SECTION 2

ALTERNATIVES CONSIDERED

Five broad-ranged alternatives were established for consideration on this project. These alternatives include: a No-Build Alternative, a Transportation System Management Alternative, a Mass Transit Alternative, an Upgrade Existing Facilities Alternative, and a Build Alternative involving the construction of a roadway on new location. Each broad-ranged alternative could be comprised of several components or sub-alternatives. This chapter presents the range of alternatives considered for the project, a discussion of the alternatives eliminated from further consideration, the alternatives selected for detailed study, and finally, the preferred alternative selected for the project.

As noted in Section 1, planning studies and alternatives development for this project began in 1993. Between 1993 and 1998, NCDOT officials evaluated the need for improvements in the area and analyzed a number of potential new locations for a bypass corridor. Collectively, these corridors comprised the broad-ranged Build Alternatives. Three preliminary corridors were evaluated by the project's agency Steering Committee in January 1994 and presented to the public in March 1994. Between 1994 and 1997, a fourth corridor was added for study. However, following the introduction of the interagency NEPA/404 Merger Process (see Section 7.1.2 for a description of this process), all previously studied corridors were reevaluated and additional corridors were developed. In addition, the broad-ranged Upgrade Existing Facilities Alternative, Transportation Systems Management Alternative, and Mass Transit Alternative were reevaluated.

2.1 NO-BUILD ALTERNATIVE

The No-Build Alternative provides no substantial improvements to Memorial Drive (NC 11) or Stantonsburg Road (US 264 Business) through the year 2030, with the exception of regular maintenance such as patching and resurfacing, regrading shoulders, and maintaining ditches. The No-Build Alternative would incur neither right of way nor substantial construction costs. There would be no long-term disruptions during construction. There would be no impacts to streams, wetlands, or other natural and cultural resources, nor would there be any residential or business relocations.

All other planned TIP and city projects would be constructed (see Section 1.8). Currently there is one project proposed in the TIP in the project study area: widening Fire Tower Road (SR 1130) to five lanes east of Memorial Drive (TIP No. U-3613). A second project, widening and extending Arlington Boulevard to NC 43/West Fifth Street (TIP No. U-4737), was recently completed.

As shown in Table 1-5, in the year 2004, seven intersections along Memorial Drive were at capacity (LOS E) or over capacity (LOS F). These intersections include Jolly Road (SR 1120),

Reedy Branch Road (SR 1131), Fire Tower Road (SR 1130), Greenville Boulevard (US 264ALT), Arlington Boulevard, and Stantonsburg Road. With the exceptions of Reedy Branch Road and Jolly Road, all of these intersections are signalized. The intersections of Arlington Boulevard and Allen Road (SR 1203) with Stantonsburg Road were also at or over capacity in 2004. With no improvements along the existing routes and no new routes for the future traffic, all of the existing signalized intersections along Memorial Drive will be over capacity by the year 2030.

As discussed in Chapter 1 and above, the No-Build Alternative would not meet the project's purpose and need; however, in accordance with the NCEPA, the No-Build Alternative was given full consideration to provide a baseline for comparison with the Build Alternative.

2.2 TRANSPORTATION SYSTEMS MANAGEMENT ALTERNATIVE

The Transportation Systems Management (TSM) Alternative includes limited construction activities designed to maximize the traffic flow and efficiency of the present transportation system. There are two main types of TSM roadway improvements: operational and physical. Examples of these improvements include:

Operational Improvements

- Traffic law enforcement
- Turn prohibitions
- Access control
- Speed Restrictions
- Signal coordination
- Signal phasing or timing changes

Physical Improvements

- Addition of turn lanes
- Intersection realignment
- Improved warning and information signs
- New signals or stop signs
- Intersection geometric and signalization improvements
- High-occupancy vehicle (HOV) lanes

The TSM roadway improvements typically are effective in solving site-specific capacity and safety deficiencies in urban areas. However, these enhancements would not improve the level of service at the intersections or along the existing roadway network enough to make a substantial difference. Capacity problems at many of the existing intersections are due to through volumes that exceed the theoretical capacities of the roadways. In order to provide any improvement in the traffic congestion on Memorial Drive (NC 11) and Stantonsburg Road (US 264 Business), additional through lanes are needed. High-occupancy vehicle (HOV) lanes are typically utilized for urbanized areas with a population over 200,000. Since Greenville's population lies below this threshold, HOV lanes and the other TSM measures would not adequately address the needs of the project and have been eliminated from further consideration.

2.3 MASS TRANSIT ALTERNATIVE

The Mass Transit Alternative includes options such as expanding the existing bus service, implementing a light rail or fixed guideway system, or a regional rail service so that the number of vehicles and subsequent congestion on local roads would be decreased. Ayden and Winterville do not have bus or rail services. The Greenville Area Transit System (GREAT) provides radial bus service along four routes throughout portions of the Greenville urban area. Two of the four bus routes serve sections of Memorial Drive (NC 11) and Stantonsburg Road (US 264 Business); however, because GREAT is a city bus service only, it does not serve Ayden, Winterville, or the surrounding area in southwest Pitt County. In addition, mass transit has been shown typically to serve low percentages (less than 5 percent on average) of person trips. Given the need to reduce trips by more than 50 percent to reach a LOS D by 2030, mass transit measures alone would not remove enough trips to alleviate congestion on Memorial Drive.

Mass transit operations are compared to other forms of travel by evaluating the number of times people use mass transit for traveling to work, shopping, schools, etc. rather than using private automobiles. Based on the city of Greenville's *Greenville Area Transit Report*, the existing bus service in Greenville serves an average of 600 trips per day. Even with expanded bus services to the project area, this alternative would not address adequately the purpose and need for the project.

There are several large employment centers in Greenville, two of which are the Pitt County Memorial Hospital within the project area and East Carolina University east of the project area. However, due to the rural nature of the project area there are no concentrated communities to generate enough mass transit trips to these employment centers. In addition, the people traveling through the area on Memorial Drive (NC 11) would not be served by either an expansion of the local bus services or a rail transit service. This traffic would remain on existing Memorial Drive contributing to the congestion instead of relieving the congestion as stated in the purpose and need for the project.

The FHWA considers urbanized areas with populations greater than 200,000 as areas where Mass Transit Alternatives should be considered (FHWA Technical Advisory T 6640.8A: p.15). As discussed in Section 1, Pitt County's existing and projected population is below 200,000 people and therefore not populated enough to consider mass transit solutions in lieu of roadway infrastructure improvements. For this and the reasons noted above, the Mass Transit Alternative was eliminated from further consideration.

2.4 BUILD ALTERNATIVES AND UPGRADE EXISTING FACILITIES ALTERNATIVE

The Greenville Southwest Bypass Build Alternative includes constructing a new roadway from Memorial Drive (NC 11) in the vicinity of NC 102, continuing northwest to connect with the existing US 264/Stantonsburg Road (US 264 Business) interchange. The bypass is proposed as a four-lane median divided freeway with controlled-access, a design speed of 70 miles per hour,

and a posted speed limit of 65 miles per hour. Grade separations would be constructed at the minor road crossings and grade separations with interchanges at the major road crossings. Interchanges were proposed at NC 102, NC 903, Forlines Road (SR 1126), US 264ALT/US 13, and US 264 for all scenarios. Several bypass alternates have been considered for the project, all of which would meet the purpose and need of the project by removing up to 50 percent of traffic from Memorial Drive and Stantonsburg Road, thereby easing congestion on those routes.

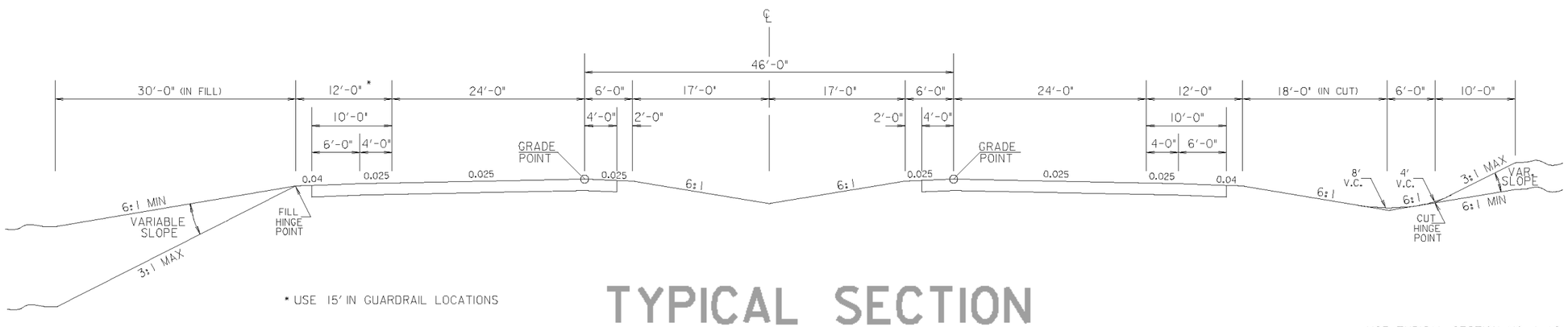
2.4.1 Design Criteria and Typical Sections

Design criteria and typical sections were established for the proposed highway facility based on existing (2004) and projected travel demand (2030) along the facility and the long-range vision for NC 11 defined by NCDOT Strategic Highway Corridors. Design guidelines were based on desirable roadway standards from the American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets (2001) and the NCDOT Roadway Design Standards Manual*. Design criteria for the build alternates are listed in Table 2-1. The selected alternative will be designed for right-of-way and letting using the 2004 version of - *A Policy on Geometric Design of Highways and Streets.*

The design criteria and typical roadway cross-section are influenced by the type of facility required to fulfill the project's purpose and need. To maintain at least a LOS D with 2030 design year traffic forecasts, the proposed facility requires at least four travel lanes (two in each direction). Therefore, the primary roadway typical section for this project has four 12-foot lanes with a 46-foot median and 4-foot inside and 10-foot outside paved shoulders. The design speed for the road is 70 mph, which will accommodate posted speed limits of 65 mph. The proposed typical sections are presented in Figure 2-1.

TABLE 2-1: BUILD ALTERNATIVE DESIGN CRITERIA

Factor	Area Used	Criteria
Functional Classification	Entire Length of Project	Freeway
Terrain	Entire Length of Project	Level
Design Speed	Freeway Two-Lane Flyover Ramp Loop	70 MPH 60 MPH 50 MPH desirable, 40 MPH minimum 30 MPH desirable, 25 MPH minimum
Right of Way Width	Entire Length of Project	250 feet minimum
Maximum Horizontal Curvature	Freeway Two-Lane Flyover Ramp Loop	1,637 feet minimum radius 1,206 feet minimum 760 feet minimum 250 feet minimum
Maximum Grade	Freeway Two-Lane Flyover Ramp Loop	3% maximum 5% maximum 5% maximum 7% maximum
Number of Lanes	Freeway	4 Lanes
Lane Width	Freeway Two-Lane Flyover Ramp-One Lane	12 feet 12 feet 14 feet



* USE 15' IN GUARDRAIL LOCATIONS

TYPICAL SECTION

USE TYPICAL SECTION NO. 1 AS FOLLOWS:
GREENVILLE SOUTHWEST BYPASS

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Figure 2-1

Build Alternate Typical Section

	Loop Ramp	18 feet typical (varies with design)
Shoulder Width	Freeway	12 feet - 10 feet paved outside 12 feet - 4 feet paved inside
Median Width	Freeway	46 feet
Maximum Superelevation	Freeway Other	0.10 ft./ft. 0.08 ft./ft.
Stopping Sight Distance	Freeway	Current AASHTO Standards
Length of Vertical Curve	Freeway	Current AASHTO Standards
Cross Slopes (Normal Sect.)	Freeway	1/4”/foot (2%)
Vertical Clearance	Freeway	16.5 feet min. over Interstates and Arterials 15.0 feet min. over Local and Collector Roads. 23.0 feet min. over Railroad

2.4.2 Evaluation of Preliminary Corridors

The preliminary study corridors were evaluated for impacts to human, environmental, and cultural resources using conceptual construction limits (plus an additional 10 feet for potential clearing impacts) to begin the selection of alternatives for detailed studies. Preliminary impacts were assessed for the following resources:

- Number of relocations (residential and commercial),
- Number of stream crossings and linear feet of stream impacts,
- Acreage of riparian buffer impacts,
- Acreage of wetland impacts,
- Length of corridor on new location,
- Historic resource impacts, and
- Number of new interchanges.

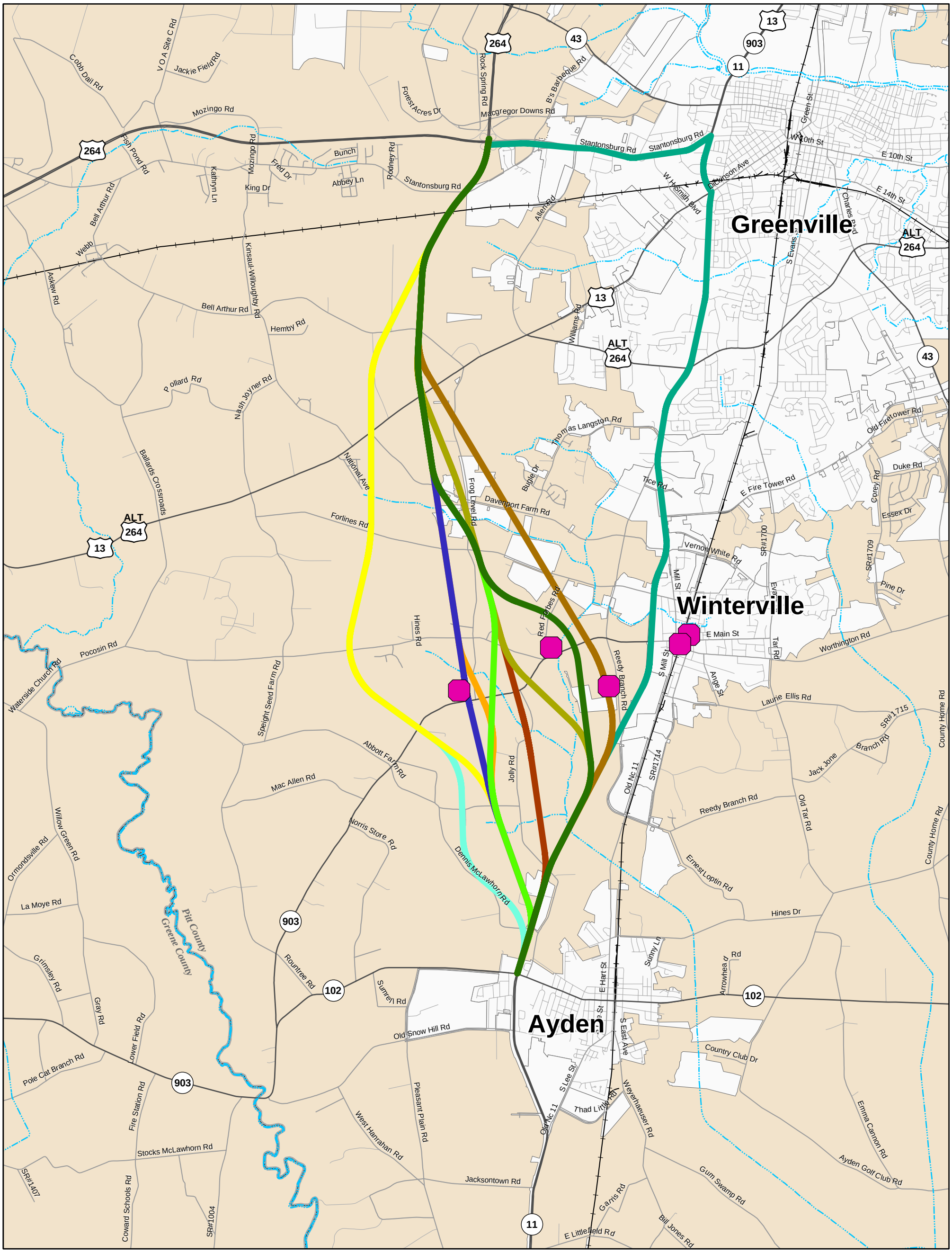
In considering preliminary impacts, planning and design objectives included:

- Avoiding residential housing, businesses, and public meeting places such as churches;
- Avoiding properties on or eligible for the National Register of Historic Places, where feasible; and
- Avoiding and minimizing impacts to wetlands, streams, and other natural resources.

2.4.2.1. Description of Preliminary Corridors

Nine preliminary corridors (1, 1A, 1B, 2, 3, 3A, 3B, 4, and 4A) on new location were developed for the project to determine the best location for a bypass on the southwest side of Greenville. Original corridors (1, 1A, 1B, 2, and 3) were developed in 1996 by NCDOT. Corridors 3A, 3B, 4, and 4A were added by NCDOT in 2001 to update the project for planned or newly-constructed residential developments in the study area. Figure 2-2 shows the locations of these preliminary corridors.

Corridor locations varied to avoid and minimize impacts to natural and cultural resources, where possible. All nine corridors followed the same location for approximately 1.3 miles south of the



Legend

- 1
- 1A
- 1B
- 2
- 3
- 3A
- 3B
- 4
- 4A
- Upgrade Existing
- Historic Property

N
W E
S

0 0.5 1 2 Miles

North Carolina
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Figure 2-2 **Preliminary Corridors Considered in 2001**

northern terminus at the existing US 264 interchange. This 1.3-mile corridor crosses the Norfolk Southern Railroad, avoids the Pitt County Landfill, and connects with the existing US 264 interchange. The corridors are described as follows:

- Corridor 1: follows existing Memorial Drive (NC 11) from NC 102 approximately 0.9 miles and then turns northwest on new location crossing several tributaries to Swift Creek. Corridor 1 crosses Abbot Farm Road (SR 1117) approximately 0.3 miles west of Jolly Road (SR 1120). Corridor 1 continues north crossing NC 903. From NC 903 to Dickinson Avenue (US 13), Corridor 1 extends north, almost parallel with Frog Level Road (SR 1127) to the west, crossing Pocosin Road (SR 1125) and Forlines Road (SR 1126). Corridor 1 then continues across Dickinson Avenue, crossing Old Stantonsburg Road (SR 1200), to connect with the existing US 264 interchange. Corridor 1 is 9.5 miles long with 8.6 miles on new location and includes four new interchanges located at Memorial Drive, NC 903, Davenport Farm Road (SR 1128), and Dickinson Avenue.

- Corridor 1A: follows Corridor 1 from NC 102 to just south of Abbott Farm Road (SR 1117). From this location, Corridor 1A extends east of Corridor 1 crossing NC 903, Pocosin Road (SR 1125), and Forlines Road (SR 1126). Corridor 1A is approximately 0.4 miles east of Corridor 1 at the Pocosin Road crossing. Corridor 1A continues northwest crossing Frog Level Road (SR 1127) and connects with Corridor 1, just north of Davenport Farm Road (SR 1128). Corridor 1A continues along Corridor 1 to connect with the existing interchange at US 264. Corridor 1A is approximately 9.6 miles long with 8.7 miles on new location. Corridor 1A includes four new interchanges located at NC 11, NC 903, Davenport Farm Road, and Dickinson Avenue (US 13).

- Corridor 1B: follows Corridor 1 from NC 102 to just south of Abbott Farm Road (SR 1117). Corridor 1B turns northwest across NC 903 and Frog Level Road (SR 1127) to connect back with Corridor 1 at Pocosin Road (SR 1125). From Pocosin Road, Corridor 1B follows Corridor 1 to the northern terminus of the project at the existing US 264 interchange. Corridor 1B was developed to avoid the Charles McLawhorn Historic Property on NC 903. Corridor 1B is approximately 9.5 miles long with 8.6 miles on new location. Corridor 1B includes four new interchanges located at NC 11, NC 903, Davenport Farm Road (SR 1128), and Dickinson Avenue (US 13).

- Corridor 2: follows existing Memorial Drive (NC 11) from NC 102 to just south of Jolly Road (SR 1120). From Memorial Drive, Corridor 2 turns northwest crossing several tributaries to Swift Creek and Jolly Road. The corridor crosses Jolly Road a second time, approximately 0.5 miles before crossing NC 903. From NC 903, the corridor continues northwest crossing Pocosin Road (SR 1125), Forlines Road (SR 1126), Frog Level Road (SR 1127), and Davenport Farm Road (SR 1128). Corridor 2 extends northwest from Davenport Farm Road to connect with Corridor 1 near Dickinson Avenue (US 13/US 264ALT). The corridor continues along Corridor 1 until the northern

- terminus at the existing US 264 interchange. Corridor 2 is approximately 9.6 miles long with 8.2 miles on new location. Corridor 2 includes four new interchanges located at NC 11, NC 903, Davenport Farm Road, and Dickinson Avenue.

- Corridor 3: follows existing Memorial Drive (NC 11) from NC 102 for approximately 3.0 miles and turns northwest just south of the Reedy Branch Road (SR 1131) and Memorial Drive intersection. The corridor continues northwest crossing NC 903, Swift Creek, Red Forbes Drive (SR 2016), Forlines Road (SR 1126), Davenport Farm Road (SR 1128), Frog Level Road (SR 1127), and Dickinson Avenue (US 13) before connecting with Corridor 1. Corridor 3 continues along Corridor 1 to the northern project terminus at the existing US 264 interchange. Corridor 3 is approximately 10.1 miles long with approximately 7.1 miles on new location. Corridor 3 includes four new interchanges located at NC 11, NC 903, Davenport Farm Road, and Dickinson Avenue.

- Corridor 3A: follows existing Memorial Drive (NC 11) from NC 102 for approximately 2.5 miles. This corridor turns northwest crossing Swift Creek and NC 903 before connecting with Corridor 2 or Corridor 1A. Corridor 3A was evaluated following both Corridors 2 and 1A to the northern terminus at the existing US 264 interchange. Both corridor combinations with Corridor 3A are approximately 10.0 miles long with 7.4 miles on new location. Four new interchanges are located along these corridors at NC 11, NC 903, Davenport Farm Road (SR 1128), and Dickinson Avenue (US 13).

- Corridor 3B: follows existing Memorial Drive (NC 11) from NC 102 for approximately 2.4 miles. This corridor turns northwest at this location, and extends north, parallel to Swift Creek, crossing NC 903, Swift Creek, and Red Forbes Drive (SR 2016). Corridor 3B continues west to connect with Corridor 1A or Corridor 2 just southeast of the Forlines Road (SR 1126) and Frog Level Road (SR 1127) intersection. Corridor 3B was evaluated following both Corridors 1A and 2 to the northern terminus at the existing US 264 interchange. Both combinations with Corridor 3B are approximately 10.1 miles long with 7.4 miles on new location. Four new interchanges are located along these corridors at NC 11, NC 903, Davenport Farm Road (SR 1128), and Dickinson Avenue (US 13).

- Corridor 4: follows existing Memorial Drive (NC 11) approximately 0.9 miles from NC 102 and turns north following Corridor 1 until Abbott Farm Road (SR 1117). From the crossing of Abbott Farm Road, Corridor 4 turns northwest of Corridor 1 crossing NC 903 west of the Charles McLawhorn Historic Property. Corridor 4 continues northwest crossing Pocosin Road (SR 1125), Forlines Road (SR 1126), and Dickinson Avenue (US 13). Corridor 4 turns northeast to cross Frog Level Road (SR 1127) and to connect with and follow Corridor 1 until the northern terminus at the existing US 264 interchange. Corridor 4 is approximately 10.1 miles long with 9.2 miles on new location. Three new interchanges located at NC 11, NC 903 and US 13 are proposed along Corridor 4.

- Corridor 4A: follows Memorial Drive (NC 11) from NC 102 for approximately 0.6 miles. From this location, Corridor 4A turns northwest on new location just east of Dennis McLawhorn Road (SR 1119) to extend north crossing Abbott Farm Road (SR 1117). From Abbott Farm Road, Corridor 4A extends northwest connecting with Corridor 4 at NC 903. Corridor 4A follows Corridor 4 until the northern end of the project at the existing US 264 interchange. Corridor 4A is approximately 10.2 miles long with 9.6 miles on new location. Three new interchanges located at NC 11, NC 903, and US 13 are proposed along Corridor 4A.

Upgrade Existing Facilities Alternative

In addition to the nine (9) new location corridors, an upgrade existing facilities was included as a preliminary corridor. The Upgrade Existing Facilities Alternative includes roadway improvements along Memorial Drive (NC 11) and Stantonsburg Road (US 264 Business) that would better serve traffic in the design year 2030.

Two options for widening Memorial Drive (NC 11) and one for Stantonsburg Road (US 264 Business) were evaluated to improve traffic congestion. Because existing Memorial Drive varies from four to six lanes, the options for the Upgrade Existing Facilities Alternative include:

- Option A: Memorial Drive as a six to eight-lane roadway (one additional lane in each direction) with Stantonsburg Road as a six-lane roadway, and
- Option B: Memorial Drive as an eight to ten-lane roadway (two additional lanes in each direction) with Stantonsburg Road as a six-lane roadway.

Functional designs prepared for the Upgrade Existing Facilities Alternative included minimum improvements needed to maintain an overall acceptable LOS (defined as LOS D for this project). Specifically, each intersection was improved by adding as many lanes as necessary. A traffic analysis was prepared to evaluate the capacity and operation of Memorial Drive and Stantonsburg Road under the Upgrade Existing Facilities Alternative scenarios.

As shown in Table 1-6, the 2030 traffic volumes projected to use existing Memorial Drive (under the no build scenario) range from 41,400 to 82,300 ADT. Additional left turn and right turn lanes, extended storage lengths and optimal signal timing and sequencing were evaluated at each intersection for Memorial Drive and Stantonsburg Road. Based on the capacity analysis, the intersection levels of service for the arterials range from LOS A to F for both Option A and Option B. There are several intersections along Memorial Drive that will operate at a LOS F even with widening to as many as eight to ten lanes. These intersections include Dickinson Road (US 13), Arlington Boulevard, Greenville Boulevard (US 264ALT), Reedy Branch Road (SR 1131), Fulford/Fire Tower Road (SR 1152/SR 1708), Davenport Farm Road (SR 1149), and Forlines Road (SR 1129). In order for the traffic operations at these intersections to improve, interchanges would need to be constructed.

Potential effects of the Upgrade Existing Facilities Alternative were evaluated and presented to representatives of federal, state, and local regulatory agencies at meetings in February 2002, April 2003, and February 2005.

2.4.2.2. Elimination of Preliminary Corridors

Representatives of federal, state, and local agencies met in February 2002 as part of the NEPA/404 Merger Process for this project to select alternatives to carry through for detailed studies. At this point, five of the preliminary corridors were eliminated (Corridors 2, 3, 3A, 3B, and 4A). These corridors were eliminated for the following reasons:

- Corridor 3: would impact the newly-constructed South Central High School, a planned elementary school, a historic property (Alfred McLawhorn House), and 64 relocations (most of any preliminary alternative).
- Corridor 3A: would impact wetlands and bottomland hardwood forest (approximately 90 and 30 acres, respectively, within the corridor) and 40 relocations, including a new unnamed subdivision.
- Corridor 3B: would impact wetlands and bottomland hardwood forest (approximately 75 and 50 acres, respectively, within the corridor) and 56 relocations.
- Corridor 4A: would impact commercial developments in Ayden, is further removed from the Greenville urban area, and impact 41 acres of wetlands.

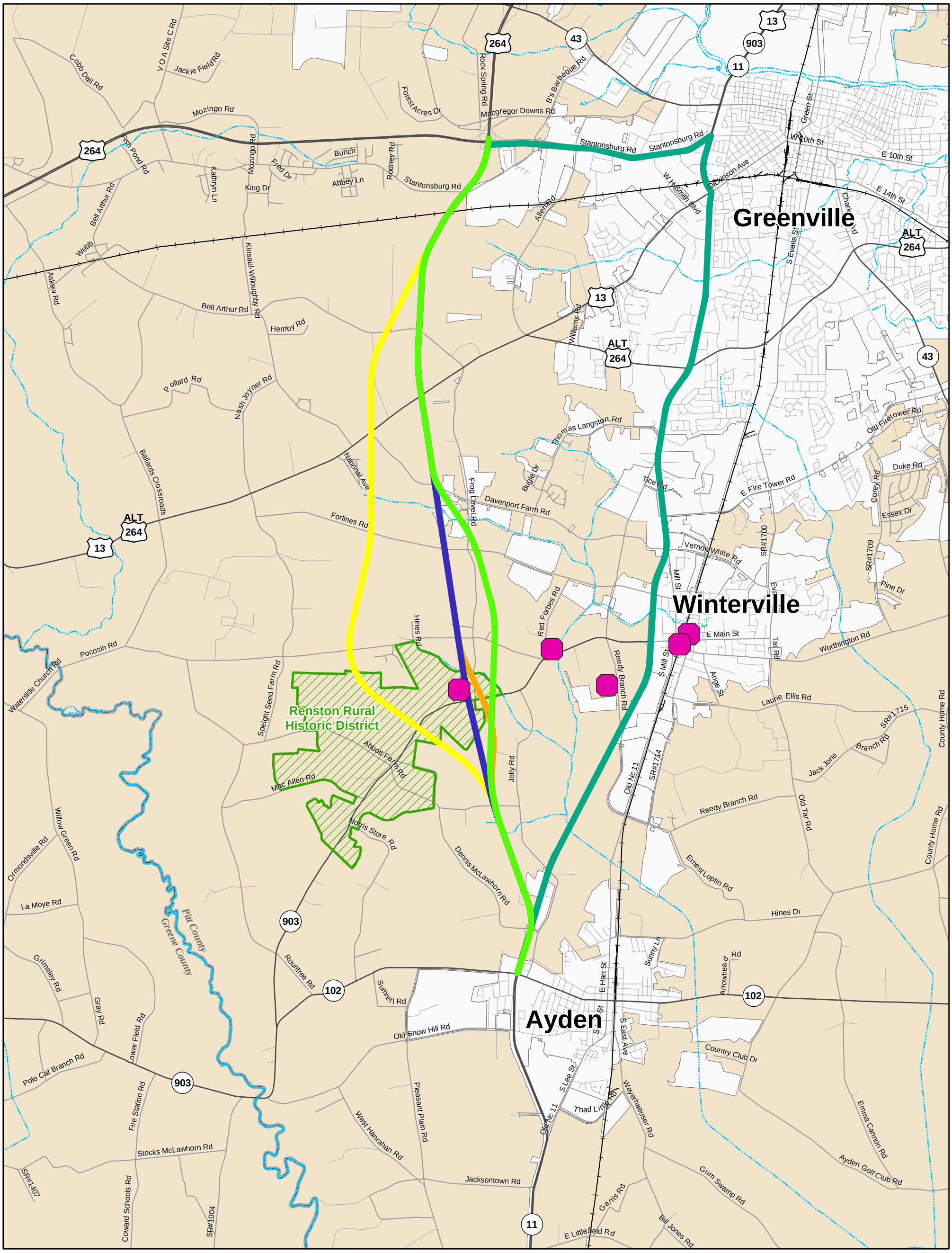
A follow-up meeting was held in April 2002 to discuss elimination of Corridor 2. Representatives of NCDOT and the NC Division of Water Quality determined that Corridor 2 would also be eliminated from study because of wetland impacts (approximately 85 acres within the corridor) to the Swift Creek system. Corridors 1, 1A, 1B, and 4 remained for further study (see Figure 2-3).

Elimination of the Upgrade Existing Facilities Alternative

The Upgrade Existing Facilities Alternative would impact a substantial number of businesses (approximately 121 businesses and 87 residences) along Stantonsburg Road (US 264 Business) and Memorial Drive (NC 11) and require major revisions in the access provided to remaining businesses. The cost of this alternative, which was estimated to be more than twice that of a bypass alternative, was also determined to be prohibitive. The design and safety of the proposed eight- to ten-lane roadway were also questioned. Due to the impacts associated with this alternative, as well as its inability to meet the project's capacity improvement needs and opposition from the public, agency representatives eliminated it from further consideration in February 2005.

2.4.2.3. Renston Rural Historic District Avoidance Alternative (Corridor 5)

In 2003, the Renston Rural Historic District was added to the National Register of Historic Places. The Renston Rural Historic District includes approximately 1,395 acres of farms, residences, churches, and cemeteries along a 2.5-mile section of NC 903 that represent the agricultural and architectural history of the area. The boundaries of the Historic District are



Legend

- 1
- 1A
- 1B
- Renston Rural Historic District
- 4
- Upgrade Existing
- Historic Property

N
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Figure 2-3 **Preliminary Corridors Considered in 2002**

defined by Horsepen Swamp Creek at the northeast end and by Callie Stokes Road at the southwest end.

All corridors under consideration at the time (Corridors 1, 1A, 1B, and 4) crossed the Historic District with varying levels of impact (see Figure 2-3). Therefore, Corridor 5 was developed as an avoidance alternative to avoid all impacts to the Historic District. Corridor 5 follows existing Memorial Drive (NC 11) for approximately 1.2 miles before turning northwest and crossing Jolly Road (SR 1120) approximately 3.2 miles west of NC 11. Corridor 5 continues northwest and crosses Horsepen Swamp, NC 903, and Pocosin Road (SR 1125). Corridor 5 follows Corridor 1 from Forlines Road (SR 1126) to its northern terminus at the existing interchange at US 264. The corridor is approximately 11.1 miles long and includes 8.4 miles on new location. The design for Corridor 5 includes four new interchanges at the existing intersection of NC 102 and NC 11 and at NC 11, NC 903, and Forlines Road. Figure 2-4 depicts Corridor 5.

An alternative corridor to the west of the Renston Historic District was briefly investigated by NCDOT. This alternative extended at most four (4) miles west of NC 11. However, NCDOT did not pursue detailed studies for this alternative because NCDOT felt it would not relieve the traffic on the existing corridor due to the increased distance from NC 11. A western alternative was also not supported by the MPO. In addition, preliminary environmental mapping indicated that a western alternative would have more wetland and stream impacts than the other alternatives. Due to this combination of reasons, an alternative farther west of the Renston District was not considered further.

2.4.2.4. Southern Extension

In 2004, based on concerns forwarded by the town of Ayden that the NC 102 and NC 11 intersection would exceed capacity and require an interchange that would adversely impact businesses in the area, several concepts were analyzed for interchange options at NC 11 and NC 102 and for extending the bypass south of the town. Options included interchange concepts at NC 11 and NC 102 such as a compressed diamond with a loop in the southwest quadrant of the interchange and a full compressed diamond interchange. In addition, an extension to the build alternates that would bypass the town of Ayden and tie into Memorial Drive (NC 11) near Old Snow Hill Road was considered. With any interchange at the intersection of NC 11 and NC 102, Ayden town officials indicated that twelve businesses valued at approximately $6 million would be impacted and that this would adversely affect the town's tax and employment base; therefore, the Town requested that the build alternates be extended south of Ayden.

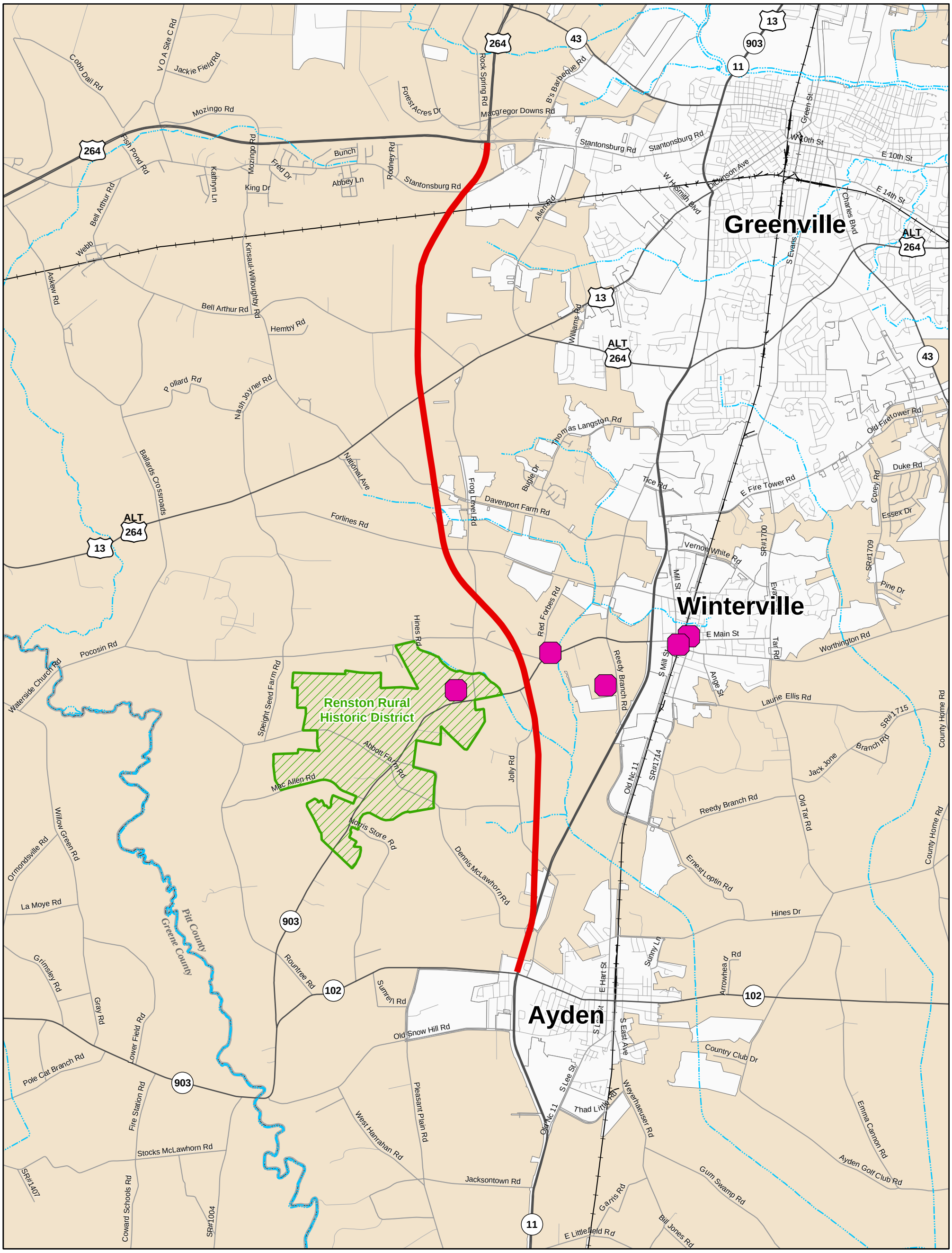

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Figure 2-4

Renston Rural Historic District Avoidance Alternate (Corridor 5)

A Southern Extension was added to Corridors 1, 1A, 1B, 4, and 5. This created new Corridors called 1-EXT, 1A-EXT, 1B-EXT, 4-EXT, and 5-EXT. The Southern Extension lengthened each of the existing bypass alternates by approximately 3.3 miles and included an interchange at NC 102 west of Ayden and a terminus at NC 11 approximately 2.9 miles south of NC 102.

2.4.2.5. Corridors Carried Forward for Detailed Study

The No-Build Alternative and Build Alternative were retained for detailed study.
Detailed study alternatives were selected in March 2005 by representatives from federal, state, and local agencies. Agencies reviewed ten bypass alternates (1, 1A, 1B, 4, 5, 1-EXT, 1A-EXT, 1B-EXT, 4-EXT, and 5-EXT), shown on Figure 2-5. Comparative impacts based on functional designs for each of these alternates are presented in Table 2-2.

Bypass Alternates 1, 1A, 1B, 4, and 5 were eliminated because of their impacts to the town of Ayden (see Southern Extension above). Bypass alternatives resulted in higher relocations as expected with a longer project but lower stream, wetland, and riparian buffer impacts than the alternatives without the bypass. Therefore, the only bypass alternates remaining under consideration were those that extended the bypass south of Ayden. Bypass Alternates 1-EXT and 1A-EXT were subsequently eliminated: Alternate 1-EXT because of its direct impact to the Charles McLawhorn historic property, which is listed on the National Register of Historic Places; and Alternate 1A-EXT because of a larger number of impacts to residences, stream crossings, and wetland impacts and because it would require relocating extensive sections of existing Frog Level Road (SR 1127).

Table 2-2 shows that 1B-EXT, 4-EXT, and 5-EXT resulted in lower environmental impacts.

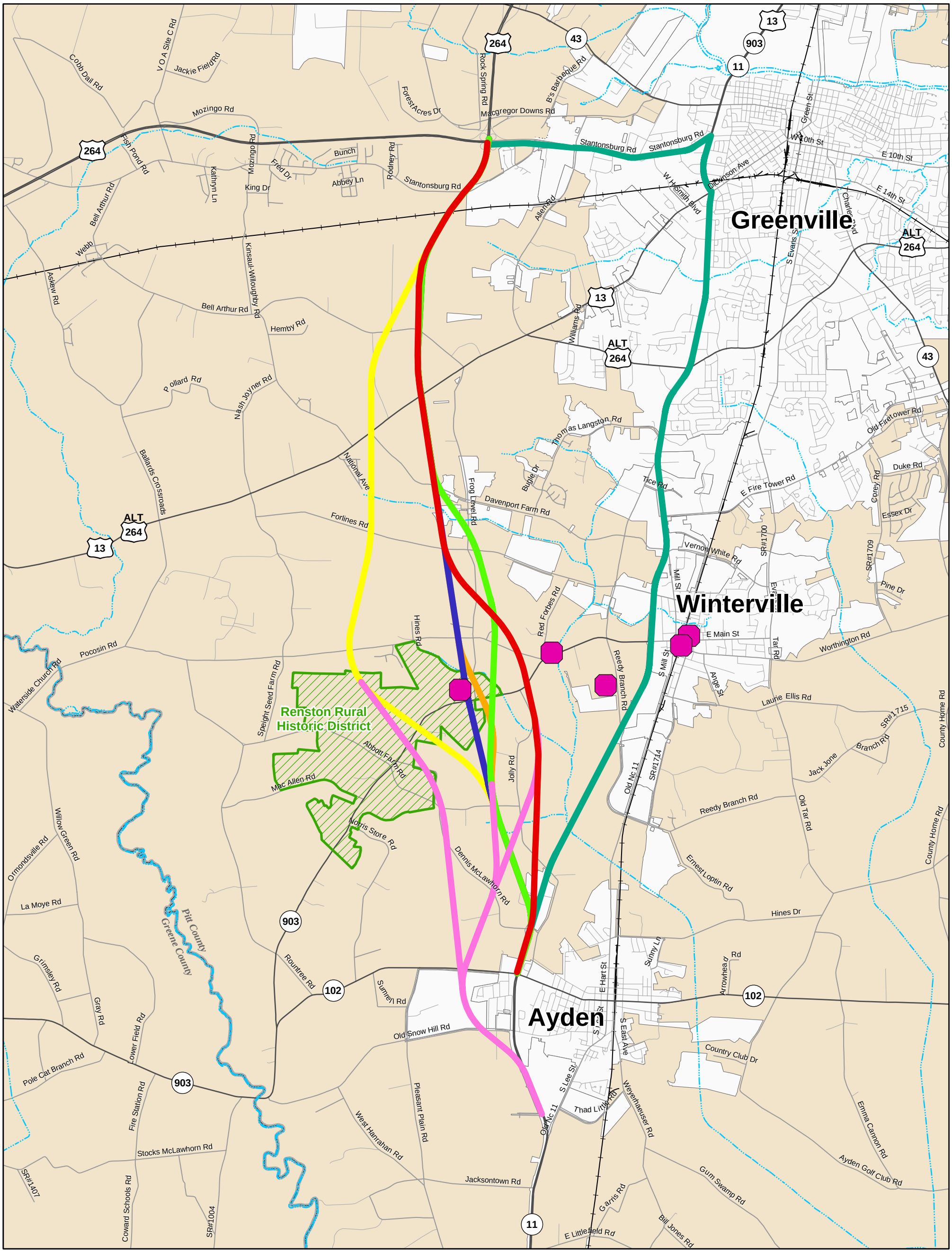

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Figure 2-5

Southern Extensions and Build Alternates Developed in 2004

TABLE 2-2: PRELIMINARY CORRIDOR IMPACTS*

		Preliminary Corridor										
		Upgrade Existing	1	1A	1B	4	5	1-EXT	1A-EXT	1B-EXT	4-EXT	5-EXT
Length of Corridor	Length on New Location	0	8.3	8.4	8.4	9.1	8.4	10.7	10.8	10.7	11.0	10.8
	Length on Existing	12.0	2.7	2.7	2.7	2.7	2.7	2.2	2.2	2.2	2.2	2.2
	Total Length	12.0	11.0	11.1	11.1	11.8	11.1	12.9	13.0	12.9	13.2	13.0
Relocations	Residential	87	38	57	32	45	34	50	73	49	40	47
	Business	121	17	18	18	6	17	17	18	18	5	18
	Total Relocations	208	55	75	50	51	51	67	91	67	45	65
Historic Resource Impacts (acres)		2.6	71.9	16.7	46.2	100.1	0	71.9	16.7	46.2	82.0	0
Streams	Stream Crossings	31	22	22	19	16	23	18	17	16	10	20
	Stream Impacts (linear feet)	5,565	4,205	4,085	3,277	2,533	4,113	3,646	3,221	2,809	1,700	3,362
Riparian Buffer	Zone 1 (square feet)	21,780	135,036	104,544	113,256	82,764	100,188	74,052	60,984	47,916	26,136	69,696
	Zone 2 (square feet)	13,068	91,476	65,340	74,052	52,272	60,984	60,984	26,136	34,848	21,780	47,916
	Total Buffer Impacts (square feet)	34,848	226,512	169,884	187,308	135,036	161,172	135,036	87,120	82,764	47,916	117,612
Wetlands (acres)		1.0	2.2	3.3	1.5	1.0	1.8	1.6	2.6	0.8	0.0	1.8

* Impacts as presented at the February 17, 2005 Concurrence Point 2 Meeting based on functional designs.

Bypass Alternates 1B-EXT, 4-EXT, and 5-EXT were carried forward for detailed study for the following reasons:

- Bypass Alternate 1B-EXT – would have lower impacts to streams, buffers, and wetlands in comparison to Alternate 5-EXT and less impacts to the Renston Rural Historic District than Alternate 4-EXT.
- Bypass Alternate 4-EXT – would have the least impacts to streams, buffers, and wetlands of any alternate.
- Bypass Alternate 5-EXT – would avoid impacts to all historic properties including the Renston Rural Historic District.

2.4.3 Description of Detailed Study Alternatives

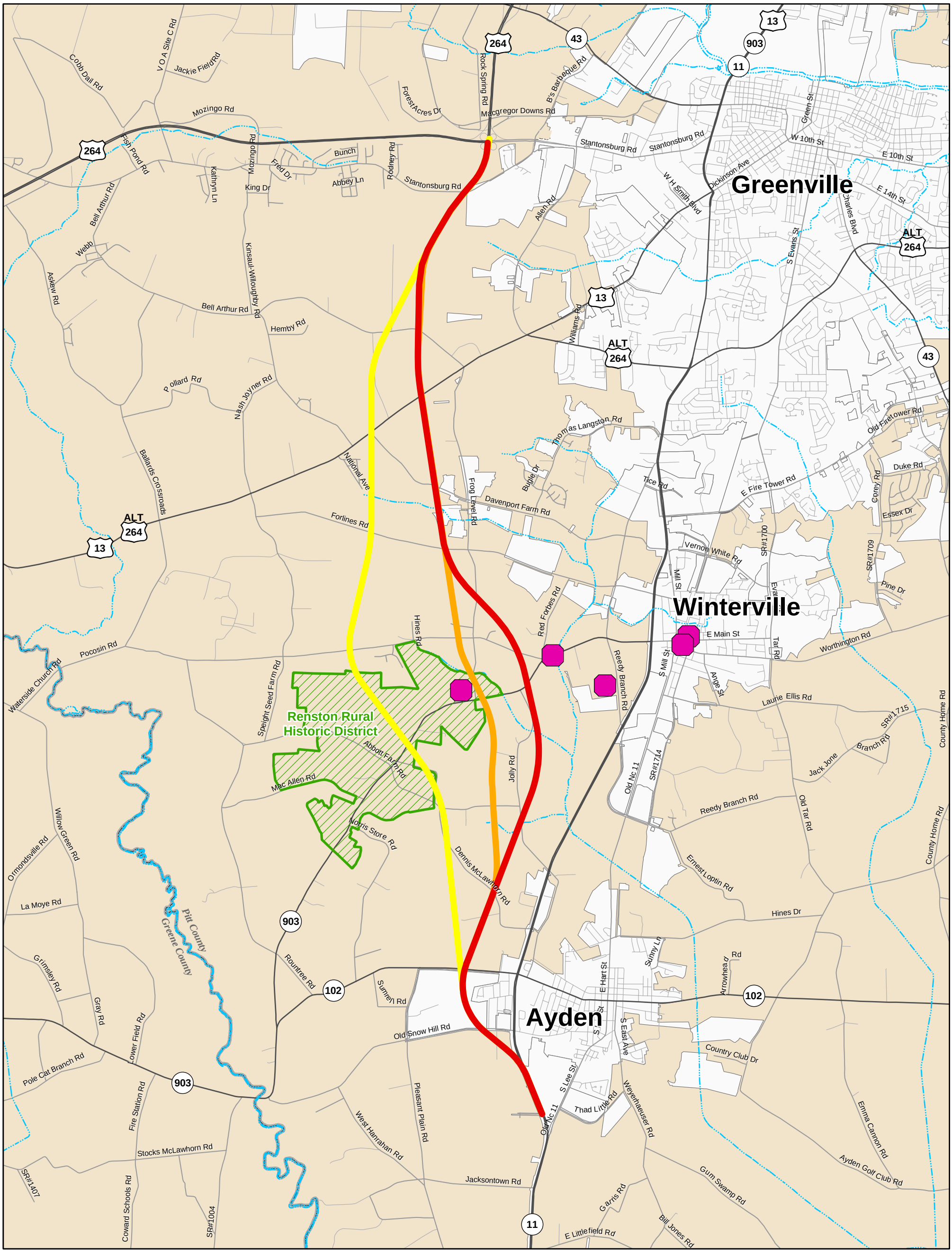
The Build Alternates for Detailed Study are shown on Figure 2-6. Each alternate would be constructed as a four-lane, divided-median facility with full control of access and interchanges at major crossroads. In addition, construction of any of the alternates would result in over 40 percent reduction of traffic on Memorial Drive (NC 11) and Stantonsburg Road (US 264 Business) in the design year 2030 and provide direct access from Winterville and Ayden to job centers and shopping in Greenville.

2.4.3.1. Bypass Alternate 1B-EXT

Alternate 1B-EXT begins at Memorial Drive (NC 11) approximately 2.9 miles south of NC 102 and turns northwest on new location crossing several tributaries to Swift Creek. Alternate 1B-EXT crosses Abbott Farm Road (SR 1117) approximately 0.3 miles west of Jolly Road (SR 1120). Alternate 1B-EXT turns northwest to cross NC 903, Frog Level Road (SR 1127) and Pocosin Road (SR 1125). From Pocosin Road, Alternate 1B-EXT continues across Dickinson Avenue (US 13), crossing Old Stantonsburg Road (SR 1200), and ties in with the northern terminus of the project at the existing US 264 interchange. Alternate 1B-EXT avoids the Charles McLawhorn historic property on NC 903. Alternate 1B-EXT is approximately 12.9 miles long with 10.7 miles on new location and includes five new interchanges located at NC 11, NC 102, NC 903, Forlines Road (SR 1126), and Dickinson Avenue (US 13).

2.4.3.2. Bypass Alternate 4-EXT

Alternate 4-EXT begins at Memorial Drive (NC 11) approximately 2.9 miles south of NC 102 and follows Alternate 1-EXT for 2.5 miles before turning northwest at NC 102. Alternate 4-EXT continues on new location crossing several tributaries to Swift Creek. Alternate 4-EXT crosses Abbott Farm Road (SR 1117) approximately 1.1 miles west of Jolly Road (SR 1120). From the crossing of Abbott Farm Road, Alternate 4-EXT turns northwest crossing NC 903 west of the Charles McLawhorn historic property. Alternate 4-EXT continues northwest crossing Pocosin Road (SR 1125), Forlines Road (SR 1126), and Dickinson Avenue (US 13). It turns northeast to cross Frog Level Road (SR 1127) and Old Stantonsburg Road (SR 1200) and connect with the



Legend

- 1B-EXT
- 4-EXT
- 5-EXT
- Renston Rural Historic District
- Historic Property

N
W E
S

0 0.5 1 2 Miles

North Carolina
Department of Transportation

Greenville Southwest Bypass Study
(Improvements to NC 11 & US 264 Bus)

NCDOT Project Definition No.: 34411
T.I.P. No. R-2250

Figure 2-6 **Alternates Selected for Detailed Study**

existing US 264 interchange. Alternate 4-EXT includes four new interchanges at NC 11, NC 102, NC 903, and US 13 and is approximately 13.2 miles long with 11.0 miles on new location.

2.4.3.3. Bypass Alternate 5-EXT

Alternate 5-EXT begins at NC 11 approximately 2.9 miles south of NC 102 and follows Alternate 1B-EXT for 3.6 miles. Alternate 5-EXT then turns northeast, crossing Jolly Road (SR 1120) near its intersection with Abbott Farm Road (SR 1117). Alternate 5-EXT continues north, crossing Horsepen Swamp and NC 903 before turning northwest to cross Frog Level Road (SR 1127) approximately 1.1 miles west of its intersection with NC 903. Alternate 5-EXT follows Alternate 1B-EXT from Forlines Road (SR 1126) north to its terminus at the existing US 264 interchange. Alternate 5-EXT includes five new interchanges at NC 11, NC 102, NC 903, Forlines Road, and Dickinson Avenue (US 13) and is approximately 13.0 miles long with 10.8 miles on new location.

2.5 TRAFFIC ANALYSIS OF BUILD ALTERNATIVES

Traffic operations and levels of service were evaluated for the alternatives under detailed study for the design year 2030 (see *Traffic Capacity Analysis for the Greenville Southwest Bypass*, 2005). The traffic projected to use the bypass in the year 2030 is 43,400 average annual daily traffic (AADT). Because the bypass alternates share common termini and some of the same route, they are included in a single capacity analysis, with the exception of the traffic analysis at the intersection of Davenport Farm Road (SR 1128) and US 264ALT/US 13. At this location, Alternate 4-EXT is located further west than the other two alternatives. The main purpose of the build traffic analysis is to show that there will be a significant reduction in traffic on the existing route if the bypass is built.

2.5.1 Year 2030 Build Traffic Projections

Under the build scenario, travel demand on Stantonsburg Road and Memorial Drive would be decreased up to 50 percent from the no build condition, as through travelers and commuters would use the Greenville Southwest Bypass instead of Memorial Drive. The resulting decrease in traffic along these roads would decrease travel time between Ayden and Greenville by more than five minutes from the no build scenario during peak times. In addition, it is likely that conflicts between commuting traffic traveling between Ayden/Winterville and job centers in Greenville, including Pitt County Memorial Hospital on Stantonsburg Road, and shoppers traveling to commercial and retail centers along Memorial Drive and Greenville Boulevard (US 264ALT) would be reduced, improving the overall driving experience and safety along Memorial Drive.

2.5.2 Year 2030 Build Capacity Analysis

Traffic operations analysis for individual freeway elements (basic freeway segments, ramp merge/diverge areas, and weave sections) was conducted.

TABLE 2-3: 2030 TRAFFIC VOLUMES (NO BUILD VS. BUILD)

Existing Road	Arterial Segment	No-Build Alternative	Build Alternative	
		ADT	ADT	Reduction Compared to No-Build Alternative
US 264 Business Stantonsburg Road	US 264 to Barbeque Rd (SR 1204)	43,600	37,400	14.2%
	Barbeque Rd (SR 1204) to Allen Rd (SR 1203)	57,200	47,000	17.8%
	Allen Rd (SR 1203) to Arlington Blvd	51,200	50,200	2.0%
	Arlington Blvd to NC 11 (Memorial Dr)	43,200	43,200	0%
NC 11 Memorial Drive	Stantonsburg Rd/Farmville Blvd to US 13 (Dickinson Ave)	50,400	40,400	19.8%
	US 13 (Dickinson Ave) to Arlington Blvd	48,500	38,500	20.6%
	Arlington Blvd to US 264ALT (Greenville Blvd)	57,500	42,900	25.4%
	US 264ALT (Greenville Blvd) to Thomas Langston Rd (SR 1134)	82,300	52,100	36.7%
	Thomas Langston Rd (SR 1134) to Reedy Branch Rd (SR 1131)	81,500	51,700	36.6%
	Reedy Branch Rd (SR 1131) to Fulford Dr (SR 1152)/Fire Tower Rd (SR 1708)	67,600	40,200	40.5%
	Fulford Dr (SR 1152)/Fire Tower Rd (SR 1708) to Davenport Farm Rd (SR 1128)/ Old NC 11 (SR 1149)	67,000	42,400	36.7%
	Davenport Farm Rd (SR 1128)/ Old NC 11 (SR 1149) to Forlines Rd (SR 1129)/Boyd St	46,600	26,000	44.2%
	Forlines Rd (SR 1129)/Boyd St to NC 903/ Main St (SR 1133)	42,200	23,400	44.5%
	NC 903/ Main St (SR 1133) to Reedy Branch Rd (SR 1131)	41,800	24,200	42.1%
	Reedy Branch Rd (SR 1131) to Jolly Rd (SR 1120)	42,200	25,600	39.3%
	Jolly Rd (SR 1120) to McLawhorn Rd (SR 1119)	41,800	24,200	42.1%
	McLawhorn Rd (SR 1119) to NC 102/ West 3rd St	41,400	20,600	50.2%
	NC 102/ West 3rd St to Old Snow Hill Rd (SR 1113)/ Snow Hill St	36,600	---	---
	NC 102/ West 3rd Street to Greenville Southwest Bypass	---	20,000	---
	Greenville Southwest Bypass to Old NC 11 (SR 1149)	---	35,400	---
	Old Snow Hill Road (SR 1113) to Old NC 11 (SR 1149)	35,400	---	---
	Old NC 11 (SR 1149) to Jacksontown Road (SR 1109)	38,400	38,400	0%

2.5.2.1. Basic Freeway Segments

Basic freeway segments are segments of the freeway that are unaffected either by merge or diverge movements at nearby ramps or by weaving movements. Essentially, they are located along the proposed freeway in the area between interchanges.

As shown in Table 2-4, all basic freeway segments along the bypass (including Bypass Alternates 1B-EXT, 4-EXT, and 5-EXT) would operate at desirable levels of service (LOS D or better) during the year 2030.

TABLE 2-4: BASIC FREEWAY SEGMENT LEVEL OF SERVICE

Location	Peak Hour (PM) Level of Service
NC 11 to NC 102	A
NC 102 to NC 903	B
NC 903 to Forlines Road (SR 1126)	B
Forlines Road (SR 1126) to US 13-264A	C
US 13-264A to US 264	C

2.5.2.2. Ramp Junctions

Merge and diverge operations are evaluated at the ramp junctions of each interchange along the proposed freeway. The merge and diverge flow rates are a measure of effectiveness for the ramp junction. Under 2030 conditions, all merge and diverge movements would operate at desirable levels of service, with LOS D or better. Table 2-5 summarizes the results of the merge and diverge capacity analysis, which would be consistent for all bypass alternates.

TABLE 2-5: RAMP JUNCTION LEVEL OF SERVICE

Ramp Junction Location	Peak Hour (PM) Level of Service			
	Northbound Ramps (Loops)		Southbound Ramps (Loops)	
	Diverge	Merge	Diverge	Merge
NC 11	A	B	A	B
NC 102	--	A	B	A
NC 903	A	B	B	B
Forlines Road (SR 1126)	B	B	C	B
US 13-264A	B (B)	B (B)	D (B)	C (C)
US 264	B (C)	B (B)	C (B)	B (C)

2.5.2.3. Weaving Areas

A weaving area is described as a crossing of two or more streams of traffic on a highway. Weaving areas do not contain any form of traffic control; therefore, they require intense lane changing maneuvers in order for drivers to safely enter and exit the highway. Level of service in the weaving area is directly related to the speed of the weaving and non-weaving vehicles. Weaving areas are associated with the proposed interchange between the Greenville Southwest Bypass and US 264. This is a fully directional interchange with loops and ramps in all quadrants.

Table 2-6 summarized weaving area LOS associated with the bypass alternates. These would be the same for each of the bypass alternates.

TABLE 2-6: FREEWAY WEAVING SEGMENT LEVEL OF SERVICE

Location	PM Peak Hour Level of Service
US 264 interchange – between Loop A and B	D
US 264 interchange – between Loop B and C	B
US 264 interchange – between Loop C and D	B
US 264 interchange – between Loop D and A	B

2.5.2.4. Signalized and Unsignalized Intersections

Along the entire project, signalized and unsignalized intersections would be located at the junctions of the freeway entrance and exit ramps as well as at the cross streets. In the design year 2030, many intersections would require signalization to operate at an acceptable level of service. Table 2-7 and the following intersection descriptions summarize the intersection levels of service along the proposed project:

- Old NC HWY 11 – All alternates would have signalized intersections at the ramp termini at Old NC HWY 11. These intersections would operate at acceptable levels of service.
- NC 102/NC 11 – All alternates would have signalized intersections at the ramp termini at NC 102/NC 11. The west side the intersection will have some improvements but the overall LOS will still be an F. This is due to the fact that upgrading that intersection is out of the scope of this project and will be covered under another project. This future improvement may be a Division or TIP project.
- NC 102/Wildwood Drive (SR 1145) – The intersection of NC 102 and SR 1145 (Wildwood Drive) currently is an unsignalized intersection that would operate at an unacceptable LOS in the design year 2030. This intersection was upgraded to an actuated coordinated signalized intersection to work in conjunction with the existing signals at the intersection of NC 102/NC 11 (Memorial Drive) and NC 102/SR 1120 (Jolly Road). An acceptable level of service is achieved with those improvements.
- NC 102 Interchange – All alternates would have signals at the ramp termini on NC 102. These intersections would operate at acceptable levels of service.
- NC 903 Interchange – All alternates would have signals at the ramp termini on NC 903. These intersections would operate at acceptable levels of service.
- Forlines Road (SR 1126) Interchange – All alternates would have signals at the ramp termini on Forlines Road. These intersections would operate at acceptable levels of service.
- US 13-264A/Davenport Farm Road (SR 1128) – Davenport Farm Road was considered out of the scope of this project for Alternate 1B-EXT and Alternate 5-EXT because of its distance away from these bypass corridors. But since Alternate 4-EXT is farther to the west, Davenport Farm Road would need to be upgraded to a coordinated signal with left and right turn lanes so that the left turners on to Davenport Farm Road would not queue

back into the interchange. Once this improvement is made, the level of service will be acceptable.

- US 13-264A Interchange – Both ramp terminals operate at LOS B or better during peak periods for the design year 2030 as signalized intersections.

TABLE 2-7: SIGNALIZED INTERSECTION LEVEL OF SERVICE SUMMARY

Intersection		2030 PM Level of Service	
		Alternates 1B-EXT, 5-EXT	Alternate 4-EXT
Old NC Hwy 11 / Bypass	-	B	B
Jolly Road (SR 1120) / NC 102	-	C	C
NC 102 / NC 11	-	E	E
NC 102 / Wildwood Drive (SR 1145)	-	C	C
Bypass / NC 102 Interchange	Ramp A	C	C
	Ramp D	B	B
Bypass / NC 903 Interchange	Ramp A	B	B
	Ramp D	A	A
Bypass / Forlines Road (SR 1126) Interchange	Ramp A	B	B
	Ramp D	B	B
US 264A/US 13 / Davenport Road (SR 1128)	-	B	C
Bypass / US 264A/US 13 Interchange	Ramp A	C	C
	Ramp D	B	B

2.6 SAFETY

The proposed project will be designed to meet current design standards (as listed in Table 2-1). The new facility would not have the geometric deficiencies of Memorial Drive, such as numerous driveways, limited turn lanes, frequent traffic stops, and, therefore, would provide a roadway that can better meet the needs of the facility users.

In addition, depending on the location and the selected alternate, the proposed project would provide a reduction in through traffic on existing Memorial Drive up to 74 percent. By diverting traffic from the existing facility, the number of conflicts occurring along this development route is expected to decrease.

2.7 COST ESTIMATES

Preliminary cost estimates were prepared for each bypass alternate based on conceptual right-of-way limits from the preliminary designs for each alternate. These cost estimates are presented in Table 2-8. These figures included estimates for construction and right-of-way costs and ranged from $179.2 million (Bypass Alternate 1B-EXT) to $187.8 million (Bypass Alternate 5-EXT).

TABLE 2-8: COST ESTIMATES FOR BYPASS ALTERNATES				
Bypass Alternate	**Length (miles)**	**Right-of-Way Cost (millions $)***	**Construction Cost (millions $)#**	**Total Cost (millions $)**
1B-EXT	12.1	25.3	153.9	179.2
4-EXT	12.4	22.6	157.4	180.0
5-EXT	12.4	35.8	152.0	187.8

* Right-of-way cost estimate prepared in March 2006.
# Construction cost estimate prepared in April 2006.

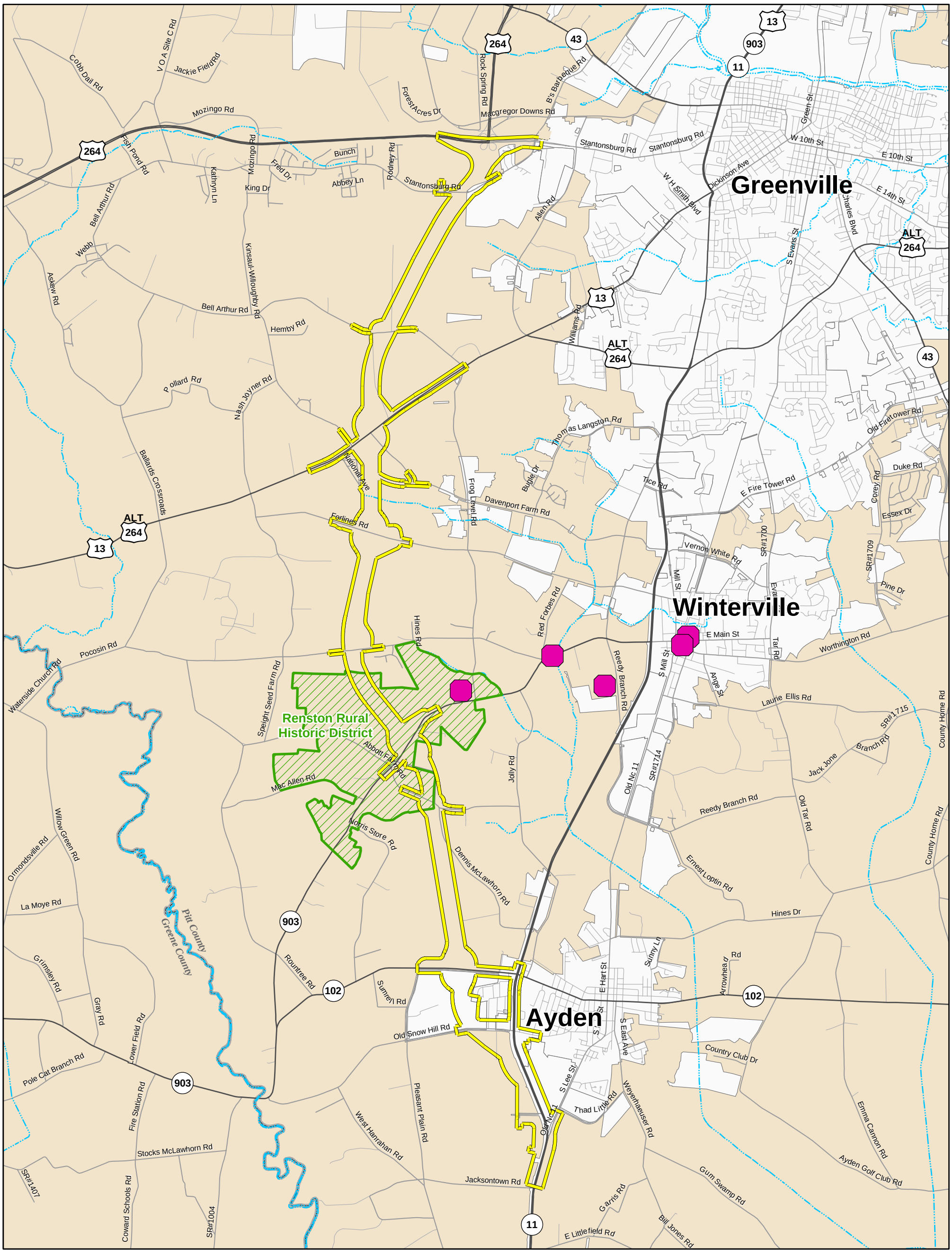
During consideration of potential design modifications to the Preferred Alternative to reduce impacts to the Renston Rural Historic District (see section 2.8.1), construction cost estimates for the NC 903 interchange area for each minimization option were prepared. Minimization option 5 would result in a construction cost for the NC 903 interchange area that was estimated at $7.7 million less than the original design of the Preferred Alternative. Minimization option 5 was incorporated into the Preferred Alternative; based on the cost reduction in the NC 903 area, the total estimated construction cost for the updated Preferred Alternative would then be $149.7 million. An updated estimate of right-of-way costs for the Preferred Alternative was prepared in June 2007 (right-of-way component of estimate) and October 2007 (utilities component of estimate). The total estimated right-of-way cost for the Preferred Alternative is $33.4 million. Please note that this estimate is higher than the estimate prepared for the DEIS for Bypass Alternate 4B-EXT because it was prepared over a year later and reflects rising property values and associated increases in land acquisition costs.

2.8 PREFERRED ALTERNATIVE

Following publication of the DEIS and the subsequent Corridor Public Hearing (see section 7.2.3), the NEPA/Section 404 Merger Team selected Bypass Alternate 4-EXT as the Least Environmentally Damaging Practicable Alternative (see section 7.1.2.4 and Appendix C - Concurrence Point 3). Alternate 4-EXT is the Preferred Alternative for the Greenville Southwest Bypass. The originally chosen Preferred Alternative (which included an interchange at NC 903) is shown in Figure 2-7. The selection of the Preferred Alternative was announced via newsletter in December 2006 to those on the project mailing list. Alternate 4-EXT was selected because it would result in the fewest residential relocations and divide the fewest number of neighborhoods, it would have the least impacts to wetlands, streams, and floodplains, its cost would be comparatively low, and it is supported by the local governments in the project area.

2.8.1 Renston Rural Historic District Impact Minimization

Study activities following designation of Alternate 4-EXT as the Preferred Alternative focused on avoiding and minimizing its potential impacts on local environmental and community resources. The Preferred Alternative would impact approximately 101 acres within Renston, including approximately 51 acres within contributing properties, and would displace nine contributing structures. Due to the magnitude of the Preferred Alternative's potential impacts on Renston, these potential impacts were a key focus of minimization efforts. The impacts of the Preferred Alternative on Renston are centered around the proposed interchange at NC 903, initially


Greenville
Winterville
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Renston Rural Historic District
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Preferred Alternative (December 2006)
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North Carolina Department of Transportation
Greenville Southwest Bypass Study
(Improvements to NC 11 & US 264 Bus)
NCDOT Project Definition No.: 34411
T.I.P. No. R-2250
Figure 2-7
Preferred Alternative (December 2006)

proposed as a diamond interchange with NC 903 and Abbott Farm Road crossing over the mainline Bypass. Control of access requirements, which would limit access onto NC 903 for properties within 1000 feet of the proposed interchange, could also necessitate the acquisition of two additional contributing properties under the original Preferred Alternative scenario. To minimize impacts of the Preferred Alternative on Renston, several potential design modifications of the NC 903 interchange were developed. The five potential minimization options considered are detailed below. Table 2-9 summarizes the key environmental impacts associated with each minimization option. Table 2-10 summarizes the specific impacts of each minimization option on contributing properties within the historic district. Figures 2-8A through 2-8F illustrate the original proposed alignment for the preferred alternative, along with each of the five minimization options, in the vicinity of the NC 903 interchange.

Minimization Option 1

This option includes a half clover interchange on the south side of NC 903; the northern half of the interchange would be removed. It would impact approximately 31 acres within contributing properties and displace nine contributing structures. Control of access requirements could also necessitate acquisition of the two additional contributing properties. It would require the same number of stream crossings (nine) as the preferred alternative.

Minimization Option 2

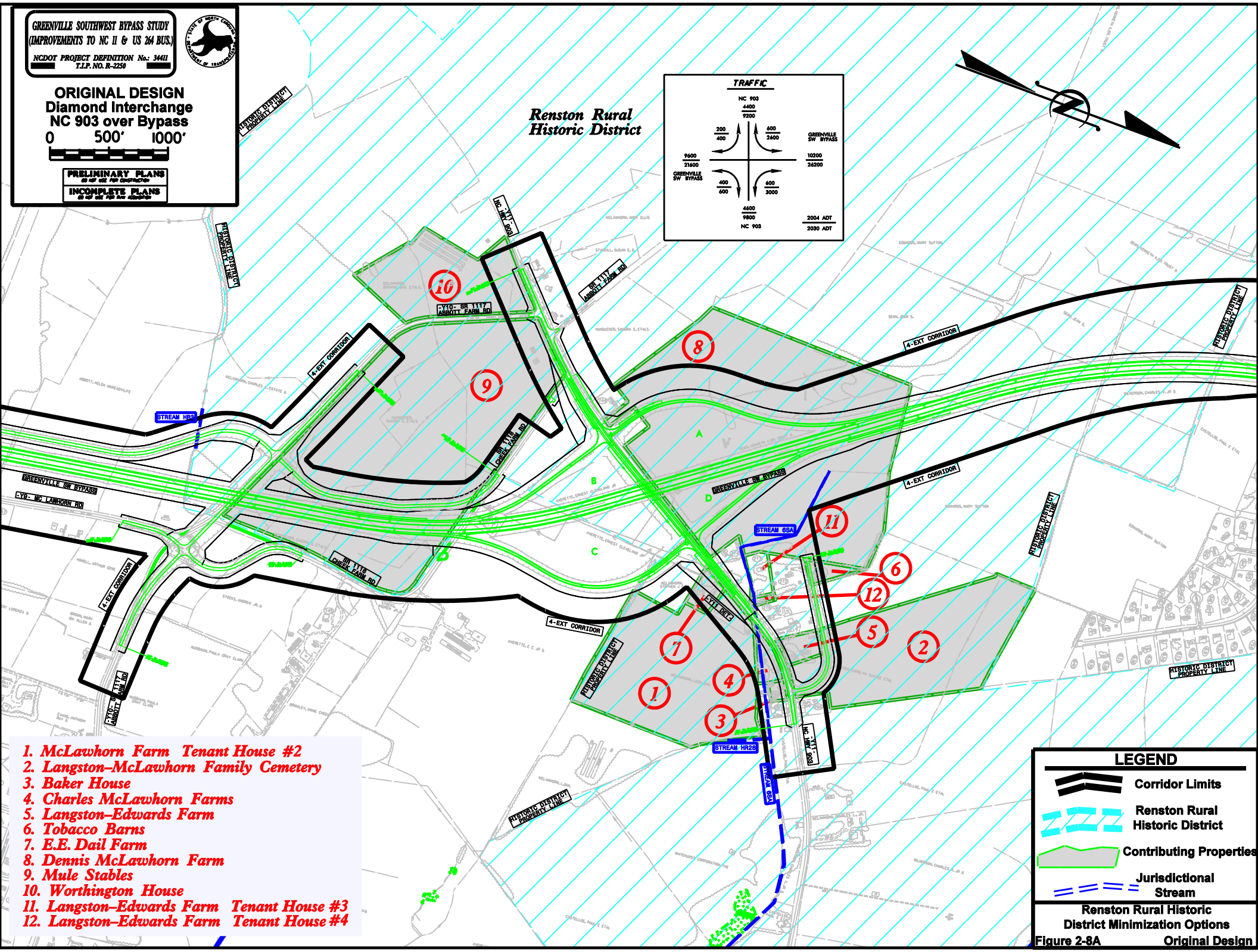
This option would include a full diamond interchange, but would take the mainline Bypass over NC 903 and Abbott Farm Road. It would impact approximately 49 acres within contributing properties and displace seven contributing structures. Control of access requirements could also necessitate acquisition of the two additional contributing properties. It would require eight stream crossings.

Minimization Option 3

This option would remove the NC 903 interchange entirely and would take the mainline Bypass over NC 903 and Abbott Farm Road. It would impact approximately 22 acres within contributing properties and displace five contributing structures. It would require seven stream crossings.

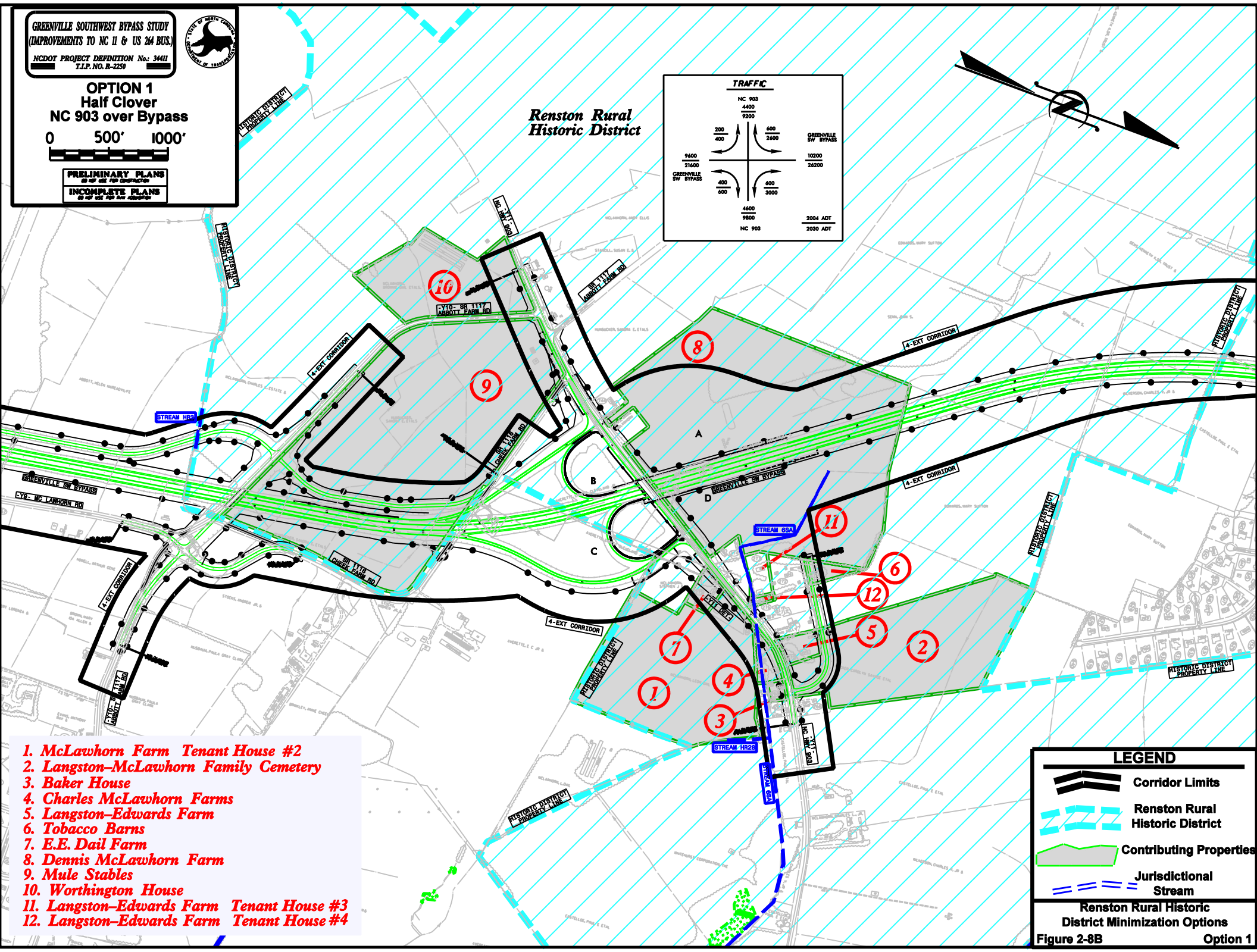
Minimization Option 4

This option would replace the south side of the NC 903 interchange with a half clover and would take the mainline Bypass over NC 903 and Abbott Farm Road. It would impact approximately 25 acres within contributing properties and displace six contributing structures. It would require seven stream crossings.



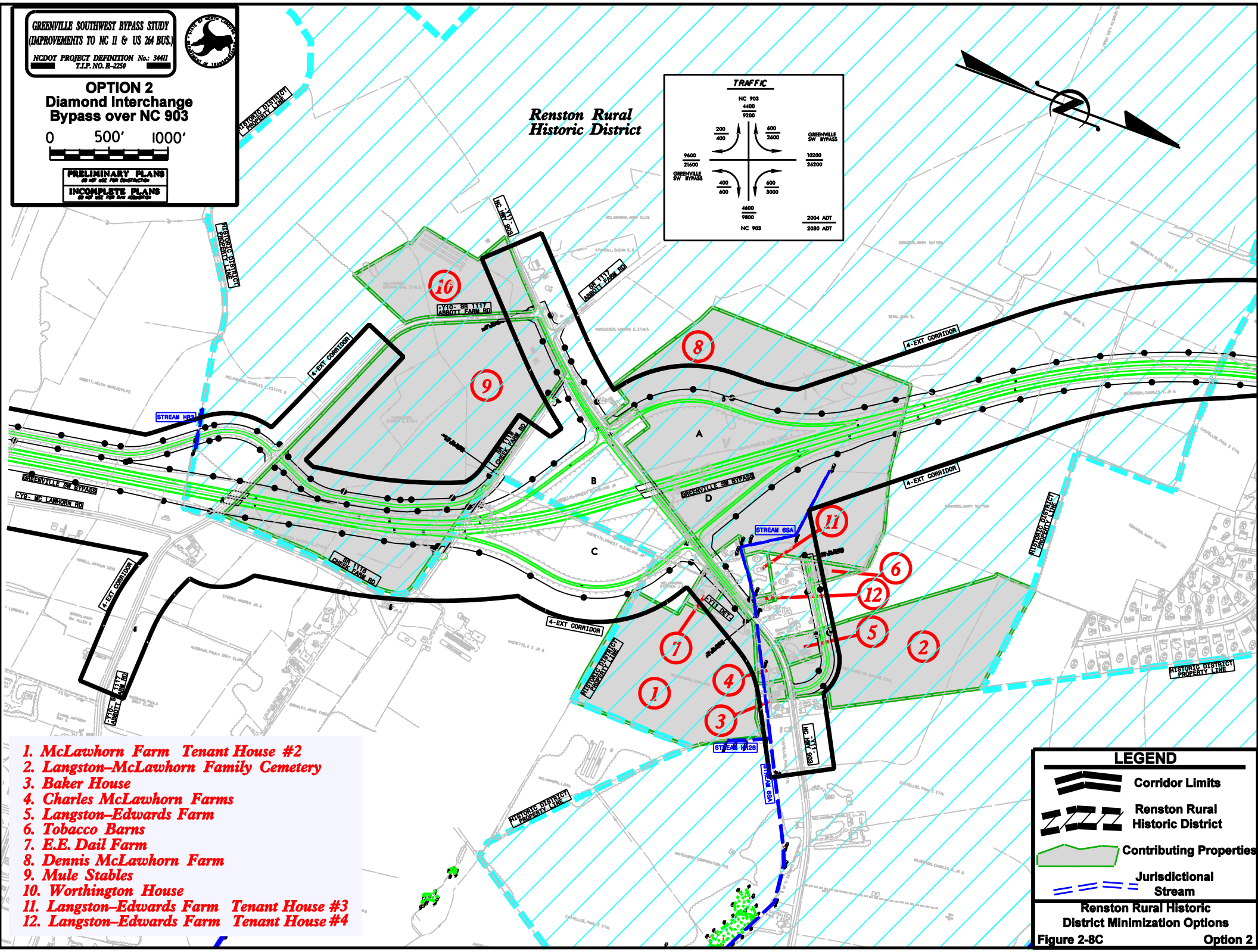
Renston Rural Historic District Minimization Options

Figure 2-8A Original Design



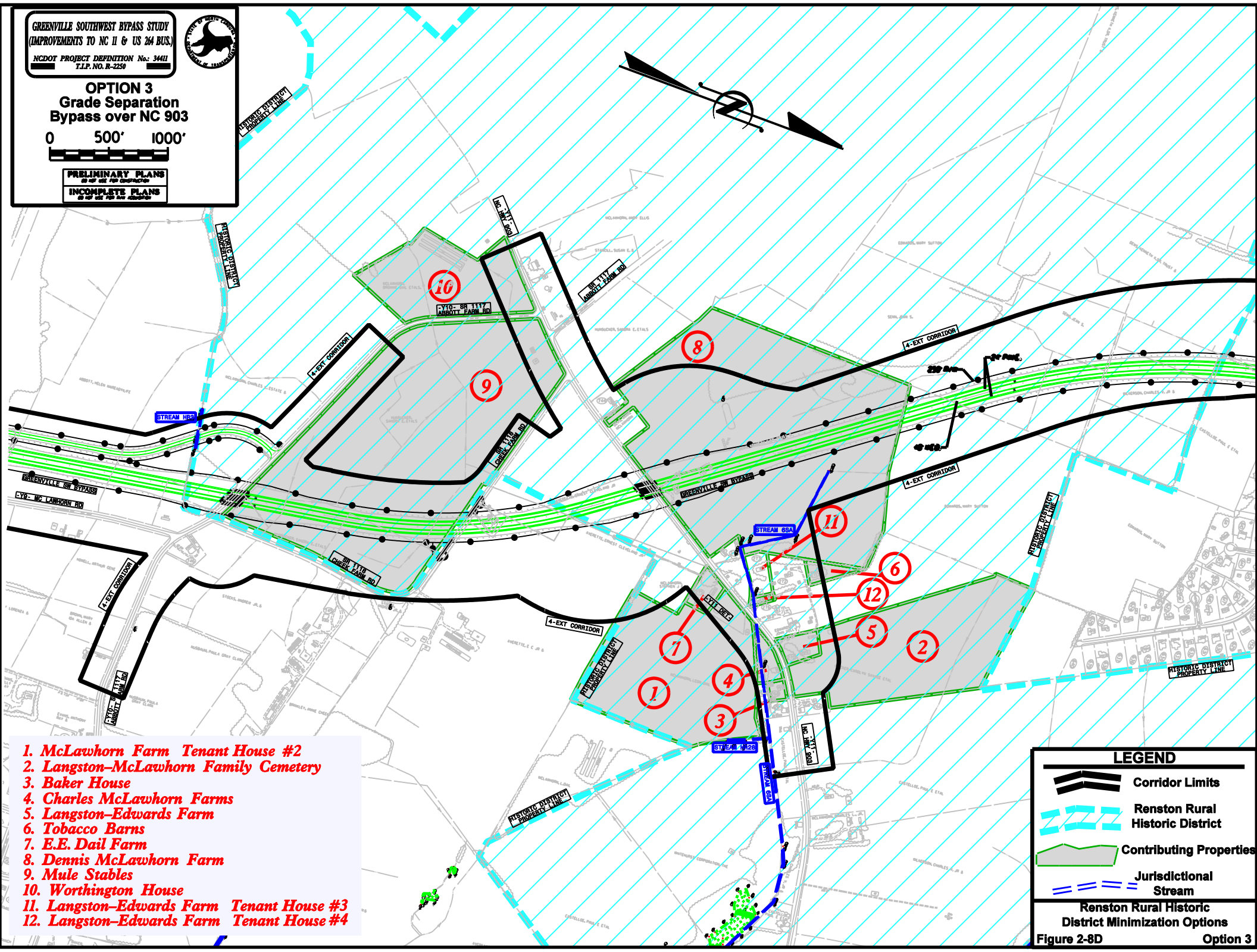
Renston Rural Historic District Minimization Options

Figure 2-8B Option 1



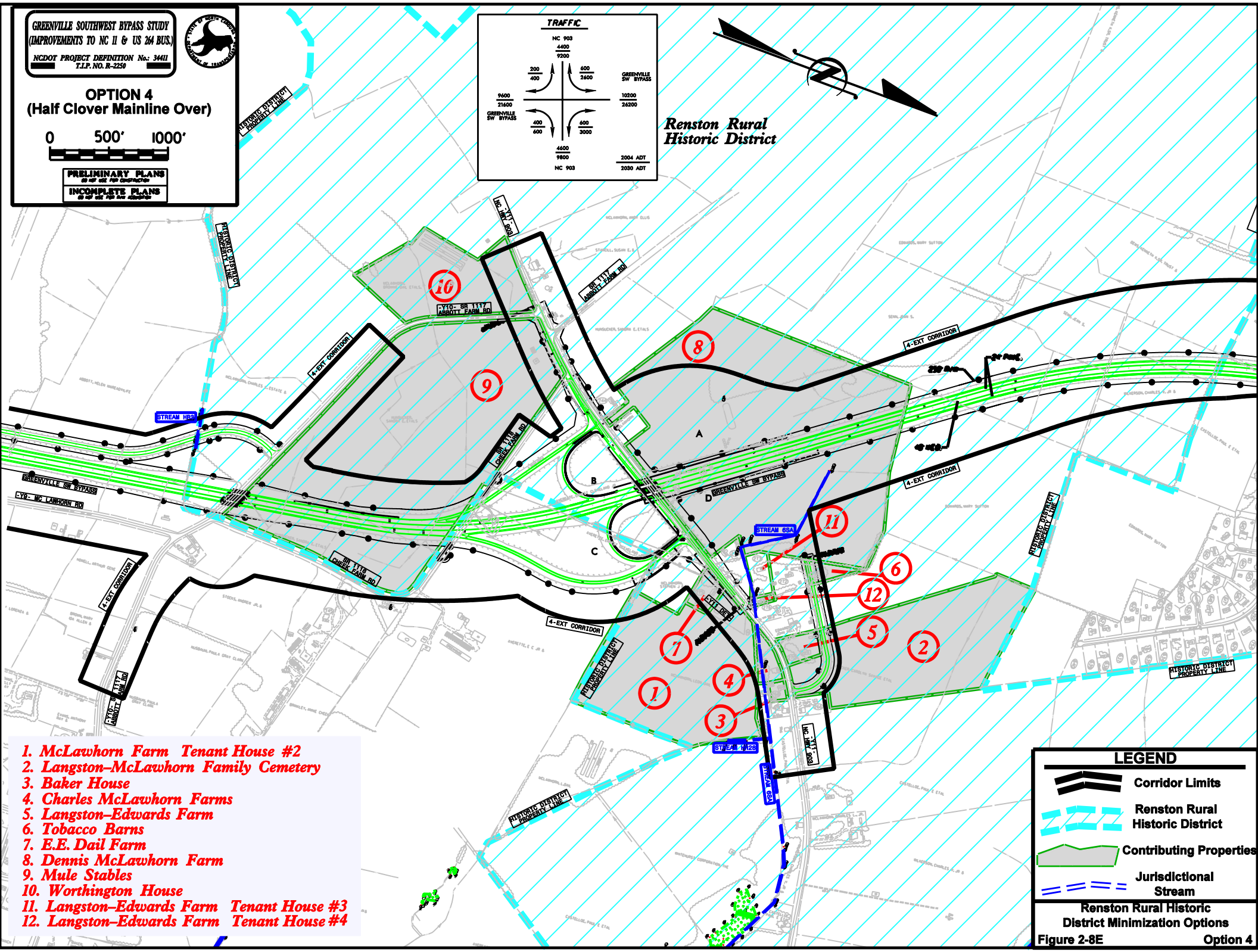
Renston Rural Historic District Minimization Options

Figure 2-8C Option 2



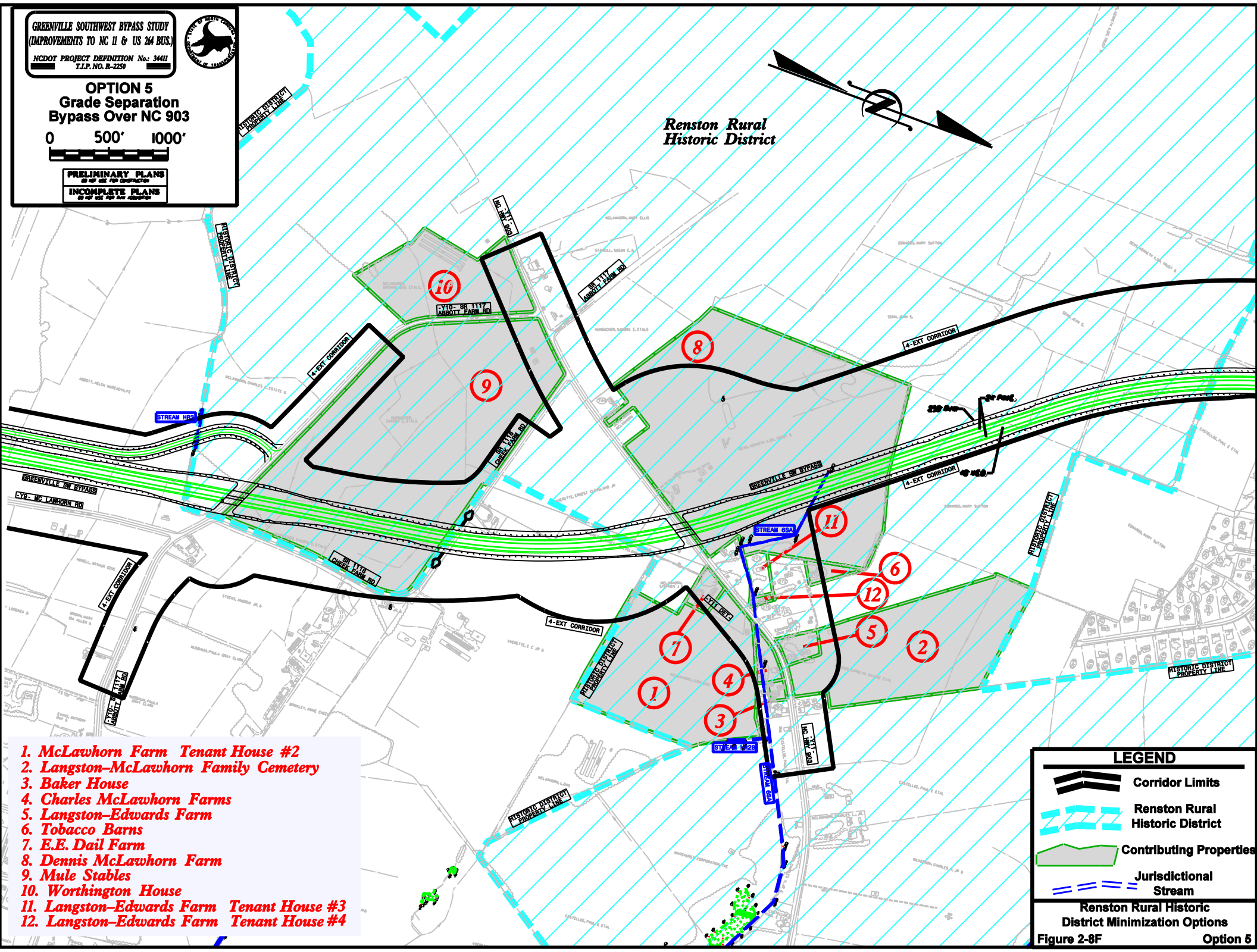
Renston Rural Historic District Minimization Options

Figure 2-8D Option 3



Renston Rural Historic District Minimization Options

Figure 2-8E Option 4



Renston Rural Historic District Minimization Options

Figure 2-8F Option 5

TABLE 2-9: ENVIRONMENTAL IMPACTS OF PREFERRED ALTERNATIVE AND HISTORIC DISTRICT MINIMIZATION OPTIONS

		Preferred Alternative (Original)	Option 1 (Half Clover on South Side of NC903)	Option 2 (Alternate 4-EXT over Abbott Farm Road & NC 903)	Option 3 (Alternate 4-EXT over Abbott Farm Road & NC 9031 with No Interchange at NC903)	Option 4 (Alternate 4-EXT over Abbott Farm Road & NC 903 with Half Clover on South Side of NC903)	Option 5 (Alternate 4-EXT shifted over Abbott Farm Road & NC 903with No Interchange at NC903)
Relocations	**Residential**	42	42	38	35	38	34
	Business	2	2	2	2	2	2
	Total Relocations	44	44	40	37	40	36
Renston Rural Historic District Impacts# (acres)		100.9	81.5	90.4	43.7	71.2	39.0
Streams	**Stream Crossings**	9	9	8	7	7	8
	Stream Impacts (linear feet)	1607	1607	1500	1463	1463	1757
Riparian Buffer	**Zone 1 (ft^2)**	96,269	96,269	89,223	87,117	87,117	102,218
	Zone 2 (ft^2)	64,378	64,378	59,275	57,396	57,396	67,419
	Total Buffer Impacts (ft^2)	160,647	160,647	148,498	144,513	144,513	169,637
Wetlands (acres)		0.1	0.1	0.1	0.1	0.1	0.1
Floodplains (acres)		0	0	0	0	0	0
Federally Protected Species		None	None	None	None	None	None
Prime Farmland Soils in Historic District (acres)		77.58	53.17	70.10	37.18	54.00	32.93
Noise Impacts	**No. of properties impacted without mitigation**	17	17	17	17	17	17
	No. of properties impacted with mitigation	7	7	7	7	7	7
Construction Cost Difference from Original Option~		N/A	+$100,000	-$1,700,000	-$6,900,000	-$1,700,000	-$7,700,000

Relocations were calculated based on existing occupied buildings (June 2006); impacts were calculated based on preliminary designs

Includes Charles McLawhorn Historic Property ~ Construction cost only; does not include right-of-way cost

TABLE 2-10: RENSTON RURAL HISTORIC DISTRICT IMPACTS BY MINIMIZATION OPTION

Contributing Property – (Map #)*	Property Name	Acres Impacted						Contributing Structure Displaced?					
		Original	Option 1	Option 2	Option 3	Option 4	Option 5	Original	Option 1	Option 2	Option 3	Option 4	Option 5
1	McLawhorn Farm Tenant House #2	0.65	0.65	0.27	0	0.16	0	--	--	--	--	--	--
2	Langston-McLawhorn Family Cemetery	1.49	1.49	1.37	0	1.37	0	--	--	--	--	--	--
3	Baker House	0.14	0.14	0	0	0	0	Yes-house	Yes-house	--	--	--	--
4	Charles McLawhorn Farms	0.50	0.50	0	0	0	0	Yes-house	Yes-house	--	--	--	--
5	Langston-Edwards Farm	0.13	0.13	0.02	0	0.02	0	Yes-barn	Yes-barn	Yes-barn	--	--	--
6	Tobacco Barns	0.31	0.31	0.31	0	0.31	0	--	--	--	--	--	--
7	E. E. Dail Farm	0.73	0.73	0.24	0	0.24	0	Yes-house	Yes-house	Yes-house	--	Yes-house	--
8	Dennis McLawhorn Farm	32.32	11.57	32.18	12.27	12.40	9.39	Yes-5 bldgs	Yes-5 bldgs	Yes-5 bldgs	Yes-5 bldgs	Yes-5 bldgs	--
9	Mule Stables	14.69	14.87	14.48	9.30	10.88	8.96	--	--	--	--	--	--
10	Worthington House	0.37	0.37	0.03	0	0.03	0	--	--	--	--	--	--
Total Impacts to Contributing Properties		51.33	30.75	48.90	21.57	25.41	18.34	9 bldgs	9 bldgs	7 bldgs	5 bldgs	6 bldgs	0 bldgs
Possible Access Issues#													
11	Langston-Edwards Farm Tenant House #3	X	X	X									
12	Langston-Edwards Farm Tenant House #4	X	X	X									

* Refer to Figures 2-8A to 2-8F

These properties could be impacted by control of access requirements; if these requirements affect a property, the entire property will be acquired.

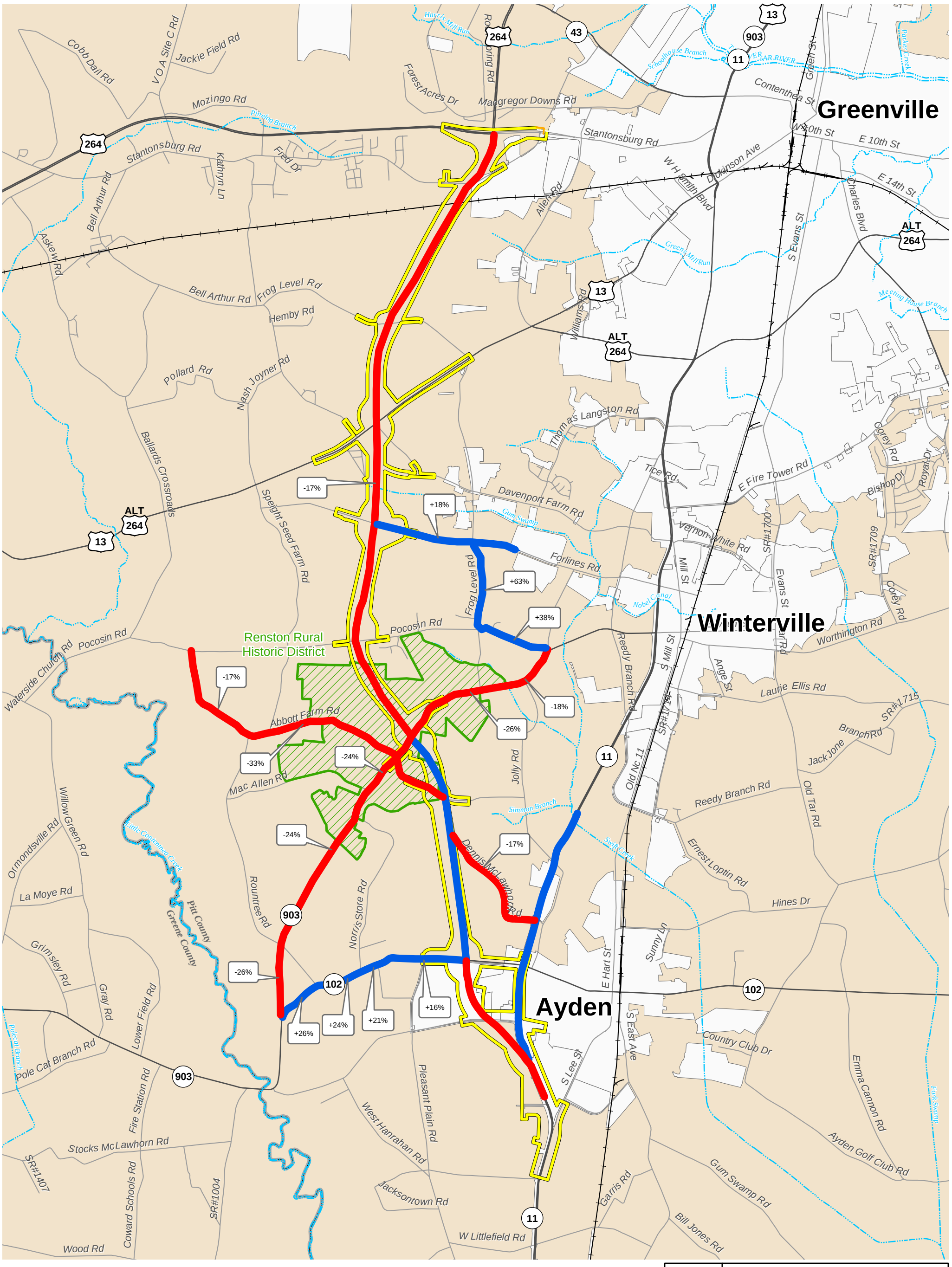
Minimization Option 5

This option would remove the NC 903 interchange entirely and shift eastward the alignment of the mainline Bypass, also taking it over NC 903 and Abbott Farm Road. While it would require eight stream crossings, one fewer than the preferred alternative, it would impact more linear feet of streams and a larger area of riparian buffers than the preferred alternative. However, this option would remove all impacts to contributing structures within Renston and would impact 18 acres within contributing properties, offering the greatest minimization of impacts to contributing structures and properties within the historic district.

Two of the minimization options (Option 3 and Option 5) would include removal of the NC 903 interchange. To determine how removal of this interchange would affect traffic volumes and levels of service on the Bypass and the surrounding road network, a forecast of design year (2030) traffic was prepared for scenarios with and without the NC 903 interchange. This analysis was a key part of the assessment of the minimization options as one of the components of the established purpose and need for the Bypass is to improve traffic flow and congestion on NC 11 (Memorial Drive) and US 264 Business (Stantonsburg Drive). If removing the NC 903 interchange would result in substantial increases in traffic volumes on NC 11 and US 264, it could limit the ability of the Bypass to meet the project's purpose and need.

Forecasted design year traffic volumes for many of the roadway segments studied were unchanged between the two scenarios (with and without the NC 903 interchange). Diagrams showing forecasted traffic volumes are shown in Appendix D. For most roadway segments with forecasted differences in volumes, many of these differences were small, and in general, levels of service were unchanged; there were, however, some notable exceptions. Table 2-11 lists the roadway segments with forecasted increases or decreases in traffic volumes without the interchange and Figure 2-9 illustrates the locations of these segments. Without the interchange, 2030 traffic volumes on the Bypass are forecasted to be slightly higher south of NC 903 and slightly lower north of Forlines Road; the volume between Forlines Road and NC 903 is forecasted to decrease by 17 percent (4,600 vehicles). Volumes on roadway segments in the vicinity of the Renston Rural Historic District (e.g. NC 903, Abbott Farm Road) are forecasted to decrease without the interchange. Volumes on NC 11 are forecasted to increase slightly although levels of service on segments and at intersections along this roadway are not forecasted to change. Without the interchange, Volumes on NC 102 are forecasted to increase by 16 to 26 percent; however, levels of service on NC 102 are not forecasted to change. Roadway segments east of the Bypass in the Forlines Road area, particularly on Frog Level Road between Forlines and Pocosin Road are also forecasted to experience considerable percent changes in volumes. Levels of service on these segments are not forecasted to change, although worsened intersection levels of service are forecasted for the unsignalized intersection of Frog Level Road and Pocosin Road (from LOS C/C at AM/PM peak to LOS F/E).

While there are some notable changes in forecasted 2030 traffic volumes on surrounding roadway segments without the Bypass interchange at NC 903, in general these changes are fairly small and in nearly all cases will not affect levels of service. The two minimization options that include



Legend

- Reduction in Traffic
- Increase in Traffic
- XX% % Reduction / Increase > 15%
- Preferred Alternative 4-EXT

N W E S

0 0.5 1 2 Miles

North Carolina Department of Transportation

Greenville Southwest Bypass Study
(Improvements to NC 11 & US 264 Bus)

NCDOT Project Definition No.: 34411
T.I.P. No. R-2250

Figure 2-9

2030 Traffic Volume Changes With NC 903 Interchange Removal

TABLE 2-11: 2030 TRAFFIC VOLUMES WITH AND WITHOUT NC 903 INTERCHANGE*					
Road	**Segment**	**ADT – With NC 903 Interchange**	**ADT – Without NC 903 Interchange**	**Change in ADT**	**Percent Change**
Greenville Southwest Bypass	US 264 to US 13-264A	50,800	49,400	-1,400	-3%
	US 13-264A to Forlines Road	39,600	38,000	-1,600	-4%
	Forlines Road to NC 903	27,400	22,800	-4,600	-17%
	NC 903 to NC 102	21,800	22,800	1,000	+5%
	NC 102 to NC 11	16,200	15,400	-800	+5%
US 264	Stantonsburg Road to north of the study area	40,800	39,400	-1,400	-3%
US 13-264A	Greenville SW Bypass to Frog Level Road	27,600	27,400	-200	-1%
	Frog Level Road to east of the study area	23,600	23,700	100	-1%
Forlines Road	Greenville SW Bypass to Frog Level Road	17,100	20,100	3,000	+18%
	Frog Level Road to east of the study area	8,500	9,500	1,000	+12%
Frog Level Road	Forlines Road to Pocosin Road	3,500	5,700	2,200	+63%
Pocosin Road	East of the study area to Frog Level Road	2,600	3,600	1,000	+38%
Roundtree Road	West of the study area to Abbott Farm Road	1,200	1,000	-200	-17%
NC 903	East of the study area to Jolly Road	5,900	5,100	-800	-14%
	Jolly Road to Frog Level Road	6,500	5,300	-1,200	-18%
	Frog Level Road to Abbott Farm Road (west)	8,600	6,400	-2,200	-26%
	Abbott Farm Road (west) to Abbott Farm Road (east)	8,200	6,200	-2,000	-24%
	Abbott Farm Road (east) to Norris Store Road	7,600	5,800	-1,800	-24%
	Norris Store Road to NC 102	7,000	5,200	-1,800	-26%
Abbott Farm Road	NC 903 to Speight Seed Farm Road	600	400	-200	-33%
	Speight Seed Farm Road to Roundtree Road	1,400	1,200	-200	-14%
	NC 903 to McLawhorn Road	1,400	1,200	-200	-14%
McLawhorn Road	Abbott Farm Road to NC 11	1,200	1,000	-200	-17%
NC 11	Reedy Branch Road to Jolly Road	19,800	20,600	800	+4%
	Jolly Road to McLawhorn Road	18,800	19,600	800	+4%
	McLawhorn Road to NC 102	18,200	19,000	800	+4%
	Greenville SW Bypass to NC 102	21,800	22,600	800	+4%
NC 102	Greenville SW Bypass to Pleasant Plan Road	11,000	12,800	1,800	+16%
	Pleasant Plain Road to Norris Store Road	8,400	10,200	1,800	+21%
	Norris Store Road to Roundtree Road	7,600	9,400	1,800	+24%
	Roundtree Road to NC 903	6,800	8,600	1,800	+26%

*Only roadway segments with forecasted increases or decreases without the interchange are shown; traffic volumes were unchanged for all other roadway segments studied.

removal of the interchange (Options 3 and 5) would therefore be feasible. Because it would allow avoidance of all contributing structures in Renston and would impact the least acreage of contributing properties, Option 5 offers the greatest opportunity for minimizing impacts to the historic district. For this reason, the NEPA/Section 404 Merger Team concurred that Option 5 would be incorporated into the Preferred Alternative. A copy of the signed Concurrence Point 4A/Avoidance and Minimization Merger Team Agreement is in Appendix C.

2.8.2 Additional Preliminary Design Adjustments

In addition to the design adjustments agreed upon during Concurrence Point 4A, several other minor adjustments have been made to the preliminary design of the Preferred Alternative to address public concerns. On April 9, 2007, the Town of Ayden Board of County Commissioners adopted a resolution requesting several proposed modifications to the design of the Preferred Alternative. A copy of this resolution is in Appendix E. NCDOT reviewed each of these requested modifications and has responded to each as follows:

Request: Provide signalized local access to NC 102 between NC 11 and the proposed Bypass interchange at NC 102.

Response: An additional median opening will be added to NC 102 between the Bypass and NC 11 at the intersection with a service road to be located at the northeast quadrant of the Bypass interchange at NC 102. A traffic signal will be added to this intersection when signal warrants are met. To make provision for this intermediate access point along NC 102, the intersection servicing Wildwood Drive and the existing shopping center at the northwest corner of NC 11 and NC 102 will have to be converted to right-in/right-out access only. A directional crossover median opening will be included at the Wildwood Drive intersection to allow eastbound traffic on NC 102 to turn left into the shopping center.

Request: Retain local access from Old Snow Hill Road/Snow Hill Street to NC 11.

Response: Introducing a connection from Old Snow Hill Road/Snow Hill Street to NC 11 would present serious safety issues contrary to accepted engineering practices and driver expectations, so this proposed modification was not incorporated into the preliminary design of the Preferred Alternative. Several convenient alternate routes would provide access via NC 102 to the Bypass. Bypass travel times to area hospitals and other health care facilities should be significantly reduced compared to travel along existing NC 11.

Request: Provide improved access from NC 102 to The Pines subdivision [on the south side of NC 102, southeast of the proposed Bypass interchange at NC 102.]

Response: As described above, the existing intersection of NC 102 and Wildwood Drive will be converted to right-in/right-out access only to allow for the provision

of an intermediate access point on NC 102 between the Bypass and NC 11. An auxiliary or relocated entrance to the subdivision farther west along NC 102 would have to be financed by the Town of Ayden or a Homeowners Association and constructed with approval by the NCDOT District Engineer's Office.

Request: Provide measures that will keep The Pines subdivision from becoming attractive to cut-through traffic, [such as] keeping Wildwood Drive open to Old Snow Hill Road and retaining access from Old Snow Hill Road/Snow Hill Street to NC 11.

Response: The current design for Old Snow Hill Road/Snow Hill Street takes it over NC 11, creating a substantial fill situation such that the new roadway height along Old Snow Hill Road will be approximately 15 feet higher than existing at this location. This would make it difficult to reconnect Wildwood Drive without substantial impacts to the neighborhood and introduction of safety concerns at the intersection.

Request: Provide a noise barrier along the west side of The Pines subdivision.

Response: Preliminary noise studies, documented in the DEIS, did not show any noise barriers in the vicinity of The Pines to be reasonable and feasible. To date, noise studies have only recommended one noise barrier at the northern end of the project. If a noise barrier is found to be reasonable and feasible during the final noise study performed as designs are finalized, a barrier will be suggested and coordinated with affected properties.

Additional requests for design modifications were made by property owners who would be impacted by the preliminary design of the Preferred Alternative. These three property owners requested that a service road proposed in the southwest quadrant of Old Snow Hill Road and the Bypass be revised so that it would stop at the property line of the Cox Farm Properties parcel on the south side of Old Snow Hill Road. Copies of these requests are in Appendix E. NCDOT responded to this request by agreeing to shorten the service road off of Old Snow Hill Road to stop at the Cox property line and lengthening a service road from the Worthington Industrial Park, south of the Cox property, so that similar access is provided.

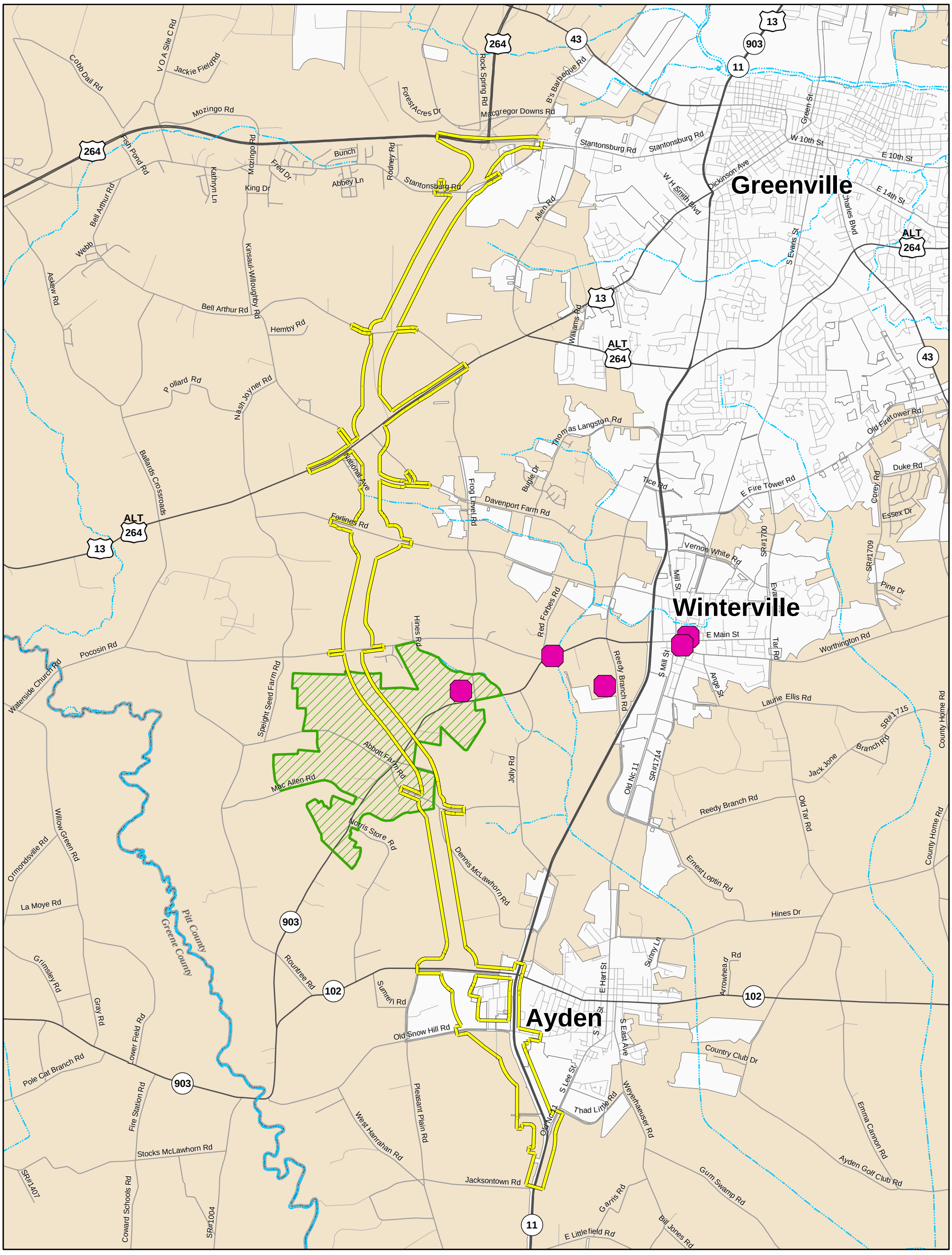
In addition to the above modifications, additional design modifications to service roads were made based on recommendations made in a service road study completed in June 2007 by NCDOT for the project (a memorandum listing the recommendations is in Appendix E). After reviewing the recommended modifications for feasibility, the following modifications were incorporated into the preliminary design for the Preferred Alternative:

- A service road originally proposed at the northwest quadrant of the NC 102 interchange was eliminated because its cost would far exceed the cost of acquiring the 3.7 acre Ann B. Sumrell parcel remainder that the service road would have accessed. A new service

road was added to the preliminary design at the northeast quadrant of this interchange because its cost would be significantly lower than the total cost to acquire two otherwise isolated parcels (21.6 and 13 acres in size) that would be accessed by the new service road. A median opening will be included on NC 102 at its intersection with the service road. The current median opening at Wildwood Drive, which provides access into The Pines subdivision, will be converted into a "left-over" median opening – an allowance for left turn access from NC 102 into the shopping center and Wildwood Drive.

- A service road originally proposed at the northeast quadrant of Pocosin Road and the Bypass was eliminated because its cost would far exceed the cost of acquiring two parcel remainders that will become isolated by the Bypass.
- The NCDOT will allow a sixty (60) foot break in the controlled access outside of the wetland limits to allow access to the Worthington Farm Property.
- A service road originally proposed at the southeast quadrant of Davenport Farm Road and the Bypass was eliminated because the parcel accessed by the service road will continue to have access to Davenport Farm Road and the extension of Bell Arthur Road.
- A service road proposed at the northeast quadrant of the US 13-264A interchange was shortened by approximately 675 feet because the four properties that would have been accessed at the end of the originally proposed service road would be uneconomic remnants without service road access. Shortening the service road will create a savings in right-of-way and construction costs.
- An additional service road study is in the final stages and will provide access to a land locked portion of the Dews/Nelson property from Pocosin Road.

The current preliminary design for the Preferred Alternative, incorporating the above modifications along with Minimization Option 5, described in the previous section, is shown in Figure 2-10. Additional modifications may be made as the planning and design phases continue.



Legend

- Preferred Alternative (Corridor Limits)
- Renston Rural Historic District
- Historic Property

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(Improvements to NC 11 & US 264 Bus)

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Figure 2-10 **Preferred Alternative**