

INTERCHANGE JUSTIFICATION STUDY



***SR111
AT
S.R. 284 &
BAKER MOUNTAIN ROAD
VAN BUREN COUNTY
NEAR
SPENCER, TENNESSEE***

**PREPARED BY
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FOR

THE TENNESSEE DEPARTMENT OF TRANSPORTATION

JULY 2005

Interchange Justification Study

State Route 111 (Corridor J) at the Intersection
with State Route 284 (Piney Road/Baker Mountain Road)

Van Buren County, Tennessee

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Chapter 1

INTRODUCTION

A. Purpose of Study

The purpose of this study is to examine the feasibility, cursory benefits and impacts of constructing an interchange at the existing intersection of State Route 111 (Corridor “J”) with State Route 284 and Baker Mountain Road south of Spencer in Van Buren County, Tennessee (see area map).

This report will examine the current conditions, the current and future needs of the area and analyze the traffic operation and any safety issues related to a new interchange at this location. In addition, utilizing the functional drawings that will be prepared, the estimated right-of-way, construction, and utility relocations costs for an interchange will be developed, and the preliminary environmental concerns will be identified. The report will identify the public involvement and input during the planning process for this study.

Preparation of this study was initiated at the request of the Tennessee Department of Transportation (TDOT).

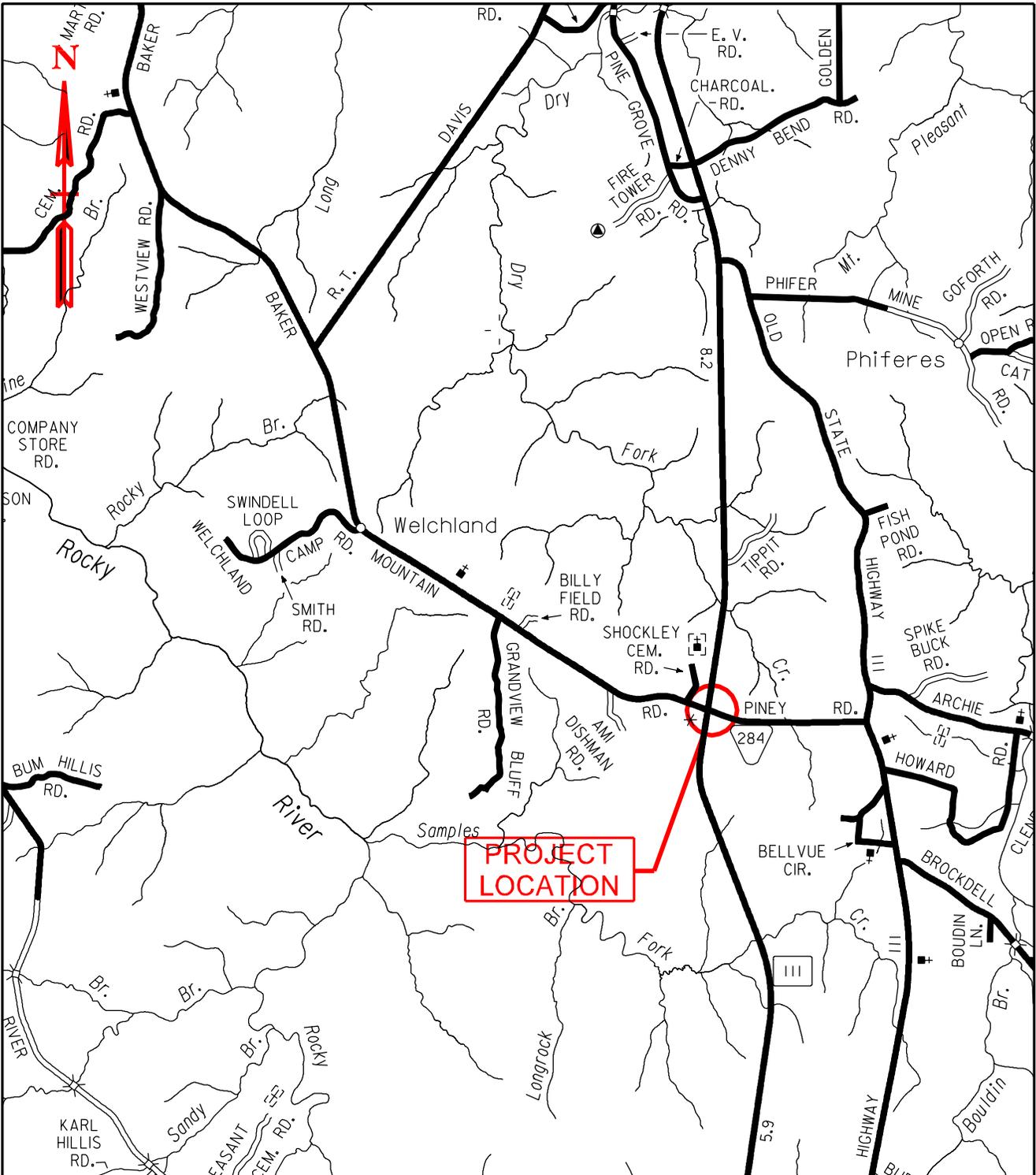
B. Description of Project Location

The project site is located approximately 8 miles south of Spencer, Tennessee. The study area is located on a portion of State Route 111 in a rural area of the Cumberland Plateau. According to the 2000 Census, the population of Van Buren County was 5,508 and the City of Spencer had a population of 1,713. Fall Creek Falls State Park is a major tourist attraction located approximately 7 miles to the east of the project site. This park has over one million visitors annually.

State Route 111 (SR 111) is part of Corridor “J” of the Appalachian Development Highway System (ADHS). SR 111 is one of several routes on the Appalachian Highway System in Tennessee and falls under the jurisdiction of the Appalachian Regional Commission. Corridor “J” begins at I-24 in Chattanooga, Tennessee and terminates at I-75 in London, Kentucky. SR 111 is also a part of the National Highway System (NHS).

Currently, SR 111 is a two-lane highway. Construction is in progress to add additional lanes on SR 111 from Spencer to approximately 1000 feet south of the project site. This project was contracted in 2002 as project number APD-NHE-111(38). Calculations in this report are based on the four-lane divided highway section that is under construction. The signed speed limit is 55 mph. At the project location, SR 111 has partial access control, with one drive for each property. The right-of-way is fenced, with openings for drives.

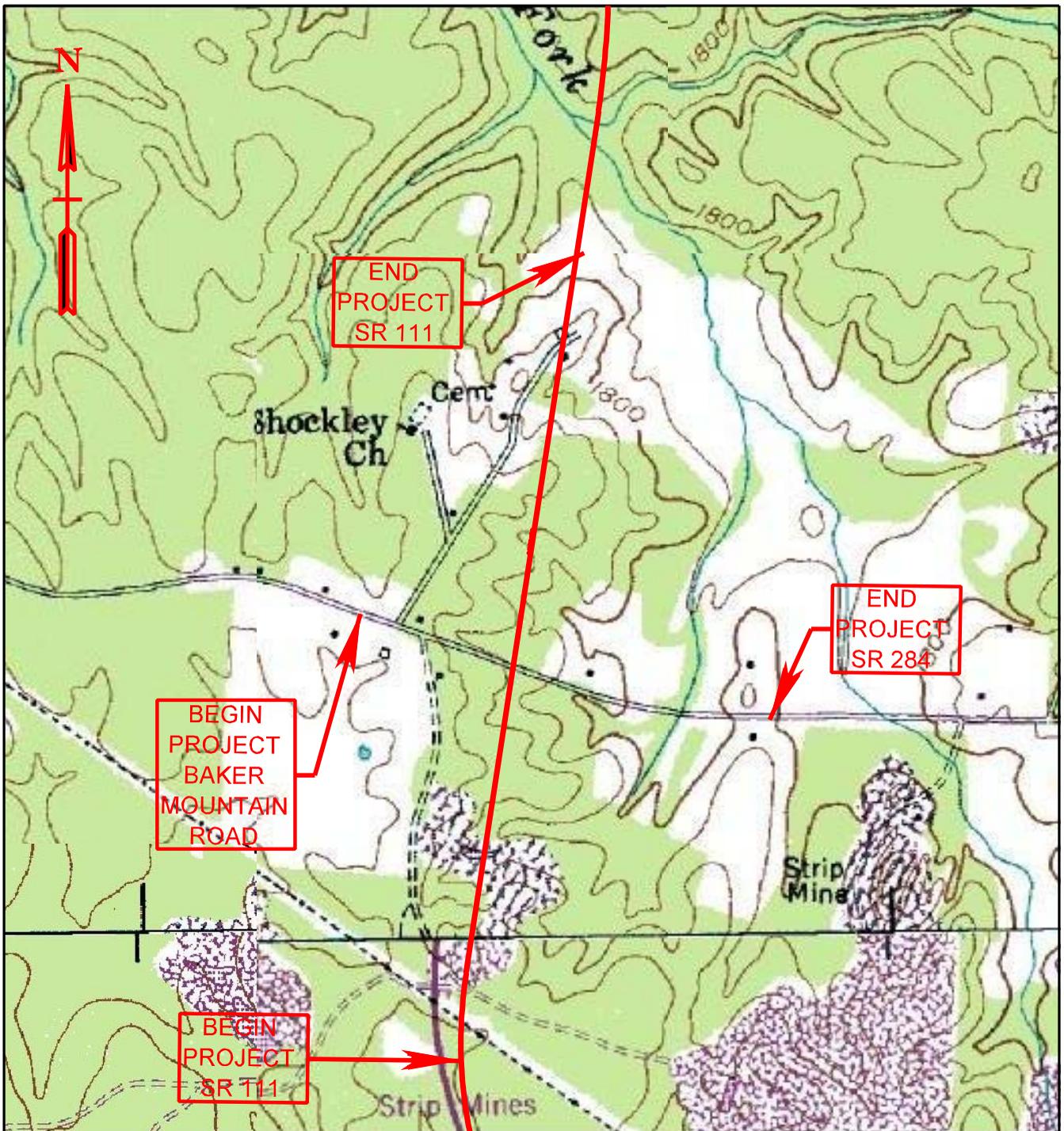
The existing intersection is at-grade, with a two-way stop condition. Traffic on SR 111 is free-flow, and the side roads have a stop condition. A flashing signal is in place at the intersection.



AREA LOCATION MAP

**APD CORRIDOR J
INTERCHANGE LOCATION AT
SR 111 AND SR 284
NEAR SPENCER, VAN BUREN COUNTY**





PROJECT LOCATION MAP

APD CORRIDOR J
INTERCHANGE LOCATION AT
SR 111
AND
SR 284 / BAKER MOUNTAIN ROAD
NEAR SPENCER, VAN BUREN COUNTY



Baker Mountain Road descends steeply from the west to the stop condition at SR 111. SR 284 climbs rapidly to the intersection with SR 111. Sight distances appear to be adequate at the intersection.

Several State Routes and local roads serve the project area in Van Buren County. State Route 111 is a north-south route while State Route 284, State Route 8, and State Route 30 are east-west routes. State Route 284 (SR 284) serves as the access road for Fall Creek Falls State Park. SR 284 begins at State Route 111 and follows an easterly direction to Fall Creek Falls State Park. At the proposed interchange site, SR 284 is also known as Piney Road, and has a speed limit of 45 mph. After SR 284 crosses Old Highway 111, the road name changes to the Archie Rhinehart Parkway. SR 284 continues through the park and terminates at State Route 30 on the north side of the park. Baker Mountain Road connects State Route 111 at State Route 284 and follows a mountain ridge northwesterly to join up with State Route 30 west of Spencer. It serves as a short cut to the park from the west. State Route 8 joins State Route 111 approximately 7 miles to the south and follows State Route 111 southward towards Chattanooga. State Route 30 interchanges with State Route 111 in Spencer approximately 8 miles to the north.

The proposed interchange would serve residents and businesses in an area that is experiencing growth. There are several subdivisions that have been platted to the west along Baker Mountain Road and a review of recent real estate sales indicate increased activity. It would also serve those park visitors who enter through the park's west entrance. Approximately 51% of vehicle trips to the park enter through the west entrance.

Property in the area of the proposed interchange is mostly residential, with a commercial site at the northeast corner of the existing intersection. The Parkway Southside Market includes a gas station and restaurant with access drives onto both SR 111 and SR 284. There are several residences along Baker Mountain Road that are within the project area and may be affected by the interchange ramps. Right-of-way for SR 111 at the proposed interchange location varies, but is generally 350 feet or more.

C. Relationship of Project to Other Transportation Improvement Plans and Classifications

Beginning in 1978, State Route 111 was constructed as a two-lane highway on right-of-way sufficient to construct a median and two additional lanes in the future. Within the study area, it was constructed as a partial access control highway. In 2003, TDOT awarded a contract to construct the median and the two additional lanes. The construction begins 800 feet south of the intersection with SR 284 and ends approximately 7 miles to the north within the City Limits of Spencer near the SR 30 interchange.

The four-legged intersection with SR 284 and Baker Mountain Road is the only major intersection within the study area. A flashing warning signal has been installed at the intersection. Other access to SR 111 is limited to a driveway for each adjoining property owner and an access control identified with a fence is in place between driveways.

As listed previously, SR 111 is part of the Appalachian Development Highway System (ADHS). Tennessee Department of Economic and Community Development Commissioner Matthew Kisber, in a letter dated March 12, 2004, requested approval from the Appalachian Regional Commission to move the proposed interchange at State Route 285 (Gooseneck Road) in Van Buren County to the location of this study. In a letter dated April 7, 2004, Mr. Thomas M. Hunter, Executive director of the Appalachian Regional Commission, approved the request to move the interchange.

State Route 111 has been classified as a rural principal arterial highway and is on the National Highway System (NHS). The construction of an interchange will not alter this classification.

TDOT's designated Highland Rim Bicycle Route begins at the western entrance to Fall Creek Falls State Park and ends at Standing Stone State Park in Overton County. From the entrance to Fall Creek Falls State Park, it follows State Route 284 to State Route 111 where it turns north and follows along SR 111 for many miles. The bike lane designation is marked on the shoulder of SR 111. The construction of an interchange should not impact the use of the bike route.

Chapter 2

PRELIMINARY PLANNING DATA

A. Land Use of Area

Historically, the land use in the area has been agricultural, with some pockets of residential. New residential subdivisions are being developed in the area, and the land use is becoming increasingly residential.

A commercial development is located in the northeast quadrant of the intersection. The site includes a gas station and restaurant with drives onto both SR 111 and SR 284.

The area around the project site has agricultural uses, including pasture and farm ponds. None of the farm ponds appear to be affected by the project. Dry Fork Creek is to the northeast of the intersection, but is not within the proposed project limits. The interchange area is not within a designated floodplain (FEMA Map 470342 0003A dated December 1, 1978).

Shockley Cemetery is northwest of the project. The cemetery is over 500 feet from the project, and no impact is expected for that parcel.

B. Traffic Served by Project

The Tennessee Department of Transportation (TDOT), Mapping and Statistics Office: Traffic Planning and Surveys Section provided traffic data for use in this study. Future traffic volumes were based on cycle counts from 2003 and a turning movement count in April 2004. They were then projected for base year and the design year based on an average growth rate from the ADAM computer program. The base year for this project is 2009, and the design year is 2029. Average Daily Traffic (ADT) volumes and Design Hour Volume (DHV) for the existing system were provided by TDOT and are included in the Appendix.

Traffic passing through the intersection consists of three main user groups. First, local traffic uses SR 111, SR 284, and Baker Mountain Road for travel within Van Buren County. Second, travelers use SR 111 as a regional route for access to Chattanooga and other points north. Third, slightly more than half of vehicles entering Fall Creek Falls State Park pass through the intersection.

Traffic volumes on SR 111 are projected to reach 3,360 vehicles per day (vpd) by 2009. Design year volumes are projected to reach 5,710 vpd. Along SR 284, the volumes are projected to reach 1,310 vpd in 2009 and 2,230 vpd in 2029. If the interchange is not constructed, the base year level of service will be "A" for all of the mainline roads in the project area, and LOS "B" at the intersection. The level of service for the mainline operations will remain at LOS "A" for the design year, but the intersection will have LOS "C".

Design Hour Volumes for interchange were 10% of the ADT. Directional splits along SR 111 and SR 284 were 60%/40%. Truck percentages were high along SR 111, at 25%. At the proposed interchange location, the highest volume turning movements are from SR 111 to SR 284 and vice-versa.

This intersection has been the site of several crashes. If no improvements are made at this location, there is the potential for the continued occurrence of crashes at the site. The state of Tennessee provided crash data from its Tennessee Roadway Information Management System (TRIMS) for use in this report.

Between January 1993 and March 2002, there were 22 crashes on SR 111 at the intersection with SR 284. 12 of these crashes occurred from 1999 to 2002. There was also one crash listed as occurring on SR 284 at the intersection with SR 111. Of these 23 crashes, 22 occurred at the intersection. These crashes resulted in 28 injuries and 1 fatality. Almost all of these crashes occurred between two vehicles (22). Of the 22 multi-vehicle crashes, 19 occurred with an angled impact, suggesting that a turning movement was involved for at least one of the vehicles. One involved a rear-end collision. Most of the crashes occurred during the day (21) and during clear conditions (16). Sight distances do not appear to be an issue at the intersection.

C. Proposed Improvement

The current construction project on SR 111 will result in a four-lane, divided roadway through the project area. The proposed interchange includes a new bridge on SR 111, with the cross roads passing beneath SR 111. The proposed interchange will improve the level of service for the intersection of SR 111 and SR 284/Baker Mountain Road. An interchange would also improve access to Fall Creek Falls State Park by eliminating turning movements on the SR 111 route to the park. Those turning movements would occur at the cross road, with only merge and diverge movements on the mainline of SR 111.

Initial planning for the interchange included several configuration alternatives. These different interchange forms were reviewed based on their safety, effectiveness in providing for the expected turning movements, impact on adjacent properties, constructability, and cost. Several of these options were discussed at an on-site meeting between TDOT staff and Wiser Company on September 15, 2004. These concepts included the following:

1. a diamond interchange at the existing intersection location with the cross roads passing over SR 111
2. a diamond interchange at the existing intersection location with the cross roads passing under SR 111
3. a partial cloverleaf at the existing intersection location with the cross roads passing over or under SR 111
4. a diamond interchange shifted approximately 600 feet south of the existing intersection
5. a partial cloverleaf shifted approximately 300 feet south existing intersection location with the cross roads passing over or under SR 111

Discussions on-site and afterward included consideration of impacts to property and residences, the extent of cross road construction, access limitations on SR 111, profile requirements, and the offset of the proposed interchange north or south from the existing intersection location.

After a general analysis of the concepts, two interchange types appeared to provide the best functionality. These were a diamond interchange (Alternate A) and a partial-cloverleaf (Alternate B). These two options were developed in detail and presented at the public meeting for the project in December 2004. These Alternates are shown in the Appendix.

Several of the characteristics of the proposed interchange are common to all of the options. These include the method of crossing SR 111, the extension of the four-lane divided section for SR 111 past the interchange project limits, access control for SR 111, and bridge construction on SR 111.

SR 284/Baker Mountain Road could be routed over SR 111 or under it. One critical factor in this determination was the topography of the interchange location. Routing the cross roads under SR 111 provides better sight distances for the profiles and shorter construction limits. Another factor in this decision was the affect of construction on the operation of SR 111. Construction of a bridge over SR 111 would have less impact than construction of a bridge for SR 111. However, because SR 111 will have a four-lane divided section, traffic could be detoured to a

two-lane condition while the bridge is under construction. Once the first bridge is complete, traffic could be routed on the new bridge to minimize the disruption to mainline traffic on SR 111. The ultimate interchange characteristics were determined to be the controlling factor in this case, so the cross roads will be relocated underneath SR 111. SR 111 will cross over SR284/Baker Mountain Road on a new bridge.

Another aspect of the project is the transition from a four-lane divided highway to a two-lane highway. It is recommended that the four-lane divided section be continued to the south beyond the end of the southbound ramp to allow for merging movements. This requirement applies to each of the interchange alternates.

Partial access control is planned for the four-lane divided highway section under construction. To maintain the access control and provide for safety of vehicles using the interchange, no access will be allowed along the proposed ramps. Also, no access will be allowed for a minimum of 300 feet beyond the longest ramp taper. This should maintain an adequate separation distance for merging and turning movements.

Both alternates require the construction of a bridge on SR 111, which will be disruptive to traffic. Since this applies to both alternates, it was not a significant factor in the comparison.

Alternate A was the diamond interchange at the existing intersection location. This configuration was the baseline for comparison with the other alternates. The ramps utilize the traditional diamond shape, and right-of-way acquisition would be required in all four quadrants. The cross roads are routed beneath SR 111 and the ramp terminals are approximately 700 feet apart. Shockley Cemetery Road would be relocated to the west beyond the 300 foot access control limits for the interchange. Alternate A would be very disruptive to traffic during construction, with construction at the intersection affecting SR 111, SR 284 and Baker Mountain Road. The effect of construction could be compounded by the high number of tourist drivers who would be unfamiliar with the area. This could have an effect on travel to the park, with the potential for decreased visitation during construction.

The partial cloverleaf layout was evaluated as Alternate B. This interchange would be located approximately 300 feet south of the existing intersection with the loop ramp in the southeast quadrant. The ramp terminals would be spaced farther apart than for the diamond interchange, approximately 1050 feet apart. Right-of-way would be required in three quadrants of the interchange. This alternate would not require acquisition of the existing Parkway Southside Market. However, a larger area would be required for the loop ramp, so the total area needed for the two alternates is similar. Shockley Cemetery Road would not be affected by this alternate. By placing the loop ramp to the south of SR 284, the northbound ramp would pass over the cross roads, requiring a wider bridge on SR 111. This provides a comparative construction cost increase to offset the cost savings for right-of-way created by avoiding the commercial property.

The offset of Alternate B from the existing interchange reduces the effect of construction on traffic in the area. Traffic can continue to utilize the existing intersection during construction. However, when compared to the diamond configuration, the partial-cloverleaf can be more confusing to drivers, particularly those unfamiliar with the required turning movements. In this

case, the unfamiliar drivers are likely to be visitors to Fall Creek Falls State Park. The affected drivers will be somewhat familiar with the interchange, as they have likely used this same interchange configuration to reach the park. Upon departure, however, there is the potential for drivers to miss the left-turn onto the northbound ramp.

The conceptual layouts for Alternates A and B were presented at a public meeting. Based on the considerations listed above, the diamond interchange was determined to be a better alternative. One negative aspect of Alternate A was the disruption of traffic at the intersection during construction. Therefore, a modified version of Alternate A was developed with a small offset to the south of the existing intersection. The new interchange layout was named Alternate C. Alternate C was evaluated and found to be the preferred alternative. The configuration of Alternate C is shown in the Functional Drawings.

Average Daily Traffic (ADT) volumes and Design Hour Volume (DHV) for the proposed system are provided in the Appendix.

An important aspect of this interchange project is to increase safety at this intersection. The construction of an interchange at this location would provide a safer operation for all users, especially those travelers exiting State Route 111 heading east to Fall Creek Falls State Park. This is accomplished by removing the left-turn movements across SR 111. Left-turn movements for the proposed system occur only on the cross roads. Many of those vehicles are RV's, while others are towing camping trailers. Providing an opportunity for the slower moving vehicles to make turns out of the speed lanes would create a much safer operation.

The current construction project to create a four-lane divided highway would alleviate a portion of the safety problem, but not as successfully as an interchange. Adding a deceleration and stacking lane for left-turn movements from SR 111 to SR 284 will reduce the risk of rear-end collisions on the southbound lanes of SR 111. Based on the 9 year period of crash data from the TDOT TRIMS program, rear-end collisions occurred only once for 22 crashes at the intersection, accounting for just over 4.5% of the crashes. Even with the four-lane improvements, vehicles would still be required to turn left across the northbound lanes of SR 111. Eliminating the turning conflicts would have an even larger effect on the safety at the intersection. Crashes with the vehicles impacting at an angle made up 19 of 22 of the crashes at the intersection, accounting for over 86% of the crashes at the intersection during the sample period. The construction of an interchange would relocate those turning movements from SR 111 to SR 284 and Baker Mountain Road. Turning movements from the off ramps onto the cross-roads would begin at a stop condition.

Construction of the interchange would also improve the safety of the intersection for the traffic turning movement from the cross roads onto SR 111. At the existing intersection, vehicles must begin at a stop condition, turn onto SR 111, and accelerate to reach the posted speed limit. Construction of the four-lane divided section would improve the safety of this movement by allowing mainline traffic an extra lane to avoid these slower moving vehicles. An interchange would further improve the safety of these movements by changing them to merging movements. This greatly reduces the differential velocities of the vehicles on SR 111. These two improvements to the safety at the intersection are especially important because of the number of

trucks, RV's, and trailers passing through the intersection. Park records show that as many as 30,000 of the visitors to the park are campers. Many of the campers are in RV's or tow small camp trailers. The percentages of truck traffic on SR 111 are at 25%. These larger and heavier vehicles require more time to accelerate and stop than passenger cars. Because of the high percentage of larger vehicles, the benefits of ramp access to SR 111 and merge/diverge movements are important at this site.

Chapter 3

ENGINEERING INVESTIGATIONS

A. Traffic Operations Analysis

The proposed interchange was analyzed to determine the impacts on SR 111 and the surrounding transportation system.

Existing Conditions (No-Build analysis)

For the existing system, the ADT along SR 111 is projected to nearly double in the 20 years from 3,360 vpd in year 2009 to 5,710 vpd in year 2029. Even with that increase in volume, the Level of Service for the existing system remains at LOS “A” in 2009 and 2029. These levels of service are based on the mainline of SR 111 and SR 284. At the intersection, the Level of Service drops from LOS “B” in 2009 to LOS “C” in 2029 (see Figure 1 and Figure 2)

Proposed Conditions (Full-Build Analysis)

The proposed interchange is not expected to change the traffic patterns at the intersection. For the proposed conditions, the mainline of SR 111, SR 284, and Baker Mountain Road all have Level of Service “A” for the base year and the design year. This is the same as for the existing system. The improvement to the level of service due to the interchange is at the intersection. The proposed interchange has a LOS “A” for all components for both the base year and design year (see Figure 3 & Figure 4). Table 1 includes a summary of the level of service provided for each component of the interchange.

The proposed ramps for access to SR 111 were analyzed with HCS2000 to determine Level of Service. Based on the AM and PM peak hourly volumes, all of the ramps operate at LOS “A” for year 2009 and 2029. The ramp terminals on the cross roads are also at LOS “A.” These levels of service correspond to the mainline level of service for the corresponding year, also LOS “A.”

Weaving calculations were not necessary for this project. The next adjacent interchange in each direction was outside the boundary of influence.

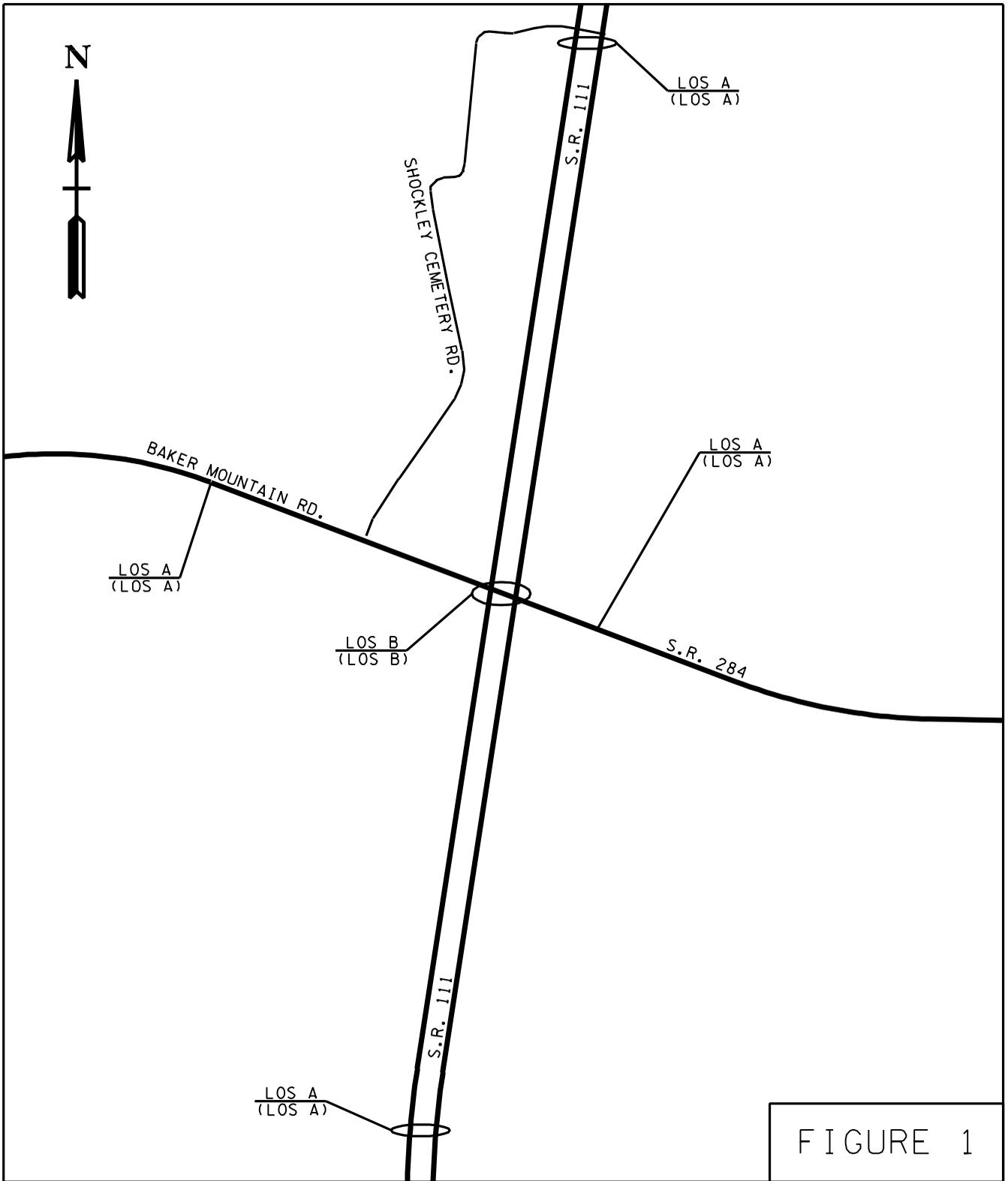


FIGURE 1

**S.R. 111 & BAKER MOUNTAIN RD./S.R. 284
 INTERCHANGE JUSTIFICATION STUDY
 NEAR SPENCER, VAN BUREN COUNTY, TENNESSEE
 EXISTING 2009 CONDITIONS
 AM - (PM)**

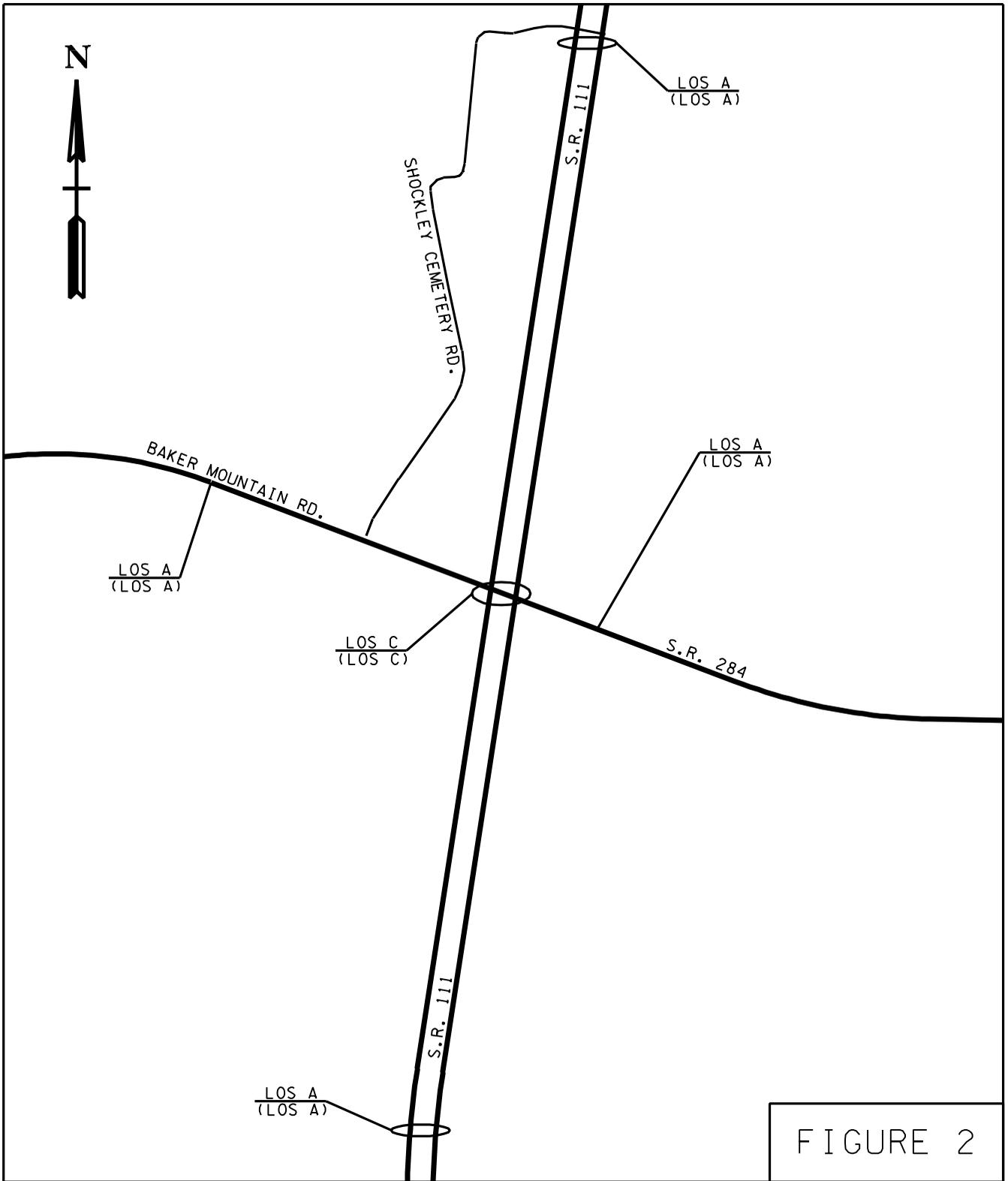


FIGURE 2

**S.R. 111 & BAKER MOUNTAIN RD./S.R. 284
 INTERCHANGE JUSTIFICATION STUDY
 NEAR SPENCER, VAN BUREN COUNTY, TENNESSEE
 EXISITING 2029 CONDITIONS
 AM - (PM)**

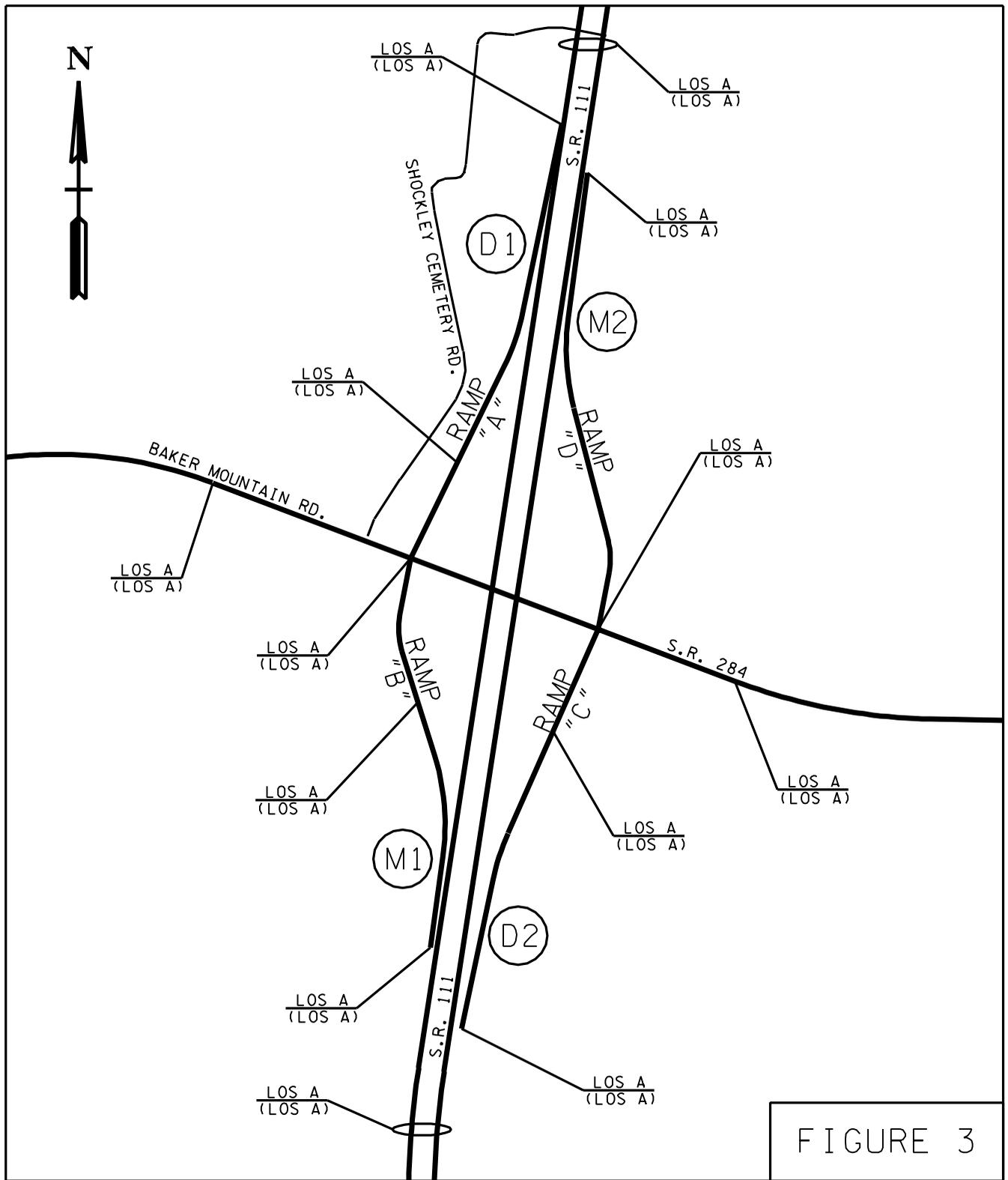


FIGURE 3

**S.R. 111 & BAKER MOUNTAIN RD./S.R. 284
 INTERCHANGE JUSTIFICATION STUDY
 NEAR SPENCER, VAN BUREN COUNTY, TENNESSEE
 PROPOSED 2009 CONDITIONS
 AM - (PM)**

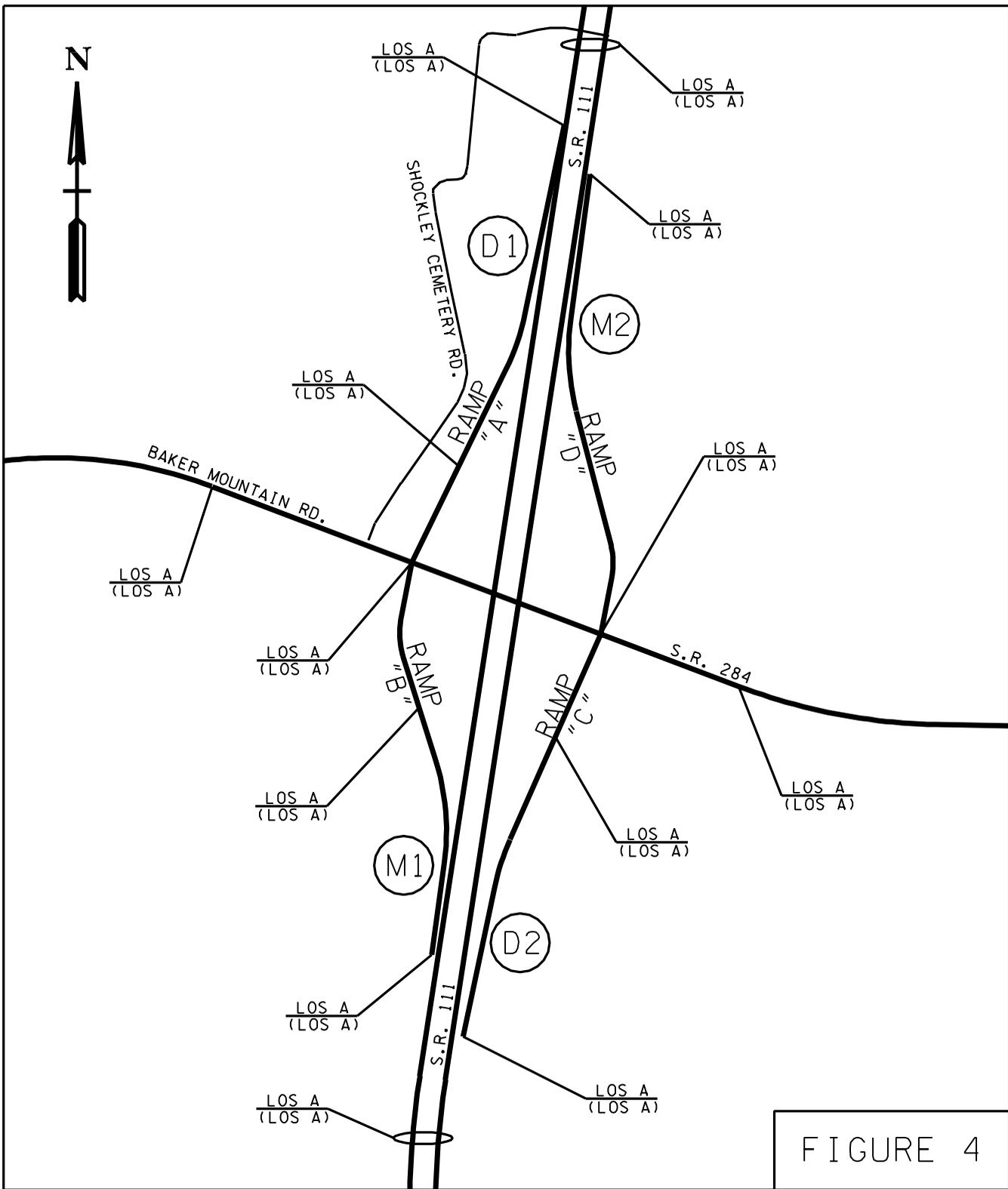


FIGURE 4

**S.R. 111 & BAKER MOUNTAIN RD./S.R. 284
 INTERCHANGE JUSTIFICATION STUDY
 NEAR SPENCER, VAN BUREN COUNTY, TENNESSEE
 PROPOSED 2029 CONDITIONS
 AM - (PM)**

Summary of Level of Service

Location	Year 2009		Year 2029	
	AM	PM	AM	PM
Existing Unsignalized Two-way stop intersection of S.R. 111 at S.R. 284 / Baker Mountain Road	B	B	C	C
S.R. 111 north of intersection with S.R. 284 / Baker Mountain Road	A	A	A	A
Baker Mountain Road west of intersection with S.R. 111	A	A	A	A
S.R. 111 south of intersection with S.R. 284 / Baker Mountain Road	A	A	A	A
S.R. 284 east of intersection with S.R. 111	A	A	A	A
Diverge (D1) from S.R. 111 (southbound)	A	A	A	A
Merge (M1) onto S.R. 111 (southbound)	A	A	A	A
Diverge (D2) from S.R. 111 (northbound)	A	A	A	A
Merge (M2) onto S.R. 111 (northbound)	A	A	A	A
Ramp "A" from S.R. 111 (southbound) to Baker Mountain Rd.	A	A	A	A
Ramp "B" from Baker Mountain Road to S.R. 111 (southbound)	A	A	A	A
Ramp "C" from S.R. 111 (northbound) to S.R. 284	A	A	A	A
Ramp "D" from S.R. 284 to S.R. 111 (northbound)	A	A	A	A
Ramp terminal at Baker Mountain Road east of S.R. 111	A	A	A	A
Ramp terminal at S.R. 284 west of S.R. 111	A	A	A	A

Table 1

B. Cost

The preliminary cost estimate for the proposed SR 111 interchange was \$5,335,225. Included in that cost was \$1,130,000 for the bridge on SR 111 to allow the relocated SR 284/Baker Mountain Road to cross under SR 111 and \$684,000 for Right-of-Way acquisition. A Cost Data Sheet is provided. Breakdowns of the costs including the calculation worksheets are included in the Appendix.

C. Environmental Concerns or Issues

The area of the interchange has been previously used for agriculture, and is mostly undeveloped. However, there are several properties that will be affected by the project. There are 2 houses within the proposed ROW that must be acquired.

A commercial development is located in the northeast quadrant of the intersection, and must be acquired for the proposed interchange. The site includes a gas station and restaurant. The site has underground gasoline storage tanks. The UST's have not been tested, and the potential for soil or groundwater contamination is not known. Sewage disposal at the site has been by septic system. The status of the septic system and any grease or oil traps on the site is unknown.

The area around the project site has agricultural uses, including pasture and farm ponds. None of the farm ponds appear to be affected by the project. Dry Fork Creek is to the northeast of the intersection, but is not within the proposed project limits. The interchange area is not within a designated floodplain (FEMA Map 470342 0003A dated December 1, 1978).

Shockley Cemetery is located to the northwest of the project. The cemetery is over 500 feet from the project, and no impact is expected for that parcel.

Initial research into the proposed roadway corridor found no evidence of endangered species within the expected limits of construction. Research at the State Historic Preservation Office (SHPO) found no records of any historic buildings along the corridor. A preliminary review found no "National Register" listed properties within the expected limits of construction.

A visit to the project site provided no visible evidence of wetlands.

COST DATA SHEET

PROJECT: IJS: SR 111 at SR 284 & Baker Mountain Road
 LOCATION: Van Buren County
 LENGTH: N/A
 CROSS SECTION: Diamond Interchange

RIGHT-OF-WAY

Land, Improvements, & Damages	(# Acres	13)	\$549,000
Incidentals	(# Tracts	7)	\$35,000
Relocation Payments	(Residences	2)	\$50,000
	(Businesses	1)	\$50,000
	(Non-Profits)	
Total Right-of-Way Cost			\$684,000

UTILITY RELOCATION

Reimbursible	\$0
Non-Reimbursable	\$127,600
Total Utility Adjustment Cost	
	\$127,600

CONSTRUCTION

Clearing and Grubbing	\$36,300
Earthwork	\$686,700
Pavement Removal	\$116,225
Drainage (Erosion Control =	\$115,000)
Structures (Preservation / Demolition =	\$0)
Railroad Crossing	\$0
Paving	\$726,625
Retaining Walls	\$0
Maintenance of Traffic	\$100,000
Topsoil	\$22,033
Seeding	\$8,924
Sodding	\$44,067
Signing	\$100,000
Signalization	\$0
Fence	\$39,700
Guardrail	\$106,000
Rip-rap or Slope Protection	\$0
Other Construction Items (8.5%)	\$278,934
Mobilization	\$178,025
10% Engineering and Contingencies	\$373,853
Total Construction Cost	
	\$4,112,386
Preliminary Engineering (10% of Construction)	
	\$411,239

TOTAL COST

\$5,335,225

D. Access Analysis

State Route 111 is a part of the National Highway System (NHS), but is not included in the National Interstate System. Because of this, the proposed interchange was not analyzed based on the requirements developed by FHWA for approval of an interchange. This project involves modifications to an existing intersection to improve safety and level of service, not a new access.

The Federal Highway Administration (FHWA) has developed a policy for approval of access requests on the interstate highway system. The Tennessee Division Office of FHWA has developed guidance in the application of the FHWA policy in Tennessee. The guidance suggests that “the justification and documentation procedures... may be applied to non-Interstate freeways or other access-controlled highways to serve other planning purposes.”¹ The guidance covers the items to be included in an Interchange Justification Study, as well as eight requirements based on FHWA policy.

In some cases, the TDOT requires that applications for access approval address these FHWA requirements. As a modification to an existing access on a partial access control highway, the eight access requirements for Interstate highways established by TDOT and the FHWA are not necessary for this project.

¹ From “Guidance on the FHWA Policy and Procedures for New or Revised Interstate Access Approval,” FHWA, Tennessee Division Office, March 2001.

Chapter 4

PLANNING PARTNERSHIPS WITH LOCAL STAKEHOLDERS

A. Affected Organizations and/or Individuals

The close proximity of Fall Creek Falls State Park is an important aspect of the proposed project. Traffic to and from the Park provides a large percentage of the volumes traveling through the intersection. The other major group affected by the project is the area residents, who use the intersection for local travel.

B. Public Meetings

A public meeting on the proposed interchange was held at the Fall Creek Falls Convention Center on December 13, 2004 to obtain community input. Statements were taken at the meeting and comment sheets were distributed.

TDOT staff and consultants from the Wisser Company provided a short presentation, and then invited the public to ask questions or make comments. Posters and handouts showing alternate layouts for the interchange were available at the meeting. Wisser Company staff attended to provide support and assistance to TDOT staff.

C. Selection of Preferred Alternate

Following the public meeting, the alternates were reviewed based on information from the public. These public comments were part of the decision process in determining the selection of the preferred alternate.

Chapter 5

SUMMARY AND CONCLUSIONS

This report was prepared to evaluate a proposed interchange on SR 111 at the existing intersection of SR 284 and Baker Mountain Road. Crashes at the existing intersection have indicated a potential safety concern at the site. This location has been accepted by the Appalachian Regional Commission for an interchange on SR 111 (Corridor J of the ADHS).

Several alternate configurations were studied. After the public meeting, the list of alternates was narrowed to three. These three options were analyzed in detail for this report. The options were the following:

- A. A diamond interchange at the existing intersection location. This was the baseline plan.
- B. A partial cloverleaf located to the south of the existing intersection.
- C. A diamond interchange offset a short distance south of the existing intersection.

Based on the selection factors discussed previously in this report, the recommended interchange configuration is Alternate C, a diamond interchange offset from the existing intersection with the cross road passing beneath SR 111.

The proposed interchange provides for the objectives of TDOT to improve safety at the site by eliminating left-turn movements on a high-speed highway, as well as improving the functional capacity of the intersection as shown by the level of service "A" achieved by the proposed project for all of the interchange components. The addition of this interchange does not impair the level of service along SR 111. Therefore we recommend the diamond interchange offset from the existing intersection as the preferred alternate.

**RECOMMENDED
INTERCHANGE
CONFIGURATION**

TYPE	YEAR	PROJECT NO.	SHEET NO.
A.P.R.	2005		11

\$\$\$\$SYTIME\$\$\$\$
 \$\$\$DOWSPEC\$\$\$



MATCH LINE - SEE SHEET 12



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
S.R. 111 & BAKER MOUNTAIN ROAD INTERCHANGE JUSTIFICATION STUDY
 ALTERNATE C
 NEAR SPENCER, TN
 VAN BUREN CO.

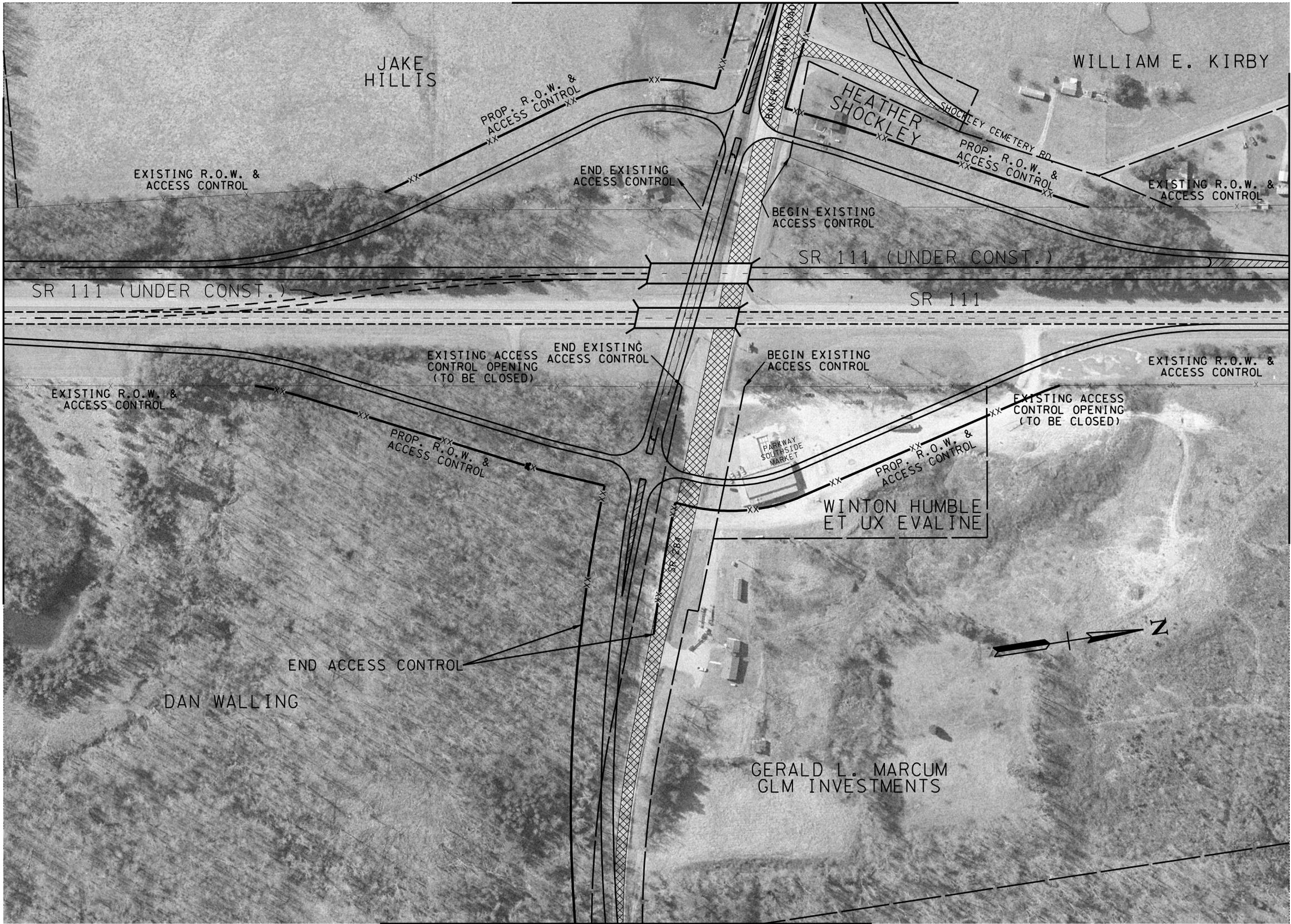
TENNESSEE D.O.T.
 DESIGN DIVISION
 FILE NO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
A.P.R.	2005		12

MATCH LINE - SEE SHEET 14

MATCH LINE - SEE SHEET 11

MATCH LINE - SEE SHEET 13



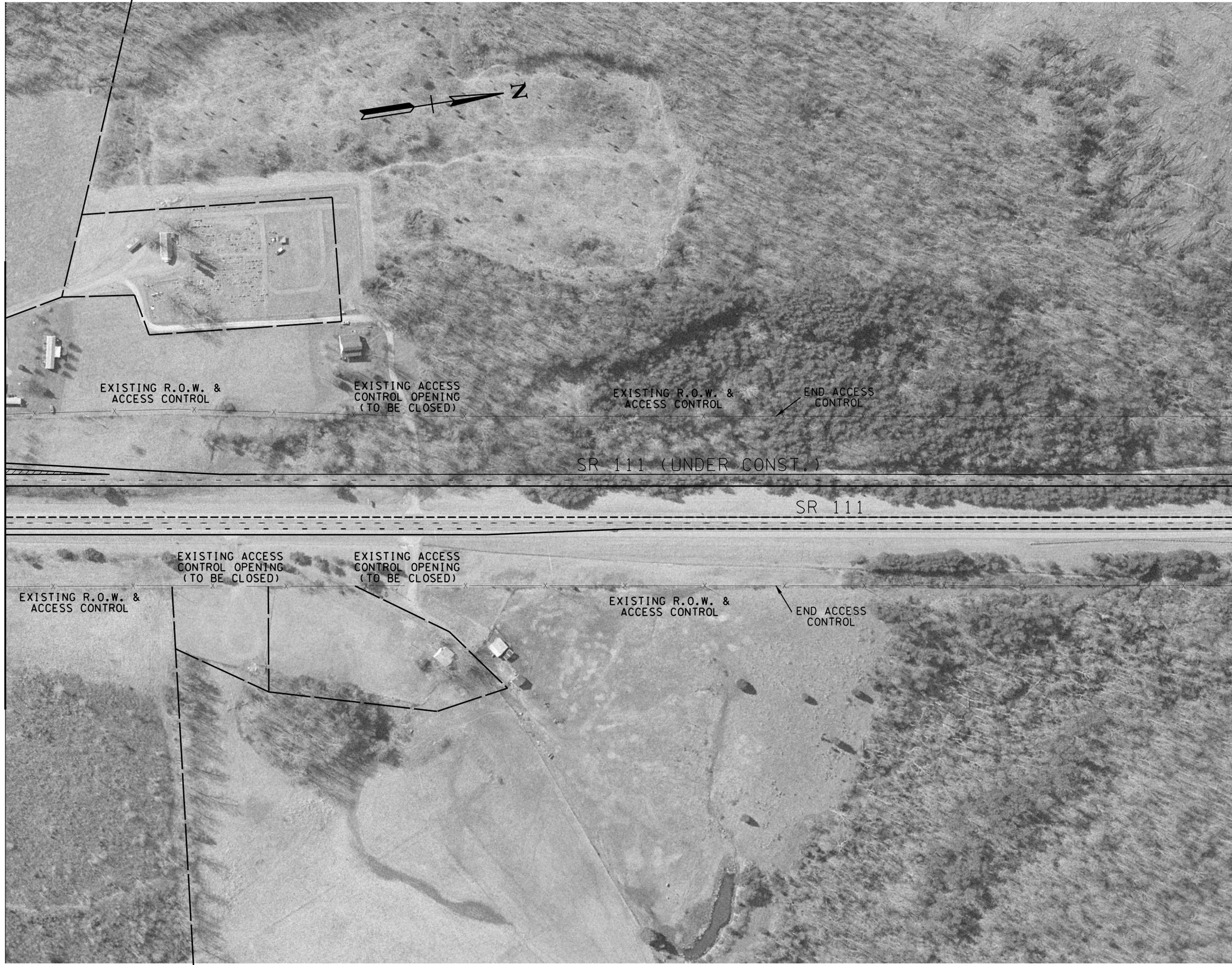
MATCH LINE - SEE SHEET 15

*****SYTIME*****
 *****DCNSPEC*****



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
S.R. 111 & BAKER MOUNTAIN ROAD INTERCHANGE JUSTIFICATION STUDY
 ALTERNATE C
 NEAR SPENCER, TN
 VAN BUREN CO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
A.P.R.	2005		13



MATCH LINE - SEE SHEET 12

\$\$\$\$SYTIME\$\$\$\$
 \$\$\$DONSPEC\$\$\$\$

SR 111 (UNDER CONST.)

SR 111



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
**S.R. 111 & BAKER
 MOUNTAIN ROAD
 INTERCHANGE
 JUSTIFICATION STUDY**
 ALTERNATE C
 NEAR SPENCER, TN
 VAN BUREN CO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
A.P.R.	2005		14



DAN WALLING

NANCY
N.
BECK

EDDIE OAKES
ET UX DONNA

JAKE
HILLIS

WILLIAM E. KIRBY

END ACCESS CONTROL

MATCH LINE - SEE SHEET 12



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
**S.R. 111 & BAKER
 MOUNTAIN ROAD
 INTERCHANGE
 JUSTIFICATION STUDY**
 ALTERNATE C
 NEAR SPENCER, TN
 VAN BUREN CO.

\$\$\$\$SYTIME\$\$\$\$
 \$\$\$DONSPEC\$\$\$

APPENDIX

Retaining Walls	Height (ft)	Length (ft)	Area (ft ²)	Cost / ft ²	
			0	40	0
Maintenance of Traffic				lump sum	100,000
Topsoil	Length (ft)	Width (ft)	Depth (in)	Total (yd ³)	Cost / yd ³
	13220	30	3	3672.2	6
Seeding	Length (ft)	Width (ft)	Area (ft ²)	Units	Cost / Unit
	13220	30	396600	495.75	18
Sodding	Length (ft)	Width (ft)	Area (yd ²)	Cost / yd ²	
	13220	10	14688.9	3	44,067
Signing	No. of Interchanges			Cost / int	
	1			100000	100,000
Signalization	Intersections			Cost / int	
	0			70000	0
Fence	Length		Cost / ft		
	3970		10		39,700
Guardrail	Number of Terminals		Cost per unit		
	8		10000	each	80,000
	Length of Rail		10	/ ft.	26,000
					106,000
Rip-Rap	Tons		Cost / Ton		
			14		0
Right-of-Way	Total Acreage	13	Cost / acre	8000	Total 104000
	Slope Esmt.				0
	Const. Esmt.				0
					104000
			Factor	1	104,000
	No. of Tracts	7	Cost / tract	5000	35,000
	Businessess	1	Displacements	350000	Market 350,000
	Residences	1	Damages	30000	Hillis 30,000
		1		65000	Shockley 65,000
					Total Right-of-Way Cost: 549,000
Mobilization	0 to 1 million		5%		
	1 to 5 million		50,000 + 4.5% in excess of 1 million		
	5 to 10 million		230,000 + 4.0% in excess of 5 million		
	10 to 20 million		430,000 + 3.5% in excess of 10 million		
	over 20 million		780,000 + 3.0% in excess of 20 million		
Utilities	Reimburable	Length	Cost/ft.		
					0
					0
	Non-Reimbursable				
	Gas				0
	UG Telephone	1800	22		39,600
	Water	2100	30		63,000
	Sewer				0
	Elec+Tel	10	Poles	2500	25,000
	Telephone		Poles		0
	Manholes		Poles		0
					127,600

**TENNESSEE DEPARTMENT OF TRANSPORTATION
 MAPPING AND STATISTICS OFFICE
 TRAFFIC PLANNING AND SURVEYS SECTION**

(REV. 10/20/03)

PROJECT NO.: _____ ROUTE: S.R. 111 @ S.R. 284
 COUNTY: VAN BUREN CITY: _____
 PROJECT PIN NUMBER: _____
 PROJECT DESCRIPTION: INTERCHANGE JUSTIFICATION STUDY

[1] S.R. 111 TRAFFIC DATA.

[2] S.R. 284 TRAFFIC DATA.

DIVISION REQUESTING:

MAINTENANCE	<input type="checkbox"/>	PAVEMENT DESIGN	<input type="checkbox"/>
PLANNING	<input checked="" type="checkbox"/>	STRUCTURES	<input type="checkbox"/>
PROG. DEVELOPMENT & ADM.	<input type="checkbox"/>	SURVEY & DESIGN	<input type="checkbox"/>
PUBLIC TRANS. & AERO.	<input type="checkbox"/>	TRAFFIC SIGNAL DESIGN	<input type="checkbox"/>
YEAR PROJECT PROGRAMMED FOR CONSTRUCTION:	_____	OTHER _____	<input type="checkbox"/>
PROJECTED LETTING DATE:	_____		

TRAFFIC ASSIGNMENT:

	BASE YEAR		DESIGN YEAR				DESIGN ROADWAY % TRUCKS		DESIGN AVERAGE DAILY LOADS		
	ADT	YEAR	ADT	DHV	%	YEAR	DIR.DIST.	DHV	ADT	FLEX	RIGID
[1]	3,360	2009	5,710	571	10	2029	60-40	17	25		
[2]	1,310	2009	2,230	223	10	2029	60-40	7	10		

REQUESTED BY: NAME MIKE UPDIKE DATE 3/4/04
 DIVISION PLANNING
 ADDRESS 900 J. K. POLK BUILDING
NASHVILLE TN 37243

REVIEWED BY: TONY ARMSTRONG *Tony Armstrong* DATE 4-19-04
 TRANSPORTATION MANAGER 1
 SUITE 1000, JAMES K. POLK BUILDING

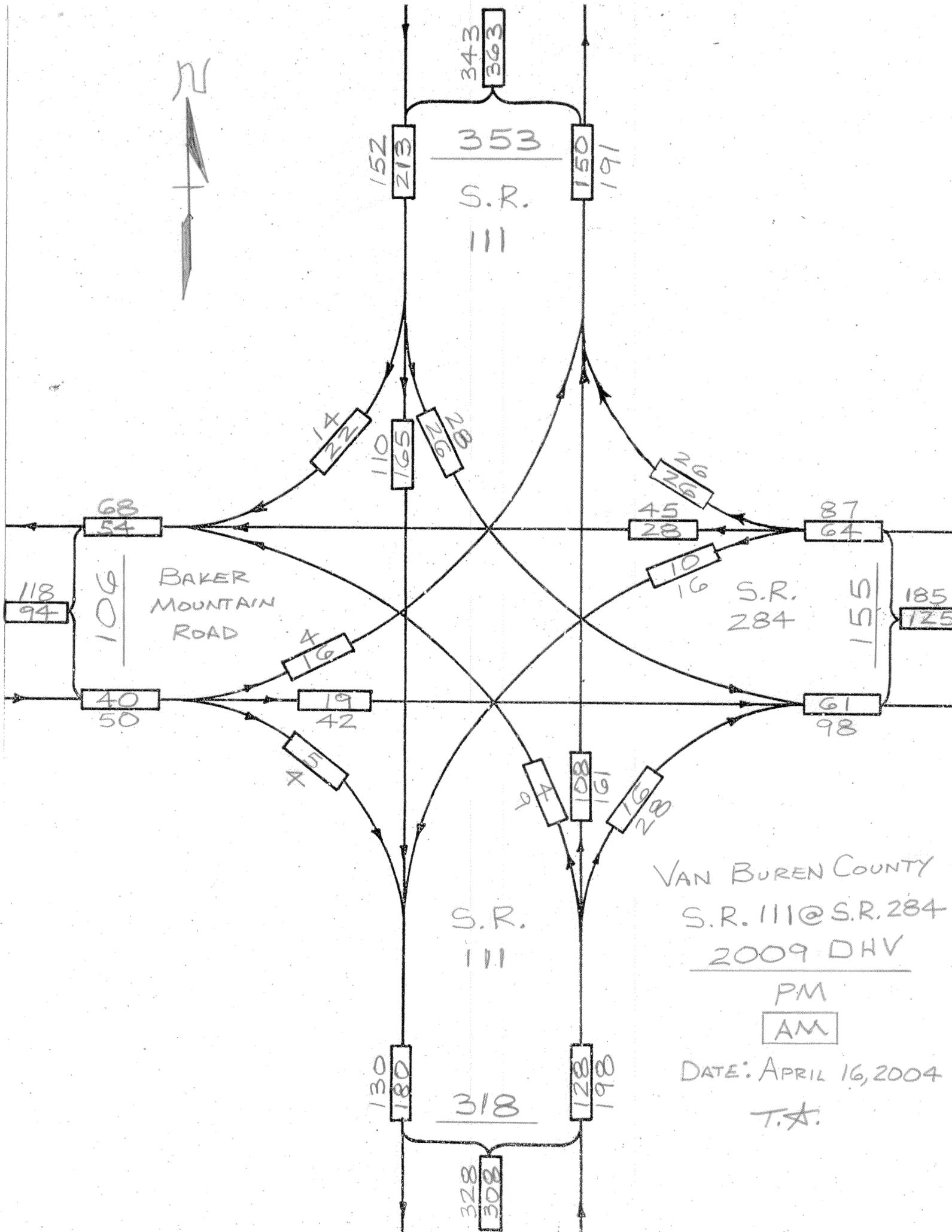
APPROVED BY: STEVE ALLEN *Steve Allen* DATE 4-20-04
 TRANSPORTATION MANAGER 2
 SUITE 1000, JAMES K. POLK BUILDING

COMMENTS:

THIS TRAFFIC BASED ON 2003 CYCLE COUNTS AND A 12-HOUR TURNING MOVEMENT COUNT [APRIL 2004]. FUTURE TRAFFIC BASED ON GROWTH RATE FROM THE ADAM COMPUTER PROGRAM.

DHV'S ARE NOT REQUIRED FOR SIDE ROADS LESS THAN 1000 ADT.

NOTE: FOR BRIDGE REPLACEMENT PROJECTS, ADLs ARE NOT REQUIRED FOR ADTs OF 1000 OR LESS AND PERCENTAGE OF TRUCKS OF 7% OR LESS.
 SEE ATTACHMENTS FOR TURNING MOVEMENTS AND/OR OTHER DETAILS.



343
363
353
S.R.
111

68
54
118
94
106
BAKER MOUNTAIN ROAD

87
64
45
28
10
16
S.R.
284
185
125
51
51

S.R.
111

VAN BUREN COUNTY
S.R. 111 @ S.R. 284
2009 DHV

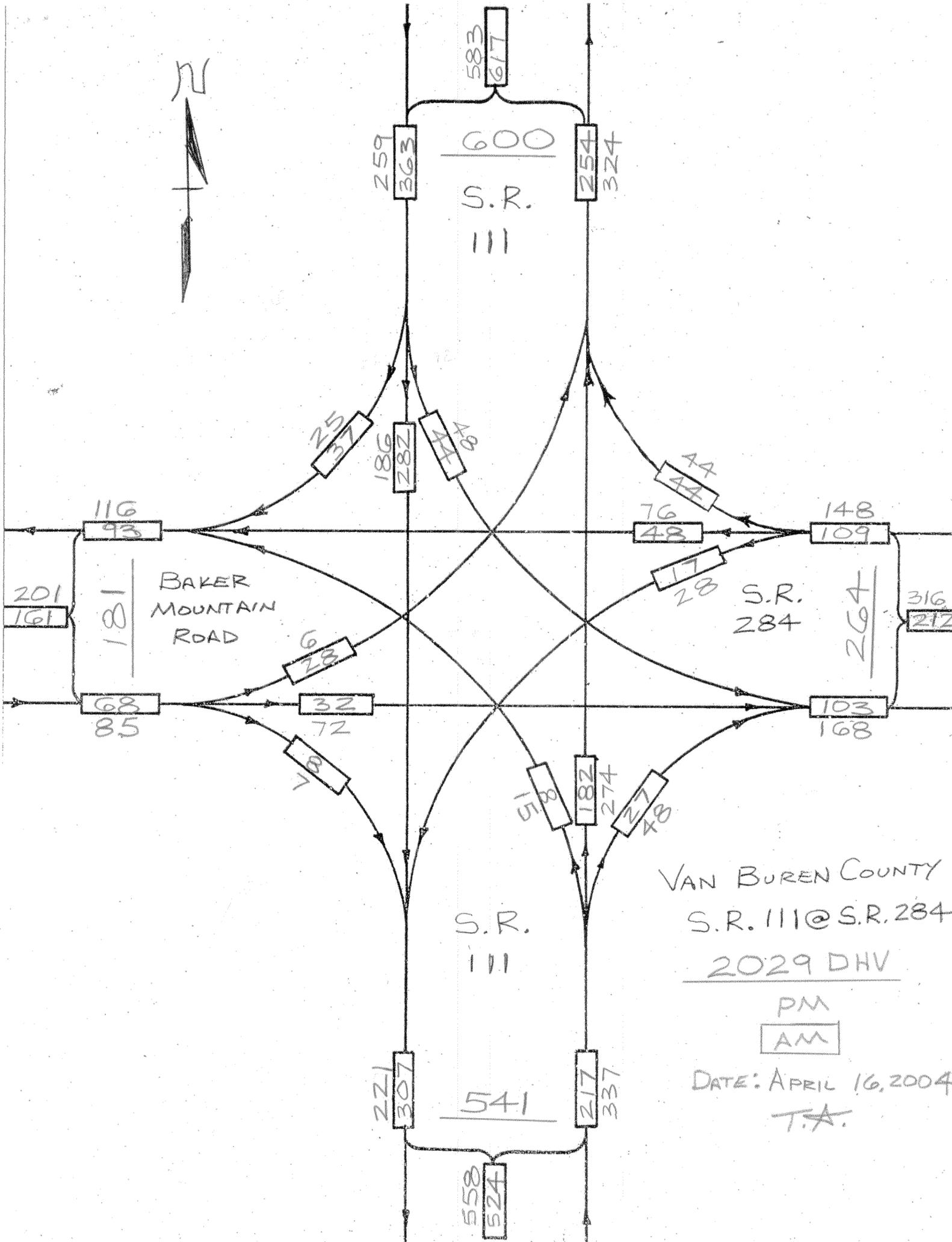
PM
AM

DATE: APRIL 16, 2004

T.A.

318

328
308



VAN BUREN COUNTY
S.R. 111 @ S.R. 284

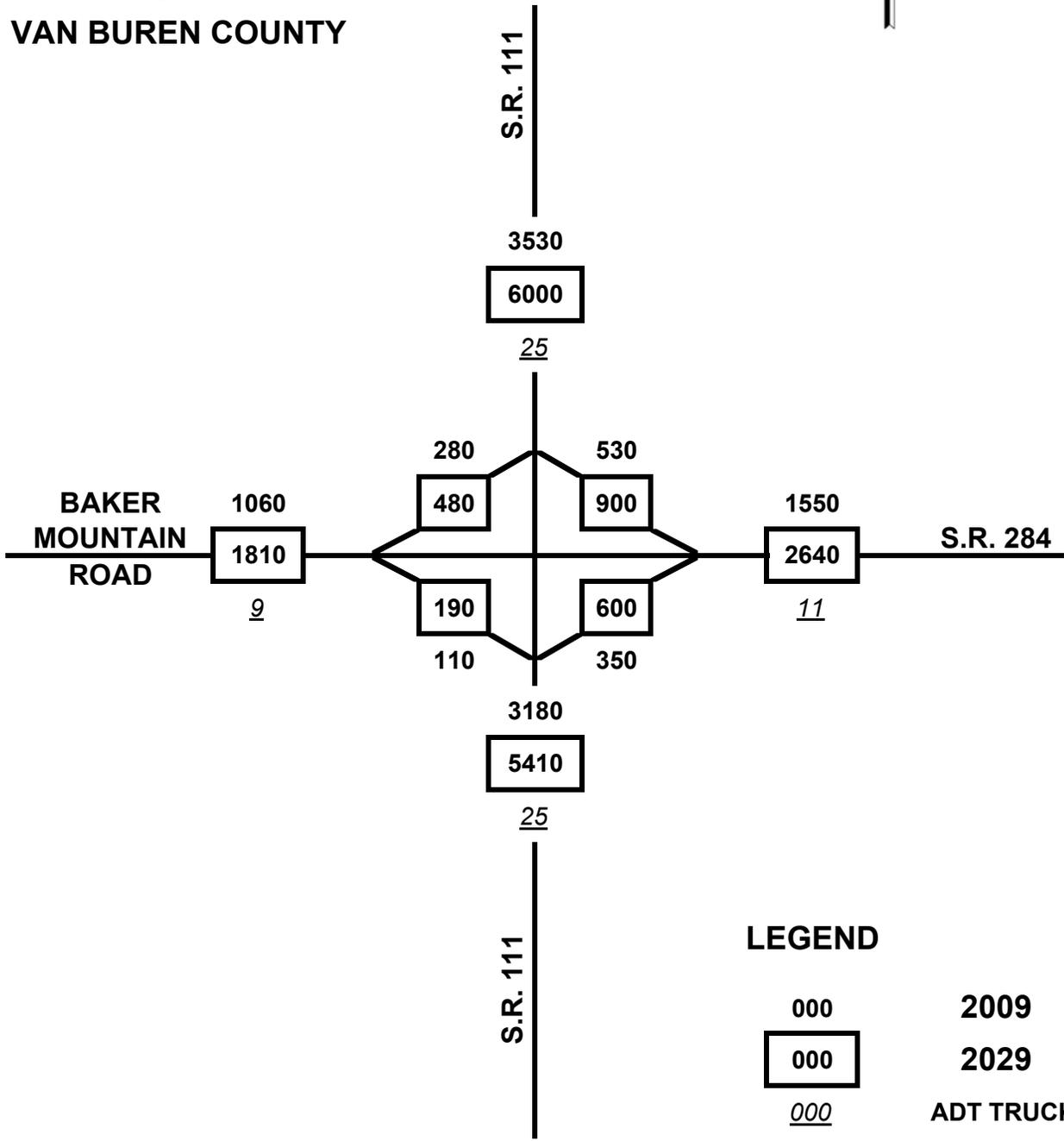
2029 DHV

PM
AM

DATE: APRIL 16, 2004

T.A.

**ADT EXISTING SYSTEM
S.R. 111 @ S.R. 284
VAN BUREN COUNTY**



DATE 4/16/04

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	Kevin Long	Intersection	S.R. 111 at Baker Mountain Rd.
Agency/Co.	Wiser Company, LLC	Jurisdiction	Van Buren County, TN
Date Performed	2/25/2005	Analysis Year	2009
Analysis Time Period	AM		
Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284			
East/West Street: Baker Mountain Rd. / S.R. 284		North/South Street: S.R. 111	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	4	108	16	26	165	22
Peak-Hour Factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Hourly Flow Rate, HFR	4	116	17	27	177	23
Percent Heavy Vehicles	7	--	--	7	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	2	0	0	2	0
Configuration	LT		TR	LT		TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	10	28	26	16	19	5
Peak-Hour Factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Hourly Flow Rate, HFR	10	30	27	17	20	5
Percent Heavy Vehicles	7	7	7	7	7	7
Percent Grade (%)		-5			3	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	1	0	1	1
Configuration	LT		R	LT		R

Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	LT	LT		R	LT		R
v (vph)	4	27	40		27	37		5
C (m) (vph)	1334	1414	542		968	533		920
v/c	0.00	0.02	0.07		0.03	0.07		0.01
95% queue length	0.01	0.06	0.24		0.09	0.22		0.02
Control Delay	7.7	7.6	12.2		8.8	12.3		8.9
LOS	A	A	B		A	B		A
Approach Delay	--	--	10.8			11.9		
Approach LOS	--	--	B			B		

Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	Kevin Long	Intersection	S.R. 111 at Baker Mountain Rd.
Agency/Co.	Wiser Company, LLC	Jurisdiction	Van Buren County, TN
Date Performed	2/25/2005	Analysis Year	2009
Analysis Time Period	PM		
Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284			
East/West Street: Baker Mountain Rd. / S.R. 284		North/South Street: S.R. 111	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	9	161	28	28	110	14
Peak-Hour Factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Hourly Flow Rate, HFR	9	173	30	30	118	15
Percent Heavy Vehicles	7	--	--	7	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	2	0	0	2	0
Configuration	LT		TR	LT		TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	16	45	26	4	42	4
Peak-Hour Factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Hourly Flow Rate, HFR	17	48	27	4	45	4
Percent Heavy Vehicles	7	7	7	7	7	7
Percent Grade (%)		-4			4	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	1	0	1	1
Configuration	LT		R	LT		R

Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	LT	LT		R	LT		R
v (vph)	9	30	65		27	49		4
C (m) (vph)	1414	1330	513		918	507		968
v/c	0.01	0.02	0.13		0.03	0.10		0.00
95% queue length	0.02	0.07	0.43		0.09	0.32		0.01
Control Delay	7.6	7.8	13.0		9.0	12.9		8.7
LOS	A	A	B		A	B		A
Approach Delay	--	--	11.9			12.5		
Approach LOS	--	--	B			B		

Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst Agency/Co. Date Performed Analysis Time Period	Kevin Long Wiser Company, LLC 2/25/2005 AM	Intersection Jurisdiction Analysis Year	S.R. 111 at Baker Mountain Rd. Van Buren County, TN 2029
Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284			
East/West Street: Baker Mountain Rd. / S.R. 284		North/South Street: S.R. 111	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	8	182	27	44	282	37
Peak-Hour Factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Hourly Flow Rate, HFR	8	195	29	47	303	39
Percent Heavy Vehicles	7	--	--	7	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	2	0	0	2	0
Configuration	LT		TR	LT		TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	17	48	44	28	32	8
Peak-Hour Factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Hourly Flow Rate, HFR	18	51	47	30	34	8
Percent Heavy Vehicles	7	7	7	7	7	7
Percent Grade (%)	-4			4		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	1	0	1	1
Configuration	LT		R	LT		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	LT	LT		R	LT		R
v (vph)	8	47	69		47	64		8
C (m) (vph)	1178	1306	366		904	344		827
v/c	0.01	0.04	0.19		0.05	0.19		0.01
95% queue length	0.02	0.11	0.68		0.16	0.67		0.03
Control Delay	8.1	7.9	17.1		9.2	17.8		9.4
LOS	A	A	C		A	C		A
Approach Delay	--	--	13.9			16.9		
Approach LOS	--	--	B			C		

Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst Agency/Co. Date Performed Analysis Time Period	Kevin Long Wiser Company, LLC 2/25/2005 PM	Intersection Jurisdiction Analysis Year	S.R. 111 at Baker Mountain Rd. Van Buren County, TN 2029
Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284			
East/West Street: Baker Mountain Rd. / S.R. 284		North/South Street: S.R. 111	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	15	274	48	48	186	25
Peak-Hour Factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Hourly Flow Rate, HFR	16	294	51	51	199	26
Percent Heavy Vehicles	7	--	--	7	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	2	0	0	2	0
Configuration	LT		TR	LT		TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	28	76	44	6	72	7
Peak-Hour Factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Hourly Flow Rate, HFR	30	81	47	6	77	7
Percent Heavy Vehicles	7	7	7	7	7	7
Percent Grade (%)		-4			4	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	1	0	1	1
Configuration	LT		R	LT		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	LT	LT		R	LT		R
v (vph)	16	51	111		47	83		7
C (m) (vph)	1305	1175	330		826	334		904
v/c	0.01	0.04	0.34		0.06	0.25		0.01
95% queue length	0.04	0.14	1.44		0.18	0.96		0.02
Control Delay	7.8	8.2	21.3		9.6	19.3		9.0
LOS	A	A	C		A	C		A
Approach Delay	--	--	17.9			18.5		
Approach LOS	--	--	C			C		

Rights Reserved

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kevin Long	Freeway/Dir of Travel	SR111 south
Agency or Company	Wiser Company, LLC	Junction	Baker Mountain Road / S.R. 284
Date Performed	2/17/2005	Jurisdiction	Van Buren County, TN
Analysis Time Period	AM	Analysis Year	2009

Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284

Inputs			
Upstream Adj Ramp	Terrain	Downstream Adj Ramp	
<input type="checkbox"/> Yes <input type="checkbox"/> On		<input type="checkbox"/> Yes <input type="checkbox"/> On	
<input type="checkbox"/> No <input type="checkbox"/> Off		<input type="checkbox"/> No <input type="checkbox"/> Off	
$L_{up} =$ ft	$S_{FF} = 60.0$ mph $S_{FR} = 30.0$ mph	$L_{down} =$ ft	
$V_u =$ veh/h	Sketch (show lanes, L_A, L_D, V_R, V_f)		$VD =$ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v = V / (PHF \cdot f_{HV} \cdot f_p)$
Freeway	213	0.90	Rolling	17	0	0.797	0.90	330
Ramp	22	0.90	Rolling	7	0	0.905	0.90	30
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v_{12}

Estimation of v_{12}	Estimation of v_{12}
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
$L_{EQ} =$ (Equation 25-2 or 25-3)	$L_{EQ} =$ (Equation 25-8 or 25-9)
$P_{FM} =$ using Equation	$P_{FD} = 1.000$ using Equation 0
$V_{12} =$ pc/h	$V_{12} = 330$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7		$V_{FI} = V_F$	330	4600	No
			V_{12}	330	4400:All	No	
V_{R12}		4600:All		$V_{FO} = V_F - V_R$	300	4600	No
			V_R	30	2000	No	

Level of Service Determination (if not F)

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
$D_R =$ (pc/ mi /ln)	$D_R = 2.6$ (pc/ mi /ln)
LOS = (Exhibit 25-4)	LOS = A (Exhibit 25-4)

Speed Estimation

Speed Estimation	Speed Estimation
$M_S =$ (Exhibit 25-19)	$D_s = 0.496$ (Exhibit 25-19)
$S_R =$ mph (Exhibit 25-19)	$S_R = 51.1$ mph (Exhibit 25-19)
$S_0 =$ mph (Exhibit 25-19)	$S_0 =$ N/A mph (Exhibit 25-19)
$S =$ mph (Exhibit 25-14)	$S = 51.1$ mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kevin Long	Freeway/Dir of Travel	SR111 south
Agency or Company	Wiser Company, LLC	Junction	Baker Mountain Road / S.R. 284
Date Performed	2/17/2005	Jurisdiction	Van Buren County, TN
Analysis Time Period	PM	Analysis Year	2009

Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284

Inputs			
Upstream Adj Ramp	Terrain		Downstream Adj Ramp
<input type="checkbox"/> Yes <input type="checkbox"/> On			<input type="checkbox"/> Yes <input type="checkbox"/> On
<input type="checkbox"/> No <input type="checkbox"/> Off			<input type="checkbox"/> No <input type="checkbox"/> Off
$L_{up} =$ ft	$S_{FF} = 60.0$ mph $S_{FR} = 30.0$ mph		$L_{down} =$ ft
$V_u =$ veh/h	Sketch (show lanes, L_A, L_D, V_R, V_f)		$VD =$ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF$ $f_{HV} f_p$
Freeway	152	0.90	Rolling	17	0	0.797	0.90	236
Ramp	14	0.90	Rolling	7	0	0.905	0.90	19
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v_{12}

Estimation of v_{12}	Estimation of v_{12}
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
$L_{EQ} =$ (Equation 25-2 or 25-3)	$L_{EQ} =$ (Equation 25-8 or 25-9)
$P_{FM} =$ using Equation	$P_{FD} = 1.000$ using Equation 0
$V_{12} =$ pc/h	$V_{12} = 236$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7		$V_{FI} = V_F$	236	4600	No
				V_{12}	236	4400:All	No
V_{R12}		4600:All		$V_{FO} = V_F - V_R$	217	4600	No
				V_R	19	2000	No

Level of Service Determination (if not F)

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
$D_R =$ (pc/ mi /ln)	$D_R = 1.8$ (pc/ mi /ln)
LOS = (Exhibit 25-4)	LOS= A (Exhibit 25-4)

Speed Estimation

Speed Estimation	Speed Estimation
$M_S =$ (Exhibit 25-19)	$D_s = 0.495$ (Exhibit 25-19)
$S_R =$ mph (Exhibit 25-19)	$S_R = 51.1$ mph (Exhibit 25-19)
$S_0 =$ mph (Exhibit 25-19)	$S_0 =$ N/A mph (Exhibit 25-19)
$S =$ mph (Exhibit 25-14)	$S = 51.1$ mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kevin Long	Freeway/Dir of Travel	SR111 south
Agency or Company	Wiser Company, LLC	Junction	Baker Mountain Road / S.R. 284
Date Performed	2/17/2005	Jurisdiction	Van Buren County, TN
Analysis Time Period	PM	Analysis Year	2029

Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284

Inputs			
Upstream Adj Ramp	Terrain	Downstream Adj Ramp	
<input type="checkbox"/> Yes <input type="checkbox"/> On		<input type="checkbox"/> Yes <input type="checkbox"/> On	
<input type="checkbox"/> No <input type="checkbox"/> Off		<input type="checkbox"/> No <input type="checkbox"/> Off	
$L_{up} =$ ft	$S_{FF} = 60.0$ mph	$L_{down} =$ ft	$S_{FR} = 30.0$ mph
$V_u =$ veh/h	Sketch (show lanes, L_A, L_D, V_R, V_f)		$VD =$ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF$ $f_{HV} f_p$
Freeway	259	0.90	Rolling	17	0	0.797	0.90	401
Ramp	25	0.90	Rolling	7	0	0.905	0.90	34
UpStream								
DownStream								

Merge Areas Diverge Areas

Estimation of v_{12}

Estimation of v_{12}	Estimation of v_{12}
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
$L_{EQ} =$ (Equation 25-2 or 25-3)	$L_{EQ} =$ (Equation 25-8 or 25-9)
$P_{FM} =$ using Equation	$P_{FD} = 1.000$ using Equation 0
$V_{12} =$ pc/h	$V_{12} = 401$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7		$V_{FI} = V_F$	401	4600	No
				V_{12}	401	4400:All	No
V_{R12}		4600:All		$V_{FO} = V_F - V_R$	367	4600	No
				V_R	34	2000	No

Level of Service Determination (if not F)

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
$D_R =$ (pc/ mi /ln)	$D_R = 3.2$ (pc/ mi /ln)
LOS = (Exhibit 25-4)	LOS= A (Exhibit 25-4)

Speed Estimation

Speed Estimation	Speed Estimation
$M_S =$ (Exhibit 25-19)	$D_s = 0.496$ (Exhibit 25-19)
$S_R =$ mph (Exhibit 25-19)	$S_R = 51.1$ mph (Exhibit 25-19)
$S_0 =$ mph (Exhibit 25-19)	$S_0 =$ N/A mph (Exhibit 25-19)
$S =$ mph (Exhibit 25-14)	$S = 51.1$ mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kevin Long	Freeway/Dir of Travel	SR111 north
Agency or Company	Wiser Company, LLC	Junction	Baker Mountain Road / S.R. 284
Date Performed	2/17/2005	Jurisdiction	Van Buren County, TN
Analysis Time Period	AM	Analysis Year	2009

Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284

Inputs			
Upstream Adj Ramp	Terrain		Downstream Adj Ramp
<input type="checkbox"/> Yes <input type="checkbox"/> On			<input type="checkbox"/> Yes <input type="checkbox"/> On
<input type="checkbox"/> No <input type="checkbox"/> Off			<input type="checkbox"/> No <input type="checkbox"/> Off
$L_{up} =$ ft	$S_{FF} = 60.0$ mph $S_{FR} = 30.0$ mph		$L_{down} =$ ft
$V_u =$ veh/h	Sketch (show lanes, L_A, L_D, V_R, V_f)		$VD =$ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF$ $f_{HV} f_p$
Freeway	128	0.90	Rolling	17	0	0.797	0.90	198
Ramp	16	0.90	Rolling	7	0	0.905	0.90	22
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v_{12}

Estimation of v_{12}	Estimation of v_{12}
$V_{12} = V_F (P_{FM})$ $L_{EQ} =$ (Equation 25-2 or 25-3) $P_{FM} =$ using Equation $V_{12} =$ pc/h	$V_{12} = V_R + (V_F - V_R)P_{FD}$ $L_{EQ} =$ (Equation 25-8 or 25-9) $P_{FD} = 1.000$ using Equation 0 $V_{12} = 198$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7		$V_{FI} = V_F$	198	4600	No
				V_{12}	198	4400:All	No
V_{R12}		4600:All		$V_{FO} = V_F - V_R$	176	4600	No
				V_R	22	2000	No

Level of Service Determination (if not F)

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ $D_R =$ (pc/ mi /ln) LOS = (Exhibit 25-4)	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ $D_R = 1.5$ (pc/ mi /ln) LOS = A (Exhibit 25-4)

Speed Estimation

Speed Estimation	Speed Estimation
$M_S =$ (Exhibit 25-19)	$D_s = 0.495$ (Exhibit 25-19)
$S_R =$ mph (Exhibit 25-19)	$S_R = 51.1$ mph (Exhibit 25-19)
$S_0 =$ mph (Exhibit 25-19)	$S_0 =$ N/A mph (Exhibit 25-19)
$S =$ mph (Exhibit 25-14)	$S = 51.1$ mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kevin Long	Freeway/Dir of Travel	SR111 north
Agency or Company	Wiser Company, LLC	Junction	Baker Mountain Road / S.R. 284
Date Performed	2/17/2005	Jurisdiction	Van Buren County, TN
Analysis Time Period	PM	Analysis Year	2009

Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284

Inputs

Upstream Adj Ramp	Terrain	Downstream Adj Ramp
<input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off		<input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off
$L_{up} =$ ft	$S_{FF} = 60.0$ mph $S_{FR} = 30.0$ mph	$L_{down} =$ ft
$V_u =$ veh/h	Sketch (show lanes, L_A, L_D, V_R, V_f)	$VD =$ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v = V / (PHF \cdot f_{HV} \cdot f_p)$
Freeway	198	0.90	Rolling	17	0	0.797	0.90	307
Ramp	28	0.90	Rolling	7	0	0.905	0.90	38
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

$L_{EQ} =$ (Equation 25-2 or 25-3)

$P_{FM} =$ using Equation

$V_{12} =$ pc/h

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

$L_{EQ} =$ (Equation 25-8 or 25-9)

$P_{FD} = 1.000$ using Equation 0

$V_{12} = 307$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7		$V_{FI} = V_F$	307	4600	No
			V_{12}	307	4400:All	No	
V_{R12}		4600:All		$V_{FO} = V_F - V_R$	269	4600	No
			V_R	38	2000	No	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

$D_R =$ (pc/ mi /ln)

LOS = (Exhibit 25-4)

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

$D_R = 2.4$ (pc/ mi /ln)

LOS = A (Exhibit 25-4)

Speed Estimation

$M_S =$ (Exhibit 25-19)

$S_R =$ mph (Exhibit 25-19)

$S_0 =$ mph (Exhibit 25-19)

$S =$ mph (Exhibit 25-14)

Speed Estimation

$D_s = 0.496$ (Exhibit 25-19)

$S_R = 51.1$ mph (Exhibit 25-19)

$S_0 =$ N/A mph (Exhibit 25-19)

$S = 51.1$ mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kevin Long	Freeway/Dir of Travel	SR111 north
Agency or Company	Wiser Company, LLC	Junction	Baker Mountain Road / S.R. 284
Date Performed	2/17/2005	Jurisdiction	Van Buren County, TN
Analysis Time Period	AM	Analysis Year	2029

Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284

Inputs			
Upstream Adj Ramp	Terrain	Downstream Adj Ramp	
<input type="checkbox"/> Yes <input type="checkbox"/> On		<input type="checkbox"/> Yes <input type="checkbox"/> On	
<input type="checkbox"/> No <input type="checkbox"/> Off		<input type="checkbox"/> No <input type="checkbox"/> Off	
$L_{up} =$ ft	$S_{FF} = 60.0$ mph	$L_{down} =$ ft	$S_{FR} = 30.0$ mph
$V_u =$ veh/h	Sketch (show lanes, L_A, L_D, V_R, V_f)		$VD =$ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF$ $f_{HV} f_p$
Freeway	217	0.90	Rolling	17	0	0.797	0.90	336
Ramp	27	0.90	Rolling	7	0	0.905	0.90	37
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v_{12}

Estimation of v_{12}	Estimation of v_{12}
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
$L_{EQ} =$ (Equation 25-2 or 25-3)	$L_{EQ} =$ (Equation 25-8 or 25-9)
$P_{FM} =$ using Equation	$P_{FD} = 1.000$ using Equation 0
$V_{12} =$ pc/h	$V_{12} = 336$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7		$V_{FI} = V_F$	336	4600	No
				V_{12}	336	4400:All	No
V_{R12}		4600:All		$V_{FO} = V_F - V_R$	299	4600	No
				V_R	37	2000	No

Level of Service Determination (if not F)

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
$D_R =$ (pc/ mi /ln)	$D_R = 2.6$ (pc/ mi /ln)
LOS = (Exhibit 25-4)	LOS= A (Exhibit 25-4)

Speed Estimation

Speed Estimation	Speed Estimation
$M_S =$ (Exhibit 25-19)	$D_s = 0.496$ (Exhibit 25-19)
$S_R =$ mph (Exhibit 25-19)	$S_R = 51.1$ mph (Exhibit 25-19)
$S_0 =$ mph (Exhibit 25-19)	$S_0 =$ N/A mph (Exhibit 25-19)
$S =$ mph (Exhibit 25-14)	$S = 51.1$ mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kevin Long	Freeway/Dir of Travel	SR111 north
Agency or Company	Wiser Company, LLC	Junction	Baker Mountain Road / S.R. 284
Date Performed	2/17/2005	Jurisdiction	Van Buren County, TN
Analysis Time Period	PM	Analysis Year	2029

Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284

Inputs			
Upstream Adj Ramp	Terrain	Downstream Adj Ramp	
<input type="checkbox"/> Yes <input type="checkbox"/> On		<input type="checkbox"/> Yes <input type="checkbox"/> On	
<input type="checkbox"/> No <input type="checkbox"/> Off		<input type="checkbox"/> No <input type="checkbox"/> Off	
$L_{up} =$ ft	$S_{FF} = 60.0$ mph	$L_{down} =$ ft	$S_{FR} = 30.0$ mph
$V_u =$ veh/h	Sketch (show lanes, L_A, L_D, V_R, V_f)		$VD =$ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF$ $f_{HV} f_p$
Freeway	337	0.90	Rolling	17	0	0.797	0.90	522
Ramp	48	0.90	Rolling	7	0	0.905	0.90	65
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v_{12}

Estimation of v_{12}	Estimation of v_{12}
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R)P_{FD}$
$L_{EQ} =$ (Equation 25-2 or 25-3)	$L_{EQ} =$ (Equation 25-8 or 25-9)
$P_{FM} =$ using Equation	$P_{FD} = 1.000$ using Equation 0
$V_{12} =$ pc/h	$V_{12} = 522$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V_{FO}		See Exhibit 25-7		$V_{FI} = V_F$	522	4600	No
				V_{12}	522	4400:All	No
V_{R12}		4600:All		$V_{FO} = V_F - V_R$	457	4600	No
				V_R	65	2000	No

Level of Service Determination (if not F)

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
$D_R =$ (pc/ mi /ln)	$D_R = 4.2$ (pc/ mi /ln)
LOS = (Exhibit 25-4)	LOS= A (Exhibit 25-4)

Speed Estimation

Speed Estimation	Speed Estimation
$M_S =$ (Exhibit 25-19)	$D_s = 0.499$ (Exhibit 25-19)
$S_R =$ mph (Exhibit 25-19)	$S_R = 51.0$ mph (Exhibit 25-19)
$S_0 =$ mph (Exhibit 25-19)	$S_0 =$ N/A mph (Exhibit 25-19)
$S =$ mph (Exhibit 25-14)	$S = 51.0$ mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst2	Kevin Long	Freeway/Dir of Travel	SR111 south
Agency or Company	Wiser Company, LLC	Junction	Baker Mountain Road / S.R. 284
Date Performed	2/18/2005	Jurisdiction	Van Buren County, TN
Analysis Time Period	AM	Analysis Year	2009

Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284

Inputs			
Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain Rolling S _{FF} = 60.0 mph S _{FR} = 35.0 mph Sketch (show lanes, L _A , L _D , V _R , V _f)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f _{HV}	f _p	v=V/PHF f _{HV} f _p
Freeway	180	0.90	Rolling	17	0	0.797	0.90	279
Ramp	4	0.90	Rolling	7	0	0.905	0.90	5
UpStream								
DownStream								

Merge Areas Diverge Areas

Estimation of v ₁₂	Estimation of v ₁₂
$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 25-2 or 25-3) P _{FM} = 1.000 using Equation 0 V ₁₂ = 279 pc/h	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 25-8 or 25-9) P _{FD} = using Equation V ₁₂ = pc/h

Capacity Checks

Capacity Checks				Capacity Checks			
	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V _{FO}	284	See Exhibit 25-7	No	V _{FI} =V _F		See Exhibit 25-14	
				V ₁₂		4400:All	
V _{R12}	284	4600:All	No	V _{FO} = V _F -		See Exhibit 25-14	
				V _R		See Exhibit 25-3	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = 0.2 (pc/ m/ln) LOS = A (Exhibit 25-4)	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/ m/ln) LOS = (Exhibit 25-4)
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Speed Estimation

M _S = 0.242 (Exhibit 25-19) S _R = 55.6 mph (Exhibit 25-19) S ₀ = N/A mph (Exhibit 25-19) S = 55.6 mph (Exhibit 25-14)	D _s = (Exhibit 25-19) S _R = mph (Exhibit 25-19) S ₀ = mph (Exhibit 25-19) S = mph (Exhibit 25-15)
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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst2	Kevin Long	Freeway/Dir of Travel	SR111 south
Agency or Company	Wiser Company, LLC	Junction	Baker Mountain Road / S.R. 284
Date Performed	2/18/2005	Jurisdiction	Van Buren County, TN
Analysis Time Period	PM	Analysis Year	2009

Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain Rolling S _{FF} = 60.0 mph S _{FR} = 35.0 mph Sketch (show lanes, L _A , L _D , V _R , V _f)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f _{HV}	f _p	v=V/PHF f _{HV} f _p
Freeway	130	0.90	Rolling	17	0	0.797	0.90	201
Ramp	4	0.90	Rolling	7	0	0.905	0.90	5
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation 0
 V₁₂ = 201 pc/h

Estimation of v₁₂

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	206	See Exhibit 25-7	No
V _{R12}	206	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} =V _F		See Exhibit 25-14	
V ₁₂		4400:All	
V _{FO} = V _F - V _R		See Exhibit 25-14	
V _R		See Exhibit 25-3	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = -0.4 (pc/ m/ln)
 LOS = A (Exhibit 25-4)

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/ m/ln)
 LOS = (Exhibit 25-4)

Speed Estimation

M_S = 0.242 (Exhibit 25-19)
 S_R = 55.6 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 55.6 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst2	Kevin Long	Freeway/Dir of Travel	SR111 south
Agency or Company	Wiser Company, LLC	Junction	Baker Mountain Road / S.R. 284
Date Performed	2/18/2005	Jurisdiction	Van Buren County, TN
Analysis Time Period	AM	Analysis Year	2029

Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284

Inputs			
Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain Rolling S _{FF} = 60.0 mph S _{FR} = 35.0 mph Sketch (show lanes, L _A , L _D , V _R , V _f)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f _{HV}	f _p	v=V/PHF f _{HV} f _p
Freeway	307	0.90	Rolling	17	0	0.797	0.90	476
Ramp	8	0.90	Rolling	7	0	0.905	0.90	11
UpStream								
DownStream								

Merge Areas Diverge Areas

Estimation of v ₁₂	Estimation of v ₁₂
$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 25-2 or 25-3) P _{FM} = 1.000 using Equation 0 V ₁₂ = 476 pc/h	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 25-8 or 25-9) P _{FD} = using Equation V ₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V _{FO}	487	See Exhibit 25-7	No	V _{FI} =V _F		See Exhibit 25-14	
				V ₁₂		4400:All	
V _{R12}	487	4600:All	No	V _{FO} = V _F -		See Exhibit 25-14	
				V _R		See Exhibit 25-3	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = 1.7 (pc/ m/ln) LOS = A (Exhibit 25-4)	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/ m/ln) LOS = (Exhibit 25-4)
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Speed Estimation

M _S = 0.243 (Exhibit 25-19) S _R = 55.6 mph (Exhibit 25-19) S ₀ = N/A mph (Exhibit 25-19) S = 55.6 mph (Exhibit 25-14)	D _s = (Exhibit 25-19) S _R = mph (Exhibit 25-19) S ₀ = mph (Exhibit 25-19) S = mph (Exhibit 25-15)
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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst2	Kevin Long	Freeway/Dir of Travel	SR111 south
Agency or Company	Wiser Company, LLC	Junction	Baker Mountain Road / S.R. 284
Date Performed	2/18/2005	Jurisdiction	Van Buren County, TN
Analysis Time Period	PM	Analysis Year	2029

Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284

Inputs			
Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain Rolling S _{FF} = 60.0 mph S _{FR} = 35.0 mph Sketch (show lanes, L _A , L _D , V _R , V _f)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f _{HV}	f _p	v=V/PHF f _{HV} f _p
Freeway	221	0.90	Rolling	17	0	0.797	0.90	342
Ramp	7	0.90	Rolling	7	0	0.905	0.90	10
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v ₁₂	Estimation of v ₁₂
$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 25-2 or 25-3) P _{FM} = 1.000 using Equation 0 V ₁₂ = 342 pc/h	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 25-8 or 25-9) P _{FD} = using Equation V ₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V _{FO}	352	See Exhibit 25-7	No	V _{FI} =V _F		See Exhibit 25-14	
				V ₁₂		4400:All	
V _{R12}	352	4600:All	No	V _{FO} = V _F -		See Exhibit 25-14	
				V _R		See Exhibit 25-3	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = 0.7 (pc/ m/ln) LOS = A (Exhibit 25-4)	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/ m/ln) LOS = (Exhibit 25-4)
---	---

Speed Estimation

M _S = 0.243 (Exhibit 25-19) S _R = 55.6 mph (Exhibit 25-19) S ₀ = N/A mph (Exhibit 25-19) S = 55.6 mph (Exhibit 25-14)	D _s = (Exhibit 25-19) S _R = mph (Exhibit 25-19) S ₀ = mph (Exhibit 25-19) S = mph (Exhibit 25-15)
---	---

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst2	Kevin Long	Freeway/Dir of Travel	SR111 north
Agency or Company	Wiser Company, LLC	Junction	Baker Mountain Road / S.R. 284
Date Performed	2/18/2005	Jurisdiction	Van Buren County, TN
Analysis Time Period	AM	Analysis Year	2009

Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284

Inputs			
Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain Rolling S _{FF} = 60.0 mph S _{FR} = 35.0 mph Sketch (show lanes, L _A , L _D , V _R , V _f)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f _{HV}	f _p	v=V/PHF f _{HV} f _p
Freeway	150	0.90	Rolling	17	0	0.797	0.90	232
Ramp	26	0.90	Rolling	7	0	0.905	0.90	35
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v ₁₂	Estimation of v ₁₂
$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 25-2 or 25-3) P _{FM} = 1.000 using Equation 0 V ₁₂ = 232 pc/h	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 25-8 or 25-9) P _{FD} = using Equation V ₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V _{FO}	267	See Exhibit 25-7	No	$V_{FI} = V_F$		See Exhibit 25-14	
				V ₁₂		4400:All	
V _{R12}	267	4600:All	No	$V_{FO} = V_F -$		See Exhibit 25-14	
				V _R		See Exhibit 25-3	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D _R = 0.0 (pc/ m/ln)	D _R = (pc/ m/ln)
LOS = A (Exhibit 25-4)	LOS = (Exhibit 25-4)

Speed Estimation

M _S = 0.242 (Exhibit 25-19)	D _s = (Exhibit 25-19)
S _R = 55.6 mph (Exhibit 25-19)	S _R = mph (Exhibit 25-19)
S ₀ = N/A mph (Exhibit 25-19)	S ₀ = mph (Exhibit 25-19)
S = 55.6 mph (Exhibit 25-14)	S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst2	Kevin Long	Freeway/Dir of Travel	SR111 north
Agency or Company	Wiser Company, LLC	Junction	Baker Mountain Road / S.R. 284
Date Performed	2/18/2005	Jurisdiction	Van Buren County, TN
Analysis Time Period	PM	Analysis Year	2009

Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284

Inputs			
Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain Rolling S _{FF} = 60.0 mph S _{FR} = 35.0 mph Sketch (show lanes, L _A , L _D , V _R , V _f)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f _{HV}	f _p	v=V/PHF f _{HV} f _p
Freeway	191	0.90	Rolling	17	0	0.797	0.90	296
Ramp	26	0.90	Rolling	7	0	0.905	0.90	35
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v ₁₂	Estimation of v ₁₂
$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 25-2 or 25-3) P _{FM} = 1.000 using Equation 0 V ₁₂ = 296 pc/h	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 25-8 or 25-9) P _{FD} = using Equation V ₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V _{FO}	331	See Exhibit 25-7	No	$V_{FI} = V_F$		See Exhibit 25-14	
				V ₁₂		4400:All	
V _{R12}	331	4600:All	No	$V_{FO} = V_F -$		See Exhibit 25-14	
				V _R		See Exhibit 25-3	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = 0.5 (pc/ m/ln) LOS = A (Exhibit 25-4)	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/ m/ln) LOS = (Exhibit 25-4)
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Speed Estimation

M _S = 0.242 (Exhibit 25-19) S _R = 55.6 mph (Exhibit 25-19) S ₀ = N/A mph (Exhibit 25-19) S = 55.6 mph (Exhibit 25-14)	D _s = (Exhibit 25-19) S _R = mph (Exhibit 25-19) S ₀ = mph (Exhibit 25-19) S = mph (Exhibit 25-15)
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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst2	Kevin Long	Freeway/Dir of Travel	SR111 north
Agency or Company	Wiser Company, LLC	Junction	Baker Mountain Road / S.R. 284
Date Performed	2/18/2005	Jurisdiction	Van Buren County, TN
Analysis Time Period	AM	Analysis Year	2029

Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain Rolling S _{FF} = 60.0 mph S _{FR} = 35.0 mph Sketch (show lanes, L _A , L _D , V _R , V _f)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
---	---	---

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f _{HV}	f _p	v=V/PHF f _{HV} f _p
Freeway	254	0.90	Rolling	17	0	0.797	0.90	394
Ramp	44	0.90	Rolling	7	0	0.905	0.90	60
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation 0
 V₁₂ = 394 pc/h

Estimation of v₁₂

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	454	See Exhibit 25-7	No
V _{R12}	454	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} =V _F		See Exhibit 25-14	
V ₁₂		4400:All	
V _{FO} = V _F - V _R		See Exhibit 25-14	
V _R		See Exhibit 25-3	

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = 1.5 (pc/ m/ln)
 LOS = A (Exhibit 25-4)

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = (pc/ m/ln)
 LOS = (Exhibit 25-4)

Speed Estimation

M_S = 0.243 (Exhibit 25-19)
 S_R = 55.6 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 55.6 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst2	Kevin Long	Freeway/Dir of Travel	SR111 north
Agency or Company	Wiser Company, LLC	Junction	Baker Mountain Road / S.R. 284
Date Performed	2/18/2005	Jurisdiction	Van Buren County, TN
Analysis Time Period	PM	Analysis Year	2029

Project Description I.J.S. for S.R. 111 at Baker Mountain Rd. / S.R. 284

Inputs			
Upstream Adj Ramp	Terrain Rolling	Downstream Adj Ramp	
<input type="checkbox"/> Yes <input type="checkbox"/> On		<input type="checkbox"/> Yes <input type="checkbox"/> On	
<input type="checkbox"/> No <input type="checkbox"/> Off		<input type="checkbox"/> No <input type="checkbox"/> Off	
$L_{up} =$ ft		$L_{down} =$ ft	
$V_u =$ veh/h	$S_{FF} = 60.0$ mph $S_{FR} = 35.0$ mph	$V_D =$ veh/h	
Sketch (show lanes, L_A, L_D, V_R, V_f)			

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF \cdot f_{HV} \cdot f_p$
Freeway	324	0.90	Rolling	17	0	0.797	0.90	502
Ramp	44	0.90	Rolling	7	0	0.905	0.90	60
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v_{12}	Estimation of v_{12}
$V_{12} = V_F (P_{FM})$	$V_{12} = V_R + (V_F - V_R) P_{FD}$
$L_{EQ} =$ (Equation 25-2 or 25-3)	$L_{EQ} =$ (Equation 25-8 or 25-9)
$P_{FM} = 1.000$ using Equation 0	$P_{FD} =$ using Equation
$V_{12} = 502$ pc/h	$V_{12} =$ pc/h

Capacity Checks

Capacity Checks				Capacity Checks			
	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V_{FO}	562	See Exhibit 25-7	No	$V_{FI} = V_F$		See Exhibit 25-14	
				V_{12}		4400:All	
V_{R12}	562	4600:All	No	$V_{FO} = V_F -$		See Exhibit 25-14	
				V_R		See Exhibit 25-3	

Level of Service Determination (if not F)

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
$D_R = 2.3$ (pc/ m/ln)	$D_R =$ (pc/ m/ln)
LOS = A (Exhibit 25-4)	LOS= (Exhibit 25-4)

Speed Estimation

Speed Estimation	Speed Estimation
$M_S = 0.244$ (Exhibit 25-19)	$D_s =$ (Exhibit 25-19)
$S_R = 55.6$ mph (Exhibit 25-19)	$S_R =$ mph (Exhibit 25-19)
$S_0 =$ N/A mph (Exhibit 25-19)	$S_0 =$ mph (Exhibit 25-19)
$S = 55.6$ mph (Exhibit 25-14)	$S =$ mph (Exhibit 25-15)

FUNCTIONAL DRAWINGS

Index Of Sheets

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2-2A	TYPICAL SECTIONS
3-6	PROPOSED ALTERNATE A
7-10	PROPOSED ALTERNATE B
11-15	PROPOSED ALTERNATE C

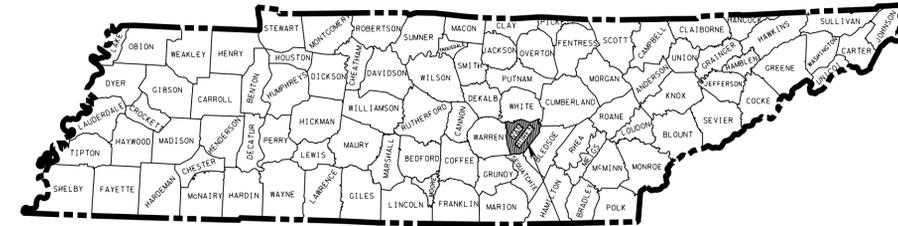
STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION BUREAU OF ENGINEERING

VAN BUREN COUNTY

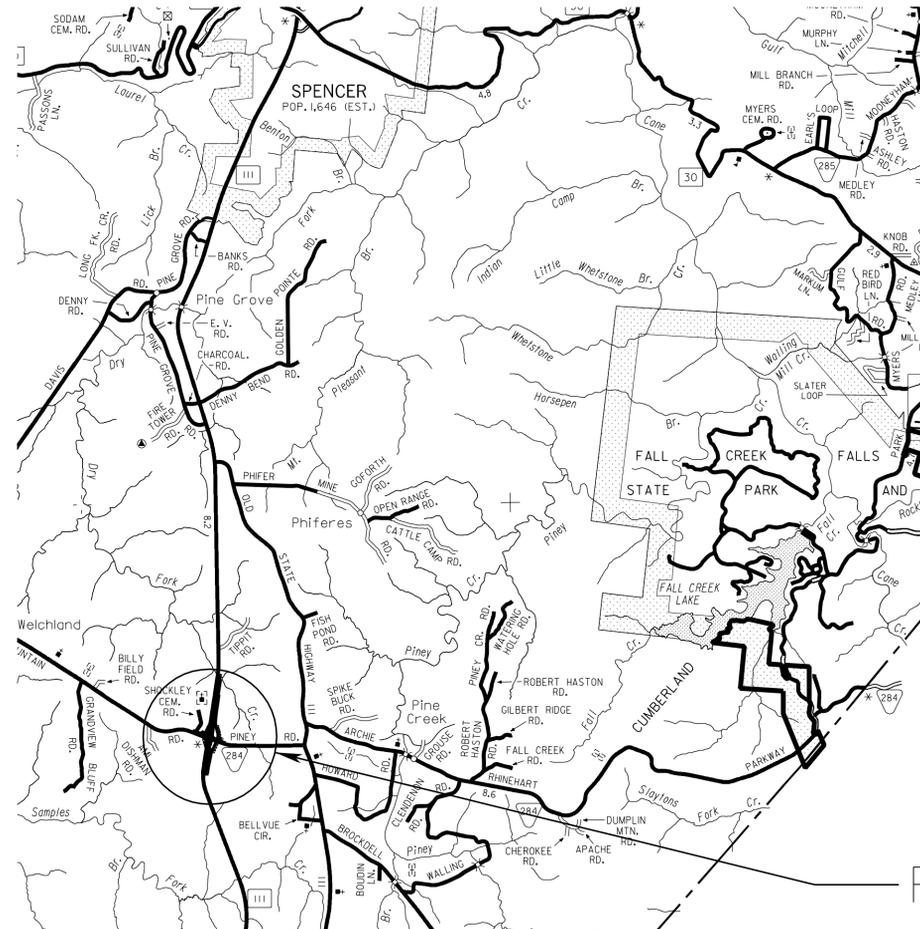
INTERCHANGE AT S.R. 111
 AND BAKER MOUNTAIN RD. / S.R. 284
 NEAR
 SPENCER, TN.

STATE HIGHWAY NO. 111 F.A.H.S. NO.

TENN.	YEAR	SHEET NO.
	2005	1
FED. AID PROJ. NO.		
STATE PROJ. NO.		



PROJECT LOCATION



PROJECT LOCATION

SPECIAL NOTES

PROPOSALS MAY BE REJECTED BY THE COMMISSIONER IF ANY OF THE UNIT PRICES CONTAINED THEREIN ARE OBVIOUSLY UNBALANCED, EITHER EXCESSIVE OR BELOW THE REASONABLE COST ANALYSIS VALUE.

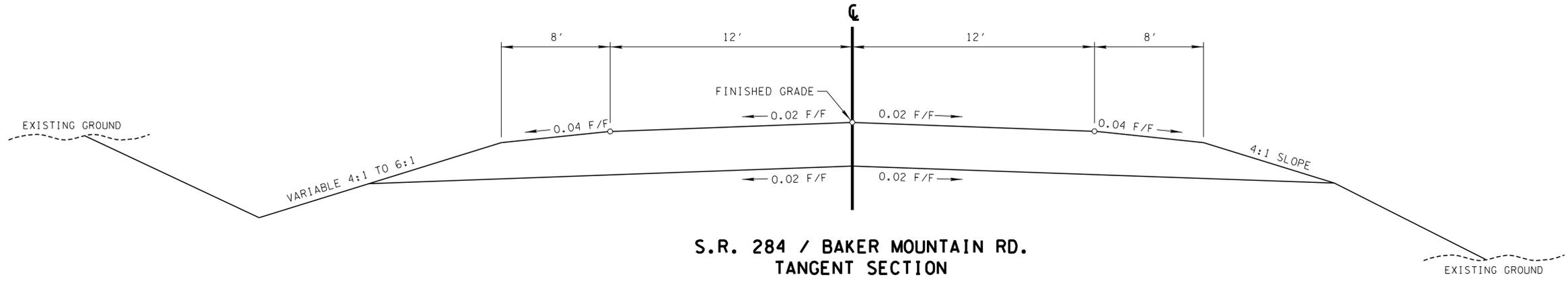
THIS PROJECT TO BE CONSTRUCTED UNDER THE STANDARD SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION DATED MARCH 1, 1995 AND ADDITIONAL SPECIFICATIONS AND SPECIAL PROVISIONS CONTAINED IN THE PLANS AND IN THE PROPOSAL CONTRACT

TDOT ROAD SP. SV. 2 _____

DESIGNER KEVIN LONG, E.I.T. CHECKED BY JOHN R. GORDON, P.E.

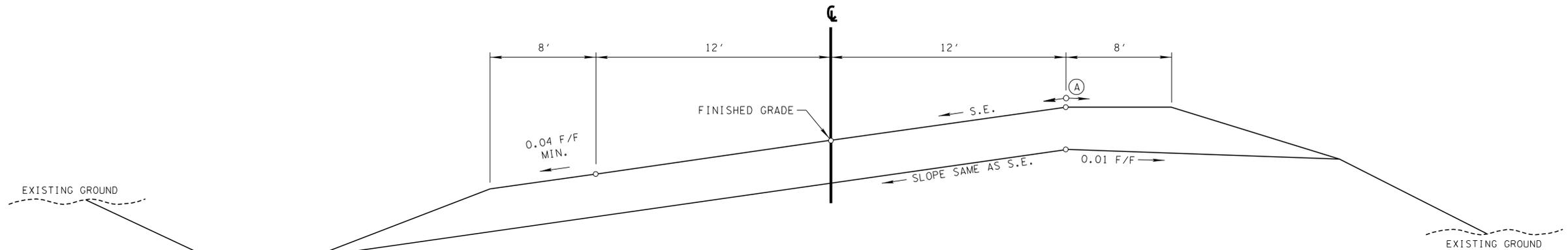
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TYPE	YEAR	PROJECT NO.	SHEET NO.
A.P.R.	2005		2



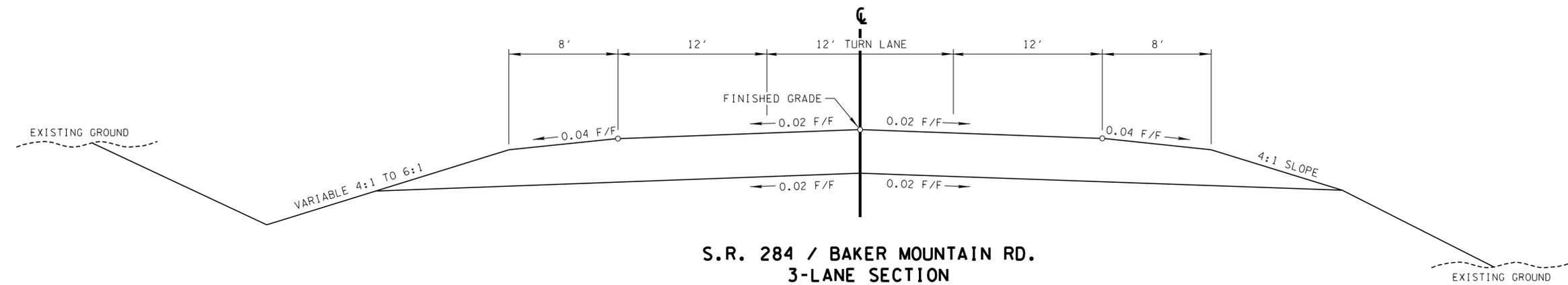
**S.R. 284 / BAKER MOUNTAIN RD.
 TANGENT SECTION**

(BASED ON STD. DWG. RD-TS-2)



**S.R. 284 / BAKER MOUNTAIN RD.
 SUPERELEVATED SECTION**

(BASED ON STD. DWG. RD-TS-2)

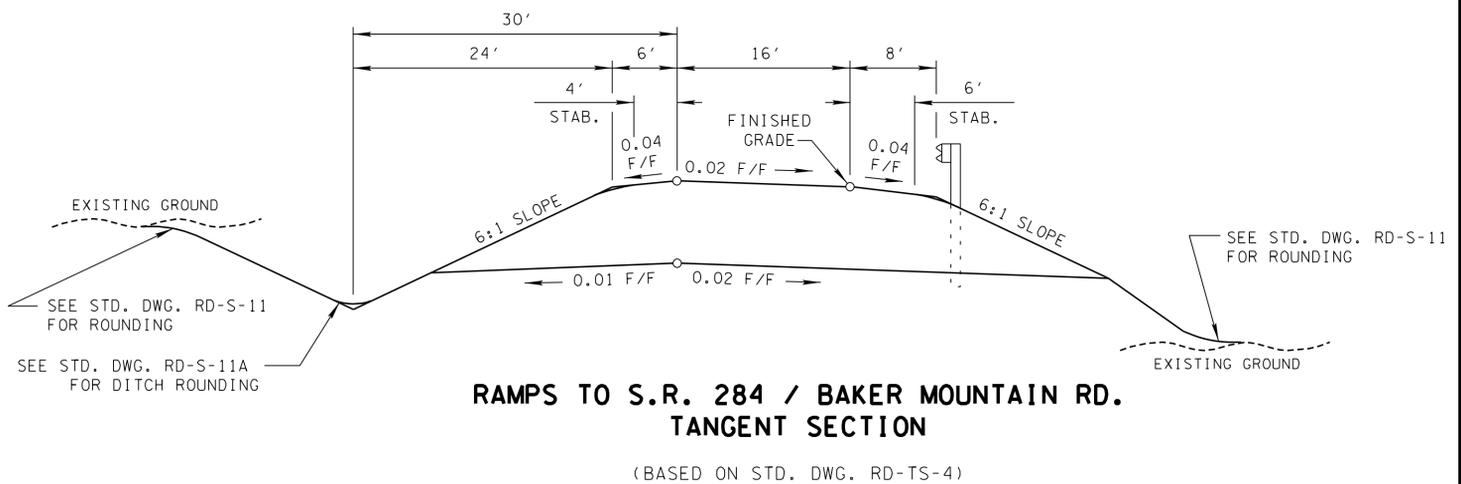
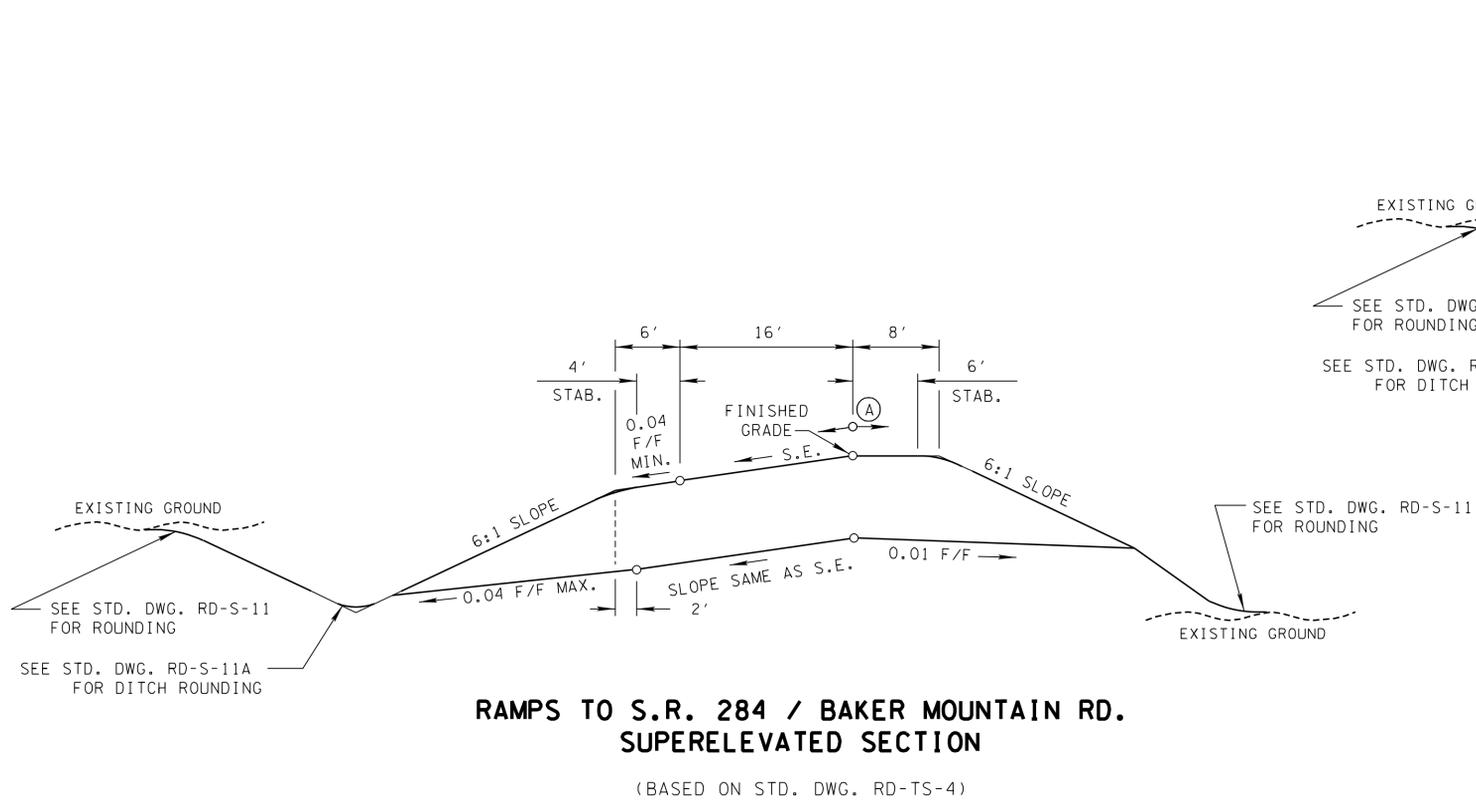
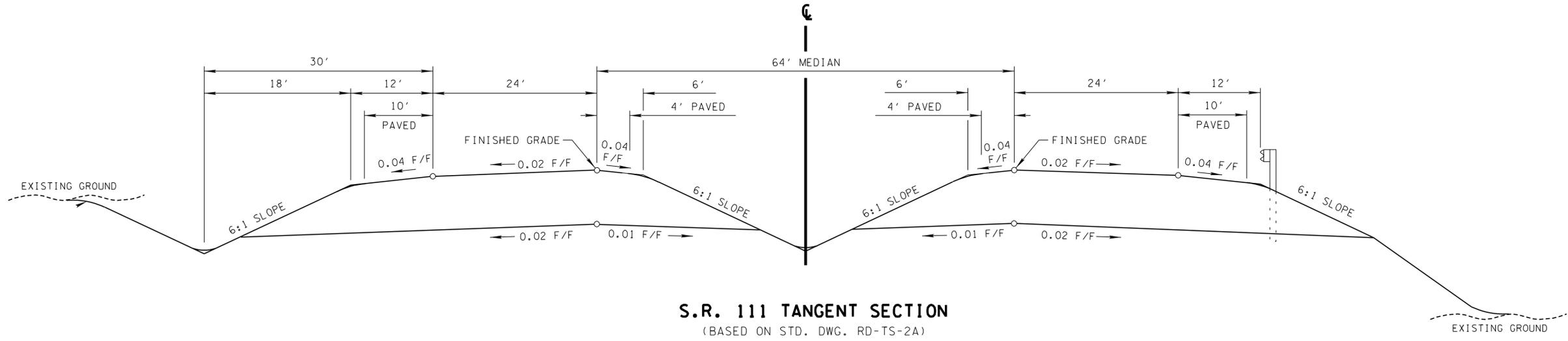


**S.R. 284 / BAKER MOUNTAIN RD.
 3-LANE SECTION**

(BASED ON STD. DWG. RD-TS-2)

\$\$\$\$SYTIME\$\$\$\$
 \$\$\$DGN\$SPEC\$

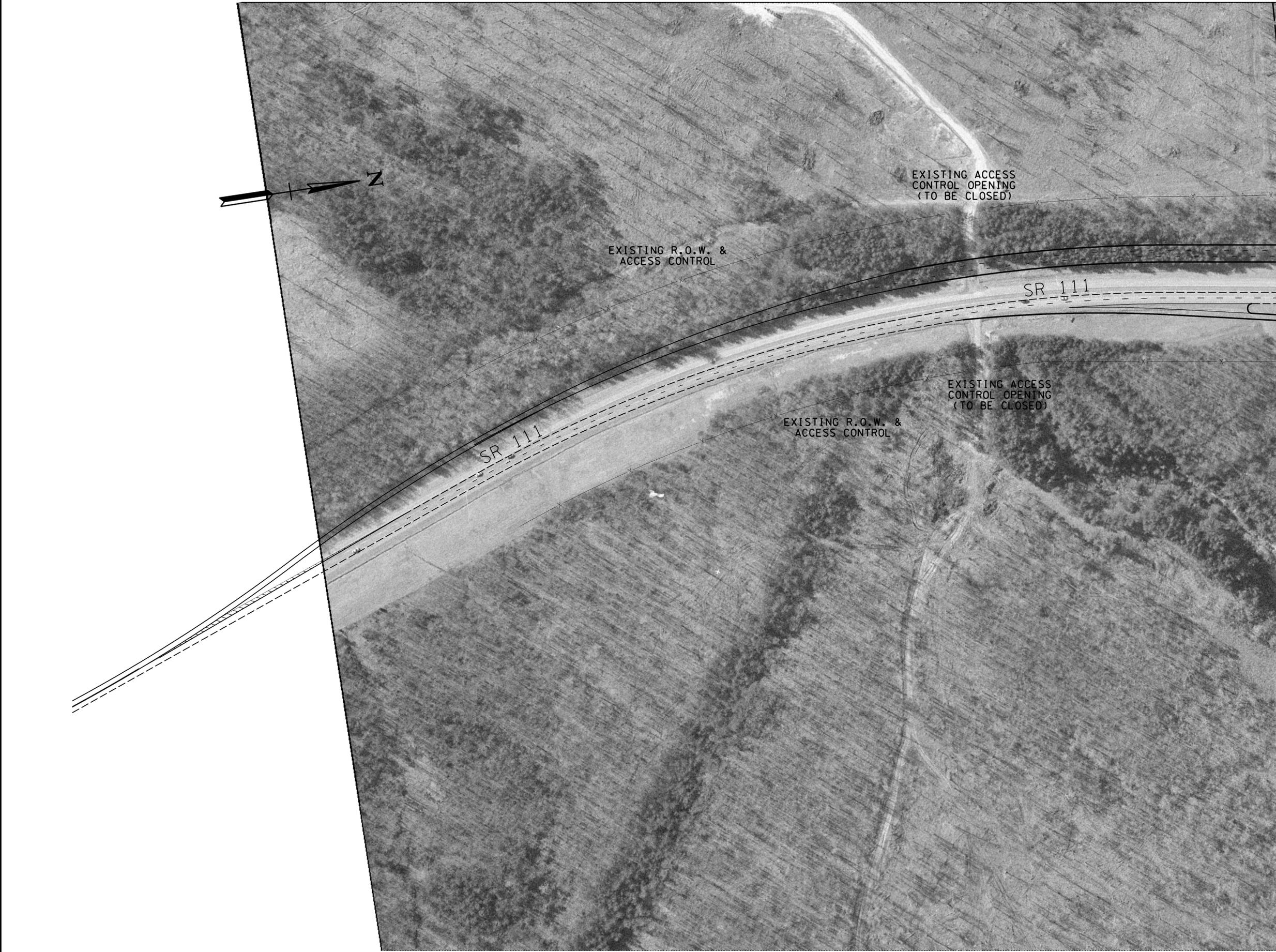
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A.P.R.	2005		2A



\$\$\$\$SYTIME\$\$\$\$
 \$\$\$DGN\$SPEC\$

TYPE	YEAR	PROJECT NO.	SHEET NO.
A.P.R.	2005		3

\$\$\$\$SYTIME\$\$\$\$
 \$\$\$DONSPCC\$\$\$



MATCH LINE - SEE SHEET 4



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
**S.R. 111 & BAKER
 MOUNTAIN ROAD
 INTERCHANGE
 JUSTIFICATION STUDY**
 ALTERNATE A
 NEAR SPENCER, TN
 VAN BUREN CO.

MATCH LINE - SEE SHEET 6

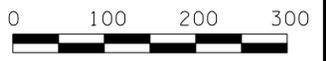
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A.P.R.	2005		4

MATCH LINE - SEE SHEET 3

MATCH LINE - SEE SHEET 5

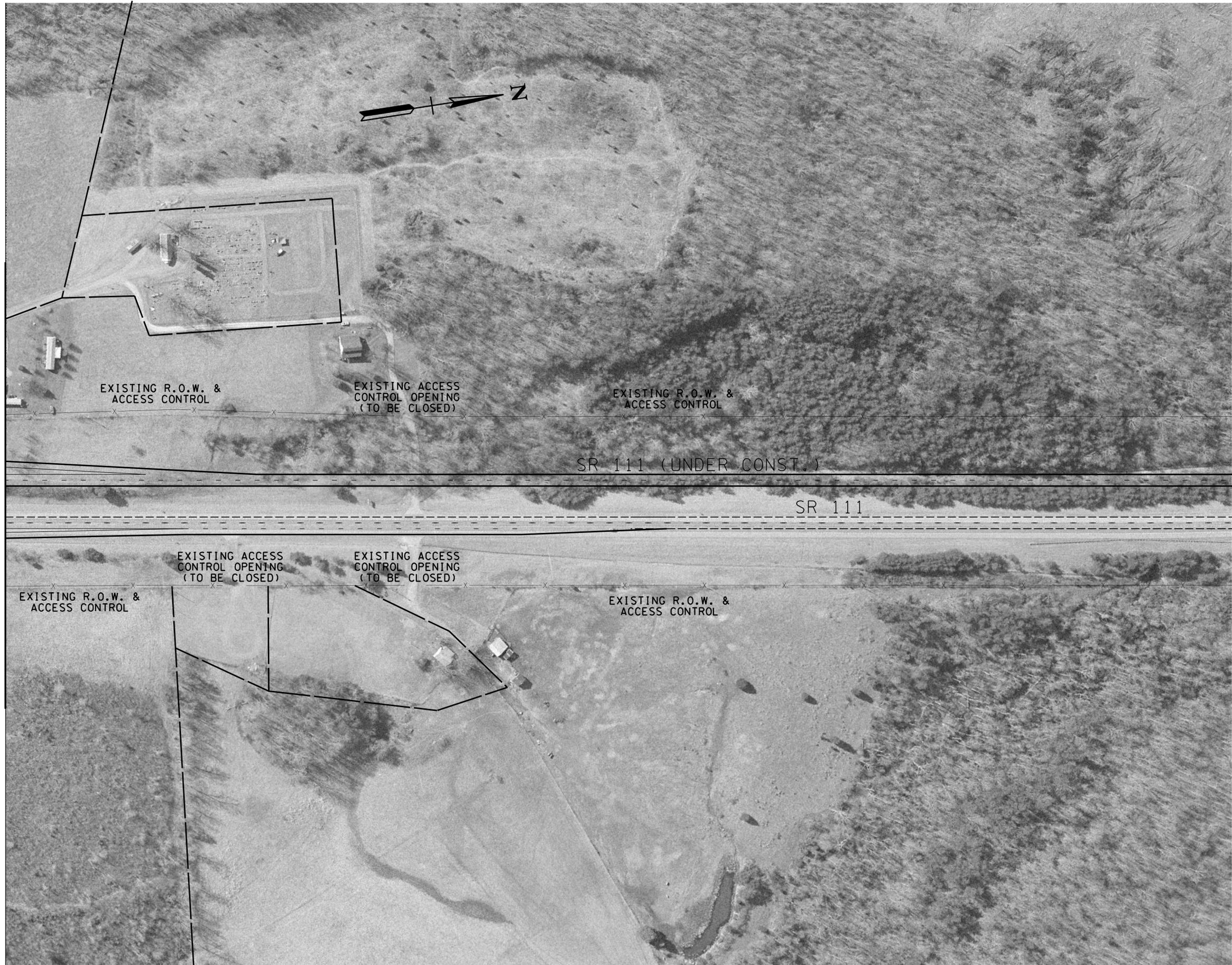


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 \$\$\$DGN\$PEC\$\$\$\$



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
S.R. 111 & BAKER MOUNTAIN ROAD INTERCHANGE JUSTIFICATION STUDY
 ALTERNATE A
 NEAR SPENCER, TN
 VAN BUREN CO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
A.P.R.	2005		5



MATCH LINE - SEE SHEET 4

\$\$\$\$SYTIME\$\$\$\$
 \$\$\$DONSPCC\$\$\$



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
S.R. 111 & BAKER MOUNTAIN ROAD INTERCHANGE JUSTIFICATION STUDY
 ALTERNATE A
 NEAR SPENCER, TN
 VAN BUREN CO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
A.P.R.	2005		6



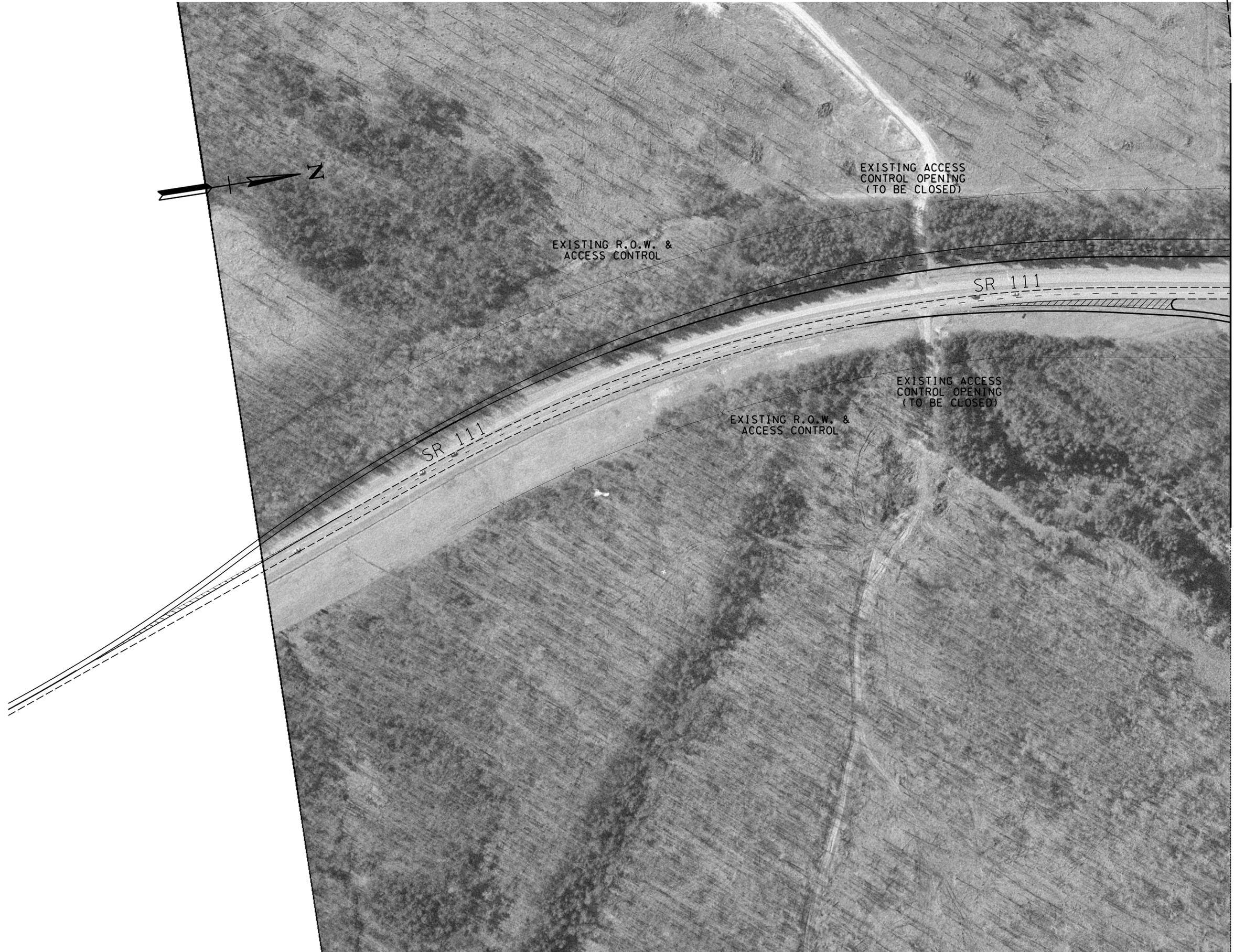
MATCH LINE - SEE SHEET 4



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
S.R. 111 & BAKER MOUNTAIN ROAD INTERCHANGE JUSTIFICATION STUDY
 ALTERNATE A
 NEAR SPENCER, TN
 VAN BUREN CO.

\$\$\$\$SYTIME\$\$\$\$
 \$\$\$DINSPEC\$\$\$\$

TYPE	YEAR	PROJECT NO.	SHEET NO.
A.P.R.	2005		7



MATCH LINE - SEE SHEET 8

\$\$\$\$SYTIME\$\$\$\$
 \$\$\$DONSPEC\$\$\$\$



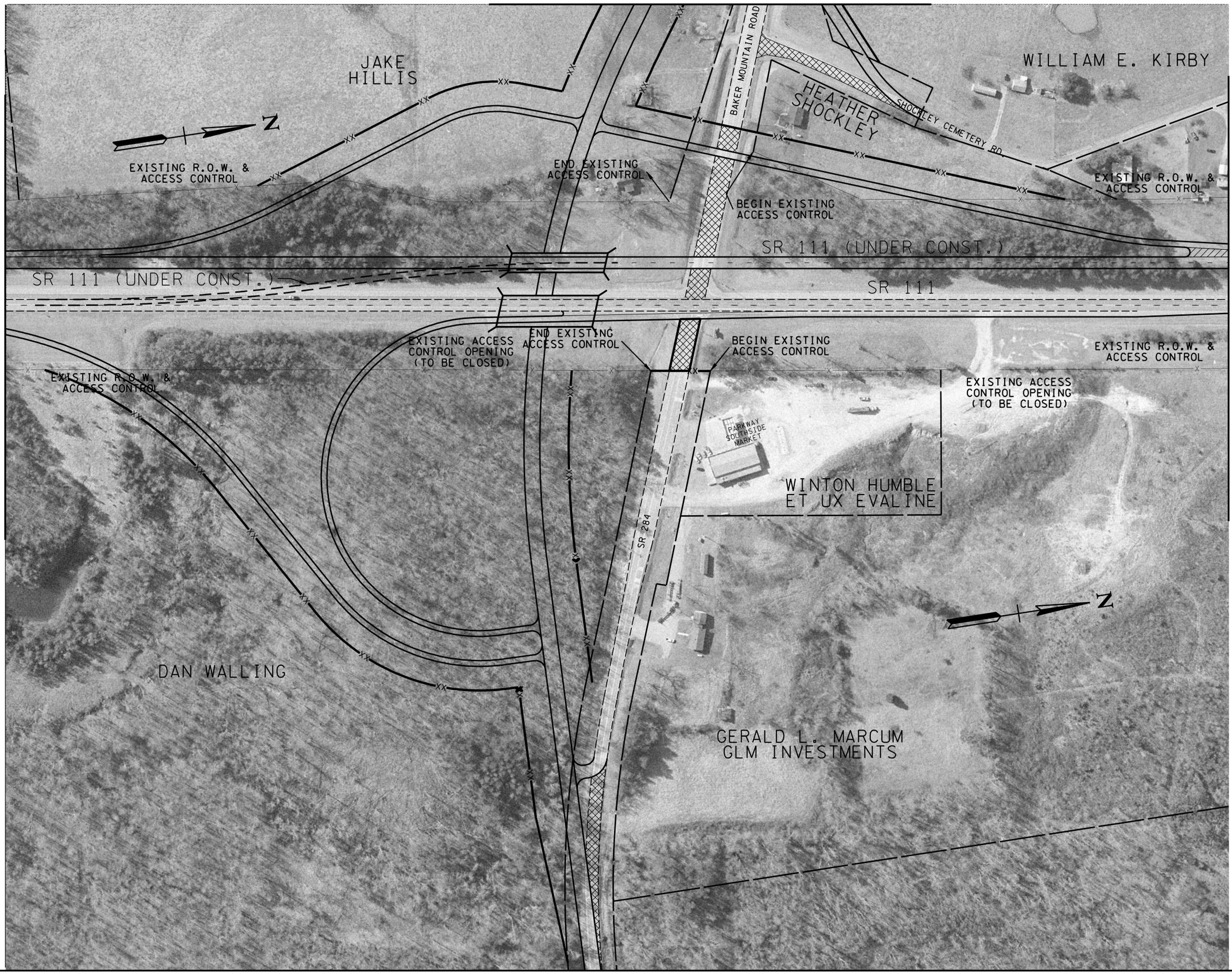
STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
**S.R. 111 & BAKER
 MOUNTAIN ROAD
 INTERCHANGE
 JUSTIFICATION STUDY**
 ALTERNATE B
 NEAR SPENCER, TN
 VAN BUREN CO.

MATCH LINE - SEE SHEET 10

TYPE	YEAR	PROJECT NO.	SHEET NO.
A.P.R.	2005		8

MATCH LINE - SEE SHEET 7

MATCH LINE - SEE SHEET 9

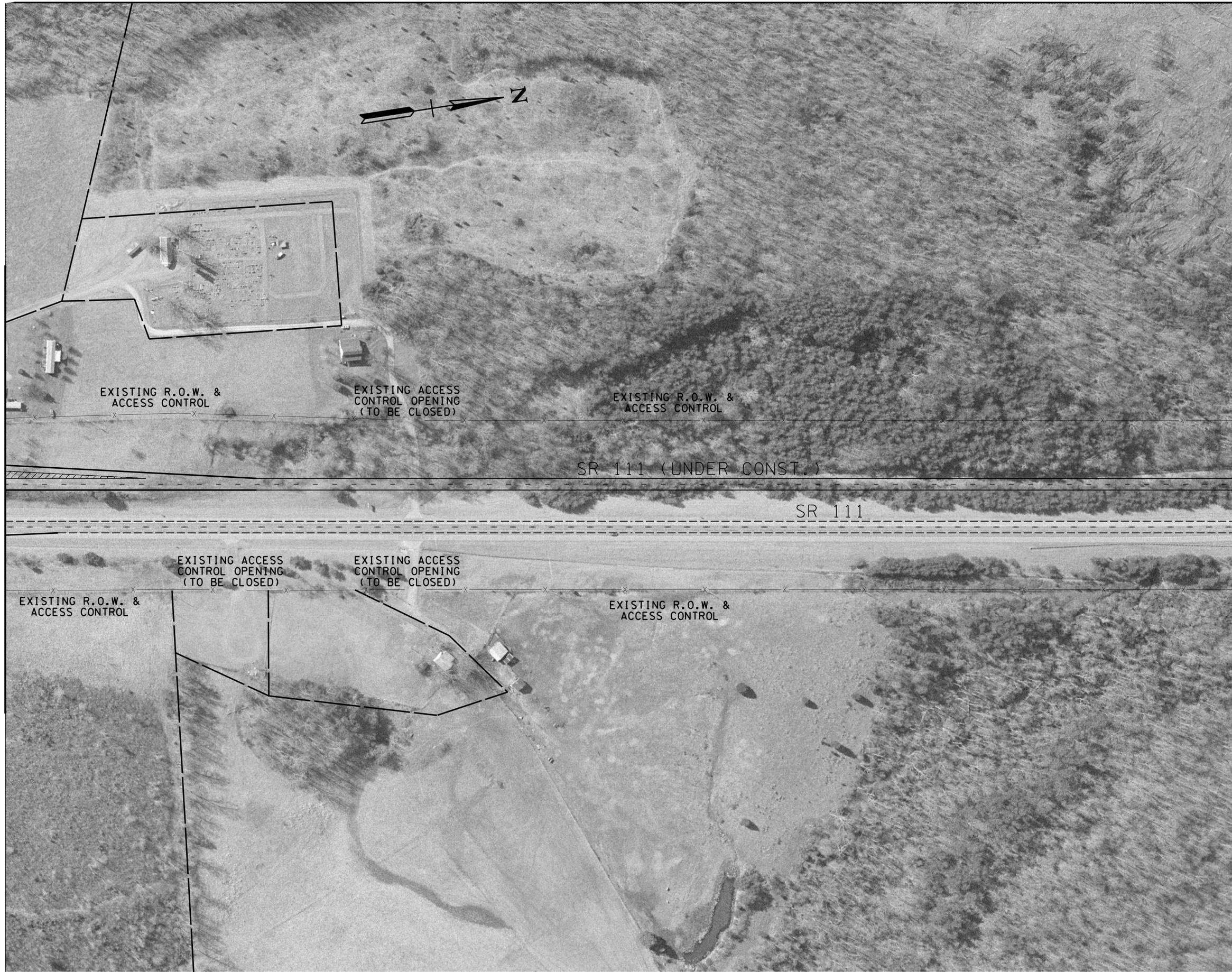


\$\$\$\$SYTIME\$\$\$\$
 \$\$\$DONSPEC\$\$\$



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
S.R. 111 & BAKER MOUNTAIN ROAD INTERCHANGE JUSTIFICATION STUDY
 ALTERNATE B
 NEAR SPENCER, TN
 VAN BUREN CO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
A.P.R.	2005		9



MATCH LINE - SEE SHEET 8

\$\$\$\$SYTIME\$\$\$\$
 \$\$\$DONSPEC\$\$\$\$



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION

**S.R. 111 & BAKER
 MOUNTAIN ROAD
 INTERCHANGE
 JUSTIFICATION STUDY**

ALTERNATE B
 NEAR SPENCER, TN
 VAN BUREN CO.

TYPE	YEAR	PROJECT NO.	SHEET NO.
A.P.R.	2005		10



MATCH LINE - SEE SHEET 8

\$\$\$\$SYTIME\$\$\$\$
 \$\$\$DONSPEC\$\$\$\$



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION
**S.R. 111 & BAKER
 MOUNTAIN ROAD
 INTERCHANGE
 JUSTIFICATION STUDY**
 ALTERNATE B
 NEAR SPENCER, TN
 VAN BUREN CO.