TRANSPORTATION PLANNING REPORT

PROPOSED NORTHERN CONNECTOR FROM US-11E (STATE ROUTE 34) WEST TO US-11E / 321 (STATE ROUTE 34) EAST GREENEVILLE, GREENE COUNTY

PREPARED BY
SAIN ASSOCIATES, INC.
IN COOPERATION WITH THE
TENNESSEE DEPARTMENT OF TRANSPORTATION
ENVIRONMENT AND PLANNING DIVISIONS

Recommended by:	Signature	DATE
CHIEF OF ENVIRONMENT AND PLANNING		5/3/06
TRANSPORTATION DIRECTOR PROJECT PLANNING DIVISION		5-2-06
TRANSPORTATION MANAGER 2 PROJECT PLANNING DIVISION	Bill Hart	5/2/06

This document is covered by 23 USC § 409 and its production pursuant to fulfilling public planning requirements does not waive the provisions of § 409.

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I. PROJECT HISTORY AND BACKGROUND INFORMATION

Project History

This report documents analyses undertaken to evaluate the opportunities for improving transportation accommodation on or as an alternative to U.S. Highway 11E in Greeneville, Tennessee. The impetus for this report originated in 1994 with House Resolution No. 157 (April 20, 1994). The resolution requested the Tennessee Department of Transportation (TDOT) evaluate opportunities to provide a four-lane highway to connect the cities of Pigeon Forge, Sevierville, Newport, and Greeneville, and the Tri-Cities Airport. The Feasibility Study for the route, called U.S. 321 (State Route 35), was completed in November 1995. Section 13 of the Feasibility Study proposed a connector route to the north of Greeneville, similar to the alignment addressed in this study.

In 2002, TDOT commissioned the Center for Transportation Research at the University of Tennessee (UT) to conduct a project assessment for U.S. 321 (State Route 35) in Greene County. The UT evaluation team recommended to TDOT that alternatives more consistent with the stated transportation needs of the City of Greeneville should be examined for Sections 12 and 13 and that those alternatives be considered in conjunction with participation from the City.

In September of 2003, TDOT received a request letter from the Mayors of Greene County, Greeneville, Baileyton, Mosheim and Tusculum in support of a "Northern Loop" around Greeneville. The request noted the stand alone feature of a "Northern Loop", stating that since the new road was consistent with the proposed State Route 35 (Pigeon Forge to Tri-Cities Airport Connector), work already conducted on that part of the project would not be lost and would tie into the rest of the U.S. 321 connector road if it were constructed.

Project Study Area

U.S. 11E is a four-lane urban principle arterial highway that extends in an east/west orientation through Greene County, providing access to Interstate 81 on the west side and Washington County to the east. For most of the study area, U.S. 11E has a median divided cross section with a depressed center median. However, a short portion of the highway between Tusculum Boulevard and Erwin Highway has a four-lane cross section with a center turn lane.

Figure 1 illustrates the location of Greeneville and U.S. 11E in the east Tennessee region, and Figure 2 shows the study area for this evaluation. The study focuses on an area extending from U.S. 11E in Greeneville northward for approximately four miles and from Mt. Pleasant Road on the west to Chuckey Ruritan Road on the east, a distance of approximately thirteen miles.

This report refers to traffic volume data and capacity analyses that were documented in a separate report entitled Traffic Forecast Study – Greeneville, TN – US 11E Proposed Bypass from Hal Henard Road to Stone Dam Road or SR 107, Greene County, prepared for the Tennessee Department of Transportation in February 2006.

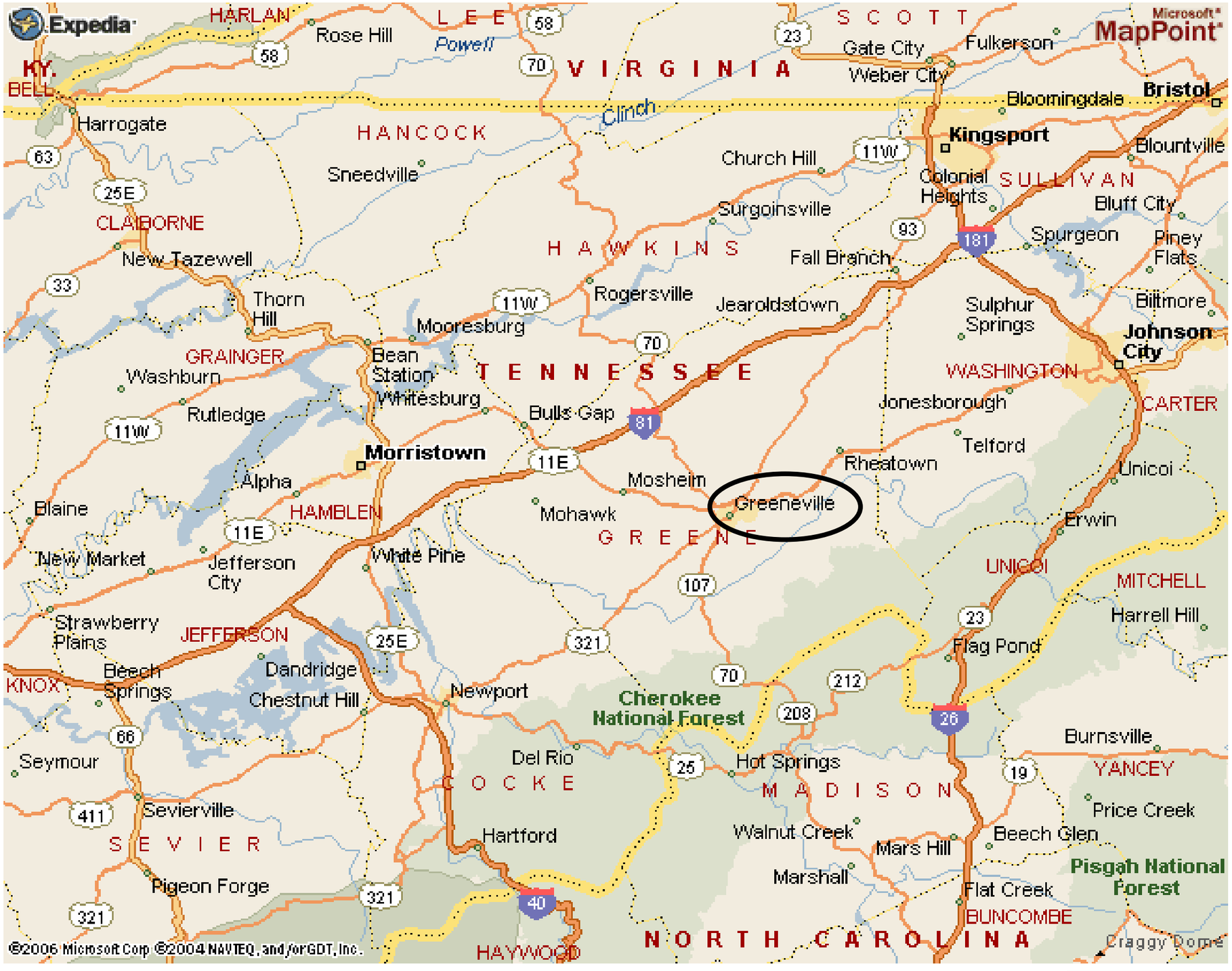


Figure 1

LOCATION MAP

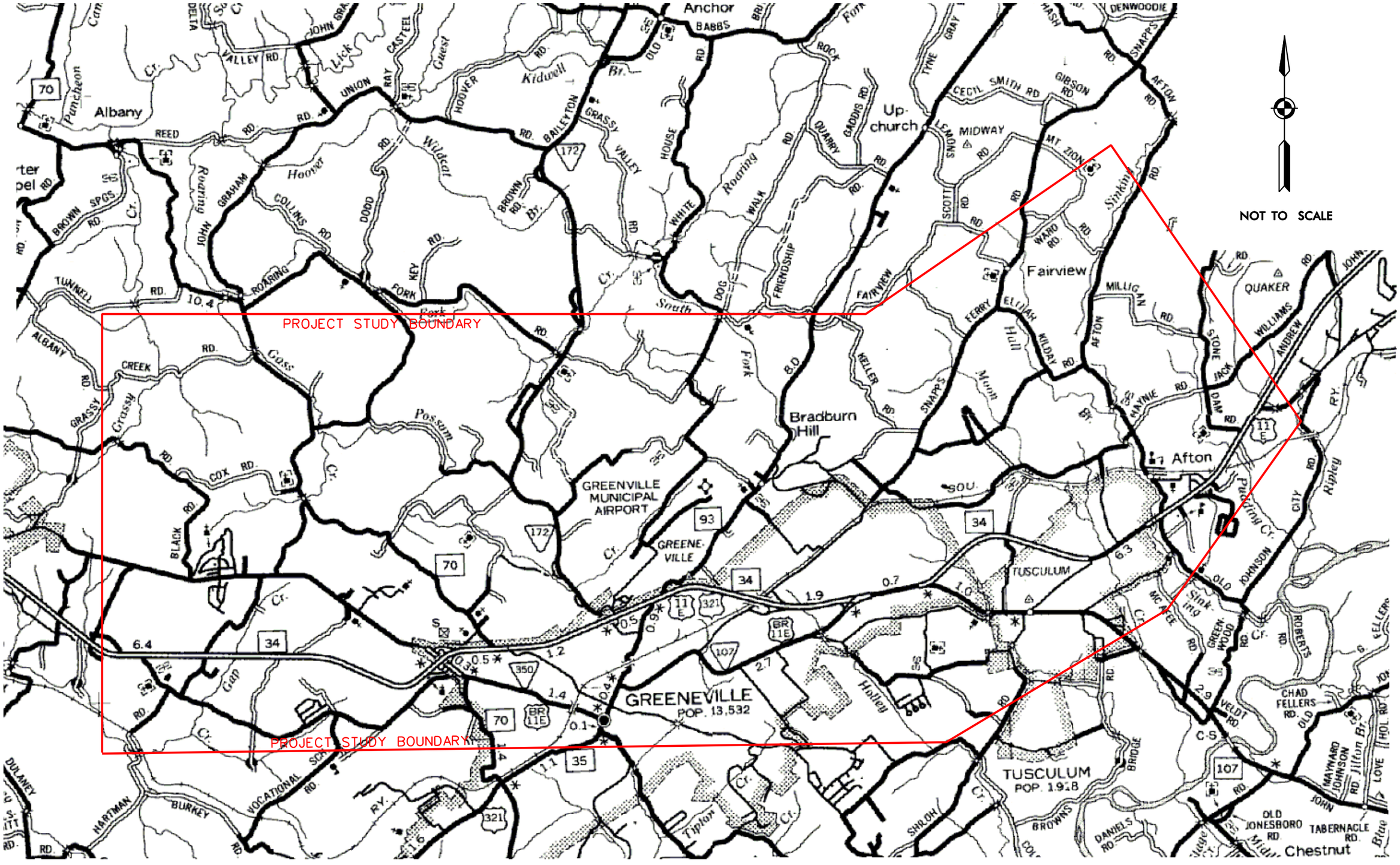


Figure 2

PROJECT STUDY AREA

Community Description

Greeneville, the county seat of Greene County, was established in 1783 and is the second oldest town in Tennessee. It is the home of the Andrew Johnson National Historic Site and numerous other sites of historical interest. Adjacent to Greeneville, the City of Tusculum is the home of Tusculum College, the oldest college in Tennessee. Also in Greene County is the Davey Crockett Birthplace State Park. The rich history and scenic beauty of the greater Greeneville area has made it a destination for tourists and a desirable community in which to live and work. The population of Greene County in the last decennial census (year 2000) was 62,909, of which 15,198 lived in the City of Greeneville. Population in Greeneville and Greene County increased by over 12% between 1990 and 2000. Growth has continued in the present decade with population estimates for 2004 at 64,718 in Greene County and 15,302 in Greeneville.

Greene County has over 90 manufacturing industries as well as more than 245,000 acres of farm land. There are two industrial parks owned by Greeneville and Greene County. Some of the larger manufacturing companies within the project study area include Plus Mark, Inc., John Deere Power Products, and Parker Hannifin. The primary farming commodities in Greene County include livestock, milk cows, hay, tobacco, and horses. Despite these assets, the area's leaders are eager to attract new industry to Greeneville and Greene County to spur job growth. According to statistics for February 2006 compiled by the Tennessee Department of Labor and Workforce Development the labor force in Greene County is experiencing an unemployment rate of 9.3%. This is 4.1% higher than the statewide average of 5.2% for Tennessee.

U.S. Highway 11E was widened and reconstructed as a bypass to the north side of Greeneville during the 1960s. Since that time, the City of Greeneville has seen an increase in commercial and industrial development along U.S. 11E that has increased traffic demand in the corridor. Figure 3 shows a map of the study area with marks to identify many of the major traffic generators located in the vicinity of U.S. 11E. The traffic generators are separated into three land use categories: 1) industrial or manufacturing, 2) retail, and 3) educational or institutional. Table 1 lists the name of each identified site.

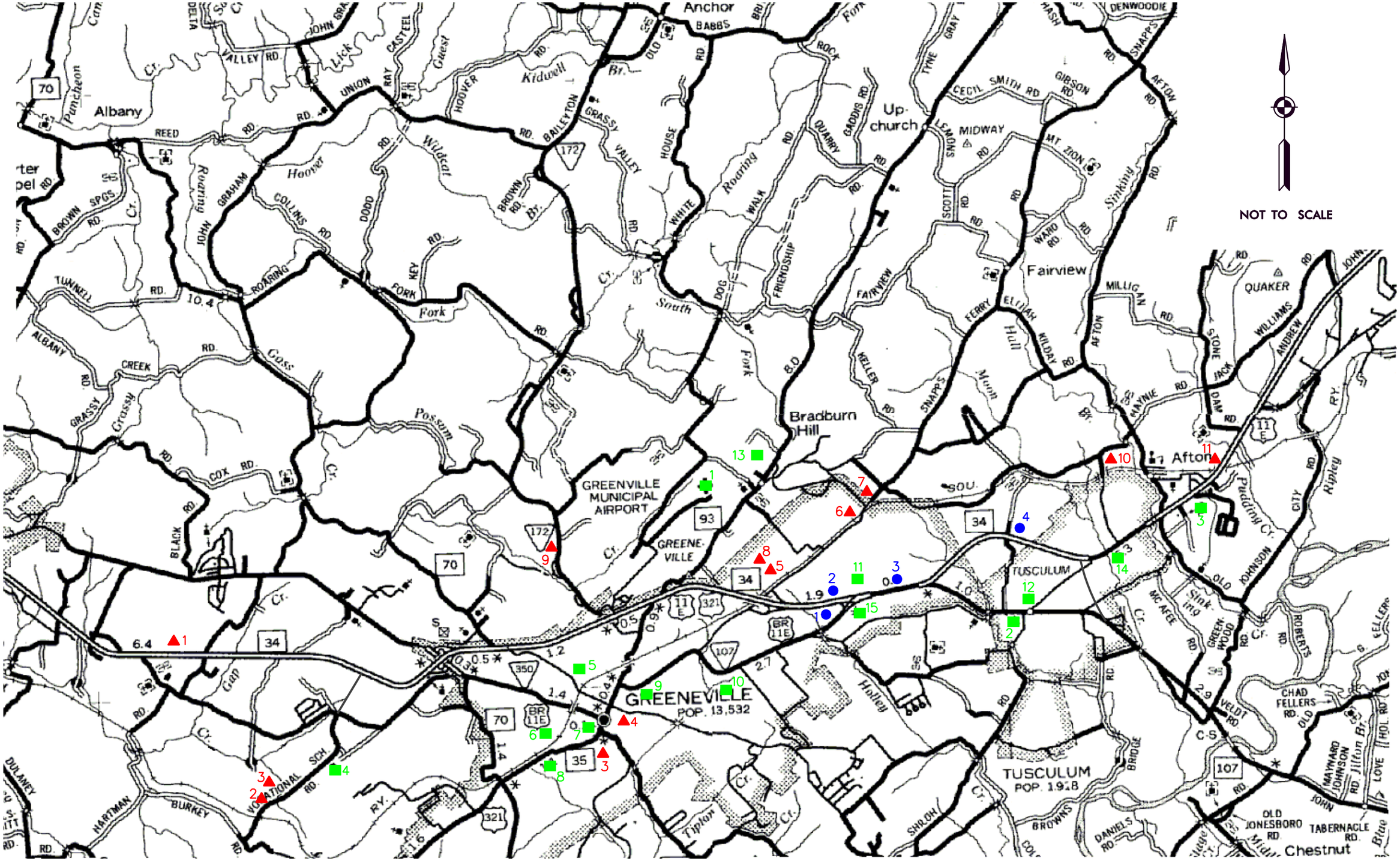


Figure 3

MAJOR TRAFFIC GENERATORS

Table 1
Major Traffic Generators

Map Symbol	Industrial or Manufacturing Business
▲ 1	TI Group Automotive Systems
▲ 2	John Deere
▲ 3	RPC Specialty Controls
▲ 4	Fulflex of Tennessee
▲ 5	Unaka Meco So-Pak-Co BTL Industries LMR Plastics
▲ 6	Parker Hannifin Group
▲ 7	Delfasco of Tennessee
▲ 8	Donaldson Company
▲ 9	Angus-Palm Industries
▲ 10	Alltrista Zinc Products
▲ 11	Plus Mark
Map Symbol	**Retail Business**
● 1	Greeneville Commons Shopping Center
● 2	Staples & Big Lots
● 3	Lowe's Home Improvement Store
● 4	Wal-Mart Supercenter
Map Symbol	**Public Facility, Institution, or School**
■ 1	Greeneville/Greene County Municipal Airport
■ 2	Tusculum College
■ 3	Chuckey Doak High School
■ 4	Greene County Center for Technology
■ 5	Highland Elementary School
■ 6	George Clem School
■ 7	Andrew Johnson School
■ 8	Crescent School
■ 9	Greeneville High School
■ 10	Eastview Elementary School
■ 11	Tusculum View Elementary School
■ 12	Doak Elementary School
■ 13	Hardin View School
■ 14	Greene Valley Development Center
■ 15	Laughlin Memorial Hospital

Existing Transportation Conditions

Increased development along U.S. 11E has fueled a steady increase in traffic volumes on the highway. In 1985, average daily traffic on U.S. 11E varied from approximately 8,700 vehicles per day west of Mt. Pleasant Road to approximately 20,600 near Tusculum Boulevard. In 2006, traffic volumes at those same locations had risen to approximately 23,000 and 31,500, respectively. According to historic traffic data from TDOT's Advanced Traffic Data Analysis and Management (ADAM) system, the average annual growth rate for traffic on U.S. 11E in the study area is 2.9% west of State Route 93 and 1.9% east of State Route 93.

The increasing traffic volumes on U.S. 11E have resulted in frequently occurring traffic congestion and travel delays. Also of concern is the mix of truck and passenger car traffic on a highway where there is no access control and many closely spaced intersections. The function of U.S. 11E as a bypass to downtown Greeneville and an efficient corridor for moving regional traffic has been altered by the expansive development of commercial sites along the highway with easy access to a multi-lane roadway. An origin destination study conducted by TDOT in 2004 revealed that approximately 22% of all vehicle trips on U.S. 11E during the morning peak hour are through trips, rather than trips with an origin or destination in Greeneville. In the afternoon peak hour, the through trip percentage increases to 29% of all vehicles. The mobility of drivers traveling through the study area is hindered by traffic congestion from locally generated traffic.

Traffic crash rates on U.S. 11E were calculated from crash data for the years 2001 through 2003. Table 2 summarizes the crash rates for two sections of the highway. The section between Mt. Pleasant Road and State Route 93 has a crash rate that is similar to the statewide average. The section between State Route 93 and Wagon Wheel Trail has a crash rate that is fifty percent higher than the statewide average. It should be noted that there are no signalized intersections in the Mt. Pleasant Road to State Route 93 section. In that area, all major cross streets are either grade separated or controlled by a side-street stop condition. The section between State Route 93 and Wagon Wheel Trail currently has eight traffic signals and denser commercial development.

Table 2
Traffic Crash Rates for 2001-2003

Location	Statewide Average	Actual Crash Rate
US 11E between Mt. Pleasant Road and SR-93	2.07	2.02
US11E between SR-93and Wagon Wheel Trail	2.07	3.11

There are few alternative modes of transportation available in the study area. Figure 4 shows the location of air, rail, bicycle, and intercity bus facilities. The Greeneville/Greene County Municipal Airport provides chartered flights, cargo shipping, taxi and rental car services. A rail line operated by Norfolk Southern Railway roughly parallels U.S. 11E in the study area. This rail line provides freight services but no passenger service. The rail line provides food-grade and general warehouses as well as paper and steel distribution in Greeneville via So-Pak-Co, Inc., which is located along the rail line at Snapps Ferry Road. A designated bikeway parallels a portion of U.S. 11E between Snapps Ferry Road and Erwin Highway. The bicycle accommodation is through a shared use shoulder, not a designated bike lane. Intercity bus service is provided in Greeneville by Greyhound Lines, Inc. via a Raceway gas station on U.S. 11E between State Route 70 and State Route 172.

In addition to these alternative transportation modes in the study area, Greene County has access to two larger airports via U.S. 11E. To the west, the McGhee Tyson Airport, serving metropolitan Knoxville, is located 70 miles from Greeneville. McGhee Tyson Airport provides non-stop service to 12 major airline hubs. To the east, Tri-City Regional Airport is located just 40 miles from Greeneville off Interstate 81. Tri-City Regional Airport provides non-stop flights to six hub cities.

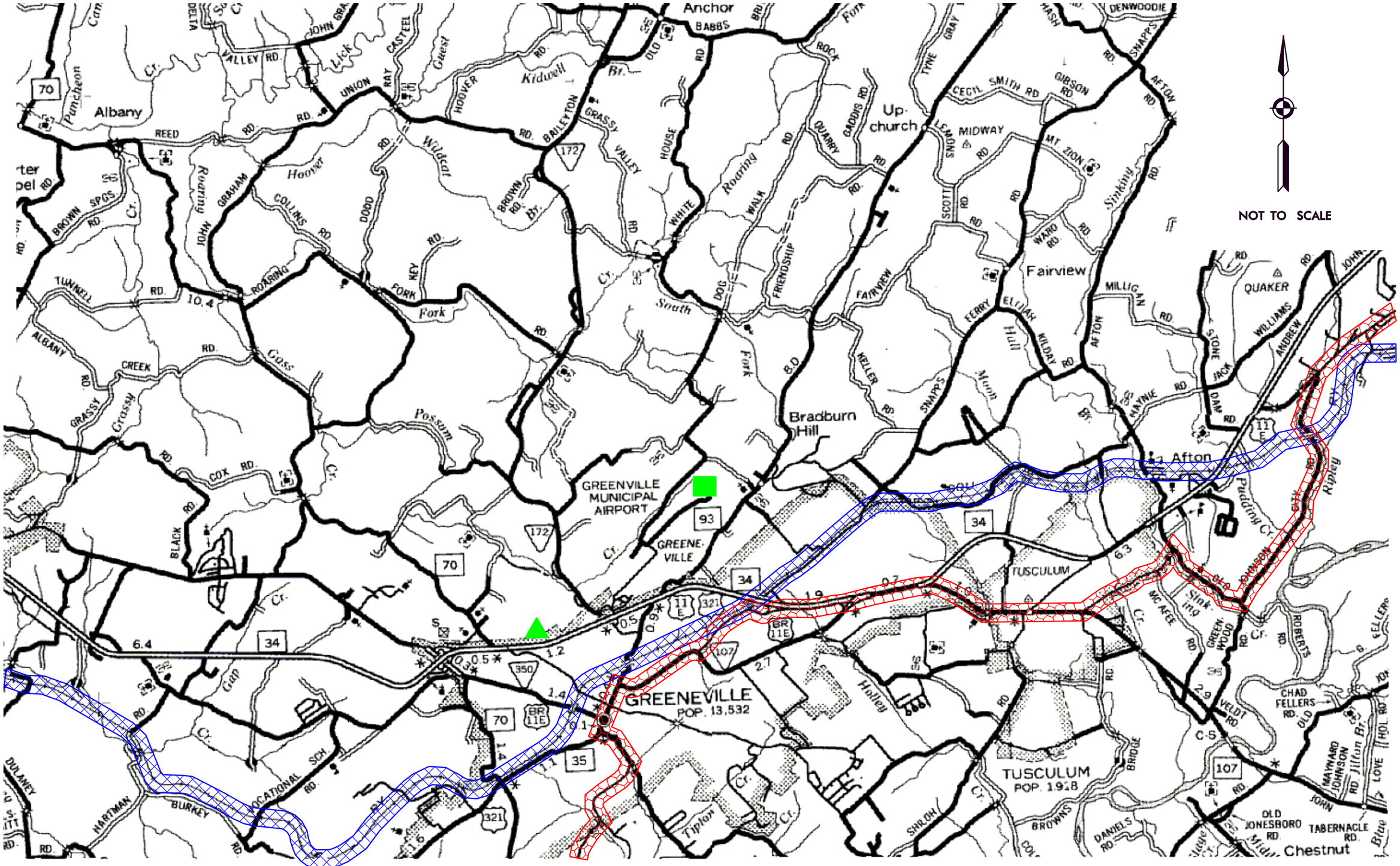


Figure 4

ALTERNATIVE TRANSPORTATION MODES IN STUDY AREA

II. PURPOSE & NEED FOR THE PROJECT

U.S. 11E is a principle arterial route linking Interstate 81 to Interstate 181 through Greene and Washington Counties. U.S. 11E serves as the primary means of interstate access for the cities of Greeneville and Tusculum. During the 1960's, the Tennessee Department of Transportation built a bypass route for U.S. 11E around the northern side of Greeneville and Tusculum. Since that time, commercial and industrial development in Greene County has steadily grown and that trend is continuing. As the cities of Greeneville and Tusculum have grown around the U.S. 11E bypass, traffic volumes on the highway have increased. There has been very little control of driveway access onto U.S. 11E, which has encouraged commercial development and created a traffic mix that includes a large amount of local traffic accessing businesses along the highway. The functionality of U.S. 11E as an intercity route has been diluted by the intense commercial development and lack of access control.

The need for improvement of U.S. 11E was identified by the Mayors of Greene County, Greeneville, Tusculum, Baileyton, and Mosheim in a letter to TDOT Commissioner Gerald Nicely in September 2003. The Mayors' letter specifically requested construction of an access controlled, median divided, four-lane highway as a "Northern Loop" to the existing U.S. 11E that would extend from west of Hal Henard Road to a point aligned with or east of State Route 107 (Tusculum Bypass). The City of Tusculum, while supporting construction of a northern connector, opposes aligning it with State Route 107. In a separate letter dated December 2003, a citizens group known as Citizens for Sensible Roads requested that TDOT evaluate opportunities for widening U.S. 11E as an alternative to a northern connector road.

Existing 2004 traffic volumes on U.S. 11E were 25,600 vehicles per day on the west end of the Greeneville study area (west of Business U.S. 11E / West Summer Street) and 21,800 vehicles per day on the east end (east of State Route 107 / Tusculum Bypass). The highest existing 2004 daily traffic volume of 38,130 occurred just west of Erwin Highway. The projected 2029 traffic volumes for these same locations are estimated to be 42,850 west of Business U.S. 11E, 31,730 east of S.R. 107, and 53,130 west of Erwin Highway. There are capacity deficiencies at several major intersections on U.S. 11E. The area between Snapps Ferry Road and Erwin Highway is densely commercialized with multiple traffic signals and driveways. In this commercialized area where traffic volumes are highest, traffic congestion is a frequent occurrence and the traffic crash rate is fifty percent higher than the Tennessee Statewide average for similar facilities. The existing roadway between Snapps Ferry Road and Erwin Highway provides no excess capacity to accommodate future growth in traffic.

The primary need on U.S. 11E and in Greene County is for improved regional mobility. Several specific needs are encompassed in this broad goal:

- Provide an access controlled east/west route to serve demand for regional accessibility to the interstate highway system and protect that provision for the future.
- Allow for additional economic growth in Greeneville, Tusculum, and Greene County by providing improvement to the transportation system.
- Reduce the density of traffic on U.S. 11E in order to improve safety and mobility.
- Provide an alternate route to reduce the amount of truck traffic on U.S. 11E, especially in the section where there is no median and there are multiple traffic signals.

III. OPTIONS CONSIDERED

Several options were considered and evaluated as a means of addressing the transportation needs along U.S. 11E and in the Greeneville/Greene County area. The options, illustrated on Figure 5, include the following:

a. "No Build" - Make no physical changes to U.S. 11E.
b. "Signal System Improvements" – Install a coordinated signal system to improve traffic progression on U.S. 11E with no geometric changes to the roadway.
c. "Widen U.S. 11E" - Add two travel lanes (one in each direction) to U.S. 11E to increase the roadway's physical capacity.
d. "Build Option A" – Construct a new access controlled northern connector road to extend from west of Hal Henard Road to a point east of Stone Dam Road.
e. "Build Option A with C Extension" – This option is a variant on Option A that was evaluated in the Traffic Forecast Study. It maintains the same alignment as Option A but with an extension on the west side from U.S. 11E to U.S. 321. The Option C extension is a separate project studied by TDOT.
f. "Build Option B" – Construct a new access controlled northern connector road to extend from west of Hal Henard Road to State Route 107 (Tusculum Bypass).
g. "Build Option B with C Extension" – This option is a variant on Option B that was evaluated in the Traffic Forecast Study. It maintains the same alignment as Option B but with an extension on the west side from U.S. 11E to U.S. 321. The Option C extension is a separate project studied by TDOT.

The following pages of this report will summarize the concept, typical section, anticipated operational performance, preliminary cost (based upon a per mile estimate), and identified environmental concerns of each considered option. The operational performance assessment is based upon traffic projections documented in the Traffic Forecast Study. Future average daily traffic volumes for each option are summarized in Tables 3 and 4 which were extracted from the Traffic Forecast Study. Traffic volume maps are included in the detailed description of each option. Table 5 includes a comparison of several performance measures that were assessed in the Traffic Forecast Study for all options. These performance measures are referred to in the subsequent discussion of each improvement option.

Table 3
Future 2009 ADT Ranges

	No Build or Widen US 11E	Opt A	Opt B	Opt A/C	Opt B/C
US 11E	25,400-40,960	18,270-35,200	18,290-31,160	17,290-34,600	17,220-29,770
Bypass		5,360-7,760	7,110-8,930	3,730-9,350	3,730-10,580

Table 4
Future 2029 ADT Ranges

	No Build or Widen US 11E	Opt A	Opt B	Opt A/C	Opt B/C
US 11E	34,080-53,600	29,150-55,540	28,690-44,750	27,450-53,840	26,640-42,830
Bypass		17,200-34,700	22,020-41,390	6,310*-36,980	6,310*-43,830

*The low volumes are on the "C" portion that does not have significant latent demand development.

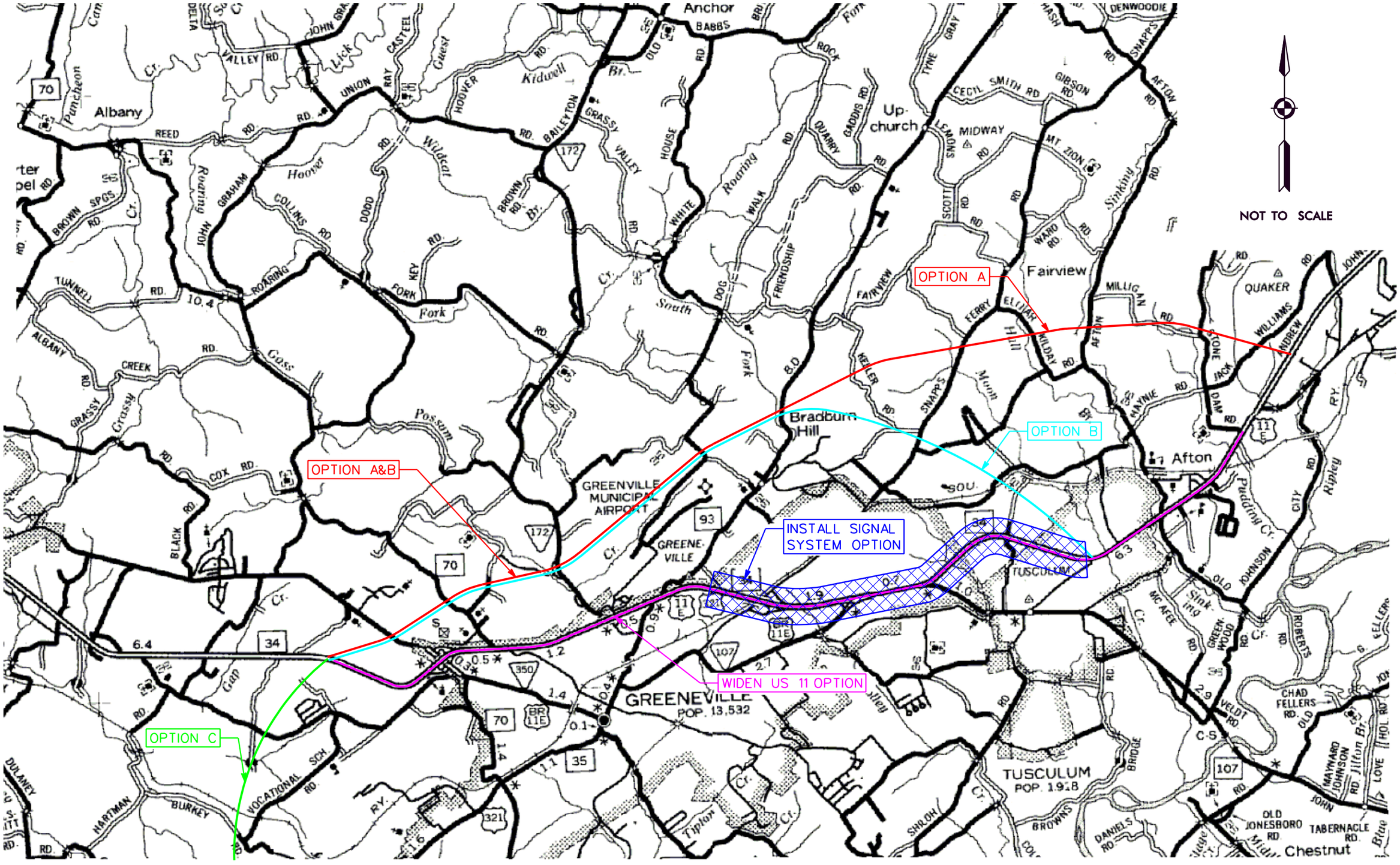


Figure 5

CONSIDERED OPTIONS

Table 5
Performance Measure Comparison

Performance Measure	No Build	Signal System	Widen US 11E	Build Option			
				A	A/C	B	B/C
Highest PM Peak Density on US 11E	30.9	30.9	20.6	26.1	25.2	24.5	23.4
PM Peak Density on Connector Option				19	20.2	22.6	23.9
Highest PM Peak Flow Rate on US 11E	1392	1392	928	1174	1133	1101	1054
PM Peak Flow Rate on Connector Option				853	909	1017	1077
Truck % on US 11E	4%-8%	4%-8%	4%-8%	2%-5%	3%-5%	2%-5%	2%-6%
Truck % on Connector Option				6%-7%	5%-7%	5%	4%-7%
Construction Cost	$0	$1,002,000	$97,506,000	$126,708,000	$179,930,000	$116,593,000	$169,815,000

No Build Option

Concept:
Make no physical changes to U.S. 11E

Typical Section (existing)**:**

- Hal Henard Road to Bachman Drive
  - four travel lanes with depressed grass median
  - right-of-way varies from 120'-200'
- Bachman Drive to Erwin Highway
  - four travel lanes with center turn lane
  - 80' of right-of-way
- Erwin Highway to east of Stone Dam Road
  - four travel lanes with depressed grass median
  - 300' of right-of-way

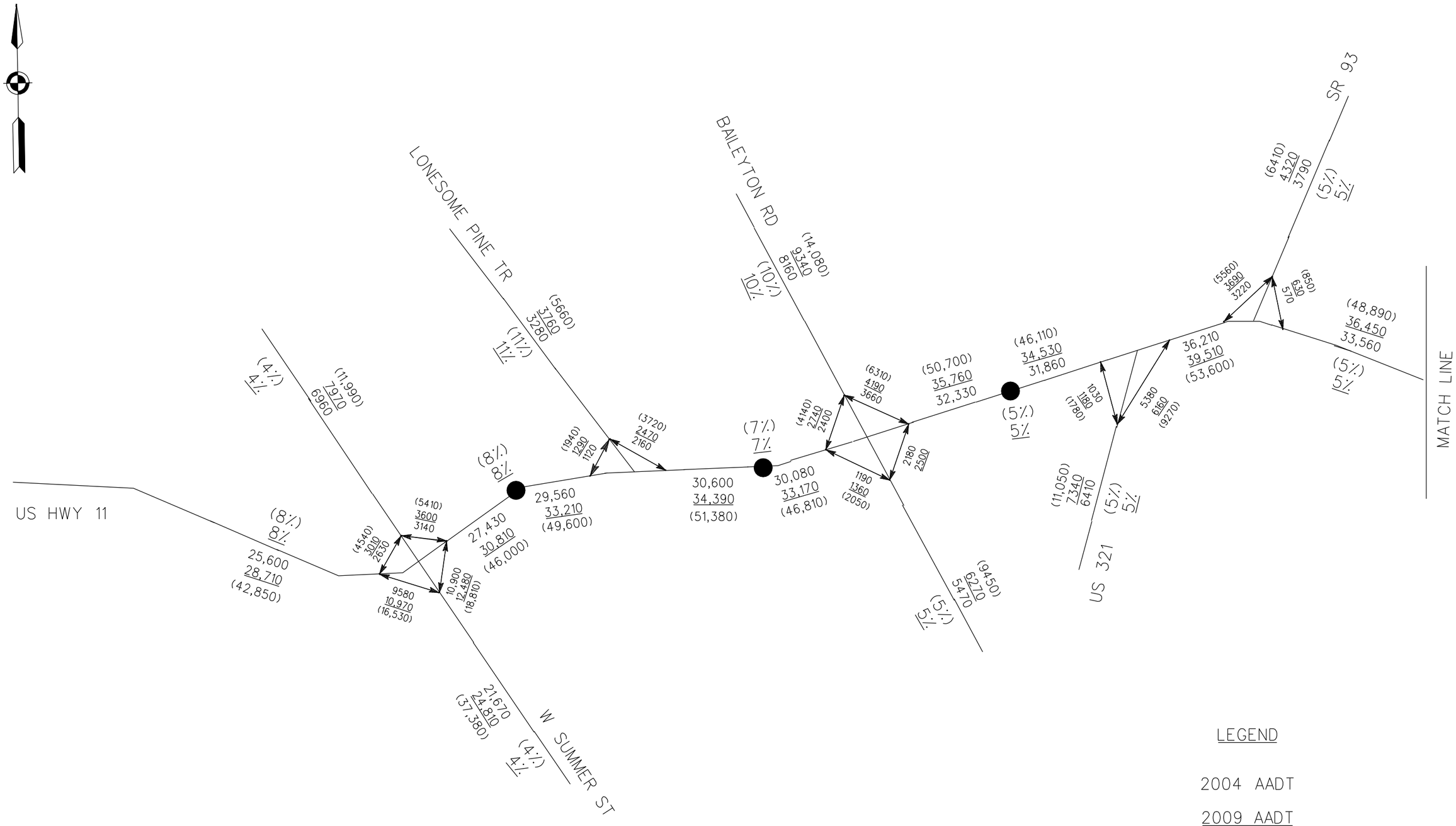
Anticipated Operational Performance:
Figures 6 and 7 illustrate the anticipated average daily traffic volumes on U.S. 11E in 2009 and 2029. By the year 2029, traffic on U.S. 11E in the study area is expected to reach a peak of approximately 54,000 vehicles per day. A traffic volume of that magnitude typically exceeds the carrying capacity of a four-lane median divided roadway. U.S. 11E has some grade separated intersections, however, the preponderance of commercial driveways limits its carrying capacity. Without any improvements, the existing peak hour traffic congestion on U.S. 11E will intensify and spread to more hours of the day.

Truck traffic on U.S. 11E ranges from 4% to 8% of total daily traffic in the study area. These percentages are higher than typical urban arterials where truck percentages might vary from 2% to 4%. The higher truck percentages are a result of the industrial and manufacturing facilities located along the U.S. 11E corridor.

As noted previously, the traffic crash rate on U.S. 11E is similar to the statewide average in the area west of State Route 93 but is fifty percent higher than average in the area east of State Route 93. As traffic volumes increase on the facility with no geometric improvements, those crash rates will likely increase.

Construction Cost Estimate: $0

Identified Environmental Concerns:
No specific environmental concerns are identified at this time for the No Build option.



LEGEND

2004 AADT

2009 AADT

(2029 AADT)

0% = 2009 AADT TRUCK %

(0%) = 2029 AADT TRUCK %

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FIGURE 6
"NO BUILD" (EXISTING SYSTEM) AADT

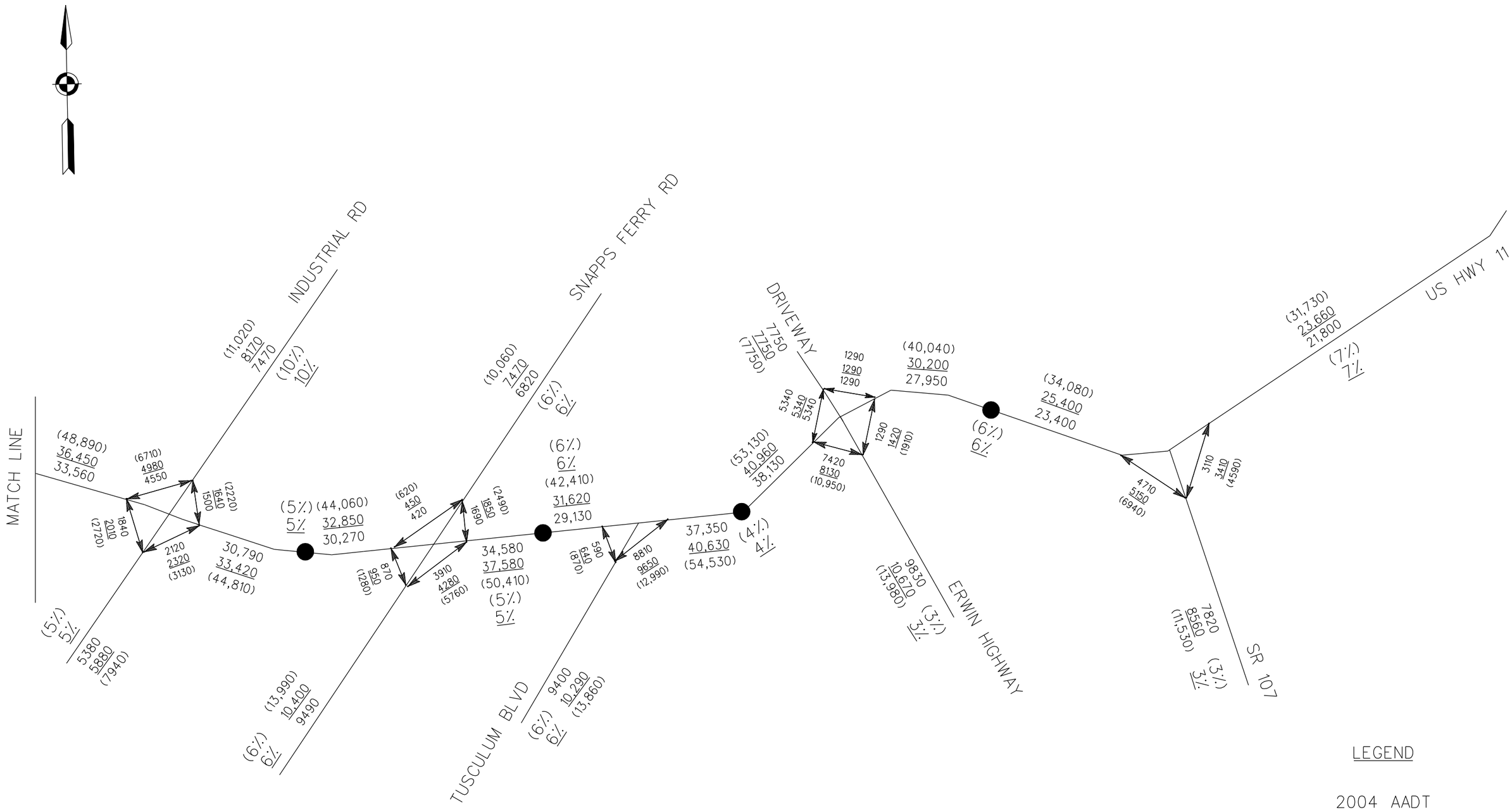

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FIGURE 7
"NO BUILD" (EXISTING SYSTEM) AADT

Signal System Improvements

Concept:
Upgrade existing signal equipment on U.S. 11E and install a signal system for eight intersections using radio interconnect with traffic responsive signal timing.

Typical Section (existing)**:**

- Hal Henard Road to Bachman Drive
  - four travel lanes with depressed grass median
  - right-of-way varies from 120'-200'
- Bachman Drive to Erwin Highway
  - four travel lanes with center turn lane
  - 80' of right-of-way
- Erwin Highway to east of Stone Dam Road
  - four travel lanes with depressed grass median
  - 300' of right-of-way

Anticipated Operational Performance:
Traffic volumes with this option will be comparable to the No Build volumes illustrated on Figures 6 and 7. In the short term, a modest level of improvement in traffic progression and crash rate could be achieved with a coordinated signal system that improves efficiency and reduces stops. However, better signal timing will not have a measurable impact to the highway's carrying capacity over the long term (2029). For traffic volumes in 2009 and 2029, traffic density and flow rates with this option will be comparable to the No Build scenario.

This option is not expected to have any impact on truck traffic or crash rates on U.S. 11E. Truck percentages and crash rates are expected to be the same as those reported for the "No Build" option.

Construction Cost Estimate: $1,002,000
This preliminary cost estimate is based upon installing new signal equipment at eight intersections with video detection and radio interconnect.

Identified Environmental Concerns:
No specific environmental concerns are identified at this time.

Widen U.S. 11E

Concept:
Widen U.S. 11E along its existing alignment to add two additional travel lanes (one in each direction). In order to maintain as much access control as possible, keep the depressed grass median where it currently exists. In the section from Bachman Drive to Erwin Highway, minimize the amount of additional right-of way by maintaining a center turn lane.

Typical Section (proposed)**:**

- west of Hal Henard Road to Bachman Drive
  - six travel lanes with variable depressed grass median
  - right-of-way varies from 170'-250'
- Bachman Drive to Erwin Highway
  - six travel lanes with center turn lane
  - minimum 108' of right-of-way
- Erwin Highway to east of Stone Dam Road
  - six travel lanes with depressed grass median
  - 300' of right-of-way

Anticipated Operational Performance:
Traffic volumes with this option will be comparable to the No Build volumes illustrated on Figures 6 and 7. Traffic capacity will be significantly improved on U.S. 11E with the additional travel lanes. The peak traffic density and peak flow rate are expected to improve by approximately 33% over the No Build option.

No change in truck traffic is expected with this option. Truck percentages will remain at 4% to 8% of total daily traffic in the study area.

The impact of widening U.S. 11E on crash rates cannot be accurately predicted. However, it is likely that the crash rate will be similar to existing conditions since it is proposed to maintain the center median or turn lane where it exists and since no changes in access control are anticipated.

Construction Cost Estimate: $97,506,000
This preliminary cost estimate is based upon widening the existing facility to six lanes for approximately 7.5 miles using typical per mile costs for urbanized conditions with rolling terrain.

Identified Environmental Concerns:
This option has the potential to impact underground storage tanks (UST) of existing or prior gas stations located along the existing highway. A detailed environmental study and concept plan for widening would be needed to assess the UST impacts of construction.

Build Option A

Concept:
Construct a new four-lane median divided roadway north of the existing U.S. 11E from a point west of Hal Henard Road to a point east of Stone Dam Road. Figures 16 through 27 at the back of this report illustrate the corridor for Option A on aerial photography and U.S.G.S. quadrangle maps. The corridor is designated as 1,500 feet wide, an area large enough to allow design flexibility within the natural topographic constraints of the area. A large map that shows the overall corridor is included as an attachment to the report. The concept plan is for Option A to be constructed as an access controlled facility with grade-separated interchanges at the termini on U.S. 11E and at the crossings of State Route 70, State Route 172, State Route 93, and Snapps Ferry Road. The crossing over Blue Springs Parkway is proposed as a grade separation with no interchange. Option A also includes an interchange for a future access to the Greeneville / Greene County Municipal Airport. For cost estimating purposes, it was assumed that all interchanges would be constructed with a diamond type configuration with the exception of the Option A termini interchanges on U.S. 11E. At the west terminus interchange, a loop ramp is needed for traffic that will travel from eastbound U.S. 11E onto the northbound Option A corridor. At the east terminus interchange, a loop ramp is needed to accommodate traffic that will travel from the Option A corridor to eastbound U.S. 11 E.

Typical Section (proposed)**:**

- Option A
  - four travel lanes with a depressed grass median and access control
  - 350' of right-of-way
- U.S. 11E – maintain existing cross section

Anticipated Operational Performance:
Figures 8 and 9 illustrate the anticipated average daily traffic volumes on Option A and U.S. 11E in 2009 and 2029. The traffic projections for Option A include diversion of traffic from U.S. 11E to the Option A corridor. (Approximately 14% of total traffic is diverted.) The projections also include additional traffic associated with new development (latent demand development) that is expected to result from improved accessibility to property along the Option A corridor. This latent demand development will also increase traffic volumes on U.S. 11E. By the year 2029, traffic on Option A is expected to peak at approximately 35,000 vehicles per day, and traffic on U.S. 11E in the study area is expected to reach a peak of approximately 56,000 vehicles per day.

The projected peak ADT for the Option A corridor is well within the capacity of a four-lane divided highway with access control. The peak ADT volume on U.S. 11 E, however, is comparable to the No Build option which exceeds the carrying capacity of a four-lane median divided roadway with no access control.

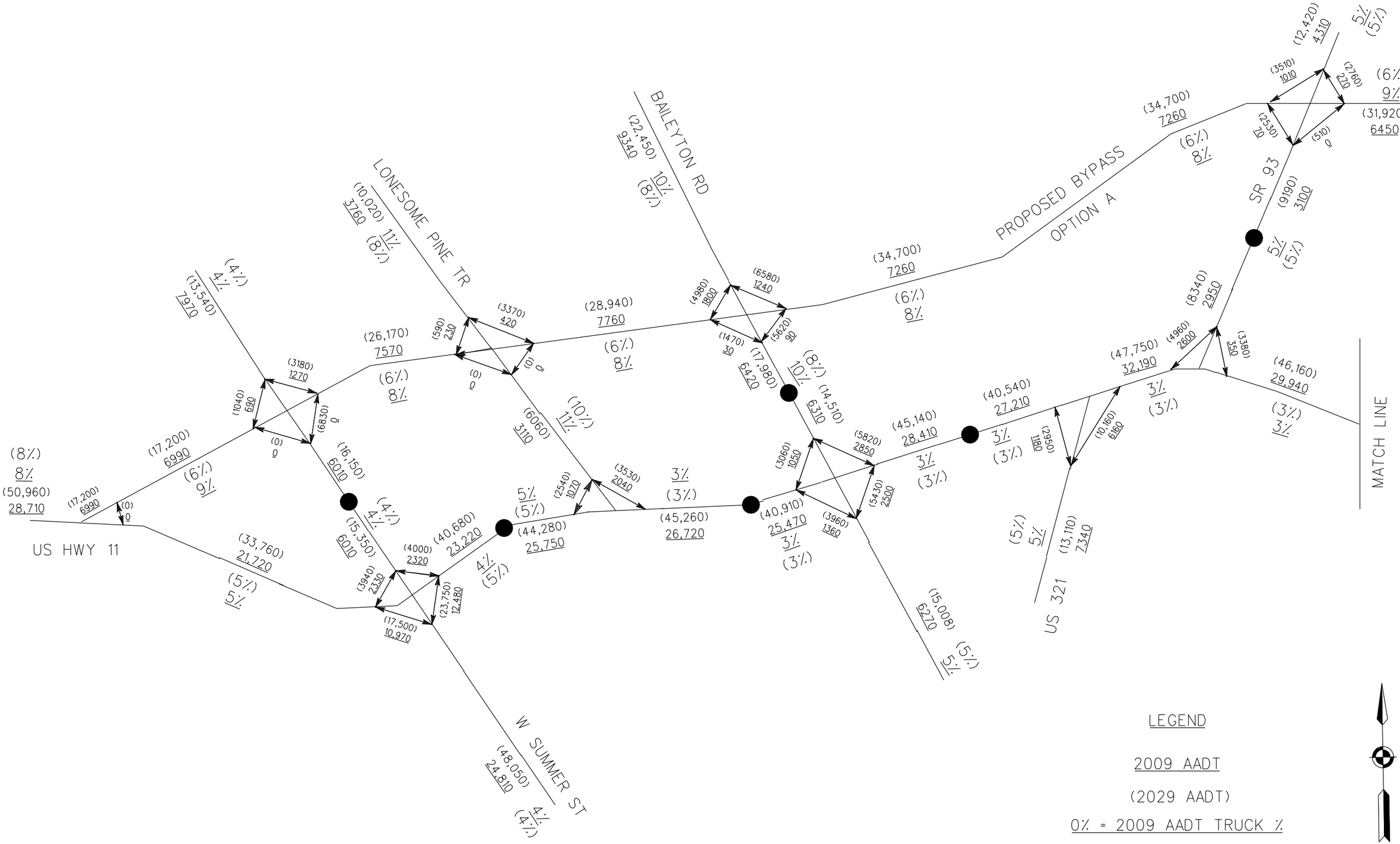

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FIGURE 8
"OPTION A" AADT

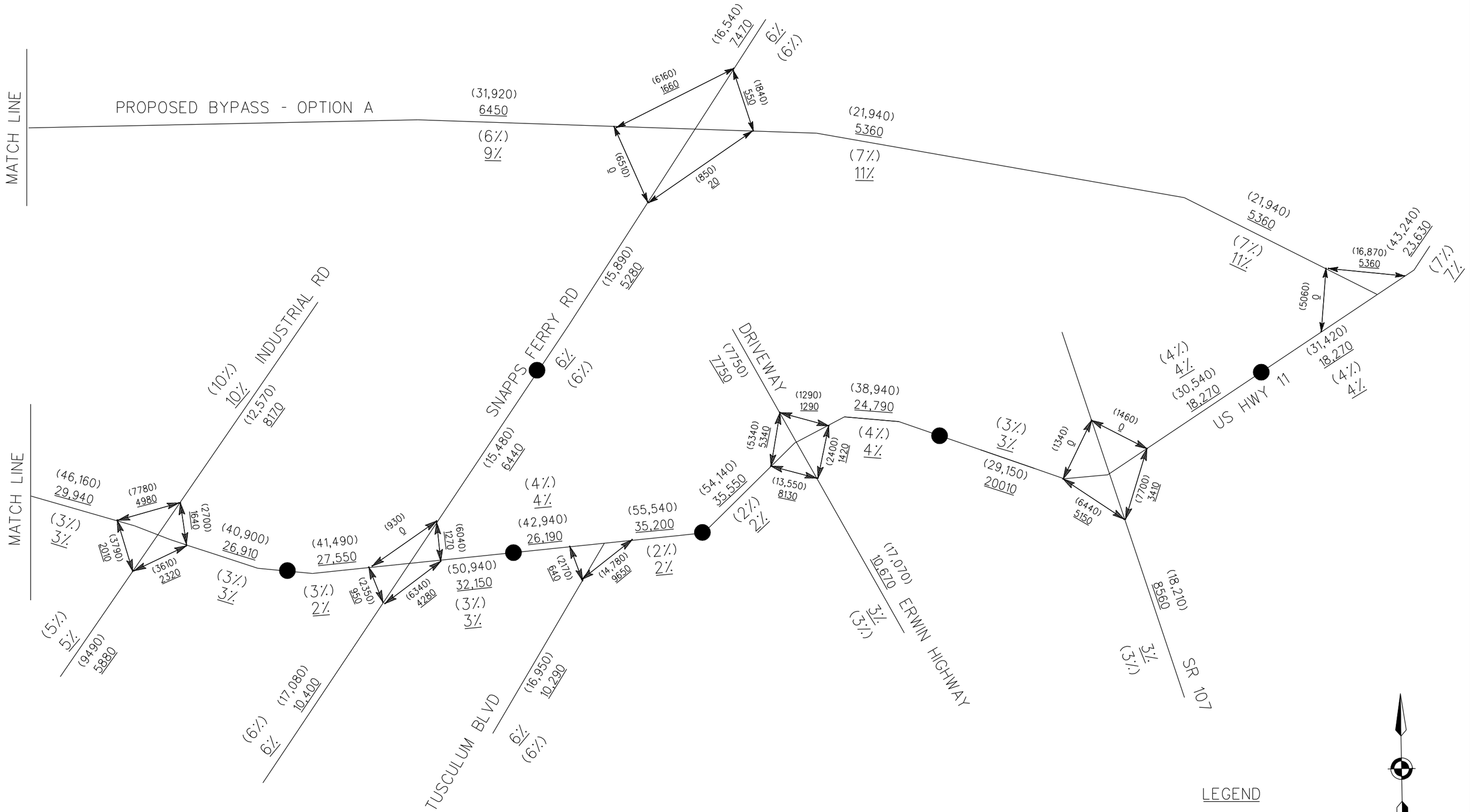

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FIGURE 9
"OPTION A" AADT

The Traffic Forecast Study included an analysis of peak hour traffic density and flow rates on U.S. 11E and Option A. With Option A, the highest PM peak hour density and traffic flow rate on U.S. 11E improves by approximately 15% over No Build conditions. Traffic density and flow rate on the Option A corridor itself is 40% better than on U.S. 11E.

With Option A, a portion of the truck traffic on U.S. 11E is expected to shift to the controlled access Option A corridor. According to the Traffic Forecast Study, truck traffic as a percentage of total traffic on U.S. 11E is expected to decrease from a range of 4%-8% with No Build to a range of 2%-5% with Option A. The projected truck percentages for the Option A corridor range from 6% to 7%.

Construction Cost Estimate: $126,708,000
This preliminary cost estimate is based upon per mile costs for approximately 9.6 miles of new four-lane median divided highway with controlled access in rolling/mountainous terrain. The estimate includes costs for seven grade separated interchanges.

Identified Environmental Concerns:
The corridor for Option A encompasses 18 blue line streams. It crosses Snapps Ferry Road in the vicinity of the David Rankin House, a national register listed property. There are three identified archaeological sites within the Option A corridor and a high probability of other sites in the project area.

Build Option A with C Extension

Concept:
Construct a new four-lane median divided roadway north of the existing U.S. 11E from a point west of Hal Henard Road to a point east of Stone Dam Road (same corridor as Option A). At the western terminus near Hal Henard Road, connect to a four-lane median divided roadway that extends from U.S. 11E southward to U.S. 321. (Option C Extension is a separate project.) The concept plan is for Options A and C to be constructed as access controlled facilities with grade-separated interchanges at the southern terminus on U.S. 321, at the crossings of State Route 349, U.S. 11E, State Route 70, State Route 172, State Route 93, and Snapps Ferry Road, and at the eastern terminus on U.S. 11E.

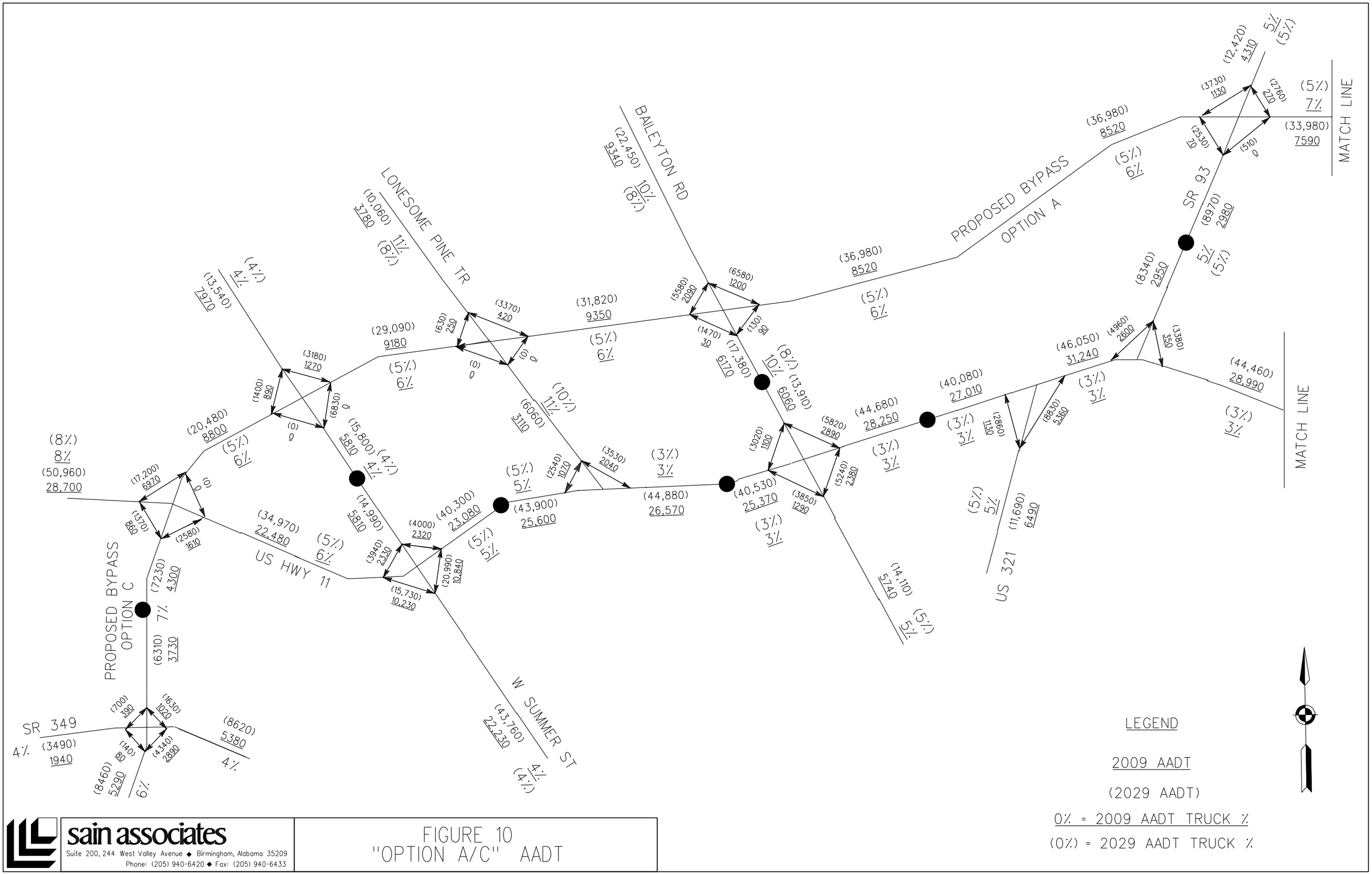
Typical Section (proposed)**:**

- Option A
  - four travel lanes with depressed grass median and access control
  - 350' of right-of-way
- Option C
  - four travel lanes with depressed grass median and access control
  - 350' of right-of-way
- U.S. 11E – maintain existing cross section

Anticipated Operational Performance:
Figures 10 and 11 illustrate the anticipated average daily traffic volumes on Option A/C and U.S. 11E in 2009 and 2029. The traffic projections for the Option A/C corridor include diversion of traffic from U.S. 11E. (Approximately 16% of total traffic is diverted.) The projections also include additional traffic associated with new development (latent demand development) that is expected to result from improved accessibility to property along the Option A/C corridor. This latent demand development will also increase traffic volumes on U.S. 11E. By the year 2029, traffic on Option A/C is expected to peak at approximately 37,000 vehicles per day, and traffic on U.S. 11E in the study area is expected to reach a peak of approximately 54,000 vehicles per day.

The projected peak ADT for the Option A/C corridor is well within the capacity of a four-lane divided highway with access control. The peak ADT volume on U.S. 11 E, however, is comparable to the No Build option which exceeds the carrying capacity of a four-lane median divided roadway with no access control.

The Traffic Forecast Study included an analysis of peak hour traffic density and flow rates on U.S. 11E and Option A/C. With Option A/C, the highest PM peak hour density and traffic flow rate on U.S. 11E improve by approximately 19% over No Build conditions. Traffic density and flow rate on the Option A/C corridor itself is 35% better than on U.S. 11E.



LEGEND

2009 AADT

(2029 AADT)

0% = 2009 AADT TRUCK %

(0%) = 2029 AADT TRUCK %

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FIGURE 10
"OPTION A/C" AADT

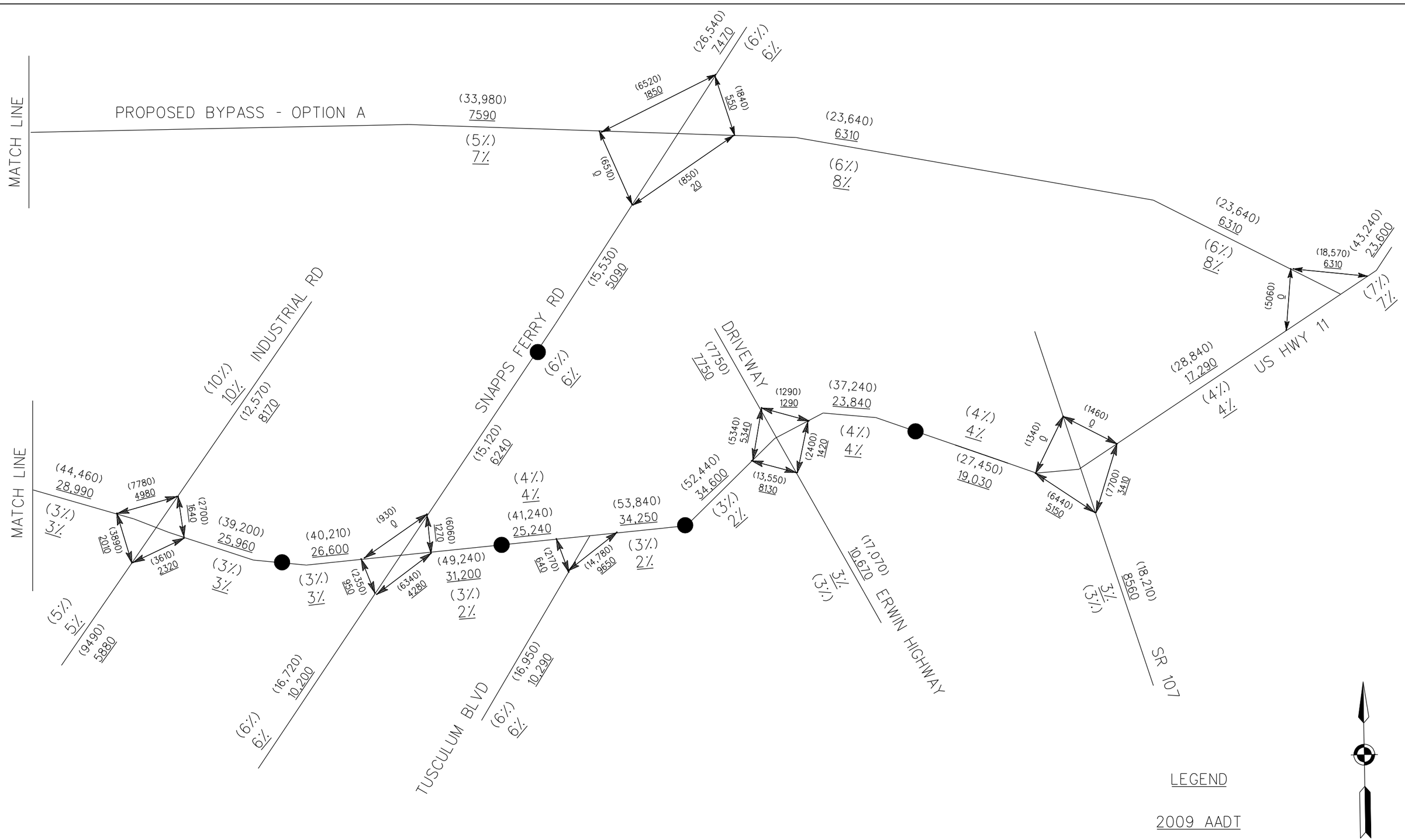

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FIGURE 11
"OPTION A/C" AADT

With Option A/C, a portion of the truck traffic on U.S. 11E is expected to shift to the controlled access Option A/C corridor. According to the Traffic Forecast Study, truck traffic as a percentage of total traffic on U.S. 11E is expected to decrease from a range of 4%-8% with No Build to a range of 3%-5% with Option A/C. The projected truck percentages for the Option A/C corridor range from 5% to 7%.

Construction Cost Estimate: $179,930,000

This preliminary cost estimate is based upon per mile costs for approximately 13.6 miles of new four-lane median divided highway with controlled access in rolling/mountainous terrain. The estimate includes costs for nine grade separated interchanges.

Identified Environmental Concerns:

The Option C corridor has not been assessed for environmental concerns since it is a separate project. The concerns listed for Option A will also apply for the Option A/C corridor.

Build Option B

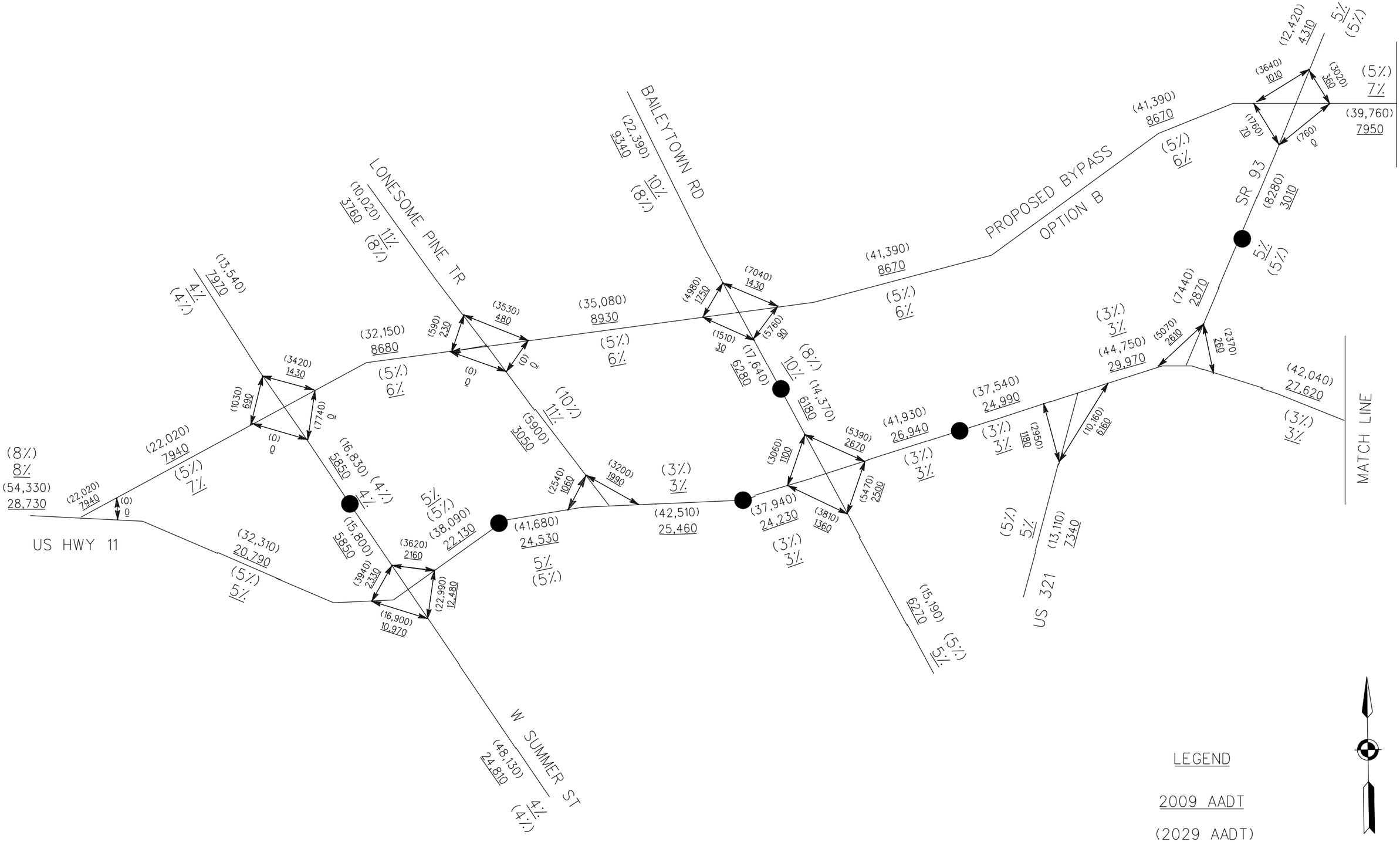
Concept:
Construct a new four-lane median divided roadway north of the existing U.S. 11E from a point west of Hal Henard Road to State Route 107. Figures 16 through 27 at the back of this report illustrate the corridor for Option B on aerial photography and U.S.G.S. quadrangle maps. The corridor is designated as 1,500 feet wide, an area large enough to allow design flexibility within the natural topographic constraints of the area. A large map that shows the overall corridor is included as an attachment to the report. The concept plan is for Option B to be constructed as an access controlled facility with grade-separated interchanges at the termini on U.S. 11E and at the crossings of State Route 70, State Route 172, State Route 93, and Snapps Ferry Road. The crossing over Blue Springs Parkway is proposed as a grade separation with no interchange. Option B also includes an interchange for future access to the Greeneville / Greene County Municipal Airport. For cost estimating purposes, it was assumed that all interchanges would be constructed with a diamond type configuration with the exception of the Option B termini interchanges on U.S. 11E. At the west terminus interchange, a loop ramp is needed for traffic that will travel from eastbound U.S. 11E onto the northbound Option B corridor. At the east terminus interchange that aligns with State Route 107, a loop ramp is needed to accommodate traffic that will travel from the Option B corridor to eastbound U.S. 11E.

Typical Section (proposed)**:**

- Option B
  - four travel lanes with depressed grass median and access control
  - 350' of right-of-way
- U.S. 11E – maintain existing cross section

Anticipated Operational Performance:
Figures 12 and 13 illustrate the anticipated average daily traffic volumes on Option B and U.S. 11E in 2009 and 2029. The traffic projections for Option B include greater diversion of traffic from U.S. 11E than was included for Option A. (Approximately 24% of total traffic is diverted compared with 14% with Option A.) The greater level of diversion is due to the connectivity provided to State Route 107. The projections also include additional traffic associated with new development (latent demand development) that is expected to result from improved accessibility to property along the Option B corridor. This latent demand development will also increase traffic volumes on U.S. 11E. By the year 2029, traffic on Option B is expected to peak at approximately 41,000 vehicles per day, and traffic on U.S. 11E in the study area is expected to reach a peak of approximately 45,000 vehicles per day.

The projected peak ADT for the Option B corridor is within the capacity of a four-lane divided highway with access control. The peak ADT volume on U.S. 11 E is approximately 17% lower than the peak volume under the No Build scenario. The added diversion of traffic from U.S. 11E with the Option B corridor will improve traffic operations on U.S. 11E.



LEGEND

2009 AADT

(2029 AADT)

0% = 2009 AADT TRUCK %

(0%) = 2029 AADT TRUCK %

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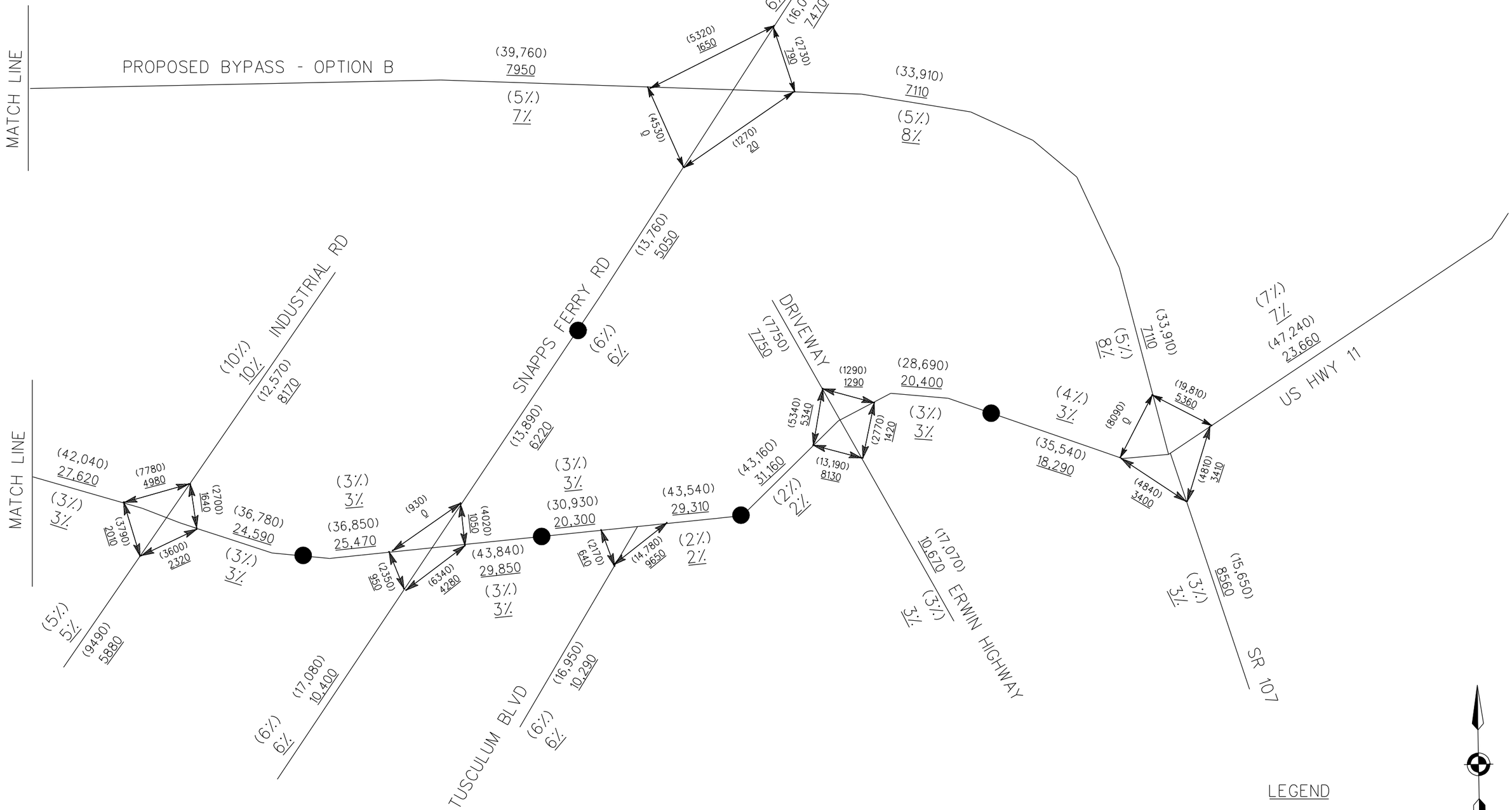
FIGURE 12
"OPTION B" AADT



LEGEND

2009 AADT

(2029 AADT)

0% = 2009 AADT TRUCK %

(0%) = 2029 AADT TRUCK %

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FIGURE 13
"OPTION B" AADT

The Traffic Forecast Study included an analysis of peak hour traffic density and flow rates on U.S. 11E and Option B. With Option B, the highest PM peak hour density and traffic flow rate on U.S. 11E improves by approximately 21% over No Build conditions. Traffic density and flow rate on the Option B corridor itself is 27% better than on U.S. 11E.

With Option B, a portion of the truck traffic on U.S. 11E is expected to shift to the controlled access Option B corridor. According to the Traffic Forecast Study, truck traffic as a percentage of total traffic on U.S. 11E is expected to decrease from a range of 4%-8% with No Build to a range of 2%-5% with Option B. The projected truck percentage for the Option B corridor is 5%.

Construction Cost Estimate: $116,593,000
This preliminary cost estimate is based upon per mile costs for approximately 8.5 miles of new four-lane median divided highway with controlled access in rolling/mountainous terrain. The estimate includes costs for seven grade separated interchanges.

Identified Environmental Concerns:
The corridor for Option B encompasses 13 blue line streams and one cemetery. The Oakland Presbyterian Cemetery is located near the eastern terminus of Option B and is shown on Figure 20. There are three identified archaeological sites within the Option B corridor and a high probability of other sites in the project area.

Build Option B with C Extension

Concept:
Construct a new four-lane median divided roadway north of the existing U.S. 11E from a point west of Hal Henard Road to State Route 107 (same corridor as Option B). At the western terminus near Hal Henard Road, connect to a four-lane median divided roadway that extends from U.S. 11E southward to U.S. 321. (Option C Extension is a separate project.) The concept plan is for Options B and C to be constructed as access controlled facilities with grade-separated interchanges at the southern terminus on U.S. 321, at the crossings of State Route 349, U.S. 11E, State Route 70, State Route 172, State Route 93, and Snapps Ferry Road, and at the eastern terminus on U.S. 11E where Option B aligns with State Route 107.

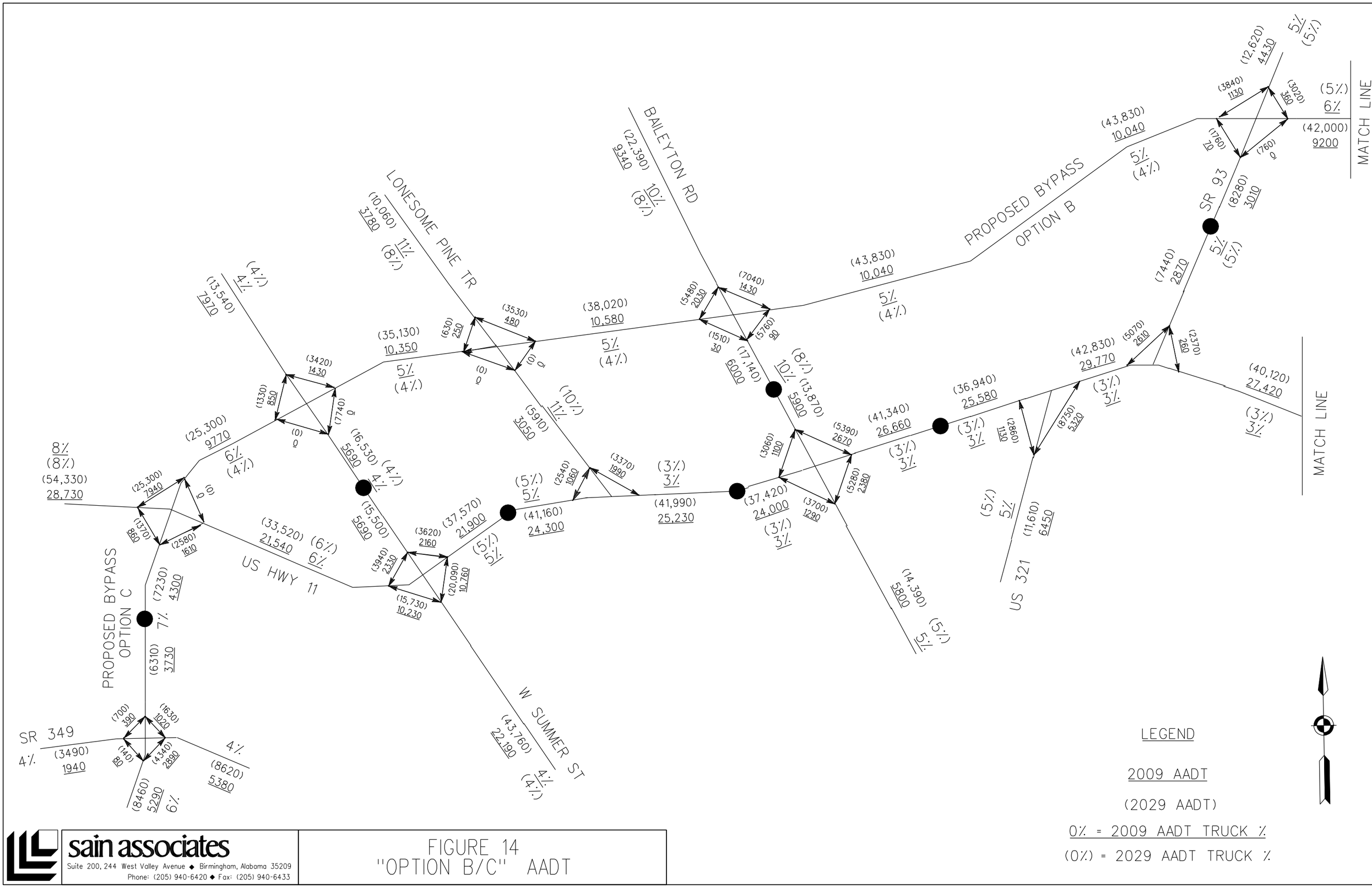
Typical Section (proposed)**:**

- Option B
  - four travel lanes with depressed grass median and access control
  - 350' of right-of-way
- Option C
  - four travel lanes with depressed grass median and access control
  - 350' of right-of-way
- U.S. 11E – maintain existing cross section

Anticipated Operational Performance:
Figures 14 and 15 illustrate the anticipated average daily traffic volumes on Option B/C and U.S. 11E in 2009 and 2029. The traffic projections for the Option B/C corridor include the greatest amount of traffic diversion from U.S. 11E. (Approximately 27% of total traffic is diverted compared to 16% with Option A/C.) The greater level of diversion is due to the connectivity provided to State Route 107 and U.S. 321. The projections also include additional traffic associated with new development (latent demand development) that is expected to result from improved accessibility to property along the Option B/C corridor. This latent demand development will also increase traffic volumes on U.S. 11E. By the year 2029, traffic on Option B/C is expected to peak at approximately 44,000 vehicles per day, and traffic on U.S. 11E in the study area is expected to reach a peak of approximately 43,000 vehicles per day.

The projected peak ADT for the Option B/C corridor is within the capacity of a four-lane divided highway with access control. The peak ADT volume on U.S. 11 E is approximately 20% lower than the peak volume under the No Build scenario. The added diversion of traffic from U.S. 11E with the Option B corridor will improve traffic operations on U.S. 11E.

The Traffic Forecast Study included an analysis of peak hour traffic density and flow rates on U.S. 11E and Option B/C. With Option B/C, the highest PM peak hour density and traffic flow rate on U.S. 11E improve by approximately 24% over No Build conditions. Traffic density and flow rate on the Option B/C corridor itself is 22% better than on U.S. 11E.



LEGEND

2009 AADT

(2029 AADT)

0% = 2009 AADT TRUCK %

(0%) = 2029 AADT TRUCK %

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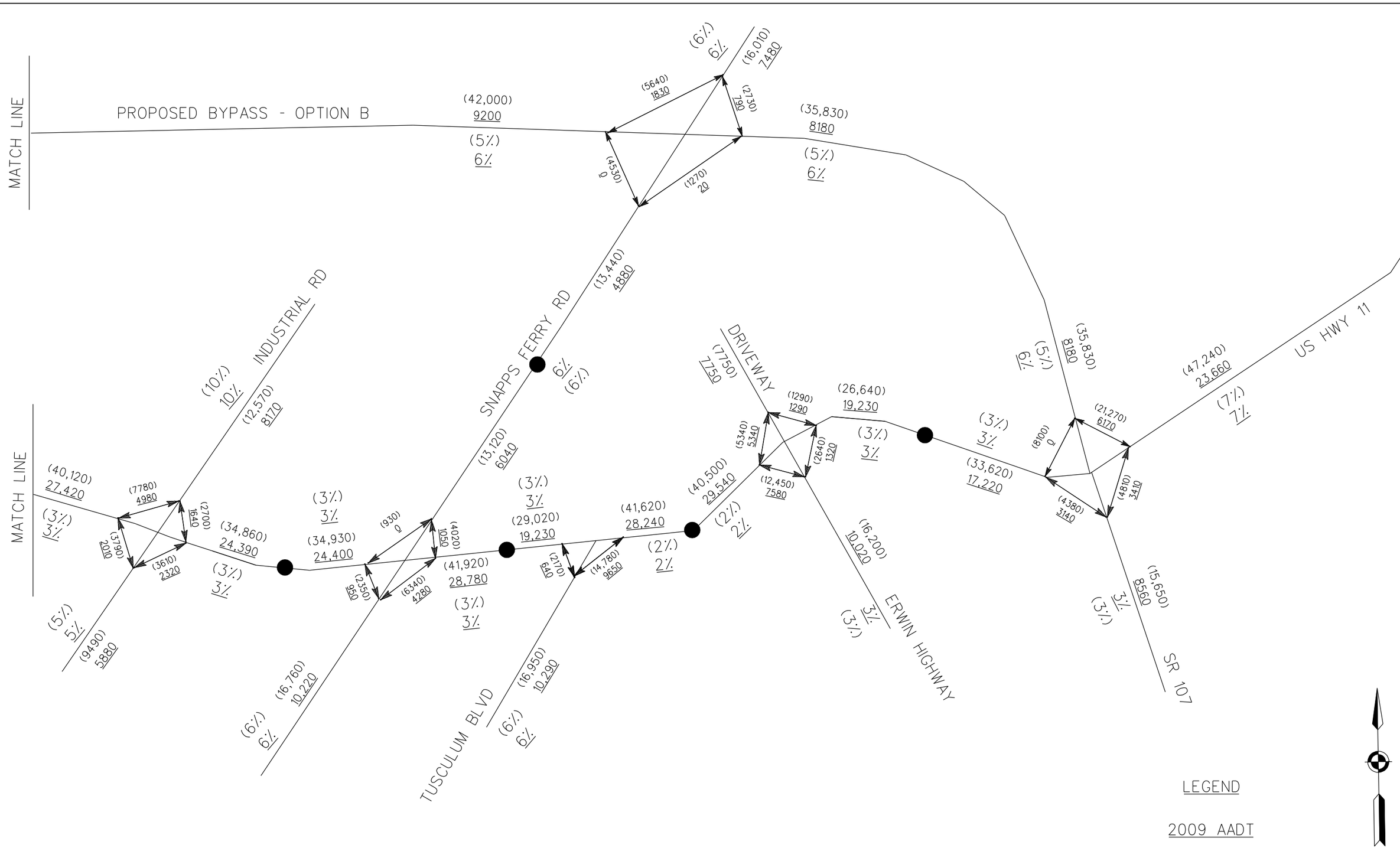
FIGURE 14
"OPTION B/C" AADT



LEGEND

2009 AADT

(2029 AADT)

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(0%) = 2029 AADT TRUCK %

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FIGURE 15
"OPTION B/C" AADT

With Option B/C, a portion of the truck traffic on U.S. 11E is expected to shift to the controlled access Option B/C corridor. According to the Traffic Forecast Study, truck traffic as a percentage of total traffic on U.S. 11E is expected to decrease from a range of 4%-8% with No Build to a range of 2%-6% with Option B/C. The projected truck percentages for the Option B/C corridor range from 4% to 7%.

Construction Cost Estimate: $169,815,000
This preliminary cost estimate is based upon per mile costs for approximately 12.5 miles of new four-lane median divided highway with controlled access in rolling/mountainous terrain. The estimate includes costs for nine grade separated interchanges.

Identified Environmental Concerns:
The Option C corridor has not been assessed for environmental concerns since it is a separate project. The concerns listed for Option B will also apply for the Option B/C corridor.

IV. ASSESSMENT OF OPTIONS

The Tennessee Department of Transportation has adopted seven guiding principles against which all transportation projects are to be evaluated. These guiding principles address concerns for system management, mobility, economic growth, safety, community, environmental stewardship, and fiscal responsibility. These guiding principles are discussed in the following paragraphs as they relate to the options for improving U.S. 11E.

Guiding Principle 1: Preserve and Manage the Existing Transportation System

When constructed in the 1960s, U.S. 11E was intended to serve as a bypass to the City of Greeneville, providing a facility for unimpeded regional mobility through Greene County. That function has been degraded in recent decades due to the lack of access control combined with increased commercial development along the highway. The numerous driveways along U.S. 11E limit the highway's traffic carrying capacity and contribute to the frequency of traffic crashes.

The option of widening U.S. 11E to provide six travel lanes is consistent with TDOT's goal of preserving the existing transportation system. It provides needed additional capacity to service existing and future traffic volumes. By widening U.S. 11E, a 33% improvement in peak traffic density and flow rate can be achieved. This option, however, does not undo the mistakes of the past that have allowed unlimited driveway access to the highway. The widening option necessitates acquisition of right-of-way in a highly developed, commercial district and will involve significant property impacts to businesses from construction activities. Utility relocations will be more costly than with the other considered options.

Options A, B, A/C, and B/C, that involve construction of a new connector road, can help preserve the service life of U.S. 11E by diverting regional traffic that does not have an origin or destination in Greeneville. Options B and B/C provide the highest level of traffic diversion due to their connectivity to State Route 107. By diverting traffic from U.S. 11E, the connector road options have an indirect positive influence on peak traffic density and flow rate on U.S. 11E. Table 6 summarizes the percent improvement on U.S. 11E that is created by each connector road option.

Table 6
Impacts to Traffic Density and Flow Rate on U.S. 11E

Considered Option	% Improvement on U.S. 11E (Compared to No Build)
Signal System	None
Widen U.S. 11E (6 lanes)	33%
Build Option A	15%
Build Option A/C	19%
Build Option B	21%
Build Option B/C	24%

If constructed, the northern connector option must be a controlled access facility in order to prevent the degradation in traffic flow that has been seen on U.S. 11E.

Guiding Principle 2: Move a Growing, Diverse, and Active Population

Of all the options considered in this report, only the "widen U.S. 11E" and "build a connector road" options provide the needed capacity to address Greene County's travel demand. The greatest increase in capacity would be provided by a connector road addition (total of 8 travel lanes between the connector road and U.S. 11E as opposed to six travel lanes with the widening option). Uncontrolled development and access along U.S. 11E has made it less conducive to accommodating regional trip making, particularly with regard to freight movement. That condition will continue even with the addition of two more travel lanes. The "build a connector road" options provide an access-controlled facility better suited to carrying through trips than U.S. 11E.

Industry is an important component of the Greene County economy. Freight movement on U.S. 11E is a concern as the highway has become more congested in recent years. The connector road options have the potential for providing an alternate route for truck traffic. The Traffic Forecast Study estimates that truck traffic on U.S. 11E could be reduced by approximately 38% (from 8% of total traffic to 5%). If instead, U.S. 11E is widened, truck trips as a percentage of total traffic will likely remain the same.

One consideration that has been important to local leaders in this assessment has been opportunities for improving access to the Greeneville / Greene County Municipal Airport. From U.S. 11E, access to the airport is provided via State Route 93, a route not well suited to truck traffic. With the connector road options, direct access into the airport property could be provided via a grade separated interchange that would be better suited to regional and truck traffic access.

Guiding Principle 3: Support the State's Economy

U.S. 11E provides direct or indirect access to all of the major population and employment centers of Greene County. Population in Greene County and Greeneville averaged a yearly growth of approximately 1.2% between the last two decennial census (1990 and 2000). The unemployment rate in Greene County was 9.3% in February 2006, compared to a statewide average of 5.2%.

Greene County leaders have expressed an interest in the construction of a new connector road because of the greater accessibility it would provide to developable property north of U.S. 11E where existing access is provided only by curving two-lane roads. The connector road options would provide more opportunities for economic growth through development than would widening the existing facility.

This study recognizes that Greeneville needs better, more direct access to Interstate 81. Improvement of SR 172 (a separate project) has been evaluated as a means of providing that improved access. The connector road Options A and B could provide a link to disperse to the east and west the traffic that an improved SR 172 would bring in from the north. If State Route 172 were improved without the connector road, the existing interchange between State Route 172 and U.S. 11E would need to be improved to increase its capacity.

Guiding Principle 4: Maximize Safety and Security

Traffic crash rates on U.S. 11E were calculated from crash data for the years 2001 through 2003. A total of 869 traffic crashes were reported during that period, of which thirty three percent (33%) involved an injury or fatality. The section of U.S. 11 between Mt. Pleasant Road and State Route 93 has a crash rate that is similar to the statewide average. The section between State Route 93 and Wagon Wheel Trail has a crash rate that is fifty percent higher than the statewide average. The area with the higher crash rate contains the densest commercial development and eight existing traffic signals. The crash rate is negatively influenced by traffic congestion and lack of access control.

Guiding Principle 5: Build Partnerships for Livable Communities

Throughout the development of the Transportation Planning Report and Traffic Forecast Study, TDOT staff has coordinated with local leaders to identify their concerns and objectives. The project documentation includes a letter from elected leaders supporting the connector road concept. A separate letter from the City of Tusculum states their support for Option A and their opposition to Option B. The project documentation also includes a letter from a local citizen group, Citizens for Sensible Roads, that opposes the connector road option and supports widening U.S. 11E.

In keeping with the goals of TDOT's current Public Involvement Process, several meetings have been held by and for the local elected officials and the public to coordinate the transportation needs envisioned by Greene County and those of TDOT. This public involvement process will continue as mandated by the provisions of the National Environmental Policy Act (NEPA).

It is noted that the connector road options will have a greater impact on residential communities than the widen U.S. 11E option. In addition, the potential for increased development associated with the connector road options will increase traffic on cross streets (State Route 70, State Route 172, State Route 93, Snapps Ferry Road).

Guiding Principle 6: Promote Stewardship of the Environment

A detailed environmental study is needed to fully address the impacts of each considered option. For comparison purposes, Table 7 summarizes environmental considerations for each option based upon information of record. It should be noted that the items listed in Table 7 are located within the identified corridors but may not necessarily be impacted.

Table 7
Comparison of Environmental Considerations

Option	Underground Storage Tanks	Streams	Archaeological Sites	Residential	Cemetery
No Build					
Signal System					
Widen U.S. 11E	●				
Option A		●	●	●	
Option B		●	●	●	●

**Environmental concerns were not compiled for Option C since it is a separate project.

Guiding Principle 7: Promote Financial Responsibility

Preliminary construction cost estimates were prepared for each considered option based upon typical per mile costs. Table 8 summarizes the construction cost estimates for all options.

Table 8
Comparison of Construction Cost Estimates

Option	Number of New Lanes	Number of New Interchanges	Construction Cost	Length	Cost Per Lane Mile
No Build	n/a	n/a	$0	n/a	n/a
Signal System	n/a	n/a	$1,002,000	8 signals	n/a
Widen U.S. 11E	2	n/a	$97,506,000	7.5 miles	$6,500,400
Option A	4	7	$126,708,000	9.6 miles	$3,299,688
Option A/C	4	9	$179,930,000	13.6miles	$3,307,537
Option B	4	7	$116,593,000	8.5 miles	$3,429,206
Option B/C	4	9	$169,815,000	12.5 miles	$3,396,300

V. SUMMARY

U.S. 11E is a four-lane urban principle arterial highway that extends in an east/west orientation through Greene County, providing access to Interstate 81 on the west side and Washington County to the east. For most of the study area, U.S. 11E has a median divided cross section with a depressed center median. However, a short portion of the highway between Tusculum Boulevard and Erwin Highway has a four-lane cross section with a center turn lane.

Increased development along U.S. 11E has fueled a steady increase in traffic volumes on the highway. The highest current (2006) traffic volume on U.S. 11E between Mt. Pleasant Road and Tusculum Boulevard is 31,500 vehicles per day. By the year 2029, average daily is expected to increase to a peak of 53,600. This level of traffic will exceed the highway's carrying capacity. An origin destination study conducted by TDOT in 2004 revealed that approximately 22% of all vehicle trips on U.S. 11E during the morning peak hour are through trips, rather than trips with an origin or destination in Greeneville. In the afternoon peak hour, the through trip percentage increases to 29% of all vehicles.

Traffic crash rates on U.S. 11E were calculated from crash data for the years 2001 through 2003. A total of 869 traffic crashes were reported during that period, of which thirty three percent (33%) involved an injury or fatality. The section of U.S. 11 E between Mt. Pleasant Road and State Route 93 has a crash rate that is similar to the statewide average. The section between State Route 93 and Wagon Wheel Trail has a crash rate that is fifty percent higher than the statewide average. The crash rate is negatively influenced by traffic congestion and lack of access control.

Improvement of U.S. 11E is needed to address the following needs:

- Provide an access controlled east/west route to serve demand for regional accessibility to the interstate highway system and protect that provision for the future.
- Allow for additional economic growth in Greeneville, Tusculum, and Greene County by providing improvement to the transportation system.
- Reduce the density of traffic on U.S. 11E in order to improve safety and mobility.
- Provide an alternate route to reduce the amount of truck traffic on U.S. 11E, especially in the section where there is no median and there are multiple traffic signals.

Seven options were considered in this evaluation. Following are items that summarize the performance or issues associated with each option:

No Build

- ➢ does not provide the needed capacity to address mobility concerns

Signal System Improvements

- ➢ provides the potential for modest short-term improvements to traffic progression and crash rates
- ➢ does not address long-term capacity concerns

Widening U.S. 11E

- increases the highway's capacity
- has the lowest overall cost, but the highest per lane mile cost due to right-of-way and utilities
- has the fewest environmental concerns
- does not provide an access controlled route
- does not remove truck traffic from U.S. 11E
- does not improve access to developable property

Option A or A/C

- increases system capacity
- provides an access controlled route for improved regional mobility
- increases access to developable property
- improves access to the Greeneville / Greene County Airport
- reduces truck traffic on U.S. 11E
- has a higher overall cost than all other options, but the lowest cost per lane mile
- has a higher potential for environmental impacts than the Widen U.S. 11E option

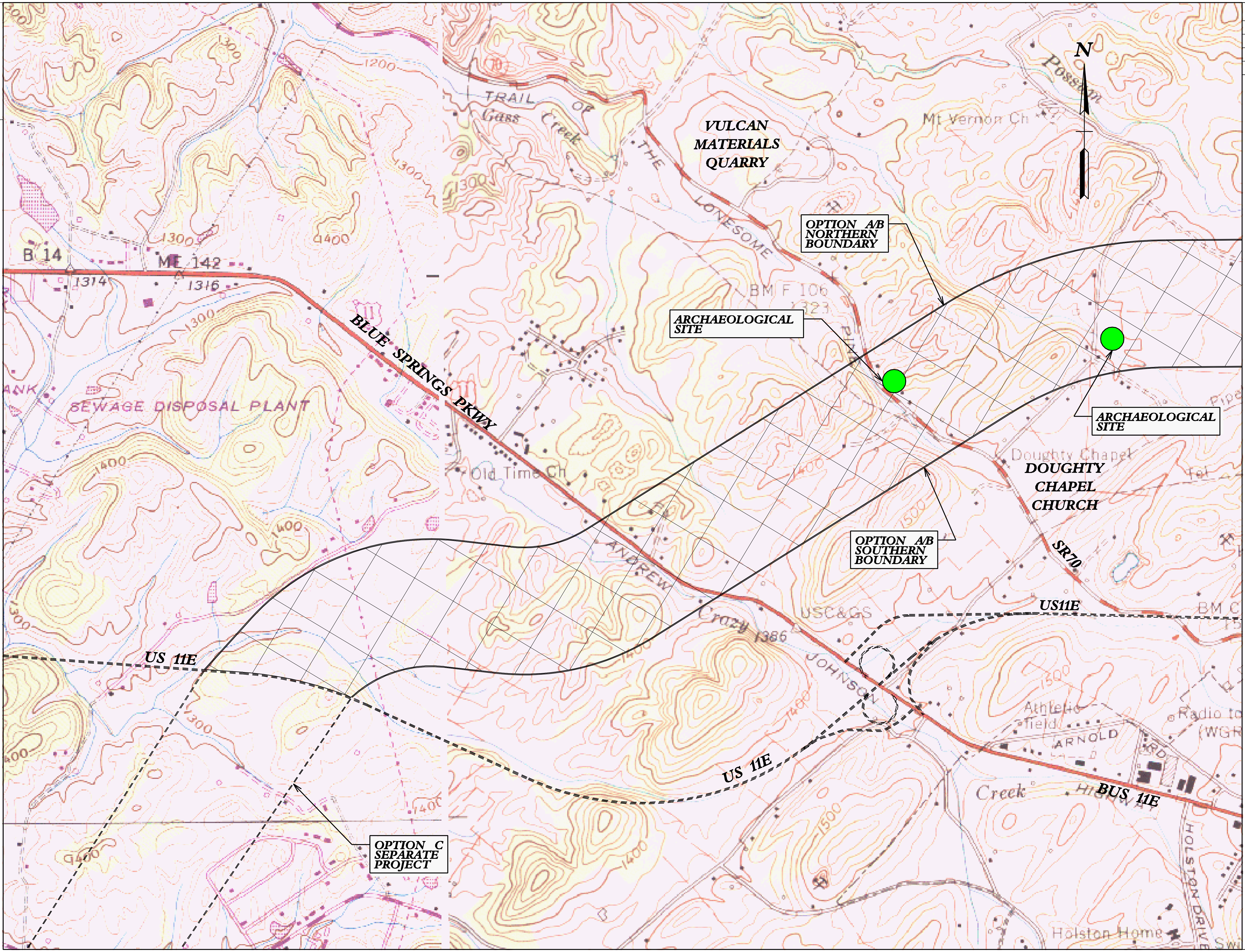
Option B or B/C

- increases system capacity
- lowers traffic volumes on U.S. 11E more than the A, A/C, or Widen U.S. 11E Options
- provides an access controlled route for improved regional mobility
- provides better route connectivity through its alignment with State Route 107
- increases access to developable property
- improves access to the Greeneville / Greene County Airport
- reduces truck traffic on U.S. 11E
- has a higher overall cost than widening U.S. 11E, but a lower cost per lane mile
- has a lower overall cost than Option A or A/C, respectively
- has a higher potential for environmental impacts than the Widen U.S. 11E option.

TENNESSEE D.O.T.
DESIGN DIVISION

FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
	2006		



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

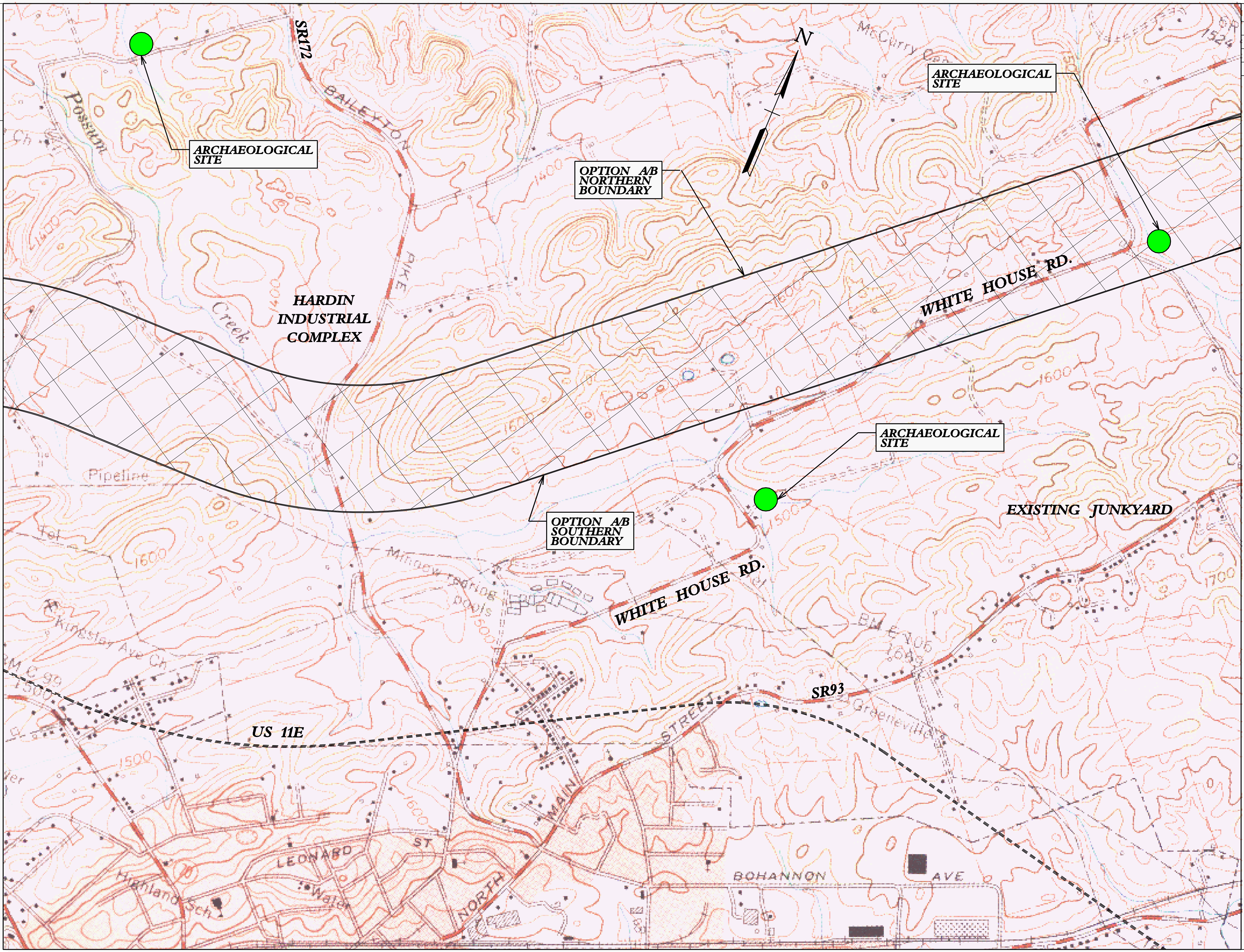
FIGURE 16 A/B

$$$$SYTIME$$$$$$
$$$$DGNSPEC$$$

TENNESSEE D.O.T.
DESIGN DIVISION

FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
	2006		



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

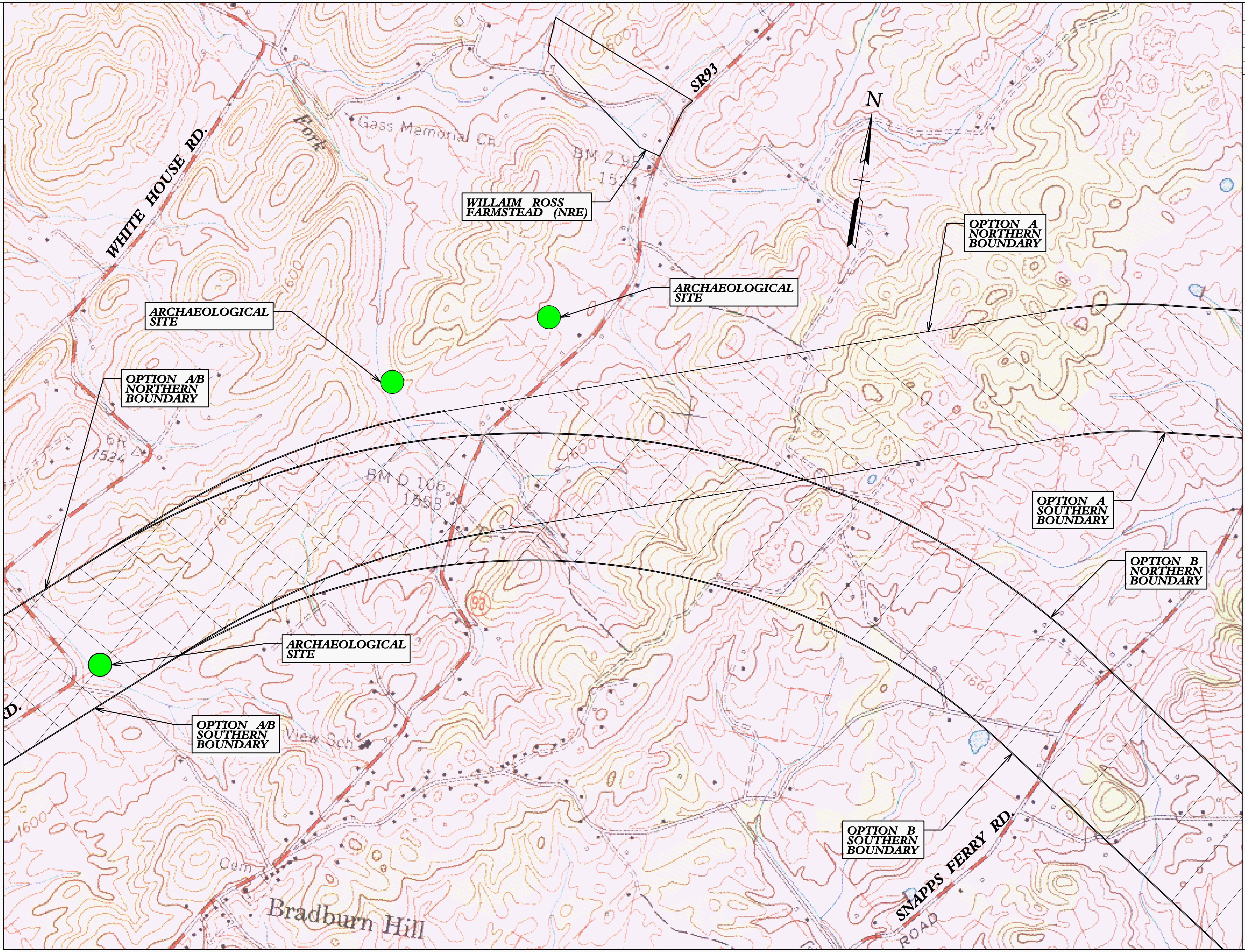
FIGURE 17 A/B

$$$$SYTIME$$$$$$
$$$$DGNSPEC$$

TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

$$$$SYTIME$$$$
$$$$DGNSPEC$$$$

TYPE	YEAR	PROJECT NO.	SHEET NO.
	2006		



0 500' 1000' 1500'

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

FIGURE 18 A/B

TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
	2006		

N

SNAPPS FERRY RD.

Cem

Fairview

Hill

OPTION A NORTHERN BOUNDARY

MS 199
1662

AFTON

MILLIGAN

ROAD

Branch

Spring

DAVID RANKIN HOUSE (NRL)

OPTION A SOUTHERN BOUNDARY

OPTION B SOUTHERN BOUNDARY

ARCHAEOLOGICAL SITE

OPTION B NORTHERN BOUNDARY

HAYNIE

RD.

0 500′ 1000′ 1500′

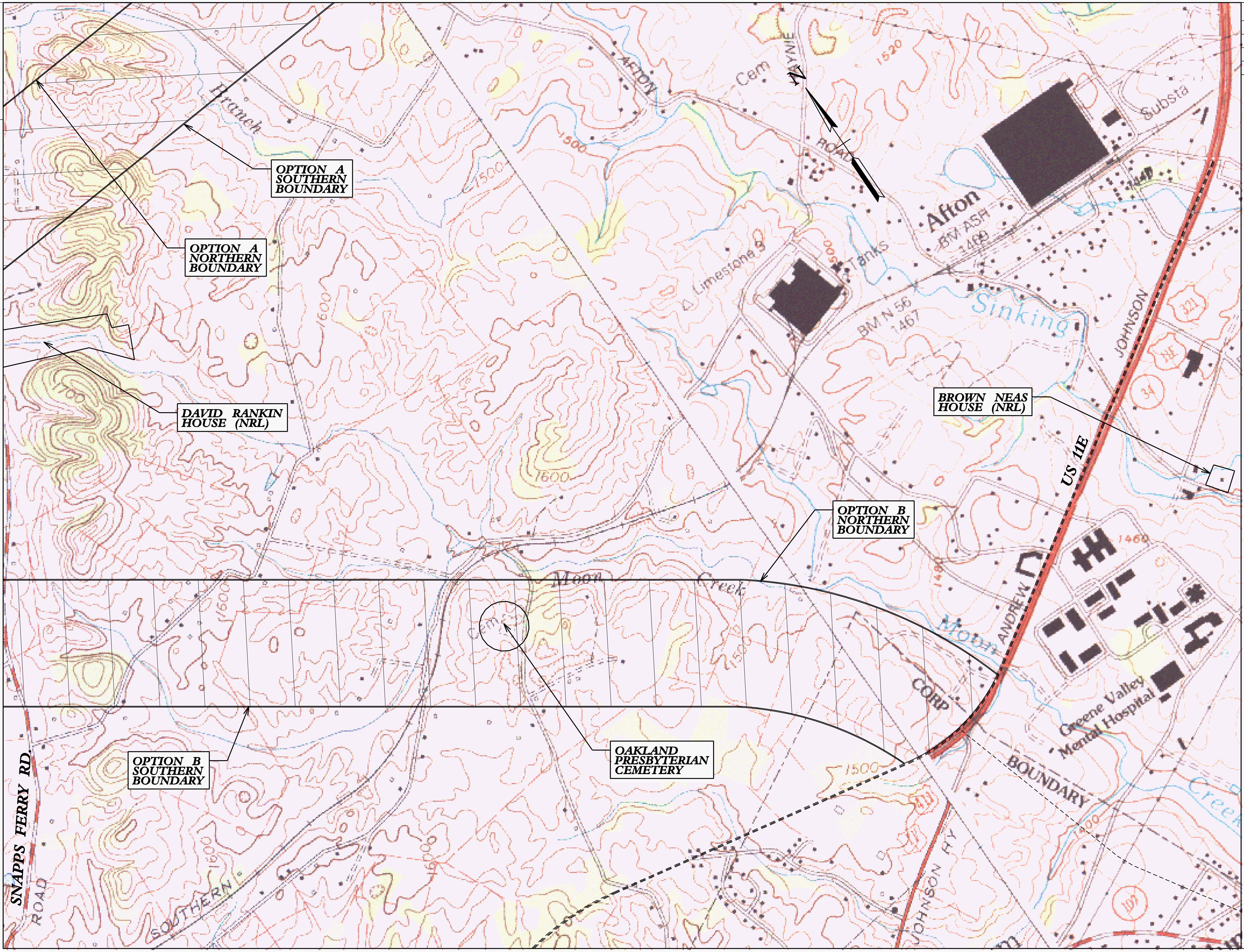
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

FIGURE 19 A/B

$$$$SYTIME$$$$$$$$
$$$$DONSPEC

TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
	2006		



0 500′ 1000′ 1500′

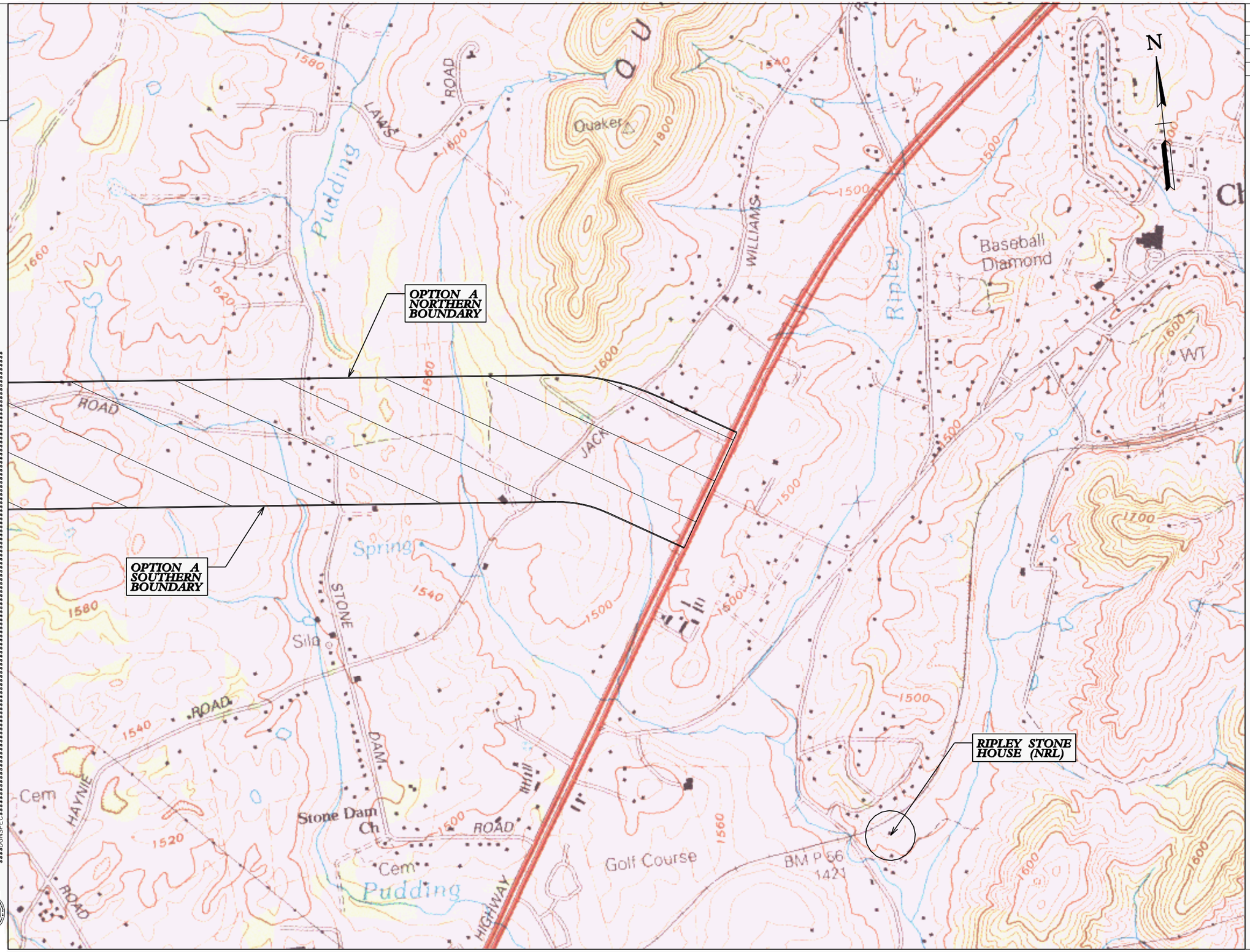
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

FIGURE 20 B

TENNESSEE D.O.T.
DESIGN DIVISION

FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
	2006		



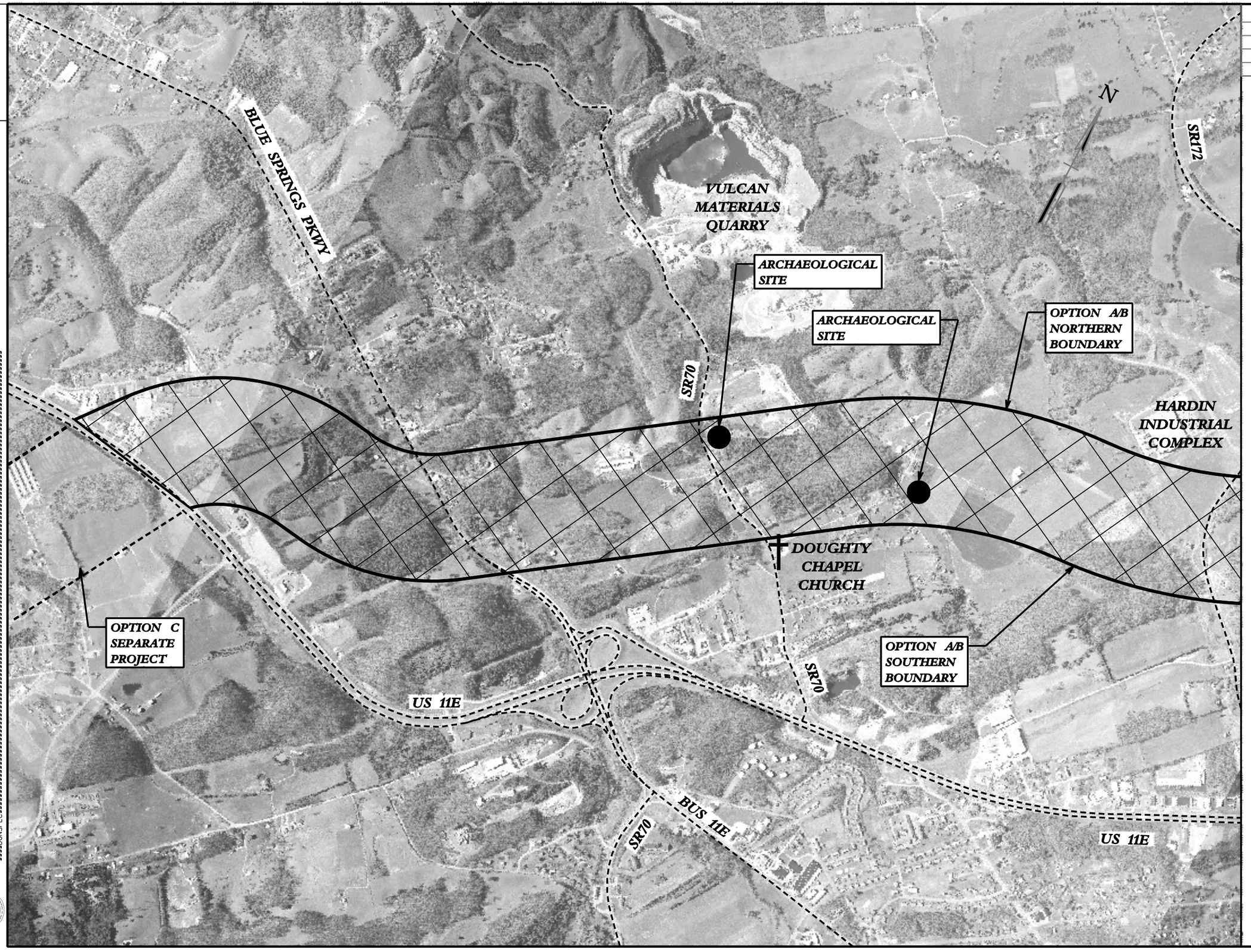
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

FIGURE 21 A

TENNESSEE D.O.T.
DESIGN DIVISION

FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
	2006		



$$$$SYTIME$$$$
$$$$DGNSPEC$$$$

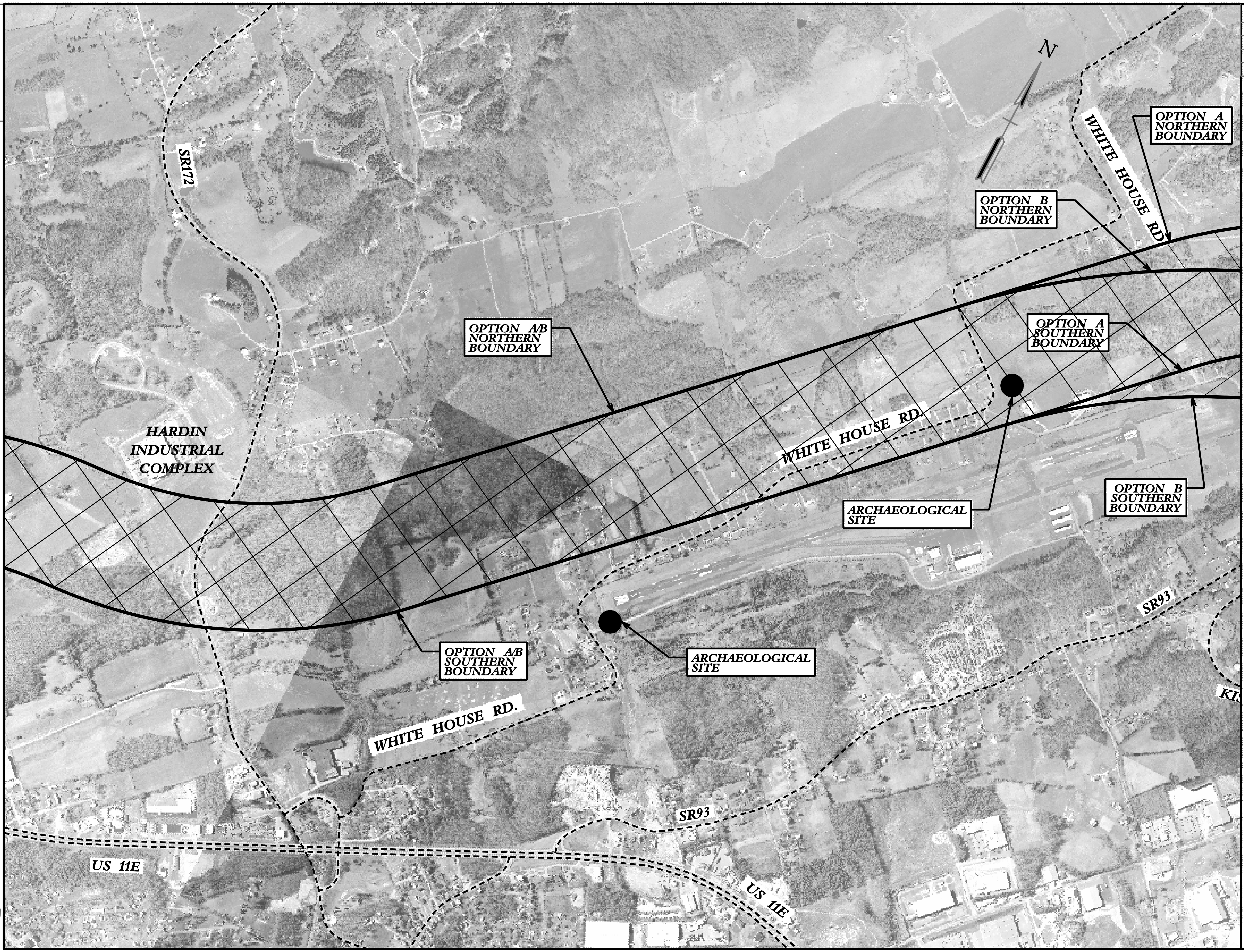
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

FIGURE 22 A/B

TENNESSEE D.O.T.
DESIGN DIVISION

FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
	2006		



0 500' 1000' 1500'

$$$$SYTIME$$$$$$
$$$$DGNSPEC$$$$$$

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

FIGURE 23 A/B

TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
	2006		

WILLAIM ROSS FARMSTEAD (NRE)

ARCHAEOLOGICAL SITE

ARCHAEOLOGICAL SITE

WHITE HOUSE RD

SR93

N

OPTION A NORTHERN BOUNDARY

OPTION A SOUTHERN BOUNDARY

DAVID RANKIN HOUSE (NRL)

OPTION B NORTHERN BOUNDARY

OPTION B SOUTHERN BOUNDARY

ARCHAEOLOGICAL SITE

SR93

KISER BLVD.

SNAPPS FERRY RD.

0 500′ 1000′ 1500′

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

FIGURE 24 A/B

$$$$$SYTIME$$$$$$$$
$$$$DGNSPEC

TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

$$$$SYTIME$$$$
$$$$DGNSPEC$$$$

TYPE	YEAR	PROJECT NO.	SHEET NO.
	2006		

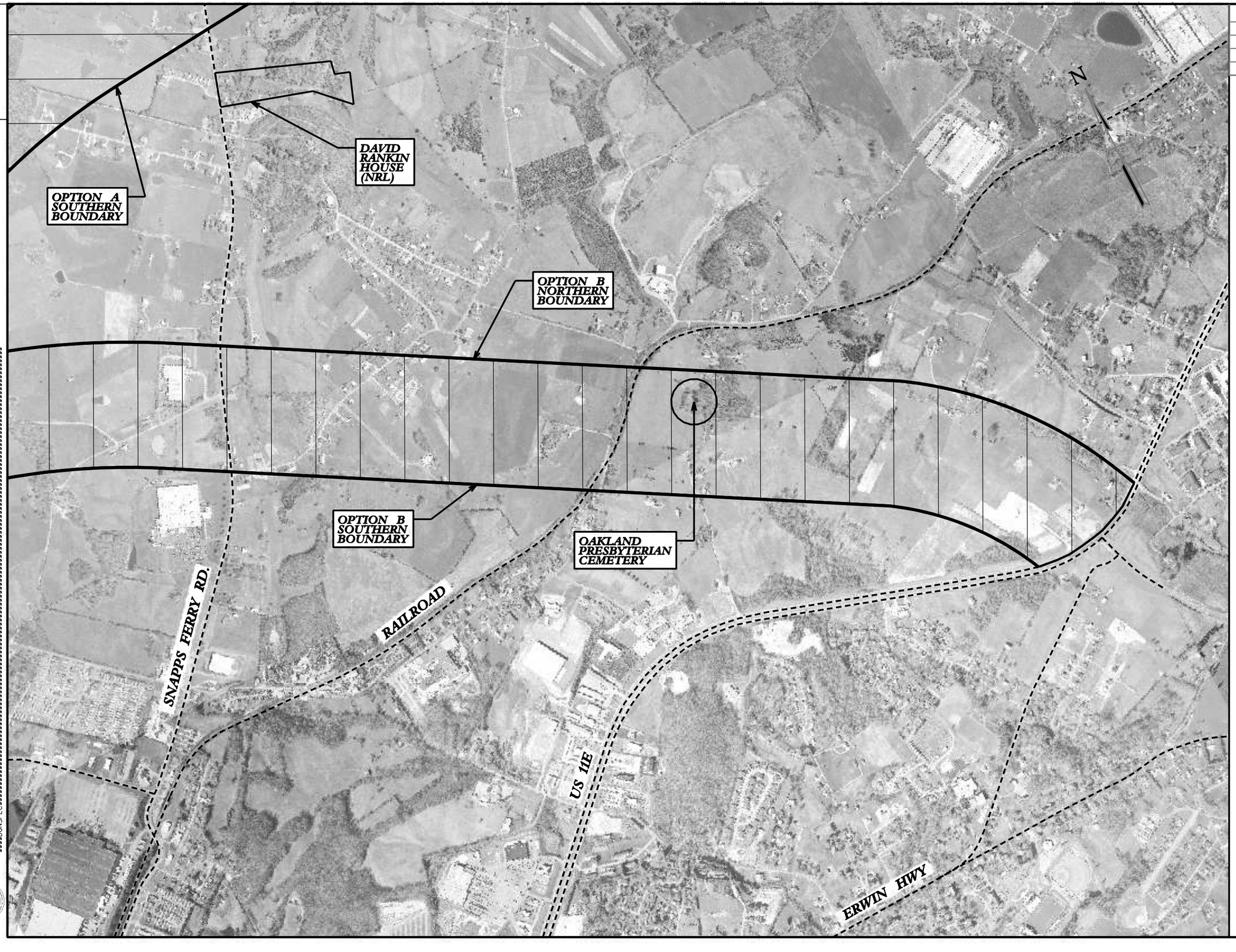
0 500' 1000' 1500'

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

FIGURE 25 A/B

TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
	2006		



0 500' 1000' 1500'

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

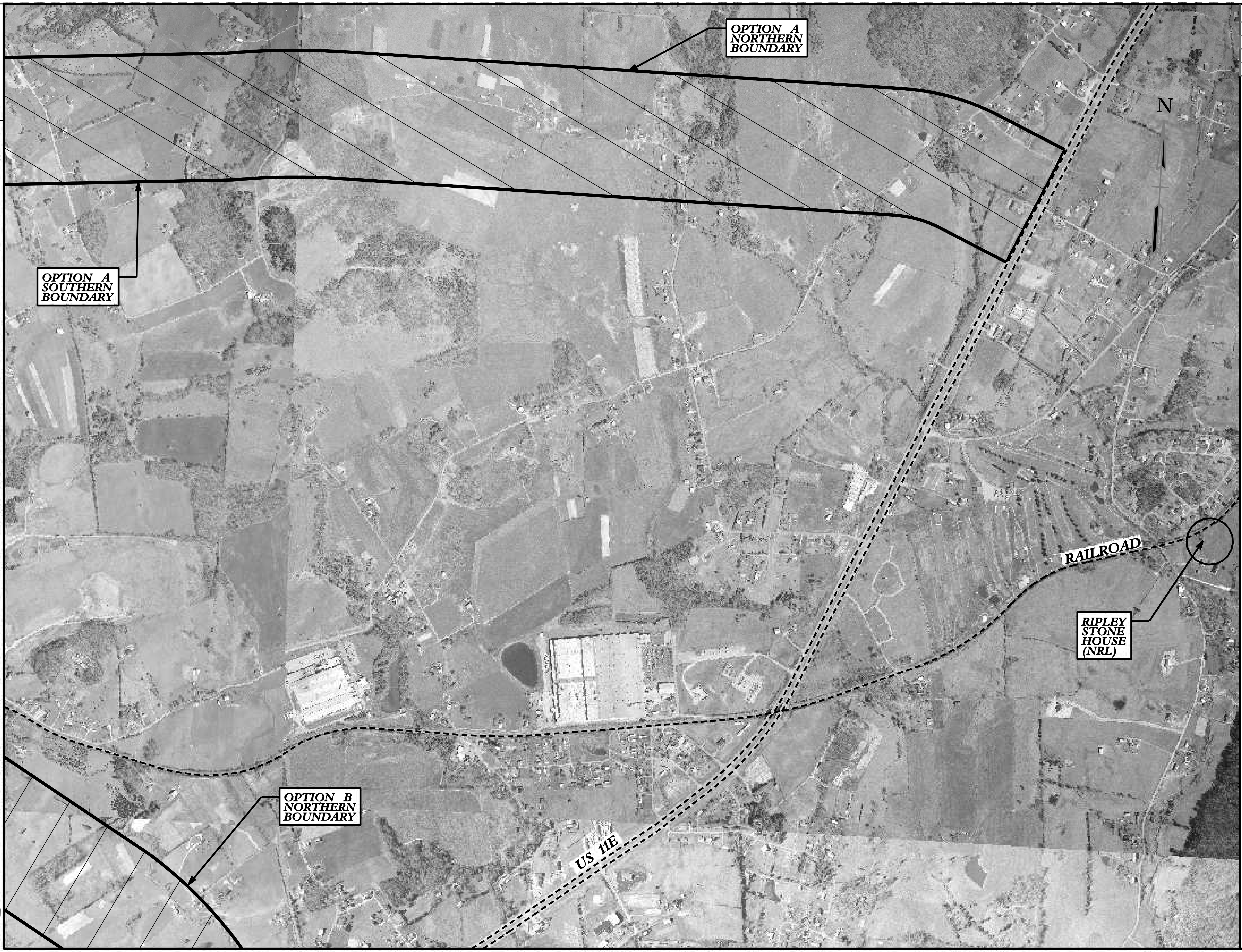
FIGURE 26 B

$$$$SYTIME$$$$$$
$$$$DGNSPEC$$$

TENNESSEE D.O.T.
DESIGN DIVISION
FILE NO.

$$$$SYTIME$$$$$$
$$$$DGNSPEC$$

TYPE	YEAR	PROJECT NO.	SHEET NO.
	2006		



0 500' 1000' 1500'

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING & DEVELOPMENT

FIGURE 27 A