Master Plan
for
NC 98 Bypass Corridor

Town of Wake Forest, North Carolina
Approved August, 2003

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* 25' easement needed for greenway trail beyond street yard due to extensive highway cut and fill slopes

NC 98
Town of Wake Forest
NORTH CAROLINA
MASTER PLAN
LEGEND

NC 98 Bypass Corridor Master Plan

CONCEPT

The NC 98 Bypass Corridor Plan for the Town of Wake Forest encompasses the area along the new NC 98 Bypass between its western terminus at Thompson Mill Road and its eastern terminus just east of Jones Dairy Road. The corridor, with the exception of the area south of the Bypass east of US 1, falls within the jurisdiction of the Town of Wake Forest. The width of corridor considered is approximately one-half mile on each side of the Bypass.

The major goals of the Corridor Plan are the following:

1) To preserve and enhance the visual quality of the corridor so as to create welcoming gateways into the community and a pleasant passage for all,
2) To create an east-west pedestrian and bike route on each side of the corridor, with connections across the highway to trail and sidewalk networks north and south of the corridor,
3) To facilitate the vehicular transportation function of the corridor, including regional flow along the Bypass and connections to the Town of Wake Forest, and
4) To encourage development within this corridor that is compatible with the first three goals.

NC 98 Bypass, when complete, will be a both a major gateway to Wake Forest and a regional arterial thoroughfare. Most of the land along the corridor is currently either residential or undeveloped. Shopping and/or business centers currently exist or are planned at the US 1 interchange and at the Jones Dairy Road intersection. Commercial and/or business uses are anticipated at the major intersections. The remainder of the corridor is expected to be residential.

The landscape along the road should be simple and bold, in keeping with the scale of the road and speed of the traffic. Plantings at intersections should accentuate the entrances to the Wake Forest community, contrasting with simpler and denser plantings between intersections. Intersection plantings are designed to allow views through to businesses and signage, while screening parking.

Plantings between intersections are designed to screen highway views from adjacent residential land and to create a simple, unified landscape along the highway. Existing woods

should be preserved or re-established wherever possible along the edges of the highway corridor between intersections. Evergreen screening should be incorporated into these plantings, particularly where adjacent land use is residential.

The corridor creates both an opportunity to develop east-west pedestrian and bicycle connections through the Town and a potential barrier to pedestrian and bicycle travel north-south across the corridor. Trails along the Bypass would provide connections between planned greenways along the Town's main stream valleys, which run generally in a north-south direction. A paved trail should be provided along each side of the Bypass. In some areas existing sidewalks and nearby greenway corridors should be used instead of an alignment next to the highway right-of-way.

As a limited access highway, with high speed limits and access only at designated street crossings, the bypass will separate downtown Wake Forest and neighborhoods south of the road. Grade-separated crossings should be considered at major road intersections and/or main greenway trail connections. Pedestrian underpasses also should be provided on each side of the railroad, under the new highway bridge, if these can be accommodated between the railroad right-of-way and the bridge abutments.

On-grade pedestrian crossings should be incorporated into all the signalized intersections, with provisions for stopping safely in the median. Signal lights should include a provision for protected pedestrian crossing times, with signage requiring traffic turning right on red to give way to pedestrians. A grade-separated pedestrian crossing over the railroad should also be considered since the roadway bridge does not include sidewalks.

Vehicular access to NC 98 Bypass is limited to designated street crossings. Most of these intersections will either be signalized or right-turn-only. There will be no driveway access to the Bypass from adjacent properties. East-west road connections are needed through the neighborhoods in the plan corridor to provide access to signalized intersections and to provide alternative routes for local travel. This corridor plan has been coordinated with the Town's new Thoroughfare Plan to provide these linkages.

The Corridor is expected to attract commercial and business uses in addition to those already associated with the US 1 interchange. These uses will access 98 Bypass via collector roads rather than directly, so should be clustered at signalized intersections. Organization of

businesses into unified centers is encouraged in this area. The size of individual commercial buildings along the Corridor should be limited to 60,000 square feet maximum. Businesses should front on the collector roads rather than on 98 Bypass, with signage and highway visibility along 98 Bypass limited to the immediate intersection areas, as indicated in the Intersection Areas plans and descriptions.

Parking visible from 98 Bypass or adjacent collector roads should be screened. Internal drives and parking lots should be interconnected wherever feasible. Pedestrian and bicycle connections should extend from front doors of each business to nearby public sidewalks and greenways.

CORRIDOR STREETSCAPE – DESIGN GUIDELINES

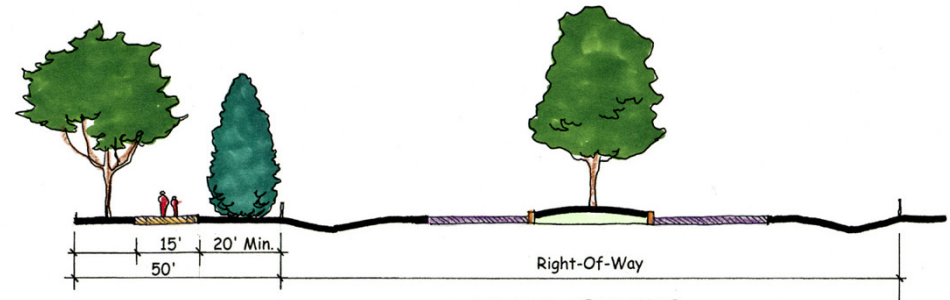
PINE WOODS EDGE: NON RESIDENTIAL

The Pine Woods Edge uses existing and planted vegetation in a streetyard of 50-foot minimum width along the edges of NC 98 Bypass to create a strong visual edge to the roadway and to screen adjacent properties. Plantings are primarily pine trees, underplanted with flowering and evergreen understory trees. Wherever possible it is highly desirable that existing woods along the Bypass be preserved.

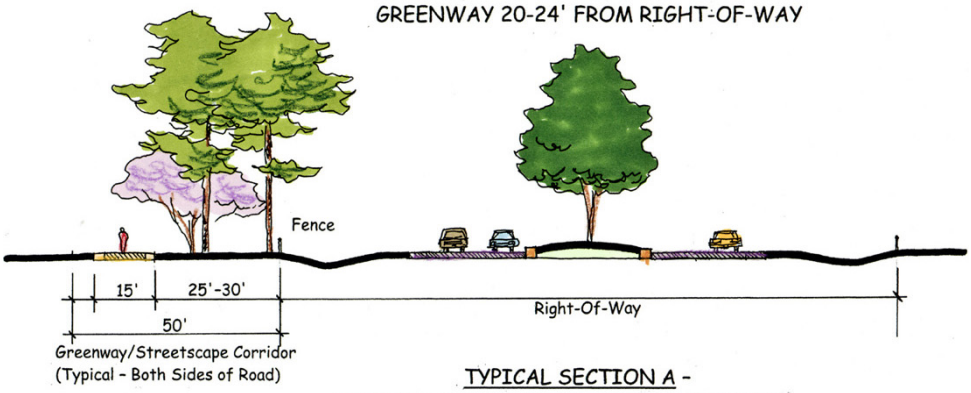
Where parking lots are potentially visible from the roadway within Pine Woods Edge areas, dense screening must be provided. This screening may consist of topographic features, buildings, walls, evergreen planting or a combination thereof sufficiently tall and dense to visually block the view of at least 80% of the parking that is potentially visible from NC 98 Bypass. Walls and berms must be supplemented by plantings. Total screening should be provided for outdoor storage, service and loading areas. Long blank building walls should have at least 50% of the wall area masked by plantings.

Tree plantings in the Pine Woods Edge may be arranged irregularly within the spacing limits described in the Table of Streetyard Widths and Plantings.

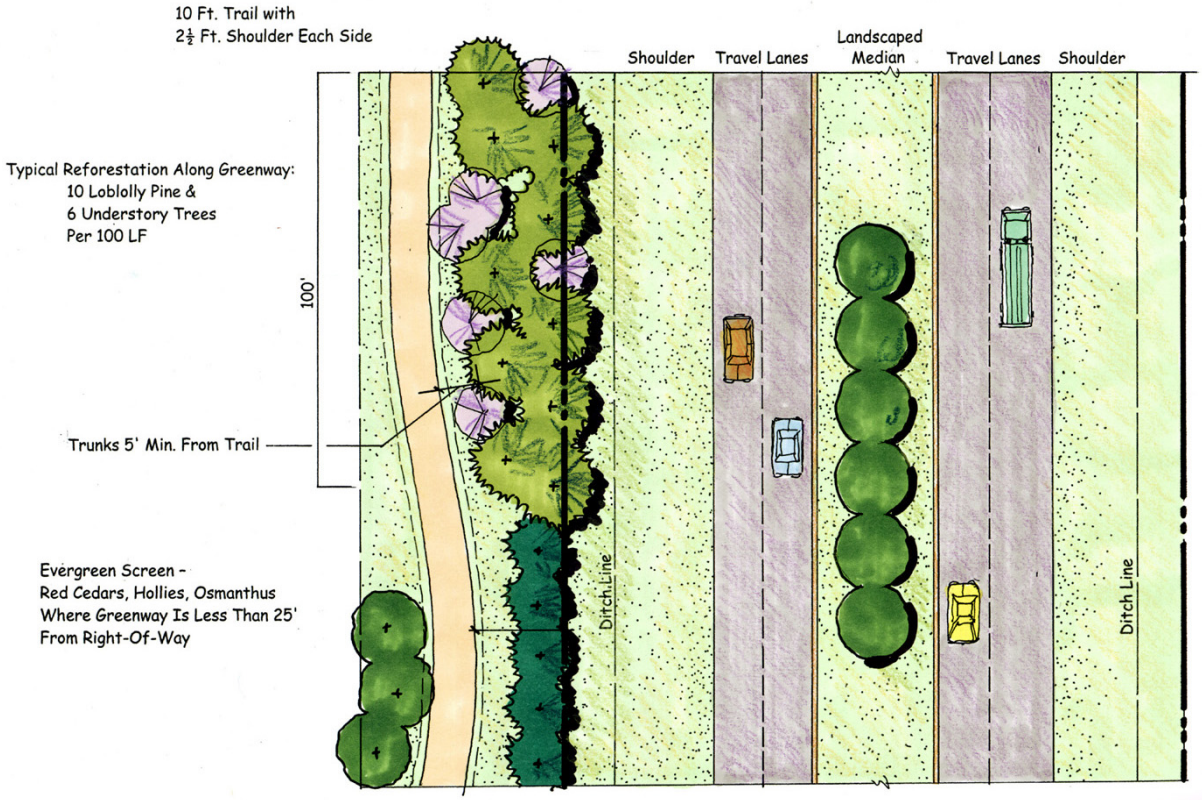
Openings in streetyard tree plantings to allow views of building facades may be provided along the streetyard. These openings shall be no more than 75-feet wide measured parallel to the highway. No more than two such openings should be permitted on any one site. The minimum spacing between openings should be 200-feet.



TYPICAL SECTION B -
GREENWAY 20-24' FROM RIGHT-OF-WAY



TYPICAL SECTION A -
GREENWAY 25' MIN. FROM RIGHT-OF-WAY



PLAN
SCALE: 1" = 20'

TYPICAL GREENWAY/STREETSCAPE CORRIDOR

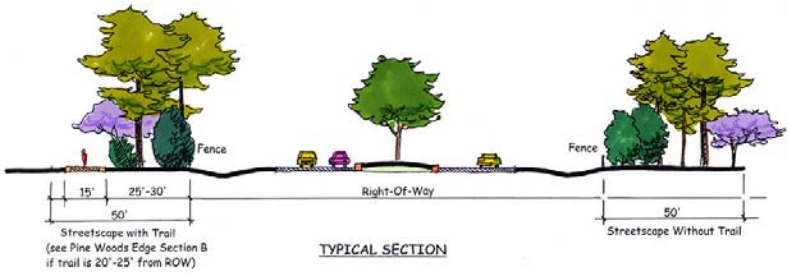
PINE WOODS EDGE: RESIDENTIAL ZONE PLANTINGS

Adjacent to residential properties the basic Pine Woods Edge plantings are augmented with denser evergreen screening in order to screen views and sounds of the highway. This is particularly important where there is little grade separation between houses and roadway. Existing woods should be preserved wherever possible and supplemented by evergreen trees and large shrubs along either the highway right of way or the woods edge adjacent to residential development. Where there are no existing woods, provide Pine Woods Edge Residential Zone plantings, supplemented with large evergreens as indicated in Table of Streetyard Widths and Plantings.

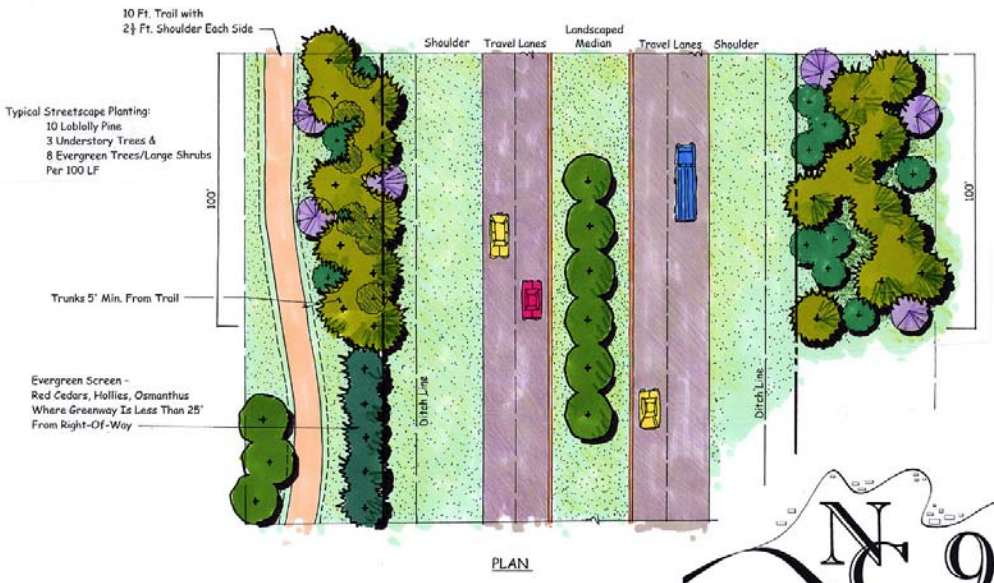
Mark Robinson & Associates
LANDSCAPE ARCHITECTURE / PLANNING

Scale: 1" = 20'

RESIDENTIAL ZONE STREETSCAPE



TYPICAL SECTION



PLAN

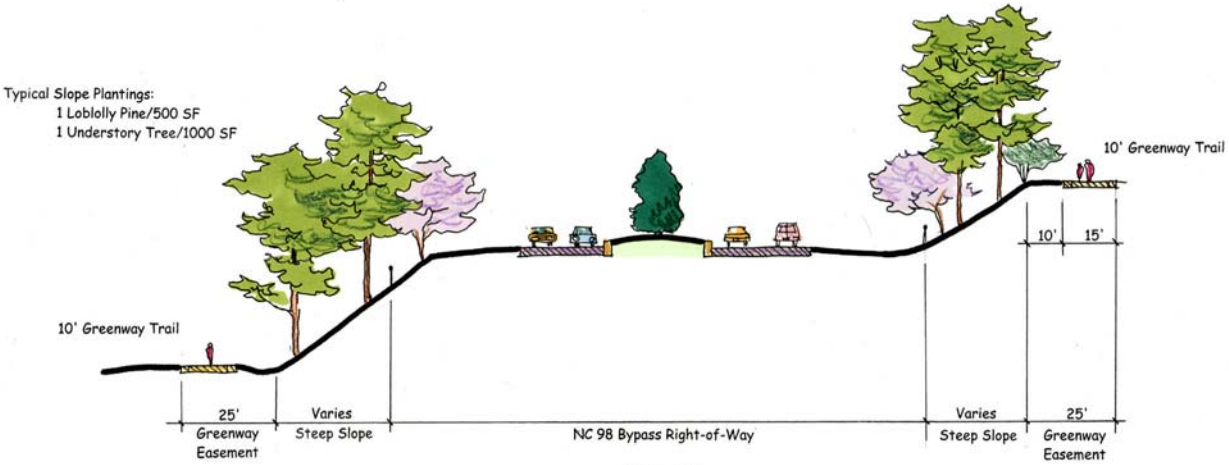
TYPICAL GREENWAY/STREETSCAPE CORRIDOR
ADJACENT TO RESIDENTIAL

NC 98 By-pass

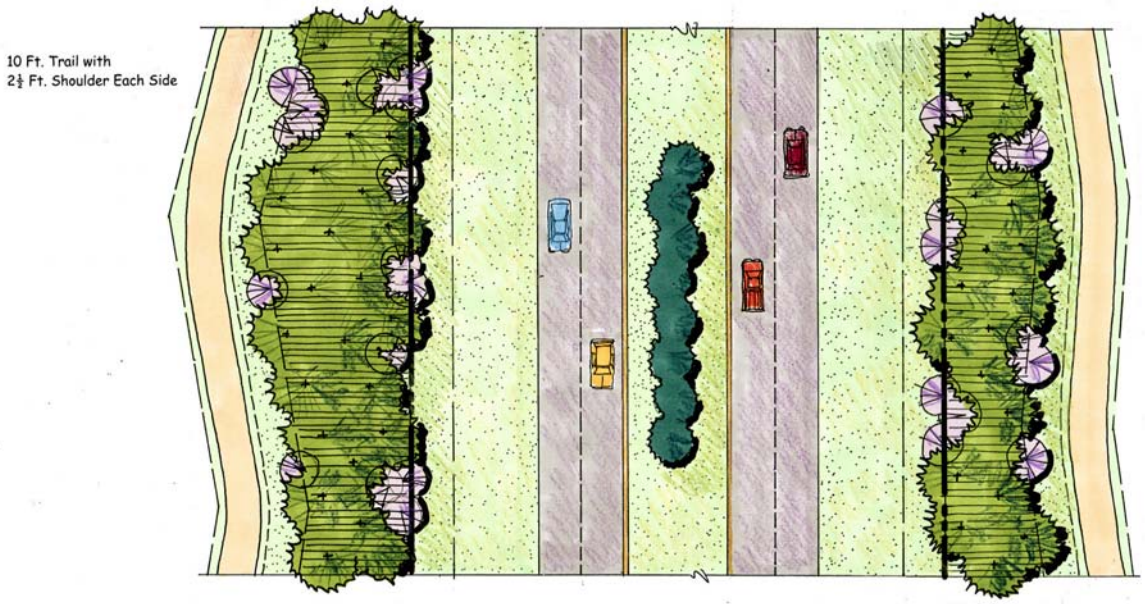
Town of Wake Forest
North Carolina

HIGHWAY SLOPE PLANTINGS

Steep cut and fill slopes within and adjacent to the right-of-way should be revegetated to the extent permitted by NCDOT to re-establish woodland along the highway edge. Highway slope plantings for cut and fill slopes beyond the typical streetyard width are indicated in the Table of Streetyard Widths and Plantings. Planting recommendations for highway slopes along Deacon's Ridge subdivision are also included in this plan.

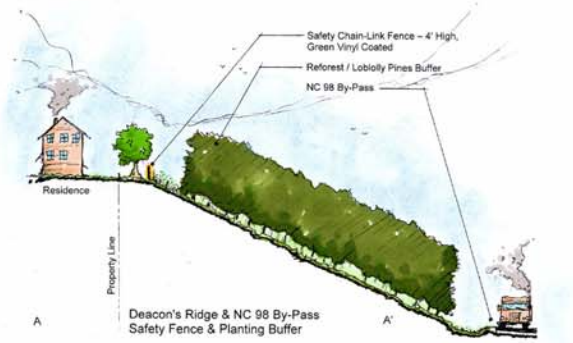


SECTION



PLAN
SCALE: 1" = 20'

GREENWAY EASEMENTS –
WHERE HIGHWAY SLOPES EXTEND BEYOND RIGHT-OF-WAY



Mark Robinson & Associates
LANDSCAPE · ARCHITECTURE · PLANNING

04 March 2003

Scale: 1" = 80'

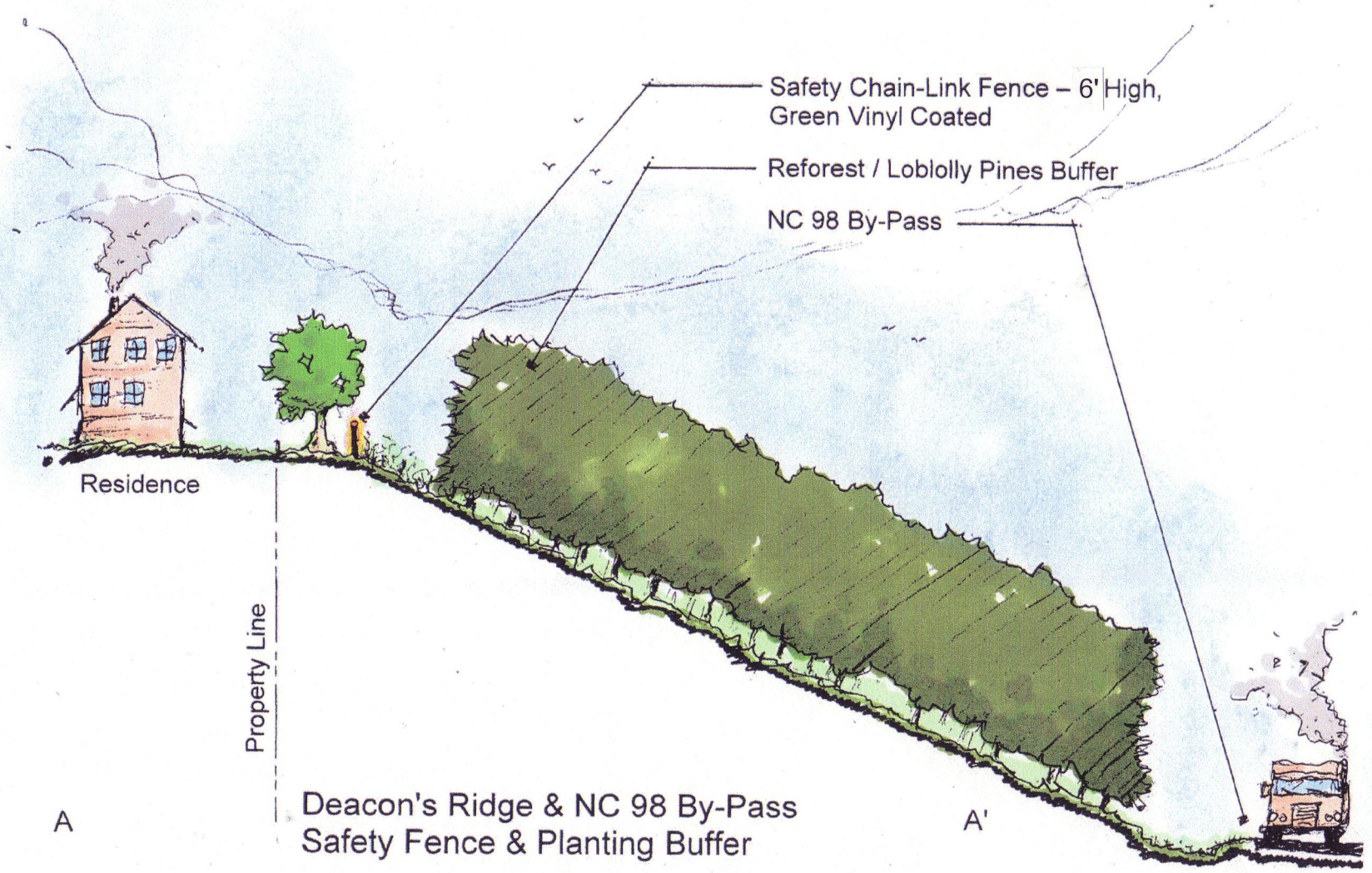
0 20' 40' 80' 160'

DEACON'S RIDGE & NC 98 BY-PASS STEEP SLOPE BUFFER

Note:
This area (between Deacon's Ridge & NC 98) has elevation difference between 5 ft. to 40+ ft. high.

NC 98 By-pass

Town of Wake Forest
North Carolina



Deacon's Ridge & NC 98 By-Pass
Safety Fence & Planting Buffer

INTERSECTION PLANTINGS

Intersection Plantings are located around major signalized intersections along NC 98 Bypass. These include:

- Jones Dairy Road/98E Business
- Franklin Street
- US 1A (Main Street)
- Ligon Mill Boulevard (future)
- Falls of Neuse Road/98W Business

Conceptual planting plans for each of these intersections are included in this Master Plan. Plantings for the US 1 interchange and associated intersections are covered in the US 1 Corridor Master Plan. Rows or clusters of large, deciduous shade trees are featured at the corners of each intersection, backed by evergreen magnolias and hollies and flanked by small flowering trees and/or evergreens.

Different varieties of trees are proposed for the corner plantings at each intersection to create variety along the corridor and add individuality to each intersection. These distinctions will be more apparent in spring and fall when trees leaf out or turn color. Varieties recommended are all large trees, primarily native, and adapted to highway planting conditions. Substitutions to this list should meet this criteria.

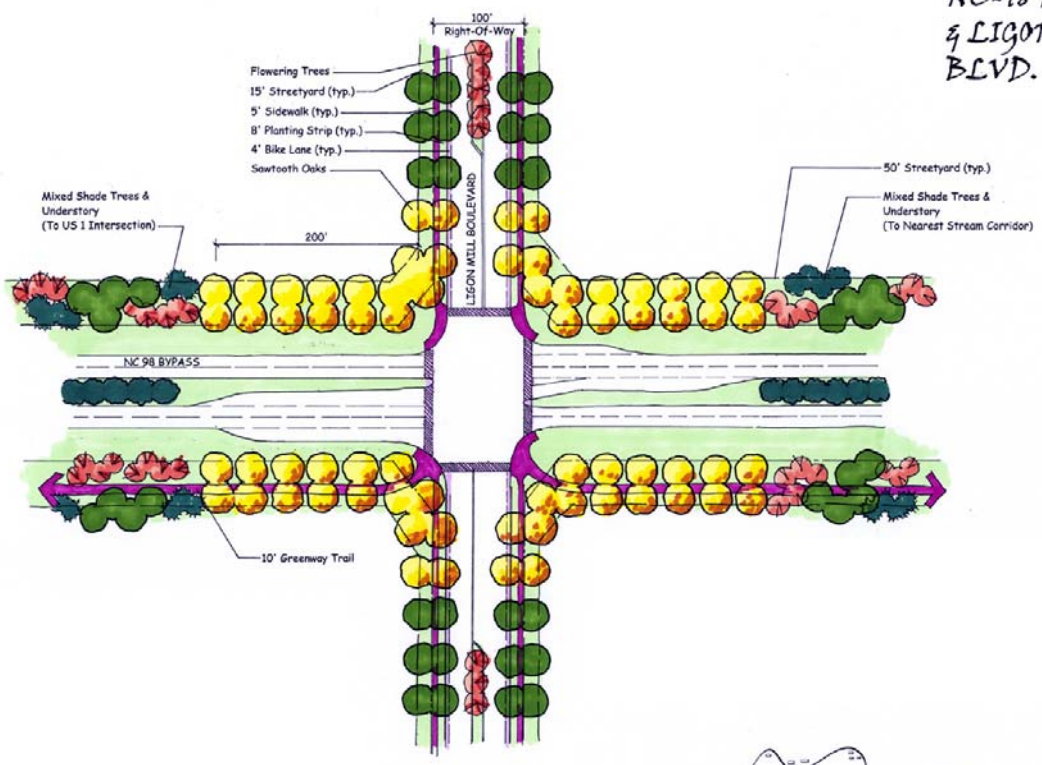
At intersections where there is existing or potential commercial development, double rows of deciduous trees, spaced 50-feet apart, are proposed for a length of approximately 200-feet next to the intersection corner plantings to provide visibility for building facades and signage. Streetyard plantings along commercial centers beyond this visibility zone are a mixture of deciduous shade trees, large evergreens and understory trees.

At intersections where adjacent land uses are not commercial, evergreen trees and large shrubs (primarily Magnolias, Hollies and Osmanthus) are used as a transition between the corner plantings and the Pine Woods Edge.

Within sight triangles at any intersection, plantings should not exceed 2.5 feet in height.

JONES DAIRY RD. & NC 98 INTERSECTION MASTER PLAN
Mark Robinson & Associates
NC 98
Town of Wake Forest
North Carolina
By-pass
WAKE FOREST RESERVOIR
Water Treatment Plant
FLOOD PRONE AREA
Smith Creek
JONES DAIRY ROAD SR 2053
NC 98 BY-PASS
WAIT AVE.
Northern Loop
Apartments
Gateway Forest Plaza Shopping Center
Town Sign
Red Oaks
Crape Myrtle
Magnolia
Willow Oaks
Street Trees
Tulip Poplars
Fine Reforestation
Pine Reforestation
Loading Area
Food Store
Sidewalk
Future Pedestrian Connection to Site
Future Site Access Point
Shopping Center Entrance Plantings
Mixed Evergreen Screen along Parking
Tall Evergreen Screen at Loading Area
Shade Trees Mixed with Flowering & Evergreen Understory Shopping Center Entrance Plantings
Start of Pine Reforestation
Greenway Trail
300
325
330

MAIN ST. TO FRANKLIN ST. & NC 98 INTERSECTIONS MASTER PLAN
Mark Robinson & Associates
NC 98
By-pass
Town of Wake Forest
North Carolina
Commercial
Office
LEGEND
Train Tracks
Intermittent Creeks
Creeks / Streams
Existing Open Space
Flood Zones
Historic Site
Proposed Road With Landscaped Median & Greenway
Pedestrian / Greenway Overpass
Cedrus deodora
Nelly R. Stevens Holly
Magnolias
Reforest / Pines
Osmanthus
Oaks / Maples
Shade Trees
Flowering Trees
Dogwoods
Possible Downtown Expansion Area
Area Suitable for Residential or Non-Residential Development.
Future Development Should Include District Connections Between the Transit Station, Surrounding Land Uses, and Downtown.
SEABOARD AIRLINE RAILROAD
S. MAIN STREET (US-1A)
PINE RIDGE DRIVE
FRANKLIN STREET
SUGAR MAPLE AV
Spring Branch
EXISTING OPEN SPACE
FLOOD PRONE AREA
NC 98 BY-PASS


Mark Robinson & Associates
LANDSCAPE ARCHITECTURE / PLANNING
06 November 2002
Scale: 1" = 60'
NC-98 BY-PASS & LIGON MILL BLVD.
100' Right-Of-Way
Flowering Trees
15' Streetyard (typ.)
5' Sidewalk (typ.)
8' Planting Strip (typ.)
4' Bike Lane (typ.)
Sawtooth Oaks
Mixed Shade Trees & Understory (To US 1 Intersection)
200'
LIGON MILL BOULEVARD
50' Streetyard (typ.)
Mixed Shade Trees & Understory (To Nearest Stream Corridor)
NC 98 BYPASS
10' Greenway Trail
NC 98 By-pass
Town of Wake Forest
North Carolina

Mark Robinson & Associates
LANDSCAPE ARCHITECTURE / PLANNING
LEGEND
Train Tracks
Intermittent Creeks
Creeks / Streams
Existing Open Space
Flood Zones
Historic Site
Magnolias
Reforest / Pines
Osmanthus
Oaks / Maples
Shade Trees
Flowering Trees
Propose Multi-Use Trail On Both Sides Of Road
RELOCATED FALLS OF NEUSE RD. & NC 98 MASTER PLAN
375
381.5
387.5
NC 98 BY-PASS
RELOCATED FALLS OF NEUSE RD.
Propose to Raleigh For Sidewalk Connection w/ Wake Forest's
CITY OF RALEIGH
OLD NC 98
SR 1967
NC 98
By-pass
Town of Wake Forest
North Carolina

MEDIAN PLANTINGS

Plantings of small flowering trees and evergreens are proposed at intervals along the road median, particularly at approaches to intersections and in the area between Main Street and Franklin Street.

FRANKLIN STREET INTERSECTION

A landscaped median is shown for the Franklin Street approaches to NC 98 Bypass. On the north side this median is 12-feet wide and extends from Sugar Maple Avenue to Yellow Poplar Avenue. On the south side this median should be 15-feet wide minimum; its southern extent should be determined in conjunction with development plans for the area.

Mark Robinson & Associates
LANDSCAPE ARCHITECTURE / PLANNING

06 November 2002

Scale: 1" = 5'

0' 2.5' 5' 10'

PROPOSE LAYOUT OF FRANKLIN STREET

FRANKLIN STREET BETWEEN EXISTING PAVEMENT TO NC-98 BY-PASS (90' ROW)

NC 98 By-pass

Town of Wake Forest
North Carolina

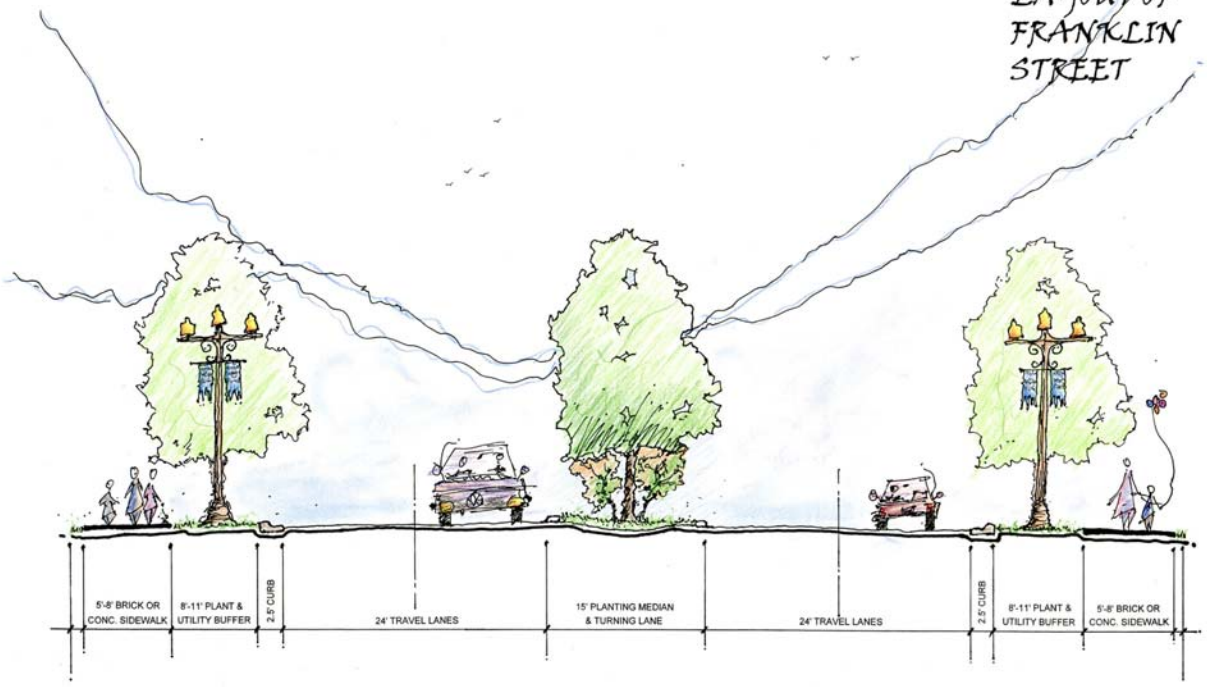
Mark Robinson & Associates
LANDSCAPE ARCHITECTURE / PLANNING

08 November 2002

Scale: 1" = 5'

0 2.5' 5' 10'

PROPOSE LAYOUT OF FRANKLIN STREET



FRANKLIN STREET SOUTH OF
NC-98 BY-PASS (100' ROW)

NC 98 By-pass

Town of Wake Forest
North Carolina

PEDESTRIAN AND BICYCLE CIRCULATION

PEDESTRIAN/BICYCLE TRAILS

A 10-foot wide paved trail should be provided along each side of Bypass, between the Richland Creek greenway corridor and the eastern end of the Bypass. There should be frequent connections to the sidewalk systems in the adjacent neighborhoods, to the Town's Richland Creek greenway system as a whole and to the Neuse River greenway. On the south side of the Bypass this trail should typically be located within the 50-foot streetyards adjacent to the NCDOT right-of-way in a greenway easement. Where highway cut or fill slopes extend beyond the right-of-way, the trail should be located in a 25-foot wide greenway easement beside the outer edges of these slopes.

The trail should be set back from the right-of-way, where feasible, at least 25-feet to 30-feet, more if possible. Most of the streetscape plantings should be between the trail and the highway. A dense evergreen planting should be used where the trail is only 20-25-feet from the right-of-way.

North of the Bypass, existing development adjacent to the roadway necessitates deviation from the typical trail alignment next to the highway along much of the route. In these situations the trail follows nearby greenway corridors and existing sidewalk systems.

Greenway trail is proposed along NC 98 west of Falls of Neuse Road/NC 98 Business to connect to the Falls Lake area and neighborhoods to the west. Multi-use trail (8-10-foot sidewalk within the road right-of-way) is proposed along NC 98 Business, starting at its western end at the Falls of Neuse Intersection, continuing past Crenshaw Manor and transitioning to sidewalks in the shopping center area. Curb and gutter is needed along this stretch of roadway to accommodate the multi-use trail.

A trail connection to Richland Creek greenway is proposed from the southeastern corner of Crenshaw Manor and the adjacent commercial area, via a pedestrian underpass under the Bypass just west of US 1.

The Town will need to work with Raleigh to develop a trail along the south side of the Bypass between Falls of Neuse Road/98 Business and the western Richland Creek trail connection, since this area is in Raleigh's jurisdiction.

TRAIL CROSSINGS

Pedestrian crossings of NC 98 Bypass should only occur at signalized intersections and, most safely, at grade-separated crossings. On grade crossings should be provided at all signalized intersections. Signal lights should provide protected pedestrian crossing times, with signage requiring traffic turning right on red to give way to pedestrians. Refuge areas should be provided in the median for pedestrians who cannot make it all the way across the road in one light cycle.

Grade separated crossings should be considered at major road intersections and main greenway connections. Pedestrian underpasses are proposed next to stream crossings at Smith Creek, at Dunn Creek (between Jones Dairy Road and Franklin Street), at the stream west of Siena Drive and at the stream just west of US 1. There is ample room under the highway bridge for a trail crossing next to Richland Creek. Grade separated crossings at Main Street and Franklin Street would need to be elevated due to topography and would therefore be costly and less likely to be used. The Main Street sidewalk currently is used heavily by middle school students and neighborhood residents. A trail under the 98 Bypass bridge, located between the railroad right-of-way and the bridge abutment would provide a grade separated alternative to on-grade crosswalks at Main Street.

A grade separated crossing at Franklin Street would be difficult and costly to achieve due to topography. Highway construction was too far along at the time of this plan to add a pedestrian underpass at the Spring Branch culvert.

If the underpass west of Siena Drive and/or west of US 1 cannot be built, a pedestrian overpass bridge should be considered in the area of each of these crossings where topography permits.

RAILROAD CROSSINGS

A pedestrian bridge crossing is needed at the NC 98 Bypass railroad crossing because the highway bridge over the railroad does not include sidewalks. This would be accomplished most easily just north of the bridge where the rail line is below the adjacent grades on both sides. North/south connector trails are needed under the highway bridge on each side of the railroad to provide access to the railroad crossing from both the northern and southern trails.

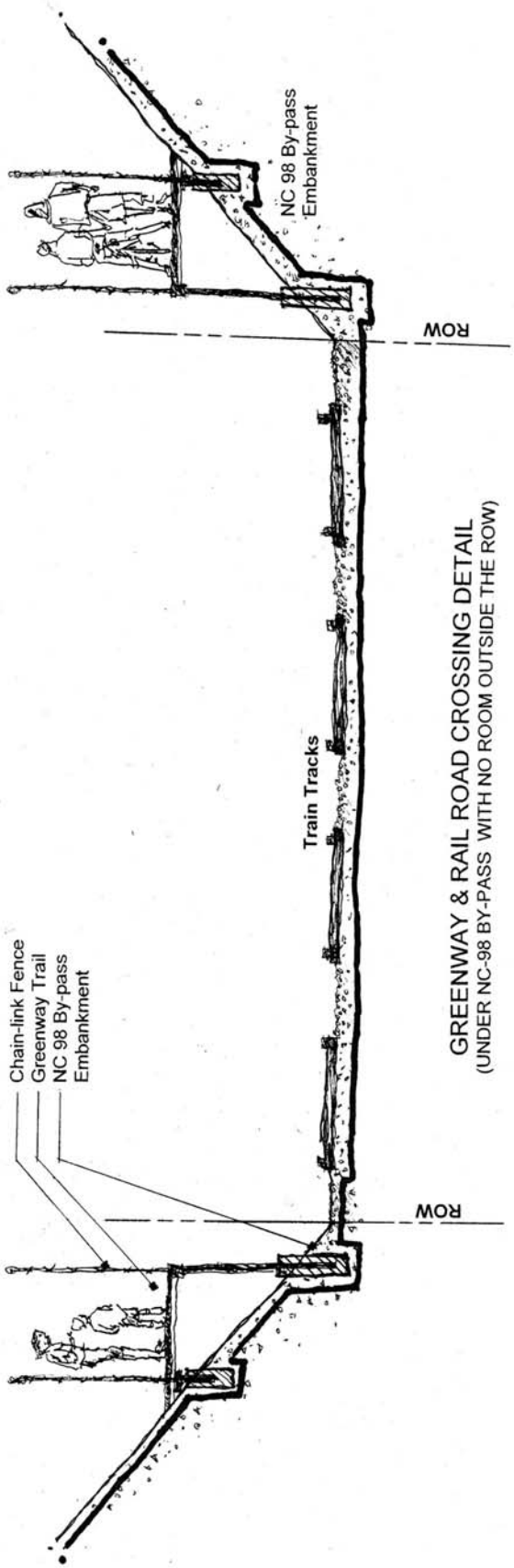
A vehicular and pedestrian grade separated crossing is needed to provide a safe crossing of the railroad in the southern area of downtown. West Holding Avenue, with sidewalks on both sides, should be extended to Main Street, with an underpass at the railroad. The existing on-grade railroad crossing on East Holding Avenue should be closed.

TRAIL CONNECTIONS TO 98 BYPASS CORRIDOR

This plan recommends development of a connector trail between downtown Wake Forest and the potential downtown expansion area south of the Bypass, with access to a potential transit stop along the rail line. This trail would use the underpass next to the railroad to cross the Bypass. It could serve as the spine for pedestrian based development and/or recreation in the area east of the railroad.

All new roads in the NC 98 Bypass Corridor should have sidewalk on at least one side. All collector roads should have sidewalk on both sides. Add sidewalks to both sides of major collector roads where they do not currently exist.

GREENWAY & RAIL ROAD CROSSING DETAIL
(UNDER NC-98 BY-PASS)
6 Ft. to 8 Ft. High
Chain-link Fence
NC 98 By-pass
Embankment
4 Ft. to 8 Ft.
Depending on space available
Distance Varies



GREENWAY & RAIL ROAD CROSSING DETAIL
(UNDER NC-98 BY-PASS WITH NO ROOM OUTSIDE THE ROW)

VEHICULAR CIRCULATION

VEHICULAR ACCESS TO BYPASS

The following roads are expected to have signalized intersections along NC 98 Bypass:

- Falls of Neuse Road/Business 98
- US 1 Interchange plus service roads on each side
- Ligon Mill Boulevard (future)
- Main Street
- Franklin Street
- Heritage Lake Road (future)
- Jones Dairy Road/Business 98/Northern Loop

Siena Drive will also access 98 Bypass but is not planned to be signalized. Any additional access roads will be limited to right on/right off access to NC 98 Bypass and are strongly discouraged.

EAST/WEST ROAD CONNECTIONS

East-west road connections are proposed within neighborhoods north and south of the Bypass to provide access to signalized intersections and to provide alternative routes for local travel. The following connections should be developed:

North of the Bypass:

- Eastern US 1 Service Road to Ligon Mill Boulevard
- West Holding Avenue – extend west to Ligon Mill Boulevard; extend east to Main Street (aligned with Dunn Avenue) with underpass at railroad. Close existing on-grade railroad crossing on current E. Holding Avenue.

South of the Bypass:

- Extend Forbes Road west to Ligon Mill Boulevard and Capital Boulevard
- Extend Amherst Creek Drive west to Ligon Mill Boulevard
- Extend Friendship Chapel Road east to Franklin Street extension
- Future connections will also be needed between Franklin Street, Heritage Lake Road and Jones Dairy Road when this area is developed.

DEVELOPMENT ALONG CORRIDOR - DESIGN GUIDELINES

COMMERCIAL/BUSINESS DEVELOPMENTS

Business development along NC 98 Bypass should be smaller in scale and more oriented to the community than the "big box" regional centers along US 1. Individual buildings should be limited to 60,000 SF maximum except in the US 1 interchange area. Main entrances and building "fronts" should be oriented towards connector streets rather than NC 98 Bypass.

SCREENING OF PARKING

Views of parking along NC 98 Bypass should be minimized. Parking areas along major collector roads should be screened using conventional methods.

PARKING SCREENING: PINE WOODS EDGE AREAS

At least 80% of any parking potentially visible from NC 98 Bypass should be screened from view using structural elements, topographical features, and plants to achieve this screening. Dense evergreens such as Southern Magnolias, Hollies or Red Cedars, closely spaced and tall enough at maturity to completely obscure views of parked cars, are examples of plant types suitable to achieve this screening.

PARKING SCREENING: INTERSECTION AREAS

Locate parking in sideyards or rear yards and behind the line of the front building façade wherever possible. Screen parking with a 4-foot high evergreen hedge along all perimeters visible from a public road. Along NC 98 Bypass it is strongly preferred that there be no more than one bay of parking located between the streetyard and a building façade. Six square feet of landscape area per linear foot of building façade is required between the façade and parking where parking is located between streetyard and façade of building. Each landscape area shall be at least 6-feet wide and 100 square feet in area. Provide at least 300 square feet of landscape area with a 10-foot minimum width for each shade tree planted in this area.

If more than one bay of parking is located between the NC 98 Bypass streetyard and a building, 20-foot wide landscape islands, with a mix of trees and tall shrubs at least 60% evergreen, must be provided between the first and second parking bays and between each two additional bays. Parking bays should be parallel to NC 98 Bypass wherever site conditions permit.

NC 98 BYPASS BUILDING FACADES

It is preferable that building walls facing NC 98 or another public street be enlivened by windows, public entrances and/or other architectural features. Long unarticulated building walls should be screened by having at least 50% of the wall area masked by plantings. The mixture of plants should include trees and shrubs, evergreen and deciduous.

SCREENING OF OUTDOOR STORAGE, SERVICE AND LOADING AREAS

These site elements should be screened from view from all public roads and adjacent properties by buildings, solid walls combined with vegetation, or evergreen plantings with a mature height sufficient to hide the total vertical extent of the element to be screened.

MASTER PLAN PROCESS

In March 2002, the Town of Wake Forest retained Mark Robinson & Associates to prepare a master plan for the NC 98 Bypass Corridor. The plan was to address road corridor appearance, pedestrian and bicycle circulation, vehicular access management and landscape standards.

The design team inventoried existing and proposed conditions of the corridor area, using roadway plans provided by NCDOT and County GIS for base information, supplemented by field investigation and information from the Town of Wake Forest Planning Department. Applicable portions of the Town's 2001 Greenway and Open Space Plan and the Thoroughfare Plan (in progress) were incorporated into the inventory and analysis of the NC 98 Bypass Corridor.

Inventory and analysis maps were presented to the Town at a Public Forum on September 12, 2002, in conjunction with Kimley Horn's Thoroughfare Plan presentation.

A preliminary master plan of the corridor was presented to a Public Forum on November 8, 2002. The response to the plan was very positive. The concerns expressed mainly related to the impact of the roadway on adjacent residents, particularly in the Deacon's Ridge and Crenshaw Manor subdivisions. These concerns related both to safety and to screening; residents requested visual and sound screening and physical barriers such as fences or walls. There was also interest in providing pedestrian connections across the Bypass, particularly underpasses at stream crossings.

The design team met with Chip Russell, Planning Director for the Town, to refine the Master Plan and address concerns raised in the Public Forum.

The Master Plan was presented at a Public Hearing during the Planning Department's meeting on August 5, 2003. The Planning Board recommended the plan to the Board of Commissioners for approval. The Board of Commissioners approved the Master Plan at their August 19, 2003 meeting.

TABLE OF STREETYARD WIDTHS AND PLANTINGS

NC 98 Bypass: Pine Woods Edge – Non-Residential

Streetyard Width:	50-foot average width (35-foot min./75-foot max.)
Street Tree Plantings:	Loblolly Pines: 10 trees/100 LF, random spaced (8-ft. min. o.c./30-ft. max. o.c.) Understory: 6 trees/100 LF
Alternate Planting: (Where greenway trail is 20-25-feet from ROW)	Evergreen screen of Osmanthus, Nellie Stevens or Greenleaf Hollies, Red Cedars, Magnolias or similar 12-foot on center (8 trees/100 LF)

NC 98 Bypass: Residential Zones

Streetyard Width:	50-foot average width (35-foot min./75-foot max.)
Street Tree Plantings:	Loblolly Pines: 10 trees/100 LF, random spaced (8-ft. min. o.c./30-ft. max. o.c.) Understory: 3 trees/100 LF Evergreen trees/large shrubs 8/100 LF
Highway Slope Revegetation: (for cut & fill slopes beyond the standard 50' streetyard width)	1 Pine/500 SF 1 Understory Tree/1000 SF See Deacon's Ridge Steep Slope Buffer Drawing for slopes along Deacon's Ridge subdivision

NC 98 Bypass: Intersection Areas

Streetyard Width:	50-foot average width (35-foot min./75-foot max.)
Street Tree Plantings:	See Individual Intersection plans. Single rows of street trees: 40-ft. o.c. Double rows of street trees: 50-ft. o.c. Magnolias/Hollies, etc.: 15-ft. o.c. Flowering Trees: 15-ft. o.c.
Commercial Streetscapes Adjacent to Intersections:	Mix of: Deciduous Shade Trees: 4/100 LF Evergreen Trees (excluding Pines): 3/100 LF Understory Trees: 4/100 LF Spaced randomly.

Featured Tree Varieties at Intersections

Intersection	Trees
Falls of Neuse Road/98 Business W.	Red Oaks/Maples
US 1	See US 1 Corridor Plan (Shumard or Nuttall Oaks)
Ligon Mill Boulevard	Sawtooth Oaks (Quercus acutissima)
Main Street (US 1A)	Red Oaks/Maples/Magnolias
Franklin Street	Deodar Cedar/Red Oaks/Maples
Heritage Lake Road (future)	To be determined
Jones Dairy Road/98 Business E.	Tulip Poplar

RECOMMENDED SHADE TREES, TALL EVERGREEN SCREENING & UNDERSTORY TREES FOR NC 98 BYPASS STREETSCAPE PLANTINGS

LARGE TREES

Botanical Name	Common Name
Acer rubrum	Red Maple
▪ Use 'October Glory' or 'Red Sunset' where Red Maples are feature trees.	
Acer saccharum 'Legacy'	Legacy Sugar Maple
Cedrus deodara *	Deodar Cedar
Betula nigra	River Birch
Ginkgo biloba	Ginkgo
Liquidambar styraciflua 'Rotundiloba'	Round-Lobed Sweetgum
Magnolia grandiflora *	Southern Magnolia
Platanus occidentalis	Sycamore
Quercus acutissima	Sawtooth Oak
Quercus nuttallii	Nuttall Oak (Red Oak family)
Quercus phellos	Willow Oak
Quercus shumardii	Shumard Oak (Red Oak family)
Ulmus parvifolia	Chinese Elm
Zelkova serrata	Japanese Zelkova

* Evergreen

TALL EVERGREEN SCREENING

Cryptomeria japonica 'Yoshino'	Yoshino Japanese Cedar
Cupressocyparis x leylandii	Leyland Cypress
Ilex x 'Greenleaf'	Greenleaf Holly
Ilex 'Nellie R. Stevens'	Nellie R. Stevens Holly & similar
▪ & similar cultivars	
Juniperus virginiana	Red Cedar
Magnolia grandiflora	Southern Magnolia
Myrica cerifera	Wax Myrtle
Osmanthus x fortuneii	Fortune's Osmanthus
Osmanthus heterophyllus	Holly Osmanthus

UNDERSTORY TREES

Acer buergerianum	Trident Maple
Carpinus caroliniana	American Hornbeam
Cercis canadensis	Redbud
Lagerstroemia cultivars	Crape Myrtle
Ostrya virginiana	American Hophornbeam
Prunus x Okame	Okame Cherry
Prunus x Yedoensis	Yoshino Cherry
Prunus serrulata 'Kwanzan'	Kwanzan Cherry
Viburnum prunifolium	Blackhaw Viburnum

Plus any of the trees on the evergreen list.

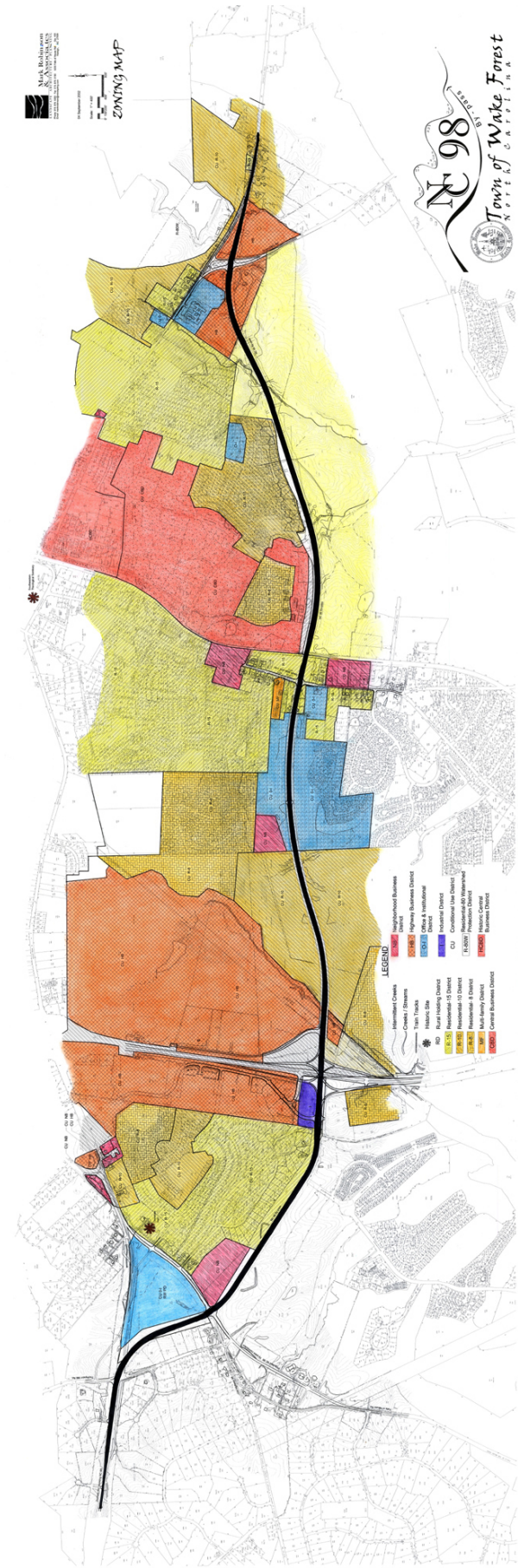
APPENDIX:

INVENTORY & ANALYSIS DRAWINGS

- SUMMARY OF ANALYSIS
- ROAD NETWORK
- ZONING MAP
- OPEN SPACE, FLOOD ZONE & GREENWAY MAP
- AREAS WHERE ADDITIONAL 25' IS NEEDED

PRELIMINARY MASTER PLAN

NC 98
BY-PASS
Town of Wake Forest
NORTH CAROLINA
ROAD NETWORK
LEGEND
National Highway
Main Thoroughfare
Proposed Main Thoroughfare
Collector Road
Proposed Collector Road
Neighborhood Road
Intermittent Creeks
Creeks / Streams
Town Parks
Open Space
Historic Site


ZONING MAP
NC 98
Town of Wake Forest
North Carolina
LEGEND

OPEN SPACE, FLOOD ZONE, & GREENWAY
NC 98
Town of Wake Forest
LEGEND

NC 98 BYPASS
Town of Wake Forest
NORTH CAROLINA
AREAS WHERE ADDITIONAL 25' IS NEEDED
LEGEND
Recommend 25' Extension Area
Train Tracks
Intermittent Creeks
Creeks / Streams
Existing Open Space
Flood Zones
Historic Site
Proposed Road With Landscaped Medians & Greenway

SUMMARY OF ANALYSIS
Major Node / Town Entrance
LIGHT & NOISE
NC 98 By-pass
Town of Wake Forest
North Carolina
LEGEND

PRELIMINARY
MASTER PLAN
NC 98
Town of Wake Forest
NORTH CAROLINA
LEGEND

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