Final Transportation Summary Report

The
RENAISSANCE PLAN
FOR THE HEART OF WAKE FOREST

Kimley-Horn
and Associates, Inc.

June 2005

Acknowledgements

Following the development of the Renaissance Plan in May 2003, the Town of Wake Forest directed Kimley-Horn and Associates, Inc. to develop a plan for urban streets within the downtown area. This plan is intended to complement the Renaissance Plan, and was made possible by the assistance of the following groups and individuals.

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Simulation of traffic using proposed improvements

The Renaissance Plan
For the Heart of Wake Forest

Background

Change within a community means different things to different people. Planning for ways to address that change, however, is critical in order for communities to remain true to what is important to its citizens.

The Town of Wake Forest recognized the need to plan for its changes. After an intensive community input process and significant consideration of several options, the town successfully established a plan designed to revitalize the heart of Wake Forest.

In 2003, planners and designers collaborated with the Town of Wake Forest to develop the downtown Renaissance Plan.

The Renaissance Plan encompasses approximately 220 acres bounded by the CSX rail line to the west, the NC 98 Bypass to the south, and the Historic and Central Business Districts to the north and the east. The area includes a mixture of retail, service, office, governmental, residential, and light industrial uses. A variety of undeveloped properties and vacant lots are also scattered throughout the planning area.

The Renaissance Plan was designed for two purposes:

- First, it seeks to provide policy and programmatic recommendations for the revitalization of and the encouragement of reinvestment into the historic downtown.
- Second, it is intended to propose a number of realistic development opportunities specifically targeted for the heart of the Wake Forest community.

These development opportunities were aimed at creating a more vibrant community to engage all who visit, work, and live in this special place.

While the plan serves as an important foundation upon which Wake Forest can grow the heart of its community, several key issues need to be addressed to make sure the Renaissance Plan is as successful as possible. Issues like the NC 98 Bypass and specific transportation improvements — such as the extension of Franklin Street, level of service to intersections, and concept design — all need to be considered before implementing any changes. To examine the impact of these issues, Kimley-Horn performed traffic analysis and developed concept design plans for the Town. The results of the planning process are included in this summary report.

Renaissance Plan with base map

The NC 98 Bypass

A project likely to impact travel and mobility in Wake Forest is the NC 98 Bypass. The NC 98 Bypass is a four-lane divided roadway being built around southern Wake Forest from NC 98/Thompson Mill Road in the west to Jones Dairy Road/East Wait Avenue in the east. It is being built to relieve congestion on the NC 98 corridor through downtown Wake Forest, which is currently experiencing high traffic and truck volumes especially in the AM and PM peak hours.

The Bypass is being constructed in three phases.

- Section C from Jones Dairy Road/East Wait Avenue to South Main Street (US 1A) is already complete and fully operational.
- Section B will extend from South Main Street (US 1A) to Capital Boulevard (US 1) and is expected to be completed in the fall of 2006.
- Section A will extend from Capital Boulevard (US 1) west to NC 98/Thompson Mill Road and is scheduled to be completed in 2009.

The completion of this Bypass is expected to significantly impact trip-making decisions in Wake Forest.

Transportation Improvements

Because the feasibility of the transportation improvements identified in the Renaissance Plan needed to be evaluated, a transportation study was conducted. The study also examined the ability of these improvements to accommodate anticipated future traffic volumes. The specific improvements that were evaluated included the extension of Franklin Street to connect to the NC 98 Bypass, roundabouts at the Franklin Street/Elm Street and Franklin Street/Holding Avenue intersections, bicycle lanes, a landscaped median, and on-street parking.

NC 98 today

The Renaissance Plan originally proposed realigning South Franklin Street north of the NC 98 Bypass to direct motorists toward the downtown area. This option, however, posed several operational problems, such as the alignment of the entrance to the Deacon's Ridge subdivision on the east side of Franklin Street.

A roundabout presented a more attractive option at this location not only from an operational standpoint but also as a traffic calming and gateway feature. For similar reasons a roundabout at the intersection of South Franklin Street and Elm Avenue has been considered.

Franklin Street

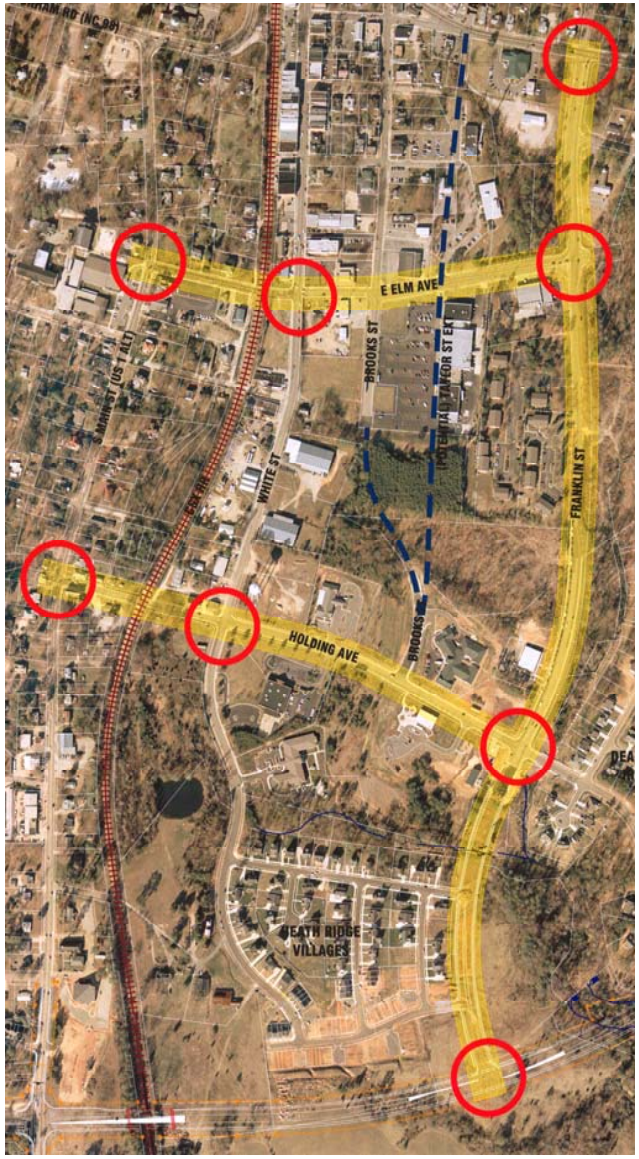
Franklin Street Extension

Franklin Street is currently being extended from Holding Avenue to the NC 98 Bypass by the Town of Wake Forest. Once it is complete, NCDOT has agreed to assume maintenance and ownership of the street for a limited period of time. At some point in the future, ownership will revert back to the Town.

Travel Demand Forecasting

In order to understand the impacts of the proposed Franklin Street connection as well as build-out of the Renaissance Plan, a number of intersections have been studied, including:

- South Main Street/Elm Avenue
- South Main Street/Holding Avenue
- White Street/Elm Avenue
- White Street/Holding Avenue
- Franklin Street/Wait Avenue
- Franklin Street/Elm Avenue
- Franklin Street/Holding Avenue
- Franklin Street/NC 98 Bypass



Study intersections

Capacity analyses were performed at each of these intersections for the existing year as well as projected year 2025 traffic volumes. Various data sources were used to determine the projected 2025 Renaissance Plan build-out traffic volumes. A copy of all traffic analysis and travel demand forecasting can be found in the technical appendix under separate cover.

First, existing traffic volumes were adjusted to account for traffic being diverted as a result of the extension of Franklin Street to the NC 98 Bypass. Second, the adjusted traffic volumes at each intersection were augmented to obtain 2025 background traffic volumes. Then the additional traffic generated by the expected Renaissance Plan redevelopment in the downtown area was discretely assigned throughout the study area.

NCDOT volume projections for the NC 98 Bypass project were used to estimate traffic volumes on the Bypass since through traffic is expected to increase significantly upon completion of the facility. Completion of the Bypass is also expected to initially reduce traffic on Wait Avenue (NC 98).

However, with the general redevelopment of downtown and the continued growth of Wake Forest, volumes are expected to return to current levels by 2025.

The Triangle Regional Model was used to verify traffic volumes on the project corridors. The model was modified to more accurately represent the downtown area and to include much of the development occurring in eastern Wake Forest. Projections from the Triangle Regional Model confirmed the area-wide volume projections for the study area.

The existing 2005 peak-hour traffic volumes are shown in Figure 1. The projected 2025 peak-hour traffic volumes are shown in Figure 2, and the resulting Average Daily Traffic volumes (ADTs) are shown in Figure 3.

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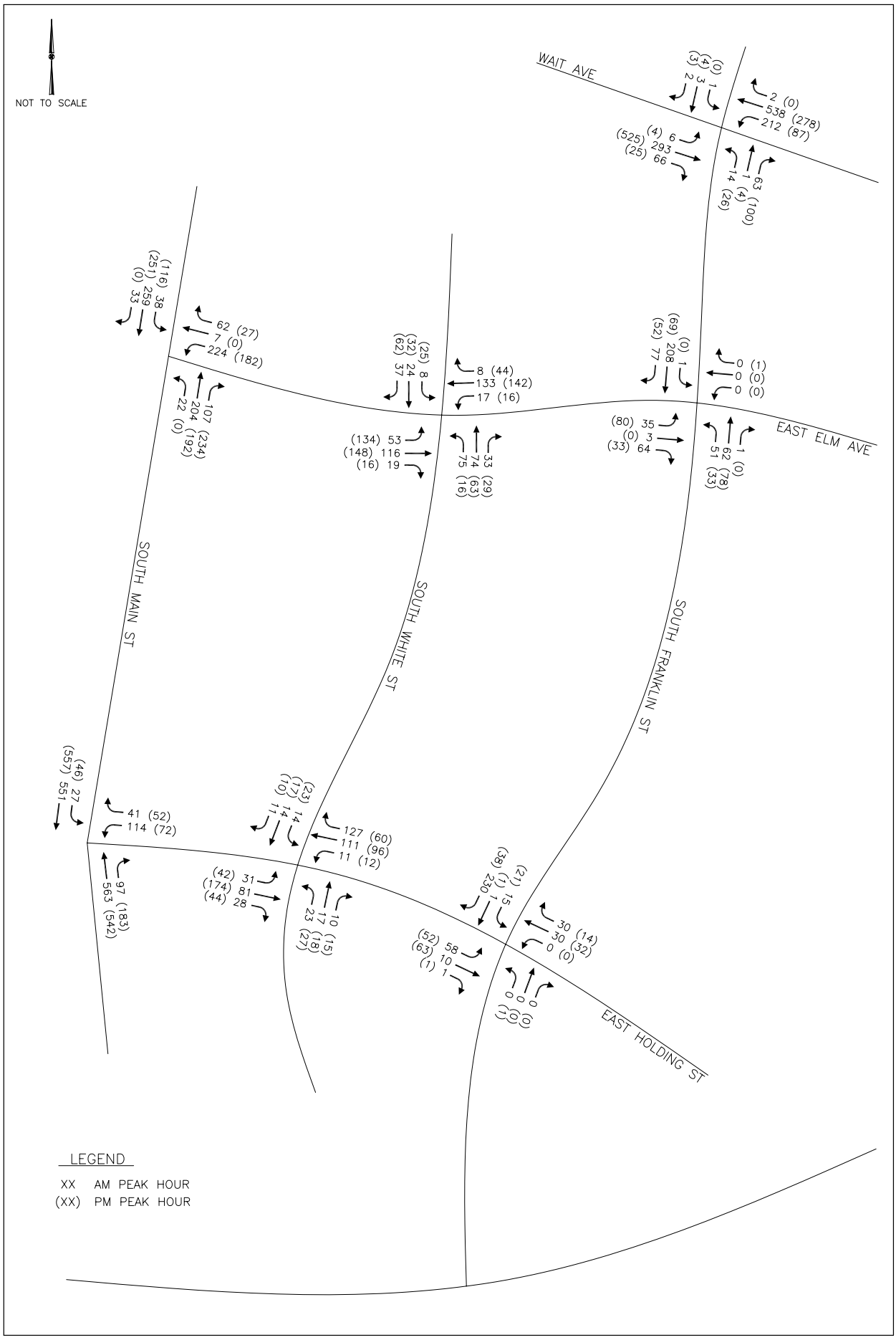

Kimley-Horn and Associates, Inc.	WAKE FOREST RENAISSANCE	EXISTING AM & PM TRAFFIC VOLUMES	FIGURE 1

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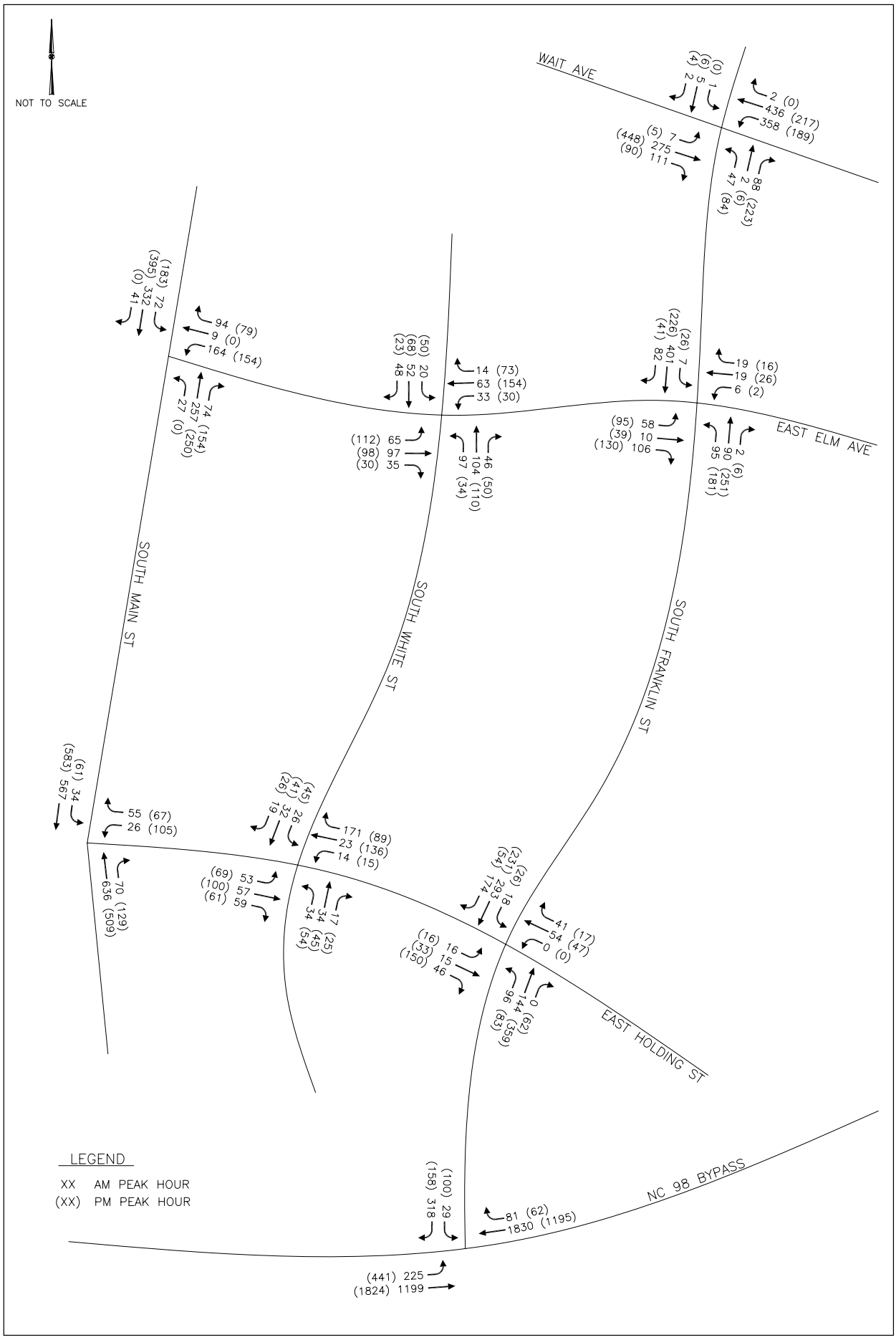

Kimley-Horn and Associates, Inc.	WAKE FOREST RENAISSANCE	PROJECTED BUILDOUT (2025) AM & PM TRAFFIC VOLUMES	FIGURE 2

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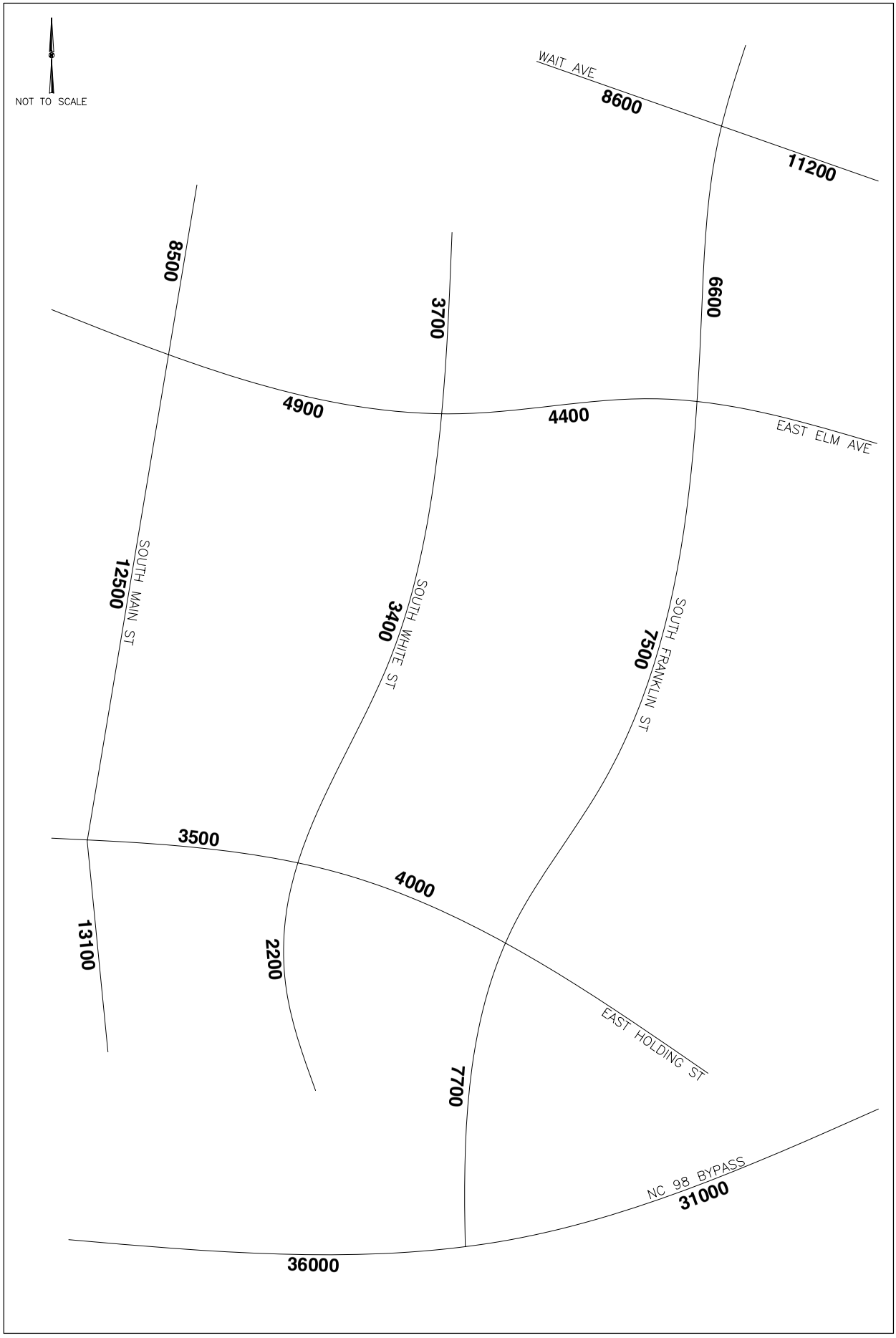


Kimley-Horn and Associates, Inc.	WAKE FOREST RENAISSANCE	BUILDOUT (2025) ADT'S	FIGURE 3

Traffic Analysis

Capacity analyses were performed for the existing and projected 2025 conditions using Synchro Version 6 software for all of the study intersections except the Franklin Street/Elm Avenue and Franklin Street/ Holding Avenue intersections. These intersections were analyzed using aaSIDRA Version 2.0 software, a more accurate and widely accepted tool for analyzing roundabouts. The level of service and delay for each of the study intersections is shown on Table 1.

Results of this analysis conclude that with appropriate intersection configuration and traffic control, study intersections are projected to operate at acceptable levels of service. The roundabouts at Holding Avenue and Elm Avenue are likewise expected to operate at exceptional levels of service — A/B in the morning and afternoon peak periods.

Table 1 — Level of Service at Intersections within Study Area

Level of Service (LOS)		
Condition	**AM Peak Hour LOS (Delay)**	**PM Peak Hour LOS (Delay)**
Wait Avenue & Franklin Street (Unsignalized)		
Existing	Moderate delays for minor street approach	Short delays for minor street approach
Projected 2025	Long delays for minor street approach	Moderate delays for minor street approach
E. Elm Avenue & Franklin Street (Roundabout)		
Existing	Short delays for minor street approach	Short delays for minor street approach
Projected 2025	A (B)*	A (A)*
E. Holding Avenue & Franklin Street (Roundabout)		
Existing	A (8.1)**	A (7.7)**
Projected 2025	A (A)*	A (A)*
NC 98 Bypass & Franklin Street (Signalized)		
Projected 2025 (Single Left)	C (29.8)	B (18.3)
Projected 2025 (Dual Lefts)	C (24.3)	B (16.2)
E. Elm Avenue & S. White Street (Unsignalized)		
Existing	Short delays for minor street approach	Short delays for minor street approach
Projected 2025	Short delays for minor street approach	Moderate delays for minor street approach
E. Holding Avenue & S. White Street (Unsignalized)		
Existing	Short delays for minor street approach	Short delays for minor street approach
Projected 2025	Short delays for minor street approach	Short delays for minor street approach
E. Elm Avenue & S. Main Street (US 1A) (Signalized)		
Existing	B (10.2)	A (9.2)
Projected 2025	B (11.0)	B (17.0)
E. Holding Avenue & S. Main Street (US 1A) (Unsignalized)		
Existing	Long delays for minor street approach	Long delays for minor street approach
Projected 2025	Moderate delays for minor street approach	Long delays for minor street approach
** Roundabout – Intersection LOS (Worst Movement LOS)*		
*** 4-Way Stop – Intersection LOS (Delay)*		

Franklin Street

Based on the capacity analyses, all of the study intersections are expected to operate at an acceptable level of service in the year 2025. It is anticipated that Franklin Street specifically will operate well as a two-lane street with roundabouts at the intersections with Elm Avenue and Holding Avenue. However, due to the high left-turn volume from eastbound NC 98 Bypass onto northbound Franklin Street, dual eastbound left turn lanes will be needed on the NC 98 Bypass in the future. As a result, Franklin Street should be constructed with two northbound lanes from the NC 98 Bypass. One of these lanes may be dropped before the roundabout at Holding Avenue (possibly as a left-turn lane at Yellow Poplar Avenue).

Simulation of traffic using proposed improvements

The addition of on-street parking or bike lanes in accordance with current design standards are not expected to cause operational problems. These should provide for a more pedestrian- and bicycle-friendly environment.

Concept Designs

Part of the planning process included conducting a public workshop on February 24, 2005. This workshop involved citizens, property owners, elected officials, and reviewing agencies, giving these stakeholders an opportunity to review and comment on transportation proposals for the downtown area.

The content presented at the workshop included traffic analysis results and simulations as well as concept designs for Franklin Street, Holding Avenue, and Elm Avenue. These designs are described in further detail on the following pages.

The resulting set of designs are responsive to community input, consistent with the vision described in the Downtown Wake Forest Renaissance Plan, and based on input from local and state officials, including the Town of Wake Forest and NCDOT.

Participants at public workshop

Franklin Street

The Franklin Street corridor is approximately 4,450 linear feet with a proposed right-of-way of 90 feet. The typical section is two-lane, median-divided roadway with on-street bike lanes and a sidewalk separated by a planting strip (see graphic to the right). This section includes one 11-foot travel lane in each direction with a 7-foot on-street bike lane on each side, a 2-foot outside gutter pan, and 1-foot inside gutter pan.

The proposed median is approximately 11 feet wide and will include irrigation and landscaping appropriate for a gateway corridor. Sidewalks approximately 5 to 7 feet in width are proposed on both sides of the street as well as pedestrian scale and vehicular lighting. The proposed section provides for a minimum clear width of 20 feet in accordance with local and state requirements, including the International Fire Codes.

Proposed intersection treatments, include roundabouts at Holding and Elm Avenues, traffic signalization at the NC 98 Bypass, reserved right-of-way for a potential future roundabout at Franklin Street and Wait Avenue, and reserved right-of-way for a potential future roundabout on Franklin (between Elm and Holding Avenues) to serve as a connection between Franklin Street and Brooks Street.

This proposed design assumed usage of existing curb and gutter with asphalt overlay from Wait Avenue to approximately 200 linear feet south of Holding Avenue (tying into current Franklin Street Extension roadway improvements).

A complete set of concept designs can be viewed at the Town of Wake Forest Engineering Department.

Franklin Street

Holding Avenue

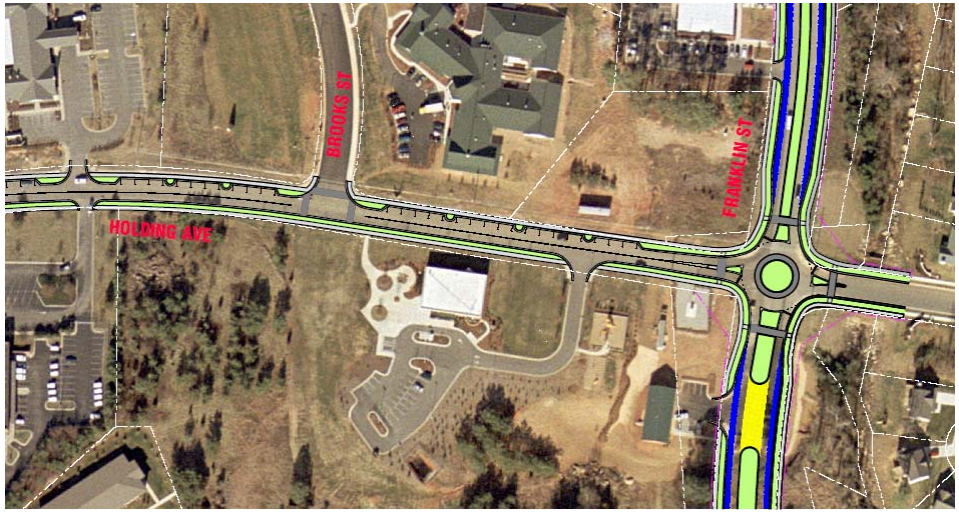
The Holding Avenue corridor is approximately 1,850 linear feet in length with a proposed right-of-way varying from approximately 50 to 60 feet.

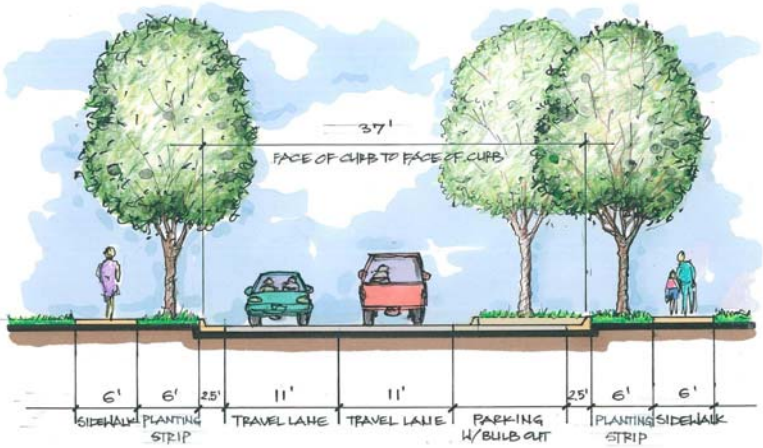
A typical section for this corridor is a two-lane roadway with on-street parking to the north. This section includes an 11-foot-wide travel lane and 2-foot gutter pan in each direction. A 6-foot-wide sidewalk is proposed on both sides of the street with the southern sidewalk being separated from the roadway by a planting strip (please see the graphic to the right).

Proposed intersection treatments include a roundabout at Franklin Street and a stop-condition at Main Street.

The proposed design assumed the installation of new curb and gutter, sidewalk, as well as asphalt overlay along entire length of Holding Avenue.

A complete set of concept designs can be viewed at the Town of Wake Forest Engineering Department.





Holding Avenue

Elm Avenue

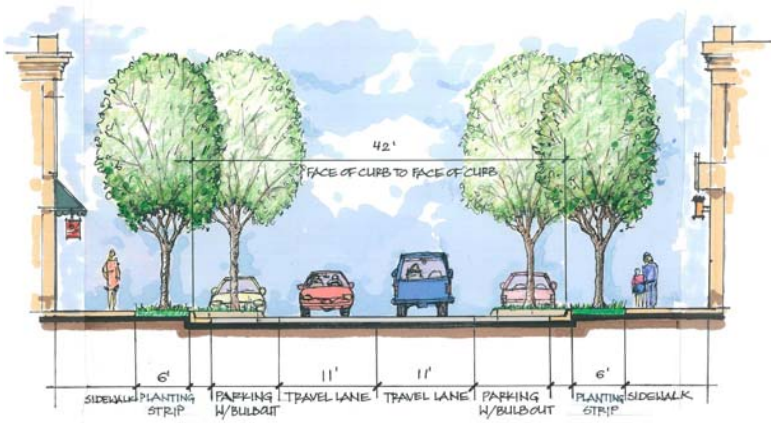
The Elm Avenue corridor is approximately 1,430 linear feet in length with a proposed right-of way varying from approximately 43 to 708 feet.

A typical section for this corridor is a two-lane roadway with on-street parking from Franklin Street to Brooks Street on both sides. This section includes an 11-foot-wide travel lane and 2-foot gutter pan in each direction.

A 6-foot-wide sidewalk is proposed on both sides of the street (please see the graphic to the right). The sidewalk on the north is separated from the roadway with a planting strip from Franklin to White Street and on the south from Franklin Street to Brooks Street. The sidewalk is located at the back of curb on the north from White Street to Main Street and on the south from Brooks Street to White Street.

Intersection treatments include a roundabout at Franklin Street as well as a traffic signal at Main Street. This proposed design assumed the installation of new curb and gutter, sidewalk, and asphalt overlay along entire length of Elm Avenue.

A complete set of concept designs can be viewed at the Town of Wake Forest Engineering Department.



Elm Avenue

Roundabout

Roundabout Details and Landscaping and Design Elements

The proposed design concepts included roundabouts that are 100 feet in diameter in the inscribed circle, and 64 feet in diameter in the center median. The lane width for the proposed design is 18 feet with an estimated travel speed of 15 to 20 mph.

Streetscape design elements will be comparable to those used with the US 1A roundabout project at the Seminary currently under design. Design elements include street trees and lawn lining the road edge with enhanced plantings of ornamental trees and landscape beds accenting the medians. Special paving treatments will occur at all intersections and roundabouts within the Franklin Street corridor.

Ornamental street and pedestrian lighting will be added along the corridor to enhance the existing light coverage while adding opportunities to enhance the character of the corridor — for example, banners or seasonal decorations. Other design elements will be incorporated into the streetscape to reflect local urban character, such as stone or brick features, street furniture, or roundabout plantings.

Remaining Process

Planning level cost estimates are being developed for the concept designs to assist with budgeting. Once the draft deliverables have been reviewed by

the Town and approved, construction designs will be initiated for the Franklin, Elm, and Holding corridors. This process will include formal surveying, construction designs, and review and approval by the Town and NCDOT. Construction of downtown street improvements are expected to be funded in large part by municipal bonds, approved by the citizens of Wake Forest in 2005.

Conclusion

Wake Forest is ready to start making the Renaissance Plan a reality. By examining the impact of traffic today and in the future, the Town is leveraging the impact of transportation enhancements to stimulate the desired vision for the downtown area.