed and analyzed to determine the preferred corridor alignment. The different alignments reflect the concerns and insight provided by the Advisory Committee and public. Ultimately, the Advisory Committee chose a hybrid of these alternative alignments as the preferred alternative to address public concerns, design constraints, and planned development issues. The evaluation determined impacts to existing structures, historic properties, environmental features, and cultural resources, while assessing benefits to overall roadway constructability and travel mobility. The following chapter details the alignment alternatives as well as the evaluation that led to the preferred alignment chosen by the committee.

Alternatives Development

The alternative corridors were developed through several mapping exercises performed by the general public, stakeholders, the Advisory Committee, and the consultant. The goal of these exercises was to develop corridors that avoid impacts to the resources described in the previous chapter while on some level still achieving the overarching goal of establishing a cost-effective corridor that improves connectivity and mobility. **Figure 3.1** shows the three potential alternative alignments developed through the mapping exercises. The following sections briefly describe each alternative and how they were developed.

Alternative A

Alternative A most closely represents the alignment shown on the Winston-Salem/Forsyth County Urban Area Thoroughfare Plan. The western terminus occurs at the intersection of Styers Ferry Road and Lasater Road. The proposed alignment travels southeast, utilizing 0.97 miles of new alignment to reach Harper Road. From the intersection with Harper Road, the proposed alignment travels east on 0.73 miles of new alignment toward Lewisville-Clemmons Road, passing the pond to the north. From Lewisville-Clemmons Road, the alignment continues on 0.18 miles of new alignment before reaching Springfield Farm Road.

The alternative uses the existing alignment of Springfield Farm Road for 1.22 miles. This proposed alternative includes minor improvements to Springfield Farm Road, including striped bike lanes and sidewalks on one or both sides of the roadway. At the end of the existing alignment, the proposed alternative continues on for another 0.56 miles before reaching Peace Haven Road.

Major observations with Alternative A include:

- Potential residential impacts along the corridor
- Potential minor/moderate wetland impacts
- Potential floodplain impacts
- Potential minor impacts to church and cemetery property
- Potential major impacts to forested area
- Potential moderate impacts to prime farmland

Alternative B

Alternative B takes into account a northern alignment suggested at the first public workshop. The western terminus occurs at the intersection of Styers Ferry Road and Lasater Road. The proposed alignment travels northeast on 0.75 miles of new alignment toward Harper Road. From here, the alignment continues northeast, utilizing 1.0 mile of alignment before reaching Lewisville-Clemmons Road. From the intersection with Lewisville-Clemmons Road, the alternative utilizes the existing alignment of Holder Road for 0.95 miles.

Under this proposed alternative, the existing alignment of Holder Road would only experience minor improvements, such as the provision of sidewalk within existing right-of-way. From Holder Road, the proposed alternative travels east on 0.63 miles of new alignment towards Hanover Park Drive. From here, the proposed alignment utilizes the existing Hanover Park Drive alignment for 0.26 miles, connecting to Peace Haven Road.

Major observations with Alternative B include:

- Potential residential impacts along the corridor
- Potential minor wetland impacts
- Potential floodplain impacts
- Potential moderate impacts to forested area
- Potential moderate impacts to prime farmland

Figure 3.1

Alternative Alignments

September 2008

- Freeway/Expressway
- Major Thoroughfare
- Minor Thoroughfare
- Collector Street
- Local Street
- Proposed Freeway/Expressway
- Study Area
- Body of Water
- 100-Year Floodplain
- Existing Structure
- Parcel

Potential Alignments

- Alternative A
- Alternative B
- Alternative C
- Alternatives A & C

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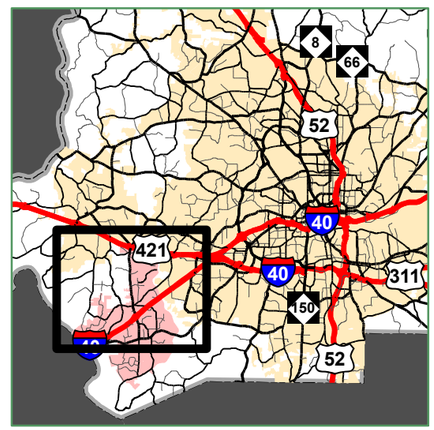
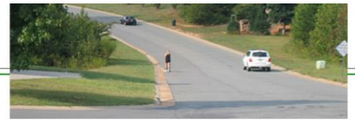
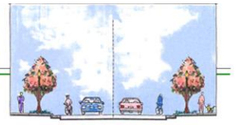


N W E S 0 0.5 Miles

Alternative C

Alternative C shares a portion of its alignment with Alternative A but travels south of the manmade lake west of Lewisville-Clemmons Road and ties into the existing Bullard Road. The western terminus occurs at the existing stub-out on Styers Crossing Court, which connects to Styers Crossing Lane. The proposed alignment travels southeast, utilizing 0.44 miles of new alignment before reaching Lasater Road. The proposed alternative utilizes the existing Bullard Road alignment for 0.67 miles. From Bullard Road, the proposed alternative travels northeast utilizing 0.93 miles of new alignment, before reaching Lewisville-Clemmons Road.

From Lewisville-Clemmons Road, Alternative C follows the same alignment as Alternative A. The proposed alternative follows 0.18 miles of new alignment to Springfield Farm Road, makes use of 1.22 miles of existing alignment along Springfield Farm Road, then travels east to Peace Haven Road along 0.56 miles of new alignment.

Major observations with Alternative C include:

- Potential residential impacts along the corridor
- Potential minor wetland impacts
- Potential floodplain impacts
- Potential minor impacts to forested area
- Potential moderate impacts to prime farmland

Alternative Evaluation Matrix

A qualitative alternative evaluation screening was performed to assess the impacts of each potential alternative. This analysis consisted of overlaying the proposed alignments onto a series of maps similar to those shown in **Chapter 2** that depict natural and man-made features, cultural/community sites, and demographic data. The alternative alignments also were evaluated in terms of constructability constraints and potential benefits in terms of connectivity, travel safety, and mobility. Prior to conducting the analysis, each category was assigned a weight by the Advisory Committee, allowing the most important potential impacts or benefits to have a greater impact on the selection of the preferred alternative. The results of the evaluation are summarized in matrix form and represent a qualitative assessment of potential impacts (see **Table 3.1**).

The matrix evaluation criteria are grouped into four separate areas:

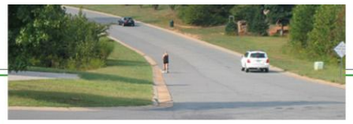
- Environmental/Natural Features
- Cultural and Community Resources
- Environmental Justice
- Mobility and Implementation

Potential project impacts are classified as “Minor”, “Moderate”, or “Major” for each of the above categories. This determination is based on a combination of objective and subjective criteria. For example, in some locations impacts may be less severe if the project involves small improvements along an existing roadway, as opposed to construction on new alignment. However in high density residential locations, improving an existing roadway may create higher impacts when compared to new location through largely undeveloped land. The following is a brief description of each of these headings.

Environmental/Natural Features

This section is primarily focused on natural features related to water quality, threatened/endangered species, forested areas, farmland and man-made hazards such as superfund sites or landfills. The characterization of impacts is primarily related to the presences of these features within a proposed corridor. As the frequency of these issues is noted, the severity index increases as the relative impact increases. Specific features in the category include:

- Wetland/stream crossings
- Floodplain crossings
- Threatened/endangered species
- Forested areas
- Prime farmland
- Hazardous waste sites/landfills


Cultural/ Community Resources

This category indicates the presence of community services, cultural resources and institutions, including schools, churches, parks, protected lands, and historic areas. The impacts to these types of community resources often reflect proximity to the resource or when right-of-way is required from these sites. In the most extreme cases, buildings may be directly impacted. Specific features in this category include:

- Schools
- Churches/cemeteries
- Historic structures and properties
- Existing structures

Environmental Justice

Environmental justice considerations at the systems planning level typically involve the analysis of available demographic data from the U.S. Census. When reviewing the potential alternatives, it is important to consider not only specific project impacts but also the distribution of projects and transportation investments throughout the study area. The review of environmental justice factors seeks to minimize the disproportionate impacts to minority and low-income groups. For the purposes of this screening exercise, projects were evaluated for their relative impacts to the following groups:

- Minority
- Hispanic
- Low-income

Mobility and Implementation

As the alternatives are evaluated against each other, the analysis must account for the relative benefits as well as the difficulties that may be encountered during implementation and construction. For this reason, the relative mobility benefits and constructability difficulties have been included in this evaluation. This is one of the first steps in understanding the expected ratio between costs and benefits. While this evaluation is not intended as a quantitative assessment of specific benefits and project costs, providing this information allows the selection of the alternative that has a realistic chance of being implemented.

Constructability

For the purposes of this evaluation, constructability was considered to ascertain the difficulties associated with project permitting, right-of-way acquisition, and traffic control. Alternatives with challenging constructability issues may be more costly due to impacts on design and delays associated with maintaining traffic flow during construction. An example of an alternative with minor constructability issues would be simple roadway improvements including the addition of bike lanes or sidewalks. Conversely, an example of a major constructability challenge would be an alternative that encroaches on an environmentally sensitive area where limited crossing opportunities exist and requires an elevated structure to minimize impacts to the environmental area. The following guidelines were used to rate impacts in this screening process:

Minor Constructability Impacts

- Minor improvements to existing alignment including the addition of bike lanes and/or sidewalks
- New alignment located outside of sensitive areas where few impacts to the built environment are expected.

Moderate Constructability Impacts

- New alignment that traverses through a sensitive area but where no changes in typical design area required. Environmental permitting may impact project schedule.

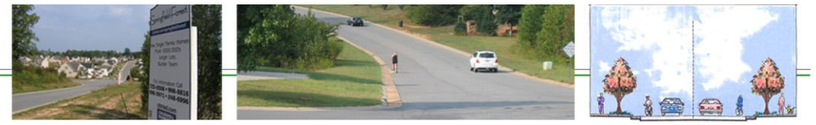
Major Constructability Impacts

- New alignment with multiple environmental impacts and/or structures. Creative design solutions and significant permitting may be required.

Connectivity, Travel Safety, and Mobility

The assessment of mobility benefits has been considered during the evaluation process. While all of the previous evaluation criteria relate to a project's potential impacts, this category seeks to qualify the relative travel benefits associated with implementing the project. Existing traffic counts and historical trends were used to identify assumed benefits to the roadway network. The evaluation matrix considers these benefits using a rating system as defined to the right:

Category	Expected Level of Benefit
***	Provides a low level of congestion relief to roadway system
**	Provides a moderate level of congestion relief to roadway system
*	Provides a high level of congestion relief to roadway system



Evaluation Matrix Results

Using the environmental, cultural, environmental justice, constructability impacts and the traffic demand benefits information, an assessment of each alternative was performed. The result of this assessment is shown in **Table 3.1**. Specific weighting was given to each input in the evaluation matrix, based on discussion with the project Advisory Committee. **Table 4.1** provides the results of this assessment.

POTENTIAL IMPACT

POTENTIAL BENEFIT

Table 3.1 - Alternative Evaluation Matrix

				ENVIRONMENTAL/NATURAL FEATURES						CULTURAL/COMMUNITY RESOURCES				ENVIRONMENTAL JUSTICE			MOBILITY AND IMPLEMENTATION	
Alternative	Length (New Location)		Length (Entire Corridor)	Wetlands/Stream Crossings	Floodplain Impacts	Forested Areas	Prime Farmland	Threatened or Endangered Species	Hazardous Waste Sites/Landfill	Schools	Churches/ Cemeteries	Historic Structures and Properties	Existing Structures	Minority	Hispanic	Low Income	Constructability	Connectivity, Travel Safety & Mobility
Alternative A	12904 ft	2.44 mi.	19346 ft	3.66 mi.	***	***	**	***	NA	NA	NA	NA	NA	**	*	NA	NA	**	***
Alternative B	12601 ft	2.39 mi.	18985 ft	3.60 mi.	***	***	**	**	NA	NA	NA	NA	NA	***	*	*	NA	**	**
Alternative C	11166 ft	2.11 mi.	21131 ft	4.00 mi.	**	***	*	**	NA	NA	NA	NA	NA	**	*	NA	NA	*	**

General Notes:

(1) Qualitative screening only. Observations were made by overlaying potential alignments on map with environmental and community resource information. Limited field review was conducted.

(2) General "rules of thumb" were followed to assess potential impacts to environmental issues.

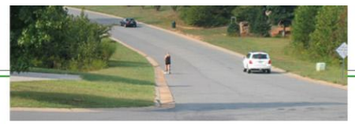
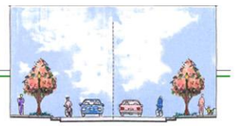
Environmental Justice Notes:

(3) Not intended to determine impacts, only to identify those communities in proximity to proposed alternatives. A much more detailed analysis including a field survey will need to be undertaken to determine specific community impacts on the selected alternative.

(4) Environmental justice impacts are directly related to the estimated number of impacted dwelling units combined with culturally sensitive zones

KEY Potential Impacts		
	NA	Not Applicable (Not obvious impact)
	*	Minor Impact
	**	Moderate Impact
	***	Major Impact

KEY Travel Demand Benefits		
	*	Provides minor potential safety improvements and limited connectivity advancements; Low level of congestion relief to roadway system expected.
	**	Provides some potential safety improvements and more connectivity advancements; Moderate level of congestion relief to roadway system expected.
	***	Provides considerable potential safety improvements and significant connectivity advancements; High level of congestion relief to roadway system expected.

Chapter 4 — Preferred Alternative Design

The Advisory Committee selected the preferred alternative following a review of the analysis of the three potential alternatives presented in **Chapter 3**. This decision was based on numerous factors, including the results of evaluation matrix, which took into account potential environmental and cultural impacts as well as congestion reduction benefits. In addition, the committee analyzed how each alternative would best benefit the transportation needs — for pedestrians, bicyclists, and motorists — in the surrounding community. The following chapter presents the basis for the selection of the preferred alternative, the roadway design criteria utilized, and the probable cost estimate.

Selection Process

Based on the results of the evaluation matrix, Alternatives A and C provided the highest level of benefits and lowest level of potential impacts. Certain segments of each alignment provide distinct benefits to the community, such as the:

- Connection between Springfield Farm Road and Peace Haven Road
- Utilization of existing alignment along Bullard Road

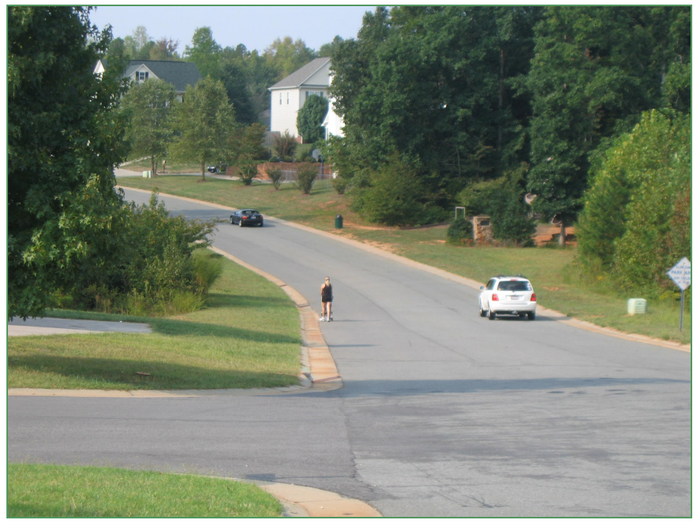
Because the benefits of Alternatives A and C overlap to a degree but have unique features, a combination of the two alternatives was selected as the preferred alternative. The decision to combine the benefits of the two alternatives was based on discussions with the project Advisory Committee and local staff and officials. The preferred alternative was presented at the second public workshop as the best option to maximize travel demand benefits, minimize potential impacts, and meet the transportation needs of the local community. Following the public workshop, adjustments were made to the alignment to incorporate information provided by stakeholders and the general public. Adjustments included a minor modification to the alignment just east of Harper Road to avoid a new home and to fine-tune where the alignment crosses Lewisville-Clemmons Road. The evaluation matrix was revised after each adjustment to the preferred alignment.

Alternative Description

The preferred alternative begins at Lasater Road, using the existing Bullard Road alignment for 0.67 miles. From Bullard Road the preferred alternative travels east, utilizing 0.93 miles of new alignment before reaching Lewisville-Clemmons Road. From here, the alignment continues on 0.18 miles of new alignment before reaching Springfield Farm Road.

The alternative uses the existing alignment of Springfield Farm Road for 1.22 miles. This proposed alternative includes minor improvements to Springfield Farm Road, including striped bike lanes and sidewalks on one side of the roadway. At the end of the existing alignment, the proposed alternative continues on for another 0.56 miles before reaching Peace Haven Road. In total, the proposed alignment utilizes 1.89 miles of existing alignment and has 1.71 miles of new alignment, for a total of 3.6 miles.

Figure 4.1 provides the alignment of the preferred alternative. **Figures 4.2, 4.3, 4.4A, and 4.4B** show the conceptual roadway design for the Connector, representing 25% design detail. Roadway design criteria and probable construction cost estimates can be found at the end of this chapter.



Springfield Farm Road — Existing

Springfield Farm Road — Enhanced

Figure 4.1

Preferred Alignment

September 2008

- Freeway/Expressway
- Major Thoroughfare
- Minor Thoroughfare
- Collector Street
- Local Street
- Proposed Freeway/Expressway
- Study Area
- Body of Water
- 100-Year Floodplain
- Existing Structure
- Parcel

Potential Alignments

- Alternative A
- Alternative B
- Alternative C
- Alternatives A & C
- Preferred Alignment

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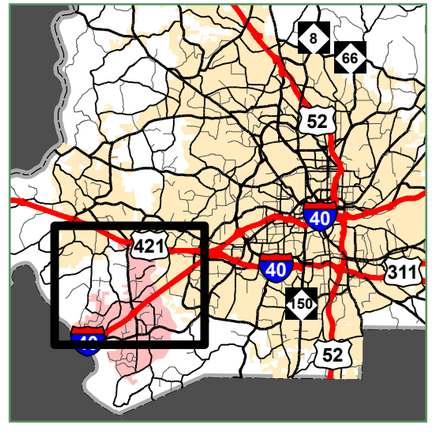
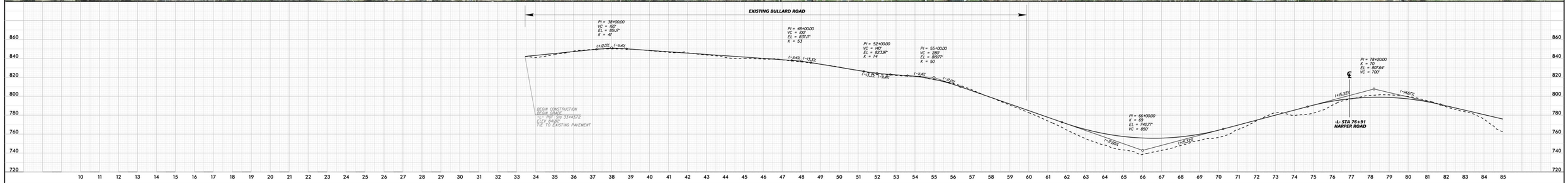


Figure 4.2 - Conceptual Roadway Design



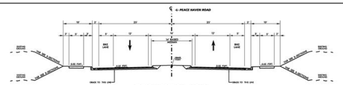
GRAPHIC SCALES

20 10 0 20 40
PROFILE (VERTICAL)

100 50 0 100 200
PROFILE (HORIZONTAL)

Kimley-Horn and Associates, Inc.
PO BOX 33068 - RALEIGH, NORTH CAROLINA 27636-3068
PHONE: (919) 677-2000 FAX: (919) 677-2050

TYPICAL SECTION NO. 1



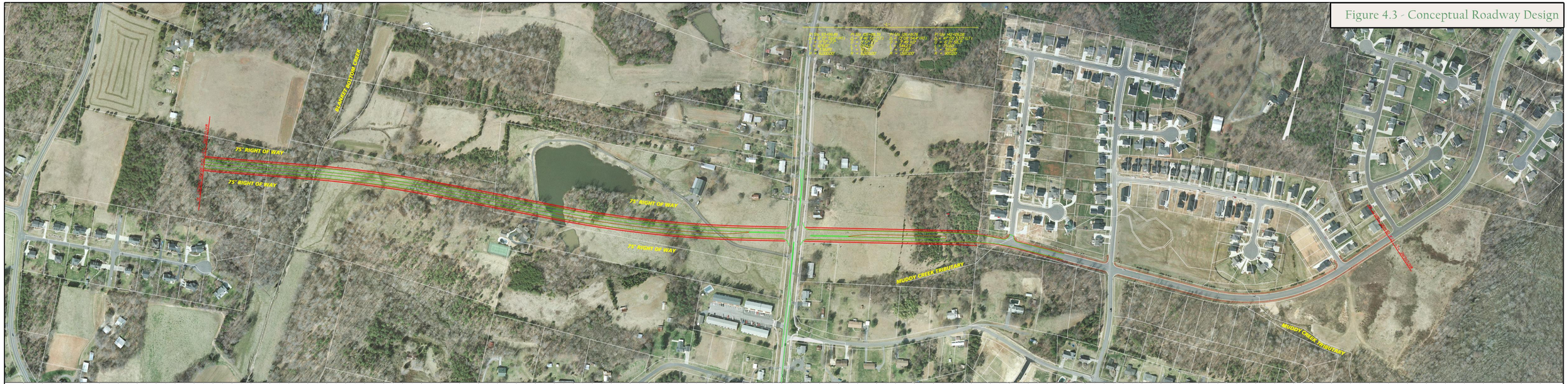
TYPICAL SECTION NO. 3

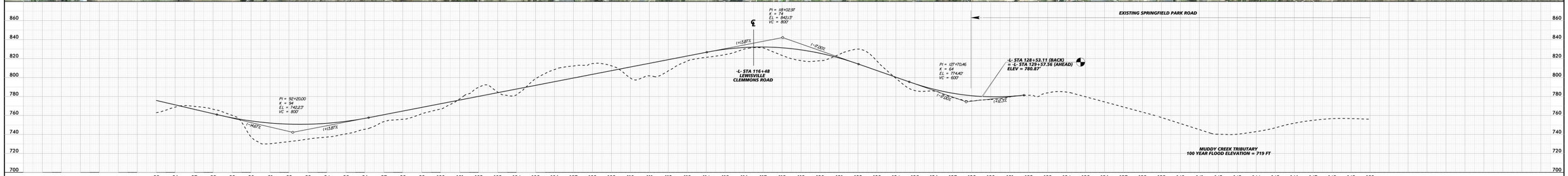
TYPICAL SECTION NO. 2

Peace Haven Road/Styers Ferry Road Connector

Winston-Salem

Figure 4.3 - Conceptual Roadway Design





GRAPHIC SCALES

20 10 0 20 40
PROFILE (VERTICAL)

100 50 0 100 200
PROFILE (HORIZONTAL)

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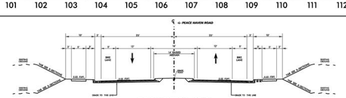
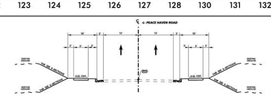
FIELD 3308 - POLESIN NORTH CAROLINA 27616-3308
PHONE 1-919-677-2000 FAX 1-919-677-2050

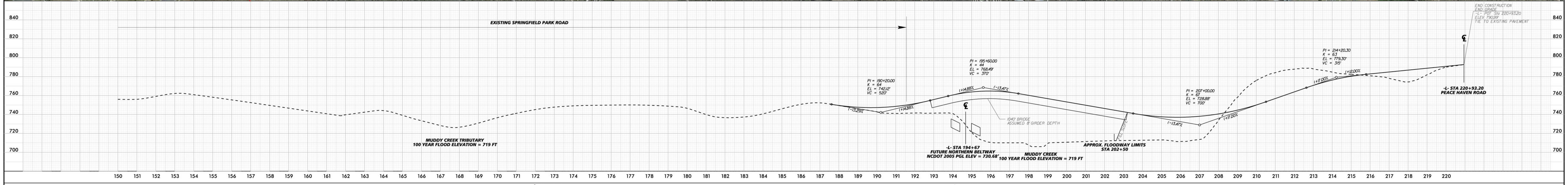




Peace Haven Road/Styers Ferry Road Connector

Winston-Salem

Figure 4.4A - Conceptual Roadway Design



GRAPHIC SCALES

PROFILE (VERTICAL)

PROFILE (HORIZONTAL)

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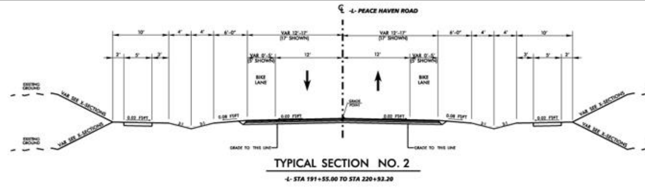
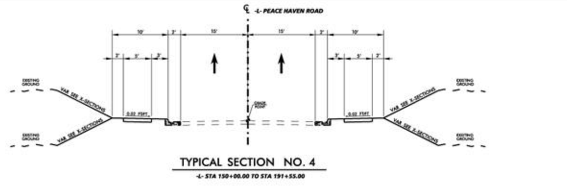
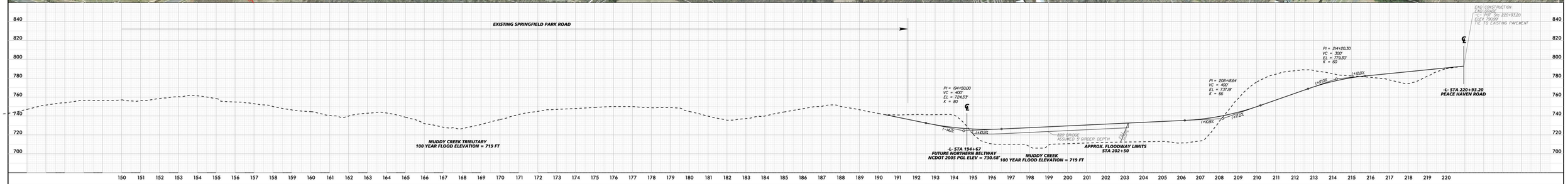




Peace Haven Road/Styers Ferry Road Connector

Winston-Salem

Figure 4.4B - Conceptual Roadway Design



GRAPHIC SCALES

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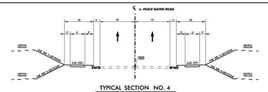
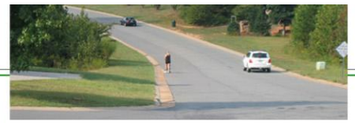
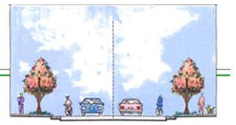
PROFILE (HORIZONTAL) 100 50 0 100 200

Kimley-Horn and Associates, Inc.



Peace Haven Road/Styers Ferry Road Connector

Winston Salem

Preferred Alternative Evaluation

Prior to evaluating each alternative, the Advisory Committee assigned weights to the criteria based on their perception of each category's relative importance to the alternative alignments. A similar process for the general public was provided through the public questionnaire distributed at the first public workshop. The Advisory Committee was asked to assign a value to the 15 categories so the total equaled 100. They did not have to assign a value to all the categories, but the total had to equal 100. The result of this process allowed the project team to assess the most important impacts and benefits, an important step in ranking the alternatives.

To reach the final ranking, the "*" values indicated in **Table 3.1** were assigned a numerical value ("*" = 1, "**" = 2, "***" = 3, "NA" = 0). These values were then multiplied by the weighted values assigned by the Advisory Committee. As shown in **Table 4.1**, the Potential Impacts received negative values and the Potential Benefits received positive values. When summarized, the resulting scores provide a relative comparison of the alternatives and the highest value received the highest ranking. While all the results are negative values, this does not indicate the potential impact of any one alternative or the preferred alternative outweighs the potential benefit. Because the preferred alternative includes partial alignments not found in any of the other alternatives, the evaluation process was conducted for this alignment. Table 4.1 also shows this result.

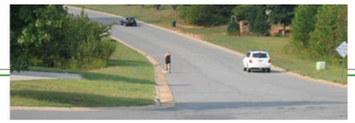
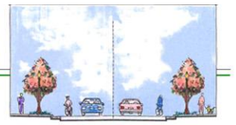
POTENTIAL IMPACT

POTENTIAL BENEFIT

Table 4.1 - Preferred Alternative Evaluation Matrix

					ENVIRONMENTAL/NATURAL FEATURES						CULTURAL/COMMUNITY				ENVIRONMENTAL JUSTICE			MOBILITY AND IMPLEMENTATION			
Alternative	Length (New Location)		Length (Entire Corridor)		Wetlands/Stream Crossings	Floodplain Impacts	Forested Areas	Prime Farmland	Threatened or Endangered Species	Hazardous Waste Sites/Landfill	Schools	Churches/ Cemeteries	Historic Structures and Properties	Existing Structures	Minority	Hispanic	Low Income	Constructability	Connectivity, Travel Safety & Mobility		
Alternative A	12,904 ft	2.44 mi.	19,346 ft	3.66 mi.	-3	-3	-2	-3	0	0	0	0	0	-2	-1	0	0	-2	3		
Alternative B	12,601 ft	2.39 mi.	18,985 ft	3.60 mi.	-3	-3	-2	-2	0	0	0	0	0	-3	-1	-1	0	-2	2		
Alternative C	11,166 ft	2.11 mi.	21,131 ft	4.00 mi.	-2	-3	-1	-2	0	0	0	0	0	-2	-1	0	0	-1	2		
Preferred Alternative	9,028 ft	1.71 mi.	18,993 ft	3.60 mi.	-2	-3	-1	-2	0	0	0	0	0	-3	-1	0	0	-1	3		
Weighted Ranking																				Result	Ranking
Alternative A	12,904 ft	2.44 mi.	19,346 ft	3.66 mi.	-23	-20	-8.67	-9	0	0	0	0	0	-7.33	-4.167	0	0	-30	62.5	-39.67	2
Alternative B	12,601 ft	2.39 mi.	18,985 ft	3.60 mi.	-23	-20	-8.67	-6	0	0	0	0	0	-11	-4.167	-1.67	0	-30	41.67	-62.83	3
Alternative C	11,166 ft	2.11 mi.	21,131 ft	4.00 mi.	-15.33	-20	-4.33	-6	0	0	0	0	0	-7.33	-4.167	0	0	-15	41.67	-30.5	1
Preferred Alternative	9,028 ft	1.71 mi.	18,993 ft	3.60 mi.	-15.33	-20	-4.33	-6	0	0	0	0	0	-11	-4.167	0	0	-15	62.5	-13.33	N/A

*Preferred alternative includes portions of both Alternatives A and C as well as unique alignment segments.

Special Design Considerations

The construction of the Peace Haven Road/Styers Ferry Road Connector requires special consideration of two roadway projects in various stages of design and construction. The public expressed the desire to extend Springfield Farm Road to Lewisville-Clemmons Road, where the Connector's design must be coordinated with the current widening of Lewisville-Clemmons Road. The public – particularly members of the Springfield Farm community also expressed concern for potential impacts due to the extension of Springfield Farm Road east to Peace Haven Road. The following provides a detailed look at these locations.

Northern Beltway Crossing (TIP Project R-2247)

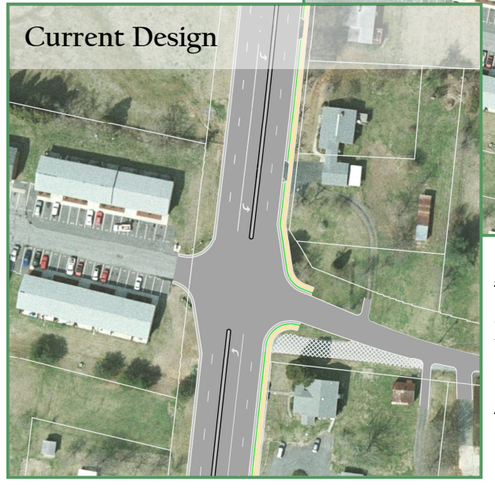
Early in the planning process, the Advisory Committee recognized the need to coordinate the Connector with the design of the proposed Northern Beltway. The freeway creates design constraints that were considered while selecting an alternative and designing the Connector. With no funding dedicated to construction, the Western Section of the North Beltway currently is on hold and most likely will need to be redesigned. Prior to initiating the redesign work, several issues will have to be addressed, including new traffic forecasts, environmental review, new design standards, and River Basin rules adherence (if applicable). The project team discussed the status of the Beltway in relation to the design and construction of the Connector. During redesign of the Beltway, the Connector's design will be considered only if the Connector has completed the state or federal environmental review process.

Roadway design of the Connector included two scenarios for the eastern segment — one at-grade crossing (only bridging the necessary wetlands) and one above-grade crossing (bridging the proposed Beltway and necessary wetlands). Plan and profile views for the two alternative designs are shown in **Figures 4.4A and 4.4B**. The option which takes the Connector over the Northern Beltway (**Figure 4.4A**) may impact the Springfield Farm community in several ways. A complete reconfiguration of the intersection with Haven Grove Trail will be required to allow sufficient vertical separation between the Connector and the Beltway. The existing intersection will be raised 3 feet, requiring modifications to driveways on the side street. The necessary pitch of the Connector as it approaches the Beltway also will require retaining walls along the existing segment of Springfield Farm Road. These modifications will create aesthetic issues (i.e. visibility of grade separation) and most likely will increase noise as vehicles accelerate to reach grade.

Lewisville-Clemmons Road Intersection (TIP Project # U-3119A)

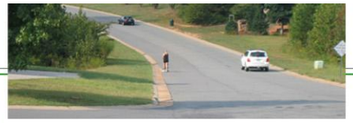
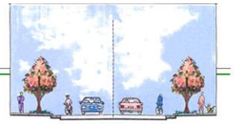
The widening of Lewisville-Clemmons Road currently under construction will create a four-lane divided roadway between US 421 and I-40. The construction project begins at Peace Haven Road and extends north to the existing 4-lane divided section at August Drive (across from West Forsyth High School). The design under construction will include full median breaks at two intersections in the vicinity of the Connector alignment – at Linwood Road and August Drive. The smaller diagram on this page shows the current design for the intersection of Lewisville-Clemmons Road and Linwood Road.

The Peace Haven Road/Styers Ferry Road Connector is designed to cross Lewisville-Clemmons Road approximately 500 feet north of the Western Villa Apartments. When the Connector is constructed, it is anticipated that the median opening at Linwood Road would be relocated to the newly created intersection with the Connector. This would provide safe access to the Springfield Farm community by way of a signalized intersection. Access at Linwood Road would be restricted to right-in/right-out movements as shown in the larger diagram to the right.



Above: Intersection of the Peace Haven Road/Styers Ferry Road Connector and Lewisville-Clemmons Road, showing laneage and the closure of the median opening at Linwood Road (under construction as of September 2008)

Left: Intersection of Lewisville-Clemmons Road and Linwood Road currently under construction as of September 2008

Roadway Design Criteria

The proposed Peace Haven Road/Styers Ferry Road Connector should be classified functionally as a minor thoroughfare due to the intent for the facility to balance access and mobility for neighborhoods within the study area. Compared to higher functioning arterials, minor thoroughfares typically provide less overall mobility, operate at lower speeds (less than 35 mph), have more frequent and greater access flexibility with adjacent land uses, serve shorter distance travel, and have lower traffic volumes. That said, the corridor will provide critical connections in the roadway network by bridging the gap between higher level arterials and locals. The primary purpose is to collect traffic from neighborhoods and distribute it to the system of major arterials throughout an area.

Design Categories

The following categories detail the design criteria for the Connector. This information is summarized in **Table 4.2**, which is located at the end of this section. Typical sections for the proposed Connector follow **Table 4.2**.

Design Speed

The design speed of a minor thoroughfare such as the Peace Haven Road/Styers Ferry Road Connector typically is 30 to 40 mph. The upper range is normal for a roadway such as the Connector, which will have few side street connections and remain relatively rural or suburban. For the benefit of safety, mobility, and efficiency, the highest possible design speed should be used. However, a design speed that is too high will create a level of driver comfort that promotes higher speeds and aggressive driving. The design speed of the facility should be a minimum of 5 mph above the anticipated posted speed.

Based on the desired posted speed limit and the design speed range suggested by AASHTO and NCDOT, the design and posted speeds for the Connector should be 40 mph and 35 mph, respectively. This posted speed should provide a safe driving environment, conform to the natural topography, allow for safe travel by bicycle and foot, and discourage aggressive driving.

Access Management

A properly functioning minor thoroughfare must operate efficiently in terms of moving vehicles (as well as bicyclists and pedestrians) while maintaining adequate access to surrounding neighborhoods. This efficiency can be obtained by limiting direct access of parcels to the roadway. The rate of access directly affects both the safety and flow of the facility. Two-lane divided segments with a plantable median are expected to have full median openings at major intersections and other locations spaced approximately 1,200 feet apart in accordance with NCDOT Access Manual Guidelines. However, in areas where the preferred alignment will follow an existing route (i.e. Bullard Road), driveway curb cuts will remain and in some cases may be converted to shared-use.

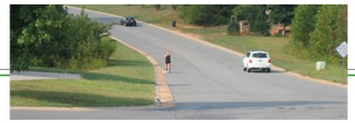
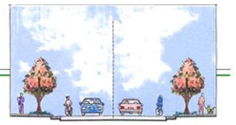
Sight Distance

Sight distance relates directly to the design speed of the roadway. Stopping distance is the distance required for a motorist traveling at the design speed to stop before reaching a stationary object in its path. At a design speed of 40 mph, a minimum of 305 feet is needed for stopping sight distance. The Connector should have at least this much unobstructed sight distance, especially approaching horizontal curvature, intersections, and median openings.

Grades

The length and steepness of grades on the alignment affect the operational characteristics of the facility and should be carefully considered to maintain uniform operation throughout the facility. Based on a design speed of 40 mph, the maximum grade for a minor thoroughfare on level terrain should be 7 percent. However, when considering stopping sight distance for vertical curvature, the maximum grade should be used only in situations where absolutely necessary.

AASHTO recommends maximum grades of 3 percent to 5 percent provided sufficient longitudinal grade allows surface drainage. AASHTO also encourages special attention for the design and spacing of storm water inlets to maintain acceptable spread of water on the roadway. The recommended maximum grade for the Connector is 3 percent.

Superelevation

Superelevation is tilting the roadway to help offset centripetal forces as a vehicle goes around a curve. Several factors control maximum superelevation including climate conditions, terrain conditions, area type, and frequency of slow moving vehicles. In general, no single superelevation rate is applicable over the entire facility because variations in the factors listed above will require a departure from the standard. AASHTO recommends several rates should be recognized when establishing design controls. With this in mind, a 6% maximum superelevation should be used for the design of the Connector.

Minimum Radius of Curvature

By considering the design speed and maximum superelevation of the Connector, the minimum radius of curvature should be 485 feet. However, like the maximum grade, the minimum radius of curvature should be used only in situations where absolutely necessary. Although a minimum radius of curvature is established, larger radii should be used when possible to ensure the highest level of driver comfort.

Cross Slope

A cross slope of the pavement ensures proper roadway drainage. A cross slope of 2 percent is recommended both for the paved area of the Connector and the paved shoulder area. The turf shoulder is recommended to have a cross slope of 8 percent.

Travel Lane Widths

The lane width of the Connector will influence safety and driver comfort as well as the roadway's level of service. To ensure the Connector fulfills its intended purpose of enhancing access mobility without comprising driver safety, 12 feet wide travel lanes should be provided.

Horizontal Clearance to Obstructions

A clear, unobstructed roadway is highly desirable to promote a safe driving environment. No trees more than 4 inches in diameter should be within the right-of-way. All utility poles should be placed outside the clear zone as described in the *2002 Roadside Design Guide*.

Medians

The width of the median of a divided facility is dependent upon the terrain and available right-of-way of the section. While medians as narrow as 4 feet may be used, such a narrow median is strongly discouraged. In general, a median width of 16 feet provides adequate separation as well as left turn vehicle storage at intersections (12-foot turn lane with a 4-foot concrete monolithic island). This width also allows for proper landscaping.

Sidewalks

The Connector is intended to balance the needs of motorized and non-motorized travel. Sidewalks constructed within the right-of-way at an acceptable distance from travel lanes can serve the dual purpose of calming traffic and enhancing the safety of pedestrians. The Connector was designed with 5-foot sidewalks on both sides, however the construction of a sidewalk on one side may be sufficient in some locations. A 5-foot grass verge should separate the sidewalk from the roadway.

Cross-Section and Right-of-Way

The appropriate cross-section should balance all aspects of the typical section while meeting the minimum spacing requirements presented in the previous sections. When possible a consistent and uniform cross-section should be provided. **Figures 4.5 and 4.6** illustrate the proposed typical cross section for the Connector.

Based on the design elements presented in this section, the total travelway width differs for the undivided and median-divided sections. For the undivided section, the roadway section is 24 feet with no bike lanes or 34 feet with bike lanes. The typical roadway right-of-way width is proposed to be 70 feet, which will include the travelway, the shoulder section (including verge and sidewalk), and the clear area beyond. For the median-divided section, the roadway is 53 feet from curb face to curb face. This width takes into account travel lanes, median, bike lanes, and curb and gutter. The overall roadway right-of-way width is proposed to be 75 feet.

Example 2-Lane Divided Cross-Section with Bike Lanes

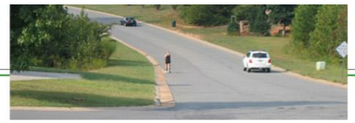
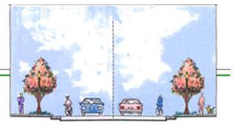




Table 4.2 – Proposed Design Criteria

	Connector (No median; No bike lanes)	Connector (No median; With bike lanes)	Connector (With Median; With bike lanes)	Various SR Routes	Various SR Routes	Reference or Note
General						
Report Figure	4.3	4.3	4.4			
Classification	Minor Thoroughfare	Minor Thoroughfare	Minor Thoroughfare	Minor Thoroughfare	Local	NCDOT p. 1-1A
Terrain Type	Level	Level	Level	Level	Level	NCDOT p. 1-1D
Design Speed (mph)	40	40	40	40	30	NCDOT p. 1-1B
Posted Speed (mph)	35	35	35	35	25	
Proposed Right-of-Way Width	70	70	75	60	60	May vary
Control of Access (Y/N)	No	No	No	No	No	
Rumble Strips (Y/N)	No	No	No	No	No	
Typical Section Type	Shoulder	Shoulder	Curb & Gutter	Shoulder	Shoulder	
Lane Width (ft)	12	12	12	12	12	
Sidewalks (Y/N)	Yes	Yes	Yes	No	No	
Bicycle Lanes (Y/N)	No	Yes	Yes	No	No	
Median Width (ft)	N/A	N/A	16	N/A	N/A	Accommodates 12' turn lane with 4' concrete monolithic island
Median Protection (Guardrail/Barrier)	N/A	N/A	N/A	N/A	N/A	
Shoulder/Berm Width						
Median (ft)	N/A	N/A	N/A	N/A	N/A	
Outside without GR (ft)	8	8	8	8	8	NCDOT p. 1-4B
Outside with GR (ft)	11	11	11	11	11	NCDOT p. 1-4B
Paved Shoulder						
Outside Total/FDPS (ft)	0	0	0	0	0	
Median Total/FDPS (ft)	0	0	0	0	0	
Grade						
Maximum (%)	7	7	7	7	7	AASHTO p. 382/472
Minimum (%)	0.3	0.3	0.3	0.3	0.3	AASHTO p.236
K Value						
Sag	64	64	64	64	37	AASHTO p. 277/381
Crest	44	44	44	44	19	AASHTO p. 272/381
Horizontal Alignment						
Maximum Superelevation (%)	6	6	6	6	6	NCDOT 1-15
Minimum Radius (ft)	485	485	485	485	231	AASHTO p. 147
Spiral (Y/N)	No	No	No	No	No	
Cross Slopes						
Pavement (%)	2	2	2	2	2	NCDOT 1-3B
Paved Shoulder (%)	2	2	2	N/A	N/A	
Turf Shoulder/Berm (%)	8	8	8	8	8	NCDOT Std. Dwg. 560.01
Median Ditch (%)	N/A	N/A	N/A	N/A	N/A	

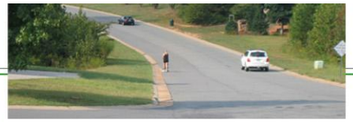
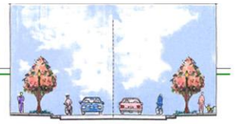




Figure 4.5: Typical Section (Rural Undivided)
Posted Speed Limit = 35 mph

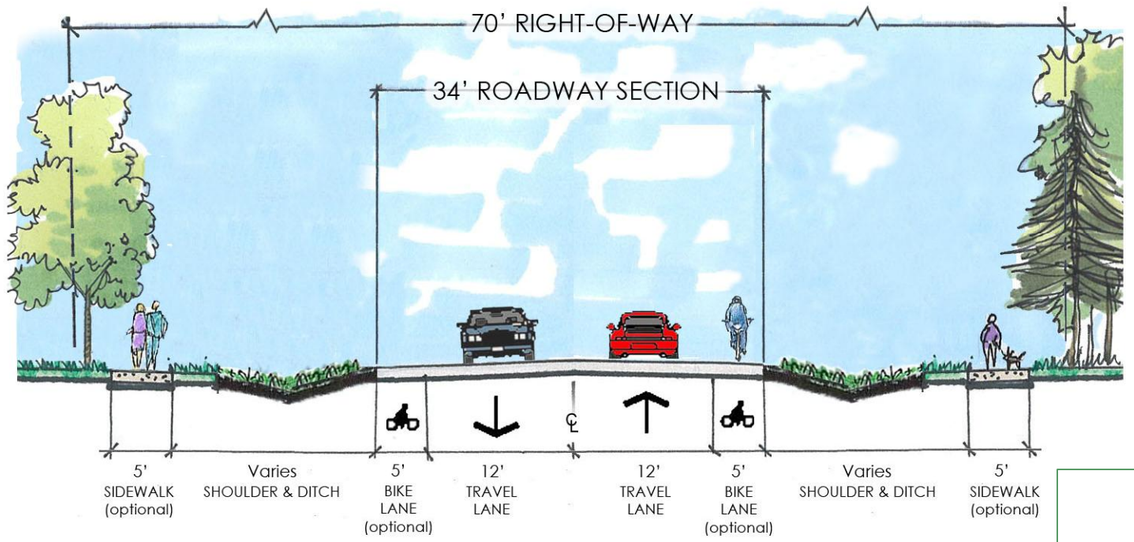
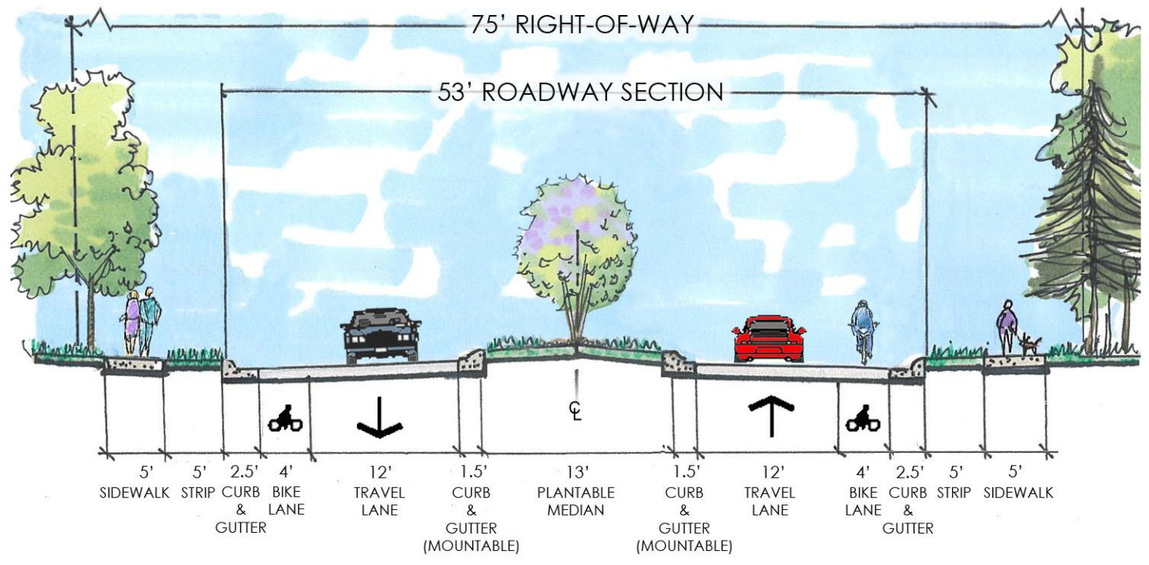
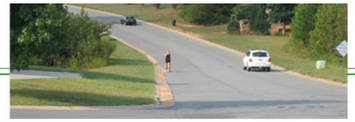
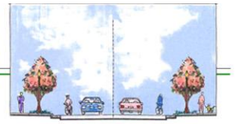


Figure 4.6: Typical Section (Median-Divided with Bike Lanes)
Posted Speed Limit = 35 mph



Probable Cost Estimate

Based on the conceptual design provided in **Figures 4.2 to 4.4B**, the estimated cost of the facility is approximately $19,337,900 with a bridge over the proposed Northern Beltway or $16,034,500 with a bridge only over the necessary wetlands. These probable construction costs were derived from estimated quantities and 2007 NCDOT average unit costs. The estimated costs do not include the following:

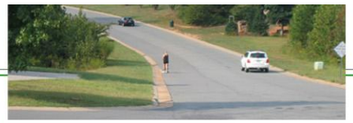
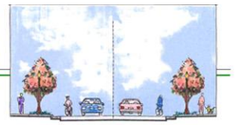
- Environmental documentation or mitigation
- Right-of-way costs
- Utility installation or relocation costs
- Signal costs (if any)

The quantities included in the estimate include clearing and grubbing, excavation, grading, widening existing pavement, pavement on new location, resurfacing existing pavement, subgrade stabilization, curb and gutter, sidewalk, erosion control, modified railroad crossings, traffic control, thermodynamic pavement markings, and structures (including a new grade separation and three culverts). **Table 4.3** provides a breakdown of these items, the quantities estimated, and the overall projected probable construction cost.

Table 4.3 - Probable Construction Cost Estimates

		Alternative 1 Bridge Over Northern Beltway			Alternative 2 At-Grade – Bridge Only Wetlands		
Description	**Unit**	**Quantity**	**Unit Price**	**Amount**	**Quantity**	**Unit Price**	**Amount**
Clearing and Grubbing	Acres	23	$12,500.00	$287,500.00	23	$12,500.00	$287,500.00
Unclassified Excavation	Cubic Yards	108,000	$9.00	$972,000.00	113,000	$9.00	$1,017,000.00
Borrow Excavation	Cubic Yards	104,000	$11.00	$1,144,000.00	41,000	$11.00	$451,000.00
Drainage Existing Location	Lump Sum	1	$100,000.00	$100,000.00	1	$100,000.00	$100,000.00
Removal of Existing Pavement	Square Yards	2,350	$10.00	$23,500.00	2,350	$10.00	$23,500.00
Fine Grading	Square Yards	71,400	$3.50	$249,900.00	71,400	$3.50	$249,900.00
New Pavement	Square Yards	35,200	$50.00	$1,760,000.00	35,200	$50.00	$1,760,000.00
Subgrade Stabilization	Square Yards	35,200	$7.00	$246,400.00	35,200	$7.00	$246,400.00
2'-6" Concrete Curb and Gutter	Linear Feet	10,700	$19.00	$203,300.00	10,700	$19.00	$203,300.00
1'-6" Concrete Curb and Gutter	Linear Feet	8,400	$16.00	$134,400.00	8,400	$16.00	$134,400.00
4" Concrete Sidewalks (both sides)	Square Yards	20,720	$30.00	$621,600.00	20,720	$30.00	$621,600.00
Erosion Control	Acres	14.00	$8,500.00	$119,000.00	14.00	$8,500.00	$119,000.00
Traffic Control	Lump Sum	1	$75,000.00	$75,000.00	1	$75,000.00	$75,000.00
Thermo and Markers	Miles	1	$35,000.00	$35,000.00	1	$35,000.00	$35,000.00
Structures*							
44' wide by 1000' length	Square Feet	45,760	$155.00	$7,092,800.00	36,080	$150.00	$5,412,000.00
Miscellaneous							$990,000.00
Misc. & Mobility (15% Strs)				$1,063,920.00			$2,395,620.00
Misc. & Mobility (45% Functional)				$2,687,220.00			
			Contract Cost	$16,815,540.00		Contract Cost	$ 13,943,020.00
			Contingency (15%)	$2,522,331.00		Contingency (15%)	$2,091,453.00
			Construction Cost	**$19,337,900.00**		**Construction Cost**	**$16,034,500.00**

*Unit cost varies to account for the increased cost (due to the height of the bridge) of the structure over the Northern Beltway.

Chapter 5 — Implementation and Action Plan

The successful implementation of the **Peace Haven Road/Styers Ferry Road Connector** improvements will depend to a great extent on the ability for local, private and governmental entities to work together in collaboration to create a corridor that is functional, safe and attractive for local citizens and regional mobility. Government agencies will be responsible for planning the protection of and making public investment to reserve the necessary right-of-way and protect its interest along the corridor. Private investment that is healthy and sustainable is achievable through well-guided land use policies that encourage quality design and protect the integrity of the Peace Haven Road/Styers Ferry Road Corridor.

Completion of this study represents an important step toward implementing quality development and aesthetic improvements along the proposed corridor. The structure of the recommendations does not require that all improvements are completed in unison. This should allow flexibility to work in partnership with the development community to implement the vision of the plan in several phases as development occurs and funding sources become available.

Many citizens expressed frustration during the public outreach process over the lack of funding sources and the uncertainty of when proposed improvements would be implemented. In reality, municipal, county and State agencies must bear the responsibility of protecting needed right-of-way by means of local adopted policy measures and in some cases direct acquisition. On the other hand, most of the corridor will be constructed by the development community.

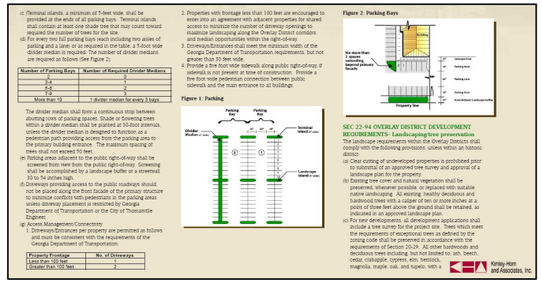
Public Workshop #1

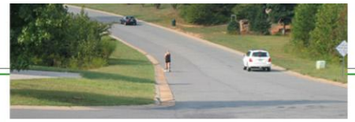
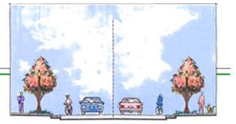
Local, state, and private partnerships offer strategic advantages to implementing improvements on a timely basis, especially considering the level of impeding development around the Peace Haven Road/Styers Ferry Road Connector and Lewisville-Clemmons Road area. The purpose of this "Action Plan" is to recognize these challenges and suggest strategies and resources to address each challenge.

General Recommendations

The following recommendations apply to the overall vision for the corridor as expressed by the local residents, business owners, stakeholders and the Advisory Committee. These recommendations can be initiated throughout the planning process and prior to any physical infrastructure improvements.

- Use this plan as a tool to review proposed development projects and plans as they locate and are implemented within the corridor.
- Due to the multiple jurisdictions that the Peace Haven Road/Styers Ferry Road Connector traverses, there is a need to identify a mechanism that will allow for the consistent implementation of this proposed street. It is recommended that the Village of Clemmons, Forsyth County and the Winston-Salem MPO adopt this plan and incorporate the preferred alternative corridor into their respective planning documents, including comprehensive plans, Future Land Use Map, and transportation plans. This will allow for the protection of the Peace Haven Road/Styers Ferry Road Connector alignment.
- Consider adopting a ***Peace Haven Road/Styers Ferry Road Connector Corridor Protection Overlay District Ordinance*** as a tool to help guide future development activities through established development standards to promote consistent development patterns along the corridor (in particular, commercial development near Lewisville-Clemmons Road). The ordinance will provide a legal framework for the Village and County to administer and enforce consistent design and development standards along the corridor. The ordinance should contain rules and requirements for the "core" components of a comprehensive development strategy, including design elements (building type, permitted uses, density and intensity, lot size, building placement, building frontage, signage, parking placement, provisions for corner clearance, joint access, and connectivity) and design requirements for building access connections. The ordinance also should require cross access between adjacent properties, shared-use driveways (if applicable), and retrofitting existing site access to the side and rear portions of the site.
- If applicable, rezoning applications would have to be consistent with "Adopted" plans.
- Physical roadway infrastructure improvements will primarily be implemented by the development community as a part of the site plan review process.


Special overlay district sample

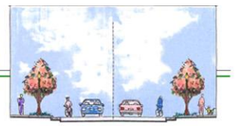
- As growth occurs along the Peace Haven Road/Styers Ferry Road Connector, require new development to adhere to the vision and recommendations outlined in this document, including provisions for shared use driveways, cross-access, and new collector streets (i.e., back-door access to abutting property) ultimately providing an interconnected system of streets. In some cases, stub-outs of the new connections will be constructed to adjoin with adjacent undeveloped property. These stub-outs should be signed as "future street connection" to avoid confusion and ensure future connections.
- Integrate future bikeways, greenway, and trail networks with the Peace Haven Road/Styers Ferry Road Connector to create an interconnected network.
- Avoid and/or minimize impacts to social and environmental sensitive areas to preserve community character and the natural environment.
- As the transportation corridor is improved and expanded minimize impacts that negatively affect the character and integrity of adjacent neighborhoods (i.e., Springfield Farms, etc.) by introducing gateways or traffic calming improvements.
- Promote alternative modes of transportation through better minor thoroughfare/collector street design and developer participation.
- Promote interconnectivity and cross-access between existing and proposed developments.

Action Plan

The implementation of corridor-wide improvements can occur through adoption of local policies and programs and state programs, in addition to private sector contributions. With this in mind, it will be important for local municipalities and NCDOT to identify viable funding sources to implement the recommendations of this plan. As a reference, the typical construction cost for a one-mile section of a 2-lane divided roadway with sidewalks is approximately $1.5 to $1.8 million. While some projects and programs will be funded and implemented by the local jurisdictions or NCDOT, alternatives are available to provide financial support for implementing corridor recommendations. The following "Action Plan" and recommendations apply to the overall vision for the corridor as expressed by the local residents, business owners, stakeholders and elected officials.

Action Item	*Timeframe*	*Responsible Party*
Adopt this Plan: pursue plan adoption by implementing agencies including Forsyth County, Village of Clemmons, W-S MPO and the North Carolina Department of Transportation (NCDOT).	2008	Forsyth County, Village of Clemmons, Winston-Salem MPO, NCDOT
Incorporate the preferred alignment of the Peace Haven Road/Styers Ferry Road Connector into local plans including the local comprehensive plans, Future Land Use Map, and transportation plans.	2009	Forsyth County, Village of Clemmons, NCDOT
Coordinate with Forsyth County and Village of Clemmons representatives to work with existing property owners and planned development to protect, reserve and dedicate needed right-of-way for the Peace Haven Road/Styers Ferry Road Connector corridor.	2009	Forsyth County, Village of Clemmons
Adopt a Model Development Overlay Ordinance as a tool to help guide development along the corridor and to promote consistent development patterns.	2009	Forsyth County
Coordinate the design and access changes with NCDOT Division 9 prior to the construction of the Peace Haven Road/Styers Ferry Road Connector and Lewisville Clemmons Road tie-in. Most likely, this intersection will require signalization.	2010	Forsyth County, Village of Clemmons, NCDOT
Pursue NCDOT STP-Enhancement Grant funding to install 5' sidewalks on Springfield Farm Road and Bullard Road. These funds are administered through a grant program with a 20% local match requirement. Website http://www.ncdot.org/financial/fiscal/Enhancement	2010	Forsyth County, Village of Clemmons
Lobby NCDOT and Division 9 representatives to improve the sections of the Peace Haven Road/Styers Ferry Road Connector that utilize existing roadways (i.e., Bullard Road, Springfield Farm Road, etc.).	2012	Forsyth County, Village of Clemmons
Actively pursue NCDOT Division Office "Spot Safety", Hazard Elimination, Governor's Highway Safety Program (GHSP), Economic Development funding, and Small Construction Funds improvement monies to implement connectivity, gateway treatments and safety improvements at key intersections along the Peace Haven Road/Styers Ferry Road Connector corridor beginning with the Lewisville-Clemmons Road, Harper and Lasater Road intersections.	2013	Forsyth County, Village of Clemmons





Phased Improvements

As mentioned previously, majority of the capital improvements will most likely be constructed through private development initiatives, while some of the "gap" improvements will be funded and implemented using State gas tax dollars administered by the North Carolina Department of Transportation (NCDOT). With this in mind, not all of the improvements can be made at one time.

Because most of the improvements will be built by the private sector, a timeframe or schedule for implementation is unrealistic. Factors that can affect the timeframe may include:

- Development/ Redevelopment activities
- Funding availability
- Permitting
- Right-of-way acquisition
- Public support or opposition

However, specific sections of the proposed corridor are expected to experience development pressures sooner than other sections. The Lewisville-Clemmons Road corridor is commercially zoned at its intersection with the proposed Peace Haven Road/Styers Ferry Road Connector. The segment between Lewisville-Clemmons Road and Harper Road is another area that appears to be a "hot-spot" for residential growth. Based on discussions with local planning staff, property owners and developers, we can expect this stretch of the Peace Haven Road/Styers Ferry Road Connector to be a high priority.

Special Programs and Initiatives

As phased improvements are implemented, special programs and initiatives should be pursued to help protect the integrity and aesthetics of the corridor.

- ***Adopt-A-Highway*** – NCDOT volunteer program used to maintain and protect the scenic beauty of corridors. www.dot.state.nc.us/adopt-a-highway
- ***Tax Incentive Program*** - Consider providing a tax incentive to existing property owners and developers located along the corridor for converting to "shared" driveways and constructing cross-access connections.
- ***Adequate Public Facilities Ordinances*** (APFOs) – Also referred to as Concurrency Regulations, adequate public facilities ordinances allow local governments to deny or delay new developments if existing government services (water and sewer, roads, schools, fire and police) cannot support it. APFOs place the burden on developers to ensure adequate services are in place for new developments they propose, fund such improvements or postpone plans until such services are in place. State legislation allows municipalities to enact such regulations.

Conclusion

A variety of funding strategies and programs are available to implement the recommended improvements for the Peace Haven Road/Styers Ferry Road Connector. These funding strategies include state and local monies, which are often limited or committed well into the future. Grant funding from the state typically requires a local match, but these monies may be used to cover many of the capital and operating expenses identified in the recommendations for the corridor. The full benefit of the Peace Haven Road/Styers Ferry Road Connector most likely will come to fruition as a result of and in partnership with the private sector. While some of the improvements will be made through public dollars, the Village of Clemmons and Forsyth County should proactively pursue the protection of the right-of-way needed for the construction of the Peace Haven Road/Styers Ferry Road Connector corridor.

Ultimately, decision-makers will need to partner with the local development community to make this plan a reality. Traditional efforts of relying on public investments to enhance safety and mobility within the region have become less desirable and reliable. If change is to occur and corridor and safety improvements are to be realized for the Peace Haven Road/Styers Ferry Road Connector, it will have to be accomplished through a meaningful and cooperative effort between public and private sectors.

One thing is certain — with the current transportation funding shortfall the most critical steps toward implementation will be carried out by leaders and "champions" identified within the community. In collaboration with state and local officials, their collective efforts will lead to a safe and aesthetically-pleasing corridor that the local community will identify as a clear success story.