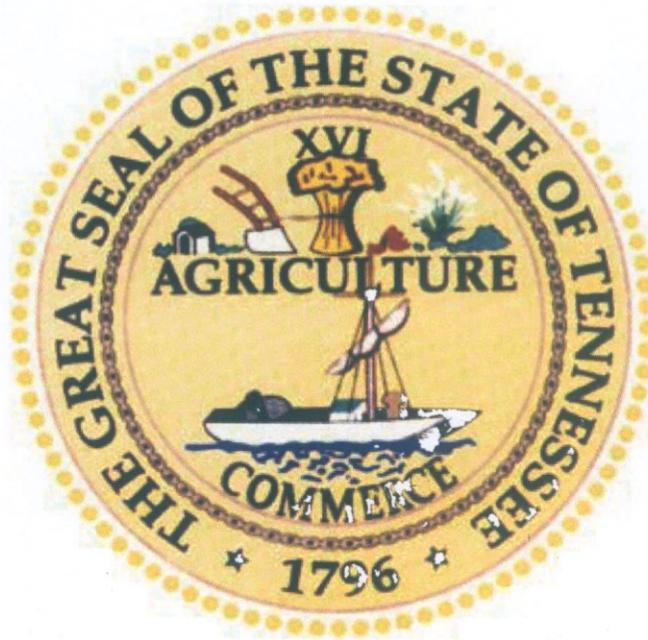


TRANSPORTATION PLANNING REPORT

STATE ROUTE 29
FROM SR 62 IN WARTBURG
TO SR 329 IN SUNBRIGHT
MORGAN COUNTY
PIN 112888.00



PREPARED BY PALMER ENGINEERING
FOR THE EAST TENNESSEE NORTH RURAL PLANNING ORGANIZATION
AND THE
TENNESSEE DEPARTMENT OF TRANSPORTATION
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Cost Data Sheets for all Options

Field Review Meeting Sign In Sheet

Field Review Meeting Summary

TDOT Early Environmental Screening Process Project Scoring

VOLUME II

SR 29 Traffic Forecast Report

TDOT Traffic Forecast

TDOT Crash Data from TRIMS

Present / Proposed Layout for SR 29/SR 62 Intersection Improvement (Under Construction)

1.0 PROJECT HISTORY AND BACKGROUND INFORMATION

1.1 Project History

This Transportation Planning Report (TPR) will evaluate various options for improving State Route (SR) 29 from the intersection with SR 62 in Wartburg to the intersection with SR 329 in Sunbright. The corridor under review is entirely within Morgan County Tennessee. The East Tennessee North Rural Planning Organization (RPO) requested this study. SR 29 through Morgan County is a vital north-south route, where few routes exist in the East Tennessee counties north of Interstate 40.

Morgan County is situated on the Cumberland Plateau, which has an elevation of approximately 1500 feet above sea level. It is surrounded by the counties of Scott, Anderson, Roane, Cumberland and Fentress. Morgan County is known for its rugged mountain terrain, which includes Frozen Head State Park and Lone Mountain State Forrest. The largest streams in the county are the Emory and the Obed Rivers, with their respective tributaries, Crooked Fork and Clear Creek, and the Clear Fork of the Cumberland River and White Oak Creek.

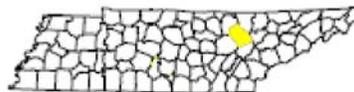
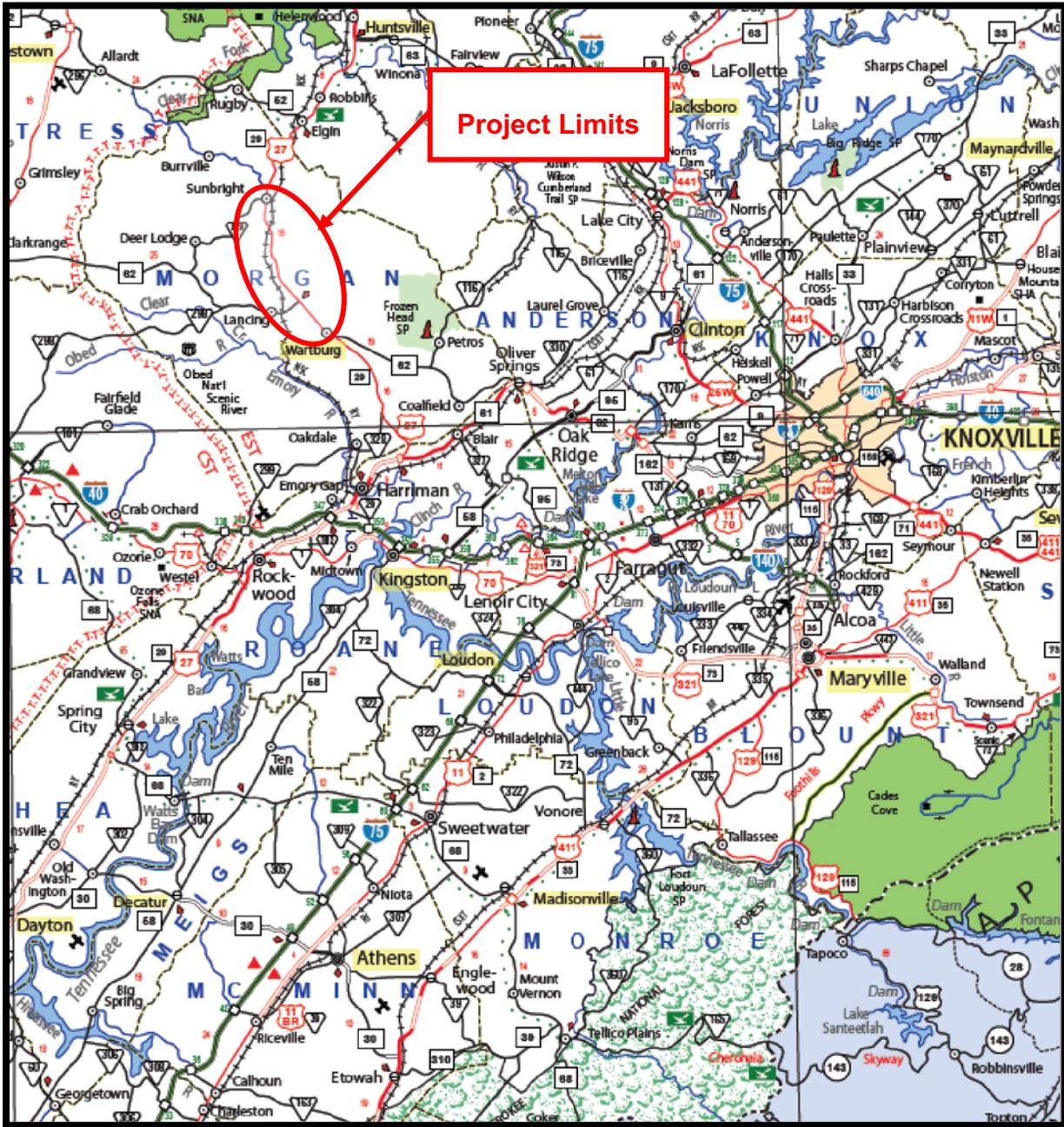
In addition to being an important local route, the roadway provides Morgan County residents with connectivity to and between southeastern Kentucky and to I-40 as well as traffic from outside the region. The roadway is one of two rural principal arterial routes that provide access to the Big South Fork National Recreation Area.

A Feasibility Study was performed in 2002 for SR 29 from SR 62 in Wartburg to Wolf Creek Road South of Elgin in Morgan and Scott Counties. The study area under review is a portion of this corridor. The purpose of the 2002 study was to determine and evaluate two (2) alternate routings for SR 29. The 2002 Feasibility Study proposed the roadway be built with four (4) lanes; however, a two (2) lane could be built on right of way acquired for four (4) lanes.

1.2 Project Study Area

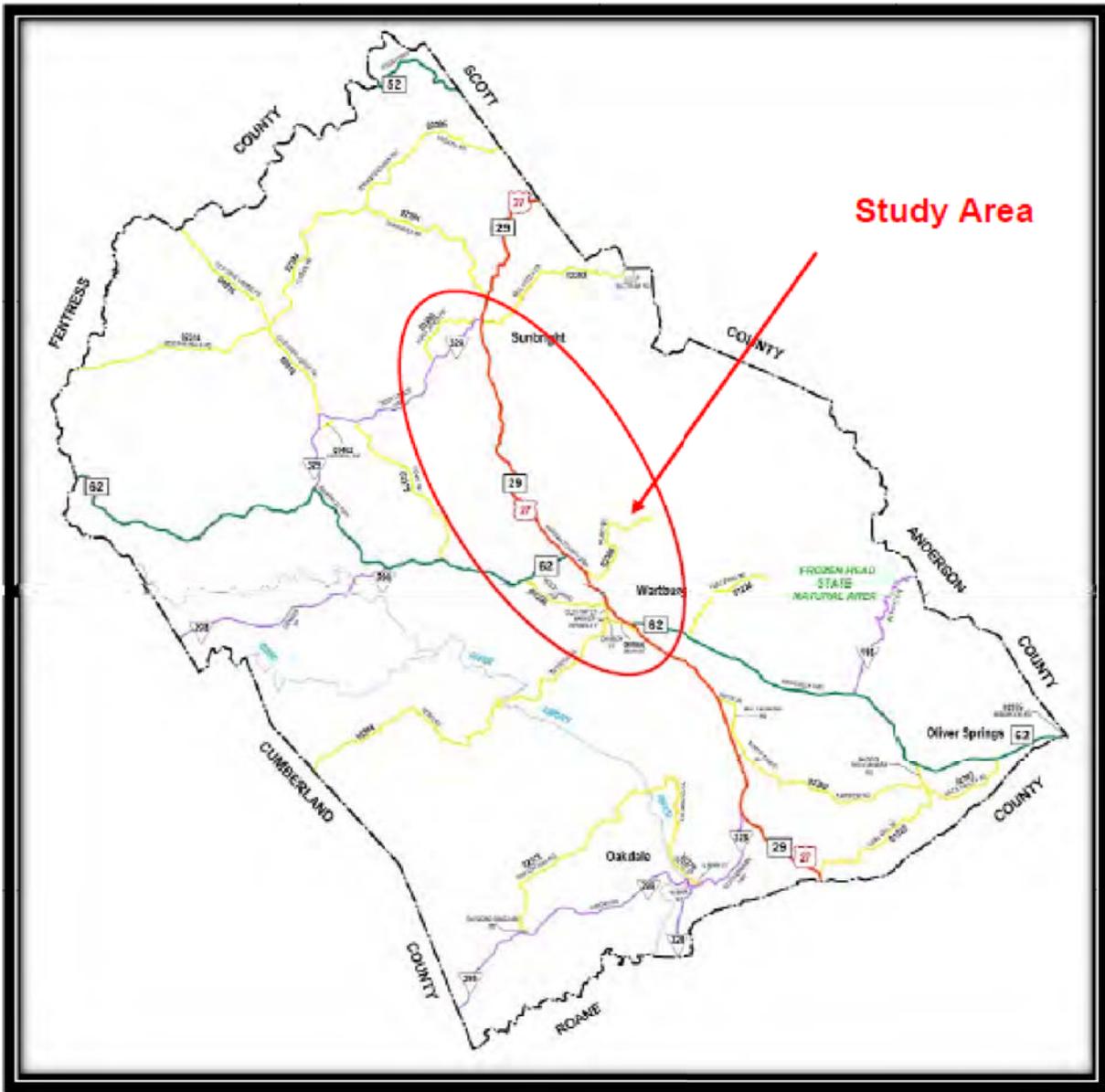
In 2009, a Preliminary Purpose and Needs Assessment was performed for SR 29 from SR 62 in Wartburg, Morgan County to SR 52 in Scott County. The recommendation of this report was a TPR to be performed for the 3.36 mile segment of SR 29 from SR 62 in Wartburg to SR 62 in Morgan County. In November 2009, TDOT's Project Planning Office requested that an additional 8.85 miles of SR 29 be added to the study area. The additional mileage was added based on a portion of SR 29 currently being under construction and safety issues on the additional 8.85 miles. This report covers SR 29 from SR 62 in Wartburg to SR 329 in Sunbright for a total of 11.91 miles. **Exhibit 1.2.1** presents a larger, regional view of the study area, while **Exhibit 1.2.2** presents a more localized view of the study area (in red).

Regional Map



Morgan County (shaded)
Exhibit 1.2.1

SR 29, From SR 62 in Wartburg to SR 329 in Sunbright



**Study Area Shown in Red
Exhibit 1.2.2**

1.3 Traffic

The projected traffic volumes for the two (2) SR 29 intersections with SR 62 and the SR 329 intersection were prepared and are included in **Volume II**. **Exhibit 1.2.2** shows the study area. This report includes the Average Annual Daily Traffic (AADT) and Design Hourly Volumes (DHV) forecast for the base year 2014 and future year 2034. The AADT volumes are expressed in vehicles per day (VPD) and a summary of the traffic forecasts for this study area is shown in **Exhibit 1.3.1**.

Turning movement counts were performed on Wednesday, July 29, 2009 between 6:00-9:00 AM, 11:00 AM – 1:00 PM and 3:00-6:00 PM for the following intersections:

- SR 29 and SR 62/Old Highway 27 intersection (South)
- SR 29 and SR 62 intersection (North)

An additional count was requested and performed on Thursday, February 11, 2010 between 6:00-9:00 AM, 11:00 AM – 1:00 PM and 3:00-6:00 PM for the following intersection:

- SR 29 and SR 329 intersection in Sunbright

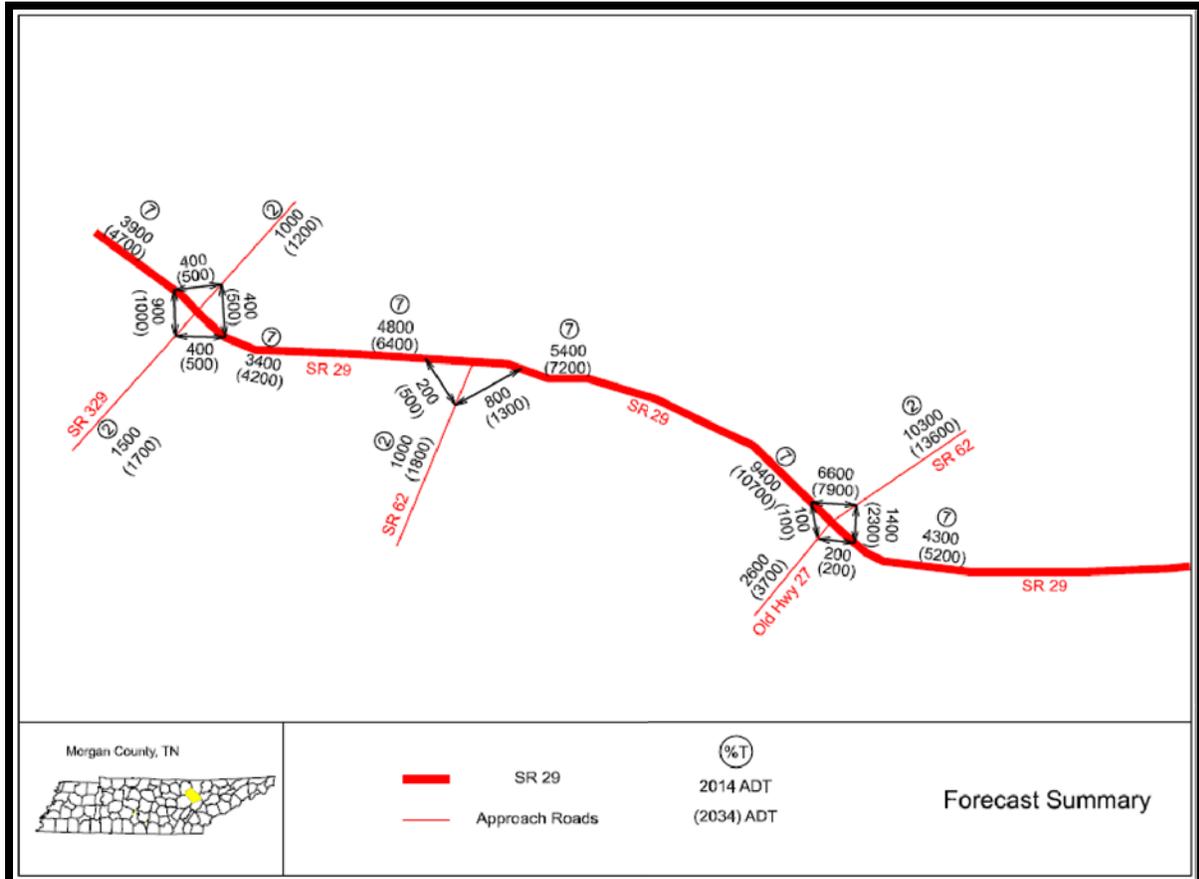


Exhibit 1.3.1 Traffic Forecasts

The forecasted percentage of trucks for the design year is approximately seven (7) percent at the intersection of SR 62 and SR 29 in Wartburg and approximately two (2) percent at the SR 329 and SR 29 intersection in Sunbright.

Level of Service (LOS) was used as the measure of effectiveness for each roadway segment. According to the Highway Capacity Manual, the level of service is defined in terms of delay. Delay results in driver discomfort, frustration, fuel consumption, and lost travel time. Delay is caused by a number of factors including traffic signal timing, geometrics, traffic congestion, and crashes at an intersection. Level of Service is based on a grade scale from A to F with A being excellent and F being failure. A Level of Service C is desirable, and D is acceptable in an urban setting. Table 1.3.1 describes the conditions at each level of service per the Highway Capacity Manual (HCM).

Table 1.3.1 - Level of Service Descriptions

LOS A	Free flow conditions. Vehicle operations are virtually unaffected by other vehicles. Easy to maneuver through traffic stream. Minor disruptions do not create a change in travel speed.
LOS B	Free flow conditions but other vehicles become noticeable. Travel speeds are similar to LOS A but driver has less maneuverability. Minor disruptions are easily absorbed.
LOS C	Driver maneuverability through traffic stream is affected by other vehicles. Minor disruptions can result in serious service deterioration and queues.
LOS D	Traffic congestion severely restricts driver maneuverability. Increasing volume results in a reduced travel speed.
LOS E	Operations at or near capacity. Disruptions often create queues and cause service to deteriorate to LOS F.
LOS F	Traffic flow becomes forced or breaks down. Vehicles arrive at a greater rate than which they are discharged or the demand exceeds the capacity. Queues form from the breakdowns, with vehicles experiencing brief periods of movement followed by stoppages.

Traffic volumes from the approved SR 29 Traffic Forecast Report were used to analyze each roadway segment. Analysis was completed using HCS+, a standard analysis tool, which uses HCM methodologies to evaluate roadway corridors.

The existing five (5) lane segment has various shoulder widths. The worst case scenario involving two (2) foot shoulders on either side of the driving lanes was analyzed, and still yielded a LOS A for the segment.

Table 1.3.2 summarizes the LOS results for the No Build conditions, the improvements to the existing two (2) lane corridor, and for the four (4) lane highway conditions. The analysis files can be found in the appendix of this report.

Table 1.3.2 - LOS Analysis

Segment	Level of Service (LOS)					
	Option 1 No Build		Option 2 5 Lane Rural/4 Lane Divided		Option 3 Widen Shoulders	
	2014	2034	2014	2034	2014	2034
SR 62/Hwy 27 in Wartburg (5 Lane Existing Segment)	A	A	A	A	A	A
End of Existing 5 Lane Segment to SR 62	C	C	A	A	C	C
SR 62 to Hawn Rd	C	D	A	A	C	C
Hawn Rd to SR 329	C	C	A	A	C	C

Based on the LOS analyses for SR 29, the roadway segments between the SR 62/Hwy 27 intersection and the SR 329 operate at an acceptable LOS and have no capacity deficiencies. In 2034, the no build scenario from SR 62 to approximate Hawn Road would operate at a LOS D. Option 2 improves this segment to a LOS A while Option 3 improves it to a LOS C.

1.4 Existing Roadway Conditions

The SR 29 study corridor in Morgan County begins in Wartburg at the intersection with SR 62 from Oliver Springs which has a corresponding log mile (LM) of 11.08 and continues to the intersection with SR 329 in Sunbright at LM 22.99. The total length of the study corridor is 11.91 miles. Existing SR 29 within the study area, has several different typical sections with different number of lanes. Beginning at LM 11.08, the roadway has a three (3) lane rural section which is currently under construction for the improvement of SR 62 and the intersection with SR 29. In this TPR, there will be no proposed improvements recommended for this portion under construction from LM 11.08 to approximately LM 11.45.

From approximately LM 11.45 to LM 11.82 the roadway has a five (5) lane rural section with five (5) foot shoulders, which carries to near the Wartburg city limits. From LM 11.82 to approximately LM 12.82 the roadway has a three (3) lane section, which represents a truck climbing lane, with primarily ten (10) foot shoulders. From LM 12.82 to LM 22.99 in Sunbright, the roadway has a two (2) lane typical section with shoulder width varying, but primarily less than two (2) feet. There is an additional truck climbing lane at LM 21.42 to LM 21.95.

The following discussion includes the approximate LM location as well as a general description of the conditions in the area. By providing the LM, it provides a quick reference to TDOT information such as the Tennessee Roadway Information Management System (TRIMS) to review additional information such as roadway features. The photographs contained within this section of the report were all taken on November 30, 2009 during a field reconnaissance of the route.

SR 29 at Kuhn Street in Wartburg (LM 11.45)

A portion of SR 29 within the study corridor is currently under construction. SR 62 is being improved from just West of Petit Lane towards Oliver Springs to approximately LM 11.45 in Wartburg and includes the intersection with SR 29. According to the construction plans for SR 62, this portion of SR 29 is proposed to be constructed utilizing a five (5) lane typical section. This report will not include any study or recommendations on this segment of SR 29. This study will take this construction into consideration when reviewing the connecting segment of SR 29.

Exhibit 1.4.1 – SR 29 at Intersection with SR 62



View of current construction looking south on SR 29 toward the Intersection with SR 62

SR 29 Near Wartburg City Limits (LM 11.85)

Just north of the Wartburg City Limits, SR 29 transitions from a five (5) lane rural section to a three (3) lane rural section. The third lane is a southbound truck climbing lane. There is a long horizontal curve at this location and the extra lane is helpful in accommodating slower traffic traveling south toward Wartburg.

Exhibit 1.4.2 – SR 29 at Warburg City Limits



View looking North on SR 29 just past Wartburg City Limits

SR 29 at SR 62 Intersection (LM 14.44)

This location was the original termini of the study area. SR 62 is also known as the Nashville Highway and accommodates traffic traveling east to west within this quadrant of the state. SR

62 does enter SR 29 with a severe vertical curve due to the existing terrain and the location of a relatively new structure on SR 62 crossing Rock Creek. Currently there is no turn lane for traffic traveling north to enter when turning onto SR 62. Right of way width in this area is approximately one hundred fifty (150) feet with forty eight (48) feet of roadway width and two (2) twelve (12) foot travel lanes.

Exhibit 1.4.3 – Aerial View of SR 29 at SR 62 Intersection



Exhibit 1.4.3 – SR 29 at SR 62 Intersection



*View From SR 62 Intersection Looking South
on SR 29*

SR 29 at Vanderpool Road (LM 14.90)

At approximate LM 14.90 near the Vanderpool Road intersection, the shoulders narrow to two (2) feet or less. These narrow shoulders extend north for approximately the next six (6) miles of SR 29. At this location, right of way widths are sixty six (66) feet, with twenty eight (28) feet of roadway width and two (2) twelve (12) foot travel lanes. Due to the many horizontal and vertical curves along the study area, the narrow shoulders do not provide sufficient run off area and allow for any correction from driver errors.

Exhibit 1.4.4 – SR 29 Near Vanderpool Road Intersection



View looking North near Vanderpool Road Intersection

As can be seen in the photograph, rumble striping has recently been installed on SR 29 from this location north to near Sunbright Tennessee. This improvement will alert drivers when approaching the edge of pavement, but the narrow shoulders do not allow for a large margin of error.

SR 29 Near Bill Hamby Road (approximate LM 15.50)

This location is representative of several areas along the study area, where residences are located very close to the roadway. As can be seen, any widening improvements along the corridor would require large rock cuts or acquiring and relocating several residences along the study area. These are issues that will need further study and consideration as the project develops.

Exhibit 1.4.5 – SR 29 Near Bill Hamby Road



View looking South at residence along SR 29

Horizontal and Vertical Curves in the SR 29 Study Area

Due to the terrain in the northeastern portion of the state, there are many horizontal and vertical curves in the existing roadway. These conditions create sight distance issues and safety concerns when traveling along SR 29. In addition, these curves make for unsafe conditions for vehicles entering and exiting SR 29 all along the corridor. The photographs below are representative of these areas along the study area.

Exhibit 1.4.6 – SR 29



View looking North at Pilot Mountain Tower Road



View looking North at Approximate LM 17.93

SR 29 From Sunbright City Limits to Intersection with SR 329

The northern terminus of the study area is the intersection with SR 329 in Sunbright Tennessee. The posted speed limit on SR 29 within Sunbright is forty (40) miles per hour. The roadway in this location consists of two (2) twelve (12) foot travel lanes with varying shoulder widths and

right of way widths. These variations are due to the location of churches, businesses and residences along the route. Access to the commercial properties in Sunbright do not appear to have any width limits to the driveways along SR 29, as most of them stretch the entire roadway frontage of the properties. From the 2000 Census, the population of Sunbright was 577. Any widening improvements at this location would need careful review to ensure the city is not severely impacted.

Exhibit 1.4.7 – SR 29 in Sunbright Tennessee



View looking North on SR 29 in Sunbright

Exhibit 1.4.8 – SR 29 Intersection with SR 329



View looking South at Intersection with SR 329

1.5 Crash History

The Tennessee Roadway Information Management System (TRIMS) provides data for locations of crashes, for geometric deficiencies such as narrow lanes (less than eleven (11) feet) and shoulder width (less than six (6) feet for arterials), and for excessive curves and grades, as defined by generally accepted design standards. The segment of SR 29 in Morgan County under review, provides sufficient lane widths (twelve (12) feet), but does have deficient horizontal and vertical curves. The narrow shoulders for the majority of the study area does not provide sufficient width for vehicles to pull off the roadway in emergency situations or provide drivers with maneuvering room to correct for any driver errors.

Records of vehicle crashes for the three (3) year period from 2007 through 2009 were reviewed to look for any significant patterns or recurring conditions. The following data is for the entire study area from LM 11.08 to LM 22.99. There were a total of ninety two (92) crashes reported in this three (3) year period. Of these crashes, twenty nine (29) occurred within the Wartburg City Limits with one (1) reporting a fatality. There were sixty three (63) crashes along the remaining route with thirty eight (38) of these crashes involving one (1) vehicle. There were three (3) fatalities reported during the period under review. The calculated crash rate for SR 29 from SR 62 in Wartburg to SR 329 in Sunbright is 1.748 and the statewide average crash rate is 1.656.

The large majority of the crashes reported involved lane departure or angle crashes. These types of crashes are indicative of roadways with vertical and horizontal curves. The review of crash data and frequency of certain types of crashes confirms some of the observations that have been noted in this report. The number of lane departure crashes suggests that shoulder width does not provide drivers with room for correcting certain driver errors. With the recent addition of rumble striping along a large portion of the study area, these types of crashes may be reduced.

1.6 Environmental Considerations

This section of the report discusses various items that should be considered as further planning and development of the study area moves forward in the planning process. The Tennessee Department of Transportation (TDOT) has introduced an Early Environmental Screening (EES) process for the report study area. By screening the latest available Geographic Information Systems (GIS) environmental data during the early stages of planning, TDOT resource and permitting agencies will be better prepared to anticipate potential environmental issues and mitigation requirements. Additional study and in depth review will be necessary in subsequent phases of the project's development to determine the significance of the impacts to the environmental concerns. The EES sheets for this corridor are shown in the Appendix.

The screening process involves using GIS to assess data as it relates geographically to the study area. There are several layers of data that is screened and these individual layers are reviewed below:

- Archeological/Historical Architecture – A preliminary review of the National Register of Historic Places (NRHP) did not indicate that any properties near the study area were listed. No impact is anticipated for any properties with archeological or historical significance.
- Community Impacts – There were several churches identified within the study area. In addition, it is determined there is a presence of population below the state average poverty level of thirteen (13) percent. The EES indicates that no impact is anticipated for any sensitive community populations within the study area.
- Ecology - No impacts are expected to any Scenic Waterway or Conservation Site as designated by the Tennessee Department of Environment and Conservation (TDEC). There are more than five (5) acres of wetland area identified. Those within the study area will need further study as the work progresses within the study area. Avoidance and mitigation will be factors to consider.
- Hazardous Substances – Even though there were no hazardous substances identified within the study area on the EES, there were abandoned oil tanks noted within the study area. These appear to be storage tanks used to store oil that had been pumped from oil wells. No oil wells were found, but an assumption would be that abandoned wells would be located within the area as well. Those within the study area may need further study as the work progresses within the study area.

Exhibit 1.6.1 – Abandoned Oil Storage Tanks



View of Oil Storage Tanks West of SR 29 at approximate LM 19.00. (11/30/09)

2.0 PURPOSE AND NEED

Improvements to SR 29 will provide a regional link to I-40, jobs, commercial areas and tourist attractions. There are few north-south routes in the area, which makes safety and accessibility on SR 29 key factors. As the current capacity is at or above the roadway's limit in the most populated area, improvements will ease congestion and possibly reduce crashes. The more rural areas of the study area (north of Wartburg) will be served by improvements to those locations where horizontal and vertical curves, shoulder widths and sight distance are deficient. Additionally, tourism will remain a viable industry in the areas as long as visitors have a safe route to travel. This study was requested by the East Tennessee North Rural Planning Organization (RPO) and is a sponsor for any improvements to SR 29. Morgan County and the City of Wartburg officials are in support of the development of this north-south corridor and recognize the positive impacts such an improvement would have on all the counties within the region.

Accessibility to jobs and services is vital for the local economy. Morgan County is in partnership with other counties in the region to develop a large industrial park near I-40. Morgan County is actively seeking to attract new industry to the region, providing new jobs and a major boost to the economy. SR 29 will provide important north-south access to these industries, thus potentially providing needed jobs to an area with very high unemployment rates and poverty rates. Currently, there are improvements to SR 29 at the intersection with SR 62 in Wartburg and improvements are in progress to the corridor north of the study area. Connectivity and continuity of the route are issues to keep in mind when improvements to the study area are being considered.

The segment of SR 29 extending from the intersection with SR 62 in Wartburg to the intersection with SR 62 in Morgan County (north of Wartburg), has an average of 4585 vehicles per day, carries a large volume of traffic along the study area, has a near term capacity deficiency and a crash rate 3.083 compared to the statewide average crash rate of 1.656. The remainder of the route does not indicate having any capacity deficiency. The entire study area does have other safety issues such as little to no shoulders, extreme vertical and horizontal curves and limited sight distances in several locations.

3.0 OPTIONS STUDIED

On Tuesday, December 1, 2009 a stakeholders meeting and field review was held with concerned stakeholders for this corridor. The meeting began at 9:00 AM and was held in the Wartburg City Hall Conference Room. The meeting began with an overview of the project and included a discussion of previous studies along the corridor and the results of those studies. The purpose and need for improvements to the roadway was discussed and input was solicited from all participants. Local officials were given the opportunity to provide input on any known potential growth or developments in the area that could have an impact on any future roadway developments. Currently, there are plans for a new tourist center to be constructed along SR 29 and potential development of major hotel to locate on SR 29 as well. There were several

comments concerning the need for the study area to be improved for safety as well as enhancing the potential economic growth for the counties within the East Tennessee North Rural Planning Organization (RPO). Minutes from the stakeholders meeting and field review as well as a list of the attendees is shown in the Appendix.

During the field review of the study area, participants were asked for their input to assist in identifying and developing potential improvement options. In addition, participants were able to identify known areas with safety issues and areas where potential local traffic impacts the roadway safety.

This planning report examines operational and safety improvement options along the study area. These options evaluate opportunities for meeting the traffic and economic needs of Morgan County and the cities and towns within, as well as the needs and concerns of the RPO. The options studied are examined in the following sections of this report.

3.1 Option 1 – No Build

This option assumes no modifications or improvements are made to add capacity along the study area. Maintenance activities, such as resurfacing, roadway marking, signing and possible isolated safety improvements could occur as part of routine maintenance along the corridor. No costs would be incurred with the no build option other than routine maintenance costs. The no build option provides no improvements and serves as a baseline option which other improvement options are compared.

3.2 Option 2 – Five (5) Lane Rural Section to Emory River (LM 13.61) / Four (4) Lane Divided Section to South of Jim Goad Road (LM 19.43) / Five (5) Lane Rural Section to LM 21.94 / Three (3) Lane Urban Section to SR 329 Intersection

This option would begin at LM 11.45 and extend the existing five (5) lane rural section that is under construction from the SR 62 intersection at LM 11.08 in Wartburg to LM 11.45. The five (5) lane rural section will extend to just north of the structure over the Emory River at LM 13.61 and transition to a four (4) lane divided section to south of Jim Goad Road. At this point, the roadway would transition to a five (5) lane rural section to approximately LM 21.94. From LM 21.94, the roadway would transition to a three (3) lane urban section to the end of the study area at the intersection with SR 329 at LM 22.99 in Sunbright. The typical sections that are described above are shown in the **Appendix**, along with the aerial layouts of this option.

The section of SR 29 from LM 11.08 to LM 11.45 is included in the construction to improve SR 62 and the intersection and transitions with SR 29. This construction will increase the number of lanes on SR 29 and is being built with a five (5) lane rural section. As previously stated, this report will not study to improve this segment, but will propose to match the typical section.

At approximately LM 13.61 there is a structure crossing the Emory River that will need to be widened. This structure is 254 feet in length and 44 feet in width which will not accommodate five (5) travel lanes. The transition from the five (5) lane rural section to the four (4) lane divided section will begin just north of the Emory River structure and will continue to just south of Jim Goad Road. From there, the roadway will transition back to the five (5) lane section before the structure crossing the Norfolk and Southern Railroad. This structure is approximately 380 feet in length and 48 feet wide and will need to be widened as well. This five (5) lane section will continue to approximate LM 21.94 and transition to a three (3) lane curb and gutter typical section to the end of the project in Sunbright at the intersection with SR 329. The transition to the three (3) lane section is necessary due to the proximity of businesses and homes along SR 29 in Sunbright. Without the transition, the majority of these businesses and homes would be acquired and become a major impact to the city. In addition, there are several horizontal and vertical curves that need to be improved from just north of the intersection with SR 62 (LM 14.44). This option includes the flattening of these curves and will require right of way acquisition as well as relocations. The estimated cost of this improvement is \$56,028,000. The complete layout for Option 2 can be found in the **Appendix** of this report.

3.3 Option 3 – Spot Improvements

During the field review with TDOT and Morgan County officials, several areas along the study area were identified as locations in need of safety improvements. The group identified a couple of areas with a large elevation change over a long distance. In addition, there were several locations where certain geometric conditions need improvement. These horizontal and vertical curves do not meet current design standards and should be improved. These options can be implemented independently or in combination as an overall improvement strategy along the study area. These spot improvements are discussed in more detail in the following sections of this report.

3.3.1 Option 3.1 – Left Turn Lane at SR 62 Intersection (LM 14.44) and Widen Shoulders from LM 14.90 to LM 20.40

This option combines the addition of a left turn lane at the SR 29 intersection with SR 62 and widening existing shoulders from Vanderpool Road at LM 14.90 to just south of the structure over the Norfolk-Southern Railroad at LM 20.40. At the intersection of SR 29 with SR 62 in Morgan County (LM 14.44), there is no existing left turn lane on SR 29. SR 62 is locally known as the “Nashville Highway” and is used to carry traffic west toward Crossville, Monterey and Cookeville. During the field review, it was noted that improvements had recently been made to SR 62 and the roadway traffic was increasing. In reviewing the crash data, there were several crashes at or near this intersection. Currently, there are two (2) travel lanes with twelve (12) foot shoulders. The right of way width at this location is 150 feet and the addition of the left turn lane should require minimal or no additional right of way. As this improvement progresses, the exact right of way requirements can be determined. The plan view of this option is shown following this narrative. For reporting purposes, the estimated costs of the intersection

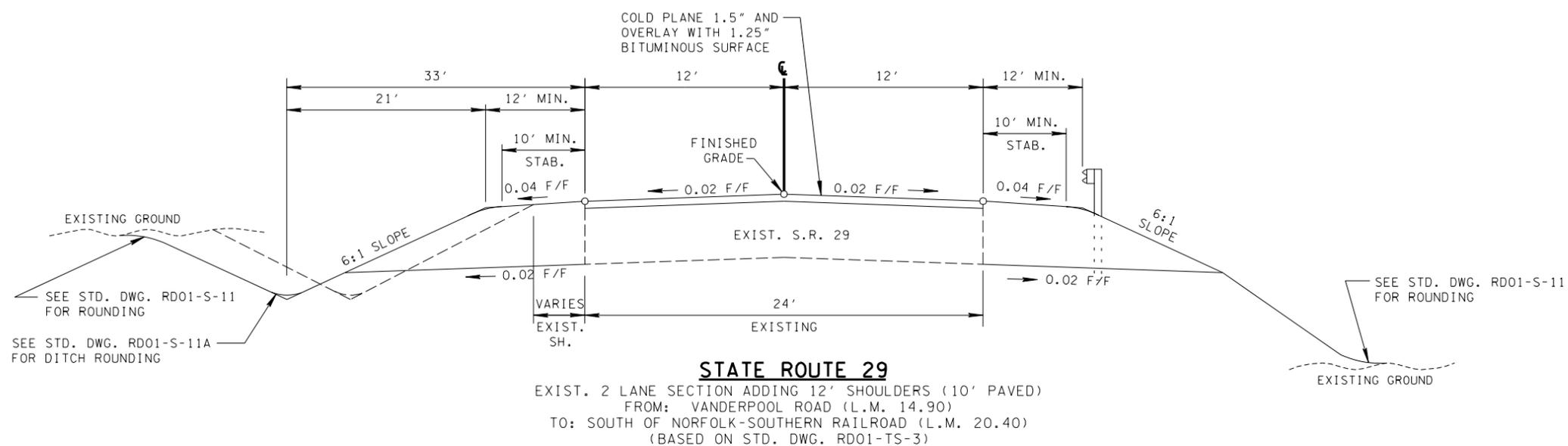
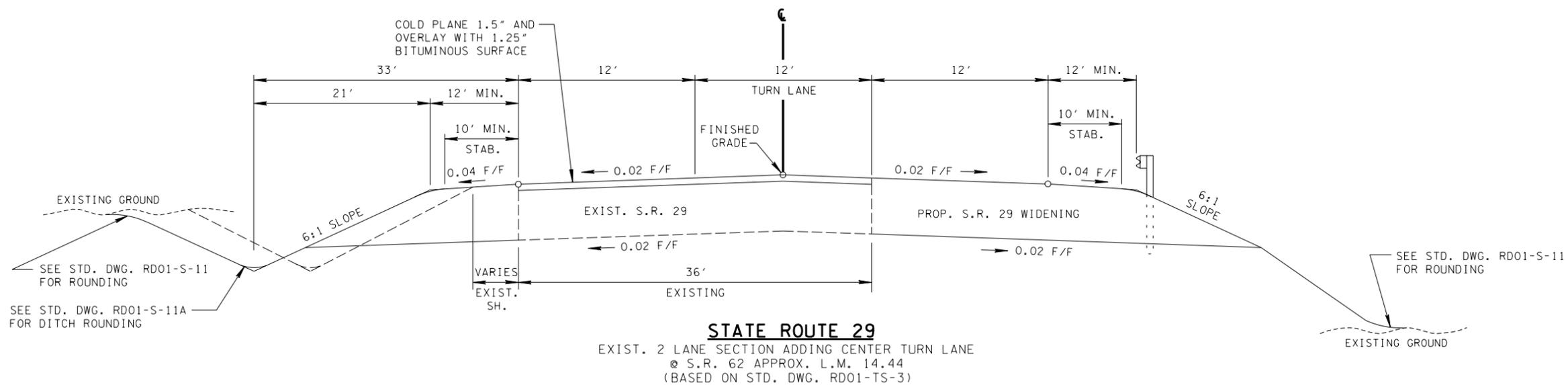
improvement and the shoulder widening improvement have been calculated separately. The total estimated cost for improving the intersection with SR 62 is approximately \$358,000.

In addition to the left turn lane, this option involves widening and improving the shoulders along existing SR 29 from Vanderpool Road at LM 14.90 to just south of the Norfolk-Southern Railroad at LM 20.40. This shoulder widening improvement will provide two (2) twelve (12) foot travel lanes with ten (10) foot paved shoulders. New pavement markings will be installed and with the shoulders having a ten (10) foot paved surface, they will serve to accommodate pedestrians and bicycles. Due to the rural nature of this segment of the study area, there will be minimal pedestrian traffic, although the improved shoulders will accommodate this traffic as well. The typical section for the above described improvement is shown following this narrative.

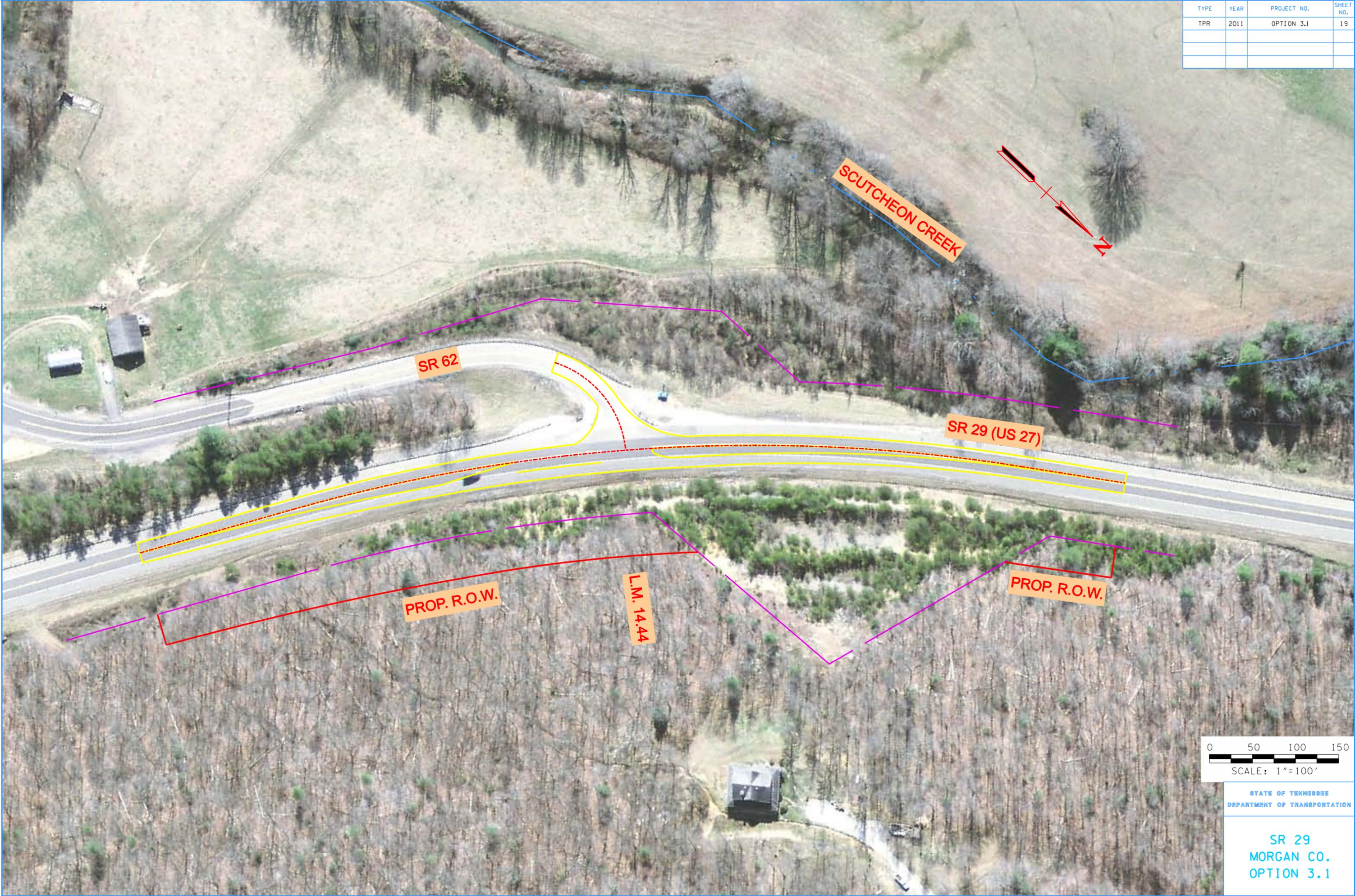
Right of way widths vary along this segment of the study ranging from sixty six (66) feet to one hundred twenty (120) feet with the majority of this segment providing one hundred twenty (120) feet. The majority of this improvement should be made within existing right of way, although additional right of way may be required in a few areas. Once survey information data is obtained for design, the need for additional right of way can be determined. The overall length of the shoulder widening improvement is 5.96 miles in length. The estimated cost to widen shoulders is \$2,868,000.

TYPE	YEAR	PROJECT NO.	SHEET NO.
TPR	2011	TYPICALS	18

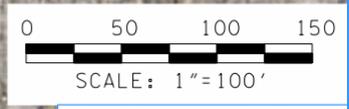
EXHIBIT 3.1 - TWO (2) LANE TYPICAL SECTION



TYPE	YEAR	PROJECT NO.	SHEET NO.
TPR	2011	OPTION 3.1	19



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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SR 29
MORGAN CO.
OPTION 3.1

3.3.2 Option 3.2 – Realign Curve on SR 29 Near Sexton Lane (LM 15.27 to LM 15.46)

This option flattens the deficient curve beginning at approximate LM 15.27 to approximate LM 15.46. This location is on SR 29 just south of Sexton Lane. The proposed radius of the curve would be extended to correspond to a sixty (60) mile per hour design speed with a posted fifty five (55) mph speed limit. This option realigns approximately 1,000 feet of SR 29 and would not involve any structure improvement. Additional right of way will be required along the northeast side of the roadway, as there is a rock cut necessary. Further review and alignment will be necessary during the design of this improvement once geologic, environmental and survey data is available. This would only require land acquisition and does not appear to include a relocation of residents. The estimated cost of this option is \$1,024,000. The plan view of this option is shown on page 21 of this report.

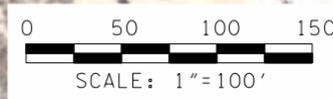
3.3.3 Option 3.3 – Realign Curve on SR 29 Near a Pond (LM 15.84 to LM 16.07)

This option will realign a sharp curve on SR 29 from approximate LM 15.84 to approximate LM 16.07. In addition to flattening the curve, the improvement will reduce a severe grade at this location. The option will shift the new alignment to the northeast and will create a fill situation. This alignment will require right of way acquisition and a residential relocation. In addition to the right of way acquisition, there is a pond that will require the potential use of a retaining wall or rock filling a portion of the pond. As the project moves into design, this will need further study to determine the optimal solution. The estimated cost of this improvement is \$1,137,000. The plan view of this option is shown on page 22 of this report.

TYPE	YEAR	PROJECT NO.	SHEET NO.
TPR	2011	OPTION 3.2	21



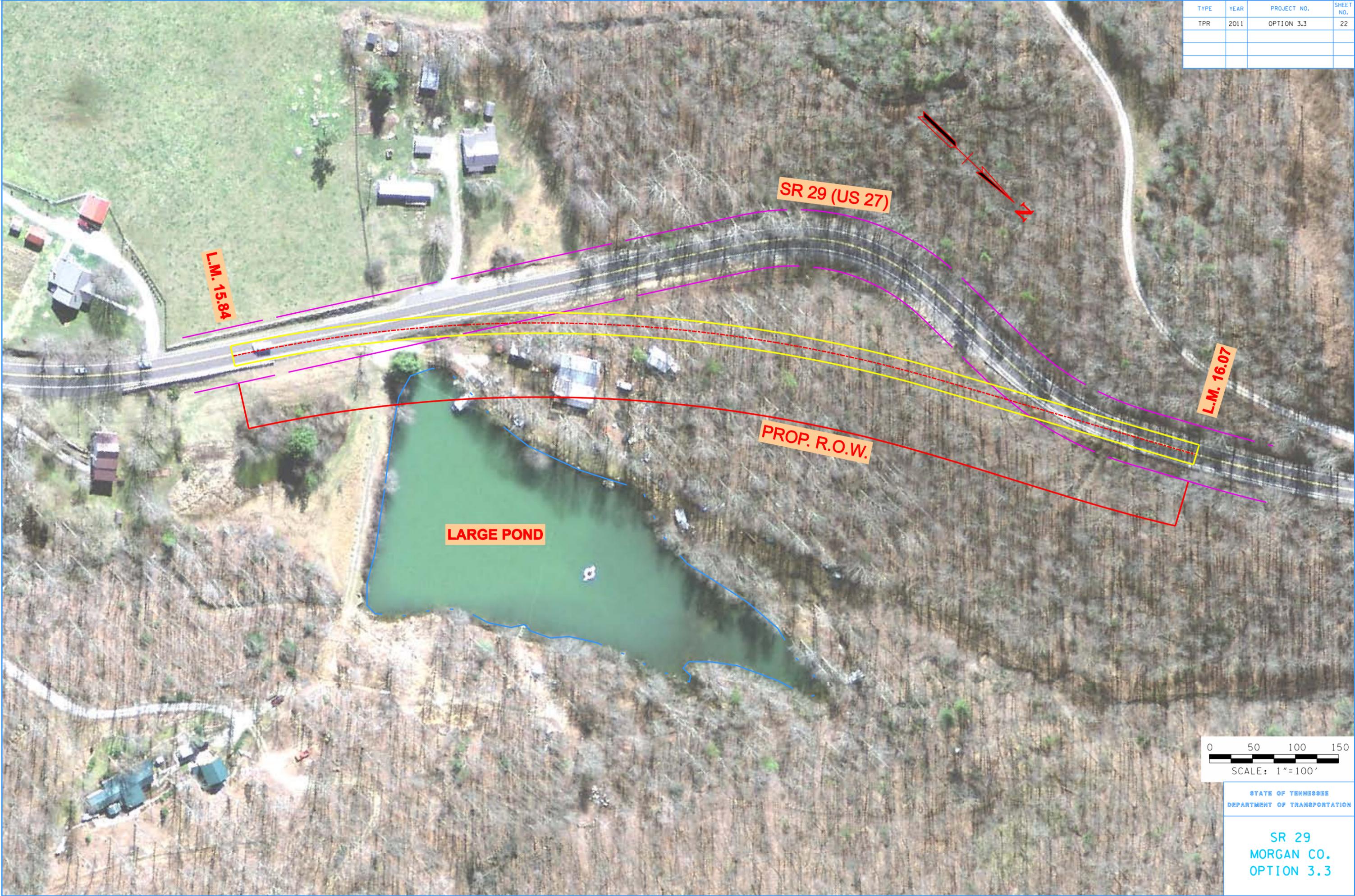
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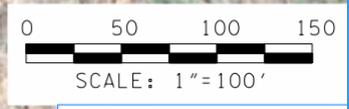
STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION

SR 29
 MORGAN CO.
 OPTION 3.2

TYPE	YEAR	PROJECT NO.	SHEET NO.
TPR	2011	OPTION 3.3	22



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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SR 29
MORGAN CO.
OPTION 3.3

3.3.4 Option 3.4– Realign Curve on SR 29 South of Andy Cooper Road (LM 16.22 to LM 16.45)

This option will realign a sharp curve on SR 29 from approximate LM 16.22 to approximate LM 16.45. This option will flatten the curve at this location and improve safety and sight distance issues for vehicles entering the roadway. This option will shift the existing roadway to the north with a moderate fill situation. The new alignment will require additional right of way on the north side of the roadway. Further review and alignment will be necessary during the design of this improvement once geologic, environmental and survey data is available. This right of way acquisition will be for land only and will not require a residential relocation. The estimated cost of this improvement is \$714,000. The plan view of this option is shown on page 24 of this report.

3.3.5 Option 3.5 – Realign Curve on SR 29 Near Morgan County Fairgrounds (LM 16.89 to LM 17.27)

This option was developed to realign a deficient horizontal and vertical curve just north of the Morgan County Fairgrounds from approximate LM 16.89 to approximate LM 17.27. In addition to the safety issues associated with the curve, there is a sight distance issue for traffic entering and exiting the fairgrounds. The curve will require additional right of way to be acquired along the east side of the existing roadway and may necessitate the acquisition of a residence. Further review and alignment will be necessary during the design of this improvement once geologic, environmental and survey data is available. There will be a need for the existing curved roadway to stay in place to provide access for residences and possibly an entrance to the fairgrounds on the west side of the roadway. An estimated cost for this improvement is approximately \$1,180,000. The plan view of this option is shown on page 25 of this report.

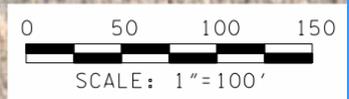
3.3.6 Option 3.6 – Realign Curves on SR 29 at Pilot Mountain Road (LM 17.63 to LM 17.86)

This option will realign deficient horizontal and vertical curves at Pilot Mountain Road and Annadel Cemetery Road from approximate LM 17.63 to approximate LM 17.86. These curves create a sight distance issue for traffic at Pilot Mountain Road. The proposed realignment will require a large fill on the west side of the roadway at Pilot Mountain Road and a moderate cut on the east side of the roadway near Annadel Cemetery Road. This option will require additional right of way and would include a residential relocation. Further study of this option will be necessary as design of the roadway progresses. The estimated cost of this improvement option is \$2,657,000. The plan view of this option is shown on page 26 of this report.

TYPE	YEAR	PROJECT NO.	SHEET NO.
TPR	2011	OPTION 3.4	24



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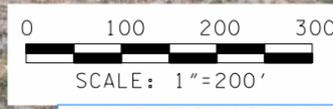
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SR 29
MORGAN CO.
OPTION 3.4

TYPE	YEAR	PROJECT NO.	SHEET NO.
TPR	2011	OPTION 3.5	25



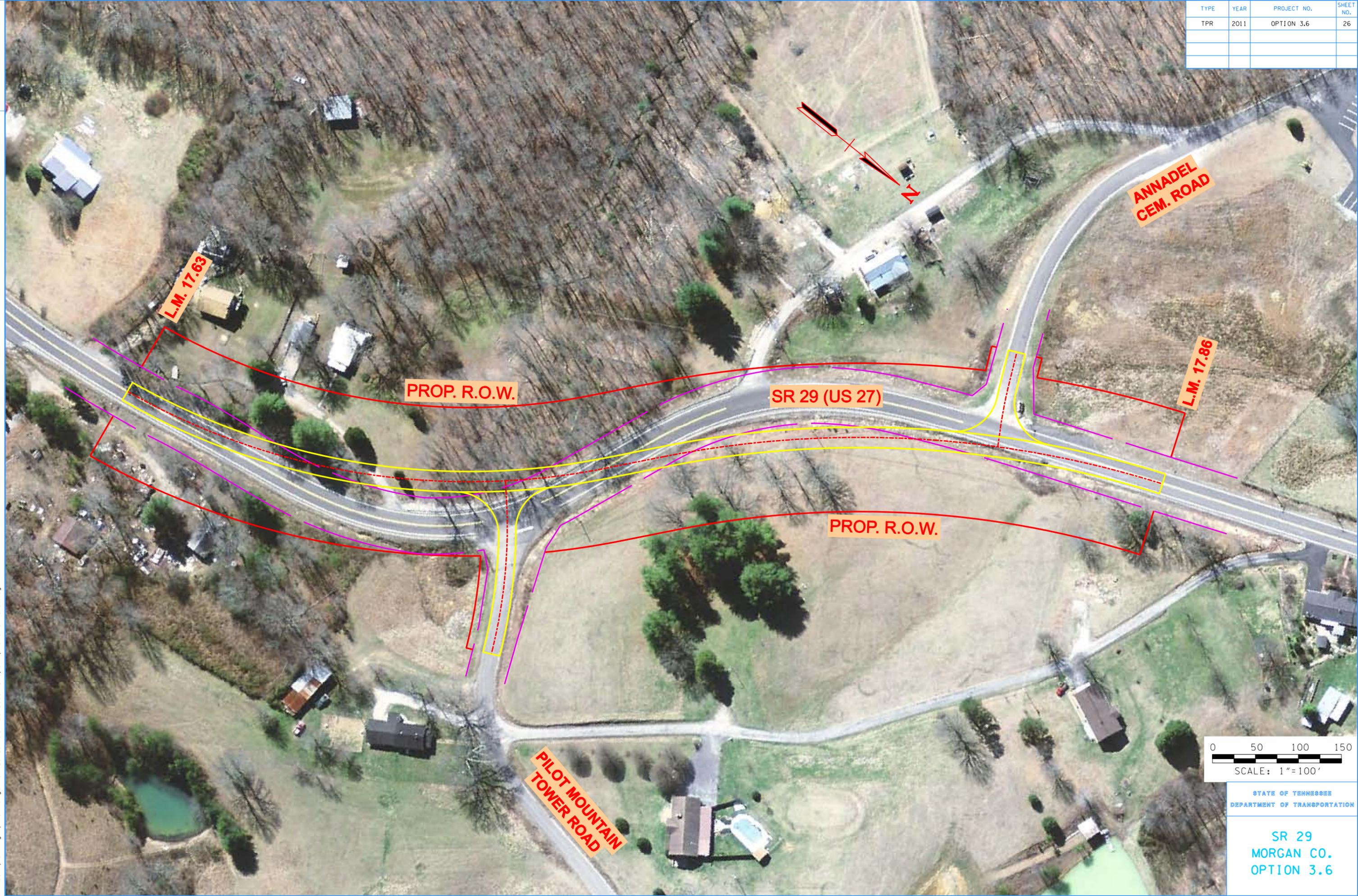
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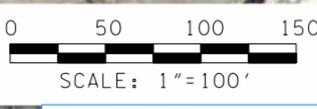
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SR 29
MORGAN CO.
OPTION 3.5

TYPE	YEAR	PROJECT NO.	SHEET NO.
TPR	2011	OPTION 3.6	26



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STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION

SR 29
 MORGAN CO.
 OPTION 3.6

3.3.7 Option 3.7 – Realign Curve on SR 29 South of Lewis Landrum Road (LM 18.79 to LM 19.02)

This option was developed to improve a horizontal and vertical curve just south of Lewis Landrum Road from approximately LM 18.79 to approximately LM 19.02. There is a sight distance issue in this area due to several drive entrances along the roadway. Realignment of this curve will necessitate the acquisition of two (2) residences for the new roadway. In addition the proposed alignment will necessitate a large cut area, thus increasing construction costs. Further review and alignment will be necessary during the design of this improvement once geologic, environmental and survey data is available. The estimated cost for this proposed option is \$3,016,000. The plan view of this option is shown on page 28 of this report.

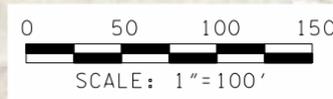
3.3.8 Option 3.8 – Realign Curve on SR 29 at Jim Goad Road (LM 19.21 to LM 19.43)

This improvement option was developed to flatten a sharp horizontal curve on SR 29 at Jim Goad Road. This location is in front of a church, a church operated school and residences which create sight distance issues for vehicles entering and exiting the roadway. There will be a need to acquire additional right of way along the west side of the roadway, although there is no residential relocation or home acquisition necessary. Further review and alignment will be necessary during the design of this improvement once geologic, environmental and survey data is available. The estimated cost for this proposed option is \$547,000. The plan view of this option is shown on page 29 of this report.

TYPE	YEAR	PROJECT NO.	SHEET NO.
TPR	2011	OPTION 3.7	28



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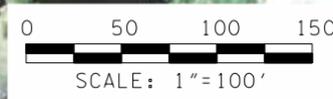
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SR 29
MORGAN CO.
OPTION 3.7

TYPE	YEAR	PROJECT NO.	SHEET NO.
TPR	2011	OPTION 3.8	29



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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SR 29
MORGAN CO.
OPTION 3.8

3.3.9 Option 3.9 – Add Truck Climbing Lane and Flatten Curve Between Grady Langley Road and Andy Cooper Road (LM 15.81 to LM 16.57)

This improvement option will add a truck climbing lane on SR 29 for northbound traffic between Grady Langley Road and Andy Cooper Road. The transition for the extra lane would begin at LM 15.81 and would transition back to the existing two (2) lane roadway at LM 16.57 for a distance of approximately 0.76 miles. At this location, there is a long vertical grade that makes it difficult for truck traffic to maintain adequate speeds and can cause an unsafe situation for vehicles desiring to pass on the existing two (2) lane roadway. The addition of this truck lane would maintain traffic flow, improve mobility and provide a safer passing opportunity along SR 29.

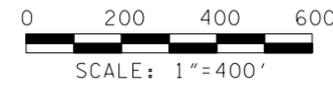
This option includes the flattening of curves that are already mentioned in the report and are identified as Option 4.2 and Option 4.3. The estimated cost for this option includes the cost to flatten these two (2) curves as well. This improvement will require additional acquisition of right of way and would include the need to acquire a home and relocate the residents. All of the needed right of way will be on the east side of the existing roadway. Further review and alignment will be necessary during the design of this improvement once geologic, environmental and survey data is available. The estimated cost of this proposed improvement is \$2,355,000. The proposed plans layout for this improvement is shown on page 31.

3.3.10 Option 3.10 – Add Truck Climbing Lane and Flatten Curves South of Lewis Landrum Road to North of Jim Goad Road (LM 18.78 to LM 19.51)

This improvement option proposes to add a truck climbing lane on SR 29 for southbound traffic from south of Lewis Landrum Road to just north of Jim Goad Road. The transition for the extra lane would begin at LM 18.78 and would transition back to the existing two (2) lane roadway at LM 19.51 for a distance of approximately 0.73 miles. At this location, there is a long vertical grade that makes it difficult for truck traffic to maintain adequate speeds and can cause an unsafe situation for vehicles desiring to pass on the existing two (2) lane roadway. Based on information obtained from USGS Quad Maps, the steepest grade at this location is approximately 2.6% for a distance of 1800 feet. Based on comments and observations at the field review, this improvement option was discussed for inclusion in the report. Further review and alignment will be necessary during the design of this improvement once geologic, environmental and survey data is available.

This option includes the flattening of curves that are already mentioned in the report and are identified as Option 4.6 and Option 4.7. The estimated cost for this option includes the cost to flatten these two (2) curves as well. This improvement will require additional acquisition of right of way and would include the need to acquire two (2) homes and relocate the residents. All of the needed right of way will be on the east side of the existing roadway. The estimated cost of this proposed improvement is \$4,217,000. The proposed plans layout for this improvement is shown on page 32.

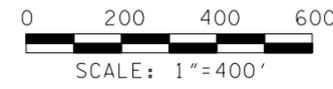
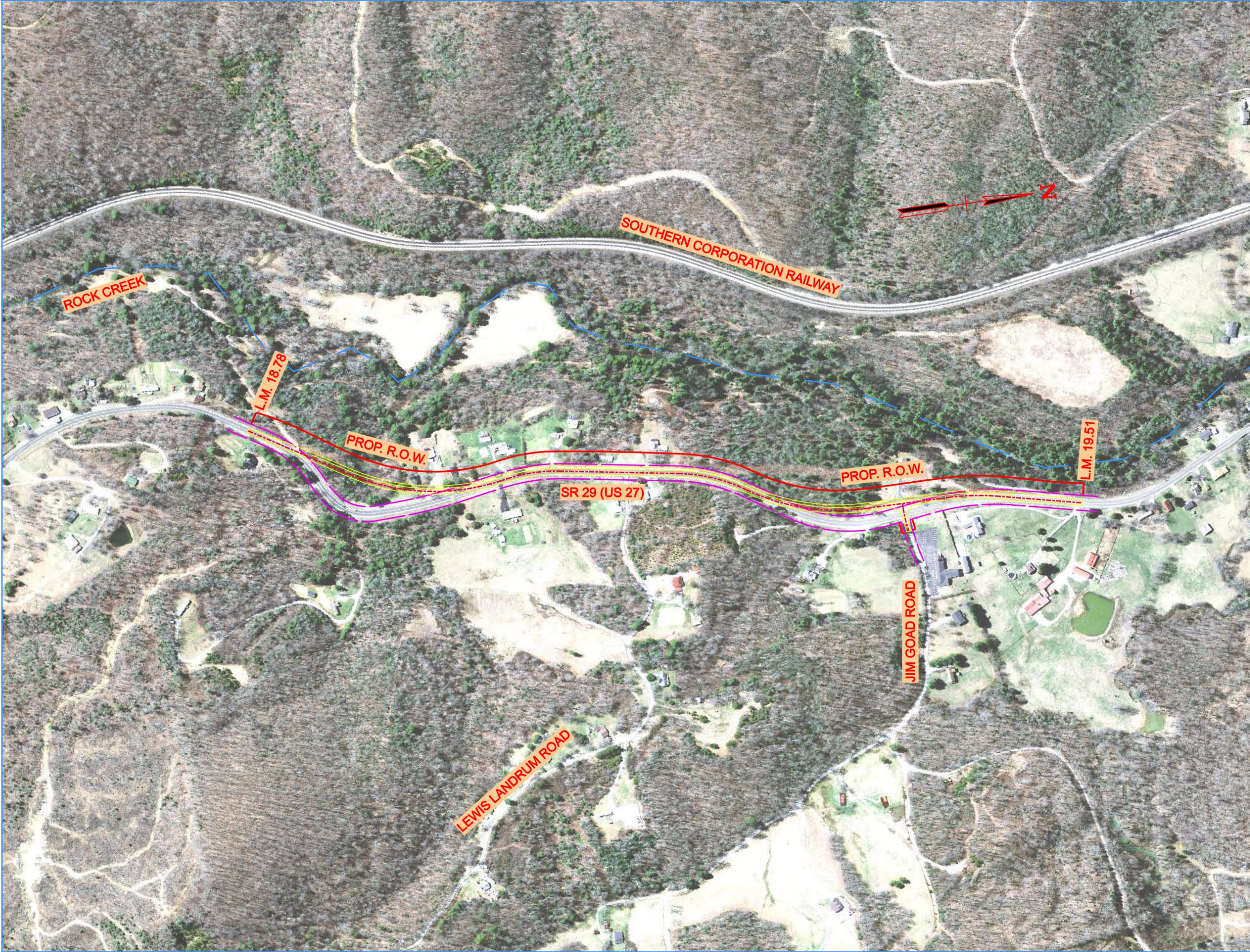
TYPE	YEAR	PROJECT NO.	SHEET NO.
TPR	2011	OPTION 3.9	31



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION

SR 29
 MORGAN CO.
 OPTION 3.9

TYPE	YEAR	PROJECT NO.	SHEET NO.
TPR	2011	OPTION 3.10	32



STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION

SR 29
 MORGAN CO.
 OPTION 3.10

3.4 Recommended Priority of Improvements

*High
Priority*

Option 3.1 – Left Turn Lane at SR 62 Intersection (LM 14.44) and Widen Shoulders from LM 14.90 to LM 20.40

This option provides safety and operational benefits to the intersection of SR 29 and SR 62 where several crashes occurred near this intersection. The shoulder widening for the remainder of the route being studied will improve roadway conditions and would expect to reduce the number of crashes due to lane departures. The option estimate is \$ 3,226,000.

Option 3.8– Realign Curve at Jim Goad Road (LM 19.21 to LM 19.43)

This option will realign deficient a horizontal curve along this section of the route. At this location is a church and church owned school which creates sight distance issues for vehicles entering and exiting the roadway. The option estimate is \$547,000.

Option 3.3 – Realign Curve on SR 29 Near a Pond (LM 15.84 to LM 16.07)

Due to the vertical and horizontal curves at this location and the number of crashes, this improvement would expect to improve safety. The option estimate is \$1,137,000.

Option 3.9 – Truck Climbing Lane-Grady Langley Road to Andy Cooper Road

These improvements will improve traffic operations and the experienced level of service by travelers along the route. By providing a safe location for the passing of slower vehicles, a decrease in head on crashes during passing would be expected. The option estimate is \$2,355,000.

Option 3.10 – Truck Climbing Lane-Lewis Landrum Road to Jim Goad Road

These improvements will improve traffic operations and the experienced level of service by travelers along the route. By providing a safe location for the passing of slower vehicles, a decrease in head on crashes during passing would be expected. The option estimate is \$4,217,000.

Option 3.5 – Realign Curve Near Morgan County Fairgrounds (LM 16.89 to LM 17.27)

This option will realign deficient vertical and horizontal curves along this section of the route. In addition, there is a sight distance issue for traffic entering or exiting the county fairgrounds. The option estimate is \$1,180,000.

Option 3.4– Realign Curve South of Andy Cooper Road (LM 16.22 to LM 16.45)

The roadway improvement at this location would provide an additional margin of safety due to improved vertical and horizontal alignments. The estimated cost of this improvement is \$714,000.



Option 3.7 – Realign Curve South of Lewis Landrum Road (LM 18.79 to LM 19.02)

This option will realign deficient vertical and horizontal curves along this section of the route. In addition, there is a sight distance issue due to the large number of drive entrances. The option estimate is \$3,016,000.

Option 3.6 – Realign Curve at Pilot Mountain Road (LM 17.63 to LM 17.86)

This option will realign deficient vertical and horizontal curves along this section of the route. In addition, there is a sight distance issue for traffic at Pilot Mountain Road. The option estimate is \$2,657,000.

Option 2 - Five (5) Lane Rural Section to Emory River (LM 13.61) / Four (4) Lane Divided Section to South of Jim Goad Road (LM 19.43) / Five (5) Lane Rural Section to LM 21.94 / Three (3) Lane Urban Section to SR 329 Intersection

The improvement of the roadway section throughout the length of the study area corridor would provide increased safety along the route as well as provide safe travel for bicyclists. Due to the extensive costs of roadway and bridge widening, this option is viewed as important, but at a lesser value than the localized spot improvements.

Low

Priority

The option estimate is \$56,028,000.

4.0 ASSESSMENT OF OPTIONS

The Tennessee Department of Transportation (TDOT) 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 discussed in this report.

4.1 - Guiding Principle #1 - Preserve and Manage the Existing Transportation System

Addressing the safety and operational needs of SR 29 will improve the overall transportation system in the region by providing the infrastructure to adequately address the movement of people and goods. This improved north-south corridor will enhance the overall transportation system in the region and provide a more efficient and safer route for roadway users.

4.2 - Guiding Principle #2 - Move a Growing, Diverse, and Active Population

The improvement options discussed in this report will improve operations and safety, as well as benefitting north-south mobility in Scott, Morgan, Anderson and Fentress Counties. An improved SR 29 will benefit the large percentages of freight movements as well improving the ability of emergency vehicles and passenger cars to pass slower moving vehicles along the route.

The corridor is important to the surrounding communities and provides regional mobility and economic opportunities for both residents and industry. Various enhancements are needed to ensure that the mobility needs of the region are served safely. A system of localized or corridor improvements can help achieve this goal.

4.3 - Guiding Principle #3 - Support the State's Economy

Morgan County's industrial and commercial businesses require adequate transportation facilities to operate efficiently. Without improvements to the transportation infrastructure, all counties within this region will find it difficult to compete in attracting industry to the area or in keeping the current industries from looking elsewhere to relocate. Enhancing the corridor with the options discussed in this study will ultimately enhance the corridor for all users.

4.4 - Guiding Principle #4 - Maximize Safety and Security

All options considered, other than the No Build, would meet or exceed current design standards and provide for safer operations. One of the primary goals of each build option is to improve the system and address deficiencies or safety related issues. Creating a safer transportation system is aligned with this guiding principle and further promotes mobility and economic opportunities as desired by the region.

4.5 - Guiding Principle #5 - Build Partnerships for Livable Communities

TDOT's Long Range Transportation Plan promotes projects that are supported by the local community. The East Tennessee North Rural Planning Organization requested this TPR because of the need for an improved north-south corridor to improve access to this region. Officials of Wartburg, as well as representatives of Morgan County are in support of the corridor improvements. As this project advances to the environmental documentation phase, the public involvement process will continue as required by provisions of the National Environmental Policy Act (NEPA).

4.6 - Guiding Principle #6 - Promote Stewardship of the Environment

All of the options take stewardship of the environment into consideration. Further environmental studies will be required when decisions are made to improve the corridor and funding is secured for the selected improvement option. Several areas within the study area will be studied for avoidance or minimizing the impacts such improvements may have. These areas include churches, scenic waterways, wetlands, potential Section 4(f) properties, historic properties and railroad impacts.

4.7 - Guiding Principle #7 - Emphasize Financial Responsibility

It is important to improve the existing infrastructure within the State of Tennessee as necessary while minimizing costs to the taxpayers. Construction cost estimates were prepared for each option considered. The recommended localized spot improvement options offer reduced cost solutions to the existing operational and safety issues. Some savings associated with a potential reduction in safety and travel time as well as revenue generated by potential economic development may offset many of the improvement costs.

5.0 SUMMARY

This study was prepared at the request of the East Tennessee North Rural Planning Organization (RPO). The RPO considers this segment to be a major north-south corridor between Kentucky and I-40. The Tennessee Department of Transportation's (TDOT) Long Range Planning Division conducted a Preliminary Purpose and Needs Study for SR 29 from SR 62 in Wartburg to SR 52 in Scott County. The study recommended that further review be performed for the segment of SR 29 from SR 62 in Wartburg to SR 62 north of Wartburg in Morgan County. This was a 3.38 mile segment that was originally requested for a TPR to be performed. In November 2009, TDOT requested that an additional 8.55 miles of SR 29 from SR 62 in Morgan County to SR 329 in Sunbright, was added to the study corridor. The additional mileage was added based on a portion of SR 29 currently being under construction and safety

issues on the additional 8.85 miles. The safety issues identified on this segment were narrow shoulders and deficient vertical and horizontal curves. The calculated crash rate for SR 29 from SR 62 in Wartburg to SR 329 in Sunbright is 1.748 and the statewide average crash rate is 1.656.

A stakeholders meeting and field review was held shortly after the decision to revise the termini. The meeting was held on Tuesday, December 1, 2009 to identify safety concerns and identify some options to address such concerns. In addition, it gave opportunity for local representation to provide input to future development along the study corridor. Existing operational and geometric conditions have been reviewed and capacity analyses for the future traffic projections have been conducted which led to the development of several conceptual improvements which independently or in combination, may improve safety and operational conditions. These improvements address the purpose, needs and goals which have been set to improve the SR 29 corridor under review.

Criteria for selecting route options should incorporate the purpose, need, goals and guiding principles listed within various sections of this report. The roadway options are summarized as follows:

- **Option 1 - No Build:** The No Build option assumes no modifications or improvements will be made over the planning horizon to add capacity. Analysis of projected traffic volumes support this. Routine maintenance related activities as well as scheduled resurfacing, signing, and possible safety projects may occur. The option however, does not support the project's stated Purpose and Need for providing a transportation facility to enhance mobility, support economic development and improve safety.
- **Option 2 - Five (5) Lane Rural / Four (4) Lane Divided Section:** This option would utilize the existing roadway where possible and extend the existing five (5) lane rural section that is currently under construction in Wartburg at SR 62. The five (5) lane rural section will extend to just north of the structure over the Emory River at LM 13.61 and transition to a four (4) lane divided section to south of Jim Goad Road. At this point, the roadway would transition to a five (5) lane rural section to approximately LM 21.94. From LM 21.94, the roadway would transition to a three (3) lane urban section to the end of the study area at the intersection with SR 329 at LM 22.99 in Sunbright.

In addition, this option recommends widening the existing structures over the Emory River and over the Norfolk-Southern Railroad Lines. The right of way necessary for this improvement will vary, but additional right of way will be needed along the majority of the route and several home acquisitions and relocations will be required. In areas where relocations and environmental features are located there will need to be further studies performed as the project progresses.

- **Option 3 - Spot Improvements:** For this option, there are ten (10) individual spot improvements recommended. Existing SR 29, especially north of the SR 62 intersection in Morgan County, has many horizontal and vertical curves that are safety issues. Seven (7) of these improvements recommend the realignment of these deficient areas by flattening the curves or increasing the radius of the curve. Two (2) improvements recommend installing truck climbing lanes at locations that contain long stretches of increasing elevation. There is a relatively large percentage of truck traffic on the route and the addition of these lanes will increase safety and improve congestion and mobility along the route. Another option will provide a left turn lane at the intersection with SR 62

Transportation Planning Report
 State Route 29 From SR 62 in Wartburg to SR 329 in Sunbright, Morgan County, TN

north of Wartburg. In addition, this option will include shoulder widening improvements for the study corridor from north of the SR 62 intersection to the intersection with SR 329 in Sunbright. Existing right of way widths vary in this area and additional right of way may not be necessary for the shoulder widening. Each of these spot improvement options can be implemented independently or in combination as an overall improvement option.

In conclusion, future improvements to the existing SR 29 corridor are necessary to address the purpose and need. The “No Build” option does not address the purpose and need discussed in this report. Some combination of these improvements is recommended to provide safer operations and enhance mobility for the roadway users, as well as encourage economic development within Morgan County and the surrounding region of Tennessee. Although it may not be feasible at this time to construct all of the recommended improvements, they could be built in increments or phases to produce the desired benefits.

Table 5.1 – Cost Summary Table

OPTION	ROW	UTILITY	CONSTRUCTION	TOTAL
Option 1-No Build	\$0	\$0	\$0	\$0
Option 2-Five (5) Lane Rural/Four (4) Lane Divided Section	\$16,895,000	\$5,760,000	\$33,373,000	\$56,028,000
Option 3.1-Turn Lane at SR62 Intersection/Widen Shoulders	\$11,000	\$274,000	\$2,941,000	\$3,226,000
Option 3.2-Realign Curve Near Sexton Lane	\$30,000	\$85,000	\$909,000	\$1,024,000
Option 3.3-Realign Curve Near Pond	\$310,000	\$110,000	\$717,000	\$1,137,000
Option 3.4-Realign Curve South of Andy Cooper Road	\$78,000	\$140,000	\$496,000	\$714,000
Option 3.5-Realign Curve Near Morgan County Fairgrounds	\$370,000	\$195,000	\$615,000	\$1,180,000
Option 3.6-Realign Curve at Pilot Mountain Road	\$91,000	\$145,000	\$2,421,000	\$2,657,000
Option 3.7-Realign Curve South of Lewis Landrum Road	\$583,000	\$110,000	\$2,323,000	\$3,016,000
Option 3.8-Realign Curve at Jim Goad Road	\$44,000	\$125,000	\$378,000	\$547,000
Option 3.9-Truck Climbing Lane-Grady Langley Road to Andy Cooper Road	\$437,000	\$370,000	\$1,548,000	\$2,355,000
Option 3.10-Truck Climbing Lane-Lewis Landrum Road to Jim Goad Road	\$424,000	\$365,000	\$3,428,000	\$4,217,000
Option 3 Totals	\$2,378,000	\$1,919,000	\$15,776,000	\$20,073,000