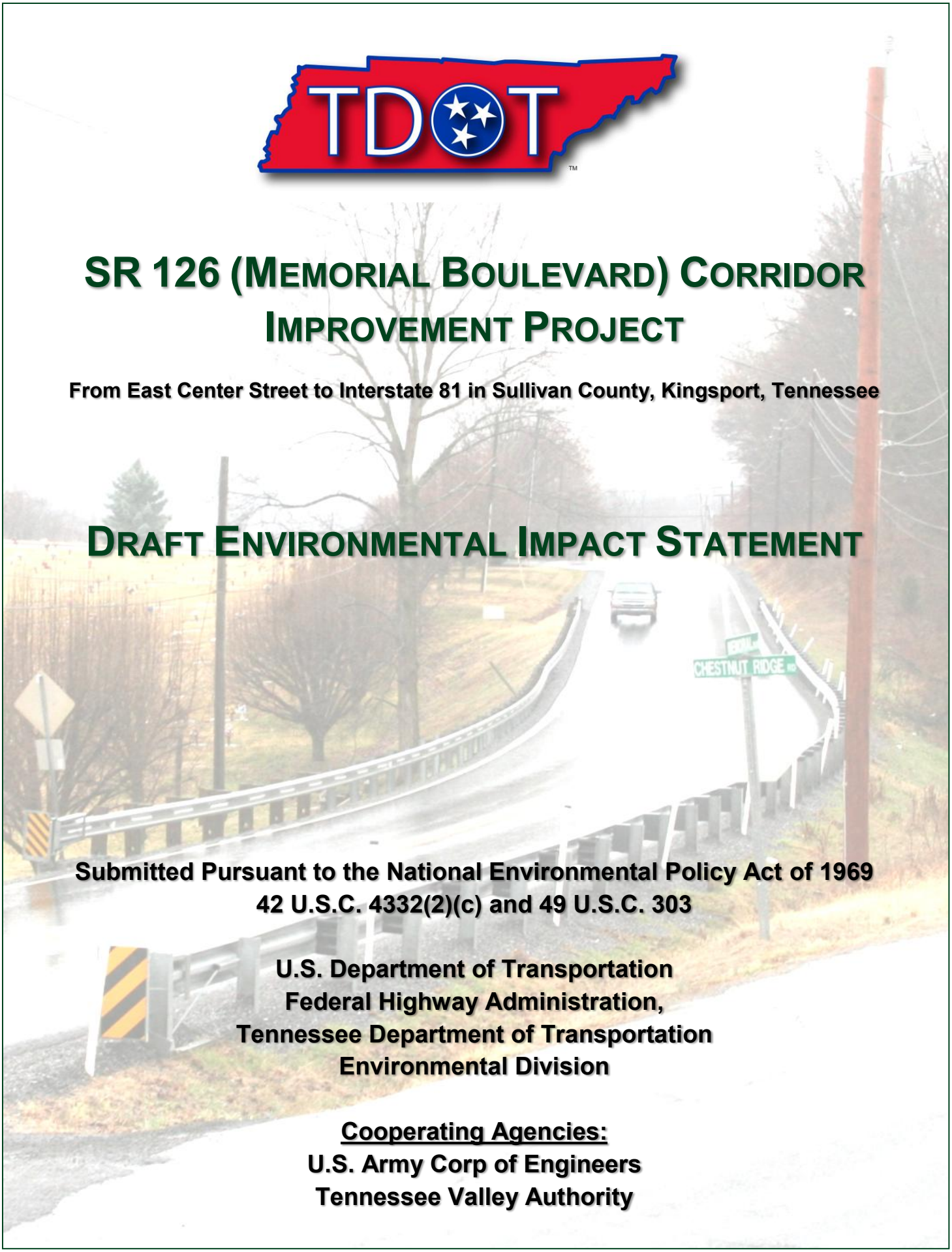


SR 126 (MEMORIAL BOULEVARD) CORRIDOR IMPROVEMENT PROJECT

From East Center Street to Interstate 81 in Sullivan County, Kingsport, Tennessee

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Submitted Pursuant to the National Environmental Policy Act of 1969
42 U.S.C. 4332(2)(c) and 49 U.S.C. 303

U.S. Department of Transportation
Federal Highway Administration,
Tennessee Department of Transportation
Environmental Division

Cooperating Agencies:
U.S. Army Corp of Engineers
Tennessee Valley Authority

SR 126 (MEMORIAL BOULEVARD) CORRIDOR IMPROVEMENT PROJECT

From East Center Street to Interstate 81 in Sullivan County, Kingsport, Tennessee

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Submitted Pursuant to the National Environmental Policy Act of 1969
42 U.S.C. 4332(2)(c) and 49 U.S.C. 303

U.S. Department of Transportation
Federal Highway Administration,
Tennessee Department of Transportation
Environmental Division

Cooperating Agencies:
U.S. Army Corp of Engineers
Tennessee Valley Authority

The State Route 126 (Memorial Boulevard) improvement project is a joint effort between the Tennessee Department of Transportation (TDOT) and the Federal Highway Administration (FHWA). The limits of the 8.4 mile long project extend from East Center Street, within the City of Kingsport's City Limits, east to Interstate 81 (I-81) in Sullivan County, Tennessee. Two Build Alternatives and the No-Build Alternative are currently under consideration for this project.

1/5/2012
Date

Pamela Kordenbrock
Federal Highway Administration, TN Division
Division Administrator

1/9/2012
Date

Suzanne Herron
Tennessee Department of Transportation

For additional information concerning this document contact:

Mr. Charles J. O'Neill
Planning and Program Management
Team Leader
Federal Highway Administration
Tennessee Division Office
404 BNA Drive Suite 508
Nashville, TN 37217
(615) 781-5770

Ms. Suzanne Herron
Director
Environmental Division
Tennessee Department of Transportation
505 Deaderick Street, Suite 900
Nashville,TN 37243
(615) 741-2612

This page intentionally left blank

Summary

SUMMARY

S.1 GENERAL PROJECT DESCRIPTION

The Tennessee Department of Transportation (TDOT), in cooperation with the Federal Highway Administration (FHWA), is proposing to improve State Route (SR) 126. The limits of the 8.4 mile long project extend from East Center Street, within the City of Kingsport's City Limits, east to Interstate 81 (I-81) in Sullivan County, Tennessee. SR 126 is also known as Memorial Boulevard within the study limits.

SR 126 (Memorial Boulevard) is primarily a two-travel lane facility (one travel lane in each direction) throughout the study corridor. Each travel lane is approximately eleven feet wide. The existing right-of-way varies from approximately sixty feet to three hundred feet wide. The speed limit varies from thirty-five to fifty miles per hour. Many sharp curves and steep grades along the route are signed with supplemental speed plaques advising lower safe travel speeds than the posted speed limit. Many roadside hazards are located in close proximity to the travel lanes. Narrow shoulders are present along the majority of the route. Sidewalks are present along approximately 0.1 mile (1%) of the 8.4 mile long corridor. Curbs are located sporadically along the route, with the majority of the corridor having roadside ditches.

Two Build Alternatives and the No-Build Alternative are currently under consideration for this project. The Build Alternatives improve SR 126 (Memorial Boulevard) to a four-lane facility (two travel lanes in each direction) within the commercial and residential areas of the western half of the study corridor. The eastern half of the study corridor, which is rural in nature, will remain a two-travel lane facility. Improved shoulders will be provided along the entire corridor and sidewalks will be extended to the majority of the commercial and residential areas.

S.2 PURPOSE AND NEED OF THE PROPOSED ACTION

The purpose of the project is to provide a safe, efficient route for local traffic between the City of Kingsport and I-81. Improvements should be sensitive to the context of the different land uses along the corridor. Specifically, the improvements along the western half of the project, which is more commercial and residential, should provide improved access to adjacent businesses and homes and improved pedestrian and bicycle connectivity. The improvements along the eastern half of the project should complement the rural nature of the area.

The needs of the project can be summarized as follows:

- The safety of the route needs to be improved. The crash rates observed along the entire SR 126 (Memorial Boulevard) study corridor exceeded the statewide average crash rates for similar roadway segments.
- The width of the roadway generally needs to be improved. Most of the existing roadway includes 11-foot wide lanes with narrow shoulders.
- The width of the shoulders needs to be improved. The shoulders along the route are typically no wider than 2 feet and often not paved. The narrow shoulders, along with other existing geometric deficiencies, contribute to the high crash rates and create a less than desirable route for pedestrians and bicyclists.
- The geometry of the roadway needs to be improved. Numerous horizontal and vertical curves along the route are inadequate for the posted speed limit.
- Improved access management is needed along the commercial areas of the route. The public cited access onto SR 126 (Memorial Boulevard) as a major problem. Difficulty entering or exiting business parking lots was identified as a significant problem because of uncontrolled access to businesses along the roadway. Many of the access points are located near or within substandard curves or hills that limit sight distance for drivers attempting to turn into or out of the businesses.
- Improved response time for emergency vehicles is needed. With improvements, emergency vehicles would be able to respond more efficiently to emergencies within and near the project corridor. Wider shoulders would enable motorists to pull over and allow the emergency vehicles to pass through to their intended destinations. Current conditions along SR 126 (Memorial Boulevard) do not feature many areas for vehicles to pull over.
- Improved access for mail delivery is needed. Current geometric conditions along SR 126 (Memorial Boulevard) create bottlenecks during mail delivery. Wider shoulders would enable delivery vehicles to depart the travel lane and motorists pass more safely.
- Improved access for school busses is needed. Current geometric conditions along SR 126 (Memorial Boulevard) make it difficult for school busses to make turns. Wider paved roadway widths would improve accessibility for the school busses along the corridor.
- Improved traffic operations are needed along the route.

S.3 ALTERNATIVES

In selecting reasonable alternatives to meet the purpose and need of the project, TDOT consulted with local, state and federal officials and agencies, identified environmentally sensitive areas and held several public involvement meetings in the project corridor. The SR 126 (Memorial Boulevard) project was the initial Context Sensitive Solutions (CSS) Project for

Tennessee. The CSS Process included a Community Resource Team (CRT) that assisted with the development of alternatives. The No-Build and two Build Alternatives are currently under consideration for this project. The final selection of the preferred alternative will not be made until after the impacts of the No-Build and Build Alternatives, comments on the Draft EIS, and the comments from the NEPA Public Hearing have been fully evaluated.

Both of the Build Alternatives were recommended by the Citizens Resource Team (CRT).

S.3.1 No-Build

The No-Build Alternative would leave SR 126 (Memorial Boulevard) between East Center Street and I-81 in its current configuration with no improvements to the roadway other than routine maintenance.

S.3.2 Build Alternative A

Several different typical cross sections are proposed along the SR 126 (Memorial Boulevard) corridor. Build Alternative A improves SR 126 (Memorial Boulevard) to a four-lane facility (two travel lanes in each direction) within the commercial and residential areas of the western half of the study corridor. The eastern half of the study corridor, which is rural in nature, will remain a two-travel lane facility. Improved shoulders will be provided along the entire corridor and sidewalks will be extended to 54% of the corridor within the commercial and residential areas. The wider shoulders and additional sidewalks will promote bicycle and pedestrian usage of the facility. Deficient horizontal and vertical curves will be improved. Additional right-of-way will be required along the entire corridor to accommodate the proposed improvements. **Chapter 2** describes the proposed roadway cross-sections in detail.

The proposed alignment of Alternative A generally follows the existing alignment. The proposed alignment shifts from side to side to minimize impacts, reduce earthwork volumes, simplify constructability, and improve the curvature of the roadway. Despite the effort to minimize impacts, considerable additional right-of-way will be required and many residences and businesses will need to be relocated. Numerous gravesites will also need to be relocated.

In addition to the SR 126 (Memorial Boulevard) roadway typical cross section and alignment improvements, several side road intersection approaches to SR 126 (Memorial Boulevard) are improved. Many of these minor connections intersect SR 126 (Memorial Boulevard) at skewed angles. Realigning side road approaches to intersect to as close to 90 degrees as possible has proven visibility and safety benefits.

Additionally, several intersections are proposed to be closed along SR 126 (Memorial Boulevard). These minor connections to SR 126 (Memorial Boulevard) will be rerouted to connect via improved intersections on neighboring roads. Closing these intersections will improve access control and safety along the route due to the reduction of conflict points.

S.3.3 Build Alternative B

Alternative B is a refinement of Alternative A. Alternative B utilizes the same proposed typical roadway cross sections as Alternative A, but the length of the four-travel lane section is reduced by approximately ½ of a mile. As with Alternative A, improved shoulders will be provided along the entire corridor. Sidewalks will be extended to 59% of the corridor within the commercial and

residential areas. The wider shoulders and additional sidewalks will promote bicycle and pedestrian usage of the facility. Deficient horizontal and vertical curves will be improved. Retaining walls will be utilized with Alternative B in the vicinity of historic Yancey's Tavern and East Lawn Memorial Gardens Cemetery. These modifications were made to minimize impacts to Yancey's Tavern and the East Lawn Memorial Gardens Cemetery located on opposing sides of SR 126 (Memorial Boulevard). It should be noted that numerous gravesites will still need to be relocated with Alternative B. Additional changes incorporated into Alternative B include minor modifications of the proposed centerline to minimize excavation and fill impacts and improve maintenance of traffic during construction. Alternative B subsequently requires less additional right-of-way and impacts fewer residences and businesses than Alternative A. **Chapter 2** describes the proposed roadway cross-sections in detail.

As with Alternative A, in addition to the SR 126 (Memorial Boulevard) roadway typical cross section and alignment improvements, several side road intersection approaches to SR 126 (Memorial Boulevard) are improved or closed. These side road modifications improve the safety and access control along SR 126 (Memorial Boulevard). The side road approaches modified in Alternative B are the same as those in Alternative A. Both of the Build Alternatives were recommended by the Citizens Resource Team (CRT).

S.4 ENVIRONMENTAL IMPACTS

S.4.1 Land Use Impacts

Land use will change as land currently in agricultural, residential, commercial, open farmland, or other uses, is converted to highway right-of-way. Secondary development resulting from the proposed project is likely to occur in the surrounding neighborhoods. Numerous gravesites will be impacted by the Build Alternatives.

The indirect and cumulative impacts to land use involves the conversion of land from agricultural use and open space to residential, and commercial uses, as well as converting commercial uses to residential uses. This conversion is already occurring at various locations in the project area. Based on a review of land use plans prepared by the surrounding communities, as the population rate increases and job opportunities increase, it is likely that the need for more residential and commercial development will continue for decades. These land use changes will result in the loss of wildlife habitat, wetlands, forested areas, farmland, as well as impact the floodplains of the surrounding rivers and streams. The number of acres of potential loss cannot be accurately determined at this time.

S.4.2 Relocation Impacts

Alternative A will result in an estimated two hundred and forty-one (241) residential relocations, forty-three (43) business displacements, and one (1) non-profit displacement. Alternative B will result in one hundred and sixty-two (162) residential relocations, thirty (30) business displacements, and one (1) non-profit displacement.

A study of the real estate market in the project area indicates a market not capable of supporting the one hundred and sixty-two (162) to two hundred and forty-one (241) residential displacements within the immediate project area. Expanding the study beyond the immediate project area reveals a market that can support this large number of relocations, but not easily. It

will be difficult to adequately address the varying needs of all those displaced by this project. Numerous, substantial Last Resort Housing Payments could be expected.

A study of the real estate market in the project area reveals that it is unlikely that the thirty (30) to forty-three (43) business displacees can relocate in the immediate project area. Successful relocation will require many of the businesses to expand their search area beyond the immediate project area.

This project is expected to cause one (1) non-profit displacement (a Kingsport volunteer fire department station) with either alternate. Due to the nature of the non-profit displacement, it will need to relocate in close proximity to its current location. Based on a study of the local real estate market, it is believed that suitable replacement sites do exist, but not in great numbers. This is complicated by the large number of businesses displaced by the project.

S.4.3 Economic Impacts

There will be long-term adverse economic impacts due to the construction of Alternative A or B. Permanent loss of tax revenue would result if a business closes or moves out of the project area due to the thirty (30) (Alternative B) or forty-three (43) (Alternative A) business displacements. The associated residential displacements of one hundred sixty-two (162) for Alternative B and two hundred forty-one (241) for Alternative A will also impact tax revenues.

S.4.4 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, February 11, 1994, requires that the evaluation of federal actions identify and address disproportionately high and adverse human health and environmental impacts on low income and minority populations. The evaluation of the Build Alternatives has revealed no concentration of low-income or minority populations along the corridor. The Build Alternatives will not change the basic social arrangement or character of the project area and would not create a barrier to social interaction.

S.4.5 Hazardous Materials

A number of potential hazardous material sites have been identified within the proposed right-of-way. Additional studies are recommended at three (3) sites within the proposed right-of-way to determine the contents and extent of materials and the specific impacts they may possess to the surrounding community. In the event that hazardous substances or wastes are encountered within the proposed right-of-way of the Build Alternatives, their disposition shall be subject to the applicable sections of the Federal Resources Conservation and Recovery Act (RCRA), as amended, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended, and the Tennessee Hazardous Waste Management Act of 1983.

The Build Alternatives will involve the removal of buildings and has the potential for encountering friable asbestos. Pursuant to the TDOT Standard Specifications for Road and Bridge Construction (March 2006), the construction contractor must notify the Tennessee Department of Environment and Conservation (TDEC) prior to the demolition of any building in accordance with TDEC policy and regulations. All structures containing friable asbestos must be demolished in accordance with these regulations and policies.

S.4.6 Protected Species

The proposed project is not likely to affect any federally listed, threatened, or endangered species or critical habitat. Although the Indiana Bat is not known to occur in the project area, at the request of the United States Fish and Wildlife Service (USFWS), a bat survey was conducted. Mist nets and field reviews were conducted in the project impact area. No Indiana Bats were located. A copy of the *Indiana Bat (Myotis sodalis) Mist Net Survey*, dated October 2011, is on file at the TDOT Environmental Division Office in Nashville, TN. Based on the best information available at this time, the requirements of section 7 of the Endangered Species Act of 1973, as amended, are fulfilled. Correspondence with the USFWS can be found in **Appendix C**.

S.4.7 Historic Impacts

The goal of **Section 106** is to identify historic properties potentially affected by a Federal undertaking, assess the undertakings effects, and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties.

Two properties protected under Section 106 of the National Historic Preservation Act of 1966 are located in the project area. The Shipley-Jarvis House is eligible for listing in the National Register of Historic Places (NRHP). The house is located on the south side of SR 126 (Memorial Boulevard) near the beginning of the project. No land will be acquired from this site. The second site, Yancey's Tavern, is listed in the NRHP. It is located on the north side of SR 126 (Memorial Boulevard) on Chestnut Ridge Road. SR 126 (Memorial Boulevard) is proposed to be widened to the south side of the roadway. However, it has been determined that widening the roadway will have an "Adverse Visual Effect" on this property. In compliance with 36 CFR 800, a Memorandum of Agreement (MOA) between the SHPO and FHWA to address the adverse effect finding to Yancey's Tavern will be executed prior to approval of the Final Environmental Impact Statement. A more detailed explanation can be found in **Chapter 4**, Historical Impacts.

S.4.8 Archaeological Impacts

A Phase I Cultural Resource Survey identified four archaeological sites in the project area (40SL412, 40SL413, 40SL419, and 40SL421). The proposed Build Alternatives have been modified to avoid impacting these sites. It was determined based on the field survey that no historic archaeological properties would therefore be impacted by the project and no further investigations were needed. The SHPO has concurred in this finding. The SHPO letter can be found in **Appendix B**.

If archaeological materials are uncovered during construction, all construction work in the area of the find will cease. The Tennessee Division of Archaeology (615-741-1588) and the recognized Native American Tribes previously coordinated with will be immediately contacted so a representative of their office may have the opportunity to examine and evaluate the materials.

S.4.9 Section 4(f) Evaluation

As described in **Section S.4.7**, there are two historic properties, one listed and one eligible for listing in the National Register of Historic Places located along the project corridor. The widening of SR 126 (Memorial Boulevard) will not require taking land from these two historic properties. There are no parks, recreation areas, waterfowls or wildlife refuges in the project impact area. No properties protected under Section 4 (f) of the US Department of Transportation Act of 1966 will be impacted in the project area.

The purpose of **Section 4(f)** is to preserve publicly owned land from a public park, recreation area, wildlife or waterfowl refuge, or significant historic site from being used for a transportation project. It requires consideration of avoidance or mitigation of damages.

S.4.10 Executive Order 11990 Wetland Impacts

There are no State or Federal jurisdictional wetlands in the project impact area.

S.5 PERMITS NEEDED

The Build Alternatives will require both State and Federal Water Quality Permits for stream crossings. Section 404 permits from the USACE, National Pollutant Discharge Elimination System (NPDES) permits, and Tennessee Water Quality Permits will be needed. A Section 26a permit or letter of no objection from the Tennessee Valley Authority is also required. TDOT will coordinate any mitigation efforts with Federal and State regulatory agencies before preparing final mitigation plans and submitting permit applications. It is during the permitting process phase that the appropriate compensatory mitigation for the unavoidable impacts of this project will be determined.

S.6 AREAS OF CONTROVERSY AND UNRESOLVED ISSUES

The primary areas of concern related to the Build Alternatives include:

- The displacement of ninety (90) to three hundred and fifty (350) graves, dependent upon which Build Alternative is selected.
- The displacement of one hundred and sixty two (162) to two hundred and forty one (241) residential relocations, dependent upon which Build Alternative is selected.
- The displacement of thirty (30) to forty-three (43) business displacements, dependent upon which Build Alternative is selected.

S.7 STATUTE OF LIMITATIONS ON FILING CLAIMS

The Federal Highway Administration (FHWA) may publish a notice in the Federal Register, pursuant to 23 USC § 139 (I), indicating that one or more Federal agencies have taken final action on permits, licenses, or approvals for this project. If such notice is published, claims seeking judicial review of those Federal agency actions will be barred unless such claims are filed within 180 days after the date of publication of the notice, or written such that a shorter time period as is specified in the Federal laws pursuant to which judicial review of the Federal agency action is allowed. If no notice is published, then the periods of time that otherwise are provided by the Federal laws governing such claims will apply.

S.8 OTHER MAJOR FEDERAL ACTIONS

There are no other major transportation improvement actions proposed by TDOT, FHWA, or other government agencies near the project study area.

TABLE A: SUMMARY OF PROJECT DATA & ESTIMATED IMPACTS

Summary of Project Data & Estimated Impacts for SR 126 (Memorial Boulevard)				
Item		No-Build	Build Alternative A	Build Alternative B
Functional Classification		Minor Arterial	Minor Arterial	Minor Arterial
Length (Miles)		8.4	8.4	8.4
Cross Sections (feet)[1]				
From:	To:			
East Center St.	Hillcrest Drive	60	160	160
Hillcrest Drive	SR 93	100	160	160
SR 93	SR 93	160	160	160
SR 93	Heather Lane	120	160	160
Heather Lane	Old Stage Road	120	160	160
Old Stage Road	Lemay Drive	120	200	200
Lemay Drive	Cooks Valley Road	120	200	120
Cooks Valley Road	Harr Town Road	120	120	120
Harr Town Road	Cochise Trail	120	160	160
Cochise Trail	Carolina Pottery Drive	60	160	160
Carolina Pottery Drive	I-81	160	300	300
I-81	I-81	300	300	300
Year 2013 AADT		8,450 - 25,800	8,450 - 25,800	8,450 - 25,800
Year 2033 AADT		13, 520 - 33,540	13, 520 - 33,540	13, 520 - 33,540
Percent Trucks		6%	6%	6%
Estimated Right-of-Way Acquisition (Acres)		0	239	121
Residential Displacements		0	241	162
Business Displacements		0	43	30
Non-Profit Displacements (Volunteer Fire Sta.)		0	1	1
Air Quality/Noise Impacts Requiring Mitigation		0	0	0
Archaelogical Sites Impacted		0	0	0
Historic Sites Impacted[2]		0	1	1
Section 4(f) Properties Impacted		0	0	0
Gravesites Impacted		0	350	90
Wetlands Impacted (Acres)		0	0	0
Stream Crossings (Linear Feet)		0	4863	3107
Floodplains Impacts (Acres)		0	4	3.2
Forest Land Acquired (Acres)[3]		0	75	54.8
Threatened/Endangered Species Impacts		0	0	0
Hazardous Material Sites Impacted (Parcels)		0	2	3
Farmland Impacted (Acres)		0	15	5
Estimated Right-of-Way Cost		$ -	$ 60,000,000	$ 48,000,000
Estimated Utility Cost		$ -	$ 5,316,000	$ 4,565,000
Estimated Construction Cost		$ -	$ 55,000,000	$ 47,000,000
Total Estimated Project Cost		$ -	$ 120,316,000	$ 99,565,000

1. The estimated ROW width is reported and based upon the typical width needed for each typical section. Actual proposed ROW widths will vary throughout the project based upon the use of slope easements, total versus partial property acquisitions, uneconomicremnants, etc.
2. Adverse visual impact
3. Includes all forest land impacted within the estimated construction limits, which may be within slope easements and outside of the ROW limits

S.9 ENVIRONMENTAL COMMITMENTS

Throughout this Environmental Impact Statement (EIS), measures are detailed to avoid, minimize, or mitigate the impacts of the proposed project on the human and natural environments. Unique commitments, outside of the normal or standard requirements of a federally funded project, including Federal and State laws, regulations, policy, best practice, and TDOT's Standard Specifications, are summarized as follows:

S.9.1 Hazardous Materials

The following three (3) sites will be evaluated as potential hazardous waste sites prior to submittal of the Final EIS.

- English Cabinets (5236 Memorial Boulevard, Kingsport, TN)
- People's Food Store (3104 Memorial Boulevard, Kingsport, TN)
- Richard Chadbourne Property (5340 Memorial Boulevard, Kingsport, TN)

A Phase II Environmental Site Investigation will be performed on the following three (3) parcels identified in the Phase I Hazardous Materials Survey Report.

- Fuel and Convenience Store (4001 Memorial Boulevard, Kingsport, TN)
- Dry Cleaning Service (3200 Memorial Boulevard, Kingsport, TN)
- Fuel and Convenience Store (5121 Memorial Boulevard)

S.9.2 Protected Species

The United States Fish and Wildlife Service (USFWS) has concurred with a "not likely to adversely affect" finding concerning the federally endangered Indiana Bat (Myotis sodalis). However, to further minimize potential for harm to the Indiana Bat, trees with a diameter at breast height of five inches or greater will not be removed from October 15 through March 31.

S.9.3 Historical

The State Historic Preservation Office (SHPO) has reviewed the project and in a letter dated November 3, 2008 stated that an adverse visual effect to Yancey's Tavern would occur if either Build Alternative was selected. Supporting documentation along with the final Memorandum of Agreement (MOA), developed in consultation with the SHPO, and any other consulting parties, must be filed with the Advisory Council on Historic Preservation (ACHP) in accordance with 36 CFR 800.6(b)(1)(iv) and Section 106 of the National Historic Preservation Act. The MOA will be prepared and signed prior to approval of the Final Environmental Impact Statement.

S.9.4 Archaeological

Four archaeological sites are located in the project area (40SL412, 40SL413, 40SL419, and 40SL421). The proposed Build Alternatives have been modified to avoid impacting these sites. However, if archaeological materials are uncovered during construction, all construction work in the area of the find will cease. The Tennessee Division of Archaeology (615-741-1588) and the recognized Native American Tribes previously coordinated with will be immediately contacted so a representative of their office may have the opportunity to examine and evaluate the materials. Any sites identified during construction of the proposed project will be monitored during construction activities to ensure that the areas are avoided and not utilized as equipment staging areas or otherwise impacted by the construction of the project.

Since the initial consultation with the Native American Tribes, two (2) additional tribes have been recognized, The Cherokee Nation and the Shawnee Tribe. Consultation with these additional Native American Tribes will be completed prior to submittal of the FEIS.

S9.5 Miscellaneous

TDOT will comply with the Tennessee State Burial Law: TCA 46-4-101-104 (Termination of land use as cemetery) for the relocation of any grave sites.

A volunteer fire department station (Number Four) will be acquired and relocated with either Build Alternative A or B. The relocation process will be carried out in such a manner as to ensure no interruption of service occurs to area residents.
This page intentionally left blank

ACRONYMS

ADA	Americans with Disabilities Act
ACHP	Advisory Council on Historic Preservation
ADT	Average Daily Traffic
AADT	Average Annual Daily Traffic
APE	Area of Potential Effect
APR	Advanced Planning Report
ARAP	Aquatic Resources Alterations Permit
BMPs	Best Management Practices
C&G	Curb and Gutter
CAAA	Clean Air Act Amendment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CRT	Community Resource Team
CSS	Context Sensitive Solutions
db	Decibels
dBA	A-weighted sound levels in decibels
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
ETW	Exceptional Tennessee Waters
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
Ft.	Foot
GPS	Global Positioning System
HC	Hydrocarbons
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
I	Interstate
KATS	Kingsport Area Transit Service
Leq	Equivalent continuous sound level
L.M.	Log Mile
LOS	Level of Service
LUST	Leaking Underground Storage Tank
LRTP	Long Range Transportation Plan
MOE	Measures of Effectiveness
MPO	Metropolitan Planning Organization
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NHS	National Highway System
NO	Nitrogen Oxides
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places

NWI	National Wetland Inventory
O3	Ozone
ONRW	Outstanding Natural Resource Waters
PE	Preliminary Engineering or Professional Engineer
pH	Level of acidity of water
PIN	Project Identification Number
PM	Particulate matter
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-Way
RSAR	Road Safety Audit Report
SHPO	State Historic Preservation Office
Sox	Sulfur Oxides
SR	State Route
SWPPP	Storm Water Pollution Prevention Plan
TCA	Tennessee Codes Annotated
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TIP	Transportation Improvement Program
TPR	Transportation Planning Report
TSM	Transportation Systems Management
TVA	Tennessee Valley Authority
TWLTL	Two Way Left Turn Lane
TWRA	Tennessee Wildlife Resources Agency
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Services
US	United States
USC	United States Codes
UST	Underground Storage Tank
v/c	Volume to Capacity Ratio
VOC	Volatile Organic Compound

Table of Contents

Table of Figures

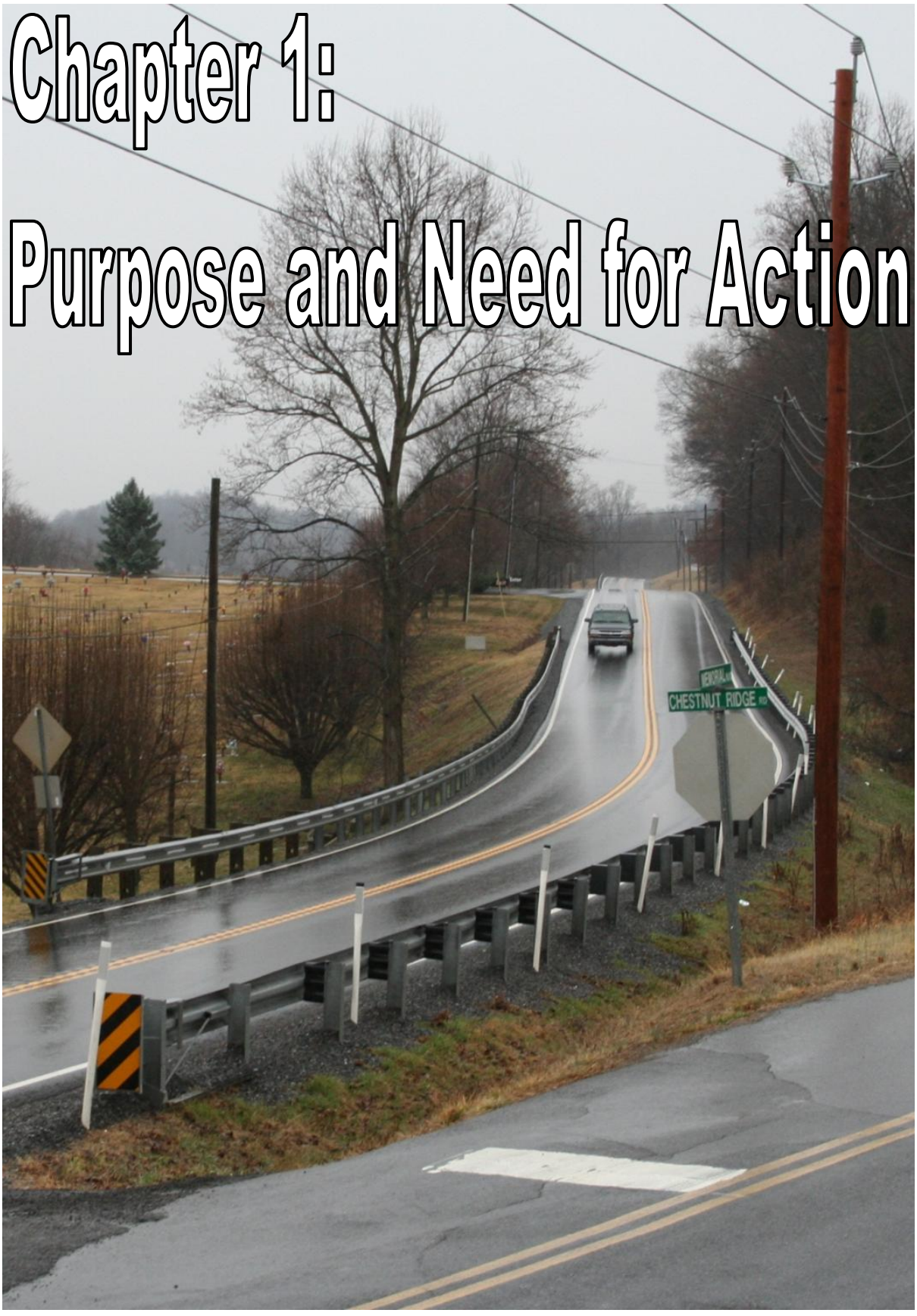
Table of Tables

Table of Appendices

This page intentionally left blank.

Chapter 1:

Purpose and Need for Action



1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The State Route (SR) 126 improvement project is a joint effort between the Tennessee Department of Transportation (TDOT) and the Federal Highway Administration (FHWA). The limits of the 8.4 mile long project extend from East Center Street, within the City of Kingsport's City Limits, east to Interstate 81 (I-81) in Sullivan County, Tennessee. SR 126 is also known as Memorial Boulevard within the study limits.

SR 126 (Memorial Boulevard) is primarily a two-travel lane facility (one travel lane in each direction) throughout the study corridor. Two Build Alternatives and the No-Build Alternative are currently under consideration for this project. The Build Alternatives improve SR 126 (Memorial Boulevard) to a four-lane facility (two travel lanes in each direction) within the commercial and residential areas of the western half of the study corridor. The eastern half of the study corridor, which is rural in nature, will remain a two-travel lane facility. Improved shoulders will be provided along the entire corridor and sidewalks will be extended to the majority of the commercial and residential areas. The existing roadway conditions and the Build Alternatives are discussed in more detail in **Section 1.2** and **Chapter 2** of this document, respectively. Conceptual Layouts of the Build Alternatives are provided in **Appendix D**.

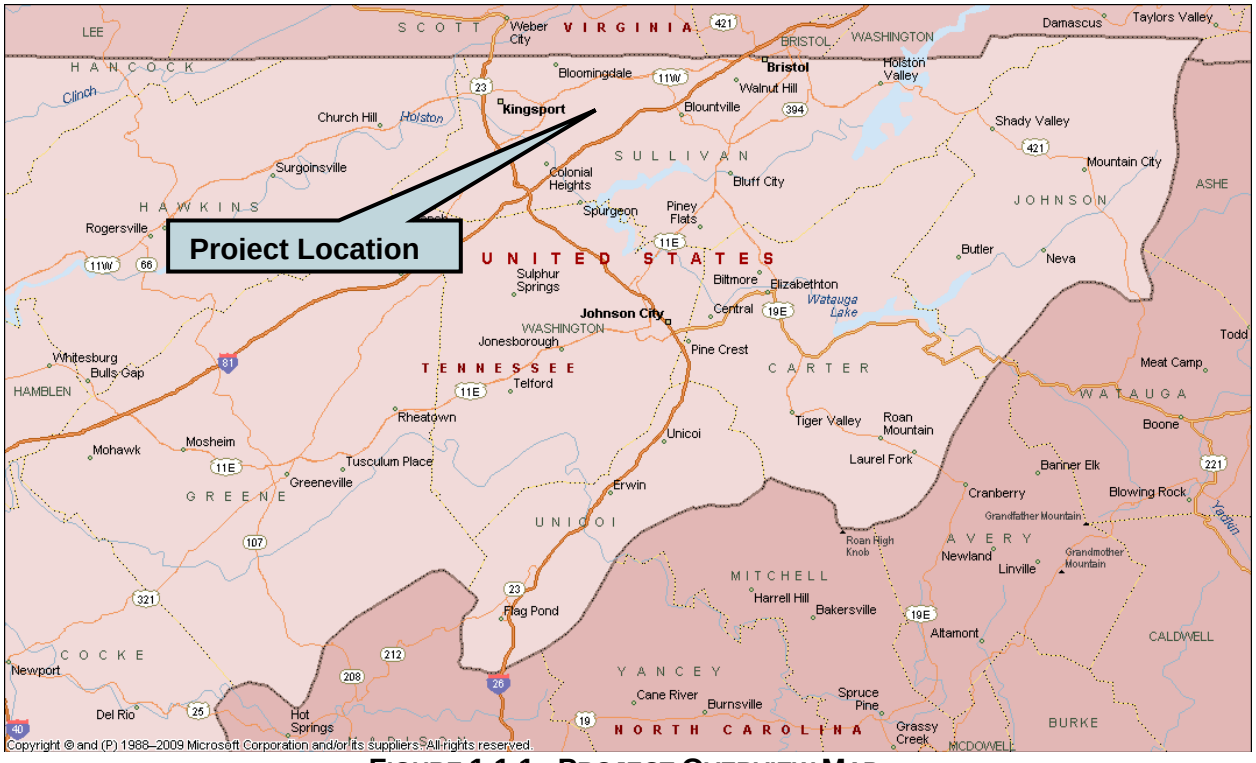


FIGURE 1.1.1: PROJECT OVERVIEW MAP

The proposed SR 126 (Memorial Boulevard) improvement project is located within the Kingsport Area Metropolitan Planning Organization's (MPO) jurisdiction. In 1977 the Kingsport Area MPO was created by federal legislation and organized by the Tennessee Department of Transportation (TDOT) and the Virginia Department of Transportation (VDOT) to develop efficient and safe street and highway networks and other transportation modes. Of utmost

importance was to approach transportation problems in highly populated areas without dividing the planning area up according to jurisdiction; the idea being that transportation systems cross jurisdictional lines. The Kingsport MPO is comprised of the following jurisdictional members; in Tennessee – TDOT, City of Kingsport, Town of Mount Carmel, Town of Church Hill, Hawkins County, and Sullivan County; representatives in Virginia include the Virginia Department of Transportation, Weber City, Gate City, and Scott County. Additional members who are in an advisory role include the Federal Transit Administration, Federal Highway Administration, First Tennessee Development District, the Tennessee Office of Local Planning (representing Church Hill and Mount Carmel), and the LENOWSICO Virginia Planning District Commission (representing Gate City and Weber City). Improvements along SR 126 (Memorial Boulevard) are included in the *Kingsport Metropolitan Area 2030 Transportation Plan*, dated June 14, 2007 and amended January 10, 2008. The plan addresses the future transportation needs within the MPO boundary.

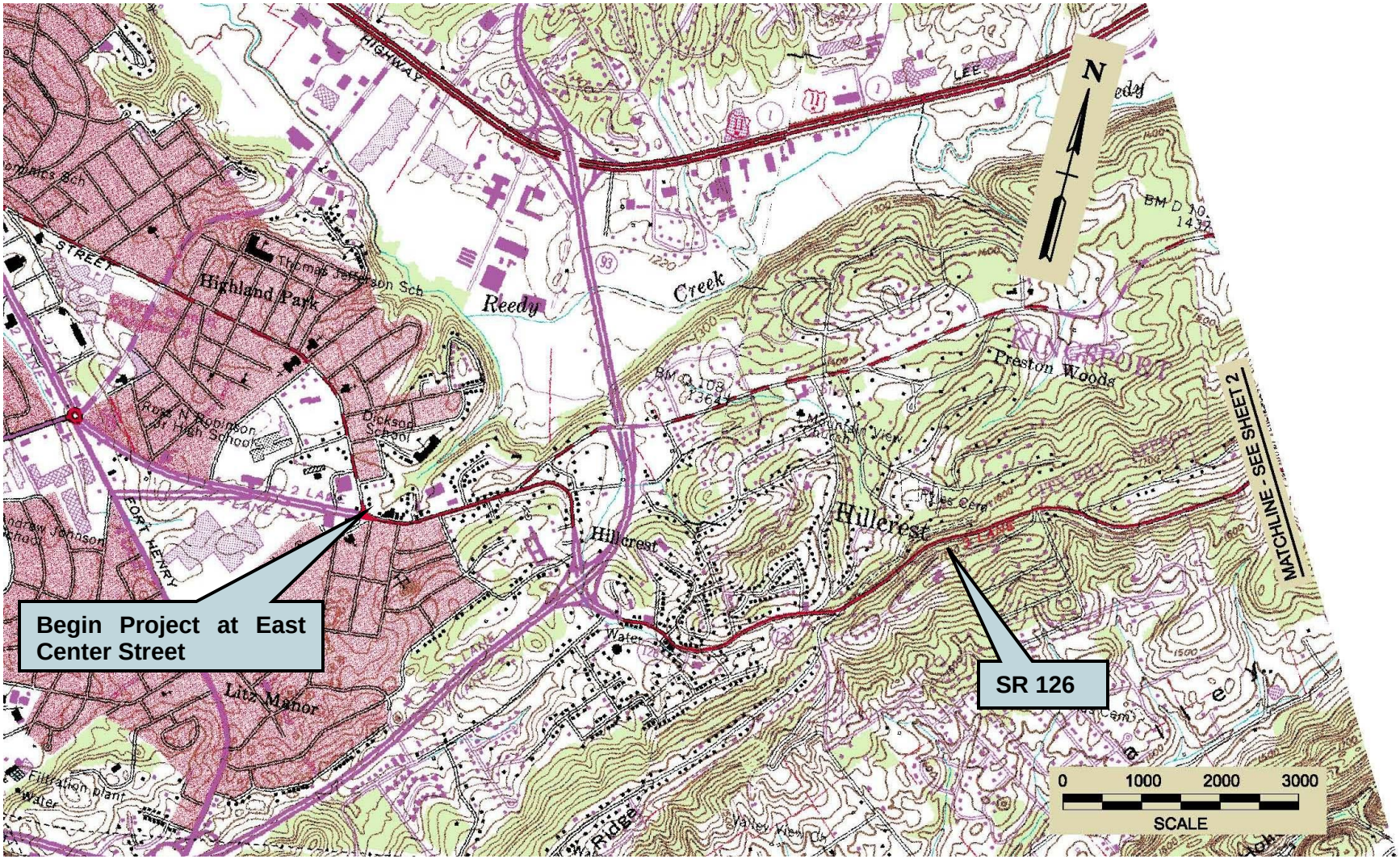


FIGURE 1.1.2: PROJECT LOCATION MAP (1 OF 3)
USGS Indian Springs and Kingsport Quad Maps

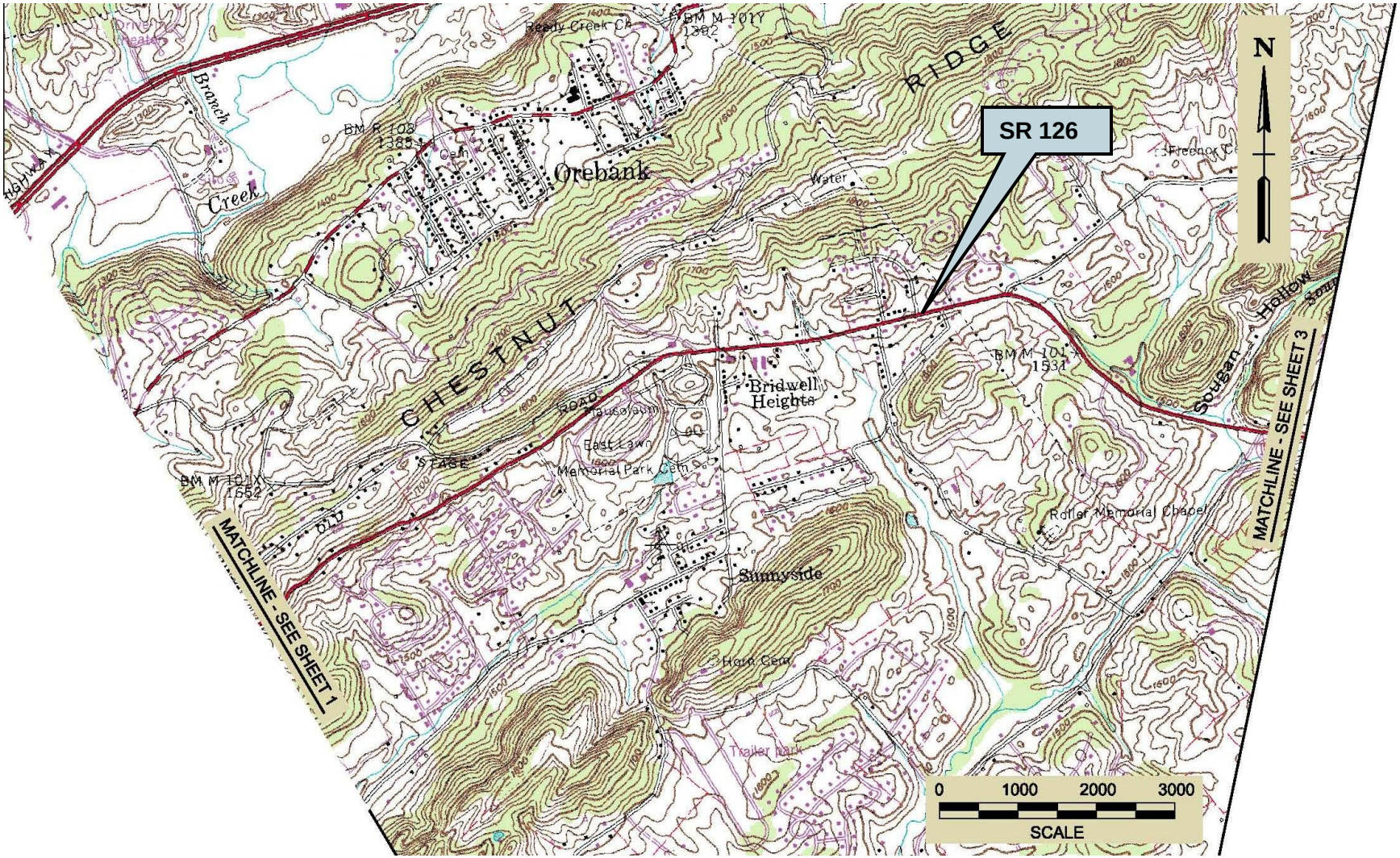


FIGURE 1.1.2: PROJECT LOCATION MAP (2 OF 3)
USGS Indian Springs and Kingsport Quad Maps

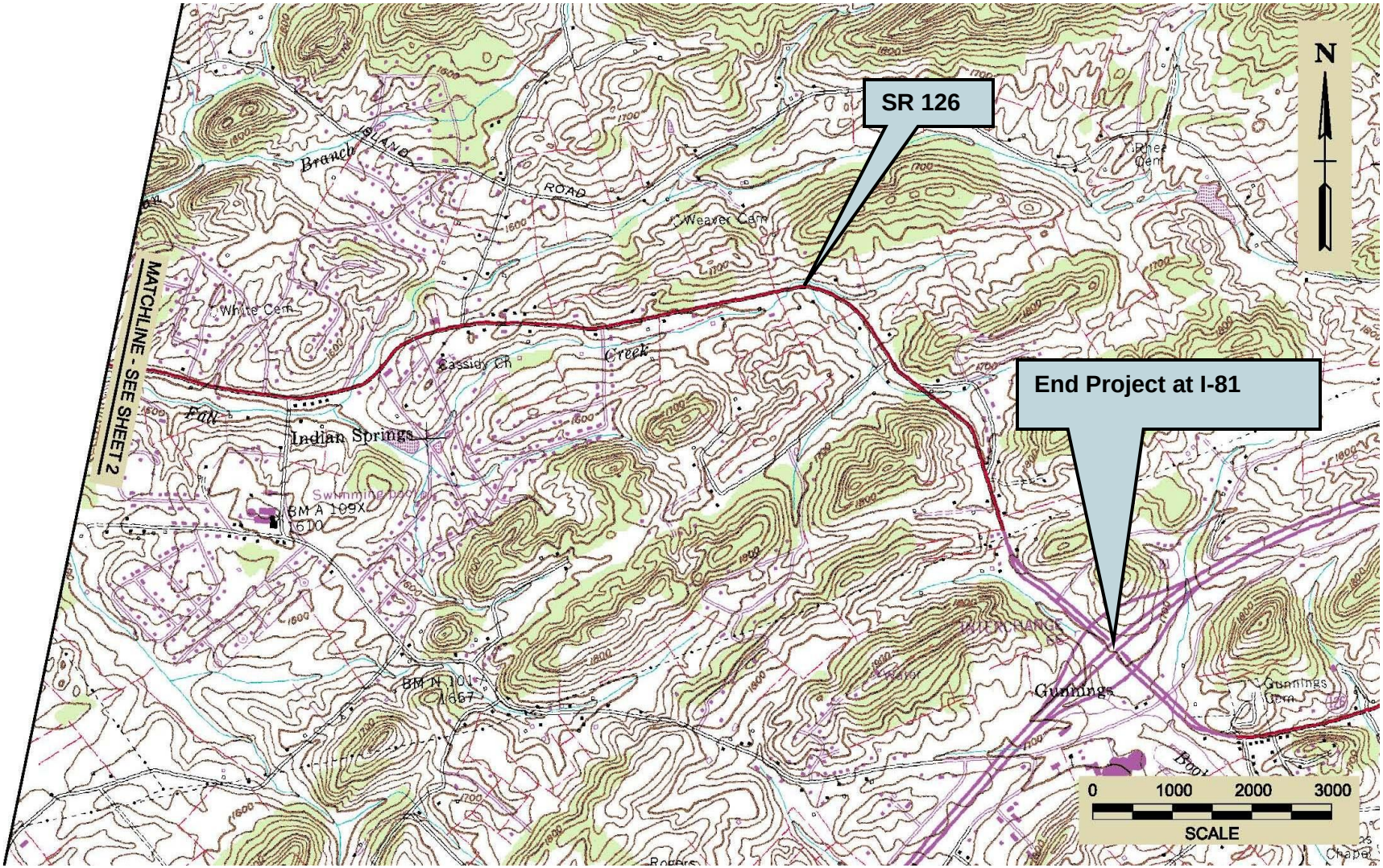


FIGURE 1.1.2: PROJECT LOCATION MAP (3 OF 3)
USGS Indian Springs and Kingsport Quad Maps

FIGURE 1.1.3: PROJECT LOCATION MAP – STREET DETAILS (1 OF 4)
(Log Mile 3.72 to Log Mile 5.7)

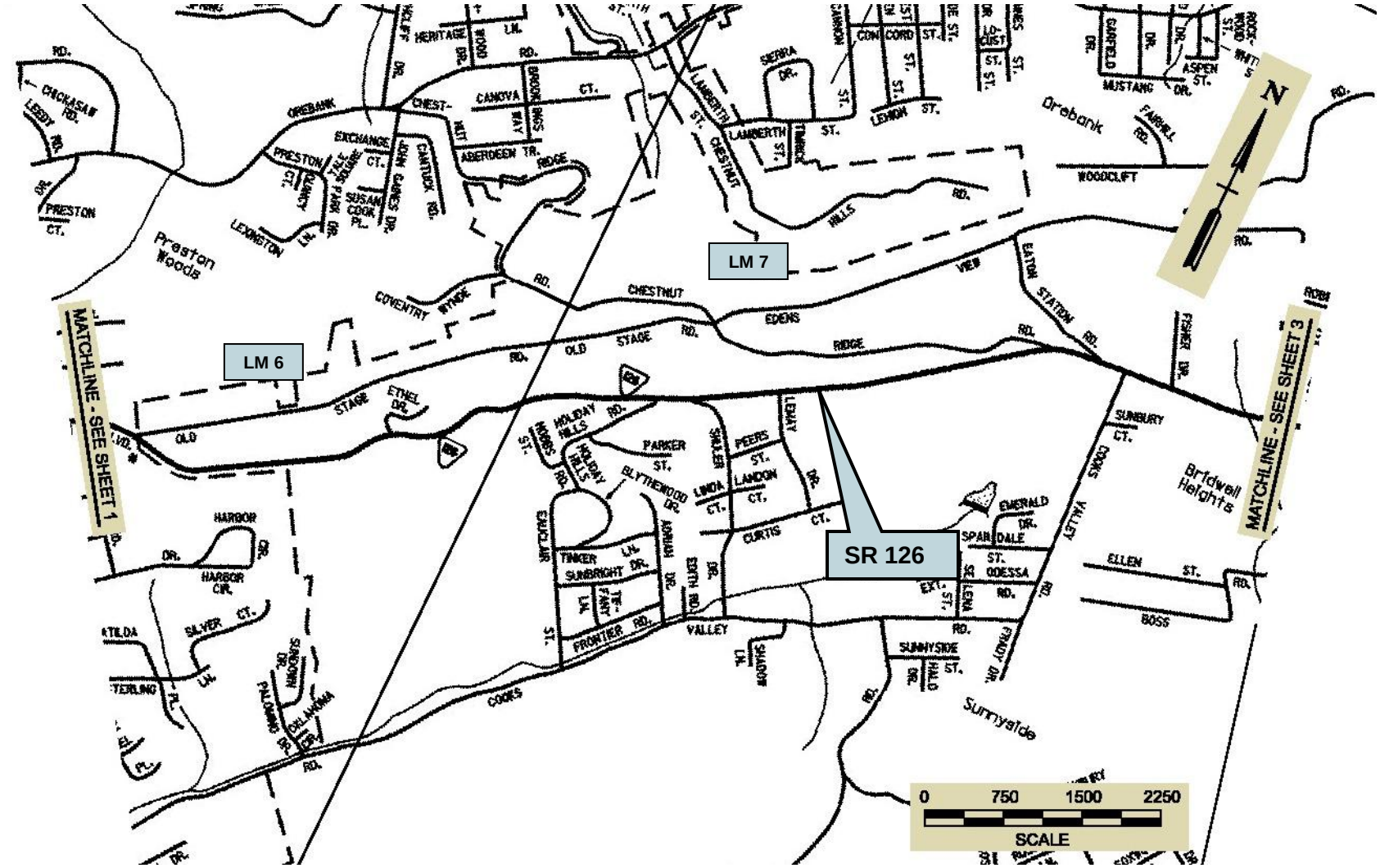


FIGURE 1.1.3: PROJECT LOCATION MAP – STREET DETAILS (2 OF 4)
(Log Mile 5.7 to Log Mile 7.99)

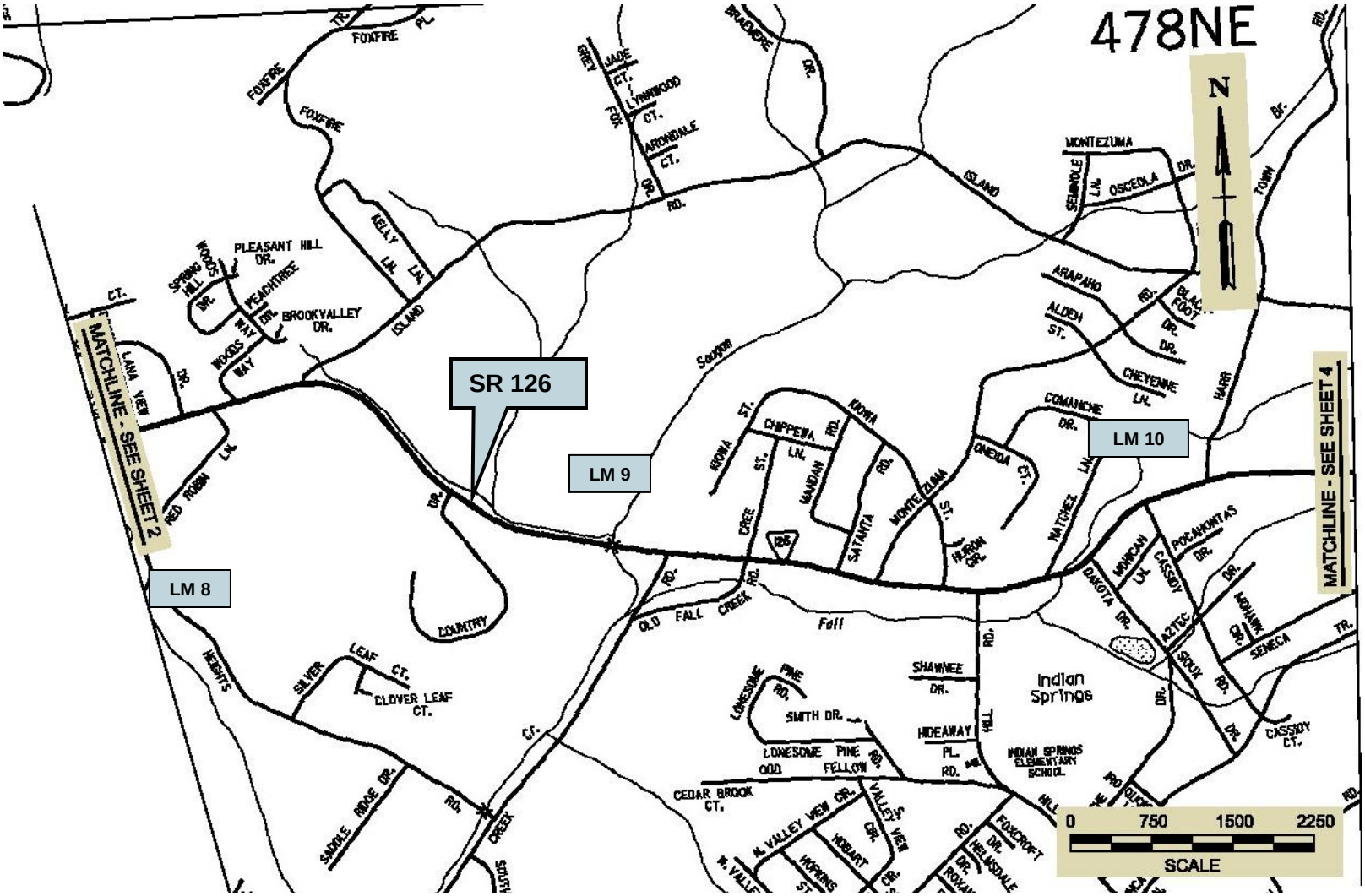


FIGURE 1.1.3: PROJECT LOCATION MAP – STREET DETAILS (3 OF 4)
(Log Mile 7.99 to Log Mile 10.37)

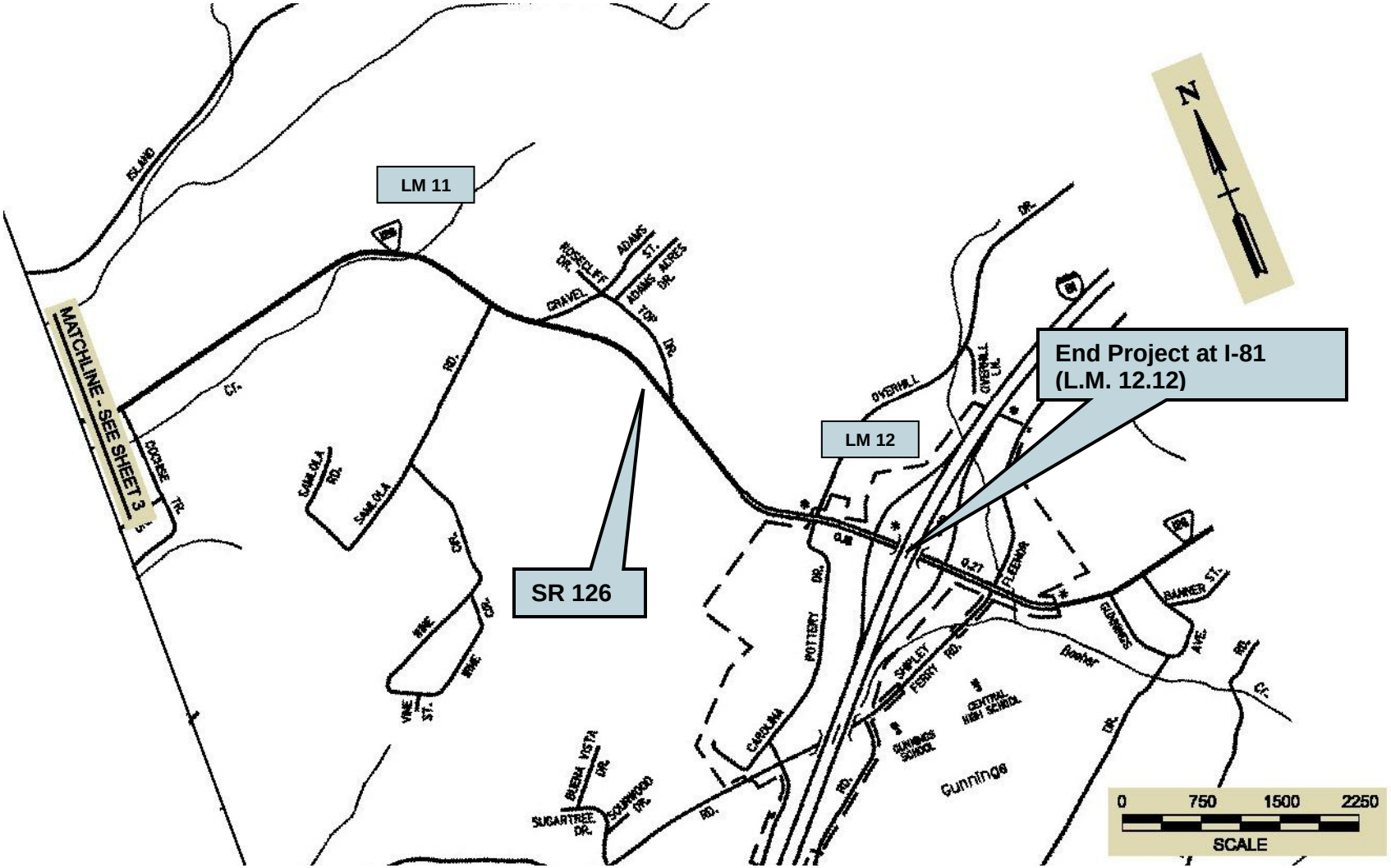


FIGURE 1.1.3: PROJECT LOCATION MAP – STREET DETAILS (4 OF 4)
(Log Mile 10.37 to Log Mile 12.12)

1.2 DESCRIPTION OF THE STUDY CORRIDOR

1.2.1 Description of the Adjacent Community

The terrain is rolling within the 8.4 mile long study limits between East Center Street and I-81. Due to the terrain, many side roads intersect SR 126 (Memorial Boulevard) at skewed angles. Steep side-slopes and guardrail are prevalent along many segments of the corridor. The corridor contains a mixture of land uses, including commercial, residential, and rural or agricultural. Poor access control is prevalent in the commercial areas, with many businesses having their entire frontage paved adjacent to the roadway. A few community resources, including those of historic significance, are located adjacent to the roadway. These resources include the Shipley-Jarvis House, which is deemed eligible for listing on the National Register of Historic Places (NRHP), Yancey's Tavern, which is listed on the NRHP, and the East Lawn Memorial Gardens Cemetery.

A mixture of residential and commercial land use is present from the corridor's western terminus at East Center Street (Log Mile 3.72) east to Beverly Hill Street (Log Mile 4.91). Within this approximately 1.19 mile long segment, the commercial land uses are generally small privately owned stores, restaurants, car lots, gas stations, and other service businesses. The residential land use is generally single family housing. The Shipley-Jarvis House is located adjacent to the northbound lanes near Woodside Drive at Log Mile (L.M.) 3.97 in this segment.

The land use is generally single family residential for the next 1.13 miles, from Beverly Hill Street (L.M. 4.91) to near Ethel Drive (L.M. 6.04).

The land use is primarily rural for the final 6.08 miles of the corridor, from near Ethel Drive (L.M. 6.04) to I-81 (L.M. 12.12). There are some areas of commercial development within this segment. The commercial land uses are generally small privately owned stores, restaurants, car lots, gas stations, and other service businesses. Yancey's Tavern and the East Lawn Memorial Gardens Cemetery are located on either side of SR 126 (Memorial Boulevard) near Chestnut Ridge Road at L.M. 7.55 in this segment.

FIGURE 1.2.1: PAVED FRONTAGE EXAMPLE 1

FIGURE 1.2.3: SHIPLEY-JARVIS HOUSE

FIGURE 1.2.2: PAVED FRONTAGE EXAMPLE 2

FIGURE 1.2.4: CEMETERY (LT), YANCEY'S TAVERN (RT.)

1.2.2 Description of the Existing Roadway

Within the 8.4 mile long study limits between East Center Street and I-81, SR 126 (Memorial Boulevard) is functionally classified as a minor arterial on the State Highway System. The roadway primarily has two travel lanes (one in each direction). Each travel lane is approximately eleven feet wide. The existing right-of-way varies from approximately sixty feet to three hundred feet wide. The speed limit varies from thirty-five to fifty miles per hour. Many sharp curves and steep grades along the route are signed with supplemental speed plaques advising lower safe travel speeds than the posted speed limit. Many roadside hazards are located in close proximity to the travel lanes. Narrow shoulders are present along the majority of the route. Sidewalks are present along approximately 0.1 mile of the 8.4 mile long corridor. Curbs are located sporadically along the route, with the majority of the corridor having roadside ditches. Four traffic signals are present, all of which are located within the first 1.5 miles of the corridor. The average daily traffic (ADT) in 2013 is estimated to range between 8,450 and 25,800 vehicles per day along the corridor. In the year 2033, the design year of the project, the traffic is projected to increase to between 13,520 and 33,540 vehicles per day.

Several different typical cross sections are utilized along the existing SR 126 (Memorial Boulevard) corridor. The following describes the existing roadway cross-sections. The existing roadway characteristics are also summarized in **Figure 1.2.5** and **Tables 1.2.1** through **1.2.3**.

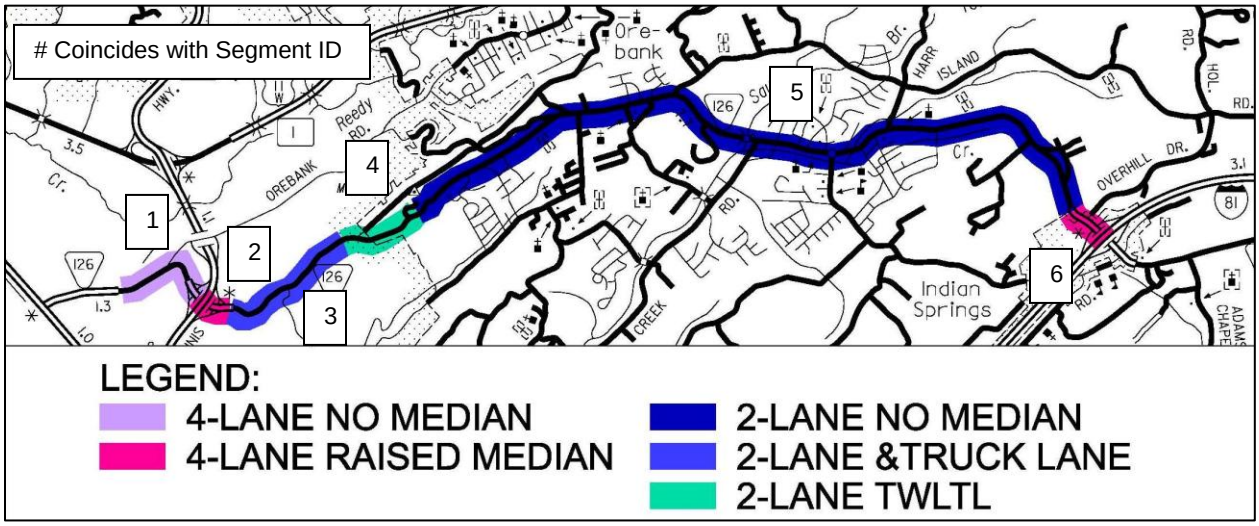


FIGURE 1.2.5: EXISTING ROADWAY CROSS SECTION LEGEND

1. East Center Street (L.M. 3.72) to west of Hillcrest Drive (L.M. 4.33)

SR 126 (Memorial Boulevard) has four travel lanes (two in each direction) along this 0.61 mile long segment. No median is present. The shoulders are two feet or less in width. The posted speed limit is thirty-five miles per hour. The existing right-of-way varies from approximately sixty to ninety feet wide. Ditches are generally located adjacent to the roadway, but curb and gutter with sidewalks are present for approximately one-tenth of a mile in the Orebank Road/Edens Ridge Road area. A traffic signal is located at East Center Street. **Figure 1.2.6**, taken at Log Mile (L.M.) 4.15, provides a photograph of the typical roadway characteristics of this first segment of the study corridor.

FIGURE 1.2.6: SEGMENT 1 PHOTOGRAPH

2. West of Hillcrest Drive (L.M. 4.33) to between Stratford Road and Heather Lane (L.M. 4.60)

SR 126 (Memorial Boulevard) has four travel lanes (two in each direction) along this 0.27 mile long segment. Unlike the first segment, a median is present that ranges in width from approximately twenty to twenty-eight feet wide. The median is generally a raised grass median. In some areas the median is depressed and within the SR 93 (John B. Dennis Highway) Interchange, the median is flush with a concrete barrier separating the opposing travel lanes. The shoulders range from five to sixteen feet in width and are generally gravel. The posted speed limit is thirty-five miles per hour. The existing right-of-way varies from approximately one hundred to one hundred and sixty feet wide. Ditches are generally located adjacent to the roadway, but curb and gutter is present for approximately one-tenth of a mile in the SR 93/Stratford Road/Heather Lane area. No sidewalks are present. Two traffic signals are located within the SR 93 (John B. Dennis Highway) Interchange. **Figure 1.2.7**, taken at Log Mile (L.M.) 4.34, provides a photograph of the typical roadway characteristics of this second segment of the study corridor.

FIGURE 1.2.7: SEGMENT 2 PHOTOGRAPH

3. Between Stratford Road and Heather Lane (L.M. 4.60) to between Trinity Lane and Tanglewood Road (L.M. 5.50)

SR 126 (Memorial Boulevard) has one westbound travel lane and two eastbound travel lanes (one of which is a truck climbing lane) along this 0.90 mile long segment. No median is present. The shoulders are approximately one-foot wide. The posted speed limit is forty-five miles per hour. The existing right-of-way is approximately sixty feet wide. Ditches are located adjacent to the roadway, with no curb and gutter or sidewalks. One traffic signal is located at Harbor Chapel Road. **Figure 1.2.8**, taken at Log Mile (L.M.) 4.90, provides a photograph of the typical roadway characteristics of this third segment of the study corridor.

FIGURE 1.2.8: SEGMENT 3 PHOTOGRAPH

4. Between Trinity Lane and Tanglewood Road (L.M. 5.50) to between Old Stage Road and Ethel Drive (L.M. 6.00)

SR 126 (Memorial Boulevard) has two travel lanes (one in each direction) along this 0.50 mile long segment. A center two-way left turn lane (TWLTL) is present. The shoulders are approximately two feet wide. The posted speed limit is forty-five miles per hour. The existing right-of-way is approximately sixty feet wide. Ditches are located adjacent to the roadway, with no curb and gutter or sidewalks. No traffic signals are present in this segment. **Figure 1.2.9**, taken at Log Mile (L.M.) 5.76, provides a photograph of the typical roadway characteristics of this fourth segment of the study corridor.

FIGURE 1.2.9: SEGMENT 4 PHOTOGRAPH

5. Between Old Stage Road and Ethel Drive (L.M. 6.00) and west of Carolina Pottery Drive (L.M. 11.90)

SR 126 (Memorial Boulevard) has two travel lanes (one in each direction) along this 5.90 mile long segment. In general, no median is present and the shoulders are two feet in width. There is a 0.16 mile long segment near Kiowa Street and Natchez Lane that has a two way left turn lane and six-foot wide shoulders. The posted speed limit is fifty miles per hour. The existing right-of-way is approximately sixty feet wide. Ditches are located adjacent to the roadway, with no curb and gutter or sidewalks present. No traffic signals are located in this segment. **Figure 1.2.10**, taken at Log Mile (L.M.) 6.65, provides a photograph of the typical roadway characteristics of this fifth segment of the study corridor.

FIGURE 1.2.10: SEGMENT 5 PHOTOGRAPH

6. West of Carolina Pottery Drive (L.M. 11.90) to I-81 (L.M. 12.12)

SR 126 (Memorial Boulevard) has four travel lanes (two in each direction) along this 0.22 mile long segment. A twenty-nine foot wide raised grass median is present. The shoulders are paved and generally twelve feet in width. The posted speed limit is forty miles per hour. The existing right-of-way is approximately three hundred feet wide. Ditches are located adjacent to the roadway, with no curb and gutter or sidewalks present. No traffic signals are located in this segment. **Figure 1.2.11**, taken at Log Mile (L.M.) 12.01, provides a photograph of the typical roadway characteristics of this sixth and final segment of the study corridor.

FIGURE 1.2.11: SEGMENT 6 PHOTOGRAPH

1.2.3 Existing Roadway Cross Section Summary

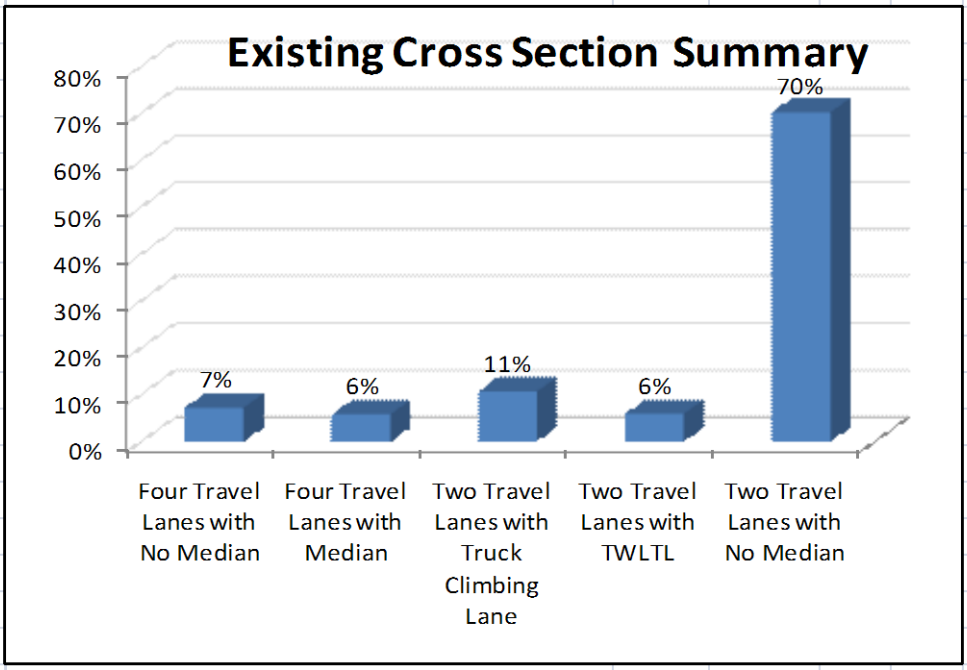
Four travel lanes are present along 13% of the corridor at the eastern and western termini. The middle 87% of the corridor has two travel lanes (including where a 0.90 mile long truck climbing lane is provided). Sidewalks are present along 1% of the corridor. A shoulder width equal to or greater than four feet, which is generally regarded as the minimum safe width for bicyclists, is present along 8% of the corridor.

TABLE 1.2.1: EXISTING SIDEWALK AND SHOULDER SUMMARY

Cross Section Description	Existing Roadway Description		
	Seg. ID	Length (Miles)	%
Sidewalks Present	1	0.1	1%
Sidewalks Not Present	1, 2, 3, 4, 5, 6	8.3	99%
Total		8.4	
Shoulders less than Four Feet Wide	1, 3, 4, 5	7.8	92%
Shoulders equal to or greater than Four Feet Wide	2, 5, 6	0.7	8%
Total		8.4	

TABLE 1.2.2: EXISTING ROADWAY SUMMARY

Cross Section Description	Existing Roadway Description			
	Seg. ID	Length (Miles)	%	
Four Travel Lanes with No Median	1	0.6	7%	13%
Four Travel Lanes with Median	2, 6	0.5	6%	
Two Travel Lanes with Truck Climbing Lane	3	0.9	11%	87%
Two Travel Lanes with TWLTL	4	0.5	6%	
Two Travel Lanes with No Median	5	5.9	70%	
Total		8.4		



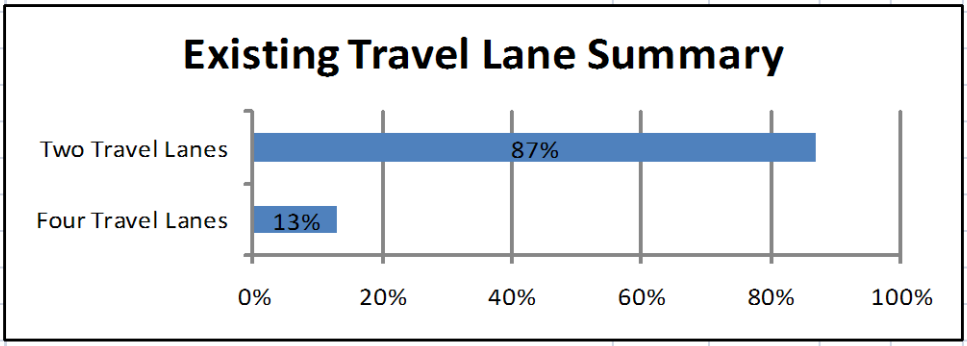


TABLE 1.2.3: EXISTING ROADWAY DESCRIPTION

SR 126 (Memorial Boulevard) Existing Roadway Description													
Segment		Posted Speed	From		To		Length	Travel Lanes		Median Desc.	Shld.	Ditch/ C&G ?	Side-walk?
ID	Dist.	Limit	LM	Description	LM	Description	(Miles)	No.	Width				
1	0.61	35	3.72	Center Street	3.78	between Center and Central Streets	0.06	4	11	Left Turn Lane	2 Ft. Paved	Ditch	No
			3.78	between Center and Central Streets	4.16	between Orebank and Edens Ridge Roads	0.38	4	11	None	1 Ft. Paved	Ditch	No
			4.16	between Orebank and Edens Ridge Roads	4.22	Edens Ridge Road	0.06	4	11.5	None	None	C&G	Yes
			4.22	Edens Ridge Road	4.25	east of Edens Ridge Road	0.03	4	11.25	None	1 Ft. Gravel/ None	Ditch/ C&G	Yes
			4.25	east of Edens Ridge Road	4.33	west of Hillcrest Drive	0.08	4	11	None	1 Ft. Gravel	Ditch	No
2	0.27	35	4.33	west of Hillcrest Drive	4.42	within the SR 93 Interchange	0.09	4	11	20 Ft. Raised Grass	5 Ft. Gravel/ 8 Ft.	Ditch	No
			4.42	within the SR 93 Interchange	4.51	within the SR 93 Interchange	0.09	4	12	28 Ft. with Barrier at Bridge	8 Ft. Gravel	Ditch	No
			4.51	within the SR 93 Interchange	4.55	Stratford Road	0.04	4	12	23 Ft. Depressed Grass	8 Ft. Gravel/ 18 Ft.	Ditch/ Curb	No
			4.55	Stratford Road	4.60	between Stratford Road and Heather Lane	0.05	4	12	22 Ft. Raised Grass	8 Ft. Gravel/ 16 Ft.	Ditch/ Curb	No

SR 126 (Memorial Boulevard) Existing Roadway Description (Continued)													
Segment		**Speed Limit**	**From**		**To**		**Length**	**Travel Lanes**		**Median Desc.**	**Shld.**	**Ditch/ C&G ?**	**Side-walk?**
ID	**Dist.**		**LM**	**Description**	**LM**	**Description**	**(Miles)**	**No.**	**Width**				
3	**0.90**	**45**	4.60	between Stratford Road and Heather Lane	5.50	between Trinity Lane and Tanglewood Road	0.90	3	11	None	1 Ft. Paved	Ditch	No
4	**0.50**	**45**	5.50	between Trinity Lane and Tanglewood Road	5.72	Briarwood Road	0.22	2	11	11 Ft. TWLTL	2 Ft. Paved	Ditch	No
			5.72	Briarwood Road	5.80	Old Stage Road	0.08	2	11	11 Ft. TWLTL	2 Ft. Soil	Ditch	No
			5.80	Old Stage Road	6.00	between Old Stage Road and Ethel Drive	0.20	2	11	10 Ft. TWLTL	2 Ft. Gravel	Ditch	No
5	**5.90**	**50**	6.00	between Old Stage Road and Ethel Drive	9.56	west of Kiowa Street	3.56	2	12	None	2 Ft. Gravel	Ditch	No
			9.56	west of Kiowa Street	9.72	west of Natchez Lane	0.16	2	12	12 Ft. TWLTL	6 Ft. Paved	Ditch	No
			9.72	west of Natchez Lane	11.82	west of Carolina Pottery Drive	2.10	2	12	None	2 Ft. Soil	Ditch	No
			11.82	west of Carolina Pottery Drive	11.90	west of Carolina Pottery Drive	0.08	Transition					No
6	**0.22**	**40**	11.90	west of Carolina Pottery Drive	12.12	I-81 Overpass	0.22	4	12	29 Ft. Raised Grass	12 Ft. Paved	Ditch	No
		42.5	**= Weighted Average**			**Σ =**	**8.40**						

1.3 PROJECT BACKGROUND AND STATUS

SR 126 (Memorial Boulevard) was initially constructed in 1926. The roadway was originally eighteen feet wide and constructed of concrete. The roadway was widened in 1950 to twenty-two feet wide and overlaid with asphalt. Existing SR 126 (Memorial Boulevard) follows the original 1926 alignment.

Since the early 1990s, improvements for SR 126 (Memorial Boulevard) have been discussed that would facilitate improved traffic and safety conditions for the route. The Executive Board and Executive Staff of the Kingsport Metropolitan Planning Organization (MPO) passed a resolution requesting the preparation of an Advanced Planning Report for SR 126 (Memorial Boulevard) in March 2003. In April 2003, a copy of this resolution was sent by the Mayor of Kingsport to TDOT. A response from TDOT was provided May 2003 acknowledging Kingsport's efforts and needs. The response was forwarded to the TDOT Planning Division with instructions to initiate a new Advance Planning Report, and in September 2003, TDOT responded by naming the SR 126 (Memorial Boulevard) project the initial Context Sensitive Solutions (CSS) Project for Tennessee.

The purpose of the CSS Project was to study and prepare a concept plan recommendation for improving SR 126 (Memorial Boulevard). A Community Resource Team (CRT) was assembled for the SR 126 (Memorial Boulevard) CSS project. The CRT met thirteen times for meetings, training, and workshops and conducted three series of Public Involvement Sessions between October 2003 and May 2005. Public opinion was surveyed at each Public Involvement Session and the results of those surveys were reviewed and discussed by the CRT. The final *Context Sensitive Solutions Report for State Route 126 (Memorial Boulevard)* is on file at the TDOT Environmental Division Office in Nashville, TN.

The CSS Project determined several "common ground" recommendations, for which there was unanimous support among the CRT members. Following is a list of items that the CRT unanimously agreed were important considerations for the SR 126 (Memorial Boulevard) project.

<u>CSS Common Ground Recommendation: Safety</u>

- Safety is the number one priority on this project
- Wide shoulders are desirable
- Improve sight distance and address geometric deficiencies at all intersections of side streets
- Provide left turn lanes at major intersections
- Provide right turn lanes at major intersections
- Consider using center line and shoulder rumble strips and reflective thermal markings where appropriate
- Special attention should be given to intersection improvements at the intersection of Carolina Pottery and Overhill Road to improve safety
- Plan development needs to be mindful of pedestrian safety and connectivity, providing a safe and separate walkway for pedestrians where feasible.

Specific areas where sidewalks are desired include East Center Street to Old Stage Road (within the City limits) and within the Indian Springs Community.

- Use side facing mailbox placement along SR 126 to improve safety for residents
- The CRT would like to avoid a "one size fits all" solution for SR 126

CSS Common Ground Recommendation: Points of Interest to the Community

The CRT wants to minimize impacts to and protect the integrity of community treasures in the SR 126 study area. Sites that are considered community treasures include:

- Cherry Point Animal Hospital
- White House at the corner of Satana Road and SR 126
- East Lawn Cemetery
- Old Indian Springs Post Office
- Chestnut Ridge view shed
- Anything within the historic boundary of Yancey's Tavern, including the tavern, barn, and trace of Old Island Road
- Shipley Mansion (near East Center Street)

CSS Common Ground Recommendation: Enhancements

The CRT supports the incorporation of the following enhancement features in the design plans for SR 126:

- Use of natural elements for retaining and buffering walls
- Landscaping to a human scale with native plant species
- Decorative guardrail where appropriate
- Use of decorative lighting where appropriate with sensitivity to residential areas
- Underground utilities instead of overhead
- Use of mast arms rather than span wire where traffic signals are installed
- Use of Texas rail instead of Jersey barrier type railing on bridges
- Bridge design needs to be an enhancement and fit within the context of the community
- Include irrigation with major landscaping
- Landscape design that is appropriate to the speed limit
- Inclusion of a roundabout at the intersection of SR 126 and East Center Street if adequate capacity can be provided for forecasted traffic volumes

CSS Common Ground Recommendation: Other Issues

- Where roadway widening is undertaken, use as much of the existing roadway as possible
- ·Where the roadway is widened from two to four lanes, consider leaving the existing road in place and constructing the new lanes to one side (asymmetrical widening)
- ·The CRT identified two major benefits of asymmetrical widening: improved traffic flow during construction, and enhanced constructability
- ·Asymmetrical widening should not preclude making improvements to horizontal and vertical alignment deficiencies

Concept plans for three distinct proposals and one blended proposal were prepared by the CSS Project's consultant team, with input from the CRT. The concepts were originally presented to the public at the November 2004 Public Involvement Session. Revised concepts were presented to the public for review and comment at the May 2005 Public Involvement Session. The majority of the CRT members supported a blend of roadway cross sections along the corridor. Proposed Build Alternative A in this document represents the majority decision of the CRT.

Additionally, the CSS document includes three minority objection statements that were prepared for specific sections of the project study area by members of the CRT. Proposed Alternative B of this document was developed to address the minority objection statement to minimize impacts to Yancey's Tavern and the East Lawn Memorial Gardens, which are located on opposite sides of SR 126 (Memorial Boulevard) near Cooks Valley Road.

In March of 2006 TDOT issued a Road Safety Audit Review (RSAR) recommending safety improvements at the intersection of Carolina Pottery Drive/Overhill Drive with SR 126 (Memorial Boulevard). This intersection is located near the I-81 Interchange. The safety improvements were warranted due to the crash rate of this intersection being over four times the critical crash rate for similar intersections. The improvements recommended in the RSAR have been constructed. The improvements included realigning the left turn lanes along SR 126 (Memorial Boulevard) to improve sight distance, improving signing and striping at the intersection, and cutting vegetation to improve sight distance.

In December of 2008 The City of Kingsport Planning MPO Office developed the *Draft State Route 126/Memorial Boulevard (Sullivan County) Safety Improvements Project* report. The report notes recommended major and minor improvements to be constructed. It notes that many of the proposed safety improvements such as intersection improvements and upgrading the S-curves on Chestnut Ridge will become an integral part of the future final upgrade of the highway. The report was issued "due to the excessive length of time to complete the highway upgrade and the urgent need to provide immediate safety enhancements."

In June of 2009 another RSAR was issued by TDOT, this time recommending safety improvements along the entire study corridor from East Center Street to I-81. This RSAR utilized input from the CSS Project and the City of Kingsport's safety study. The RSAR notes that the crash rate along the entire corridor is higher than the statewide average crash rates for similar roadway segments. The RSAR identified short-term safety solutions that would correct critical areas of concern. Example improvements include signing and striping improvements,

the implementation of rumble strips/stripes, and minor shoulder improvements. The recommendations in the RSAR were completed in 2010.

Each of these safety studies demonstrates a documented need for safety improvements along the study corridor. These past efforts to improve the safety of the roadway have involved relatively inexpensive improvements for spot locations along the route. These efforts attempt to mitigate locations with high crash rates. A corridor-wide improvement is needed to improve the roadway characteristics of SR 126 (Memorial Drive).

1.4 PURPOSE AND NEED OF THE PROPOSED ACTION

1.4.1 Purpose of the Proposed Action

The purpose of the project is to provide a safe, efficient route for local traffic between the City of Kingsport and I-81. Improvements should be sensitive to the context of the different land uses along the corridor. Specifically, the improvements along the western half of the project, which is more commercial and residential, should provide improved access to adjacent businesses and homes and improved pedestrian and bicycle connectivity. The improvements along the eastern half of the project should complement the rural nature of the area.

1.4.2 Need of the Proposed Action

The needs of the project can be summarized as follows:

- The safety of the route needs to be improved. The crash rates observed along the entire SR 126 (Memorial Boulevard) study corridor exceeded the statewide average crash rates for similar roadway segments.
- The width of the roadway generally needs to be improved. Most of the existing roadway includes 11 foot wide lanes with narrow shoulders.
- The width of the shoulders needs to be improved. The shoulders along the route are typically no wider than 2 feet and often not paved. The narrow shoulders, along with other existing geometric deficiencies, contribute to the high crash rates and create a less than desirable route for pedestrians and bicyclists.
- The geometry of the roadway needs to be improved. Numerous horizontal and vertical curves along the route are inadequate for the posted speed limit.
- Improved access management is needed along the commercial areas of the route. The public cited access onto SR 126 (Memorial Boulevard) as a major problem. Difficulty entering or exiting business parking lots was identified as a significant problem because of uncontrolled access to businesses along the roadway. Many of the access points are located near or within substandard curves or hills that limit sight distance for drivers attempting to turn into or out of the businesses.
- Improved response time for emergency vehicles is needed. With improvements, emergency vehicles would be able to respond more efficiently to emergencies within and near the project corridor. Wider shoulders would enable motorists to pull over and allow the emergency vehicles to pass through to their intended destinations. Current conditions along SR 126 (Memorial Boulevard) do not feature many areas for vehicles to pull over.

- Improved access for mail delivery is needed. Current geometric conditions along SR 126 (Memorial Boulevard) create bottlenecks during mail delivery. Wider shoulders would enable delivery vehicles to depart the travel lane and motorists pass more safely.
- Improved access for school busses is needed. Current geometric conditions along SR 126 (Memorial Boulevard) make it difficult for school busses to make turns. Wider paved roadway widths would improve accessibility for the school busses along the corridor.
- Improved traffic operations are needed along the route.

1.5 DISCUSSION OF NEEDS OF THE PROPOSED ACTION

1.5.1 System Linkage

Kingsport is served by two United States (US) Highways, US 23 and US 11W; two Interstates, I-26 and I-81; and four State Routes, SR 93, SR 92A, SR 126, and SR 136. SR 126 (Memorial Boulevard) provides a direct link between the City of Kingsport and I-81 and continues east to Bristol. SR 126 (Memorial Boulevard) is generally parallel to US 11W and I-81 within the study limits. SR 126 (Memorial Boulevard) primarily services local traffic and provides access to these higher type facilities that are utilized for longer distance travel. It is also a popular commuter route between adjacent communities and the City of Kingsport.

The termini for this project meet the requirements of being logical and displaying independent utility. This longstanding route has connected Kingsport to communities, including Indian Hills and Bridwell Heights, for decades (this route was the original US 11W, constructed in 1926); and to I-81 since the 1970s. Improvements and reconstruction of portions of the roadway will allow this route to remain open in a safer, more efficient manner.

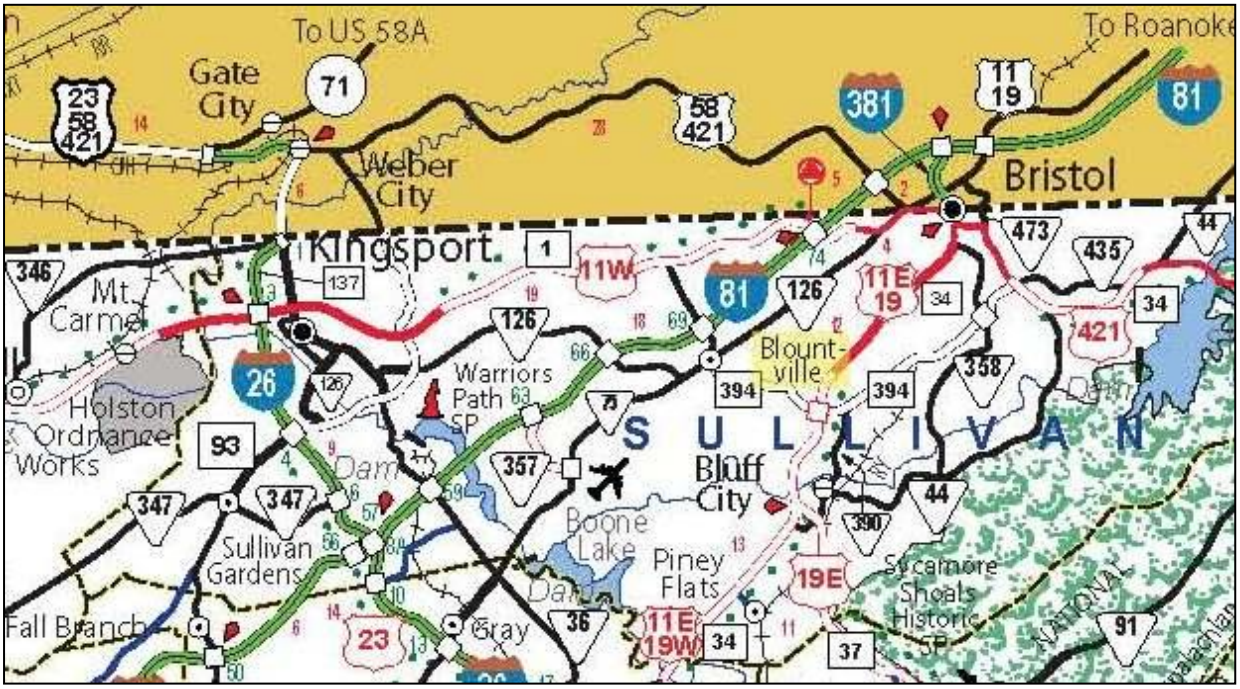


FIGURE 1.5.1: KINGSPORT HIGHWAY MAP

1.5.2 Existing Roadway Deficiencies

The existing roadway features inadequate lane widths, a lack of shoulders, and an unforgiving roadside with steep side slopes and roadside hazards. Additionally, substandard horizontal and vertical curves were identified by the public and by the Community Resource Team as a major concern on SR 126 (Memorial Boulevard). These concerns were validated by engineering field studies. Following is a summary of the identified deficiencies for horizontal and vertical curves within the study area.

Horizontal Curve Evaluation

Horizontal alignment is comprised of the straight lines and curves that make up the side to side elements of a roadway. A horizontal curve is what most people refer to as a curve or bend in the roadway. The speed at which a reasonable and prudent driver traverses a curve should be consistent with the amount of sight distance provided in the curve to allow for the driver to respond to the roadway conditions ahead. The design speed of horizontal curves should be consistent with the overall design speed of the roadway, and where it is not consistent, advisory or warning speed limits should be posted.

Along the study section of SR 126 (Memorial Boulevard), approximately 41% (20 out of 49) of the horizontal curves are substandard for the posted speed limit. **Table 1.5.1** identifies the location and severity of each deficient curve. The table also notes whether or not an advisory speed warning is posted in advance of the curve.

TABLE 1.5.1: HORIZONTAL CURVES WITH SUBSTANDARD DESIGN SPEEDS

Location	Curve Design Speed	Posted Speed Limit	Advisory Speed Warning
East of Orebank Road	25 mph	35 mph	
At Kite Street	30 mph	35 mph	
East side of Kent Street	30 mph	35 mph	
At Harbor Chapel Road	35 mph	45 mph	
East of Old Stage Road	30 mph	45 mph	30 mph
On Chestnut Ridge	35 mph	50 mph	35 mph
On Chestnut Ridge	40 mph	50 mph	35 mph
On Chestnut Ridge	40 mph	50 mph	35 mph
On Chestnut Ridge	25 mph	50 mph	35 mph
On Chestnut Ridge	30 mph	50 mph	35 mph
On Chestnut Ridge	45 mph	50 mph	35 mph
At Chestnut Ridge Road	45 mph	50 mph	
East side of Island Road	45 mph	50 mph	
At Shadowtown Road	45 mph	50 mph	
Between Natchez Lane & Dakota Drive	35 mph	50 mph	
West side of Cassidy Drive	45 mph	50 mph	
West side of Cochise Trail	45 mph	50 mph	
West of Samlola Road	40 mph	50 mph	
West of Samlola Road	45 mph	50 mph	
West of Overhill Drive	40 mph	50 mph	35 mph

Vertical Curve Evaluation

Vertical alignment is comprised of the straight lines and curves that make up the up and down elements of a roadway. A vertical curve is what most people refer to as a hill or valley. The design speed of a vertical curve is intended to prevent the driver's travel speed from exceeding his or her line of sight, thus allowing the driver ample time to respond to the roadway conditions ahead. A flatter curve allows the driver to see a greater distance, allowing a higher speed limit.

Data from a controlled aerial survey was used to develop a centerline profile for the project area of SR 126 (Memorial Boulevard). The curvature of the profile was examined to identify vertical curves that are substandard for the posted speed limit. **Table 1.5.2** lists 42 vertical curves by location that have a design speed less than the posted speed limit.

TABLE 1.5.2: VERTICAL CURVES WITH SUBSTANDARD DESIGN SPEEDS

Location	Type of Curve	Design Speed	Posted Speed	Curve Length
East of Trinity Lane	sag	35 mph	45 mph	183’
East of Trinity Lane	crest	40 mph	45 mph	214’
Between Trinity Lane & Tanglewood Road	crest	40 mph	45 mph	241’
Between Trinity Lane & Tanglewood Road	sag	40 mph	45 mph	257’
East of Old Stage Road	crest	40 mph	45 mph	273’
East of Old Stage Road	crest	40 mph	50 mph	176’
On Chestnut Ridge	sag	20 mph	50 mph	178’
On Chestnut Ridge	crest	45 mph	50 mph	379’
On Chestnut Ridge	sag	40 mph	50 mph	192’
On Chestnut Ridge	sag	45 mph	50 mph	168’
On Chestnut Ridge	crest	45 mph	50 mph	103’
On Chestnut Ridge	sag	35 mph	50 mph	164’
On Chestnut Ridge	crest	40 mph	50 mph	316’
East of Shuler Road	crest	35 mph	50 mph	346’
At Lemay Drive	crest	40 mph	50 mph	410’
East of Lemay Drive	crest	40 mph	50 mph	483’
East of Lemay Drive	sag	20 mph	50 mph	207’
West of Chestnut Ridge Road	crest	40 mph	50 mph	294’
West of Chestnut Ridge Road	sag	35 mph	50 mph	240’
East of Chestnut Ridge Road	crest	40 mph	50 mph	310’
Between Cooks Valley Road & Fisher Drive	sag	35 mph	50 mph	271’
East of Fisher Drive	crest	40 mph	50 mph	175’
Between Fisher Drive & Bridwell Heights	sag	30 mph	50 mph	271’
Between Bridwell Heights & Lana View Road	crest	40 mph	50 mph	316’
Between Lana View Road & Wembeck Drive	sag	35 mph	50 mph	295’
At Island Road	crest	40 mph	50 mph	271’
At Country Drive	crest	45 mph	50 mph	204’
West of Fall Creek Road	sag	35 mph	50 mph	219’
At Fall Creek Road	crest	40 mph	50 mph	340’
West of Cree Street	sag	35 mph	50 mph	387’
Between Cree Street & Santanta Road	crest	40 mph	50 mph	264’
At Montezuma Road	sag	40 mph	50 mph	318’
East of Natchez Lane	sag	45 mph	50 mph	600’
West of Cochise Trail	sag	35 mph	50 mph	429’
East of Cochise Trail	crest	40 mph	50 mph	291’
East of Cochise Trail	sag	45 mph	50 mph	324’
East of Cochise Trail	crest	45 mph	50 mph	350’
Between Cochise Trail & Samlola Road	crest	45 mph	50 mph	186’
Between Samlola Road & Gravel Top Road (west)	crest	45 mph	50 mph	525’
East of Gravel Top Road (east)	crest	40 mph	50 mph	390’
West of I-81 westbound ramp	sag	45 mph	50 mph	240’
West of I-81 westbound ramp	sag	40 mph	50 mph	296’

1.5.3 Modal Interrelationships

There are currently few modal interrelationships along the SR 126 (Memorial Boulevard) corridor. Narrow shoulders and lane widths, along with other existing geometric deficiencies, create a less than desirable route for pedestrians and bicyclists. Only approximately 1% of the corridor has sidewalks, limiting the facility's usage by pedestrians. Transit service is available along the far western segment of the corridor, and does not access the vast majority of the project study area east of Stratford Road.

1.5.4 Safety

A safety analysis was conducted for the project. Crash data from 1999 through 2007 was utilized in the safety analysis. The analysis demonstrates that the actual crash rates observed along the entire SR 126 (Memorial Boulevard) study corridor exceeded the statewide average crash rates for similar roadway segments (see **Table 1.5.3**).

TABLE 1.5.3: CRASH RATE SUMMARY FOR SR 126

Section Limits or Intersection Description	Typical Section	Total Crashes	Injury Crashes	Fatal Crashes	Actual Crash Rate	Statewide Average Rate
E. Center Street to Sun Bridge Rehab	4-lane undivided	130	37	0	4.014	3.3920
Sun Bridge Rehab to east of Stratford Rd.	4-lane divided	150	33	0	11.487	2.0112
East of Stratford Rd. to east of Old Stage Rd.	2-lane + climb	208	58	2	4.818	2.4188
East of Old Stage Rd. to west of Overhill Rd.	2-lane	436	137	13	2.906	1.6565
SR 126 intersection with Carolina Pottery Drive / Overhill Road	N/A	51	26	1	1.91	0.2193

Several intersections along SR 126 (Memorial Boulevard) were also identified as having high numbers of crashes. Those intersections include (with the number of crashes in parentheses):

- Overhill Road/Carolina Pottery Drive (74)
- Stratford Road (49)
- SR 93 (John B. Dennis Highway) Southbound Ramps (35)
- Harbor Chapel Road (26)
- Fall Creek Road (34)
- Amy Avenue (31)
- East Center Street (25)

Sixteen fatal crashes were reported between 1999 and 2007. Their location, date, time, and type of crash are listed in **Table 1.5.4**. As can be seen in the table, the majority of the fatal crashes were either lane departure crashes or head on crashes. These types of crashes are generally associated with high travel speeds, poor roadside design/lack of shoulders, and narrow lanes.

Table 1.5.5 lists the fatal crash rates along the SR 126 (Memorial Boulevard) Study Corridor. As can be seen in the table, the actual fatal crash rate along SR 126 (Memorial Boulevard) from Stratford Road to Overhill Road is between two to eight times higher than the statewide fatal crash rate for similar roadway segments. The area between Stratford Road and Overhill Road is 7.4 miles long and accounts for 88% of the 8.4 mile long study corridor.

TABLE 1.5.4: FATALITY CRASH LOCATIONS

Location Description	Date	Time	Type of Crash
Culvert between East Lawn Cemetery and Chestnut Ridge Road	3/27/99	21:25	The vehicle ran off the road and overturned.
Overhill Road / Carolina Pottery	6/5/00	15:13	Angle collision between two vehicles
East of Cochise Trail	6/7/00	6:18	Head-on collision between two vehicles
Between Chestnut Ridge Road and Old Stage Road	5/20/02	18:35	The vehicle ran off the road and hit a fixed object.
Between Trinity Lane and Tanglewood Road	8/26/02	14:58	The vehicle ran off the road and overturned.
Between Island Road and Country Acres Drive	7/16/03	1:40	The vehicle ran off the road and hit a fixed object.
Between Old Stage Road and Cooks Valley Road	7/18/03	16:15	Head-on collision between two vehicles
Between Chestnut Ridge Road and Old Stage Road	1/13/03	6:25	Angle collision between two vehicles
Between Trinity Lane and Tanglewood Road	1/16/04	18:25	Vehicle was sideswiped by an on-coming vehicle
Between LeMay Drive and Chestnut Ridge Road	8/9/04	5:00	Single car crash; vehicle encountered an animal
Between Cree Street and Satanta Road	3/25/04	23:55	The vehicle ran off the road and hit a fixed object.
At the SR 126 intersection with Satanta Road	9/28/04	17:45	The vehicle ran off the road and hit a fixed object.
Near the SR 126 intersection with Cochise Trail	11/24/04	12:00	Vehicle collided with a utility pole
Between Old Stage Road and Holliday Hills Road	12/20/05	10:58	Head-on collision between two vehicles
Between Old Stage Road and Holliday Hills Road	12/12/06	14:00	Angle collision between two vehicles
Between Old Stage Road and Holliday Hills Road	10/6/06	20:35	Vehicle ran off the road to avoid colliding with another vehicle

TABLE 1.5.5: FATAL CRASH RATE SUMMARY FOR SR 126

Section Description	Fatal Crash Rates	
	SR 126	TN Average
East Center Street to Sun Bridge Rehab	0.0000	0.02
Sun Bridge Rehab to east of Stratford Road	0.0000	0.01
East of Stratford Road to east of Old Stage Road	0.0463	0.02
East of Old Stage Road to west of Overhill Rd.	0.0867	0.01

1.6 LEVEL OF SERVICE ANALYSIS

1.6.1 Traffic

Traffic projections were created by TDOT during the Context Sensitive Solutions Process to assist with determining the needed improvements. The traffic volumes are summarized in **Table 1.5.6: SR 126 Traffic Volumes**. Annual Average Daily Traffic (AADT) mainline volumes are reported for the Build and Design Years of 2013 and 2033.

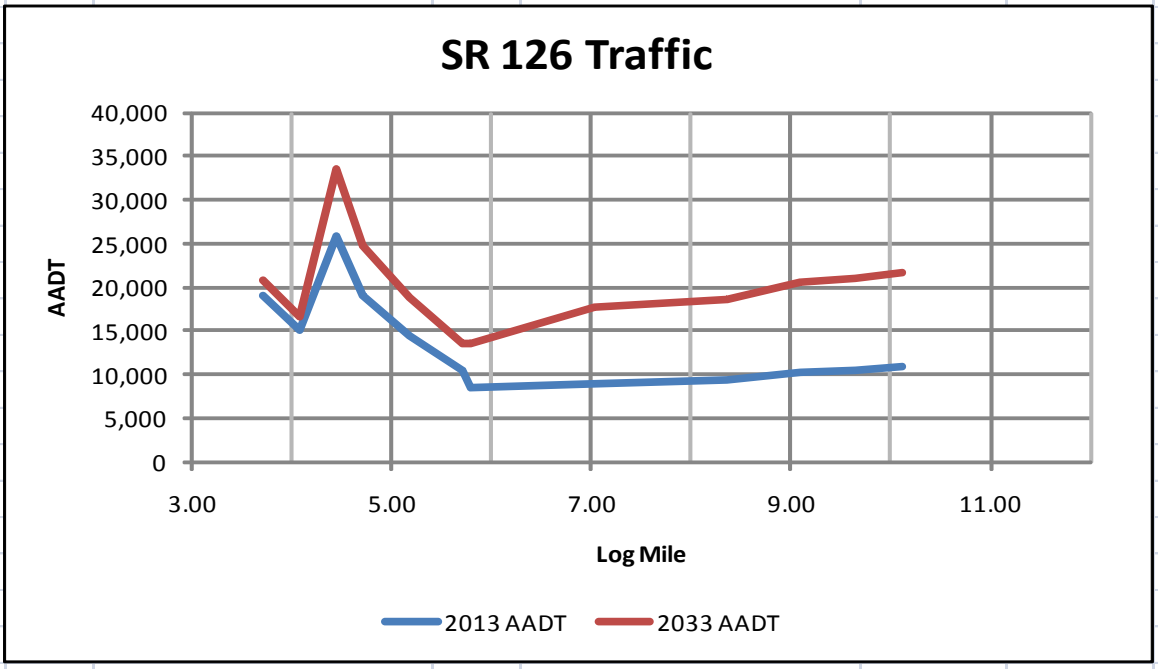
The Build Year Traffic (2013) utilized four TDOT count stations within the study corridor, historical data within the study corridor, and calibrated turning movement counts. The Design Year Traffic (2033) was calculated utilizing four zones segmented by the TDOT count stations, with respect to variance in growth rates provided from the Kingsport MPO model. The growth rates were as follows:

- 0.5% per year between East Center Street and SR 93 (John B. Dennis Highway)
- 1.5% per year between SR 93 (John B. Dennis Highway) and Old Stage Road
- 3.0% per year between Old Stage Road and Shuler Drive
- 5.0% per year between Shuler Drive and I-81 and Shuler Drive

As can be seen in **Table 1.5.6**, the traffic is heaviest at the western terminus of the study corridor, peaking in the SR 93 (John B. Dennis Highway) Interchange area. The land use in this area is mixed commercial and residential. The traffic then gradually decreases until it reaches Lemay Drive. Lemay Drive is located near Kingsport's City Limits in a residential area. The land use east from Lemay Drive changes from residential to rural. East from Lemay Drive, the traffic volumes are lighter, but increase gradually until reaching the study corridor's eastern terminus at I-81.

TABLE 1.5.6: SR 126 TRAFFIC VOLUMES

SR 126 Existing and Future Traffic Volumes					
From		To		2013	2033
L.M.	Cross Road	L.M.	Cross Road	AADT	AADT
3.72	East Center Street	4.09	Orebank Road	18,960	20,860
4.09	Orebank Road	4.44	SR 93	15,100	16,700
4.44	SR 93	4.71	Hawthorne Street	25,800	33,540
4.71	Hawthorne Street	5.18	Harbor Chapel Road	19,080	24,800
5.18	Harbor Chapel Road	5.72	Briarwood Road	14,500	18,850
5.72	Briarwood Road	5.80	Old Stage Road	10,430	13,560
5.80	Old Stage Road	7.04	Lemay Road	8,450	13,520
7.04	Lemay Road	8.37	Island Road	8,920	17,840
8.37	Island Road	9.10	Fall Creek Road	9,360	18,720
9.10	Fall Creek Road	9.65	Hill Road	10,260	20,520
9.65	Hill Road	10.11	Harr Town Road	10,550	21,100
10.11	Harr Town Road	12.12	I-81	10,830	21,660



1.6.2 Capacity Analysis Results

Several measures of effectiveness (MOE) are utilized in this document to assess the operational conditions of SR 126 (Memorial Boulevard) for the No-Build and two Build Alternatives. These measures of effectiveness are level of service, volume to capacity ratio, and average travel speed. A definition of these measures is provided in the following text. A detailed discussion of the No-Build Alternative and two Build Alternative's MOE are also provided. A summary of the No-Build and Build Alternative's Design Year (2033) MOE are provided in **Figure 1.6.1: SR 126 Design Year (2033) LOS**, **Figure 1.6.2: SR 126 Alternative Design Year (2033) MOE Comparison**, and **Figure 1.6.3: SR 126 Alternative Design Year (2033) Travel Speed Comparison**. The Level of Service calculations can be found on file at the TDOT Environmental Division Office in Nashville, TN.

Without improvements (No-Build), the corridor will experience LOS ranging from C to F in the design year and a corresponding average travel speed of 24 mph.

With improvements (Build Alternatives), the LOS will be improved to a range of B to F with an average travel speed of up to 34 mph.

Level of Service

Level of Service (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. LOS range from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each LOS represents a range of operating conditions and the driver's perception of those conditions. Please refer to **Table 1.6.1: LOS Table** for a description of each LOS.

The quality of service was assessed utilizing the methodology outlined in the *Highway Capacity Manual 2000* (HCM) *Two-Lane Highways* and *Multilane Highways* Chapters. The Level of Service (LOS) Calculations were performed with the Highway Capacity Software (HCS+T7F Version 5.3). HCS+ is developed and maintained as an implementation of the HCM procedures. HCS+ calculations assign a LOS along route segments with similar geometric and traffic characteristics.

Volume to Capacity Ratio & Congestion Reduction

Unlike LOS, which is a qualitative measure, the volume to capacity ratio (v/c) is a quantitative measure. The v/c ratio is reported to demonstrate the magnitude of congestion for the options included in this document. The v/c ratio demonstrates how much reserve capacity along a roadway segment is available, or how much the segment is overcapacity. A v/c ratio near or above "1" indicates a roadway experiences congestion.

Average Travel Speed

Average travel speed is calculated in the LOS analysis. Speed is an important measure of congestion and the quality of the traffic service provided to the motorist.

TABLE 1.6.1: LOS TABLE

LOS	Traffic Flow Conditions	Representative Photo
A	Free flow operations. Vehicles are almost completely unimpeded in their ability to maneuver with the traffic stream. The general level of physical and psychological comfort provided to the driver is high.	
B	Reasonable free flow operations. The ability to maneuver within the traffic stream is only slightly restricted and the general level of physical and psychological comfort provided to the driver is still high.	
C	Flow with speeds at or near free flow speeds. Freedom to maneuver within the traffic stream is noticeably restricted and lane changes require more vigilance on the part of the driver. The driver notices an increase in tension.	
D	Speeds decline with increasing traffic. Freedom to maneuver within the traffic stream is more noticeably limited. The driver experiences reduced physical and psychological comfort levels.	
E	At lower boundary, the facility is at capacity. Operations are volatile because there are virtually no gaps in the traffic stream. There is little room to maneuver. The driver experiences poor levels of physical and psychological comfort.	
F	Breakdowns in traffic flow. The number of vehicles entering the highway section exceed the capacity or ability of the highway to accommodate that number of vehicles. There is little room to maneuver. The driver experiences poor levels of physical and psychological comfort.	

No-Build Alternative

The No-Build Alternative makes no improvements to SR 126 (Memorial Boulevard) other than scheduled maintenance activities. The existing roadway characteristics of the No-Build Alternative are discussed in **Section 1.2.2**.

For the No-Build Alternative, the Highway Capacity Software (HCS) analysis calculates Levels of Service (LOS) ranging from C to F along SR 126 (Memorial Boulevard) through the year 2033 during peak hour conditions. Eighty-seven percent (87%) of the route is calculated to operate with a deficient LOS of E or F by 2033. A summary of the LOS calculations for the No-Build Alternative is provided in **Table 1.6.2**. The LOS are reported for the years 2013 and 2033.

For the No-Build Alternative in the year 2013, the volume to capacity ratio (v/c) of SR 126 (Memorial Boulevard) is calculated to range from 0.27 to 0.76, with a weighted average of 0.47. In 2033, the v/c ranges from 0.54 to 0.99 with a weighted average of 0.81. The average was weighted based upon the length of each segment analyzed. A v/c ratio near or above "1" indicates a roadway experiences congestion. A summary of the v/c calculations for the No-Build Alternative is provided in **Table 1.6.2**. The v/c are reported for the years 2013 and 2033.

The speed limit ranges from 35 to 50 mph along SR 126 (Memorial Boulevard). For the No-Build Alternative in the year 2013, travel speeds along the corridor are calculated by the HCS to range from 21 mph to 42 mph, with a weighted average of 32 mph. In 2033, the travel speed ranges from 15 mph to 42 mph with a weighted average of 24 mph. The average was weighted based upon the length of each segment analyzed. The weighted average of the speed limit along the route is 47 mph. The calculated average route speed is 68% and 51% of the posted speed limit in the years 2013 and 2033, respectively. A summary of the travel speed calculations for the No-Build Alternative is provided in **Table 1.6.2**. The travel speeds are reported for the years 2013 and 2033.

The existing SR 126 (Memorial Boulevard) Corridor (No-Build Alternative) between East Center Street to the west and I-81 to the east is 8.4 miles in length. For the No-Build Alternative in the year 2013, the travel time along the corridor is calculated to be 16 minutes. In 2035, the travel time is calculated to be 21 minutes.

Build Alternative A

Build Alternative A improves SR 126 (Memorial Boulevard) to a four-lane facility (two travel lanes in each direction) within the commercial and residential areas of the western half of the study corridor. The eastern half of the study corridor, which is rural in nature, will remain a two-travel lane facility. Improved shoulders will be provided along the entire corridor and sidewalks will be extended to the majority of the commercial and residential areas. Build Alternative A is discussed in more detail in **Chapter 2**.

For Build Alternative A, the Highway Capacity Software (HCS) analysis calculates Levels of Service (LOS) ranging from B to F along SR 126 (Memorial Boulevard) through the year 2033 during peak hour conditions. Fifty-four percent (54%) of the route is calculated to operate with a deficient LOS of E or F by 2033. A summary of the LOS calculations for Build Alternative A is provided in **Table 1.6.3**. The LOS are reported for the years 2013 and 2033.

For Build Alternative A in the year 2013, the volume to capacity ratio (v/c) of SR 126 (Memorial Boulevard) is calculated to range from 0.24 to 0.70, with a weighted average of 0.38. In 2033, the v/c ranges from 0.31 to 0.91 with a weighted average of 0.64. The average was weighted

based upon the length of each segment analyzed. A v/c ratio near or above "1" indicates a roadway experiences congestion. A summary of the v/c calculations for Build Alternative A is provided in **Table 1.6.3**. The v/c are reported for the years 2013 and 2033.

The speed limit of Alternative A will likely range from 35 to 50 mph along SR 126 (Memorial Boulevard). For Build Alternative A in the year 2013, travel speeds along the corridor are calculated by the HCS to range from 31 mph to 43 mph, with a weighted average of 38 mph. In 2033, the travel speed also ranges from 31 mph to 43 mph, but the weighted average decreases to 34 mph. The average was weighted based upon the length of each segment analyzed. The weighted average of the proposed speed limit along the route is 44 mph. The calculated average route speed is 86% and 77% of the posted speed limit in the years 2013 and 2033, respectively. A summary of the travel speed calculations for Build Alternative A is provided in **Table 1.6.3**. The travel speeds are reported for the years 2013 and 2033.

The existing SR 126 (Memorial Boulevard) Corridor (No-Build Alternative) between East Center Street to the west and I-81 to the east is 8.4 miles in length. The length of Build Alternative A will be similar. For Build Alternative A in the year 2013 the travel time along the corridor is calculated to be 13 minutes. In 2033, the travel time is calculated to be 15 minutes.

Build Alternative B

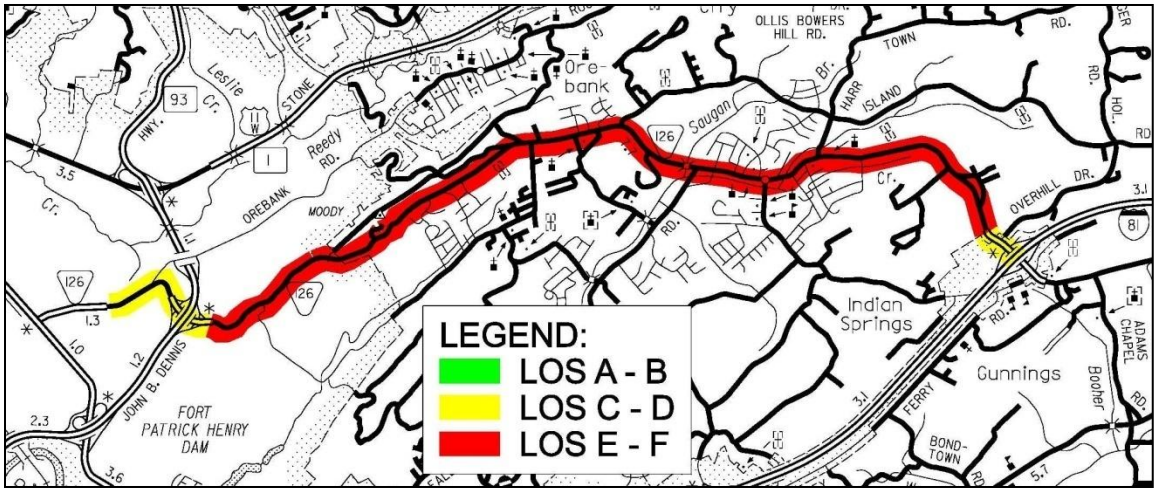
Build Alternative B is similar to Build Alternative A. The length of the four-lane improvement is reduced by approximately 0.46 mile in Build Alternative B to reduce impacts to East Lawn Memorial Gardens while avoiding impacts to Yancey's Tavern. These environmentally sensitive properties are located on either side of SR 126 (Memorial Boulevard) near Eaton Station Road. Build Alternative B is discussed in more detail in **Chapter 2**.

For Build Alternative B, the Highway Capacity Software (HCS) analysis calculates Levels of Service (LOS) ranging from B to F along SR 126 (Memorial Boulevard) through the year 2033 during peak hour conditions. Fifty-nine percent (59%) of the route is calculated to operate with a deficient LOS of E or F by 2033. A summary of the LOS calculations for Build Alternative B is provided in **Table 1.6.4**. The LOS are reported for the years 2013 and 2033.

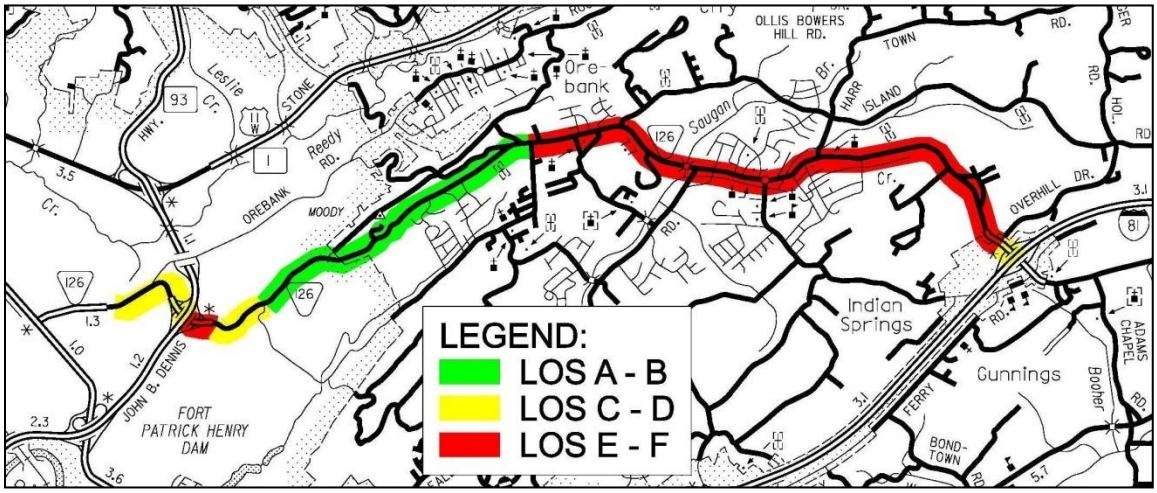
For Build Alternative B in the year 2013, the volume to capacity ratio (v/c) of SR 126 (Memorial Boulevard) is calculated to range from 0.24 to 0.70, with a weighted average of 0.39. In 2033, the v/c ranges from 0.31 to 0.91 with a weighted average of 0.67. The average was weighted based upon the length of each segment analyzed. A v/c ratio near or above "1" indicates a roadway experiences congestion. A summary of the v/c calculations for Build Alternative B is provided in **Table 1.6.4**. The v/c are reported for the years 2013 and 2033.

The speed limit of Alternative B will likely range from 35 to 50 mph along SR 126 (Memorial Boulevard). For Build Alternative B in the year 2013, travel speeds along the corridor are calculated by the HCS to range from 31 mph to 43 mph, with a weighted average of 38 mph. In 2033, the travel speed also ranges from 31 mph to 43 mph, but the weighted average decreases to 33 mph. The average was weighted based upon the length of each segment analyzed. The weighted average of the proposed speed limit along the route is 44 mph. The calculated average route speed is 86% and 75% of the posted speed limit in the years 2013 and 2033, respectively. A summary of the travel speed calculations for Build Alternative B is provided in **Table 1.6.4**. The travel speeds are reported for the years 2013 and 2033.

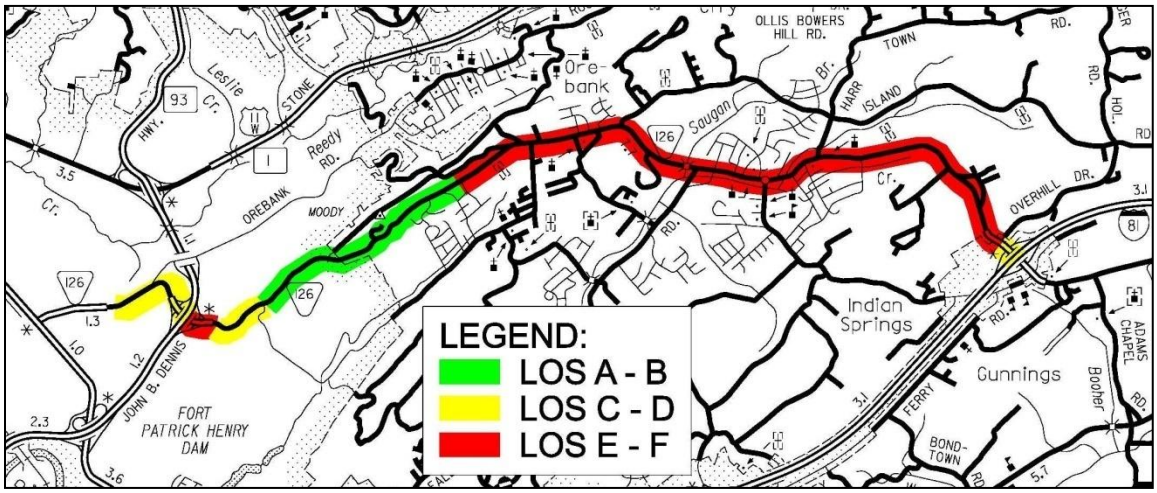
The existing SR 126 (Memorial Boulevard) Corridor (No-Build Alternative) between East Center Street to the west and I-81 to the east is 8.4 miles in length. The length of Build Alternative B will be similar. For Build Alternative B in the year 2013 the travel time along the corridor is calculated to be 13 minutes. In 2033, the travel time is calculated to be 15 minutes.



No-Build



Build Alternative A



Build Alternative B

FIGURE 1.6.1: SR 126 DESIGN YEAR (2033) LOS

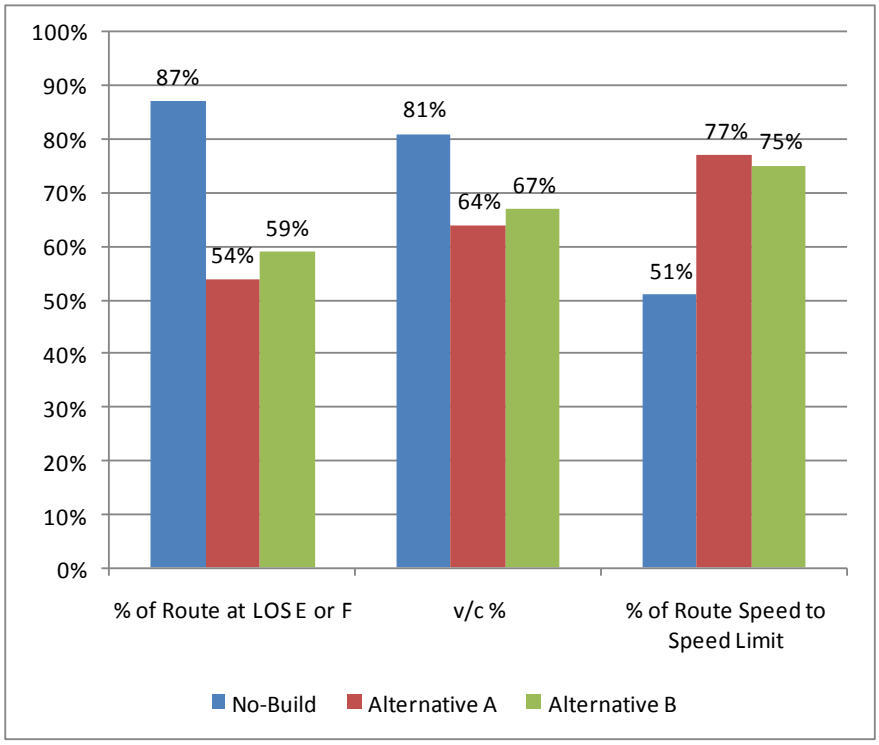


FIGURE 1.6.2: SR 126 ALTERNATIVE DESIGN YEAR (2033) MOE COMPARISON

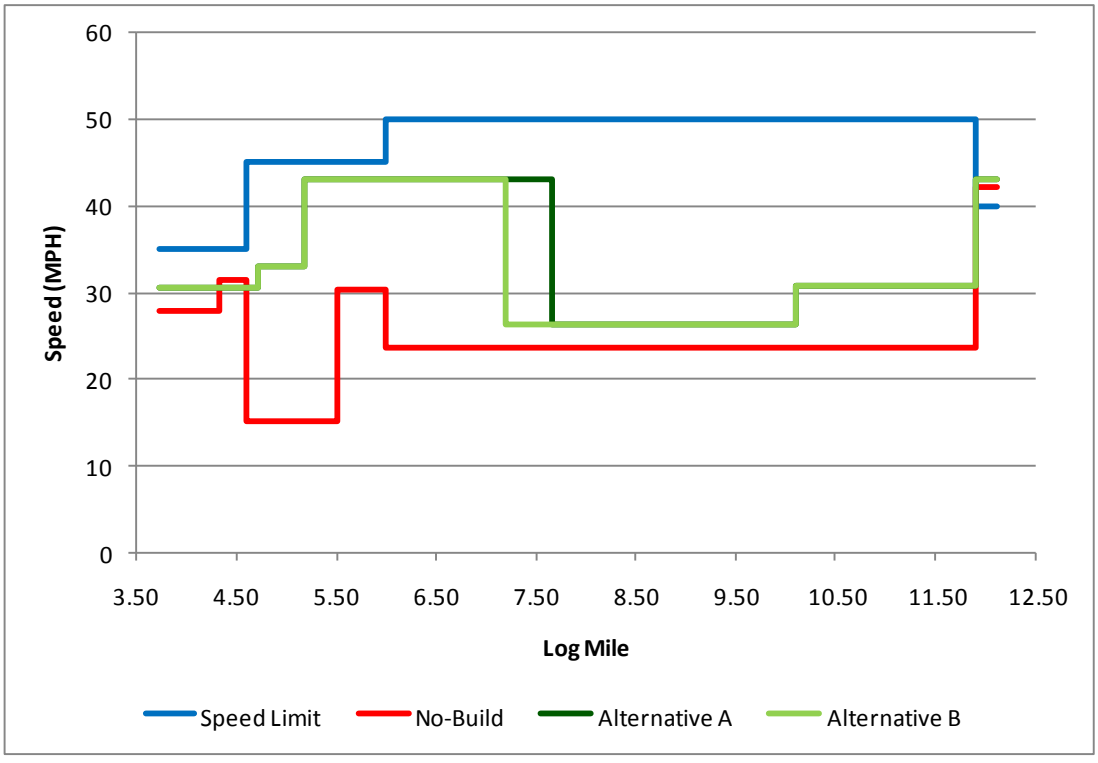


FIGURE 1.6.3: SR 126 ALTERNATIVE DESIGN YEAR (2033) TRAVEL SPEED COMPARISON

TABLE 1.6.2: NO-BUILD ALTERNATIVE LOS

ID	From		To		Dist.	Cross Section	Speed	2013				2033			
	L.M.	Desc.	L.M.	Desc.			Limit	AADT	LOS	Speed	v/c	AADT	LOS	Speed	v/c
1	3.72	Center St.	4.33	Hillcrest Dr.	0.61	4-Lanes with No Median and Narrow Shoulders	35	18,960	C	28	0.51	20,860	C	28	0.56
2	4.33	Hillcrest Dr.	4.60	Heather Ln.	0.27	4-Lanes with a Raised Grass Median and Wide Shoulders	35	25,800	D	32	0.70	33,540	D	32	0.91
3	4.60	Heather Ln.	5.50	Tangle-wood Rd.	0.9	2-Lanes Eastbound, 1-Lane Westbound with No Median and Narrow Shoulders	45	19,080	E	21	0.76	24,800	F	15	0.99
4	5.50	Tangle-wood Rd.	6.00	Ethel Dr.	0.5	2-Lanes with TWLTL and Narrow Shoulders	45	10,430	E	33	0.42	13,560	E	30	0.54
5	6.00	Ethel Dr.	11.90	Carolina Pottery Dr.	5.9	2-Lanes with No Median and Narrow Shoulders	50	10,550	E	33	0.42	21,100	F	24	0.84
6	11.90	Carolina Pottery Dr.	12.12	I-81	0.22	4-Lanes with a Raised Grass Median and Wide Shoulders	40	10,830	B	42	0.27	21,660	C	42	0.55
				Σ =	**8.4**	**Weighted Average =**	**47**			**32**	**0.47**			**24**	**0.81**

TABLE 1.6.3: BUILD ALTERNATIVE A LOS

ID	From		To		Dist.	Cross Section	Speed	2013				2033			
	L.M.	Desc.	L.M.	Desc.			Limit	AADT	LOS	Speed	v/c	AADT	LOS	Speed	v/c
1a	3.72	Center St.	4.44	SR 93	0.72	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	18,960	C	31	0.51	20,860	C	31	0.56
1b	4.44	SR 93	4.71	Haw-thorne St.	0.27	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	25,800	D	31	0.70	33,540	E	31	0.91
2	4.71	Haw-thorne St.	5.18	Harbor Chapel Rd.	0.47	4-Lanes with a TWLTL and 4 Ft. Shoulders	35	19,080	C	33	0.52	24,800	D	33	0.67
3	5.18	Harbor Chapel Rd.	7.66	Cooks Valley Rd.	2.48	4-Lanes with a Raised Grass Median and 4-8 Ft. Shoulders	45	10,430	A	43	0.24	13,560	B	43	0.31
4	7.66	Cooks Valley Rd.	10.11	Harr Town Rd.	2.45	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	10,260	E	36	0.41	20,520	E	26	0.82
5	10.11	Harr Town Rd.	11.90	Carolina Pottery Rd.	1.79	2-Lanes with No Median and 10 Ft. Shoulders	50	10,830	D	41	0.43	21,660	F	31	0.86
6	11.90	Carolina Pottery Rd.	12.12	I-81	0.22	4-Lanes with a Raised Grass Median and 12 Ft. Shoulders	40	10,830	B	43	0.27	21,660	C	43	0.55
				Σ =	**8.4**	**Weighted Average =**	**44**			**38**	**0.38**			**34**	**0.64**

TABLE 1.6.4: BUILD ALTERNATIVE B LOS

ID	From		To		Dist.	Cross Section	Speed	2013				2033			
	L.M.	Desc.	L.M.	Desc.			Limit	AADT	LOS	Speed	v/c	AADT	LOS	Speed	v/c
1a	3.72	Center St.	4.44	SR 93	0.72	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	18,960	C	31	0.51	20,860	C	31	0.56
1b	4.44	SR 93	4.71	Haw-thorne St.	0.27	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	25,800	D	31	0.70	33,540	E	31	0.91
2	4.71	Haw-thorne St.	5.18	Harbor Chapel Rd.	0.47	4-Lanes with a TWLTL and 4 Ft. Shoulders	35	19,080	C	33	0.52	24,800	D	33	0.67
3	5.18	Harbor Chapel Rd.	7.20	Lemay Dr.	2.02	4-Lanes with a Raised Grass Median and 4-8 Ft. Shoulders	45	10,430	A	43	0.24	13,560	B	43	0.31
4	7.20	Lemay Dr.	10.11	Harr Town Rd.	2.91	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	10,260	E	36	0.41	20,520	E	26	0.82
5	10.11	Harr Town Rd.	11.90	Carolina Pottery Rd.	1.79	2-Lanes with No Median and 10 Ft. Shoulders	50	10,830	D	41	0.43	21,660	F	31	0.86
6	11.90	Carolina Pottery Rd.	12.12	I-81	0.22	4-Lanes with a Raised Grass Median and 12 Ft. Shoulders	40	10,830	B	43	0.27	21,660	C	43	0.55
				Σ =	**8.4**	**Weighted Average =**	**44**			**38**	**0.39**			**33**	**0.67**

1.7 CONSISTENCY WITH EXISTING TRANSPORTATION PLANS

The project is included in the Kingsport Metropolitan Planning Organization's (MPO) *Transportation Improvement Program, Fiscal Years 2011 through 2014*, adopted October 20th, 2010. The project is listed in *Section A, Previous Projects*. The projects in Section A are major projects carried over from the previous (2008-2011) Transportation Improvement Program (TIP). The project is listed on page 12 of the 2011-2014 TIP. The project description is provided in **Table 1.7.1: TIP Listing**.

This project is also included in the *Kingsport Metropolitan Area 2030 Transportation Plan*, dated June 14, 2007 and amended January 10, 2008. The plan addresses the future transportation needs within the MPO boundary. The project is listed on pages 119 and 120 of the amended plan. The project description is provided in **Table 1.7.2: Transportation Plan Listing**.

TABLE 1.7.1: TIP LISTING

ID	Project Location	Description	Status
TN-5 PIN 105467.00	SR 126 from Center St. to I-81	Reconstructing/widening improvements	Currently in PE Phase

TABLE 1.7.2: TRANSPORTATION PLAN LISTING

Project No.	Jurisdiction	Project Name (not Prioritized)	Location (To and From)	Functional Classification	Project Purpose	Type Project	General Improvements	Additional Information	Estimated Cost
MNA-20a	Kingsport Sullivan County	Memorial Blvd./State Route 126	Center Street to Cook's Valley Road	Minor Arterial	Safety and Related Congestion Relief	Major Reconstruction	Reconstruct to 4 lanes with grass median	Apply context sensitive solutions concepts	$22,867,800
MNA-20b	Kingsport Sullivan County	Memorial Blvd./State Route 126	Cook's Valley Road to I-81	Minor Arterial	Safety and Related Congestion Relief	Major Reconstruction	Reconstruct to 3 lanes and wide shoulder/clear zones, soften curbs	3 lanes/2 lanes/widen shoulders	$17,150,850

1.8 SUMMARY

Based on the above discussion, it has been determined that there is a need for the proposed project. SR 126 (Memorial Boulevard) provides a direct link between the City of Kingsport and I-81. SR 126 (Memorial Boulevard) is generally parallel to US 11W and I-81 within the study limits. SR 126 (Memorial Boulevard) primarily services local traffic and provides access to these higher type facilities that are utilized for longer distance travel. It is also a popular commuter route between adjacent communities and the City of Kingsport. SR 126 (Memorial Boulevard) has documented safety and geometric deficiencies that need to be improved. The existing roadway allows no safe modal choice except for automobiles due to the narrow shoulders and lack of sidewalks. The project has logical termini, is of sufficient length to address environmental matters on a broad scope, has independent utility, and will not restrict consideration of alternatives for other foreseeable transportation improvements.

Chapter 2: Alternatives

2.0 ALTERNATIVES

This chapter of the Draft Environmental Impact Statement (DEIS) describes the alternatives under consideration for the 8.4 mile-long SR 126 (Memorial Boulevard) Corridor improvement project. In selecting reasonable alternatives to meet the purpose and need of the project, TDOT consulted with local, state and federal officials and agencies, identified environmentally sensitive areas and held several public involvement meetings in the project corridor. The No-Build and two Build Alternatives are currently under consideration for this project. Background concerning how these alternatives were determined is provided in **Section 2.1**. The geometric features of the existing roadway, which are consistent with the No-Build Alternative, were discussed in detail in **Chapter 1, Section 1.2**. The two Build Alternatives (Build Alternative A and Build Alternative B) are described in detail in **Sections 2.3** and **2.4.** The No-Build and two Build Alternatives are compared in **Section 2.5**, along with how each alternative addresses the purpose and need of the project. Conceptual Layouts of Alternatives A and B are provided in **Appendix D**. The alternatives that were considered but eliminated from further study are described and the reason for their elimination are summarized in **Section 2.6**. The final selection of the preferred alternative will not be made until after the impacts of the No-Build and Build Alternatives, comments on the Draft EIS, and the comments from the NEPA Public Hearing have been fully evaluated.

2.1 BACKGROUND IN DETERMINING REASONABLE ALTERNATIVES TO INCLUDE IN THE DEIS

The SR 126 (Memorial Boulevard) project was the initial Context Sensitive Solutions (CSS) Project for Tennessee. A Community Resource Team (CRT) was assembled for the SR 126 (Memorial Boulevard) CSS project. The CRT met thirteen times for meetings, training, and workshops and conducted three series of Public Involvement Sessions between October 2003 and May 2005.

A continuous four-travel lane alternative with a divided median was considered and discussed beginning in the planning stages of the project and through the CSS phase. Although some support was noted for this alternative, there was considerable opposition, in part, due to the increased right-of-way requirements, which would require a higher number of family and business relocations, adverse impacts to the historic Yancey's Tavern property, and additional grave relocations within the East Lawn Memorial Gardens Cemetery located directly across the roadway from the tavern. The continuous four-travel lane alternative would also require higher areas of encroachment into floodplains, greater lengths of channel changes to streams, and potentially additional hazardous material impacts. The public expressed concerns about potential diminished visual and rural aesthetics, accelerated development and increased traffic speed in the corridor if a continuous four-lane alignment was constructed.

In the CSS Process, the public expressed preferences for the blending of four-, three-, and two-lane sections of the roadway. They also expressed a preference for maintaining fewer travel lanes and lower speed limits in portions of the project area to minimize potential increases in land use changes adjacent to the project area.

Concept plans were presented at the public involvement meetings associated with the CSS Process. The concept plans were not fully developed alternatives. They were presented as tables with options (i.e., landscaped median or center turn lane), and presented to the public for discussion. Three main concepts, A, B, and C, were presented during the Public Involvement

Session that occurred at Sunnyside Baptist Church on May 26, 2005. The Summary of Cross Section Elements for these conceptual alternatives is included in **Appendix E**.

A detailed preference survey was included at the end of handout material distributed during the May 2005 Public Involvement Session. In the survey, citizens were asked to express a preference for Concept A, B, C, or the "No-Build" Alternative along various segments of the study corridor. The public comments favored Concept C by 1102 of the 2424 responses collected. Concept C incorporates the public's expressed preference for the blending of four-, three-, and two-lane sections of the roadway along the corridor. Concepts A and B were dismissed by the CRT and TDOT based on public lack of support for a four-lane section in the portion of the project between Cooks Valley Road and I-81. Concept C was carried forward for further consideration in the design process. Concept C has been renamed Build Alternative A in this document. Build Alternative B in this document is a refinement of Build Alternative A. Build Alternative B incorporates the public's desire to minimize adverse impacts to the historic Yancey's Tavern property and additional grave relocations within the East Lawn Memorial Gardens Cemetery, located directly across the roadway from the tavern.

2.2 NO-BUILD ALTERNATIVE

The No-Build, or No Action, Alternative makes no improvements to SR 126 (Memorial Boulevard) other than scheduled maintenance activities. There are several advantages to the No-Build Alternative. One is that present travel patterns would not be temporarily disrupted by the construction of this project. Noise and construction impacts would not occur. There would be no impacts to wildlife, cultural resources, or farmland. There would be no family or business relocations. The No-Build Alternative would have no direct impacts on the environment.

There are, however, several disadvantages to the No-Build Alternative. It would not improve vehicular, pedestrian, or bicyclist mobility. It would not correct existing geometric deficiencies along the route. It would not improve safety. It does not meet the Purpose and Need of the project.

2.3 BUILD ALTERNATIVE A

Build Alternative A improves SR 126 (Memorial Boulevard) to a four-lane facility (two travel lanes in each direction) within the commercial and residential areas of the western half of the study corridor. The eastern half of the study corridor, which is rural in nature, will remain a two-travel lane facility. Either a raised median or two way left turn lane (TWLTL) will be provided along the majority of the route. Improved shoulders will be provided along the entire corridor and sidewalks will be extended to the majority of the commercial and residential areas.

Several different typical cross sections are proposed along the SR 126 (Memorial Boulevard) corridor. Additional right-of-way will be required along the entire corridor to accommodate the proposed improvements. **Section 2.3.1** describes the proposed roadway cross-sections in detail. The proposed roadway characteristics are also summarized in **Figures 2.3.1** through **2.3.20** and **Table 2.3.1**. Additionally, Conceptual Layouts of Build Alternative A are provided in **Appendix D**.

The proposed alignment of Alternative A generally follows the existing alignment. The proposed alignment shifts from side to side to minimize impacts, reduce earthwork volumes, simplify constructability, and improve the curvature of the roadway. Despite the effort to minimize

impacts, considerable additional right-of-way will be required and many residences and businesses will need to be relocated. Numerous gravesites will also need to be relocated.

In addition to the SR 126 (Memorial Boulevard) roadway typical cross section and alignment improvements, several side road intersection approaches to SR 126 (Memorial Boulevard) are improved. Many of these minor connections intersect SR 126 (Memorial Boulevard) at skewed angles. Realigning side road approaches to intersect to as close to 90 degrees as possible has proven visibility and safety benefits. Conceptual Layouts of Build Alternative A, which include the proposed side road approach realignments, are provided in **Appendix D**. Side Road approaches to SR 126 (Memorial Boulevard) to be realigned include:

- Warpath Drive
- Miller Street
- Orebank Road
- John B. Dennis Exit Ramp
- Heather Lane
- Old Stage Road
- Eaton Station Road
- Woods Way
- Island Road
- Natchez Lane
- Harr Town Road
- Adams Street

Several intersections are proposed to be closed along SR 126 (Memorial Boulevard). These minor connections to SR 126 (Memorial Boulevard) will be rerouted to connect via improved intersections on neighboring roads. Closing these intersections will improve access control and safety along the route due to the reduction of conflict points. Conceptual Layouts of Build Alternative A, which include the proposed intersection closings, are provided in **Appendix D**. Intersections to be closed along SR 126 (Memorial Boulevard) include:

- Edens Ridge Road
- Hawthorne Street
- Kent Street
- Amy Avenue
- Trinity Lane
- Tanglewood Road
- Holiday Road
- Shuler Drive
- Chestnut Ridge Road
- Red Robin Lane
- Gravel Top Road

2.3.1 Build Alternative A Typical Proposed Roadway Cross Sections

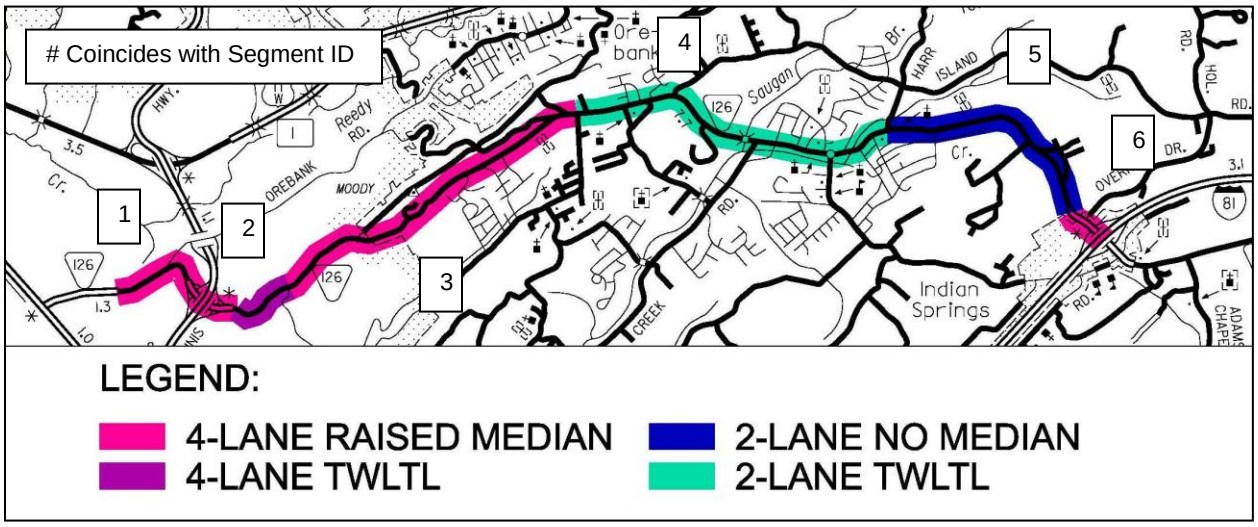


FIGURE 2.3.1: BUILD ALTERNATIVE A CROSS SECTION LEGEND

1. East Center Street (L.M. 3.72) to west of Hawthorne Street (L.M. 4.71)

On the first 1.0 mile long segment from East Center Street to west of Hawthorne Street, the proposed cross section includes four travel lanes (two in each direction), a raised grass median, four-foot wide paved shoulders, and curb and gutter. Sidewalks will be located on both sides of the roadway. The travel lanes will be eleven feet wide. The four-foot wide shoulders will accommodate bicyclists. The design speed of this segment is 35 miles per hour. Please refer to **Figure 2.3.2** for a depiction of the proposed typical section of this segment. Renderings of the existing and proposed typical sections in this segment are provided in **Figures 2.3.3** and **2.3.4**.

A roundabout is proposed at the five legged intersection of SR 126 (Memorial Boulevard), East Center Street, Warpath Drive, and Miller Street located at the corridor's western terminus. A roundabout is a type of circular road intersection where traffic enters a one-way stream around a central island. Statistically, roundabouts are safer than traditional intersections. While a roundabout is the preferred improvement option at this intersection, a second option, which would maintain the existing traffic signal, is still under consideration.

Additional features in this section include realigning the Orebank Road Intersection to connect to SR 126 (Memorial Boulevard) at an improved skew, closing the Edens Ridge Road Intersection, and reducing the skew and improving the channelization of the northbound John B. Dennis exit ramp to eastbound SR 126 (Memorial Boulevard). These features will improve the safety and access control along SR 126 (Memorial Boulevard).

The Shipley-Jarvis House is located adjacent to the northbound lanes near Woodside Drive in this segment. The Shipley-Jarvis House is deemed eligible for listing on the National Register of Historic Places (NRHP). The improvements will be constructed along the southbound lanes to avoid impacting the Shipley-Jarvis House.

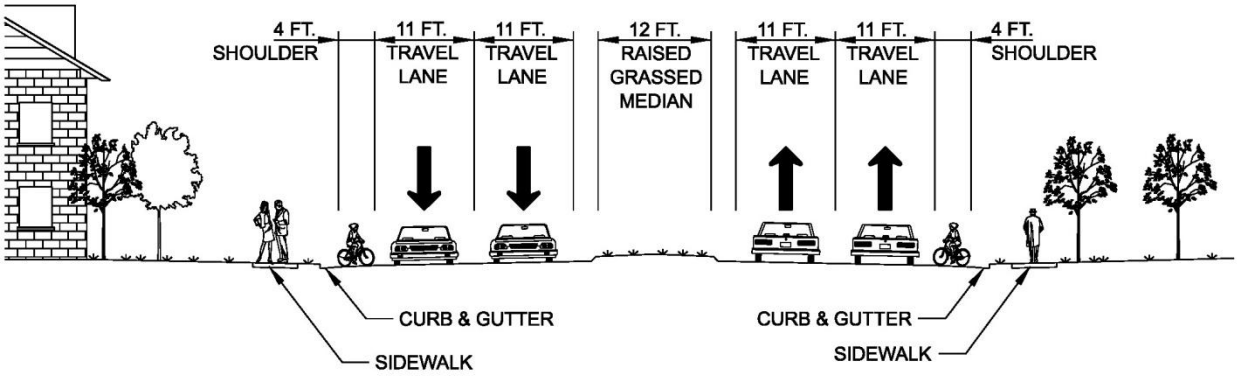


FIGURE 2.3.2: SEGMENT 1 PROPOSED TYPICAL SECTION

FIGURE 2.3.3: SEGMENT 1 EXISTING TYPICAL SECTION

FIGURE 2.3.4: SEGMENT 1 PROPOSED TYPICAL SECTION
4-Lane, Raised Median, Shoulders, Curb & Gutter, & Sidewalks

2. West of Hawthorne Street (L.M. 4.71) to Harbor Chapel Road (L.M. 5.18)

The proposed cross section of this 0.5 mile long segment of SR 126 (Memorial Boulevard) from west of Hawthorne Street to Harbor Chapel Road includes four travel lanes (two in each direction), four-foot wide paved shoulders, and curb and gutter. The median in this section will consist of a two-way left turn lane, instead of the raised grass median proposed in Segment 1. Sidewalks will be located on both sides of the roadway. The travel lanes will be eleven feet wide. The four-foot wide shoulders will accommodate bicyclists. The design speed of this segment is 35 miles per hour. Please refer to **Figure 2.3.5** for a depiction of the proposed typical section of this segment. Renderings of the existing and proposed typical sections in this segment are provided in **Figures 2.3.6** and **2.3.7**.

Additional features in this section include intersection realignments and closings. Hawthorne Street's intersection with the south side of SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via Kite Street. In addition, the Kent Street intersection with SR 126 (Memorial Boulevard) will be closed, with access to SR 126 (Memorial Boulevard) also being provided via Kite Street. The Amy Avenue/Woodridge Avenue intersection with SR 126 (Memorial Boulevard) will be closed and realigned to intersect with Glenwood Street. Heather Lane's approach to SR 126 (Memorial Parkway) will be realigned to improve the skew of the intersection. These features will improve the safety and access control along SR 126 (Memorial Boulevard).

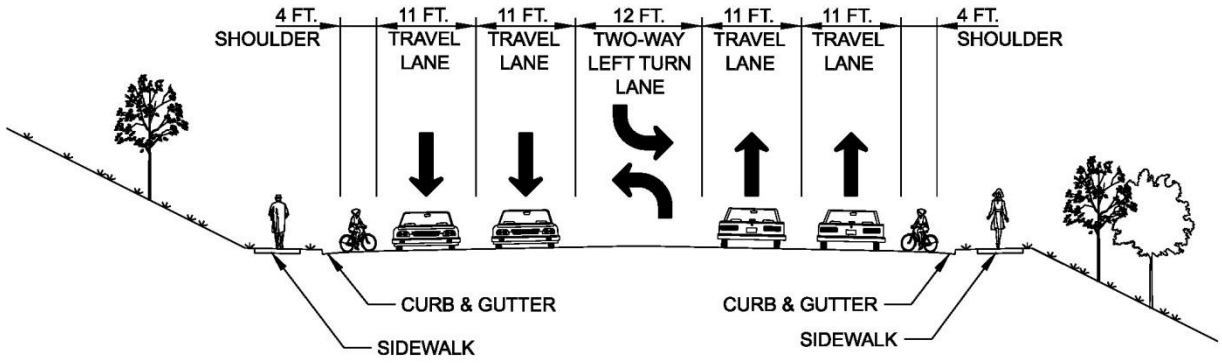


FIGURE 2.3.5: SEGMENT 2 PROPOSED TYPICAL SECTION

FIGURE 2.3.6: SEGMENT 2 EXISTING TYPICAL SECTION

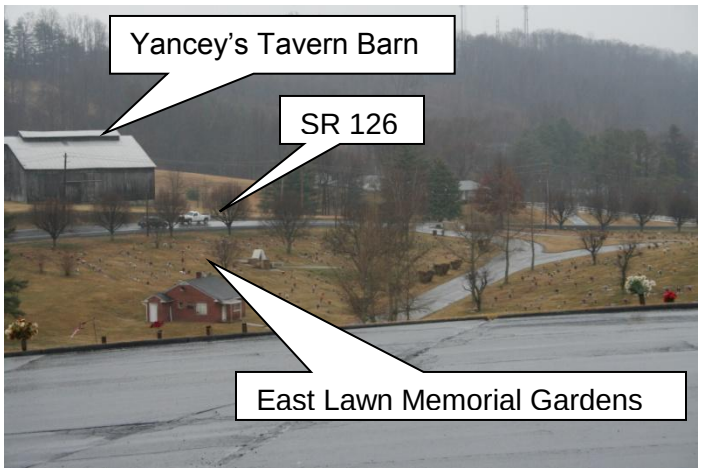
FIGURE 2.3.7: SEGMENT 2 PROPOSED TYPICAL SECTION
4-Lane, TWLTL, Shoulders, Curb & Gutter, & Sidewalks

3. Harbor Chapel Road (L.M. 5.18) to Cooks Valley Road (L.M. 7.66)

The proposed cross section of this 2.5 mile long segment of SR 126 (Memorial Boulevard) from Harbor Chapel Road to Cooks Valley Road includes four travel lanes (two in each direction), and a raised grass median. The first 0.6 mile of this segment from Harbor Chapel Road to east of Old Stage Road includes four-foot wide paved shoulders, curb and gutter, and sidewalks on both sides of the roadway. The next 1.9 miles of this segment from east of Old Stage Road to Cooks Valley Road will not have curb and gutter, and instead will have roadside ditches for drainage. The shoulders will be eight feet wide, six feet of which will be paved. No sidewalks will be provided along this 1.9 mile segment between Old Stage Road and Cooks Valley Road due to the lack of properties fronting SR 126 (Memorial Boulevard). The travel lanes throughout the entire 2.5 mile long segment will be eleven feet wide. The four to six-foot wide paved shoulders will accommodate bicyclists. The design speed of this segment is 45 miles per hour. Please refer to **Figures 2.3.8** and **2.3.9** for a depiction of the proposed typical sections of this segment. Renderings of the existing and proposed typical sections in this segment are provided in **Figures 2.3.10** through **2.3.12**.

Additional features in this section include intersection realignments and closings. Trinity Lane's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via a new connection to Amy Avenue and Glenwood Street. Tanglewood's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via a new connection to Briarwood Road. Old Stage Road's approach to SR 126 (Memorial Boulevard) will be realigned to improve the skew of the intersection. Holiday Road's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via a new connection between Parker Street and Old Parker Drive. The new connection will provide access to Peers Street and Lemay Drive. Shuler Drive's Intersection with SR 126 (Memorial Boulevard) will also be closed. Access to SR 126 (Memorial Drive) will be provided via Peers Street and Lemay Drive. Chestnut Ridge Road's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via Old Stage Road and Eaton Station Road. Eaton Station Road's approach to SR 126 (Memorial Parkway) will be realigned to improve the skew of the intersection. These features will improve the safety and access control along SR 126 (Memorial Boulevard).

Two community resources are located on either side of SR 126 (Memorial Boulevard) in this segment: Yancey's Tavern and the East Lawn Memorial Gardens Cemetery. Yancey's Tavern is listed on the National Register of Historic Places. To avoid direct impacts to the Yancey's Tavern property, it is proposed to widen SR 126 (Memorial Boulevard) to the south. The roadway improvements will impact the East Lawn Memorial Gardens Cemetery. Yancey's Tavern and East Lawn Memorial Gardens are discussed in more detail in **Chapters 3** and **4**.



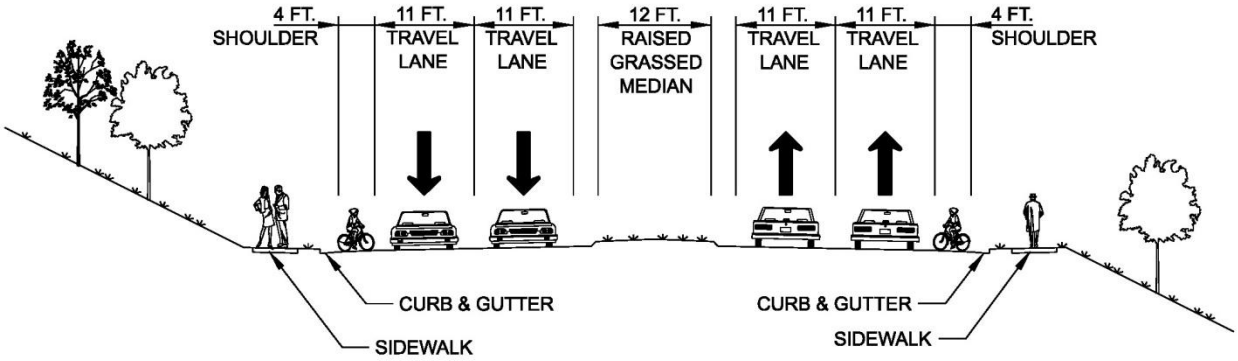


FIGURE 2.3.8: SEGMENT 3A PROPOSED TYPICAL SECTION

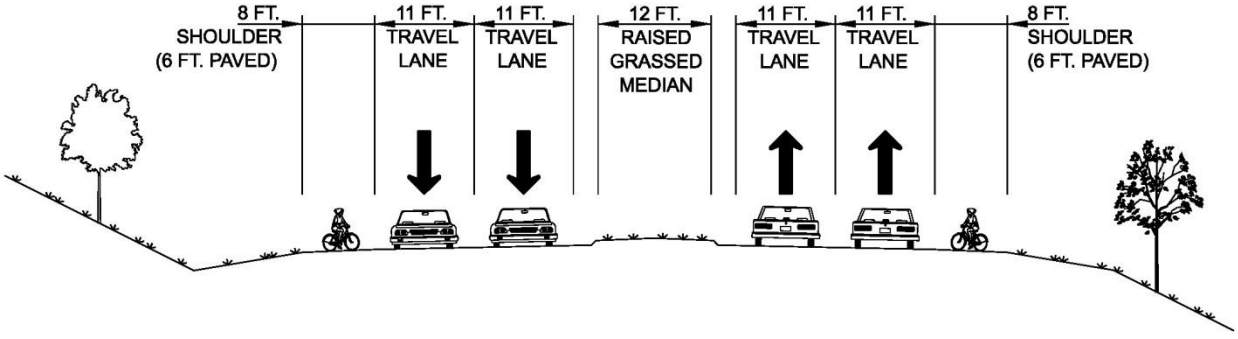


FIGURE 2.3.9: SEGMENT 3B PROPOSED TYPICAL SECTION

FIGURE 2.3.10: SEGMENT 3 EXISTING TYPICAL SECTION

FIGURE 2.3.11: SEGMENT 3A PROPOSED TYPICAL SECTION
4-Lane, Raised Median, Shoulders, Curb & Gutter, & Sidewalks

FIGURE 2.3.12: SEGMENT 3B PROPOSED TYPICAL SECTION
4-Lane, Raised Median, Shoulders, Roadside Ditches

4. Cooks Valley Road (L.M. 7.66) to Harr Town Road (L.M. 10.11)

The proposed cross section of this 2.5 mile long segment of SR 126 (Memorial Boulevard) from Cooks Valley Road to Harr Town Road includes two travel lanes (one in each direction), six-foot wide paved shoulders, and curb and gutter. The median in this section will consist of a two-way left turn lane. Sidewalks will be located on both sides of the roadway. The travel lanes will be eleven feet wide. The six-foot wide shoulders will accommodate bicyclists. The design speed of this segment is 45 miles per hour. Please refer to **Figure 2.3.13** for a depiction of the proposed typical section of this segment. Renderings of the existing and proposed typical sections in this segment are provided in **Figures 2.3.14** and **2.3.15**.

Additional features in this section include intersection realignments and closings. Red Robin Lane's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via Bridwell Heights Road. The side road approaches of Woods Way, Island Road, Natchez Lane, and Harr Town Road to SR 126 (Memorial Boulevard) will be realigned to improve the skews of the intersections. These features will improve the safety and access control along SR 126 (Memorial Boulevard).

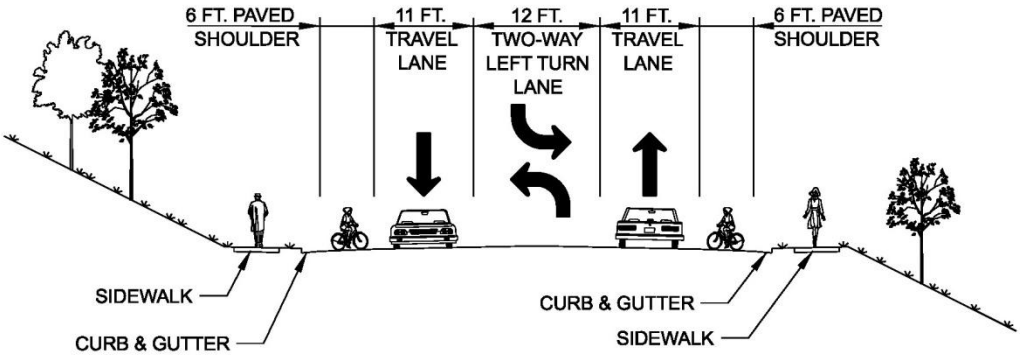


FIGURE 2.3.13: SEGMENT 4 PROPOSED TYPICAL SECTION

FIGURE 2.3.14: SEGMENT 4 EXISTING TYPICAL SECTION

FIGURE 2.3.15: SEGMENT 4 PROPOSED TYPICAL SECTION
2-Lane, TWLTL, Shoulders, Curb & Gutter, & Sidewalks

5. Harr Town Road (L.M. 10.11) to west of Carolina Pottery Drive (L.M. 11.90)

The proposed cross section of this 1.8 mile long segment of SR 126 (Memorial Boulevard) from Harr Town Road to west of Carolina Pottery Drive includes two travel lanes (one in each direction) with no median. This section will not have curb and gutter, and instead will have roadside ditches for drainage. The shoulders will be ten feet wide, eight feet of which will be paved. No sidewalks will be provided due to the rural nature of the surrounding community. The travel lanes will be twelve feet wide. Rumble strips will be provided along the centerline of the roadway to deter drivers from crossing into the opposing lane. Rumble strips will also be provided along the shoulders. The shoulder rumble strips will include ten-foot gaps between thirty-foot rumble strip segments to accommodate bicyclists. The design speed of this segment is 45 miles per hour. Please refer to **Figure 2.3.16** for a depiction of the proposed typical section of this segment. Renderings of the existing and proposed typical sections in this segment are provided in **Figures 2.3.16** and **2.3.17**.

Additional features in this section include intersection realignments and closings. The side road approache of Adams Street to SR 126 (Memorial Boulevard) will be realigned to improve the skews of the intersections. Gravel Top Road's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via the improved Adams Street Intersection. These features will improve the safety and access control along SR 126 (Memorial Boulevard).

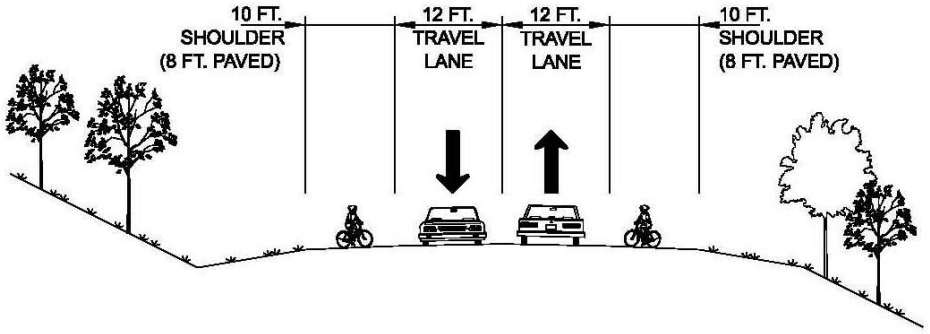


FIGURE 2.3.16: SEGMENT 5 PROPOSED TYPICAL SECTION

FIGURE 2.3.16: SEGMENT 5 EXISTING TYPICAL SECTION

FIGURE 2.3.17: SEGMENT 5 PROPOSED TYPICAL SECTION
2-Lane, No Median, Shoulders, Roadside Ditches

6. West of Carolina Pottery Drive (L.M. 11.90) to I-81 (L.M. 12.12)

The proposed cross section of this 0.2 mile long segment of SR 126 (Memorial Boulevard) from west of Carolina Pottery Drive to I-81 includes four travel lanes (two in each direction), and a raised grass median. This segment will not have curb and gutter, and instead will have roadside ditches for drainage. The shoulders will be twelve feet wide and paved. No sidewalks will be provided along this segment due to the rural nature of the surrounding community. The travel lanes will be twelve feet wide. The twelve-foot wide paved shoulders will accommodate bicyclists. The design speed of this segment is 45 miles per hour. Please refer to **Figure 2.3.18** for a depiction of the proposed typical section of this segment. Renderings of the existing and proposed typical sections in this segment are provided in **Figures 2.3.19** and **2.3.20**.

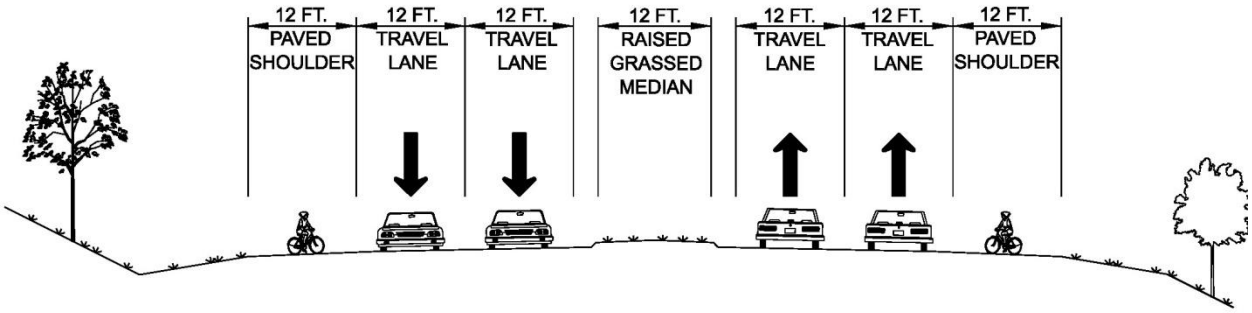


FIGURE 2.3.18: SEGMENT 6 PROPOSED TYPICAL SECTION

FIGURE 2.3.19: SEGMENT 6 EXISTING TYPICAL SECTION

FIGURE 2.3.20: SEGMENT 6 PROPOSED TYPICAL SECTION
4-Lane, Raised Median, Shoulders, Roadside Ditches

TABLE 2.3.1: BUILD ALTERNATIVE A DESCRIPTION

SR 126 (Memorial Boulevard) Alternative A Roadway Description												
Segment		**Design Speed**	**From**		**To**		**Travel Lanes**		**Median Desc. (Typical)**	**Shld.**	**Ditch/ C&G ?**	**Side-walk?**
ID	**Dist.**		**LM**	**Description**	**LM**	**Description**	**No.**	**Width**				
1	**1.0**	**35**	3.72	Center Street	4.71	west of Hawthorne Street	4	11	12 Ft. Raised Grass	4 Ft. Paved	C&G	Yes
2	**0.47**	**35**	4.71	west of Hawthorne Street	5.18	Harbor Chapel Road	4	11	12 Ft. Paved TWLTL	4 Ft. Paved	C&G	Yes
3	**2.48**	**45**	5.18	Harbor Chapel Road	5.80	east of Old Stage Road	4	11	12 Ft. Raised Grass	4 Ft. Paved	C&G	Yes
			5.80	east of Old Stage Road	7.66	Cooks Valley Road	4	11	12 Ft. Raised Grass	6 Ft. Paved/ 8 Ft. Total	Ditch	No
4	**2.45**	**45**	7.66	Cooks Valley Road	10.11	Harr Town Road	2	11	12 Ft. Paved TWLTL	6 Ft. Paved	C&G	Yes
5	**1.79**	**45**	10.11	Harr Town Road	11.90	west of Carolina Pottery Drive	2	12	None w/ Rumble Strip	8 Ft. Paved/10 Ft. Total	Ditch	No
6	**0.22**	**45**	11.90	west of Carolina Pottery Drive	12.12	I-81	4	12	12 Ft. Raised Grass	12 Ft. Paved	Ditch	No
Σ =	**8.40**	**43.3**	**= Weighted Average**									

2.4 BUILD ALTERNATIVE B

Alternative B is a refinement of Alternative A. Alternative B utilizes the same proposed typical roadway cross sections as Alternative A, but the length of the four-travel lane section of Segment 3 is reduced. As a result, the two-travel lane section of Segment 4 begins further west, near Lemay Drive, and is longer than in Alternative A. Retaining walls will also be utilized in the vicinity of historic Yancey's Tavern and East Lawn Memorial Gardens Cemetery. These modifications were made to minimize impacts to Yancey's Tavern and the East Lawn Memorial Gardens Cemetery located on opposing sides of SR 126 (Memorial Boulevard) in Segment 4. It should be noted that numerous gravesites will still need to be relocated with Alternative B. Additional changes incorporated into Alternative B include minor modifications of the proposed centerline to minimize excavation and fill impacts and improve maintenance of traffic during construction. Alternative B subsequently requires less additional right-of-way and impacts fewer residences and businesses than Alternative A.

Section 2.4.1 describes the proposed SR 126 (Memorial Boulevard) roadway cross-sections, along with side road improvements, in detail. The proposed roadway characteristics are also summarized in **Figures 2.4.1** through **2.4.8** and **Table 2.4.1**. Additionally, Conceptual Layouts of Build Alternative B are provided in **Appendix D**.

In addition to the SR 126 (Memorial Boulevard) roadway typical cross section and alignment improvements, several side road intersection approaches to SR 126 (Memorial Boulevard) are improved or closed. These side road modifications improve the safety and access control along SR 126 (Memorial Boulevard). The side road approaches modified in Alternative B are the same as those in Alternative A. For a list of the affected side roads, please refer to **Section 2.3**.

2.4.1 Build Alternative B Typical Proposed Roadway Cross Sections

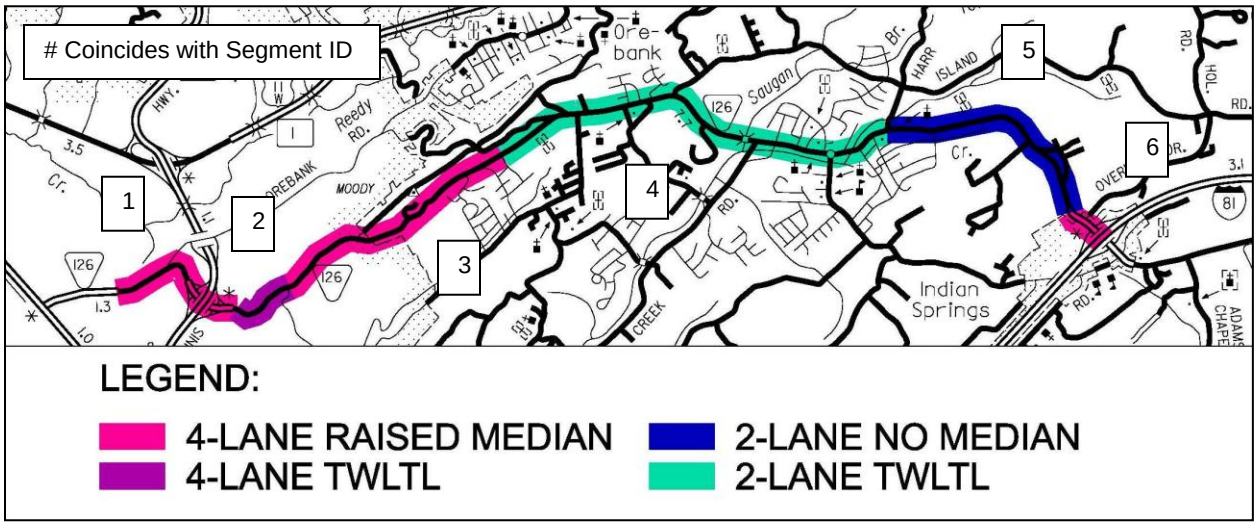


FIGURE 2.4.1: BUILD ALTERNATIVE B CROSS SECTION LEGEND

1. East Center Street (L.M. 3.72) to west of Hawthorne Street (L.M. 4.71)

On the first 1.0 mile long segment from East Center Street to west of Hawthorne Street, the proposed cross section includes four travel lanes (two in each direction), a raised grass median, four-foot wide paved shoulders, and curb and gutter. Sidewalks will be located on both sides of the roadway. The travel lanes will be eleven feet wide. The four-foot wide shoulders will accommodate bicyclists. The design speed of this segment is 35 miles per hour. Please refer to **Figure 2.4.2** for a depiction of the proposed typical section of this segment.

A roundabout is proposed at the five legged intersection of SR 126 (Memorial Boulevard), East Center Street, Warpath Drive, and Miller Street located at the corridor's western terminus. A roundabout is a type of circular road intersection where traffic enters a one-way stream around a central island. Statistically, roundabouts are safer than traditional intersections. While a roundabout is the preferred improvement option at this intersection, a second option, which would maintain the existing traffic signal, is still under consideration.

Additional features in this section include realigning the Orebank Road Intersection to connect to SR 126 (Memorial Boulevard) at an improved skew, closing the Edens Ridge Road Intersection, and reducing the skew and improving the channelization of the northbound John B. Dennis exit ramp to eastbound SR 126 (Memorial Boulevard). These features will improve the safety and access control along SR 126 (Memorial Boulevard).

The Shipley-Jarvis House is located adjacent to the northbound lanes near Woodside Drive in this segment. The Shipley-Jarvis House is deemed eligible for listing on the National Register of Historic Places (NRHP). The improvements will be constructed along the southbound lanes to avoid impacting the Shipley-Jarvis House.

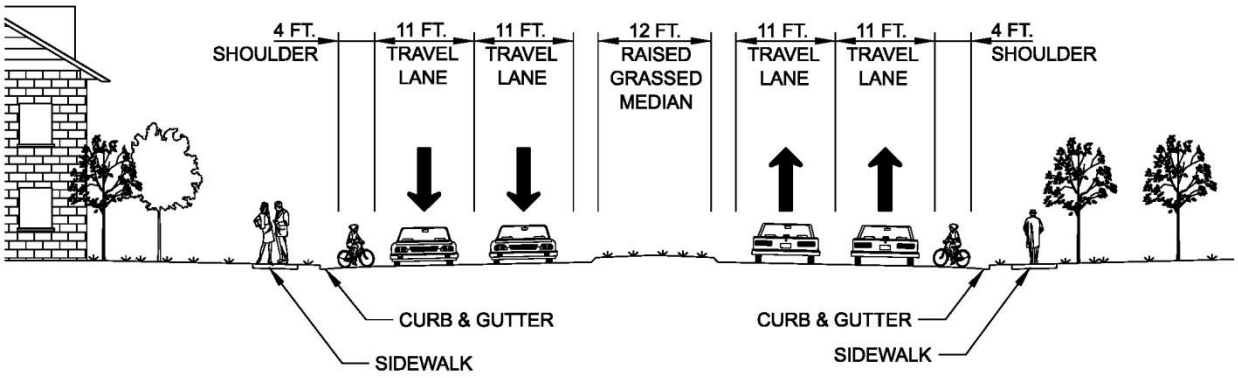


FIGURE 2.4.2: SEGMENT 1 PROPOSED TYPICAL SECTION

2. West of Hawthorne Street (L.M. 4.71) to Harbor Chapel Road (L.M. 5.18)

The proposed cross section of this 0.5 mile long segment of SR 126 (Memorial Boulevard) from west of Hawthorne Street to Harbor Chapel Road includes four travel lanes (two in each direction), four-foot wide paved shoulders, and curb and gutter. The median in this section will consist of a two-way left turn lane, instead of the raised grass median proposed in Segment 1. Sidewalks will be located on both sides of the roadway. The travel lanes will be eleven feet wide. The four-foot wide shoulders will accommodate bicyclists. The design speed of this

segment is 35 miles per hour. Please refer to **Figure 2.4.3** for a depiction of the proposed typical section of this segment.

Additional features in this section include intersection realignments and closings. Hawthorne Street's intersection with the south side of SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via Kite Street. In addition, the Kent Street intersection with SR 126 (Memorial Boulevard) will be closed, with access to SR 126 (Memorial Boulevard) also being provided via Kite Street. The Amy Avenue/Woodridge Avenue intersection with SR 126 (Memorial Boulevard) will be closed and realigned to intersect with Glenwood Street. Heather Lane's approach to SR 126 (Memorial Parkway) will be realigned to improve the skew of the intersection. These features will improve the safety and access control along SR 126 (Memorial Boulevard).

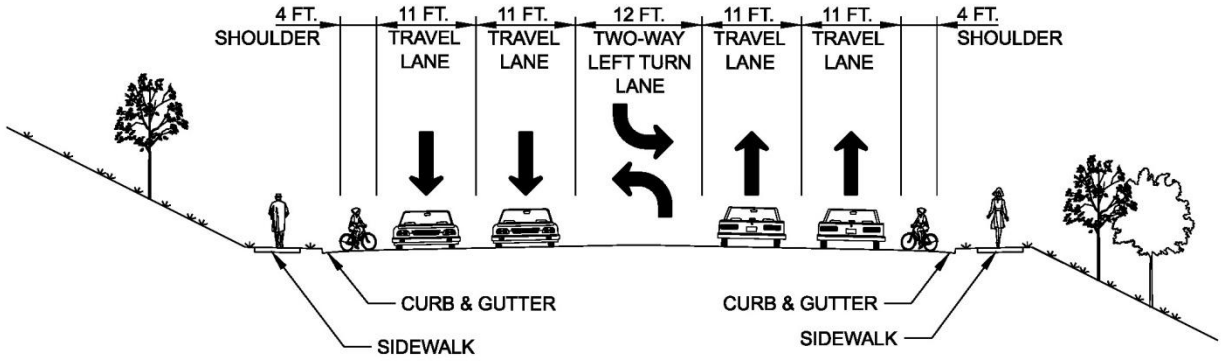


FIGURE 2.4.3: SEGMENT 2 PROPOSED TYPICAL SECTION

3. Harbor Chapel Road (L.M. 5.18) to east of Lemay Drive (L.M. 7.20)

The proposed cross section of this 2.0 mile long segment of SR 126 (Memorial Boulevard) from Harbor Chapel Road to Cooks Valley Road includes four travel lanes (two in each direction), and a raised grass median. This section is 0.5 miles shorter than in Alternative A. The first 0.6 mile of this segment from Harbor Chapel Road to east of Old Stage Road includes four-foot wide paved shoulders, curb and gutter, and sidewalks on both sides of the roadway. The next 1.4 miles of this segment from east of Old Stage Road to Cooks Valley Road will not have curb and gutter, and instead will have roadside ditches for drainage. The shoulders will be eight feet wide, six feet of which will be paved. No sidewalks will be provided along this 1.4 mile segment between Old Stage Road and Cooks Valley Road due to the lack of properties fronting SR 126 (Memorial Boulevard). The travel lanes throughout the entire 2.5 mile long segment will be eleven feet wide. The four to six-foot wide paved shoulders will accommodate bicyclists. The design speed of this segment is 45 miles per hour. Please refer to **Figures 2.4.4** and **2.4.5** for a depiction of the proposed typical sections of this segment.

Additional features in this section include intersection realignments and closings. Trinity Lane's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via a new connection to Amy Avenue and Glenwood Street. Tanglewood's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via a new connection to Briarwood Road. Old Stage Road's approach to SR 126 (Memorial Boulevard) will be realigned to improve the skew of the intersection. Holiday Road's intersection with SR 126 (Memorial Boulevard) will be closed.

Access to SR 126 (Memorial Boulevard) will be provided via a new connection between Parker Street and Old Parker Drive. The new connection will provide access to Peers Street and Lemay Drive. Shuler Drive's Intersection with SR 126 (Memorial Boulevard) will also be closed. Access to SR 126 (Memorial Drive) will be provided via Peers Street and Lemay Drive. These features will improve the safety and access control along SR 126 (Memorial Boulevard).

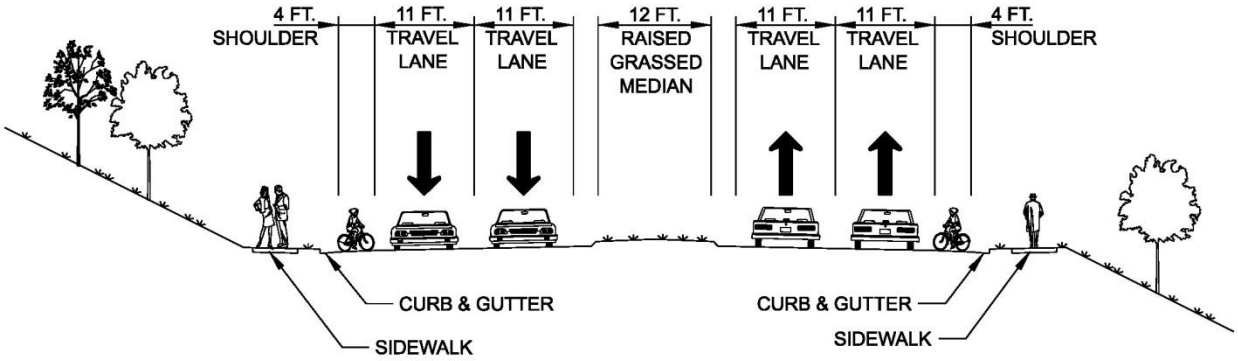


FIGURE 2.4.4: SEGMENT 3A PROPOSED TYPICAL SECTION

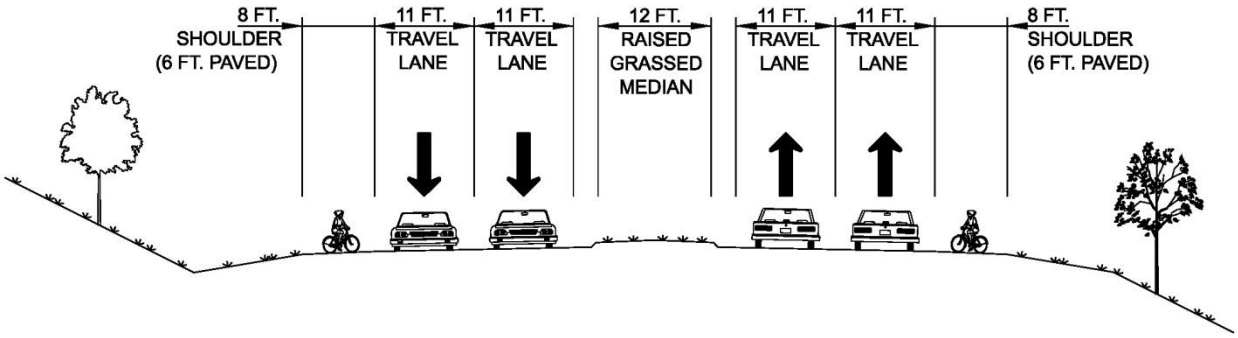


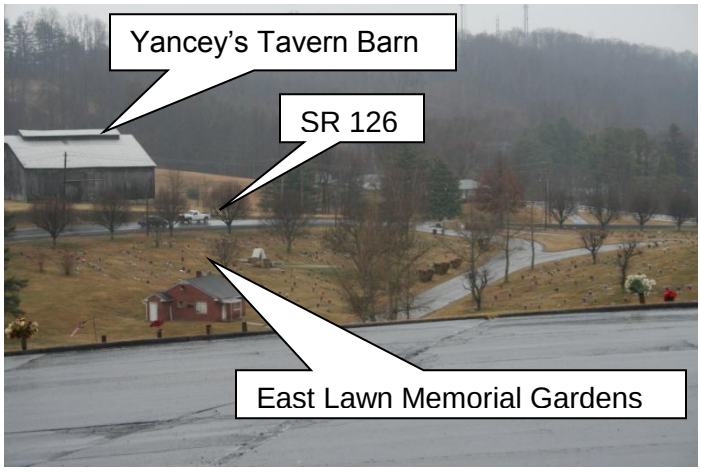
FIGURE 2.4.5: SEGMENT 3B PROPOSED TYPICAL SECTION

4. East of Lemay Drive (L.M. 7.20) to Harr Town Road (L.M. 10.11)

The proposed cross section of this 2.9 mile long segment of SR 126 (Memorial Boulevard) from east of Lemay Drive to Harr Town Road includes two travel lanes (one in each direction), six-foot wide paved shoulders, and curb and gutter. The median in this section will consist of a two-way left turn lane. Sidewalks will be located on both sides of the roadway. The travel lanes will be eleven feet wide. The six-foot wide shoulders will accommodate bicyclists. The design speed of this segment is 45 miles per hour. This section is 0.5 miles longer than in Alternative A. Please refer to **Figure 2.4.6** for a depiction of the proposed typical section of this segment.

Additional features in this section include intersection realignments and closings. Chestnut Ridge Road's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via Old Stage Road and Eaton Station Road. Red Robin

Lane's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via Bridwell Heights Road. The side road approaches of Eaton Station Road, Woods Way, Island Road, Natchez Lane, and Harr Town Road to SR 126 (Memorial Boulevard) will be realigned to improve the skews of the intersections. These features will improve the safety and access control along SR 126 (Memorial Boulevard).



Two community resources are located on either side of SR 126 (Memorial Boulevard) in this segment: Yancey's Tavern and the East Lawn Memorial Gardens Cemetery. Yancey's Tavern is listed on the National Register of Historic Places. To avoid direct impacts to the Yancey's Tavern property, it is proposed to widen SR 126 (Memorial Boulevard) to the south. The roadway improvements will impact the East Lawn Memorial Gardens Cemetery. In order to minimize the impacts, the roadway cross section is reduced to two travel lanes in this section of Alternative B, compared to four travel lanes in Alternative A. This will minimize the visual impacts to Yancey's Tavern and reduce the number of gravesites which must be relocated in the East Lawn Memorial Gardens Cemetery. Retaining walls will also be utilized in this area to further reduce impacts to the cemetery. Yancey's Tavern and East Lawn Memorial Gardens are discussed in more detail in **Chapters 3** and **4**.

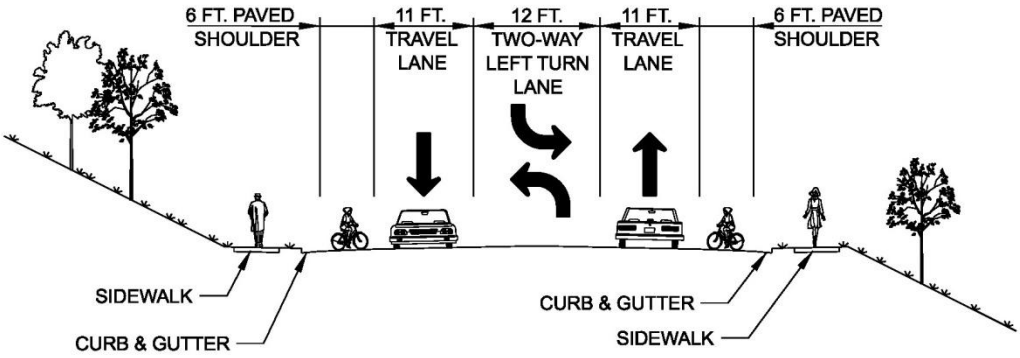


FIGURE 2.4.6: SEGMENT 4 PROPOSED TYPICAL SECTION

5. Harr Town Road (L.M. 10.11) to west of Carolina Pottery Drive (L.M. 11.90)

The proposed cross section of this 1.8 mile long segment of SR 126 (Memorial Boulevard) from Harr Town Road to west of Carolina Pottery Drive includes two travel lanes (one in each direction) with no median. This section will not have curb and gutter, and instead will have roadside ditches for drainage. The shoulders will be ten feet wide, eight feet of which will be paved. No sidewalks will be provided due to the rural nature of the surrounding community. The travel lanes will be twelve feet wide. Rumble strips will be provided along the centerline of the roadway to deter drivers from crossing into the opposing lane. Rumble strips will also be provided along the shoulders. The shoulder rumble strips will include ten-foot gaps between thirty-foot rumble strip segments to accommodate bicyclists. The design speed of this segment is 45 miles per hour. Please refer to **Figure 2.4.7** for a depiction of the proposed typical section of this segment.

Additional features in this section include intersection realignments and closings. The side road approache of Adams Street to SR 126 (Memorial Boulevard) will be realigned to improve the skews of the intersections. Gravel Top Road's intersection with SR 126 (Memorial Boulevard) will be closed. Access to SR 126 (Memorial Boulevard) will be provided via the improved Adams Street Intersection. These features will improve the safety and access control along SR 126 (Memorial Boulevard).

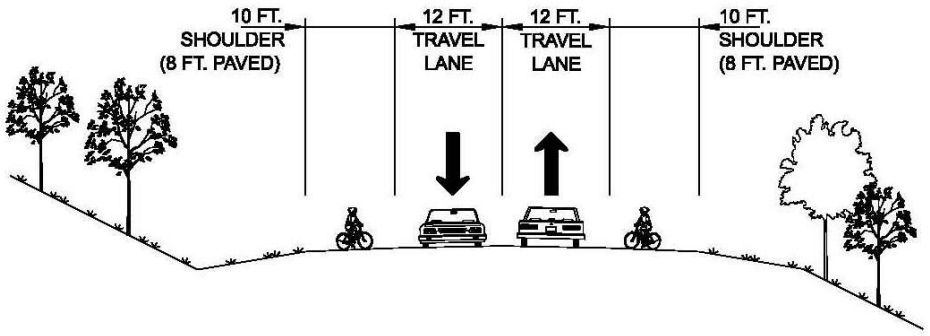


FIGURE 2.4.7: SEGMENT 5 PROPOSED TYPICAL SECTION

6. West of Carolina Pottery Drive (L.M. 11.90) to I-81 (L.M. 12.12)

The proposed cross section of this 0.2 mile long segment of SR 126 (Memorial Boulevard) from west of Carolina Pottery Drive to I-81 includes four travel lanes (two in each direction), and a raised grass median. This segment will not have curb and gutter, and instead will have roadside ditches for drainage. The shoulders will be twelve feet wide and paved. No sidewalks will be provided along this segment due to the rural nature of the surrounding community. The travel lanes will be twelve feet wide. The twelve-foot wide paved shoulders will accommodate bicyclists. The design speed of this segment is 45 miles per hour. Please refer to **Figure 2.4.8** for a depiction of the proposed typical section of this segment.

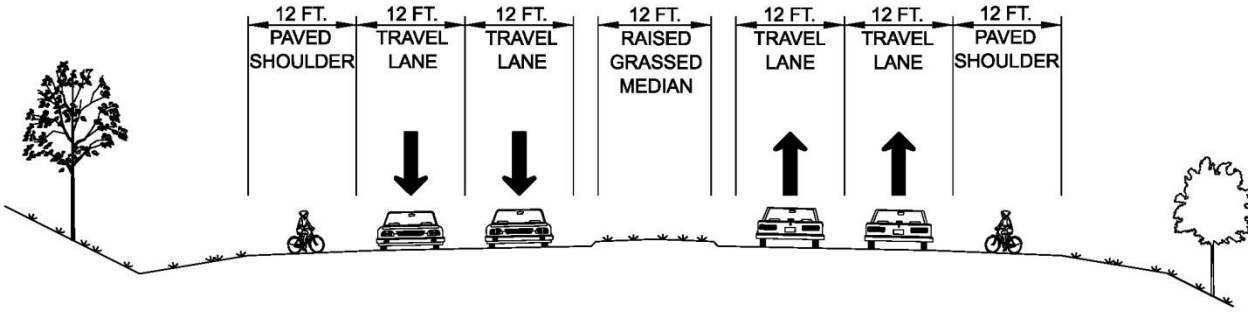


FIGURE 2.4.8: SEGMENT 6 PROPOSED TYPICAL SECTION

TABLE 2.4.1: BUILD ALTERNATIVE B DESCRIPTION

SR 126 (Memorial Boulevard) Alternative B Roadway Description												
Segment		Design Speed	From		To		Travel Lanes		Median Desc. (Typical)	Shld.	Ditch/ C&G ?	Side-walk?
ID	Dist.		LM	Description	LM	Description	No.	Width				
1	1.0	35	3.72	Center Street	4.71	west of Hawthorne Street	4	11	12 Ft. Raised Grass	4 Ft. Paved	C&G	Yes
2	0.47	35	4.71	west of Hawthorne Street	5.18	Harbor Chapel Road	4	11	12 Ft. Paved TWLTL	4 Ft. Paved	C&G	Yes
3	2.02	45	5.18	Harbor Chapel Road	5.80	east of Old Stage Road	4	11	12 Ft. Raised Grass	4 Ft. Paved	C&G	Yes
			5.80	east of Old Stage Road	7.20	East of Lemay Drive	4	11	12 Ft. Raised Grass	6 Ft. Paved/ 8 Ft. Total	Ditch	No
4	2.91	45	7.20	East of Lemay Drive	10.11	Harr Town Road	2	11	12 Ft. Paved TWLTL	6 Ft. Paved	C&G	Yes
5	1.79	45	10.11	Harr Town Road	11.90	west of Carolina Pottery Drive	2	12	None w/ Rumble Strip	8 Ft. Paved/10 Ft. Total	Ditch	No
6	0.22	45	11.90	west of Carolina Pottery Drive	12.12	I-81	4	12	12 Ft. Raised Grass	12 Ft. Paved	Ditch	No
Σ =	8.40	43.3	= Weighted Average									

2.5 ALTERNATIVES COMPARISON

The No-Build and two Build Alternatives are currently under consideration for this project. The No-Build, or No Action, Alternative makes no improvements to SR 126 (Memorial Boulevard) other than scheduled maintenance activities. Build Alternative A improves SR 126 (Memorial Boulevard) to a four-lane facility (two travel lanes in each direction) within the commercial and residential areas of the western half of the study corridor. The eastern half of the study corridor, which is rural in nature, will remain a two-travel lane facility. Improved shoulders will be provided along the entire corridor and sidewalks will be extended to the majority of the commercial and residential areas. Alternative B is a refinement of Alternative A. Alternative B utilizes the same proposed typical roadway cross sections as Alternative A, but the length of the four-travel lane section is reduced to minimize environmental impacts.

As can be seen in **Table 2.5.1**, the project corridor is 8.4 miles long. The No-Build Alternative will have no impacts to wildlife, cultural resources, or farmland and there would be no residential or business relocations. The No-Build Alternative would not impact any gravesites and has no construction costs. Alternative A has considerable residential and business relocations and will impact a large number of gravesites. While Alternative B reduces the impacts associated with Alternative A, the number of residential, business, and gravesite relocations are still considerable. The alternatives' affected environment and environmental consequences are discussed in **Chapters 3** and **4.**

Figure 2.5.1 and **Tables 2.5.2** and **2.5.3** summarizes the different roadway cross sections utilized in each alternative. The No-Build Alternative utilizes a four-travel lane cross section along 13% of the study corridor. Build Alternative A utilizes a four-travel lane cross section along 50% of the corridor. Alternative B utilizes a four-travel lane cross section along 44% of the corridor. The remainder of the corridor for all three alternatives will be two travel lanes.

Figure 2.5.2 and **Table 2.5.4** summarizes the location of sidewalks along each alternative. The No-Build Alternative has sidewalks along 1% of the study corridor. Alternative A extends sidewalks to 54% of the study corridor, while Alternative B extends sidewalks to 59% of the study corridor. The sidewalks in Alternatives A and B are located in residential and commercial areas, and not provided along the more rural areas.

The No-Build Alternative has shoulders equal to or greater than four feet in width along 8% of the study corridor. Build Alternatives A and B have shoulders equal to or greater than four feet in width along the entire study corridor.

2.5.1 Do the Alternatives Meet the Project's Purpose and Need?

The No-Build Alternative does not meet the purpose and need of the project. The No-Build Alternative does not create a safer, more efficient route for local traffic between the City of Kingsport and I-81. The existing narrow lane and shoulder widths would not be improved. The numerous deficient horizontal and vertical curves would not be improved. These existing geometric deficiencies lead to the observed high crash rate along the route. The narrow shoulders and lack of sidewalks limit bicycle and pedestrian usage of the facility. The No-Build Alternative does not improve access management along the route. The existing poor access management contributes to poor traffic operations and higher crash rates. The No-Build Alternative does not improve traffic operations or travel times for commuters or emergency response vehicles.

Build Alternatives A and B both meet the purpose and need of the project. Both Build Alternatives create a safer, more efficient route between the City of Kingsport and I-81. Lane widths and shoulder widths will be improved along the corridor. Deficient horizontal and vertical curves will be improved. These geometric improvements will create a safer, more efficient route. The addition of wider shoulders along the entire corridor and sidewalks along commercial and residential areas will promote bicycle and pedestrian usage of the facility. Access management will be improved along the commercial areas of the corridor through the use of raised grass medians and curb and gutter. Throughout the entire study corridor access management will be improved by closing or realigning many side road intersections with SR 126 (Memorial Boulevard). Improved access management will improve the safety and efficiency of the route. Both Build Alternatives improve traffic operations and travel times for both commuters and emergency response vehicles. Both Build Alternatives A and B provide these improvements in a context sensitive design, preserving the rural nature of the eastern half of the study corridor.

TABLE 2.5.1: SUMMARY OF PROJECT DATA & ESTIMATED IMPACTS

Summary of Project Data & Estimated Impacts for SR 126 (Memorial Boulevard)				
Item		No-Build	Build Alternative A	Build Alternative B
Functional Classification		Minor Arterial	Minor Arterial	Minor Arterial
Length (Miles)		8.4	8.4	8.4
Cross Sections (feet)[1]				
From:	To:			
East Center St.	Hillcrest Drive	60	160	160
Hillcrest Drive	SR 93	100	160	160
SR 93	SR 93	160	160	160
SR 93	Heather Lane	120	160	160
Heather Lane	Old Stage Road	120	160	160
Old Stage Road	Lemay Drive	120	200	200
Lemay Drive	Cooks Valley Road	120	200	120
Cooks Valley Road	Harr Town Road	120	120	120
Harr Town Road	Cochise Trail	120	160	160
Cochise Trail	Carolina Pottery Drive	60	160	160
Carolina Pottery Drive	I-81	160	300	300
I-81	I-81	300	300	300
Year 2013 AADT		8,450 - 25,800	8,450 - 25,800	8,450 - 25,800
Year 2033 AADT		13, 520 - 33,540	13, 520 - 33,540	13, 520 - 33,540
Percent Trucks		6%	6%	6%
Estimated Right-of-Way Acquisition (Acres)		0	239	121
Residential Displacements		0	241	162
Business Displacements		0	43	30
Non-Profit Displacements (Volunteer Fire Sta.)		0	1	1
Air Quality/Noise Impacts Requiring Mitigation		0	0	0
Archaelogical Sites Impacted		0	0	0
Historic Sites Impacted[2]		0	1	1
Section 4(f) Properties Impacted		0	0	0
Gravesites Impacted		0	350	90
Wetlands Impacted (Acres)		0	0	0
Stream Crossings (Linear Feet)		0	4863	3107
Floodplains Impacts (Acres)		0	4	3.2
Forest Land Acquired (Acres)[3]		0	75	54.8
Threatened/Endangered Species Impacts		0	0	0
Hazardous Material Sites Impacted (Parcels)		0	2	3
Farmland Impacted (Acres)		0	15	5
Estimated Right-of-Way Cost		$ -	$ 60,000,000	$ 48,000,000
Estimated Utility Cost		$ -	$ 5,316,000	$ 4,565,000
Estimated Construction Cost		$ -	$ 55,000,000	$ 47,000,000
Total Estimated Project Cost		$ -	$ 120,316,000	$ 99,565,000

1. The estimated ROW width is reported and based upon the typical width needed for each typical section. Actual proposed ROW widths will vary throughout the project based upon the use of slope easements, total versus partial property acquisitions, uneconomicremnants, etc.
2. Adverse visual impact
3. Includes all forest land impacted within the estimated construction limits, which may be within slope easements and outside of the ROW limits

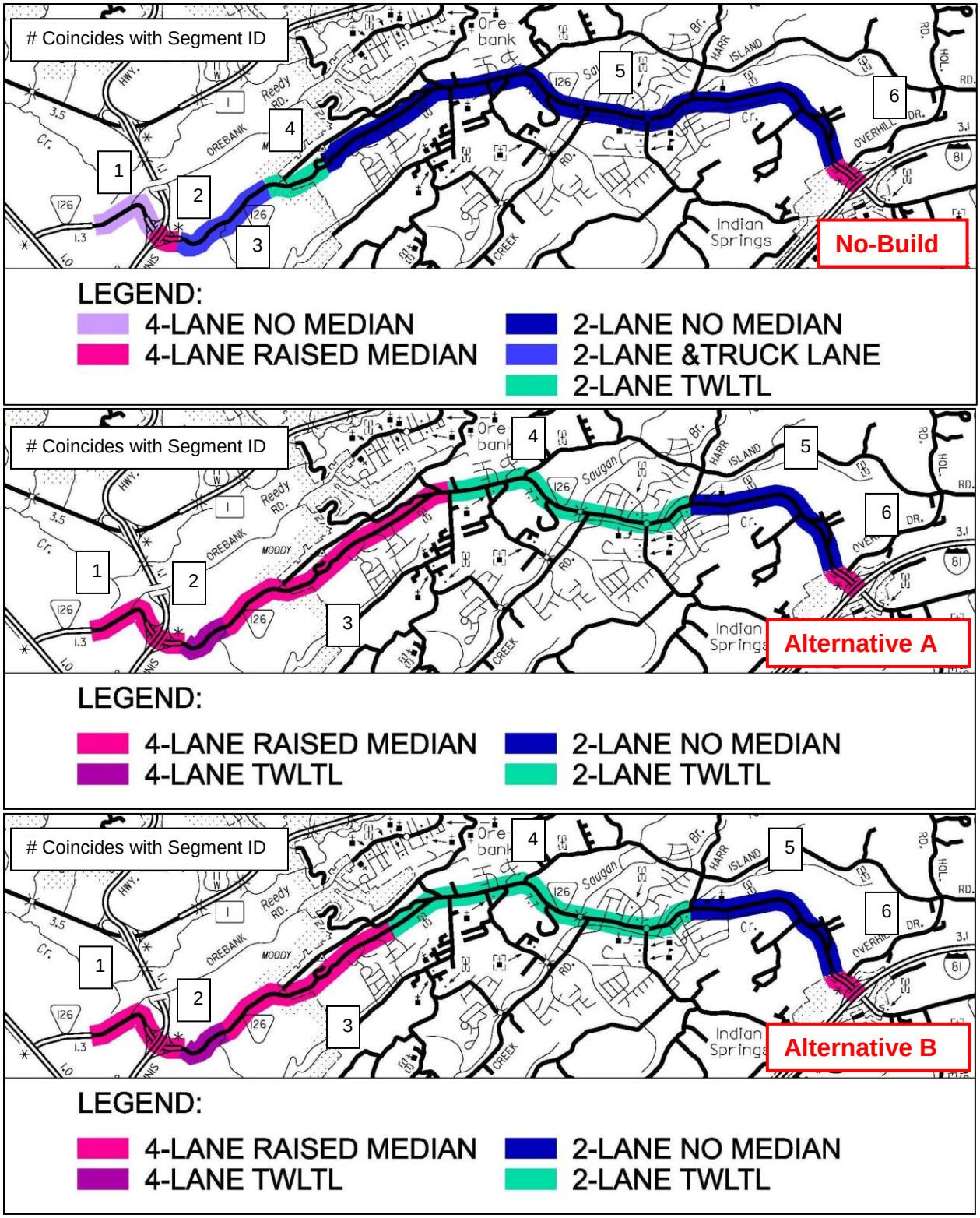
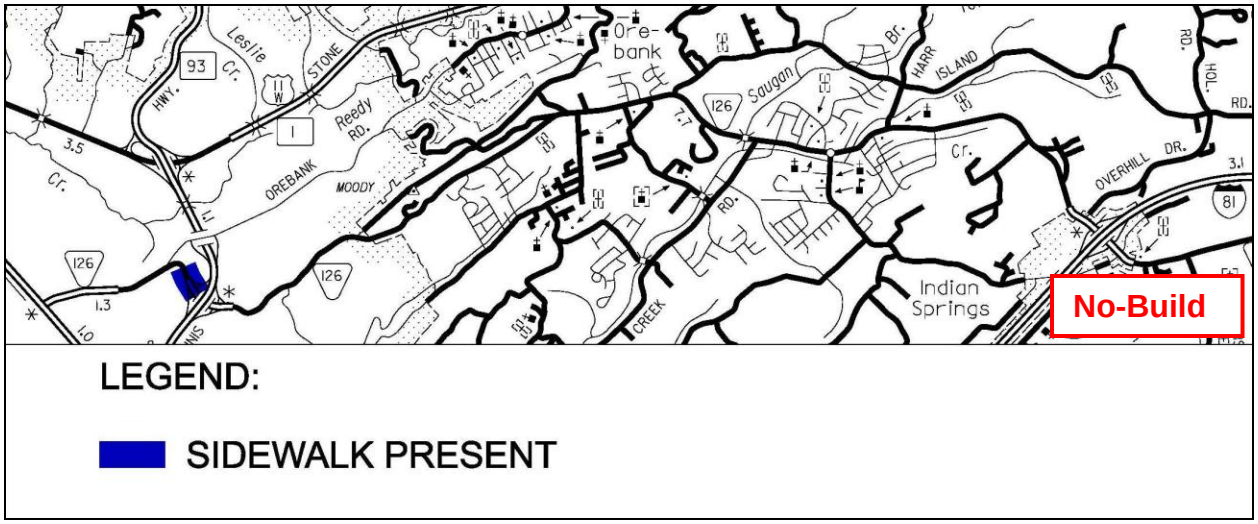
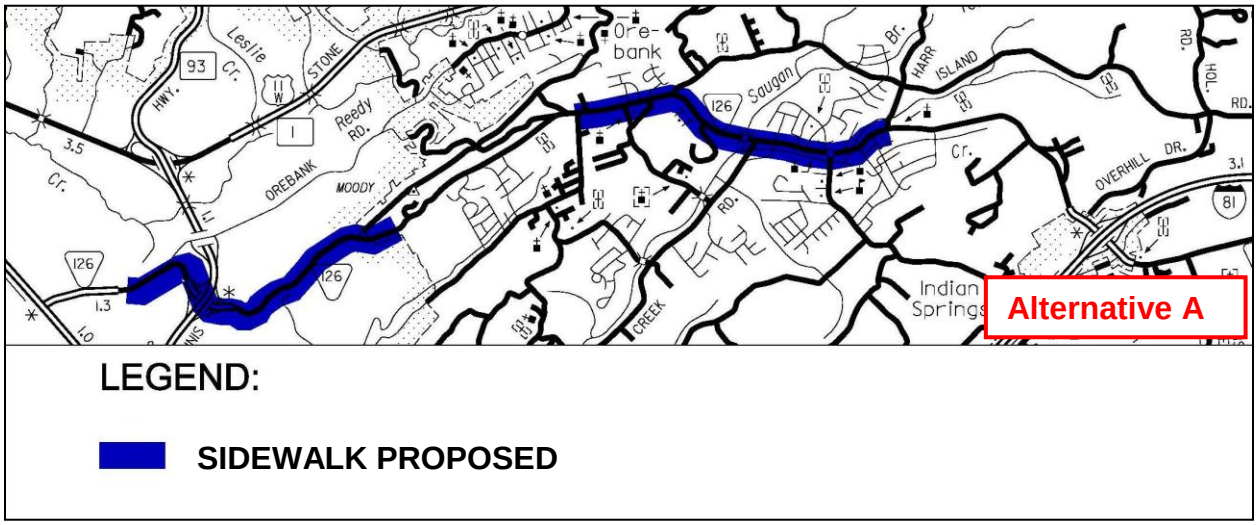


FIGURE 2.5.1: CROSS SECTION COMPARISON





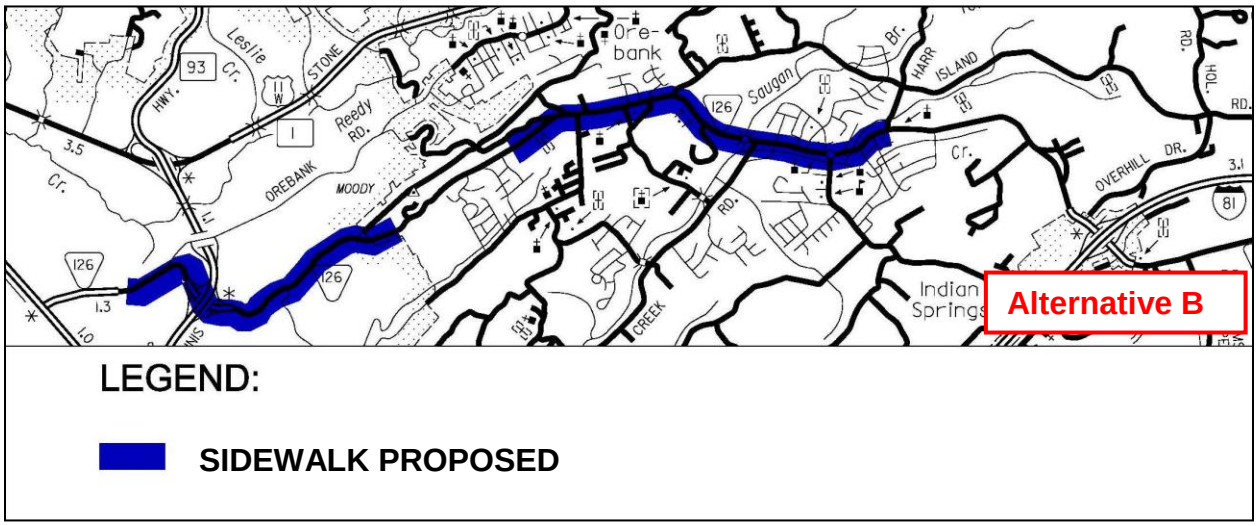


FIGURE 2.5.2: SIDEWALK COMPARISON

TABLE 2.5.2: TRAVEL LANE COMPARISON

Travel Lane Summary			
	No-Build	Alternative A	Alternative B
Four Travel Lanes	13%	50%	44%
Two Travel Lanes	87%	50%	56%

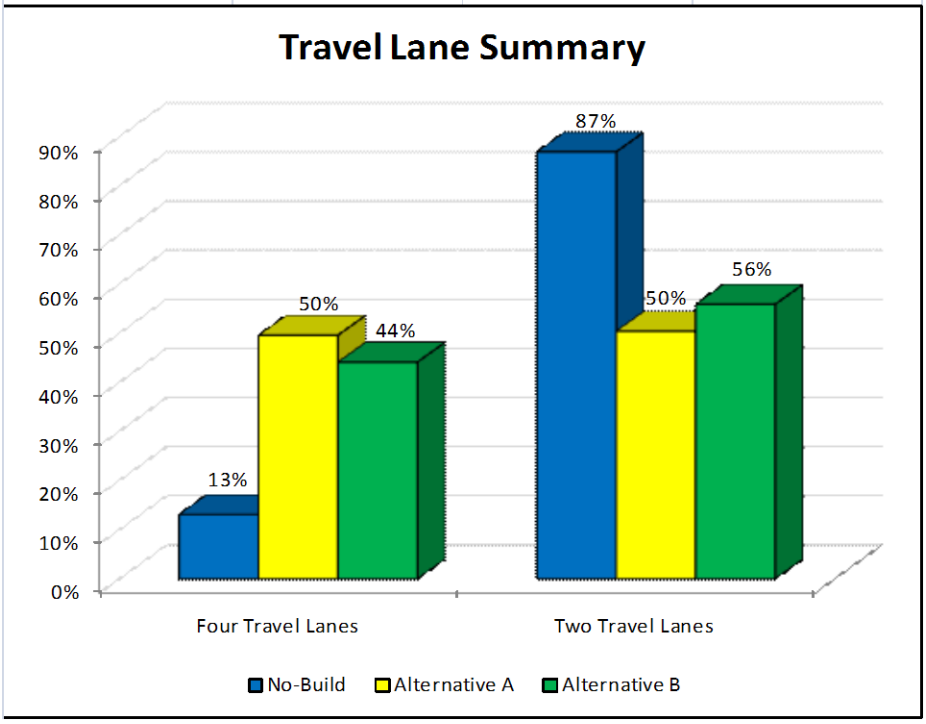


TABLE 2.5.3: CROSS SECTION COMPARISON

Cross Section Description	Alternative											
	No-Build				Alternative A				Alternative B			
	Seg. ID	Length (Miles)	%		Seg. ID	Length (Miles)	%		Seg. ID	Length (Miles)	%	
Four Travel Lanes with No Median	1	0.6	7%		n/a	0.0	0%		n/a	0.0	0%	
Four Travel Lanes with Median	2, 6	0.5	6%	13%	1, 3, 6	3.7	44%	50%	1, 3, 6	3.2	39%	44%
Four Travel Lanes with TWLTL	n/a	0.0	0%		2	0.5	6%		2	0.5	6%	
Two Travel Lanes with Truck Climbing Lane	3	0.9	11%		n/a	0.0	0%		n/a	0.0	0%	
Two Travel Lanes with TWLTL	4	0.5	6%	87%	4	2.5	29%	50%	4	2.9	35%	56%
Two Travel Lanes with No Median	5	5.9	70%		5	1.8	21%		5	1.8	21%	
Total		8.4				8.4				8.4		

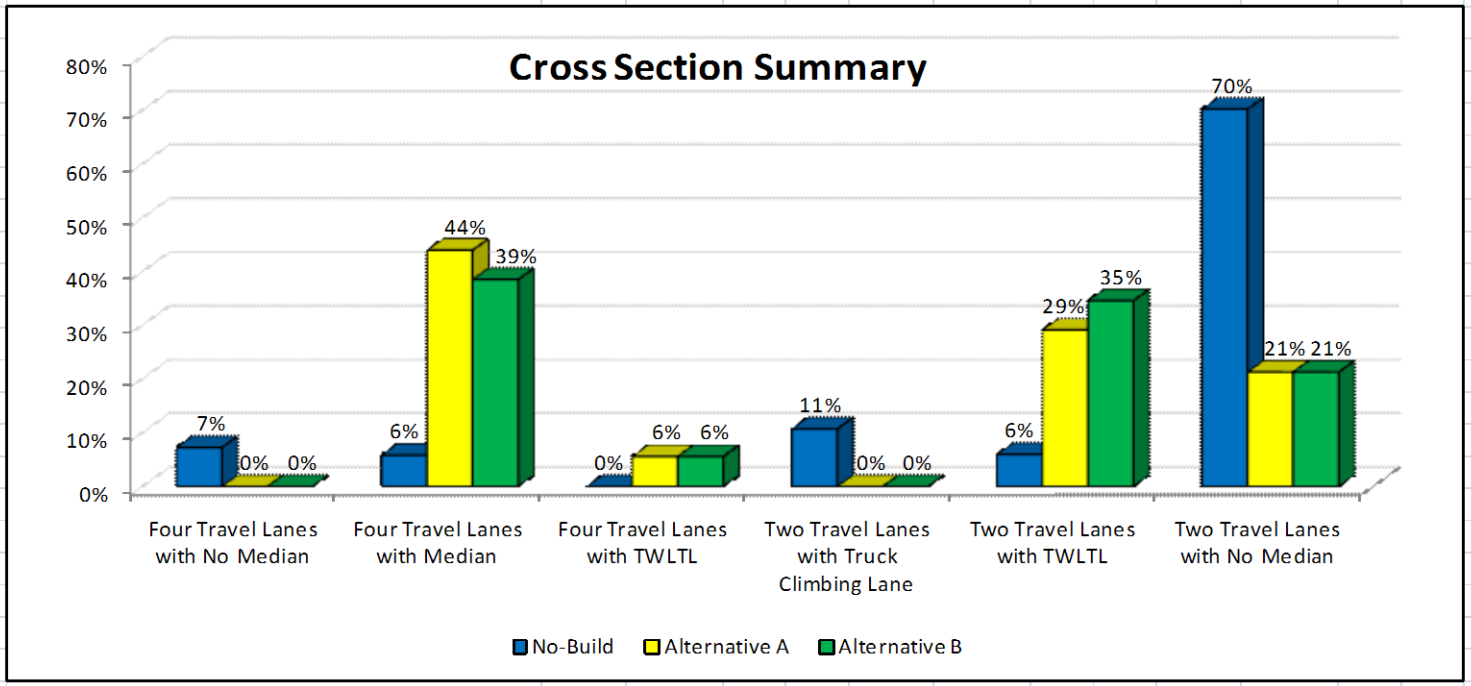


TABLE 2.5.4: SIDEWALK AND SHOULDER COMPARISON

Cross Section Description	Alternative								
	No-Build			Alternative A			Alternative B		
	Seg. ID	Length (Miles)	%	Seg. ID	Length (Miles)	%	Seg. ID	Length (Miles)	%
Sidewalks Present	1	0.1	1%	1, 2, 3, 4	4.5	54%	1, 2, 3, 4	5.0	59%
Sidewalks Not Present	1, 2, 3, 4, 5, 6	8.3	99%	3, 5, 6	3.9	46%	3, 5, 6	3.4	40%
Total		8.4			8.4			8.4	
Shoulders less than Four Feet Wide	1, 3, 4, 5	7.8	92%	-	0.0	0%	-	0.0	0%
Shoulders equal to or greater than Four Feet Wide	2, 5, 6	0.7	8%	1, 2, 3, 4, 5, 6	8.4	100%	1, 2, 3, 4, 5, 6	8.4	100%
Total		8.4			8.4			8.4	

2.6 ALTERNATIVES PREVIOUSLY CONSIDERED BUT ELIMINATED

In addition to the Build Alternatives, other transportation policy alternatives were considered for this project. The alternatives included a Four-Travel Lane Option, a Transportation Systems Management Alternative and a Mass Transit Alternative. The Four-Travel Lane Option was eliminated in the public involvement/Context Sensitive Solution process discussed in **Section 2.1**. Neither The TSM nor Mass Transit Alternatives alone can serve the purpose and need for this project, and were therefore not carried forward in this document. However, elements of each of these transportation policy alternatives are provided in the Build Alternatives.

2.6.1 Four-Travel Lane Option

As discussed in **Section 2.1**, a continuous four-travel lane alternative with a divided median was considered and discussed beginning in the planning stages of the project and through the CSS phase. Although some support was noted for this alternative, there was considerable opposition, in part, due to the increased right-of-way requirements, which would require a higher number of relocations, adverse impacts to the historic Yancey's Tavern property, and additional relocations within the East Lawn Memorial Gardens Cemetery located directly across the roadway from the tavern. The continuous four-travel lane alternative would also require higher areas of encroachment into floodplains, greater lengths of channel changes to streams, and potential hazardous materials impacts would also have been required. The public expressed concerns about potential diminished visual and rural aesthetics, accelerated development and increased traffic speed in the corridor if a continuous four-lane alignment was constructed. Due to the lack of public support, a continuous four-travel lane option was not carried forward in this document.

2.6.1 TSM Alternative

Transportation Systems Management (TSM) is an integrated approach to optimize the performance of the existing transportation infrastructure through the implementation of systems, services, and projects designed to preserve capacity and improve security, safety, and reliability. The goal of TSM is to improve the efficiency of existing transportation facilities while minimizing the need for major construction/reconstruction projects.

TSM strategies alone cannot serve the purpose and need for this project, which includes correcting existing roadway deficiencies and improving access management. Therefore TSM alternatives as the only improvements were not carried forward in this document. Common TSM strategies, along with their effects to this project, are listed in **Table 2.6.1**.

TABLE 2.6.1: TSM STRATEGIES

TSM Strategy #1: Ridesharing	
Tools:	Carpooling, vanpooling, alternative work hours, guaranteed ride home, telecommuting, paratransit services, park and ride facilities
Effect on the Study Area:	The effects of ridesharing strategies are regional in nature, and not corridor specific. The effect of ridesharing strategies in the mostly rural setting of the project corridor would be expected to be minimal. Advances in technology have enabled many to work from home. However, the potential impact of telecommuting on the transportation system is difficult to ascertain, and should be considered minimal. Paratransit services are presently handled as a demand-response service in Kingsport's City Limits. Paratransit services are a benefit to those unable to drive, but generally have minimal impact on traffic. Park and ride facilities are provided for motorists to park and transfer to public transit, carpool or vanpool. No park and ride facilities are located in the project study area and public transit is only offered in the far eastern area of the study area. Additional park and ride facilities may compliment roadway improvements, but without expanded transit availability would not significantly improve congestion in the area or meet the purpose and need of the project.
TSM Strategy #2: Roadway Improvements	
Tools:	Intersection improvements, channelization, traffic surveillance and control systems, traffic control centers, computerized signal systems
Effect on the Study Area:	Intersection improvements and improved channelization are included in the Build Alternatives. Only Four traffic signals are present along the 8.4 mile long study corridor, all of which are located within the first 1.5 miles. While improving traffic surveillance and control systems would be beneficial, it would not impact the majority of the project.
TSM Strategy #3: Dedicated Laneage	
Tools:	HOV lanes, HOV and bus bypass lanes, bus bypass ramps
Effect on the Study Area:	These tools are generally applied to freeway facilities and are not applicable to the study corridor.

TSM Strategy #4: Bicycle and Pedestrian Facilities	
Tools:	Provide bicycle and pedestrian facilities.
Effect on the Study Area:	The Build Alternative will provide shoulders wide enough to accommodate bicyclists and will provide sidewalks along most residential and commercial segments of the corridor. These facilities will compliment the roadway improvements. Bicycle and pedestrian facilities alone would not meet the purpose and need of the project or noticeably reduce congestion along the corridor. Furthermore, constructing bicycle and pedestrian facilities would incur high costs due to the narrow existing right-of-way, surrounding terrain, and adjacent development.
TSM Strategy #5: Transit Improvements	
Tools:	Transit service enhancement or expansion, transit traffic signal preemption, transit information services, exclusive transit ROW, and mode change facilities
Effect on the Study Area:	Transit improvements are discussed in **Section 2.6.2 Mass Transit Alternative**.
TSM Strategy #6: Intelligent Transportation Systems	
Tools:	Intelligent transportation systems and advanced public transportation system technology, incident management, and motorist information systems
Effect on the Study Area:	These systems are primarily applied to freeway facilities. Many non freeway ITS strategies, including dynamic message signs and improved personal GPS systems that provide congestion alerts, provide value. However, quantitative estimates of their benefits are not yet available since many of these strategies are relatively new. ITS improvements alone would not be expected to significantly improve traffic operations along the corridor and would not meet the purpose and need of the project.

TSM Strategy #7: General Purpose Lanes	
Tools:	Add additional general purpose lanes
Effect on the Study Area:	The addition of general purpose lanes is included in the Build Alternatives. This strategy has the potential to have the most impact on congestion relief. It also will likely have the highest cost and will tend to negatively impact vehicle miles traveled and, in some cases, emissions. Therefore, the addition of general purpose lanes was considered only after all of the other strategies had been evaluated and found to be ineffective.

2.6.2 Mass Transit Alternative

Fixed route mass transit service is offered within the City of Kingsport through the Kingsport Area Transit Service (KATS). KATS operates from 7:30 am until 5:30 pm, Monday through Friday, excluding holidays. Five routes are currently offered by KATS (see **Figure 2.6.1**). The cost to ride a KATS bus is $1.

Paratransit is also available within Kingsport's City Limits. KATS Paratransit is a curb-to-curb, origin-to-destination next day transportation service that is available to those individuals who reside in the City of Kingsport, and because of their disability or health-related condition, cannot independently board, ride and/or disembark from an accessible fixed-route transit bus or cannot get to/from a boarding or disembarking location. All KATS Paratransit eligible customers must be Americans with Disabilities Act (ADA) certified by the transit agency before scheduling a ride.

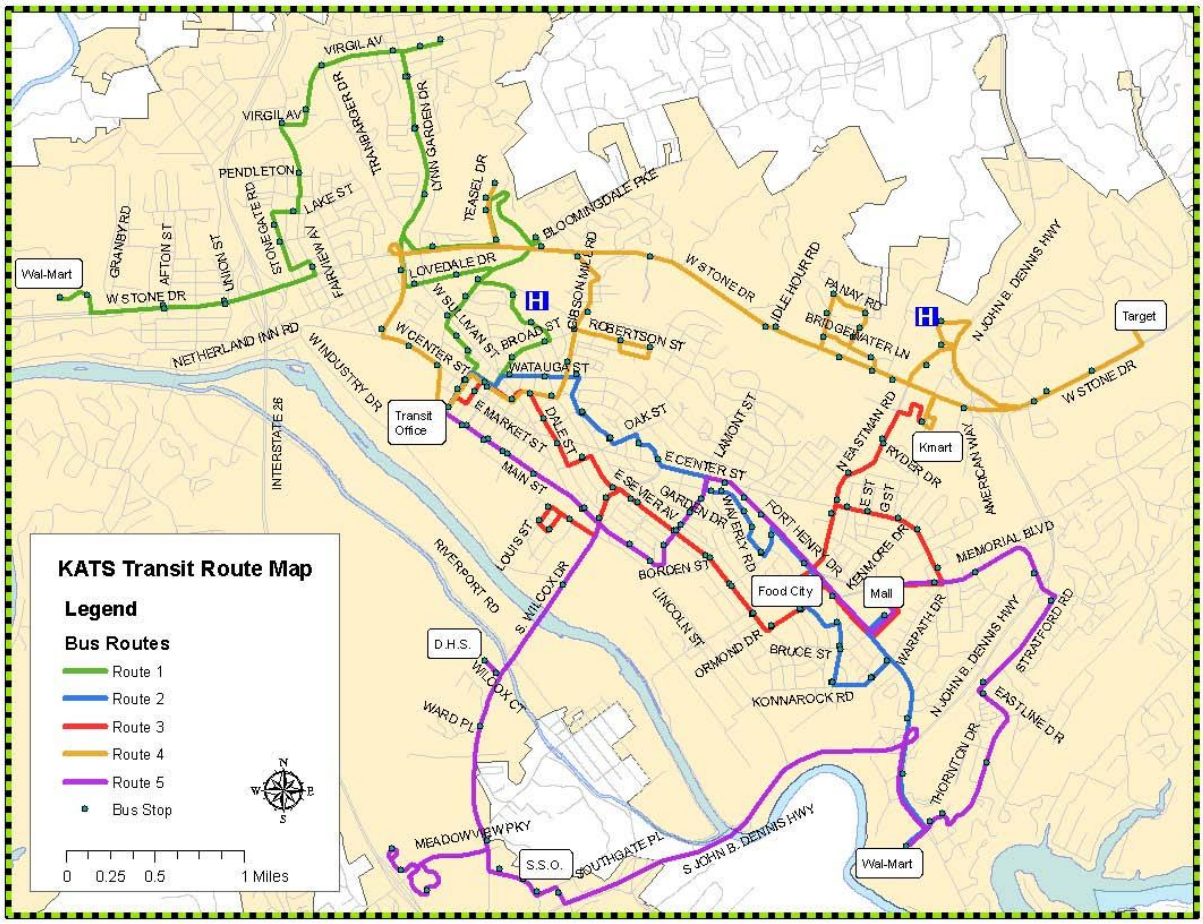


FIGURE 2.6.1: KATS TRANSIT ROUTES

Fixed route transit service is currently offered within the first 0.8 mile, or 10%, of the study corridor, between East Center Street and Stratford Road. Paratransit is offered within the Kingsport City Limits, which accounts for 2.1 miles, or 25%, of the study corridor. There are no known plans to extend transit service beyond these limits. The majority of the study corridor is rural in nature with low population densities, which is unfavorable for transit ridership. Furthermore, improvements to the mass transit system alone do not serve the purpose and need for this project, which includes improving the safety of the route and relieving congestion. Therefore, a Mass Transit Alternative was not carried forward in this document.

It should be noted that if expanding transit service along the study corridor is ever warranted, the improvements in the Build Alternatives would be beneficial to the expansion. SR 126 (Memorial Boulevard) is primarily a two-lane roadway with limited capacity for future traffic growth. The majority of the route has a rural cross section with no shoulders or sidewalks. The narrow cross section width, lack of shoulders, and lack of sidewalks makes many segments of the corridor unfavorable for bus/transit service. There are few safe locations to locate bus stops, with poor pedestrian connectivity between potential stops and adjacent developments. The proposed improvements will correct these deficiencies along the route and provide a facility that is more acceptable for transit service.

Chapter 3: Affected Environment

3.0 AFFECTED ENVIRONMENT

This chapter provides an inventory of the natural and human environment within the project corridor. This includes existing neighborhoods, the income level of residents, racial populations, cultural and historic resources, aquatic and terrestrial species, streams, wetlands, and types of land uses.

3.1 LAND USE

3.1.1 Existing Land Use

Land use in the initial portion of the project area, from East Center Street in downtown Kingsport to the John B. Dennis Highway, is primarily commercial, but does include some residential land use. Commercial uses are a mix of services, including exercise facilities, a dry cleaning business, an auto repair business, a music store, and several convenience stores. The residential land use is mainly conventional framed-structure housing (40 years of age or older).

The land use transitions to mainly residential with very few commercial enterprises as SR 126 (Memorial Boulevard) crosses underneath the John B. Dennis Highway. Between the John B. Dennis Highway and Old Stage Road the land use is an urban residential composition that includes a mixture of older single family residential houses, apartments, and multiplex dwellings, with some businesses. The homes in this area are limited to road proximity by the slopes of the hill. They are either in a valley beneath SR 126 (Memorial Boulevard) or above the roadway on a ridge.

East of Old Stage Road, SR 126 (Memorial Boulevard) crests a ridge and begins to level off. The areas to the north and south of Memorial Boulevard become less severe in their slopes. In this area, the land use remains residential, although agricultural land use becomes more evident. The area between Stagecoach Road and Cook Valley Road also includes the East Lawn Memorial Park, a cemetery with numerous gravesites adjacent to the existing roadway, and Yancey's Tavern, a National Register of Historic Places listed property.

From the cemetery to Samlola Road, the land use on either side of Memorial Boulevard is a blend of residential and agricultural, with some commercial land use scattered lightly through the area. Within this segment, residences are more densely populated around Fall Creek Road, Lonesome Pine Road, Cochise Trail, and Chippewa Lane. Conversations with local officials indicated that residential development of over one hundred homes is ongoing adjacent to Island Road. The areas of commercial land use are concentrated around smaller communities. The Indian Hills area features a shopping center with a national chain discount store. In addition, a veterinary clinic and several small businesses exist in this area that includes the junction of SR 126 (Memorial Boulevard) and Island Road.

From Samlola Road to Overhill Drive, the area is less developed. Some homes exist, but farmland is more prevalent. The Overhill Drive area, Shadowtown Road, and Carolina Pottery Drive are all located in the vicinity around the SR 126 (Memorial Boulevard) Interchange with I-81, the eastern terminus of the project. This area is primarily highway commercial with some residential land use.

3.1.2 Land Use Plans and Regulatory Controls

Kingsport's City Limits include the western terminus of the study corridor at East Center Street and extend eastward to approximately the western terminus of Old Stagecoach Road. The area from Old Stagecoach Road eastward to the I-81 interchange is not within the Kingsport City Limits. Kingsport's City Limits also include the area around I-81 as a linear corridor. The Interchange of SR 126 (Memorial Boulevard) and I-81 is included in this linear corridor and is therefore within the city limits.

Reviews of the project area and zoning maps indicate that approximately half of the existing and planned development in the corridor within Kingsport's City Limits consists of residential land use. The predominant residential land use zoning is single family units, with some multi-unit dwellings (duplexes and apartments). These areas are shaded in yellow in **Figure 3.1.1**. Commercial land use zoning is predominantly at the western and eastern termini of the corridor. These areas are shaded in blue, pink, orange and red in **Figure 3.1.1**.

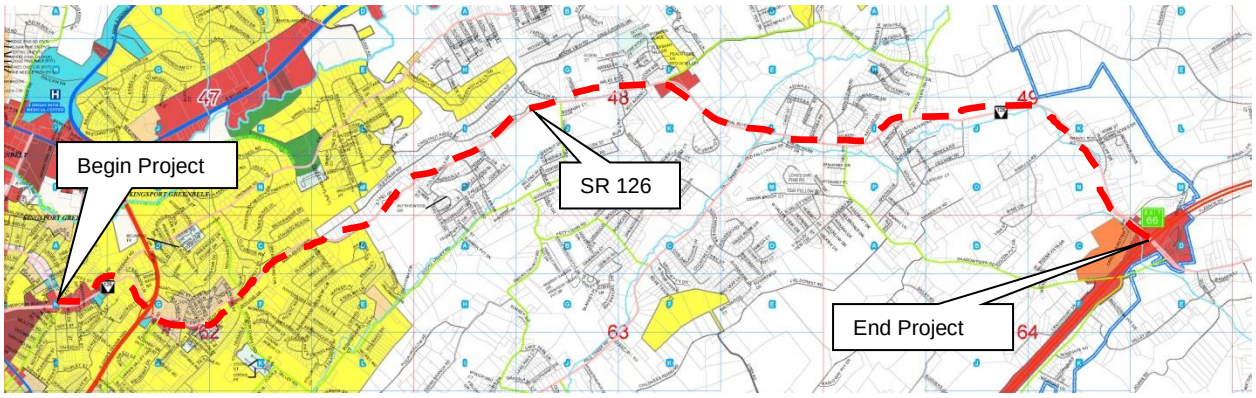


FIGURE 3.1.1: KINGSPORT LAND USE ZONING IN THE PROJECT AREA

Outside of Kingsport's City Limits, Sullivan County Planning regulates development. Reviews of the project area and zoning maps indicate that most of the existing and planned development in the corridor outside of Kingsport's City Limits consists of residential land use, mainly single family units, with some multi-unit dwellings (duplexes and apartments). These areas are shaded in yellow in **Figure 3.1.2**. Commercial land use zoning is scattered along the corridor. These areas are shaded in blue pink, orange and red in **Figure 3.1.2**. Agriculturally zoned areas exist along the study corridor and are shaded in green. Based on site observations, many residentially zoned areas are also utilized for agricultural use.

The *Sullivan County Regional Plan: A Guide for Future Land Use and Transportation Development, Planning Period 2006 – 2026* notes that like many counties in northeast Tennessee, the pattern of land use or development in Sullivan County has been significantly affected by natural factors, including extreme slopes and soil suitability. Slopes in Sullivan County, and within the SR 126 (Memorial Boulevard) Study Corridor, range from below 5 percent to nearly 50 percent. In areas greater than 20 percent slope, limitations to development are severe. Based on soils analysis, there is very little of Sullivan County that is considered suitable for urban development utilizing subsurface sewage disposal systems (septic tanks). Areas not serviced by sewer lines therefore have limited high density development potential.

Approximately half of the SR 126 (Memorial Boulevard) Corridor outside of Kingsport's City Limits, from Harr Town Road to I-81, is not serviced by sewer lines.

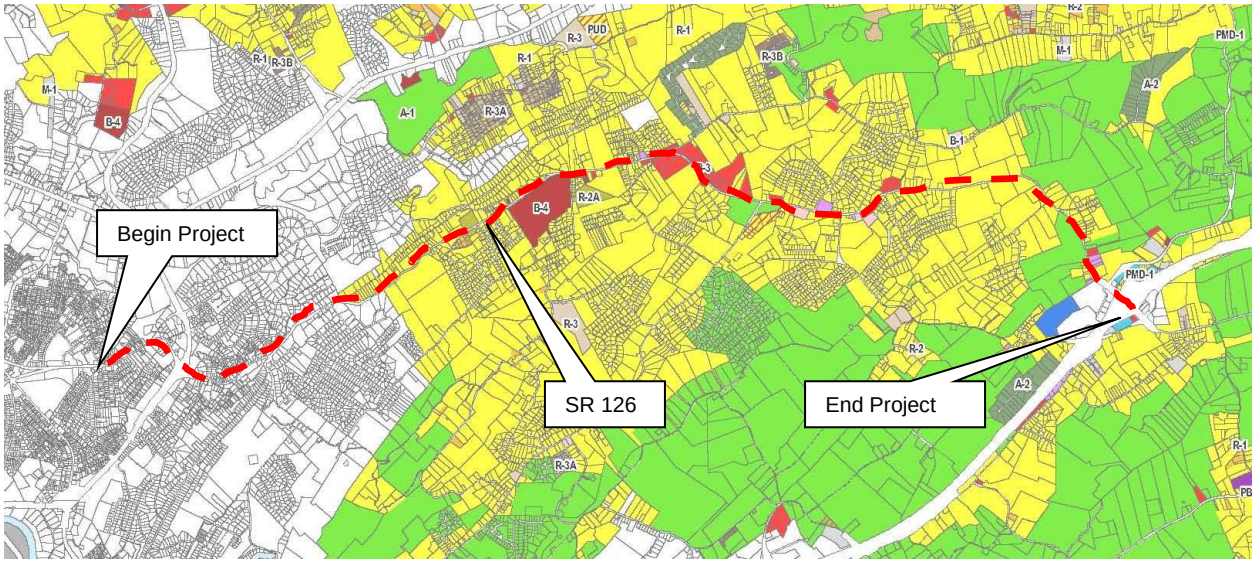


FIGURE 3.1.2: SULLIVAN COUNTY LAND USE ZONING IN THE PROJECT AREA

3.2 COMMUNITY SERVICES

3.2.1 Schools

The Sullivan County Department of Education serves over 13,000 students. The county currently has 25 schools which are distributed into 4 zones; North, South, East and Central. Each zone consists of a high school and several elementary and middle schools. In total there are four comprehensive high schools, seven middle schools, one intermediate school and 12 elementary schools. One school, Mary Hughes, combines grades Kindergarten through Eighth Grade. Indian Springs Elementary School is located approximately 300 yards south of SR 126 (Memorial Boulevard). Central High School is located just outside the eastern terminus of the study corridor, east of I-81. Sullivan County Schools are listed in **Table 3.2.1**. Schools that serve the project area with bus routes are represented in gray shading.

TABLE 3.2.1: SULLIVAN COUNTY SCHOOLS*

Bluff City Elementary	Kingsley Elementary	
Bluff City Middle	Mary Hughes Elementary & Middle Schools	Blountville Elementary
Brookside Elementary	Miller Perry Elementary	Blountville Middle
Cedar Grove Elementary	North High School	Central Heights Elementary
Colonial Heights Middle	Rock Springs Elementary	Central High School
East High School	South High School	Holston Valley Middle
Emmett Elementary	Sullivan Elementary	
	Sullivan Middle	
Holston Elementary		
Indian Springs Elementary	Weaver Elementary	
Ketron Intermediate		

* Source: Sullivan County School Board website (http://www.scde.k12.tn.us/metadot/index.pl?id=2167&isa=Category&op=show)

3.2.2 Fire, Medical Emergency, and Police Protection

The proposed project area includes one volunteer fire station, Kingsport Fire Department Station #4, which is located near the western terminus of the study area near Heather Lane. No other emergency service facilities are located within the project impact area.

3.2.3 Hospitals

Sullivan County has several hospitals, and three are located in Kingsport. They are described below. None are located within close proximity to the project corridor.

HealthSouth Rehabilitation Hospital of Kingsport is an acute inpatient rehabilitation hospital treating more than 1,000 patients annually from Southwest Virginia, Northeast Tennessee, Southeast Kentucky and Northwest North Carolina. The hospital offers care by physician specialists in physical medicine and rehabilitation, pulmonary care, neurology, gastroenterology, internal medicine, and family practice.

Indian Path Medical Center is a full range outpatient service acute care hospital with 261 beds. It is located in Kingsport off the John B. Dennis Highway. Services include an emergency department, a family-centered birthing center, and skilled nursing beds.

Holston Valley Medical Center is one of Tennessee's six Level I trauma centers, equipped to care for the most critically injured patients. This facility houses a Level III neonatal intensive care unit which cares for the region's most critically ill babies.

3.2.4 Utilities

Both Build Alternatives under consideration would be located adjacent to, and would replace portions of, the existing roadway. Conversations with local officials have indicated that the City of Kingsport has existing sewer lines and water lines within sections of the project area. Some lines will have to be moved, replaced, and/or repaired.

Coordination with the City's Public Works was done to determine possible future impacts on utilities and it was determined that there are no plans to add new water or sewer lines along SR 126 (Memorial Boulevard). Any additional sewer lines would be added along area creeks, and

additional water lines would be added along area roadways, but not SR 126 (Memorial Boulevard).

3.2.5 Multi-modal Transportation

Airports
The area is served by the Tri-Cities Regional Airport. This facility is owned by Johnson City, Kingsport and Bristol, TN, and Bristol, VA. It is centrally located to facilitate the needs of the Tri-City area, and is not located near the project area.

Rail
Rail freight is very light in Sullivan County, and according to the Kingsport Area MPO's 2030 Long Range Transportation Plan and the Sullivan County Regional Plan 2006-2026, future plans do not include increased usage of this form of transportation. Norfolk Southern serves the Industrial Park in Piney Flats, Bluff City and Bristol. None of these areas are within or adjacent to the project corridor. There are proposed plans by Kingsport to increase rail activities by CSX at its intermodal facility off Lincoln Street, which primarily accommodates the needs of the Eastman Chemical plant. No existing railways and no proposed railways are identified within the project corridor.

Bicycle Trails
SR 126 (Memorial Boulevard) is not listed as a Tennessee Bicycle Route. However, it is TDOT's Policy (Bicycle and Pedestrian Policy #530-01) that provisions for bicycles and pedestrians be integrated into new construction and reconstruction of roadway projects through design features appropriate for the context and function of the transportation facility.

3.3 SOCIAL AND ECONOMIC CHARACTERISTICS

Sullivan County is defined by 413.0 square miles of land area and a population density of 374.2 people per square mile. The average household size is 2.22 persons compared to a national average family size of 2.60 persons. The County population in 2010 was estimated to be 162,197. Owner-occupied homes totaled 47,531, while 17,430 residents occupied rented homes in Sullivan County.

Manufacturing was the largest of 20 major employment sectors in 2008, providing an average annual income of $68,124. Sullivan County's per capita income grew by 8.6% between 1996 and 2006 (adjusted for inflation).

TABLE 3.3.1: SUMMARY OF DEMOGRAPHICS, SULLIVAN COUNTY, TN

People & Income Overview (By Place of Residence)	Value	Industry Overview (2008) (By Place of Work)	Value
Population (2010)	162,197	**Covered Employment**	72,164
Growth (%) since 1990	6.9%	Manufacturing - % all jobs in County	23.2%
Households (2010)	64,961		
Labor Force (persons) (2009)	71,629	Transportation & Warehousing - % all jobs in County	3.1%
Unemployment Rate (2007)	10.9%		

3.3.1 Social Characteristics

Population Trends and Forecasts

The University of Tennessee (UT) Center for Business and Economic Research performs population projections for the state of Tennessee, including state, county, and city populations. County populations are based on data to determine the annual change in population (the change in population equals births minus deaths plus net migration).

Population Characteristics - TN & Sullivan County

Population projections for Tennessee and Sullivan County are shown in **Table 3.3.2**. Population growth for Sullivan County in the decades of, 2000, 2010, 2020, 2030, and 2040 are less than the population growth for the state. Sullivan County shows a growth rate (2.47%) between 2000 and 2010 that is 9.0 % below the projected growth rate for the state (11.5%). Projected growth rates for Sullivan County indicate a net growth in population through 2040 of 9.5% higher than the 2000 figure. The State of Tennessee is predicted to realize an increase in population of 42.5% between 2000 and 2040.

TABLE 3.3.2: POPULATION AND FORECAST GROWTH 2000-2040, TENNESSEE AND SULLIVAN COUNTY

Geographic Area	Population					
	2000	2010	2020	2030	2040	2000-2040 Change
Tennessee	5,689,283	6,346,105	6,841,868	7,489,809	8,106,583	2,417,300
Change	-	+11.5%	+7.8%	+9.5%	+8.2%	+42.5%
Sullivan County	153,048	156,823	159,551	163,795	167,599	14,551
Change	-	+2.5%	+1.7%	+2.7%	+2.3%	9.5%

Source: *UT Center for Business and Economic Research, 2010 and U.S. Census Bureau, 2010*

Population Characteristics - City of Kingsport

As shown in **Table 3.3.3**, the population totals for the City of Kingsport have remained steady when comparing estimates from 2005 through 2009. Between 2009 and 2010, the population increased by 7.7% due to a series of annexations. Projections and estimates for populations in Kingsport are not conducted by the U.T. Center for Business and Economic Research. The estimations below were provided by the U.S. Census Bureau. No projections into 2040 exist for the City of Kingsport.

TABLE 3.3.3: KINGSPORT COMPARATIVE POPULATIONS, 2005 - 2010

Kingsport Population by Year		Rate of Change in Percentages
2005	44,238	---
2006	44,259	+0.05%
2007	44,548	+0.65%
2008	44,610	+0.14%
2009	44,758	+0.33%
2010	48,205	+7.70%

Population Characteristics - Study Corridor

The project study corridor bisects seven U.S. Census tracts. However, many of these seven census tracts include large portions that are located outside of the immediate project area. Most of the SR 126 (Memorial Boulevard) project is situated within Census Tract 423. Lesser portions of the project are located within Census Tracts 408, 409, 410, 411, 422 and 424. These adjacent Census Tracts are provided in **Figure 3.3.1**.

The 2010 population within the immediate study corridor was 26,683. Census tracts 423 (6,780 persons), 410 (4,052 persons), and 408 (3,633 persons) had the largest populations. Senior adults, those 65 years of age and older, comprise a majority of the population in all tracts considered.. **Table 3.3.4** provides specific data for each of the Census Tracts in the study corridor.

TABLE 3.3.4: POPULATION AGE CHARACTERISTICS, CENSUS TRACTS FOR SULLIVAN COUNTY, 2010

Subject	Sullivan County Census Tracts							Total
Census Tracts	408	409	410	411	422	423	424	
TOTAL POPULATION	3,633	3,229	4,052	2,375	3,199	6,780	3,415	26,683
Under 5	208	203	204	106	152	335	173	1,381
5 – 14	420	418	564	270	393	850	375	3,290
15 – 24	399	380	363	230	384	680	415	2,851
25 – 34	408	322	385	243	281	615	343	2,597
35 – 44	436	388	551	297	453	964	493	3,582
45 – 54	461	431	654	335	525	1062	536	4,004
55 – 64	433	421	571	343	429	1064	485	3,746
65 and over	868	666	760	551	582	1210	595	5,232
Median age	43.9	42.6	44.3	46.5	43.8	44.3	43.4	

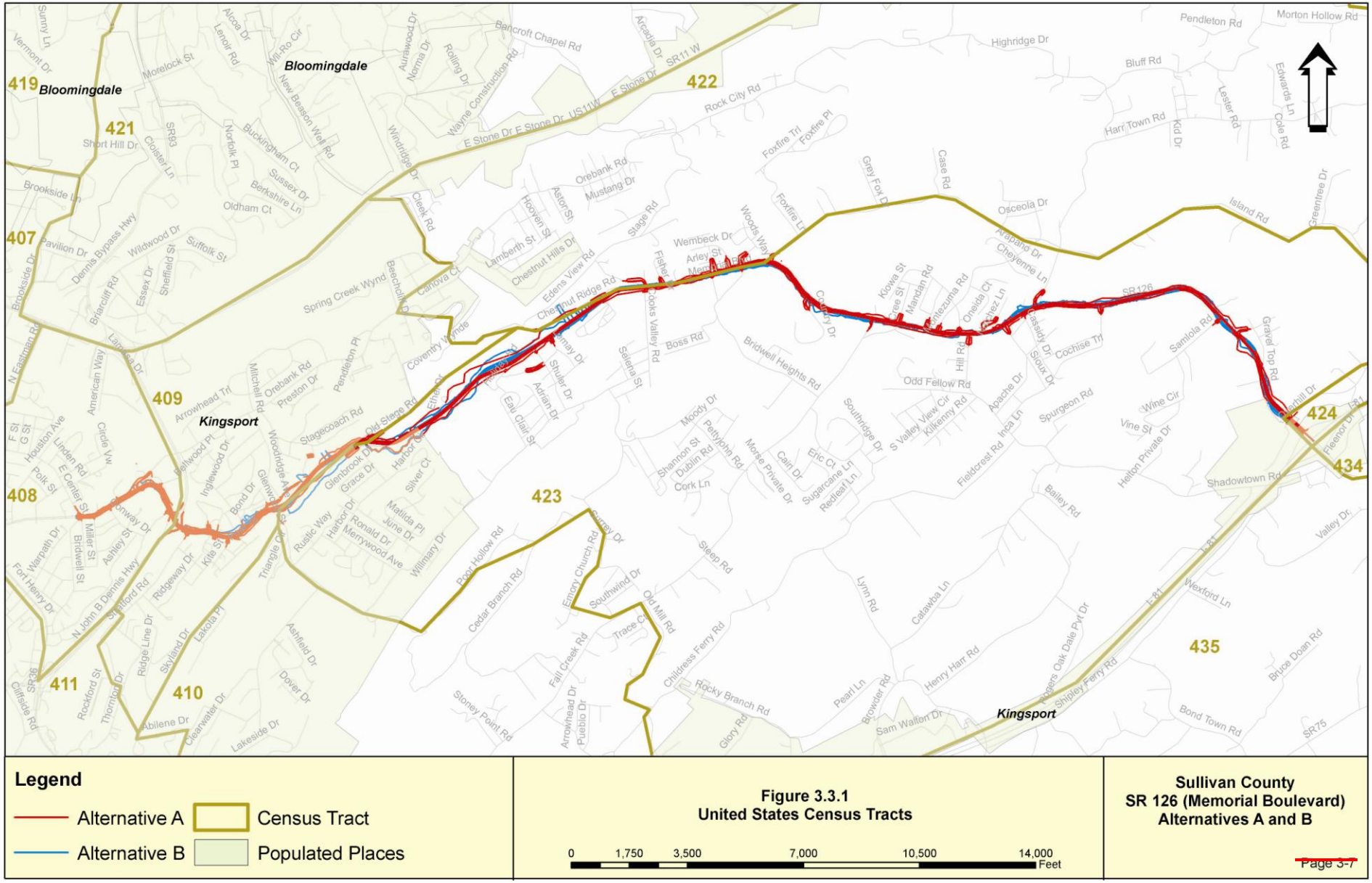


FIGURE 3.3.1: U.S. CENSUS TRACTS IN PROJECT CORRIDOR

Social Groups - Sullivan County & Study Corridor

The majority of Sullivan County's population is white. As seen in **Table 3.3.5**, the Census Tracts for the study corridor also reflect a majority white population. The largest minority group in Sullivan County is comprised of African American citizens. African-Americans account for 92.3% of the minority population in Sullivan County.

TABLE 3.3.5: RACIAL CHARACTERISTICS BY CENSUS TRACTS, SULLIVAN COUNTY, 2010*

Subject	Sullivan County Census Tracts							Total
	408	409	410	411	422	423	424	
RACE								
Total Population	3,633	3,229	4,052	2,375	3,199	6,780	3,415	26,683
One Race*	3,573	3,152	4,020	2,325	3,161	6,711	3,385	26,327
White	3,371	3,008	3,936	2,204	3,105	6,593	3,325	25,542
African-American	123	82	25	62	13	36	20	361
American Indian/Alaskan	19	5	7	12	7	14	5	69
Asian	12	40	39	21	12	42	13	179
Native Hawaiian	1	1	1	0	0	4	1	8
Some other race	47	16	12	26	24	22	21	168
Two or more races*	60	77	32	50	38	69	30	356
Hispanic/Latino (of any race)	94	40	40	50	45	60	39	368

*Beginning in 2000, the U.S. Census Bureau allowed individuals to identify one or more races to indicate their racial identity.

Educational Characteristics - TN, Sullivan County

Sullivan County has a lower percentage of residents who are high school graduates or equivalent (85.1%) than the State of Tennessee (88.3%). Sullivan County also has a lower percentage of residents who have attained a Bachelor's Degree or higher (18.5%) than the State of Tennessee (26.7%).

TABLE 3.3.6: EDUCATIONAL ATTAINMENT PERCENTAGES, TENNESSEE AND SULLIVAN COUNTY, 2010

AREA	Percentage of Population High School Graduate or Higher	Percentage of Population Bachelor's Degree or Higher
Tennessee	88.3%	26.7%
Sullivan County	85.1%	18.5%

Urban/Rural Population Distribution - Sullivan County

The urban and rural distribution of residents within Sullivan County indicates that most residents live within the populated areas of Kingsport and Bristol. The study corridor is located primarily within a rural area. A small portion of the project within the city limits is urban. The U.S. Census 2000 figures estimate that 73.5% of the county's residents are classified as living in urban areas, and the remaining 26.5% reside in rural areas. The 2010 data for urban/rural distribution of residents is currently unavailable. Table **3.3.7** provides total population counts and percentages for these categories in Sullivan County.

TABLE 3.3.7: URBAN/RURAL REPRESENTATION OF SULLIVAN COUNTY

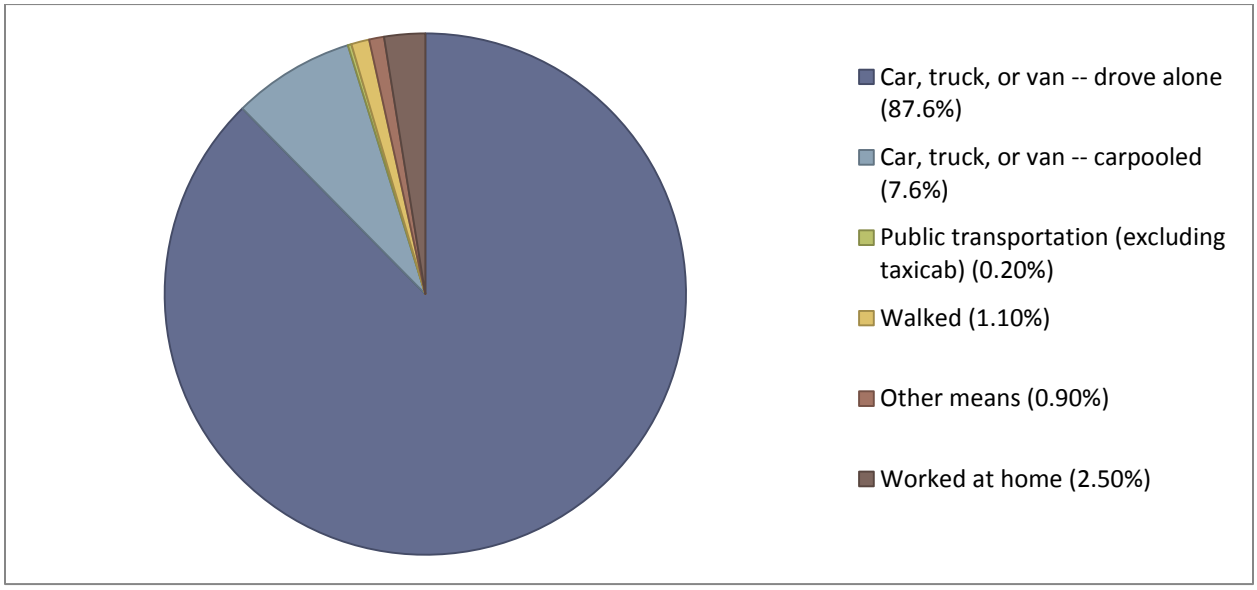
Classification Type	Population Total	Percentage of Population within Classification
2000 Total Urban Population inside urbanized areas.	112,474	73.5%
2000 Total Rural	40,574	26.5%

*The 2010 Census Data for Urban/Rural representation is not currently available

Commuting Patterns - Sullivan County

Commuting patterns are important in establishing modes of transportation and length of time commuting to and from work. These statistics can indicate the level of alternative means of transportation that are utilized. A great majority of the residents in Sullivan County choose the most common method of driving to and from work; driving by car (87.6% with a single occupant). Carpooling is the second choice (7.6% with two or more vehicle occupants). Very few residents utilize buses, taxis, bicycles or walking when commuting to work. **Table 3.3.8** includes a graphic which represents the means of transportation to work based on figures from the 2010 U.S. Census.

TABLE 3.3.8: COMMUTING PATTERNS



Housing – TN, Sullivan County, & Study Corridor

Interviews were conducted with local officials at the Kingsport MPO and with a local real estate agent, and the Multiple Listing database was reviewed for Kingsport and Sullivan County. The discussions and research indicate that the area has not experienced drastic declines in activities during the economic downturn between 2008 and 2009. Sales prices and home sales volumes showed that home values remained steady between 2006 and 2009 for Kingsport and the Tri-City region of Kingsport, Bristol and Johnson City. Annual sales volumes for the same years declined, but activities in 2010 are indicating an increase will be realized by the end of the year.

Tables 3.3.9A and 3.3.9B provides U.S. Census 2010 information on the number of tenants and the type of homes they occupy. As seen in the table, 8,595 of the 11,091 housing units in the study corridor (77.5 percent) were owner-occupied, with the remaining 22.5% of housing units being occupied by renters. Census Tracts 408 (42.1 percent) and 409 (29.4 percent) had the highest percentages of renter-occupied housing units, while Census Tract 410 (11.3 percent) and Census Tract 422 (16.0 percent) had the lowest percentages.

TABLE 3.3.9A: COMPARATIVE HOUSING DATA FOR SULLIVAN COUNTY AND TENNESSEE, 2010 CENSUS

	Total Project Area*	Sullivan County	Tennessee
Total:	11,091	73,825	2,815,087
Owner Occupied	8,595	47,531	1,662,768
Percentage	77.5%	73.2%	68.1%
Renter Occupied	2,496	17,430	777,895
Percentage	22.5%	26.8%	31.9%

TABLE 3.3.9B: COMPARATIVE HOUSING DATA FOR PROJECT AREA CENSUS TRACTS, 2010 CENSUS

	Census Tract 408, Sullivan County, Tennessee	Census Tract 409, Sullivan County, Tennessee	Census Tract 410, Sullivan County, Tennessee	Census Tract 411, Sullivan County, Tennessee	Census Tract 422, Sullivan County, Tennessee	Census Tract 423, Sullivan County, Tennessee	Census Tract 424, Sullivan County, Tennessee
Total:	1,569	1,388	1,599	1,103	1,284	2,725	1,423
Owner occupied	908	980	1,418	803	1,078	2,284	1,124
Percentage	57.9	70.6	88.7	72.8	84	83.8	79
Renter occupied	661	408	181	300	206	441	299
Percentage	42.1	29.4	11.3	27.2	16	16.2	21

***** These figures resulted from totaling the values of the seven Census Tract Areas

Poverty – TN, Sullivan County, City of Kingsport, & Study Corridor

This project is located mainly within rural areas that are transitioning to suburban land use. The initial portion of the project is within the city limits of Kingsport in an urban setting. An additional portion of the project, along the I-81 corridor near and at the eastern terminus, is also within the city limits. The U.S. Census Bureau reported in its 2007 estimations that Kingsport had a higher poverty level than Sullivan County or the State of Tennessee. This concentration of low income residents is consistent with most towns and cities.

A total of 7.4 percent of Kingsport's residents were estimated in 2007 to be living below the poverty level, which is almost one percent higher than the State of Tennessee's total. The area along the project corridor does not feature concentrations of socially interdependent family clusters. The area consists primarily of subdivisions and larger tracts of land with homes. Some apartments and multiplex buildings exist within or adjacent to the project limits, but these rental structures are not occupied by a largely minority or low-income groups. **Table 3.3.10** compares poverty levels on statewide, county, and city levels. **Table 3.3.11** compares poverty levels within the project's Census Tracts. Updated poverty levels estimates are not available for the adjacent Census Tracts.

TABLE 3.3.10: RESIDENTS WITH INCOME BELOW THE POVERTY LEVEL IN 2007*

Kingsport	20.2%
Sullivan County	15.0%
Tennessee	15.9%

* U.S. Census Bureau, Quickfacts2007

TABLE 3.3.11: U.S. CENSUS TRACT HOUSEHOLD INCOME, 2000

Subject	Sullivan County Census Tracts							Total
	408	409	410	411	422	423	424	
INCOME IN 1999								
Households	1,636	1,274	1,379	1,137	1,185	2,592	1,326	10,529
Median household income ($)	25,522	36,757	43,651	33,512	39,694	45,889	27,833	
Families	965	917	1,082	732	918	2,032	1,006	7,652
Median family income ($)	31,715	49,712	50,833	41,279	44,844	52,132	33,393	
Below poverty families	144	90	29	93	59	74	127	616
Percent of all families below poverty*	14.9	9.8	2.7	12.7	6.4	3.6	12.6	8.1
Below poverty individuals	652	402	167	342	260	297	527	2,647

* U.S. Census Bureau, 2000 (2010 Dataset is not available)

Personal Income – TN & Sullivan County

The Tennessee Advisory Commission on Intergovernmental Relations (TACIR) provides selected statistical information for Counties and compares them to State data. In 2007 the per capita personal income of Sullivan County was $32,141. This is less than the State's per capita personal income of $33,395 and ranks 11th out of Tennessee's 95 counties.

In 2008 the median household income of Sullivan County was $41,115. This is less than the State's median household income of $43,610 and ranks 27th out of Tennessee's 95 counties.

3.3.2 Economic Characteristics

Table **3.3.12** provides labor force characteristics for Sullivan County and the State of Tennessee. Sullivan County had a lower unemployment rate (10.9%) compared to Tennessee's statewide rate of 11.3%.

TABLE 3.3.12: LABOR FORCE CHARACTERISTICS FOR SULLIVAN COUNTY, 2010*

AREA	Total Labor Force(2010)		Total/Percentage of Unemployment Rate(2010)
	Labor Force	Employment	Unemployment
Tennessee	3,081,522	2,733,310	348,212 / 11.3%
Sullivan County	71,269	63,500	7,769 / 10.9%

*2010 Labor Force Data were not available for Kingsport or the Adjacent Census Tracts.

The highest numbers of employees throughout the study corridor's census tracts, and in total, are located in the sectors of manufacturing, educational, health and social services, and in retail trade (See **Table 3.3.13**). The immediate project area features mainly retail, agricultural, and other service industries. The majority of the retail located within the project area is in the East Center Street area, and also at the interchange with I-81.

TABLE 3.3.13: ECONOMIC CHARACTERISTICS, SULLIVAN COUNTY CENSUS TRACTS, 2000*

Subject Industry Employees	Sullivan County Census Tracts							Total
	408	409	410	411	422	423	424	
Agriculture, forest, fishing and hunting, and mining	6	0	11	0	6	18	22	63
Construction	149	70	94	63	144	197	202	919
Manufacturing	218	245	388	188	238	636	349	2,262
Wholesale trade	52	93	49	49	31	133	65	472
Retail trade	216	135	171	163	282	483	120	1,570
Transportation and warehousing, and utilities	29	20	84	17	71	96	68	385
Information	16	25	54	21	12	113	18	259
Finance, insurance, real estate, and rental and leasing	48	92	84	38	70	162	27	521
Educational, health and social services	217	217	373	200	257	734	181	2,179
Professional, scientific, management, administrative, and waste management services	63	41	130	74	116	178	88	690
Arts, entertainment, recreation, accommodation and food services	112	138	103	74	80	218	169	894
Other services (except public administration)	104	63	83	62	45	126	151	634
Public administration	33	24	39	37	46	110	5	294

*2010 Data not available

3.3.3 Summary of Socioeconomic Characteristics

The City of Kingsport has remained somewhat steady in its population for the past few years as more residents move into the county than the city. In part, the topography limits development within many areas of the city limits. Many residents of the City of Kingsport and Sullivan County are senior adults that retired from the Eastman Kodak plant and have remained in the area. The vast majority of residents in the county and city are white, middle class, and own their own homes.

The unemployment rate of the area, reflective of those across the nation, increased in the latter part of 2008 and through 2009 due to the national economic recession. Sullivan County has a lower percentage of residents who are high school graduates or equivalent (85.1%) than the State of Tennessee (88.3%). Sullivan County also has a lower percentage of residents who

have attained a Bachelor's Degree or higher (18.5%) than the State of Tennessee (26.7%). The poverty rate of Sullivan County (15.0%) is comparable to the poverty rate for Tennessee (15.9%). Higher poverty rates are present within Kingsport's City Limits (20.2%).

3.4 NATURAL ENVIRONMENT

3.4.1 Geology

Topography and Geology

The project is located in Sullivan County, along the eastern limits of the City of Kingsport to its interchange with I-81. This area of Sullivan County features undulating to rolling valleys with rounded hills. The project area is situated within the Valley and Ridge physiographic region. In Tennessee, the Valley and Ridge is sometimes referred to as the Valley of East Tennessee, a rolling lowland formed on highly folded limestone, dolomite, and shale. Fertile valleys separated by wooded ridges make up this area. The eastern escarpment of the Cumberland Plateau and the Blue Ridge subdivision mark the boundaries of this region.

The Valley and Ridge is an area comprised of Ordovician and Ordovician-Cambrian age limestone, dolomite, shale, chert, siltstone, sandstone, and clay. Numerous elongated ridges and intervening valleys, all trending in a northeast-southwest direction, characterize this physiographic region. As a general rule the major ridges are formed by prominent quartzitic sandstone. Subordinate ridges consist of Lower Devonian sandstone and various sandstones of the Upper Devonian. The valleys and lower flanks of major ridges are underlain by shale and limestone. Valley floors contain rolling hills. Hills formed of shale are generally well rounded and smooth; those formed of limestone are somewhat irregular. Streams generally follow the narrow valley floors or cut across the strike of the ridges. The Tennessee River flows southwest through the region. Principal feeders from the north are the Clinch, French Broad, and Holston Rivers. Major tributaries from the east are the Hiwassee and Little Tennessee Rivers.

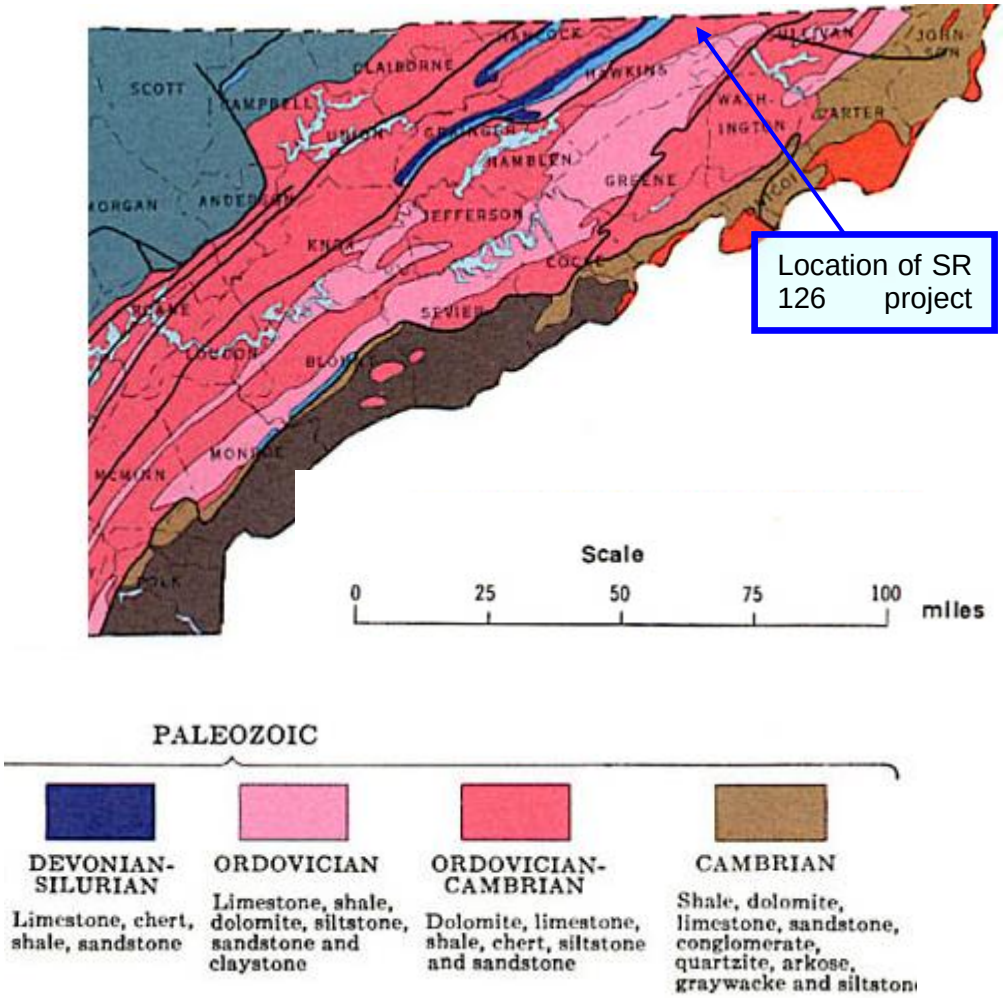


FIGURE 3.4.1: GENERALIZED GEOLOGIC MAP OF EAST TENNESSEE

Karst Features

Karst is an area of irregular limestone in which erosion has produced fissures (cracks), sinkholes, underground streams, and caverns.

Although karst topography is present within the project area, very few sinkholes have been mapped in the greater project region, and no significant sinkholes, if any, are being indicated within the project limits. Field trips also did not result in the identification of sinkholes within or adjacent to the project limits. The underlying geologic formations, particularly the Knox Group and the Honaker Dolomite group, are susceptible to sinkhole development due to their carbonate (limestone and dolostone) composition. Sinkhole development or discovery of developing sinkholes could occur at any time, but were not evident in areas where recent development has occurred in the areas surrounding SR 126 (Memorial Boulevard).

Other Geological Issues

TDOT conducted a preliminary geologic investigation that was submitted on June 29, 2009. The varying topography ranges throughout the project from nearly level areas to steeply rolling terrain. A copy of the Preliminary Geologic Report is on file at the TDOT Environmental Division Office in Nashville, TN.

Pyritic material is not expected to be encountered on the proposed project, and there does not appear to be any significant geological issues that cannot be addressed during the design or construction phase.

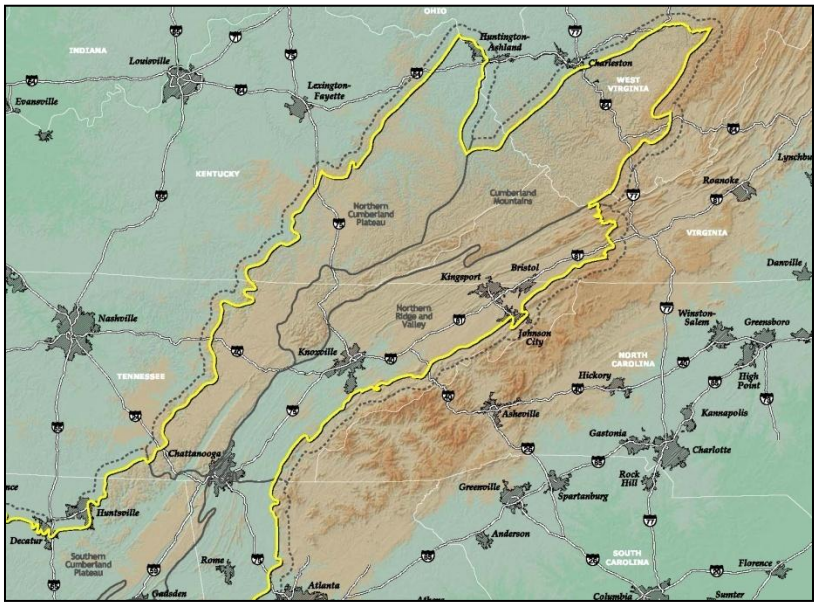
A possible old borrow site was observed just west of Holiday Hills Road adjacent to the westbound lane of existing SR 126 (Memorial Boulevard). The surrounding ground and backslope appeared stable, with no curvature being noted in the large diameter trees at the top of the slope. No geotechnical concerns were noted with regard to this area.

The observations made during the field trip and reviews of topographic mapping anticipate the majority of roadway improvements would require shifting into the existing hill slopes. This would result in a greater number of constructed cut slopes than embankment fills. The greatest cuts are expected in areas with steeper terrain such as the Sougan Hollow vicinity and the southern flank of Chestnut Ridge. Moderate to steep cuts could occur throughout the project, with less steep cuts being anticipated in areas of more gentle topography. Other areas along creek bottoms or in areas where the roadway is not shifted into the hill slopes could encounter minor to moderate fills.

3.5 NATURAL RESOURCES

3.5.1 Terrestrial Habitat

The project area is within the EPA Level III ecoregion termed the “Ridge and Valley Ecoregion.” This northeast-southwest trending, relatively low-lying, but diverse ecoregion is sandwiched between generally higher, more rugged mountainous regions with greater forest cover. **Figure 3.5.1** provides a location of the project in relation to the Ridge and Valley Ecoregion.



The Ridge & Valley Ecoregion (yellow outline in the figure above) includes the project area.

FIGURE 3.5.1: RIDGE AND VALLEY ECOREGION

Springs and caves are relatively numerous. Present-day forests cover about 50% of the region. The ecoregion has a diversity of aquatic habitats and species of fish. Natural plant communities in this area of the ecoregion are Appalachian oak forest (mixed oaks, hickory, pine, poplar, birch, maple); bottomland oak and mesophytic forests; and cedar barrens.

Field studies and records reviews indicate that two main types of forests, mixed mesophytic and upper hardwood, exist in the project area. The mixed mesophytic habitat is found in the more sheltered ravines of the lower elevations and is dominated by woody species of White Basswood (*Tilia heterophylla*), American Beech (*Fagus grandifolia*), Yellow Buckeye (*Aesculus octandra*), Sugar Maple (*Acer saccharum*), Red Oak (*Quercus rubra*), Fraser Magnolia (*Magnolia fraseri*), conifers such as White Pine (*Pinus strobus),* Eastern Hemlock (*Tsuga canadensis*), and White Ash (*Fraxinus americana*). The under-story vegetation includes successional species such as Flowering Dogwood (*Cornus florida*), Eastern Redbud (*Cercis canadensis*), Eastern Red Cedar (*Juniperus virginiana*) and Sassafras (*Sassafras albidum*). Rhododendron (*Rhododendron maximum*) and Mountain Laurel (*Kalmia latifolia*) dominate the slopes and stream sides. The upper hardwood habitat is found mainly at the higher elevations. The tree species are often stunted or broken due to exposure to strong winds. Species include Red Oak, American Beech, Sugar Maple, American Elm, and Virginia Pine.

Some open land does exist in the project area. Areas such as cemeteries, abandoned farmland, hay fields, utility right-of-ways, etc., exhibit early-successional, grass-shrub habitat with the dominant plants being cool-season grasses (fescue, timothy, and orchard grass), and a vast assortment of forbs (a broad-leaf herb other than a grass, growing in a field or meadow), and shrubs such as blackberry and honeysuckle. Reviews of aerial photographs of the project corridor over the past sixty years indicate that the amount of trees in the area has increased. This can be attributed to the loss of small farmland, which has reverted to fallow fields. **Figure**

3.5.2 shows the extensive forest fragmentation in the project area due to urban, residential, and agricultural land usage.

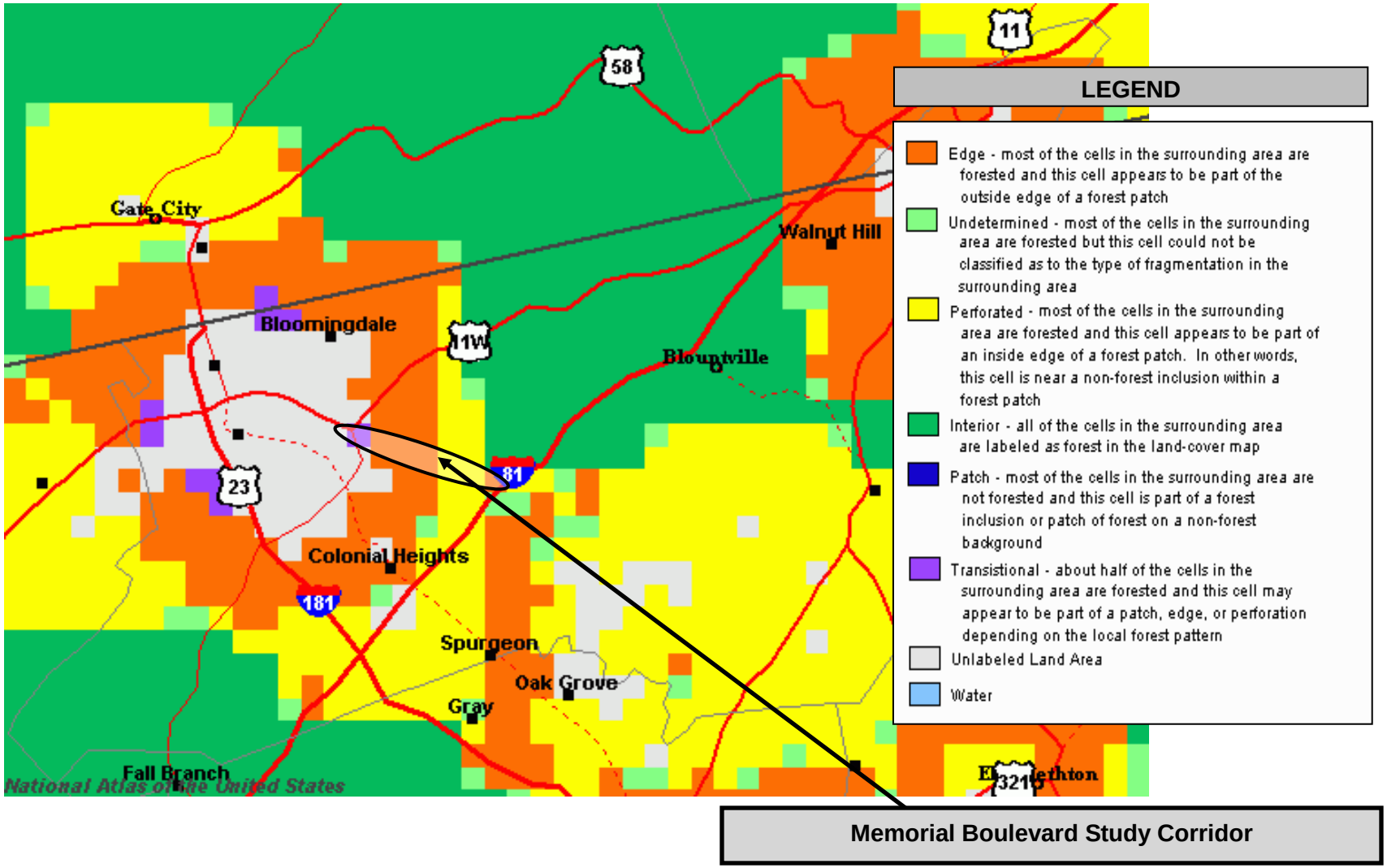


FIGURE 3.5.2: FOREST FRAGMENTATION OF THE STUDY CORRIDOR AND SULLIVAN COUNTY

3.5.2 Aquatic Resources

Surface Waters

Five streams are identified within the project corridor. Three are perennial streams: Sougans Branch, Fall Creek, and an unnamed tributary of Sougans Branch. Two streams are intermittent streams: An unnamed tributary of Fall Creek and an unnamed tributary of Reedy Creek. None of the five streams are listed as Tennessee Exceptional Waters within the project impact area, and none are impaired to the degree that they have been placed upon the Tennessee 303(d) list of impaired streams published by the Tennessee Department of Conservation's (TDEC) Division of Water Quality Control. Habitat quality of each of the streams was investigated, and all five streams scored in the below-average range. Stream impacts are discussed in **Chapter 4**.

Floodplains

Reviews of Federal Emergency Management Agency (FEMA) maps that show the historic 100-year floodplains indicated that floodplains are evident within and near the SR 126 (Memorial Boulevard) project corridor. The floodplains are associated with two streams, the Fall Creek and Sougans Branch of Fall Creek, which are currently crossed by the existing SR 126 (Memorial Boulevard). Floodplain impacts are discussed in **Chapter 4**.

Jurisdictional Wetlands

Surveys were conducted within the project impact area of the project. In addition, National Wetland Inventory maps, topographical maps, and coordination with state and federal agencies were conducted to locate the presence of these resources. No wetlands were located within the corridor. No impacts are anticipated to these resources.

Conservation Areas and Targeted Conservation Sites

The Nature Conservancy published a report (The Nature Conservancy, 2003) that evaluated the significant ecological features within the ecological region that coincides with the project area. These areas within the region are designated as "Conservation Areas" (**See Figure 3.5.3**). The Conservation Areas are noted as brown horizontally striped areas for terrestrial sites, and blue vertically striped areas for aquatic sites. No Conservation Areas coincide with the project.

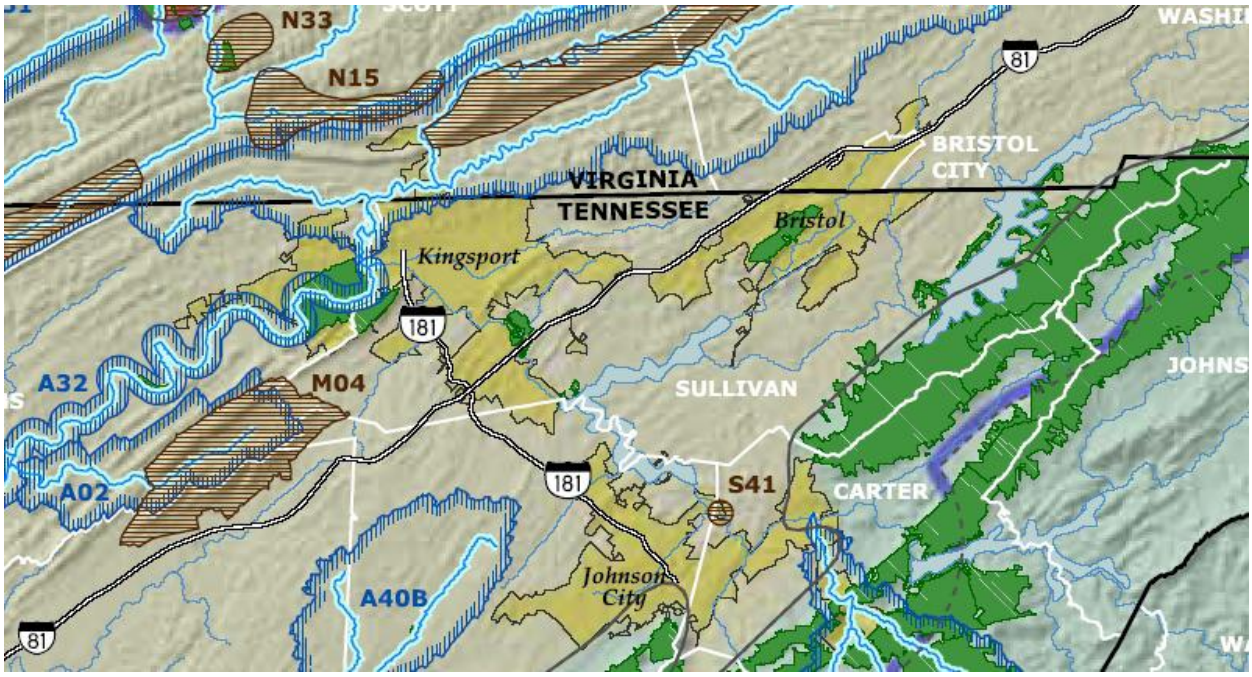


FIGURE 3.5.3: CONSERVATION AREAS

3.5.3 Federally Listed and Proposed Threatened and Endangered Species

There are eleven (11) species federally listed as threatened or endangered in Sullivan County, Tennessee. The threatened species are; Spotfin chub (*Erimonax monachus*), and American Hart's tongue fern (*Phyllitis scolopendrium var Americana*). The endangered species include; Gray bat (*Myotis grisescens*), Tubercled-blossom pearlymussel (*Epioblasma torulosa torulosa*), Shiny pigtoe (*Fusconaia edgariana*), Fine-rayed pigtoe pearlymussel (*Fusconaia cuneolus*), Tan riffle shell (*Epioblasma walkeri*), Cumberland monkeyface pearlymussel (*Quadrula intermedia*), Green-blossom pearlymussel (*Epioblasma torulosa gubernaculum*), Littlewing pearlymussel (*Pegias fabula*), and the Duskytail darter (*Etheostoma percnurum*). An ecological survey was conducted for the project area and the results are discussed in **Chapter 4**.

Although the Indiana Bat is not known to occur in the project area, at the request of the United States Fish and Wildlife Service (USFWS), a bat survey for this federally listed endangered species was conducted. Mist nets and field reviews were conducted in the project impact area. No Indiana Bats were located. A copy of the *Indiana Bat (Myotis sodalis) Mist Net Survey*, dated October 2011, is on file at the TDOT Environmental Division Office in Nashville, TN.

3.5.4 State Listed Species

A review of the TDEC Threatened and Endangered Species File was conducted in July 2009. The identified species have been compiled into lists of plants and animals. The identified state listed species in Sullivan County are listed in **Tables 3.5.1 (Plants)** and **3.5.2 (Animals)**.

Field studies and records research have been conducted to identify Federal and State-listed species or habitat in the project impact area. None were evident in this area of Sullivan County.

No known populations of Federal and State-listed species were identified within the project area.

3.5.5 Invasive Species

Invasive species pose perhaps the biggest threat to native ecosystems. Exotic invasive species are those that have evolved within one ecosystem and were introduced, either intentionally or accidentally, to another ecosystem. Because exotic species evolved elsewhere, they encounter few or no natural control mechanisms in their new location allowing them to spread easily and quickly. Exotic plants exhibit a particularly dangerous hazard due to their capacity to reproduce rapidly. As they broaden their range, invasive plants disrupt available nutrients, occupy space, and out-compete native plants. Some exotic species introduce pathogens or insect pests that can suddenly devastate an ecosystem, while the exotic species remains relatively immune to its effects. Exotic plants are often used in an ornamental setting but cross-over into an uncontrollable habitat. Some exotic plants, such as leafy spurge (*Euphorbia esula*) may be poisonous to wildlife and livestock. Others, like Chinese chestnut (*Castanea mollisima*), don't offer quite the nutritional value of their native counterparts (*Castanea dentata*). All of these alterations negatively affect the ecosystem, often dramatically. Revegetating disturbed areas with woody native vegetation can minimize the potential impacts. Ecological impacts are further discussed in **Chapter 4**.

TABLE 3.5.1: PLANTS IDENTIFIED WITHIN SULLIVAN COUNTY BY TDEC (1 OF 2)

Scientific Name	Common Name	Status – Habitat Information
Allium burdickii	Narrow-leaf Ramps	Threatened and Commercially Exploited – This plant is found in rich woods.
Berberis canadensis	American Barberry	Special Concern – This perennial shrub is found on rocky woods and river bars. According to the Nature Conservancy, American barberry was formerly found in fire-maintained habitats which kept the canopy open, *i.e*., it was an inhabitant of savannas and open woodlands, and fire suppression has significantly restricted its habitat to sites with shallow soil (such as glades and cliffs) or areas with mowing or other canopy-clearing activities (such as powerline corridors, railroad/road rights-of-way and riverbanks).
Botrychium matricariifolium	Chamomile Grapefern	Special Concern - This fern is found in mountain woods and thickets.
Buckleya distichophylla	Piratebush	Threatened - A large shrub which is found in rocky mountain woods. The plants can be found scattered among host trees within openings of hemlock forests, but habitats also include south-facing slopes and chestnut oak forests. It was thought that *B. distichophylla* was host specific to hemlocks, but subsequent investigations have shown otherwise.
Cimicifuga rubifolia	Appalachian Bugbane	Threatened - Occupied habitat in Tennessee includes rich soil on river bluffs, north-facing hillsides and talus slopes, moist dolomite ledges in ravines, as well as rocky and shady woods below limestone bluffs.
Cymophyllus fraserianus	Fraser's Sedge	Special Concern - This herbaceous plant is found in mixed mesophytic forests.
Cypripedium acaule	Pink Lady's-slipper	Special Concern and Commercially Exploited - This herbaceous plant is found in piney woods.
Draba ramosissima	Branching Whitlow-grass	Special Concern - This herbaceous plant is found on dry, calcareous rocky cliffs.
Dryopteris cristata	Crested Shield-fern	Threatened - This herbaceous plant is found in bogs.
Gentiana austromontana	Appalachian Gentian	Special Concern - This herbaceous plant is found in high elevation open woods.
Goodyera repens	Dwarf Rattlesnake-plantain	Special Concern - This herbaceous plant is found in cool, moist, mountainous forest usually in proximity to conifers.
Hexastylis virginica	Virginia Heartleaf	Special Concern - This herbaceous plant is found in sandy or rocky woods.
Hydrastis Canadensis	Goldenseal	Special Concern and Commercially Exploited - This herbaceous plant grows best in rich, mesic hardwood forest, especially those underlain by limestone or alkaline soils.
Hydrophyllum virginianum	Appalachian Waterleaf	Threatened - This herbaceous plant grows in rich moist woods.
Juglans cinerea	Butternut	Threatened - This tree is found in rich woods and hollows.
Lonicera dioica	Mountain Honeysuckle	Special Concern - This herbaceous plant grows in moist mountain woods and thickets.
Magnolia virginiana	Sweetbay Magnolia	Threatened - This tree is found in forested acidic wetlands

TABLE 3.5.1: PLANTS IDENTIFIED WITHIN SULLIVAN COUNTY BY TDEC (2 OF 2)

Scientific Name	Common Name	Status – Habitat Information
Maianthemum stellatum	Starflower False Solomon's-seal	Endangered - This herbaceous plant is found on moist streambanks, floodplains, and sandy woods.
Meehania cordata	Heartleaf Meehania	Threatened - This herbaceous plant is found on wooded mountain slopes.
Panax quinquefolius	American Ginseng	Special Concern and Commercially Exploited – This plant occurs primarily in rich, cool, moist hardwood-dominated or mixed woods, under a closed canopy, especially on slopes or ravines and often over a limestone or marble parent material on soil with a good humus component.
Platanthera flava var. herbiola	Tubercled Rein-orchid	Threatened - This plant occurs in swamps and floodplains.
Platanthera grandiflora	Large Purple Fringed Orchid	Endangered - This plant occurs in wet meadows and along streams.
Platanthera orbiculata	Large Round-leaved Orchid	Threatened - This plant is found in mid-elevation mesic forests.
Pyrola Americana	American Wintergreen	Endangered - This plant occurs in moist woods and bogs.
Scutellaria saxatilis	Rock Skullcap	Threatened - This plant occurs in rocky woods and moist cliffs.
Silene caroliniana ssp. Pensylvanica	Carolina Pink	Threatened - This plant is found in sandy, dry and open woodlands and rocky bluffs.
Streptopus amplexifolius	White Mandarin	Threatened - This plant occurs in wet cliffs and mesophytic mountain woods.
Symplocarpus foetidus	Skunk-cabbage	Endangered - This plant occurs in swamps and bogs.
Thuja occidentalis	Northern White Cedar	Special Concern - This tree is found on calcareous rocky seeps and cliffs.
Trientalis borealis	Northern Starflower	Threatened - This plant occurs in mountain mesophytic hardwood forests.
Tsuga caroliniana	Carolina Hemlock	Threatened - This plant is found on dry ridges.
Vitis rupestris	- Sand Grape	Endangered - This plant occurs on sandy, rocky riverbanks.
Woodsia scopulina ssp. Appalachiana	Alleghany Cliff-fern	Special Concern - This fern occurs on mountain cliffs.

TABLE 3.5.2: ANIMALS IDENTIFIED WITHIN SULLIVAN COUNTY BY TWRA AND TDEC (1 OF 2)

Scientific Name	Common Name	Status – Habitat Information
Allocapnia brooksi	Stonefly	Endangered – This aquatic invertebrate occurs in streams.
Gomphus consanguis	Cherokee Clubtail Dragonfly	Special Concern - Larvae of this aquatic invertebrate are usually found in small first- and second-order streams with silty pool bottoms; occupied streams are often spring-fed. Adults utilize these same habitats during the breeding season, but are also found in nearby fields and other areas of open habitat.
Nesticus paynei	A Cave Spider	Special Concern - S
Speyeria Diana	Diana Fritillary	Special Concern – This species occurs in woodlands.
Helicodiscus notius specus	Land Snail	Special Concern – This snail is found in caves.
Io fluvialis	Spiny Riversnail	Special Concern – This snail occurs in medium to large rocky streams with sandy substrate.
Percina aurantiaca	Tangerine Darter	Wildlife-In-Need-Of-Management – This fish occurs in medium sized streams to moderate rivers, with adults typically occupying the deeper, smooth-surfaced areas with moderately swift currents adjacent to shallow riffles. Smaller individuals are usually found along the shoreline of pools.
Percina burtoni	Blotchside Darter	Wildlife-In-Need-Of-Management
Percina macrocephala	Longhead Darter	Threatened
Phoxinus tennesseensis	Tennessee Dace	Wildlife-In-Need-Of-Management
Haliaeetus leucocephalus	Bald Eagle	Wildlife-In-Need-Of-Management – This species requires miles of shoreline along unpolluted water with high perching and lookout points, and tall, often dead, trees for nests.
Limnothlypis swainsonii	Swainson's Warbler	Wildlife-In-Need-Of-Management – In the mountains of east Tennessee, this bird occurs in rhododendron or mountain laurel tangles, generally in ravines in hardwood or mixed forests.
Corvus corax	Common Raven	Threatened – This bird prefers mountainous (elevation usually above 3000 feet), hilly areas with open and spottily wooded lowlands. It is usually found far from humans.
Tyto alba	Common Barn Owl	Wildlife-In-Need-Of-Management – Owls prefer areas of idle or lightly grazed grassland. Reduction in number of buildings and silos that can still be accessed for nesting, but remain out of reach of increasing raccoon populations, is a major contributing factor to the decrease in the population of barn owls.
Rallus limicola	Virginia Rail	Special Concern – This is a bird of marshes and wetlands.
Parascalops breweri	Hairy-tailed Mole	Wildlife-In-Need-Of-Management – This species is not restricted to any one habitat type, and is found in secondary hardwood forest, open fields, old pastures, cultivated fields, and along roadsides.

TABLE 3.5.2: ANIMALS IDENTIFIED WITHIN SULLIVAN COUNTY BY TWRA AND TDEC(1 OF 2)

Scientific Name	Common Name	Status – Habitat Information
Sorex fumeus	Smoky Shrew	Wildlife-In-Need-Of-Management – This species is apparently confined to mountains, and the preferred habitat is damp deciduous-coniferous forest around stumps, under mossy logs and rocks and near streams.
Sorex longirostris	Southeastern Shrew	Wildlife-In-Need-Of-Management – This species is most common in moist to wet areas usually bordering swamps, marshes or rivers. It is also found in old fields, dry upland hardwoods, and planted pine plots. In all habitats, this species is associated with heavy ground cover of grasses, sedges, rushes, blackberry, Japanese honeysuckle, and/or thick mats of decaying leaves.
Synaptomys cooperi	Southern Bog Lemming	Wildlife-In-Need-Of-Management – This small mammal appears to have a broad range of habitats, ranging from moist meadows, marsh borders, dry field thickets, eastern red cedar woodland, and moist woodlands.
Zapus hudsonius	Meadow Jumping Mouse	Wildlife-In-Need-Of-Management – They are found in grasslands, orchards, meadow and old fields. It prefers areas with numerous shrubs, and areas with herbaceous ground cover. They are sometimes taken in wooded areas when herbaceous cover is adequate. Impatiens (touch-me-not) is apparently a good habitat indicator.

3.6 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. The historic preservation review process mandated by Section 106 is outlined in regulations issued by the Council and referred to as "Protection of Historic Properties" (36 CFR Part 800).

Surveys of potential historic/archaeological sites were performed in accordance with Section 106 guidelines outlined in 36 CFR 800. The purpose of these studies was to determine the presence of resources listed, or eligible for listing, in the National Register of Historic Places (NRHP) within the Area of Potential Effect (APE). The APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.

The NRHP criteria of eligibility outlined in 36 CFR 60.4 were applied to all surveyed resources. Those criteria are as follows:

- Criterion A – Sites that are associated with events that have made an important contribution to the broad patterns of our history; or
- Criterion B - Sites associated with the lives of persons of considerable importance in our past; or
- Criterion C – Sites that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a noteworthy and distinguishable entity whose components may lack individual distinction; or

- Criterion D – Sites that have yielded, or may be likely to yield, information important in history or prehistory.

3.6.1 Architectural/Historic Resources

The APE was established as being 1,500 feet in distance from either side of the existing SR 126 (Memorial Boulevard) centerline. TDOT identified two properties within the APE that are eligible for, or listed on, the National Register of Historic Places (NRHP). The properties are the Shipley-Jarvis House, located at 3309 Memorial Boulevard (SR 126), and Yancey's Tavern, located on SR 126 (Memorial Boulevard) at its intersection with Chestnut Ridge Road. The properties are described below, and their status on the NRHP is included. See **Figure 3.6.1** for a map of the APE.

Shipley-Jarvis House

This site, located on the south side of SR 126 (Memorial Boulevard) in a residential and commercial section of East Kingsport, exemplifies the adaptation of nineteenth century dwellings to conform to twentieth century architectural tastes. Its architectural features continue to illustrate both mid-nineteenth century building methods and twentieth-century stylistic changes. TDOT deemed this site eligible for listing in the NRHP under Criterion C for its architectural style. The Shipley-Jarvis House is located on a 1.6 acre tract near the project's East Center Street terminus. See **Figure 3.6.2A** for a map of the site.

Yancey's Tavern

This property was listed in the NRHP in 1972 under Criterion A for its significance in the early settlement of Sullivan County. According to the NRHP listing, the tavern was constructed in 1782 as a double log house with a dogtrot. Underneath the present façade remain the logs used to construct the house. Hand fired brick replaced the original chimneys which were constructed of stone. Bricks have also replaced some of the original stone foundation. Brick was used in recent years to completely enclose the cellar, but the framing of the door and window openings leading into the cellar are from a much earlier time period. Front and back porches were later additions to the structure. The back wing of the house includes a fireplace with simple mantel suggesting an early date, though it is not part of the original structure. The location of a back chimney suggests that this area was once a small distance of open area between the kitchen and the main structure. Openings for windows and doors pre-date the 20th century, but are not original materials. See **Figure 3.6.2B** for a map of the site.

The interior of Yancey's Tavern is simple with three plain, well-executed mantels on the first floor. The two second-story rooms are accessed by separate stairways. The construction of the dogtrot is visible on the second floor because this portion of the house has not been finished for use.

The Yancey's Tavern property includes various outbuildings such as a barn, a wash house, spring house, chicken house, and a corn crib, which all are associated with the late 19th/early 20th centuries. The frame granary which features a shingled roof and stone foundation is considerably earlier according to the NRHP narrative.

The NRHP also states that Yancey's Tavern was a crucial stopping point along Island Road, which was a major artery in East Tennessee. This allowed the tavern to figure prominently in the development of the area, and attracted notable visitors, including John Sevier and William Blount. The tavern also served as headquarters for local businesses including meetings of the Sullivan County court. Island Road predates the tavern, being completed in September 1761, and is the first road constructed in Tennessee, and also to the southwest. Island Road connected Chillhowie, Virginia, to the Long Island of the Holston River. Part of Island Road later was renamed the "Great Stage Road." The Tennessee section of Island Road supported connection between three forts, including Eaton's Fort which in the early 1770s was a portion of Amos Eaton's 'corn rights' land. Eaton sold a portion of his land near the fort in 1779 to James Hollis, who ultimately sold 900 acres to John Yancey, Sr. in 1782. It cannot be determined if the structure now known as Yancey's Tavern was constructed prior to the sale of the land to Yancey, but the tavern became operable shortly after the real estate transaction was completed. The Yancey heirs maintained the property until the last half of the 19th century. The property changed ownership several times until it was purchased in 1889 by John R. Spahr, whose descendants owned the property into the 20th century. The property was purchased by the current owner, Rann L. Vaulx, at auction.

The project impact to these two NRHP resources is discussed in **Chapter 4**.

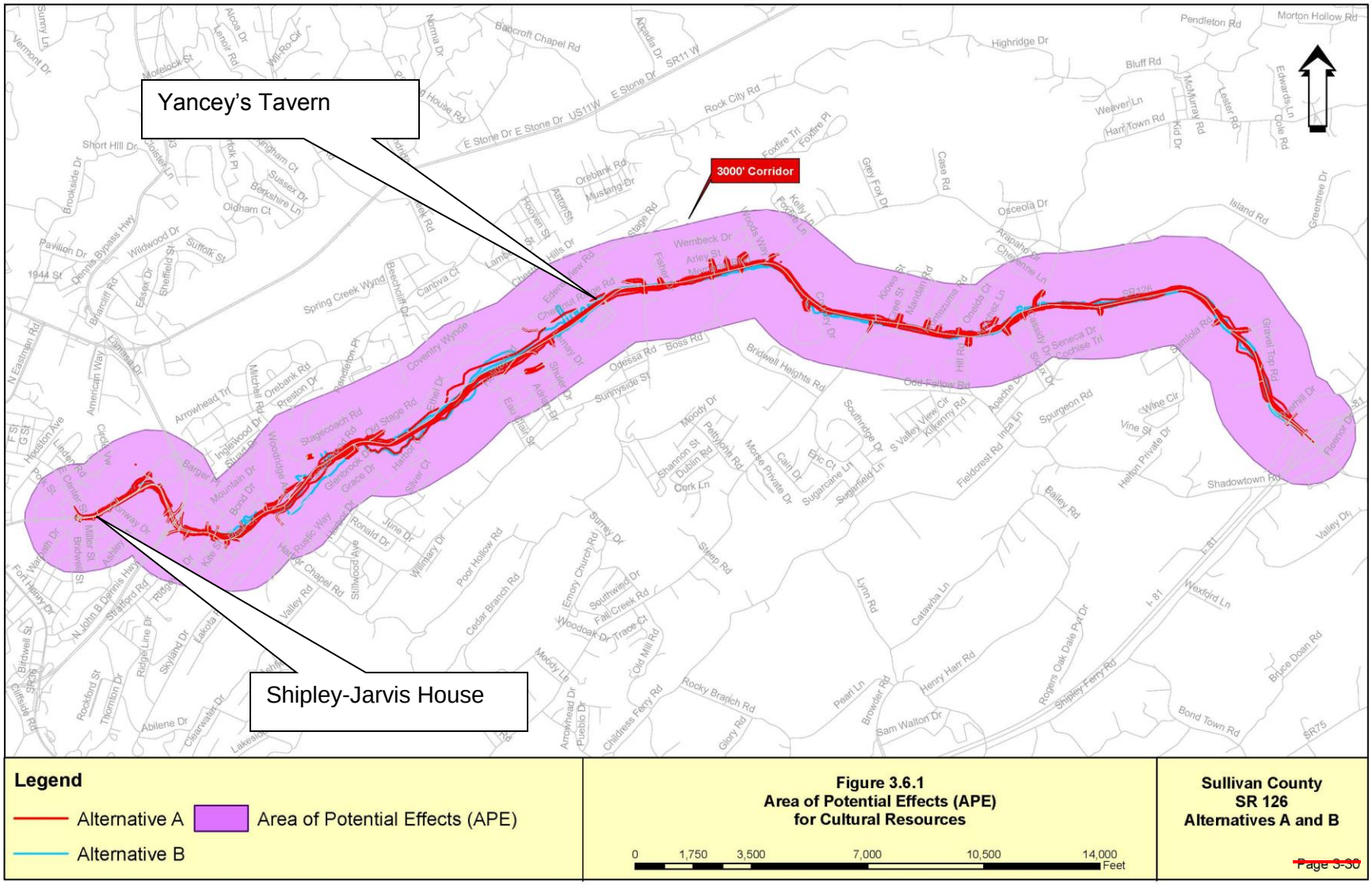


FIGURE 3.6.1: APE FOR CULTURAL RESOURCES

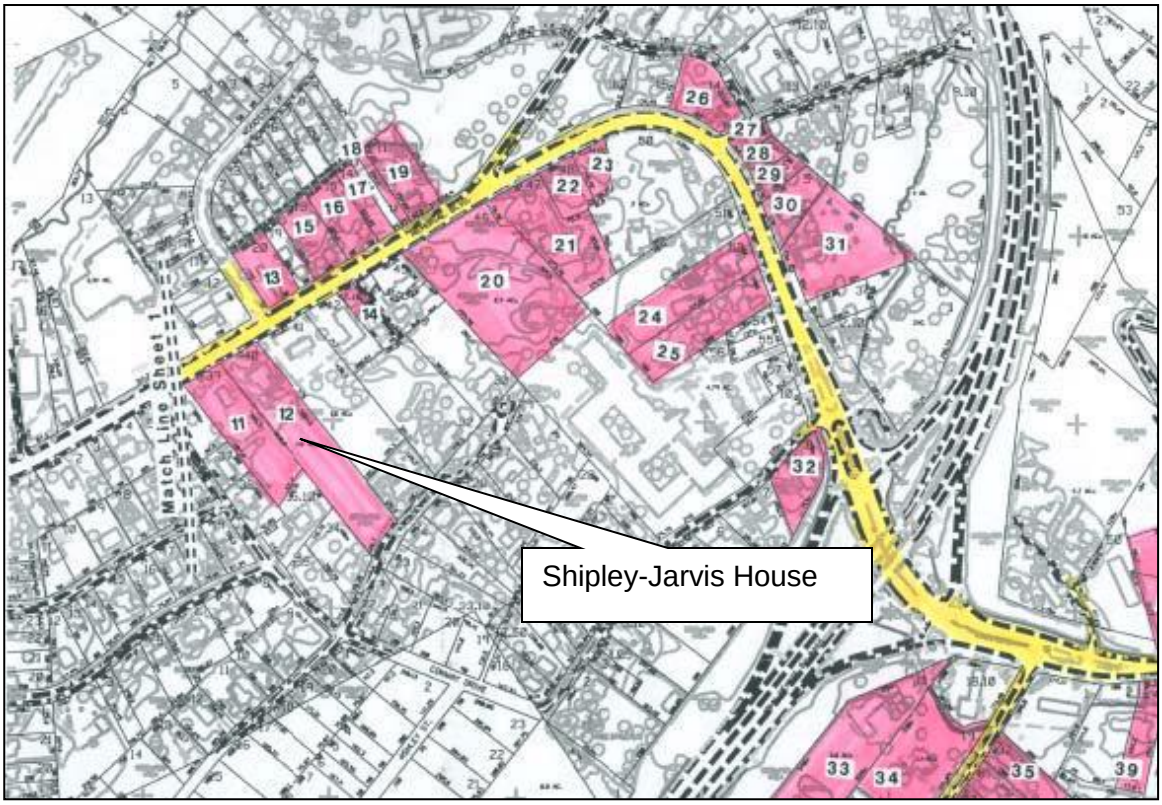


FIGURE 3.6.2A: SHIPLEY-JARVIS HOUSE

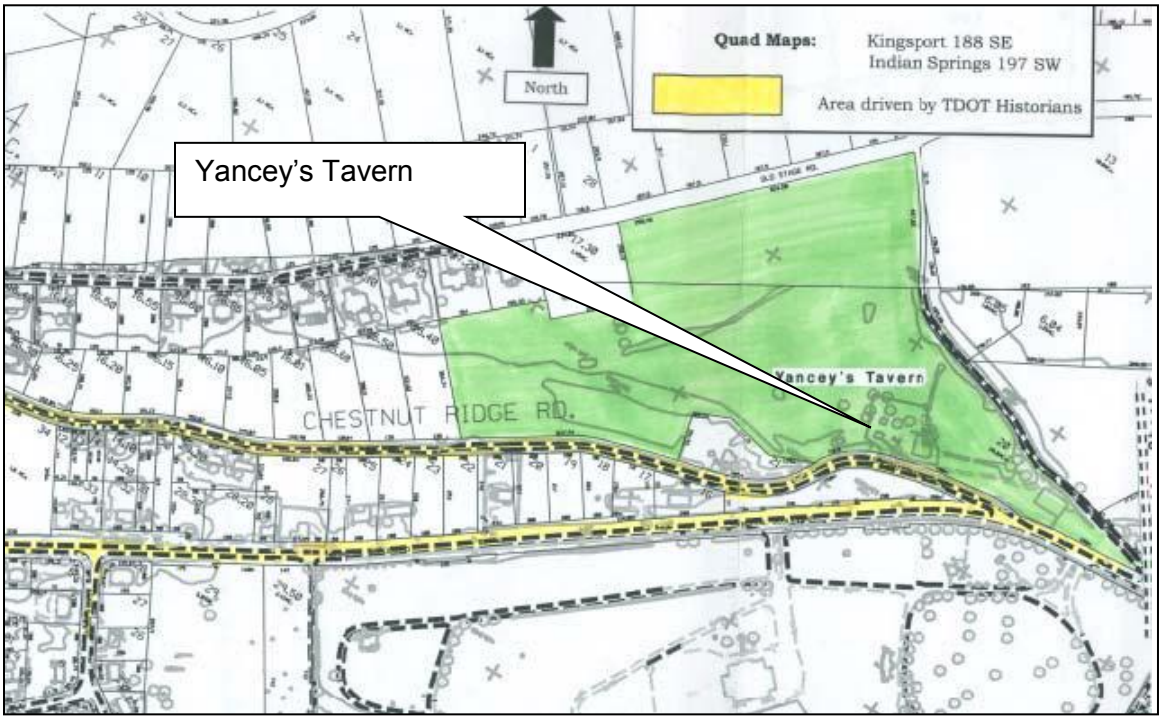


FIGURE 3.6.2B: YANCEY'S TAVERN

3.6.2 Archaeological Resources

Beginning in October 2001, investigations were conducted to provide information on the distribution of important archaeological properties within the project area. This information was used to make informed management decisions relating to the design, improvements, and construction of SR 126 (Memorial Boulevard).

These investigations were conducted in two phases. Phase 1a consisted of a literature and records search for the areas surrounding the proposed alternatives. This phase of the investigation addressed three objectives; (1) to identify all previously recorded archaeological and historical properties within the study area, (2) to develop an environmental, cultural and historical context for the study area, and, (3) to develop a model to predict site locations within the various topographic regions included within the study area.

Phase 1b, the second phase of the investigation, consisted of a systematic pedestrian survey of high-probability areas resulting from the predictive model for archaeological resources within the proposed alternatives. Goals and methods employed during the pedestrian survey were based upon criteria outlined in the *Scope of Work for TDOT Phase 1 Archaeological Assessments* (Kline 1999). The objective of the survey was to identify and record all cultural resources within or adjacent to the proposed highway corridor that are listed, eligible for listing, or potentially eligible for listing on the NRHP pursuant to criteria set forth in 36 CFR 60.4. The archaeological assessment is discussed in **Chapter 4**.

3.7 RECREATIONAL RESOURCES

The project corridor was visited, maps of the area were reviewed, and conversations were conducted with local officials to determine if resources, including public and private parks, wildlife refuge areas, and other forms of recreation might exist. No recreational resources were identified within or near the project corridor.

3.8 VISUAL RESOURCES

The project begins in an urbanized segment of Kingsport, and as it moves eastward, climbs a hill, and transitions into an agricultural/scattered residential area. The urban area is in a relatively flat area with numerous houses and businesses densely situated along the existing roadway and surrounding areas. As the project climbs out of the urbanized area, homes become less densely aggregated. Most of the homes are along the existing SR 126 (Memorial Boulevard) or along feeder roads. Farmland becomes more evident as the project area moves eastward. Reviews of land use maps on file at the TDOT Environmental Division Office in Nashville, TN, which span a fifty-year period, show that many areas now have more trees within the area in relation to the initial photographs from the 1950s. Most of the areas with trees are in the rural area, and indicate the loss of smaller farms as lack of agricultural activity allows for re-growth. Some additional wooded areas are located in neighborhoods that have been established for several decades.

In addition to becoming more rural in nature, the project terrain becomes more mountainous and rolling. Vegetation is predominately a mix of agricultural lands and scattered forests in the eastern two-thirds of the project. The western third of the project contains mainly manicured lawns or is covered by impermeable surfaces in the urban section of the project. Local and

commuter traffic generally use the existing SR 126 (Memorial Boulevard) on a daily basis, and view the surrounding landscape from their vehicles.

Viewers of the road are comprised of residents and businesses occupying the areas, and vary in frequency based upon whether they are located in an urban or rural setting. These numbers range from high in Kingsport to low in the middle portion of the project. The view of SR 126 (Memorial Boulevard) within town includes heavier traffic scenarios, especially in peak commute hours, while those areas along the agricultural sections experience lower numbers of vehicles traveling at higher speeds. A variance exists along the intersection of SR 126 (Memorial Boulevard) at I-81. A higher number of vehicles are experienced in this area and consist of commuters, some local traffic, and long-range travelers using the interchange for rests, fueling, and overnight stays.

Throughout the Context Sensitive Solutions process, the Community Resource Team expressed concerns on behalf of the public regarding any action that would diminish the scenic attributes of the hillsides that comprise a great portion of the project. The hills and rural nature of the greater portion of the project are important to residents of the immediate area, and to residents of Kingsport and Sullivan County.

Chapter 4: Environmental Consequences

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter describes the direct environmental impacts of the No-Build and Build Alternatives, as well as the indirect and cumulative impacts of the proposed project. The following resource categories were determined to be appropriate for this study and are consistent with the general guidelines set forth by the FHWA.

1. Land Use Impacts
2. Farmland Impacts
3. Social Impacts
4. Relocation Impacts
5. Environmental Justice
6. Economic Impacts
7. Pedestrians and Bicyclists Impacts
8. Soils and Geologic Impacts
9. Ecological Impacts
10. Air Quality Impacts
11. Noise Impacts
12. Historical Impacts
13. Archaeological Impacts
14. Section 4(f) Evaluation
15. Section 6(f) Evaluation
16. Hazardous Material Impacts
17. Visual Impacts
18. Wild & Scenic Rivers and Tennessee Scenic Rivers
19. Energy Impacts
20. Construction Impacts
21. Short Term Impacts vs. Long Term Benefits
22. Irreversible and Irretrievable Commitments of Resources
23. Indirect and Cumulative Impacts

Table 4.1 provides a summary of the primary environmental impacts of the Build Alternatives. All known environmental impacts of the project are discussed in detail in **Sections 4.1** through **4.23** of this document.

TABLE 4.1 ENVIRONMENTAL IMPACTS MATRIX

Alternative	Residential Relocations	Business/Non-Profit Relocations	Employees Affected	Gravesites Impacted	Wetlands Impacts (Acres)	Floodplains Impacts (Acres)	Forest Land Acquired (Acres)	Stream Crossings	Stream Impacts (Linear Ft)	Hazardous Materials Sites	Adverse Visual Impacts to Historical Sites	Impacts to Archaeological Sites	Farmland Impacts (Acres)	Farms Segmented or Totally Acquired	Threatened and Endangered Species	Section 4(f)/ Section 6(f) Impacts	Air Quality/Noise Impacts Requiring Mitigation
A	241	43/1	125 to 175	350	0	4.0	75.0	5	4,863	2	1	0	15	0	0	0/0	0/0
B	162	30/1	75 to 125	90	0	3.2	54.8	5	3,107	3	1	0	5	0	0	0/0	0/0

4.1 LAND USE IMPACTS

The land use along the project corridor is a mixture of residential, commercial, and agricultural. The widening of the roadway will result in the conversion of these land uses (121-239 acres) to roadway right-of-way. Indirect and cumulative impacts are expected to occur with the project study corridor and are discussed further in **Section 4.23 Indirect and Cumulative Impacts**.

4.1.1 East Lawn Memorial Gardens

A large cemetery, East Lawn Memorial Gardens, is located on the south side of State Route 126 and abuts the existing right-of-way. There are several thousand grave sites in this cemetery. It is estimated that 350 currently occupied gravesites would be impacted by Alternative A. It is estimated Alternative B would impact 90 currently occupied gravesites. The proposed Alternative B cross-section reduces the number of travel lanes through this area to reduce the impact to the cemetery. A review of the cemetery plat indicated that there are numerous sites available for relocation of the affected grave sites. TDOT will comply with the Tennessee State Burial Law: TCA 46-4-101-104 (Termination of land use as cemetery) for the relocation of any grave sites.

For both Alternatives A and B, the proposed alignment was shifted to the south side of the roadway to avoid impacting the National Register of Historic Places listed Yancey's Tavern property. The taking of land from the Yancey's Tavern tract would have resulted in an Adverse Affect under Section 106 of the National Historic Preservation Act of 1966. The use of the land would have also resulted in a Section 4(f) finding under the provisions of Section 4(f) of the National Transportation Act of 1966.

4.2 FARMLAND IMPACTS

The Federal Farmland Protection Act was passed in 1981. The purpose of the Act is to prevent the conversion of farmlands to non-agricultural uses by minimizing the impacts that federal programs have on farmlands. Before farmland can be used for a project utilizing federal funds, an assessment must be completed to determine if prime, unique or statewide or locally important farmlands would be converted to non-agricultural uses.

The Natural Resource Conservation Service (NRCS) characterizes eligible farmlands as prime, unique, or of statewide or local significance. The designations are based on NRCS soil type and are protected by federal legislation.

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, or oil-seed and other agricultural crops with minimum input of fuel, fertilizer, pesticides, and labor without intolerable soil erosion. Prime farmland includes land that possesses the above characteristics and may include land currently used as cropland, pastureland, rangeland or forestland. Prime farmland does not include land already in or committed to urban development or water storage.

Unique farmland is land other than prime farmland that is used for production of specific high-value food and fiber crops. It has the special combination of soil quality, location, growing

season and moisture supply needed to economically produce high quality or high yields of specific crops when treated and managed according to acceptable farming methods.

Statewide or locally important farmland is land that has been designated of state or local importance for the production of food, feed, fiber, forage or oil-seed crops but is not of national significance.

The impacts of the proposed project on farmland were determined through coordination with NRCS, which included an evaluation using the US Department of Agriculture's (USDA) Farmland Conversion Impact Rating Form (see coordination letter from NRCS in **Appendix A**). The form was completed in accordance with 7 CFR, Part 658 of the *National Farmland Protection Policy Act.* The site assessment criteria (part VI on the form) are designed to assess important factors other than the agricultural value of the land. The ten assessment criteria used for transportation and other corridor-like studies consider not only the land currently being farmed, but also the land use around the project area and whether or not that land use is urban, non-urban or in transition. The criteria also determine the following:

- Whether the conversion of the proposed agricultural site would eventually cause the conversion of neighboring farmland;
- Whether there are adequate support facilities, activities and industry to keep the farms in business;
- The extent to which local and state government and private programs have made efforts to protect farmland from conversion;
- Relative amount of on-farm investment; and
- Whether there are agriculturally related activities, businesses or jobs dependent on the site staying in agricultural production

Each factor is assigned a score relative to its importance. Sites that receive a total site assessment score of 160 points or less are given a minimal level of consideration for protection. Sites with a total site assessment score of 161 points or more would require the consideration of alternative project alignments that would serve the proposed purpose but convert either fewer acres of farmland or other farmland that has a relatively lower value.

The site assessment score for the alternatives under consideration was 82 points, indicating that consideration of alternative project alignments that would serve the proposed purpose but convert either fewer acres of farmland or other farmland that has a relatively lower value is not necessary. The completed USDA Farmland Conversion Impact Rating form is included in **Appendix A**.

TABLE 4.2.1: FARMLAND CONVERSION TOTALS

Alternative	Total Acres in 2000-foot Study Corridor	Total Acres Prime & Unique Farmland Required by Alternative	Total Acres of Land to be Converted to Roadway ROW	Total Farmland Impact Rating Score
A	2,100	15	239	82
B	2,100	5	121	82

The No-Build Alternative would have no effect on farming operations since existing conditions would remain unchanged.

Construction of the Build Alternatives will result in the direct conversion of between 5 and 15 acres of farmland to a transportation facility.

4.3 SOCIAL IMPACTS

4.3.1 Schools

Construction of the proposed project will not directly impact any school property. Accessibility to and from area schools will be enhanced by improvements to SR 126 (Memorial Boulevard). SR 126 (Memorial Boulevard) is the main route for students traveling to schools from areas east of Kingsport. Indian Springs Elementary serves students in the immediate project area. Several Sullivan County bus routes use portions of SR 126 (Memorial Boulevard) or its connecting roads to distribute students between home and school. The improved roadway will provide shoulders and sidewalks that will create a safer environment for bus riders.

4.3.2 Fire and Police

A volunteer fire department station (Number Four) will be acquired and relocated with either Build Alternative A or B. The volunteer fire department is a non-profit organization and is located along SR 126 (Memorial Boulevard) at the intersection with Heather Lane. It is not occupied full time, but is used during emergencies and includes a garage and a small office/organization area. The relocation process will be carried out in such a manner as to ensure no interruption of service occurs to area residents. No other police, fire, or emergency services facilities will be displaced.

The proposed improvements will improve emergency response time for police and emergency service. The additional lanes and shoulders will provide safer travel conditions for emergency vehicles and the general public.

4.3.3 Hospitals

The project will improve traffic flow on SR 126 (Memorial Boulevard) to four immediate area hospitals. None of the services provided by these facilities will be impaired by the proposed alternative.

4.3.4 Utilities

Relocation of utilities will be required, however; no long-term utility impacts are anticipated. Temporary service disruptions could result during project construction. Utility relocation will require coordination with local service providers, which will minimize, if not avoid, disruptions.

4.4 RELOCATION IMPACTS

Displacements are a potential adverse environmental effect associated with any proposed project. A Conceptual State Relocation Plan (CSRP) has been prepared to assess the effects of displacements and to determine the probability of successful relocation. On April 8, 2010, a

CSRP was completed for this project. A copy of the CSRP is on file in the TDOT Environmental Division Office in Nashville, TN. Alternative A will result in an estimated 241 residential relocations, 43 business displacements, and 1 non-profit displacement. Alternative B will result in 162 residential relocations, 30 business displacements, and 1 non-profit displacement. A summary of relocation impacts is provided in the **Table 4.4.1**.

TABLE 4.4.1: RELOCATION IMPACTS FOR BUILD ALTERNATIVES

	Alternative A	Alternative B
Single Family Homes	102	90
Multi-Family Units	135	69
Mobile Homes	4	3
Annual Income Range of Affected Households	$25,000 to >$100,000	$25,000 to >$100,000
Homes occupied by low-income residents	Less than 5	Less than 5
Homes with Minority Occupants	None evident	None evident
Homes with Elderly Occupants	50 to 60	40 to 50
Households with 5 or more residents	15 to 20	10 to 15
Homes with disabled residents	20 to 25	20 to 25
Family or Social Clusters	0	0
Businesses	43	30
Number of Employees Affected	125 to 175	75 to 125
Non-Profit Organizations	1	1
Community Institutions	0	0

4.4.1 Specific Information for each Build Alternative

Alternative A

Alternative A will result in an estimated relocation of 102 occupied conventional single family residences and 135 multiple family units. It is estimated that 75% of the conventional houses have 2 to 3 bedrooms, 20% have 1 to 2 bedrooms, and 5% have 3 to 4 bedrooms. The estimated price range for the affected houses is from $60,000 to over $400,000. Most of the homes (approximately 70%) are in good condition, 10% of the homes are in very good condition, 15% of the homes are in fair condition, and the remaining 5% are estimated to be in poor condition. Ages of the conventional homes range from new to over 100 years old, with most being between 25 and 49 years of age. A total of 4 mobile/pre-constructed homes will be relocated. The mobile homes appear to be between 10 and 35 years in age. The homes are in fair to good condition. Each appears to have 2 to 3 bedrooms. The value of the mobile homes ranges between $25,000 and $40,000. No neighborhoods will be bisected, and no divisive or disruptive impacts to minority or ethnic neighborhoods are anticipated.

Forty-three (43) businesses and one (1) non-profit organization will be relocated by Alternative A. The non-profit organization, a volunteer fire department station, would be acquired and moved. It is not occupied full time, but is used during emergencies and includes a garage and a small office/organization area. The relocation process will be carried out in such a manner as to ensure no interruption of service occurs to area residents.

The Conceptual Stage Relocation Plan found that no schools or churches will be partially or totally acquired by Alternative A.

Although no neighborhoods will be split or bisected, traffic patterns will change for some residences with the closing of some streets that currently have direct access to SR 126 (Memorial Boulevard). The street closings are proposed to improve access control along SR 126 (Memorial Boulevard) and to improve safety. Access will be available to SR 126 (Memorial Boulevard) via other nearby streets.

Alternative B

Alternative B will require the relocation of 90 occupied conventional single family residences and 69 multiple family units. It is estimated that 20% of the houses have 1 to 2 bedrooms, 75% of the houses have 2 to 3 bedrooms, and 5% have 3 or more bedrooms. The estimated price range for the affected houses is from $60,000 to over $400,000. Most of the homes (approximately 70%) are in good condition, 10% of the homes are in very good condition, 25% of the homes are in fair condition, and the remaining 5% are estimated to be in poor condition. Ages of the conventional homes range from new to over 100 years old, with most being between 25 and 49 years of age. A total of three mobile/pre-constructed homes would be required to be relocated. It is estimated that the mobile homes have 2 or 3 bedrooms. The mobile homes are in fair to good condition. The mobile homes are between 10 and 25 years of age. It is believed the mobile homes are occupied by their owners. No neighborhoods will be bisected, and no divisive or disruptive impacts to minority or ethnic neighborhoods are anticipated for Alternative B.

Thirty (30) businesses and one (1) non-profit organization will be relocated by Alternative B. The non-profit organization, a volunteer fire department station, would be acquired and moved. It is not occupied full time, but is used during emergencies and includes a garage and a small office/organization area. The relocation process will be carried out in such a manner as to ensure no interruption of service occurs to area residents.

The Conceptual Stage Relocation Plan found that no schools or churches will be partially or totally acquired by Alternative B.

Although no neighborhoods will be split or bisected, traffic patterns will change for some residences with the closing of some streets that currently have direct access to SR 126 (Memorial Boulevard). The street closings are proposed to improve access control along SR 126 (Memorial Boulevard) and to improve safety. Access will be available to SR 126 (Memorial Boulevard) via other nearby streets.

4.4.2 Relocation Assistance

The Tennessee Department of Transportation will make relocation assistance available to all eligible persons impacted by this project, including residences, businesses, farm operations, non-profit organizations, and those requiring special services or assistance in accordance with provisions in Title VI of the Civil Rights Act of 1964. Title VI prohibits discrimination on the basis of race, color, and national origin in programs and activities receiving federal financial assistance. The Regional Relocation Staff will administer the relocation program under the rules, policies, and procedures set forth in the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended, the Uniform Relocation Assistance Act of 1972, implementing federal regulations, TCA 13-11-101 through 119, The State of Tennessee

Relocation Assistance Brochure and Chapter Nine of the State of Tennessee, Department of Transportation, Right-of-Way Manual.

Relocation resources are available to all the displaced without discrimination. Relocation impacts to the displaced would include possible loss of neighbors, adjustment to new surroundings, and moving inconveniences. Although the impacts associated with project displacements are adverse, they would be short-term in duration. The provisions of suitable and acceptable replacement housing, combined with adequate relocation payments, can be expected to minimize relocation impacts. If any situation should exist where decent, safe, and sanitary housing within the financial means of the displacees is not available, such housing will be made available under the replacement housing of last resort provisions.

At least one relocation agent is assigned to each highway project to carry out the relocation assistance payments program. A relocation agent will contact each person to be relocated to determine individual needs and desires, to provide information, answer questions, and aid in finding replacement property.

The Department provides advance notification of impending right-of-way acquisition and before acquiring right-of-way has all properties appraised on the basis of comparable sales and land values in the area. Owners of property to be acquired will be offered fair market value for their property. Relocation services and payment are provided without regard to race, color, religion, sex, or national origin.

Brochures that describe in detail the right-of-way acquisition program and relocation assistance and payments program are distributed at all public hearings and are made available upon request to any interested person.

Implementation of the proposed project will not substantially change the basic social arrangement or character of the project area. The proposed project will not split neighborhoods or separate residence from community facilities. Although no neighborhoods will be split or bisected, traffic patterns will change for some residences with the closing of some streets that currently have direct access to SR 126 (Memorial Boulevard). The street closings are proposed to improve access control along SR 126 (Memorial Boulevard) and to improve safety. Access will be available to SR 126 (Memorial Boulevard) via other nearby streets.

Residential Relocation Information

A study of the real estate market in the project area indicates a market not capable of supporting the one hundred and sixty two (162) to two hundred and forty one (241) residential displacements within the immediate project area. Expanding the study beyond the immediate project area reveals a market that can support this large number of relocations, but not easily. It will be difficult to adequately address the varying needs of all those displaced by this project. Numerous, substantial Last Resort Housing Payments could be expected.

Last Resort Housing is used when there is no comparable housing available for sale or rent within TDOT's current limitations. Should Last Resort Housing become necessary, supplemental payments or other housing options, as determined by TDOT, can be implemented through procedures provided for in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. The displacees will be interviewed on an individual basis during the acquisition phase and more specific solutions will be made at the time all the facts are gathered.

No person lawfully occupying real property will be required to move without at least 90 days written notice of the intended vacating date, and no occupant of a residential property will be required to move until decent, safe, and sanitary replacement housing is made available. "Made available" means that either the affected person has by themselves obtained and has the right of possession of replacement housing or the Department has offered the relocatee decent, safe, and sanitary housing that is within their financial means and available for immediate occupancy.

Business Relocation Information

A study of the real estate market in the project area reveals that it is unlikely that the thirty (30) to forty-three (43) business displacees can relocate in the immediate project area. Successful relocation will require many of the businesses to expand their search area beyond the immediate project area.

Non-Profit Relocation Information

This project is expected to cause one (1) non-profit displacement (a Kingsport volunteer fire department station) with either alternate. Due to the nature of their "business", they will need to relocate in close proximity to their current location. Based on a study of the local real estate market, it is believed that suitable replacement sites do exist, but not in great numbers. This is complicated by the large number of businesses displaced by the project.

4.5 ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations,* requires that the evaluation of Federal actions identify and address disproportionately high and adverse human health and environmental impacts on low income and minority populations. The majority of the residents in the project area based on 2010 census data are non-minority.

The Build Alternatives are not anticipated to have any disproportionate or adverse effects to minority or low-income populations and no neighborhoods or communities would be bisected.

The Kingsport MPO conducted a study to identify Environmental Justice areas or neighborhoods within its boundaries. The efforts are documented in the MPO's 2030 Long Range Transportation Plan (amended January 10, 2008) study. A copy of a map which details these areas is provided in **Figure 4.5.1**. Although areas have been identified in the region, the areas surrounding the proposed project were not identified as containing areas of concern.

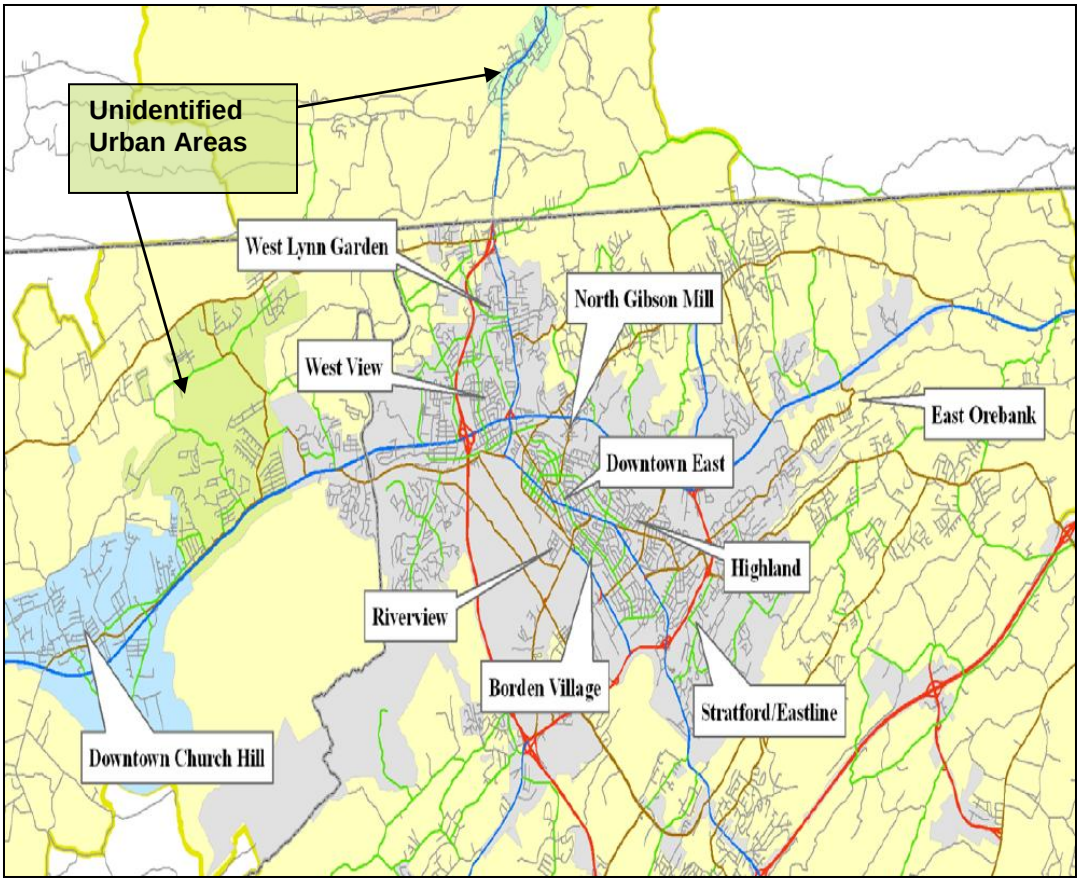


FIGURE 4.5.1: IDENTIFIED ENVIRONMENTAL JUSTICE AREAS, KINGSPORT MPO

Note: The yellow shaded portions of the map denote the Kingsport MPO area. The gray shaded area indicates the City Limits of Kingsport. The light blue area is common to Downtown Church Hill. Two other populated areas are noted in green and an aqua color, but do not bear names. The project area has been highlighted in blue. The various flags indicating names such as "North Gibson Mill" or "Stratford/Eastline" are areas that have been identified by the MPO study as areas of Environmental Justice concern.

The proposed project will not have an adverse or disproportionately high impact for minority populations and low income populations. All people in the area, including special interest groups, will share equally in the benefits of the proposed project.

4.6 ECONOMIC IMPACTS

There will be long-term adverse economic effects due to the construction of Alternative A or B. With Alternative A, there will be 241 residential relocations and 43 business relocations involved. With Alternative B there will be 162 residential relocations and 30 business relocations involved. The results of the Conceptual Stage Relocation Plan indicate a market not capable of supporting the large number of anticipated residential or business displacements within the immediate project area. Expanding the study beyond the immediate project area reveals a market that can support this large number of relocations, but not easily. Some of the businesses may choose to go out of business or move out of the project area, causing a loss of

tax revenues. Also, the buying of additional right-of-way by the government will decrease the area property tax base. Due in part to both Build Alternatives not adding travel lanes to approximately half of the study corridor, implementation of the improved facility would likely not result in an increase in land use development pace, nor would it be likely to induce a change in the types of land uses (i.e. shifting to industrial development from residential development and light commercial development). No industrial sites are located within or adjacent to the proposed project's limits. No impacts would be imposed upon these resources by the project.

4.7 PEDESTRIANS AND BICYCLISTS IMPACTS

The lack of sufficient shoulders or sidewalks creates an unsafe environment for bicycles and pedestrians along SR 126 (Memorial Blvd.). The proposed Build Alternatives will provide shoulders along the entire route, sidewalks where appropriate, and improve sight distances. Although the shoulders will not be marked for bicycles and pedestrians, the paved shoulders will be wide enough to accommodate bicycles and pedestrians. (See Cross-Section schematics **Chapter 2**)

4.8 SOILS AND GEOLOGIC IMPACTS

The varied topography encountered throughout the project area will require a range of minor to possibly considerable cuts and fills. A subsurface investigation program with core drilling will be conducted prior to construction.

The potential for slope stability problems within both soil and rock areas will require a detailed evaluation of the actual slope conditions, particularly within the cut slopes of steep and rocky terrain. This evaluation will be conducted to determine the actual stability and slope geometry. Any slope stability problems that might be determined will be addressed in either the design or construction phase of the project.

Karst topography, though present in the area, was not identified within or adjacent to the project limits. The underlying geologic formations are susceptible to the formation of sinkholes, and early development of these features could occur during construction. If sinkholes are discovered, the appropriate permits and mitigation treatments would be implemented before completion of the construction phase.

A copy of the *Geologic Report* for SR 126 (Memorial Boulevard) is on file in the TDOT Environmental Division Office in Nashville, TN.

4.9 ECOLOGICAL IMPACTS

An ecological study was conducted in December 2008 to characterize the existing terrestrial and aquatic habitat within the proposed Build Alternatives and to identify jurisdictional water resources including wetlands, streams, springs, sinkholes, etc. as well as the potential for the presence of any threatened and/or endangered species and their critical habitat. The ecological study also reviewed water quality impacts, floodplain benefit impacts, and geology within the proposed Build Alternative corridor and evaluated potential environmental impacts to these resources. The complete Ecology Report is on file in the TDOT Environmental Division Office in Nashville, TN.

4.9.1 Terrestrial Ecology

The improvements to SR 126 (Memorial Boulevard) will result in minimal impacts to local wildlife and plant communities in the area. The existing roadway will be widened, requiring additional land beyond the current right-of-way.

Roads and highways affect wildlife in many ways; both directly as roadkill, and indirectly through the degradation, fragmentation, and loss of habitat. Construction of the proposed project will result in the loss of habitat for small mammals and birds. Forested habitat is minimal in the project area, and the area within the corridor is comprised mainly of existing roadway, housing and commercial land use within the city limits, and scattered housing and agricultural use with a small amount of commercial land use in the rural section of the project. Most of the land has been converted to agricultural and residential/commercial use over the past century. The proposed project will result in minimal loss of wildlife habitat and local wildlife populations.

Construction of the proposed project in previously undisturbed areas will also impact native vegetation. Mitigation measures for the disturbances of the floral community will include revegetating the areas with native plants as soon as possible. Leaving soil exposed to the elements for a prolonged period of time will increase the likelihood of invasion of the area by invasive/exotic plant species and could potentially cause erosion and sedimentation problems in nearby area streams. Plants chosen for the site will be compatible with the hydrology, geology, and land use of the surrounding landscape. Due to the fact the proposed project is along an existing facility, the majority of any removal of native vegetation will occur along the shoulders and will remain minimal.

Various successional vegetative stages will be considered when replacing native species to prevent the landscape from converting into a monoculture state, thereby decreasing floral diversity. Since the proposed project is along an existing facility, absent of extensive forested areas, the impacts to terrestrial plants and animals will be minimal and extensive mitigation measures are not necessary.

Direct impacts to the terrestrial environment are anticipated to be minimal. Alternative A will result in 75 acres of scattered forested habitat to be converted to right-of-way, and Alternative B will require 54.8 acres of scattered forested habitat.

4.9.2 Aquatic Ecology

Five (5) streams were identified within the project corridor. Three (3) are perennial streams: Sougans Branch, Fall Creek, and an unnamed tributary of Sougans Branch. Two (2) streams are intermittent streams: An unnamed tributary of Fall Creek and an unnamed tributary of Reedy Creek. Habitat quality of each of the streams was investigated, and all five (5) streams scored in the below-average range. **Figure 4.9.1** identifies the location of these streams.

A **perennial stream** has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

An **intermittent stream** has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Source: **www.nap.usace.army.mil/cenap-op/regulatory/definitions.html**

Impacts to a stream during road construction activities are primarily destruction of habitat and sedimentation. Habitat destruction will directly impact portions of the stream located within the project's right-of-way limits. Sedimentation is associated with construction activities. Sedimentation impacts are usually temporary and can impact a stream for hundreds of feet downstream. These impacts include reduced levels of oxygen in the stream, and interference with the ability of fish, aquatic insects, mussels and other aquatic organisms to utilize oxygen from the water. Temperature patterns and water flow patterns can be altered. Siltation increases turbidity (cloudiness from dust and other disturbed particles) which can slow photosynthesis, clog gills in fish and other aquatic life, and covers macroinvertebrates and fish egg-laying substrates (streambed layers). This can result in long term negative impacts to streams. Siltation can redistribute itself to increase flooding events, loss of storage capacity in reservoirs, and potential economic impacts associated with increased water treatment costs. Organic chemicals and metals can be reintroduced into the water columns that were previously contaminated.

Nonpoint source pollution in the project area is related primarily to agricultural practices. In addition, urban runoff, sewage and construction activities contribute to nonpoint source pollution. These pollutants include deicing compounds, weed, rodent, and insect control products, surface runoff of pollutants coming from vehicular operations (oil, grease, asbestos and rubber), toxic chemical spills by trucks into a water supply system, and contamination of surface and groundwater supplies by polluted fill materials. Deicing and herbicide/pesticide uses are seasonal, and typically result in short term increases in area waters. Surface runoffs associated with vehicles are unavoidable, but the quantities of these pollutants are typically small which would result in negligible impacts. Accidental spills are not predictable, but emergency procedures are in place that report, contain, and clean up hazardous materials. The impacts to area streams will be minimized by strict adherence to the Standard Specification for soil erosion and sediment control.

FIGURE 4.9.1: IMPACTED STREAMS

Alternative A Stream Impacts

Five (5) streams will be impacted by Alternative A; three (3) are perennial and two (2) are intermittent streams. None of the five (5) have been listed as Tennessee Exceptional Waters within the project impact area, and none were impaired to the degree that they have been placed upon the Tennessee 303(d) list of impaired streams published by TDEC Division of Water Pollution Control. Habitat quality of each of the streams was investigated, and all five streams scored in the below-average range. The total amount of stream channel impacted will be determined after final project plans become available (i.e., alternative selected), but impacts have been estimated based upon preliminary plans for Alternative A. No bridges will be required; all stream crossings will consist of culverts or pipes. Alternative A would require a total of 1,278 feet of culverts to be constructed. A total of 3,585 feet of stream would be relocated within the project's proposed right-of-way. Table **4.9.1** and Table **4.9.2** illustrates stream impacts anticipated in association with Alternative A. TDOT considered shifting the alignment to avoid these resources, but this would not have been feasible. The shifts would result in additional relocations of residents and greater impacts to floodplains.

Alternative B Stream Impacts

The same five (5) streams as previously mentioned will be impacted by Alternative B. The total amount of stream channel impacted will be determined after final project plans become available (i.e., alternative selected), but impacts have been estimated based upon preliminary plans. No bridges will be required; all stream crossings will consist of culverts or pipes. Alternative B would require a total of 846 feet of culverts to be constructed. A total of 2,261 feet of stream would be relocated within the project's proposed right-of-way. **Table 4.9.1** and Table **4.9.2** illustrates stream impacts anticipated in association with Alternative B. TDOT considered shifting the alignment to avoid these resources, but this would not have been feasible. The shifts would result in additional relocations of residents and greater impacts to floodplains.

TABLE 4.9.1: LINEAR FEET OF STREAM IMPACT BY IMPACT TYPE, SR 126, SULLIVAN COUNTY, TENNESSEE FOR SELECTED ALTERNATIVES A AND B

Item	Total Linear Feet Impacted	Culverts/Pipes (ft)	Crossing / Bridge (ft)	Relocation (ft)
Alternative A	4,863	1,278	NA	3,585
Alternative B	3,107	846	NA	2,261

TABLE 4.9.2: COMPARISONS OF STREAM IMPACTS IN LINEAR FEET FOR ALTERNATIVE A AND ALTERNATIVE B

Streams Impacted	Drainage Area (acres)	Flow Regime	Alternative A: Linear Feet Impacted	Alternative B: Linear Feet Impacted
U.T Reedy Creek	113	Intermittent	428	174
U.T. Fall Creek	53	Intermittent	192	92
U.T. Sougan Branch	439	Perennial	2,506	1,868
Sougan Branch	1,574	Perennial	93	99
Fall Creek	2,032	Perennial	1,644	874
			Total: 4,863	**Total: 3,107**

Mitigation Measures for Impacted Streams

To protect water quality and aquatic species it is necessary that stream crossings be designed perpendicular to the direction of flow. The construction of culverts should be staged during the drier times of the year when stream flows have been reduced. The culverts will not be constructed immediately following rain events. Locations of these structures will be determined during final design and prior to submission of federal and state permit applications.

Where culverts penetrate the existing embankment, they will be lengthened so that the existing drainage function would be preserved. Therefore, there will be no additional flooding upstream of the existing berm. Additional culvert improvements would be made during final design, if necessary, based on a hydraulic capacity analysis. Culverts will also be wide enough to pass high flows and should be placed so as not to restrict the movement of aquatic vertebrates within the streams.

Mitigation is required for all stream impacts which do not meet requirements for general TDEC Division of Water Aquatic Resources Alterations permits (ARAP) and for certain Nationwide Section 404 permits (U.S. Army Corps of Engineers; TDOT 2004).

Coordination with TDEC Division of Water Pollution Control for a potential Water Quality Certification (401) prior to disturbance of streams is required. A 401 Water Certification states that a discharge into surface waters must comply with the aquatic protection requirements of the State of Tennessee. The *Status of Water Quality in Tennessee Year 2000 305 (b) Report* states "As a general rule, the Division prefers bridging of streams or even relocation of streams as an alternative to culverting." Furthermore, large projects where culverting is unavoidable may require an in lieu fee for compensatory mitigation. Aquatic life cannot be maintained in a culverted body of water. Altered stream flow consists of layers of water that do not mix. Hence, there is limited mixing of nutrients and dissolved oxygen. Additionally, the smooth bottom of the culvert eliminates refuge, feeding and egg-laying sites for aquatic organisms associated with natural stream substrates.

A Section 404 Dredge and Fill Permit will be required from the USACE prior to any construction work on the proposed project. Permittees must meet all conditions, restrictions, and notification procedures required prior to work under any said permit.

Unavoidable impacts to waters of the U.S. could still occur after all appropriate avoidance and minimization measures have been taken. Compensatory mitigation is likely to be required to offset any unavoidable impacts to waters of the U.S. TDOT will implement the current sanctioned stream mitigation compensation, as necessary, at the time of attaining permits.

TDOT Standard Specifications, Section 6-290.00, Sediment Control and Erosion Prevention, would be followed to minimize impacts to the five streams. To minimize potential run-off impacts to streams (and subsequent wildlife that utilize those streams) during and after construction, all appropriate BMP's in accordance with the FHWA will be implemented to control sedimentation and debris within contributing drainages.

Minimization of Stream Impacts

The Build Alternatives will be designed to avoid major impacts to waters of the State/U.S. to the extents practicable. Efforts to further minimize impacts will continue throughout the design,

permitting, and construction processes. Unavoidable impacts will be mitigated as required by applicable laws and regulations. In an effort to minimize sedimentation impacts, erosion prevention and sediment control plans will be included in the project construction plans. TDOT will also implement its *Standard Specifications for Road and Bridge Construction* and the *Statewide Storm Water Management Plan (SSWMP)*, which includes erosion prevention and sediment control standards for use during construction. The State of Tennessee sets water quality criteria for waters of the state; these standards must be met during construction of the project.

Erosion control devices should limit any adverse effects to area streams. Such devices include filter rings and siltation traps. Maintaining the vegetated buffer zone between the roadway and the streams will minimize the impact of non-point source pollution to the streams. Also, drainage ditches should direct runoff into appropriate areas to allow the non-point source pollutants to filter out of the drainage. To minimize potential runoff impacts to the project streams, all appropriate Best Management Practices will be implemented to ensure water quality in the project area is not adversely impacted during construction. Exact measures will be developed and coordinated with the appropriate permit agencies later in the design phase.

Along streams it is important to leave mature canopy when possible and allow establishment of a dense herbaceous layer of native species. Re-vegetating disturbed areas as soon as possible with native floral species should diminish erosion impacts. Using native species will improve habitats by adding diversity and discouraging invasive species growth. Riparian zones will provide habitat for existing species and attract the lower food chain organisms that may draw fish and invertebrates indigenous to the area.

Heavy equipment will not be allowed directly in the stream. Where possible, diversion channels will be constructed to keep surface flow away from the construction site or to direct flow from the construction site into appropriate sediment control services. Seeding with temporary vegetation to help control sediment runoff will be considered. Construction will not take place immediately following rain storm events.

If these mitigation measures are utilized, there should be no cumulative impacts to streams as a result of the construction of this project.

Water Quality Impacts/Minimization

Potential environmental impacts other than direct alteration of the streams consists of sediment laden stormwater run-off due to construction of the project. In order to minimize the impacts to water quality as a result of construction activities, erosion prevention and sediment control (EPSC) “Best Management Practices” (BMPs) will be utilized. Some of the BMPs that should be utilized include the following:

- Preservation of roadside vegetation beyond the limits of construction where possible
- Early re-vegetation of disturbed areas to hold soil movement to a minimum
- The use of detention/retention structures, surface, subsurface, and cross drains designed to protect the water quality of both groundwater and surface waters
- Inclusion of BMPs in the construction plans, specifications, and contract pay items as specified in TDOT *Standard Specification for Road and Bridge Construction as well as the Drainage Manual*

- Prohibiting the release of chemicals, fuels, lubricants, bitumens, raw sewage, or harmful waste into or alongside of streams or impoundments, or into natural or manmade channels that lead to same

Wetland Impacts

No wetlands under the provisions of Executive Order 11990 were identified in the project impact area. The build alternative will have no direct impact on State or Federal jurisdictional wetlands.

Floodplain Impacts

Executive Order 11988, Floodplain Management, addresses concerns associated with encroachment upon floodplains. Federal agencies must avoid significant impacts to floodplains if a practical alternative exists. Longitudinal encroachments will be minimized on this project. One longitudinal crossing would occur with both Build Alternatives. There are no practical alternatives that would avoid longitudinal crossings of floodplains, and total avoidance was not possible. The selection or location of other build alternatives in other areas of the corridor would cause greater impacts by encroachment and greater right-of-way acquisition associated with wider typical sections and new construction.

Reviews of Floodplain Insurance Rate Maps supplied by FEMA indicate that Alternative A and Alternative B each cross two floodplains within the project area. The floodplains are associated with Fall Creek and the Sougans Branch of Fall Creek. Table **4.9.3** shows the floodplain acreage impacted by each Alternative. These floodplains are located adjacent to SR 126 (Memorial Boulevard) in the eastern sections of the project as identified in **Figure 4.9.2**. The total number of acres impacted is less than five acres. Encroachments upon the floodplains have been minimized by remaining as close to the existing roadway as possible.

TABLE 4.9.3: FLOODPLAIN IMPACTS

Area	Alternative A	Alternative B
Total Area of land within the 2,000-foot Corridor	2100 acres	2100 acres
Impacted Floodplains within the Corridor	4.0 acres	3.2 acres

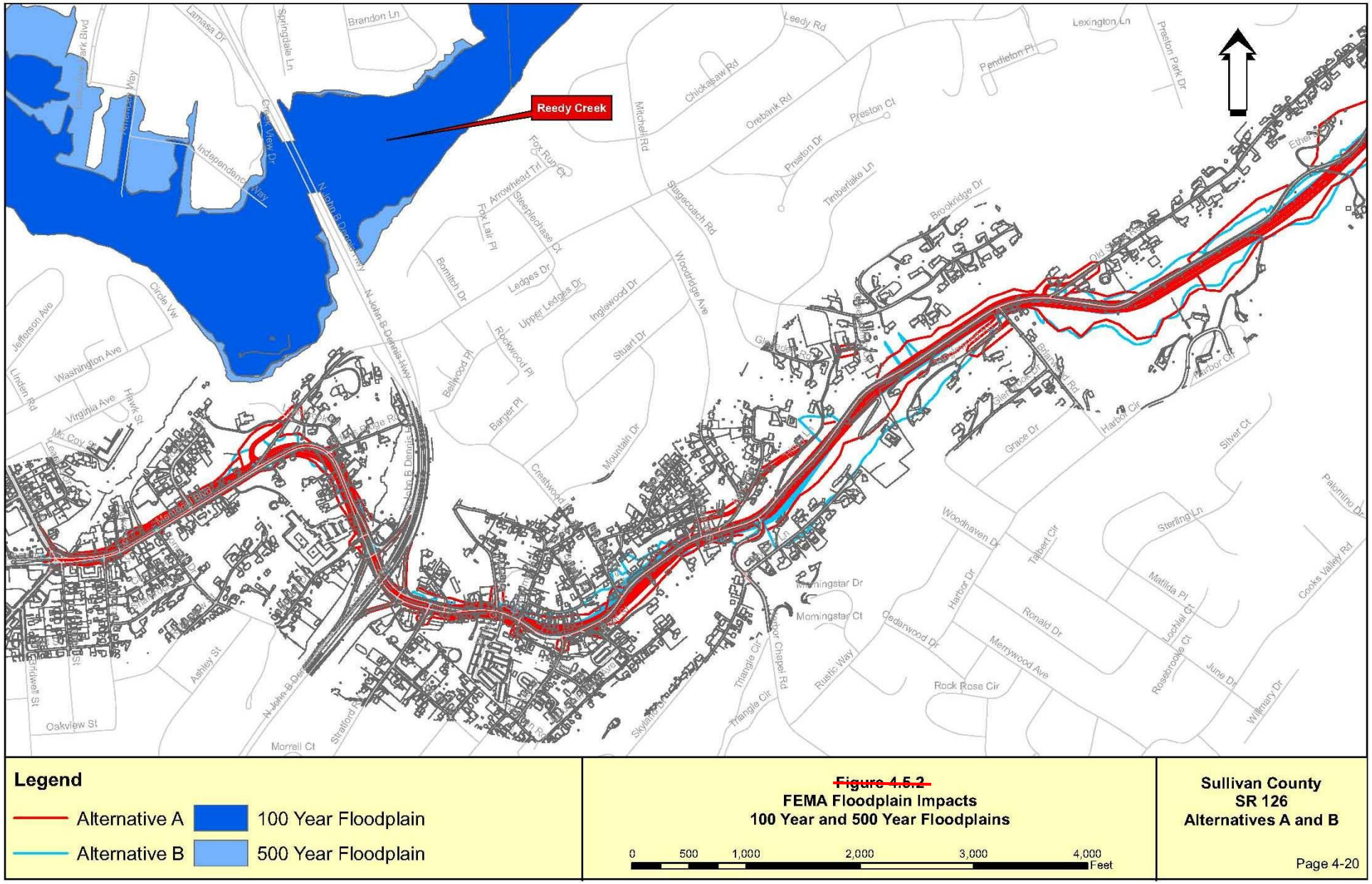


FIGURE 4.9.2: FEMA FLOODPLAINS (1 OF 2)

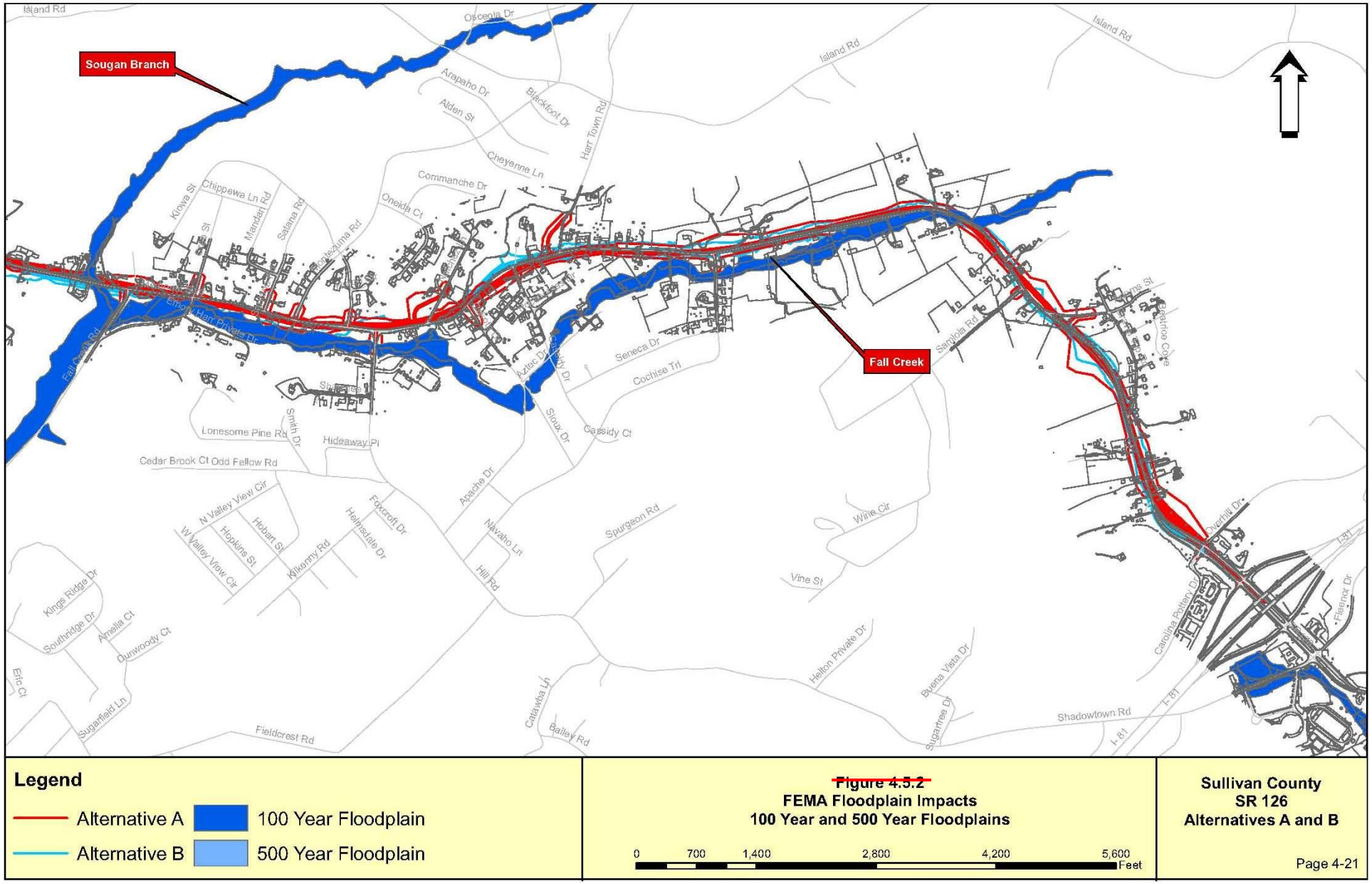


FIGURE 4.9.2: FEMA FLOODPLAINS (2 OF 2)

Minimization of Floodplain Impacts

The project will be designed to minimize floodplain impacts as required by the Federal Highways Administration procedures in 23 CFR 650A. Impacts will be minimized through the use of a perpendicular roadway design aimed at reducing fill and/or structures within the floodplain. The floodplain crossing will be designed so that the following criteria are met:

- There is no potential for interruption or termination of the transportation facility that is needed for emergency vehicles or provides the communities' only evacuation route due to the construction of the project
- The water crossings will convey floodwaters so there will be no increase in flooding due to the encroachment in the floodplain
- The Build Alternatives will have no substantial adverse impacts on the natural and beneficial floodplain values

The proposed project will not have a substantial impact on the 100 year floodplain.

Water Quality Permits

Alteration Permitting:

Entities that propose to construct projects that alter a stream, river, or lake must first obtain a water quality permit. Physical alterations to properties of waters of the State require an Aquatic Resource Alteration Permit (ARAP) or a Section 401 Water Quality Certification. Alterations to waters of the U.S. require either a Section 404 Nationwide or Individual Permit from the U.S. Army Corps of Engineers (USACE) and, where applicable, a 26a permit or letter of no objection from the Tennessee Valley Authority (TVA).

State Permits Required for Stream Impacts:

A *General NPDES Permit for Discharges of Stormwater Associated with Construction Activities* will be required for the proposed project. This permit is issued by the Tennessee Department of Environment & Conservation (TDEC), Division of Water Pollution Control pursuant to the federally-promulgated National Pollutant Discharge Elimination System (NPDES) program. The permit requires a Stormwater Pollution Prevention Plan (SWPPP) detailing the erosion prevention and sediment control practices designed to minimize sediment-laden stormwater run-off during precipitation events. One or more Aquatic Resource Alteration Permits (ARAP) under Section 401 of the Clean Water Act will be required for the proposed project. The stream crossings will require either a General Permit or Individual Permit under the ARAP program administered by TDEC. The type of permit issued will be determined after the significance of the impacts to the streams is reviewed by TDEC.

Federal Permits Required for Stream Impacts:

One or more permits under Section 404 of the Clean Water Act will be required for the proposed project. The crossing of streams will require either a Nationwide Permit or Individual Permit under the federal permit program administered by the U.S. Army Corps of Engineers (USACE). The type of permit issued will be determined after the significance of the impacts to the streams is reviewed by the USACE. A Tennessee Valley Authority Section 26a Permit will be required for the proposed stream crossing in Sullivan County

4.9.3 Impacts to Threatened and Endangered Species

Reviews of records, surveys, and responses received from federal and state agencies that monitor the status of threatened and endangered species have indicated that no such species would be impacted by the proposed project.

Although the Indiana Bat is not known to occur in the project area, at the request of the United States Fish and Wildlife Service (USFWS), a bat survey was conducted for this federally listed endangered species. Mist nets and field reviews were conducted in the project impact area. No Indiana Bats were located. A copy of the *Indiana Bat (Myotis sodalis) Mist Net Survey*, dated October 2011, is on file at the TDOT Environmental Division Office in Nashville, TN. The USFWS has concurred with a "not likely to adversely affect" finding concerning the Indiana Bat. However, to further minimize potential for harm to the Indiana Bat, trees with a diameter at breast height of five inches or greater will not be removed from October 15 through March 31.

Based on the best information available at this time, the requirements of Section 7 of the Endangered Species Act of 1973, as amended, are fulfilled. The USFWS response letters are contained in **Appendix C**.

Additional Protective Acts for Migratory Birds:

During the research of potential threatened and endangered species for the project corridor, bald eagles were cited as a species known to exist in Sullivan County. Field surveys did not identify either bald eagles or nests. If this species was to locate within the project APE at any time, including the construction phase, they would be protected under the US Migratory Bird Treaty Act (MBTA) and the US Bald and Golden Eagle Protection Act.

The MBTA (1918) was implemented for the protection of birds migrating between the U.S. and Canada. Under the Act, it is illegal for people to "take" migratory birds, their eggs, feathers or nests. A migratory bird is any species or family of birds that live, reproduce or migrate within or across international borders at some point during their annual life cycle. "Take" is defined in the MBTA "to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing or transporting any migratory bird, nest, egg, or part thereof."

The US Bald and Golden Eagle Protection Act offers additional protection to all bald and golden eagles. Bald eagles may not be taken for any purpose unless the Secretary of the Interior issues a permit prior to the taking. At this time, no mitigation measures are required. A copy of the Ecological Study prepared for this project is on file at TDOT's Environmental Division Office in Nashville, TN.

Impacts to State-Listed Species:

Reviews of records, field trips and responses from state agencies that monitor the status of state-listed species of plants and animals indicate that no impacts are anticipated for listed species in Sullivan County. The species list is contained in **Chapter 3**. The species of concern have been identified historically in Sullivan County, but no recent identifications are evident in the project area.

Invasive Species Impacts:

Executive Order 13112 was enacted to prevent the introduction of invasive species and provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species cause.

The potential for introducing additional exotic or invasive species to the natural and farmed plant communities in the project area is remote. Habitat fragmentation has already resulted in the establishment of these organisms in the region. Additional fragmentation of habitat and soil disturbance could create more favorable conditions for the existing non-native species. These impacts will be minimized by planting native vegetation on cut and fill slopes and in the medians of the selected Build Alternatives.

4.10 AIR QUALITY IMPACTS

SR 126 (Memorial Boulevard) in Sullivan County is in an attainment area according to EPA for mobile source air pollutants. The project is included in Section A of the Kingsport Metropolitan Planning Organization's (MPO) 2011-2014 Transportation Improvement Program (TIP), as adopted October 2010. The project was previously included in the conforming 2008-2011 TIP.

According to the Tennessee Department of Environment and Conservation, Division of Air Pollution Control, this project is in an area designated as attainment/unclassified for the National Ambient Air Quality Standards (NAAQS), therefore, a transportation conformity determination is not required.

Based upon the analysis of highway projects with similar meteorological conditions and traffic volumes, the carbon monoxide (CO) levels of the subject project will be well below the National Ambient Air Quality Standard (35ppm one-hour and 9ppm eight-hour). Since the project will have levels below this standard and is located in a region of air quality conformity, it was determined that there will be no CO impact on the air quality of the area from the proposed project. This project qualifies as a "project with low potential MSAT effects" in accordance with FHWA's guidance.

A copy of the *Highway Traffic Noise and Air Quality Analysis* Report, as updated in October of 2011, is on file in the TDOT Environmental Division Office in Nashville, TN.

4.10.1 Mobile Source Air Toxics (MSAT)

On February 3, 2006, the FHWA released "*Interim Guidance on Air Toxic Analysis in NEPA Documents.*"[1] This guidance was superseded on September 30, 2009 by FHWA's "*Interim Guidance Update on Air Toxic Analysis in NEPA Documents.*"[2] The purpose FHWA's guidance is to advise on when and how to analyze Mobile Source Air Toxics (MSATs) in the NEPA

[1] *Interim Guidance on Air Toxic Analysis in NEPA Documents*, FHWA, February 3, 2006. http://www.fhwa.dot.gov/environment/airtoxic/020306guidmem.htm

[2] *Interim Guidance Update on Air Toxic Analysis in NEPA Documents*, FHWA, September 30, 2009. http://www.fhwa.dot.gov/environment/airtoxic/100109guidmem.htm

process for highways. This guidance is interim, because MSAT science is still evolving. As the science progresses, FHWA will update the guidance.

The qualitative analysis presented below provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The assessment is derived in part from a study conducted by the FHWA entitled *"A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives."*[3] Additional information regarding MSATs is provided at the end of this section.

FHWA's Interim Guidance groups projects into the following categories:

- Exempt Projects and Projects with no Meaningful Potential MSAT Effects;
- Projects with Low Potential MSAT Effects; and,
- Projects with Higher Potential MSAT Effects.

FHWA's Interim Guidance provides examples of "Projects with Low Potential MSAT Effects." These projects include minor widening projects and new interchanges, such as those that replace a signalized intersegment on a surface street or where design year traffic projections are less than 140,000 to 150,000 AADT.

The Build Alternatives include the widening of SR 126 (Memorial Boulevard). The highest projected design year 2033 AADT on SR 126 is 33,540 and substantially lower than the FHWA criterion. Therefore, the project meets the criteria for a "Project with Low Potential MSAT Effects."

For both the No-Build and Build Alternatives, the amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The estimated VMT for the Build Alternatives are essentially the same as the VMT for the No-Build Alternative. Therefore, it is expected that there would be no appreciable difference in overall MSAT emissions between the No-Build and Build Alternatives.

Additionally, travel speeds for the Build Alternatives are expected to be higher than for the No-Build Alternative. According to EPA's MOBILE6 emissions model, emissions of all of the priority MSATs except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models.

Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 72 percent between 1999 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

[3] Claggett, M., et. al., "*A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives,"* Federal Highway Administration, Resource Center.

The additional travel lanes contemplated for the Build Alternatives will have the effect of moving some traffic closer to nearby residences and other sensitive uses; therefore, under the Build Alternatives there may be localized areas where ambient concentrations of MSATs could be higher than under the No-Build Alternative. However, as discussed above, the magnitude and the duration of these potential increases compared to the No-Build Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts.

In sum, when a highway is widened, the localized level of MSAT emissions for the Build Alternatives could be higher relative to the No Build Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

Substantial construction-related MSAT emissions are not anticipated for this project as construction is not planned to occur over an extended building period. However, construction activity may generate temporary increases in MSAT emissions in the project area.

MSATs Background

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/ncea/iris/index.html). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (vehicle-miles travelled, VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in **Figure 4.10.1**.

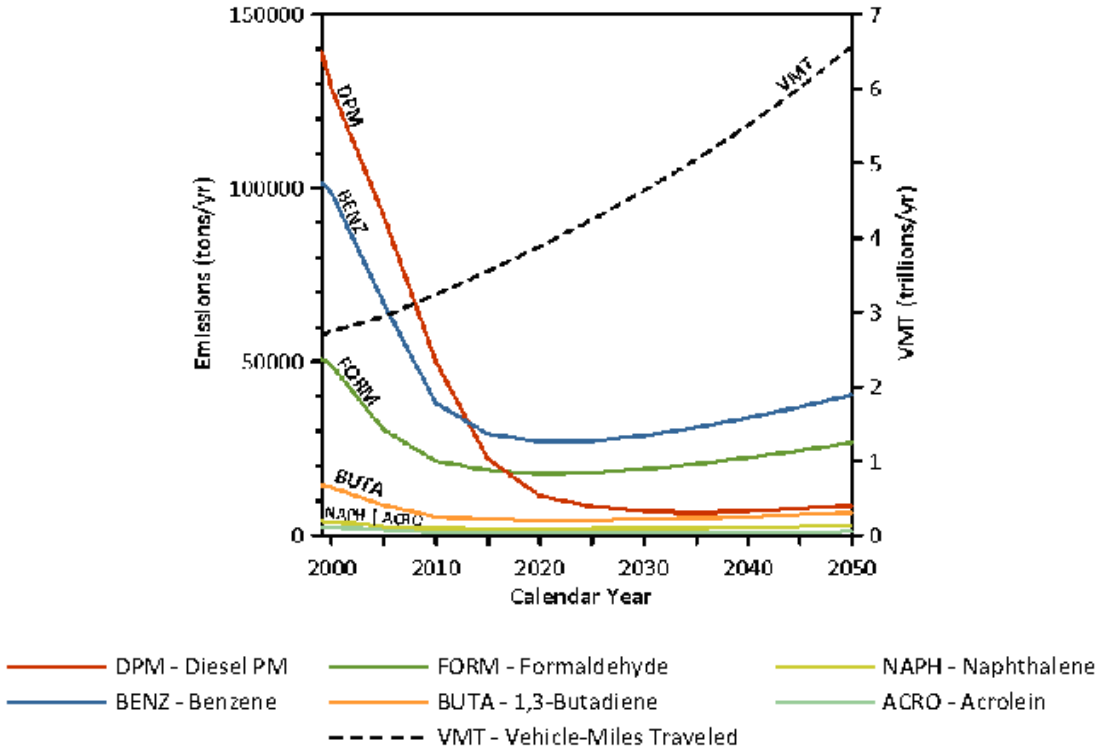


FIGURE 4.10.1: NATIONAL MSAT EMISSION TRENDS 1999 – 2050
FOR VEHICLES OPERATING ON ROADWAYSUSING EPA's MOBILE6.2 MODEL

Note:
(1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050.
(2) Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors
Source: U.S. Environmental Protection Agency. MOBILE6.2 Model run 20 August 2009.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of the National Environmental Policy Act (NEPA).

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, we are duly expected by the public and other agencies to address MSAT impacts in our environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field.

Unavailable Information for Project Specific MSAT Impact Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any

genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The U.S. Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/ncea/iris/index.html). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in an NCHRP study (http://www.epa.gov/scram001/dispersion_alt.htm#hyroad), which documents poor model performance at ten sites across the country - three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with National Ambient Air Quality Standards for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT

exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

4.10.2 Climate Change

Climate change, also referred to as global warming, is an increase in the overall average atmospheric temperature of the earth due to the trapping of heat in the atmosphere by greenhouse gases. The primary greenhouse gas emitted by human activities in the US is carbon dioxide (CO_2), which represents approximately 85 percent of total greenhouse gas emissions.

Transportation sources contribute to global warming through the burning of petroleum-based fuel. According to the FHWA, transportation sources are responsible for approximately one-quarter of the greenhouse gas emissions in the US. Automobiles and light-duty trucks account for almost two-thirds of emissions from the transportation sector and emissions have steadily grown since 1990.

Emissions from transportation sources depend on the number of trips or miles traveled by each type of vehicle per year, which are, in turn, influenced by larger economic trends and consumer behavior. Over the long term, changes in vehicle fuel efficiency, driving behavior, and fuel type will influence the level of emissions.

Under the Clean Air Act, the EPA has the authority to establish motor vehicle emissions standards for CO_2 and other greenhouse gases although such standards have not yet been established.

FHWA is actively involved in efforts to initiate, contact, and disseminate climate-change-related research and to provide technical assistance to stakeholders. The FHWA is also involved in climate change initiatives with the USDOT Center for Climate Change and Environmental Forecasting.

Climate change and related effects are complex and global in nature. As a result, the impacts of any single transportation project cannot be effectively estimated in terms of global warming effect. However, the emissions changes due to individual projects are very small compared to global emissions.

Once standards are established and guidance for assessing the potential greenhouse gas effects of transportation projects becomes available, a more in-depth assessment rate may be possible.

4.11 NOISE IMPACTS

The noise evaluation for this project was conducted in accordance with Federal guidance for handling noise impacts and abatement contained in 23 Code of Federal Regulations (CFR) Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise" and the Tennessee Department of Transportation's Policy on Highway Traffic Noise Abatement, effective July 13, 2011. A copy of the *Highway Traffic Noise and Air Quality Analysis Report* (updated October 2011) for SR 126 (Memorial Boulevard) is on file in the TDOT Environmental Division Office in Nashville, TN.

4.11.1 Fundamentals of Sound and Noise

The intensity or loudness of sound is measured in units called decibels (dB). However, because the human ear does not hear sound waves of different frequencies at the same subjective loudness, an adjustment or weighting of the high-pitched and low-pitched sounds is made to approximate how an average person hears sounds. When such adjustments to the sound levels are made, they are called "A-weighted levels" and are labeled "dBA." **Figure 4.11.1** shows some common indoor and outdoor sound levels.

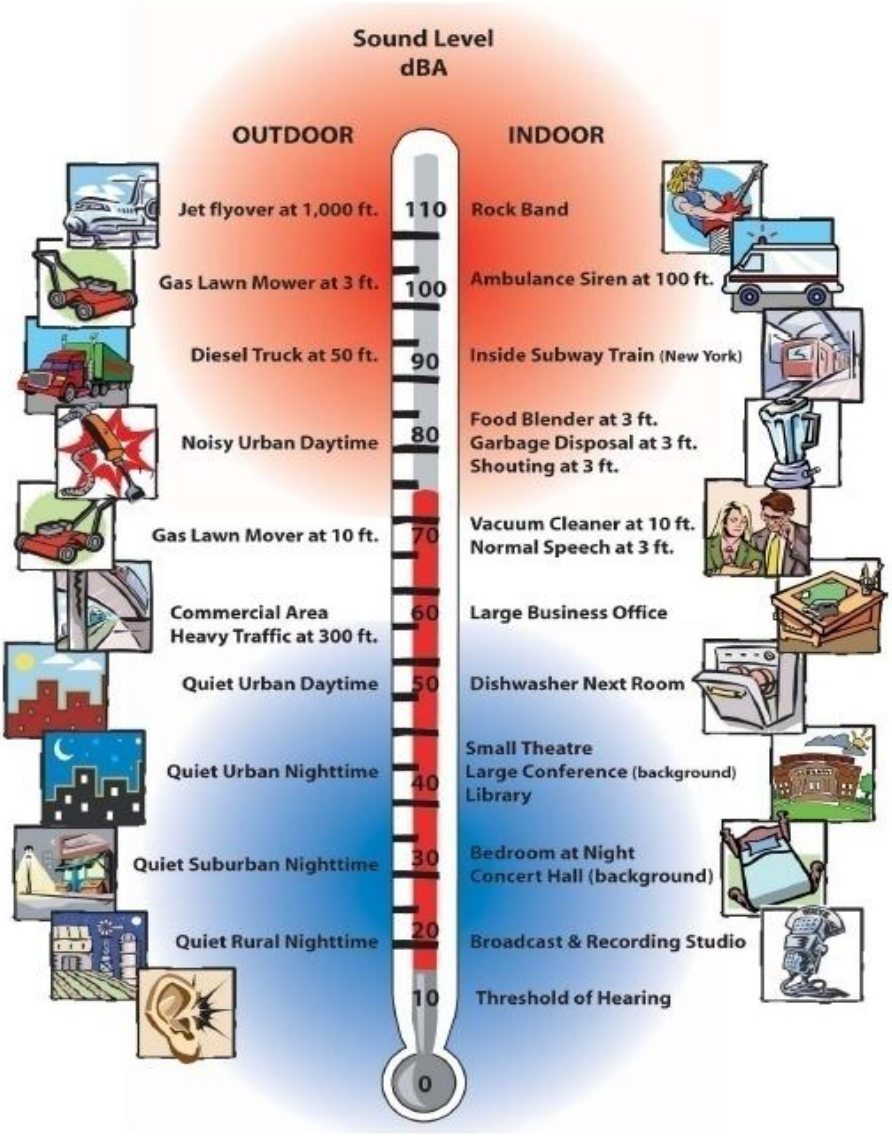


FIGURE 4.11.1: COMMON INDOOR AND OUTDOOR NOISE LEVELS

Noise is defined as unwanted sound. Since highway traffic sound is normally unwanted, it is usually called highway traffic noise. The level of highway traffic noise is never constant; therefore, it is necessary to use a statistical descriptor to describe the varying traffic noise levels. The equivalent continuous sound level (L_{eq}) is the statistical descriptor used in a noise impact analysis. The L_{eq} sound level is the steady A-weighted sound level, which would produce the same A-weighted sound energy over a stated period of time.

4.11.2 Criteria for Determining Impacts

FHWA regulations establish Noise Abatement Criteria (NAC) that must be used by states to determine if noise-sensitive land uses will be impacted by a project.

The regulations state that noise mitigation should be evaluated for any receptor or group of receptors where predicted traffic noise levels, using future traffic volumes and roadway conditions, approach or exceed the NAC shown in **Table 4.11.1.**

Traffic noise is considered to "approach" a criterion at a level of 1 dBA less than the criterion (e.g., 66 dBA for Category B receptors).

The FHWA regulations and TDOT's noise policy also define impacts to occur if there is a substantial increase in design year sound levels over existing sound levels. **Table 4.11.2** presents TDOT's criteria to define substantial noise increase.

4.11.3 Determination of Existing Sound Levels

Noise measurements were conducted at several noise-sensitive land uses in the project area to characterize the existing noise environment. Existing peak hour sound levels at the measurement locations range from 44 to 66 dBA.

4.11.4 Determination of Future Sound Levels

Sound levels for the No-Build Alternative are predicted to be 1 to 3 dB higher than existing sound levels depending on location.

Noise modeling of Build Alternatives A and B was completed using the FHWA Traffic Noise Model (TNM 2.5) computer program. The program calculated design year 2033 sound levels at the noise-sensitive land uses in the project area.

4.11.5 Noise Impact Evaluation

As noted previously, a location is impacted if 1) the predicted worst hour noise level approaches or exceeds the NAC or 2) there is a substantial increase in design year noise levels above existing noise levels.

TABLE 4.11.1. FHWA NOISE ABATEMENT CRITERIA IN 23 CFR 772

Activity Category	L_{Aeq} (1h)	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B(1)	67	Exterior	Residential.
C(1)	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structure, radio stations, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structure, radio studios, recording studios, schools, and television studios.
E(1)	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D, or F.
F	---	---	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	---	---	Undeveloped lands that are not permitted.

(1) Includes undeveloped lands permitted for this activity category.

TABLE 4.11.2: SUBSTANTIAL NOISE LEVEL INCREASE

Existing Noise Level (dBA) (1)	Subjective Descriptor
42 or less	15 or more
43	14 or more
44	13 or more
45	12 or more
46	11 or more
47 or more	10 or more

Design year sound levels for the Build Alternative are predicted to be 1 dB to 8 dB higher than existing sound levels. These increases are not substantial in accordance with TDOT's Noise Policy. Therefore, none of the land uses are predicted to be impacted by a substantial increase in sound level.

Design year sound levels at most receivers are predicted to be less than the NAC for both Alternatives A and B. However, 35 residences are predicted to be impacted under Alternative A with design year sound levels of 66 dBA or higher. Similarly, 45 residences are predicted to be impacted under Alternative B.

The increased number of impacts under Alternative B is primarily the results of fewer takes under Alternative B due to a narrower right-of-way. The taking of fewer properties leaves some residences in close proximity to SR 126 (Memorial Boulevard).

A copy of the *Highway Traffic Noise and Air Quality Analysis Report* (updated October 2011) for SR 126 (Memorial Boulevard) is on file in the TDOT Environmental Division Office in Nashville, TN.

4.11.6 Noise Abatement Evaluation

Abatement is generally evaluated when impacts are predicted to occur. Noise barriers were evaluated to reduce sound levels for impacted land uses. In order for noise barriers to be included in a project, they must be determined to be both feasible and reasonable in accordance with TDOT's Noise Policy.

Feasibility means that the construction of a barrier would not be anticipated to pose any major design, construction, maintenance, or safety problems that the barrier would reduce traffic noise levels for the majority of the impacted first-row receptors.

SR 126 (Memorial Boulevard) is not a limited access facility. In fact, of the 35 impacted residences under Alternative A, 29 have direct driveway access to SR 126 (Memorial Boulevard). Similarly, of the 45 impacted residences under Alternative B, 40 have direct driveway access to SR 126 (Memorial Boulevard). Noise barriers are not feasible to mitigate impacts at these residences because a noise barrier would limit access from these properties and adjacent properties.

The remaining impacted residences under both Alternatives are isolated from other impacted residences. Noise barriers for these residences would not be reasonable since the required area per benefited residence will greatly exceed the allowable area for benefited residence.

As a result, noise barriers were determined not to be feasible or reasonable for this project.

4.11.7 Information for Local Officials

There are tracts of undeveloped land adjacent to SR 126 (Memorial Boulevard). TDOT encourages the local governments with jurisdiction over these lands, as well as potential developers of these lands to practice noise compatibility planning in order to avoid future noise impacts. The following language is included in TDOT's noise policy:

> *"Highway traffic noise should be reduced through a program of shared responsibility. Local governments should use their power to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway or that the developments are planned, designed and constructed in such a way that noise impacts are minimized."*

Two guidance documents on noise compatible land use planning are available from FHWA and can be found at: http://www.fhwa.dot.gov/environment/audible/index.htm and http://www.fhwa.dot.gov/environment/noise/quietzon.

Table 4.11.3 presents design year sound levels for areas along SR 126 where vacant and possibly developable lands exist. Noise predictions were made at distances between 100 and 400 feet from the centerline of the closest travel lane for the design year. As indicated, sound levels within approximately 100 feet of the centerline of the closest travel lane of SR 126 will approach or exceed the NAC of 66 dBA. Noise-sensitive land uses should generally not be constructed in these areas unless noise mitigation measures are provided.

TABLE 4.11.3: DESIGN YEAR 2033 SOUND LEVELS FOR UNDEVELOPED LANDS

Distance from SR 126 [(1)]	L_{eq} (1h) (dBA)[(2)]
100 feet	66
200 feet	62
300 feet	57
400 feet	53

(1) Perpendicular distance to the center of near lane. (2) At-grade scenario.

These values do not represent predicted levels at every location at a particular distance back from the roadway. Sound levels will vary with changes in terrain and will be affected by the shielding of objects such as buildings. This information is being included to make local officials and planners aware of anticipated highway noise levels so that future development will be compatible with these levels.

Finally, TDOT currently has an active Type II Noise Barrier Program to facilitate the construction of "retrofit" noise barriers along existing highways. To be eligible for a Type II noise barrier, an area must meet the following criteria:

- The neighborhood must be located along a limited-access roadway;
- The neighborhood must be primarily residential;
- The majority (more than 50%) of residences in the neighborhood near the highway pre-dated the initial highway construction;
- A noise barrier for the neighborhood must not have been previously determined to be not reasonable or not feasible as part of a new highway construction or through-lane widening study (Type I project);
- Existing noise levels measured in the neighborhood must be above the Noise Abatement Criteria (NAC) of 66 dBA;
- A barrier must be feasible to construct and will provide substantial noise reduction; and,

- A barrier must be reasonable (barrier cost per benefitted residence) in accordance with TDOT's noise policy. A residence is considered "benefitted" if the noise barrier will reduce the traffic noise by at least 5 dB.

4.11.8 Construction Noise

It is expected that TDOT's construction specifications will apply to this project. As a result, construction procedures shall be governed by the *Standard Specifications for Road and Bridge Construction* as issued by TDOT and as amended by the most recent applicable supplements. The contractor will be bound by Section 107.01 of the Standard Specifications to observe any noise ordinance in effect within the project limits. Detoured traffic shall be routed during construction so as to cause the least practicable noise impact on noise-sensitive areas.

4.12 HISTORIC IMPACTS

In compliance with the requirements of Section 106 of the National Historic Preservation Act of 1966 and the implementing regulations 36 CFR 800, the Cultural Resource survey conducted for the project identified one National Register of Historic Places (NRHP) listed property and one NRHP eligible property within the established Area of Potential Effect (APE).

Yancey's Tavern is located on the northern side of State Route 126 (Memorial Boulevard) on Chestnut Ridge Road (See **Figure 4.12.1**). Yancey's Tavern was listed in the NRHP in 1972 under Criterion A for its significance in the early settlement of Sullivan County. It was an important stop along the Island Road, the major artery in upper East Tennessee. A five acre boundary surrounding the Tavern was established in 1972.

The current alignment of State Route 126 (Memorial Boulevard) is located south of Yancey's Tavern and is separated from the main roadway by land and Chestnut Ridge Road. With Alternative A, the proposed widening from two lanes to four lanes with a median, curbs and gutters, and sidewalks will not take any land from the Yancey's Tavern property. However, the widening will introduce a roadway that is out of scale with the historic setting and will introduce an adverse visual impact to the historic property. Alternative B also does not take any land from the Yancey's Tavern Property. Alternative B includes retaining walls and a narrower roadway cross section with fewer lanes in this area in an effort to minimize impacts to Yancey's Tavern and East Lawn Memorial Gardens Cemetery, which is located across SR 126 (Memorial Boulevard) from the tavern. The State Historic Preservation Office (SHPO) has reviewed the project and in a letter dated November 3, 2008 stated that an adverse visual effect to Yancey's Tavern would occur if either Build Alternative was selected (SHPO letter is contained in **Appendix B**). On February 26, 2010 the SHPO advised that, under 36 CFR 800, the Advisory Council on Historic Preservation (ACHP) should be consulted regarding this adverse effect.

Upon receiving written notification and information regarding the adverse affect to Yancy's Tavern, the ACHP responded that there is no need for their participation to resolve the adverse effect. The ACHP correspondence, dated February 18, 2011, also noted that supporting documentation along with the final Memorandum of Agreement (MOA), developed in consultation with the SHPO, and any other consulting parties, must be filed with the ACHP in accordance with 36 CFR 800.6(b)(1)(iv) and Section 106 of the National Historic Preservation Act. The MOA will be prepared and signed prior to approval of the Final Environmental Impact Statement. The ACHP correspondence is located in **Appendix B**.

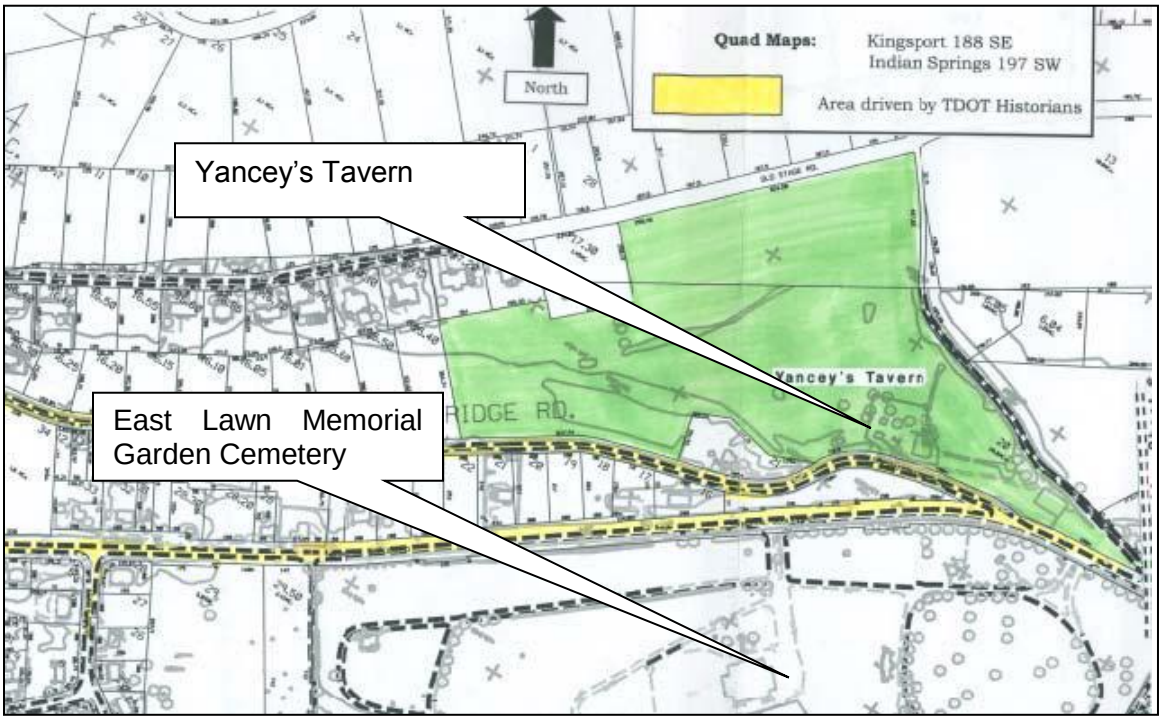


FIGURE 4.12.1: YANCEY'S TAVERN

A second historic property, the Shipley-Jarvis House, is located on the south side of SR 126 (Memorial Boulevard) near the beginning of the project in a residential and commercial sector of Kingsport. The Shipley-Jarvis House has been determined to be eligible for listing in the National Register of Historic Places.

The Shipley-Jarvis House exemplifies the adaptation of nineteenth century dwellings to conform to twentieth century architectural tastes. The house is in excellent condition and is a good example of Colonial Revival Architecture. The Colonial Revival style was popularized in the 1880's and became the dominant style for domestic building for the first half of the twentieth century.

The Shipley-Jarvis House is a good example of the evolution of architectural styles that blends early styles with modern feature. Its architectural features continue to illustrate both ninetieth century building methods and twentieth century stylistic changes. The Shipley-Jarvis House was determined eligible for listing in the NRHP under Criterion C for its architectural style.

The proposed widening of the roadway in front of the Shipley-Jarvis House will not acquire any right-of-way from the property. It has been determined that the proposed project will have an effect that is not adverse to this property. No mitigation is required. The SHPO concurred in this finding in a letter dated November 3, 2008 (SHPO letter is contained in **Appendix B**.)

To learn more about these listed or eligible National Register properties, facts about Section 106 of the National Historic Preservation Act, and National Register Criteria, copies of the Historical and Architectural Survey and Documentation for Effect Under 36 CFR 800 Evaluation reports are available for viewing in TDOT's Environmental Division Office in Nashville.

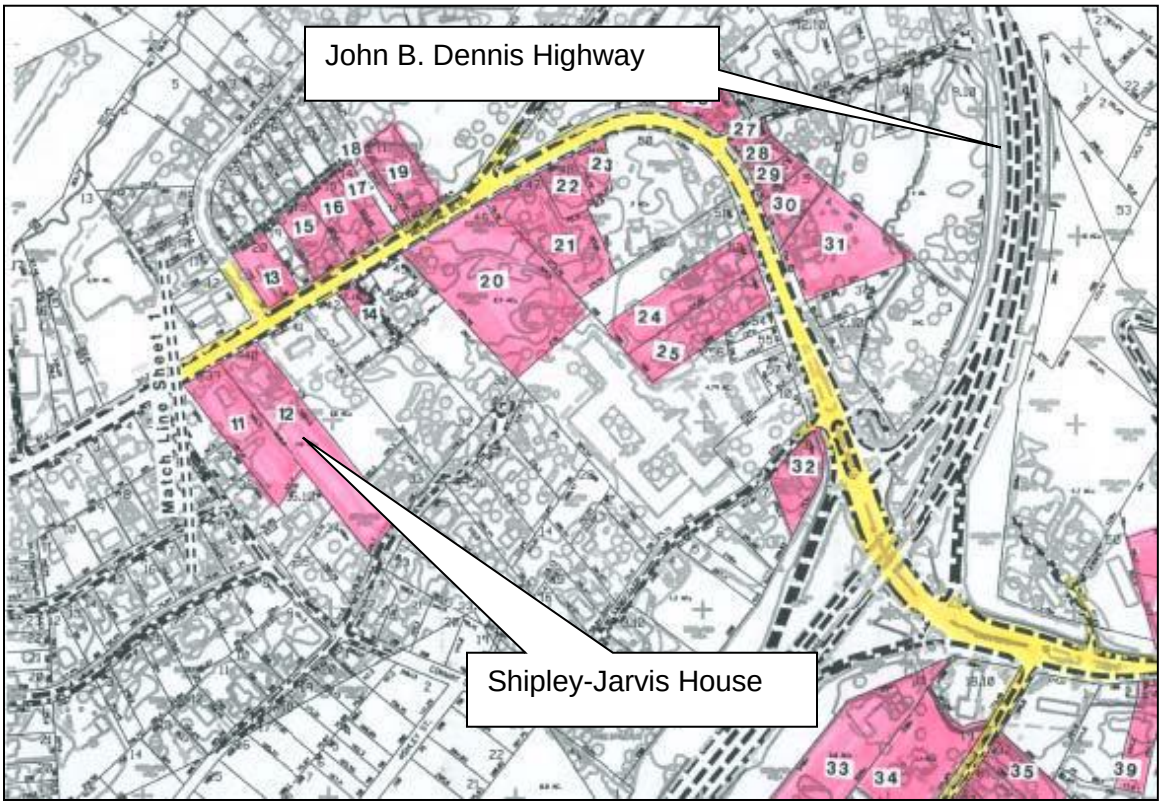


FIGURE 4.11.2: SHIPLEY-JARVIS HOUSE

4.13 ARCHAEOLOGICAL ASSESSMENT

A Phase I Cultural Resources Survey for the proposed improvements to SR 126 (Memorial Boulevard) has been completed. The purpose of the archaeological survey was: to identify and evaluate any archaeological resources (excluding standing structures) located within the area of potential effect that were listed or potentially eligible for listing on the National Register of Historic Places (NRHP) pursuant to the criteria set forth in 36 CFR 60.4; to assess the effects of the proposed construction on such resources; and to provide recommendations for further archaeological resource management decisions in compliance with Section 106 of the National Historic Preservation Act.

The results of the archaeological surveys identified four sites within or adjacent to the proposed build alternatives.

40SL412 is a late 19th-early 20th century farmstead site with a small prehistoric component. The site contains information that could be important to understanding life in rural Sullivan County in the late 19th-early 20th centuries.

40SL413 is a prehistoric lithic scatter that has a high potential for intact deposits below the plowzone. Since there are not many prehistoric sites along the corridor, the SHPO agreed this one is potentially eligible.

40SL419 is the archaeological component of the already NR-listed Yancey's Tavern property, including both historic and prehistoric components. The historic component was determined eligible and the prehistoric component was determined potentially eligible. The prehistoric component lies inside the area of the barn, Eaton Station Road, and SR 126 (Memorial Boulevard).

40SL421 is a small historic house site with a surviving stone-lined cellar and a brick-lined cistern, both situated on a rocky rise between the current SR 126 (Memorial Boulevard) and one of its earlier roadbeds. Probable dates for the structure range from between 1854 and 1939.

The proposed Build Alternatives have been modified to avoid impacting these sites. The SHPO has reviewed the revised project area, and in a letter dated July 14, 2010 stated the project as presently proposed contains no archaeological resources eligible for listing in the National Register of Historic Places. (SHPO letter is included in **Appendix B**)

Native American Consultation

A Section 106 consultation notice was sent to the following federally recognized tribes for Sullivan County. An asterisk indicates a response was returned. No culturally sensitive or sacred sites were identified. Each responding tribe requested to be notified in the event of an inadvertent find.

- Eastern Shawnee Tribe of Oklahoma*
- Muscogee (Creek) Nation*
- Eastern Band of Cherokee Indians*
- Chickasaw Nation
- Choctaw Nation of Oklahoma
- Seminole Nation of Oklahoma
- United Keetowah Band of Cherokees
- Quapaw Tribe of Oklahoma
- Thlopthlocco Tribal Town, Oklahoma

Since the initial consultation with the Native American Tribes, two (2) additional tribes have been recognized, The Cherokee Nation and the Shawnee Tribe. Consultation with these additional Native American Tribes will be completed prior to submittal of the FEIS.

If archeological material is uncovered during construction, all construction will cease in that area and the Tennessee Division of Archaeology and the recognized Native American Tribes will be contacted so a representative can have the opportunity to examine and evaluate the material. A copy of the Archaeological Survey is on file at TDOT Environmental Division office in Nashville.

4.14 SECTION 4(F) EVALUATION

4.14.1 Section 4(f) Finding

Section 4(f) of the United States Department of Transportation (USDOT) Act of 1966 Section 6009, requires federal aid projects to include special efforts to preserve the natural beauty of the countryside, public park and recreation lands, wildlife and waterfowl refuges, and historic sites. Approval of projects that have the potential to impact any of these resources can be made only if the following conditions are met:

1. There is no feasible or prudent alternative to the use of land from the property; and
2. The action includes all possible planning to minimize harm to the property resulting from use.

The purpose of **Section 4(f)** is to preserve publicly owned land from a public park, recreation area, wildlife or waterfowl refuge, or significant historic site from being used for a transportation project. It requires consideration of avoidance or mitigation of damages.

There are two historic sites within the project study corridor. The Build Alternatives as presently proposed will not take property from either site. There are no public parks, recreation lands, wildlife or waterfowl refuges in the project impact area. No Section 4(f) resources will be impacted by the proposed Build Alternatives.

4.15 SECTION 6(F) LAND AND WATER CONSERVATION ACT

No Section 6(f) funds have been appropriated in the project impact area.

4.16 HAZARDOUS MATERIAL IMPACTS

Hazardous materials are substances that have, or will have when combined with other materials, a harmful effect on the human and natural environment. Hazardous materials are primarily regulated under the Federal Resource Conservation and Recovery Act (RCRA) of 1976, as amended, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980; and the Superfund Amendments and Reauthorization Act (SARA) of 1986.

A broad hazardous materials study was conducted for this project in 2007/2008. The results of the study were based on visual inspection and documentation of state and federal agencies. Agencies whose records were reviewed included the U.S. Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation, Division of Underground Storage Tanks (DUST) and Division of Solid and Hazardous Waste Management.

The National Priorities List (NPL) is a federal list of sites subject to cleanup directed by the EPA. These sites are part of the national Superfund program. The NPL revealed no NPL in the proposed project impact area.

The Comprehensive Environmental Response and Liability Act Information System (CERCLIS) is also part of the national Superfund program. Inclusion in CERCLIS is the first step in the ranking of potentially hazardous sites to determine whether they meet the criteria for inclusion in the NPL. There are no active CERCLIS sites within the project area.

Superfund also has an archive designation. The "archive status" means that assessment at a site has been completed and the EPA has determined no steps will be taken to designate the site as a priority by listing it on the NPL. There are no super fund sites in the project impact area.

4.16.1 Hazardous Materials

A Phase I Environmental Site Assessment (ESA) was conducted in accordance with the scope and limiting conditions set forth in the American Society for Testing and Materials (ASTM) practice 1527. Recognized Environmental Conditions (RECs) were identified for properties within, or adjacent to, the proposed right-of-way limits of the Build Alternatives under consideration in this document.

The goal of this Assessment was to determine the potential presence of aboveground and/or underground storage tanks, hazardous wastes or materials, solid and special wastes and areas of potential hazardous waste concerns which may pose a threat to human health and/or the environment. The results of the Phase I ESA were utilized to determine the need for Phase II Site Assessments.

The project team worked within a two thousand (2,000) foot wide corridor, one thousand (1,000) feet from either side of the existing centerline of SR 126 (Memorial Boulevard). A total of one hundred and eleven (111) sites were investigated in this Phase I ESA. Records searches and field inspections were combined to determine the existence of underground storage tanks (USTs), above ground storage tanks (ASTs) and other known and unknown sources of potentially hazardous materials.

In the Phase I ESA, a state and federal database search was conducted in March, 2008 and identified a total of nine (9) potentially Recognized Environmental Conditions (pRECs) located in the two thousand (2,000) foot wide study corridor of the proposed project. After a thorough review of the files, an on-site field reconnaissance, literature search, and conversations with officials from TDEC in Nashville and Johnson City, it was determined that three (3) sites were of sufficient concern to warrant a recommendation for Phase II testing.

4.16.2 Properties with Potentially Recognized Environmental Concerns

<u>1. Station 5-0111; 3717 Memorial Boulevard, Kingsport, TN 37663</u>

This site, just north of John B. Dennis Parkway, is currently not a hazardous waste concern. It was reported in 1991 to have had a leaking underground storage tank (LUST). The site is currently active, but past concerns appear to have been mitigated. No further environmental concerns appear to exist.

FIGURE 4.16.1: GAS STATION NEAR THE JOHN B. DENNIS HIGHWAY

2. Fuel and Convenience Store; 4001 Memorial Boulevard, Kingsport, TN 37664

This UST site is an active gasoline/convenience mart. A total of five gasoline tanks are located at this site. Two are in use and three are permanently out of use. The three inactive tanks showed no signs of leakage via stains, oil sheens or odors during field visits. The database records search indicates that no tank or pipe leakages have been reported.

The site's two active 12,000 gallon fuel tanks feature composite construction of steel with FRP. No leakages were evident during the visual walkthrough and none were reported in the database records search. An automotive tank gauge is used for inventory control and piping is flexible plastic.

Although the field visit and the search results indicate that no environmental concerns were evident, it is recommended that a detailed Environmental Site Assessment be conducted. This will ensure that no leakages of the out of service tanks are occurring or will occur prior to construction of the project.

FIGURE 4.16.2: GAS STATION AT 4001 MEMORIAL BOULEVARD

3. Pool and Spa Supplies Store; 3933 Memorial Boulevard, Kingsport, TN 37664

This UST-reported site is currently occupied by a retail Pool and Spa store. An interview was conducted with the owner in November 2007 during the field trips. The project construction limits do not require a total acquisition of this site. The search indicated that a 1000 gallon UST for gasoline was once located on this site. Tank leak detection was listed in the report. Conversations with the owner indicate that the tank was removed approximately 20 years ago. Paperwork documenting the removal is located at this site. No vent pipes or other signs associated with gasoline USTs were evident at this site.

4. Gas Station; 5001 Memorial Boulevard, Kingsport, TN

This inactive UST site is located adjacent to SR 126 (Memorial Boulevard). The search indicated that three USTs are located on the site. Tank leak detection is listed for all three of the tanks. However an interview with the current owner indicated that the tanks were removed.

The current business occupying the site is an upholstery and fabric store. An interview with the Director of the Sullivan County Emergency Management Agency, confirmed that the tanks have been removed. According to the current occupant the tanks were removed approximately 25 years ago.

Although the site does not appear to present an environmental concern in relation to the project, a vent pipe was detected in the front, right corner of the building. If a Build Alternative requires partial or full acquisition of this property, it is recommended that further investigations be conducted to ensure that proper removal has been completed at the site.

FIGURE 4.16.3: FORMER GAS STATION AT 5001 MEMORIAL BOULEVARD – EVIDENCE OF TANK REMOVAL

5. Dry Cleaning Service; 3200 Memorial Boulevard, Kingsport, TN 37660

This site was identified as a Resource Conservation and Recovery Act (RCRA), and FINDS (Facility Index System) site. Drycleaners produce ignitable waste. The Tennessee Department of Environment and Conservation (TDEC) records database indicated that there are no concerns associated with this site.

Any substances used for dry cleaning are contained within the building. The walking inspection of the site indicated no leakages or stains, and no odors were evident. This site is located near the western terminus of the project in an urban setting. The removal of the dry cleaning facility could pose a minor environmental concern due to ignitable waste and warrants further evaluation.

6. Pipe & Muffler Repair Service; 3310 Memorial Boulevard, Kingsport, TN 37664

This automobile repair facility is a former full service gasoline station. Conversations with the owner indicate that the gasoline tanks have been removed. At this time, the site does not appear to present environmental concerns for the project. The field visit did not indicate the presence of ASTs, USTs, hazardous waste, stains or signs of leakage on the premises. No environmental concerns appear to exist for this site.

7. Market and Deli; 5121 Memorial Boulevard, Kingsport, TN 37664

This is an active site. Database reports and field visits indicate that two gasoline tanks are located on this site and both are currently in use. Each tank is a fiber reinforced plastic tank, asphalt coated and the interiors are lined. The pipe materials also consist of nonpressurized fiberglass reinforced plastic material. No leaks have been detected and no environmental concerns have been reported in relation to this site.

An inactive kerosene tank was reported as leaking in the past. A fourth tank, a 2000 gallon diesel tank, was identified, but no tank leaks were reported or evident. The field trip did not reveal any stains, oil slicks or other visual signs of contamination associated with leaks. The site is located east of any anticipated construction activities. Further investigation is recommended if future alignments shift to the east to ensure that the kerosene leak has either been mitigated or is avoided.

FIGURE 4.16.4: MARKET AND DELI AT 5121 MEMORIAL BOULEVARD

8. Unnamed Construction Site; SR 126 (Memorial Boulevard adjacent to 5234 Memorial Blvd.), Kingsport, TN 37664

This is an unreported site. Reviews of the project plans indicate that only a portion of the property near the front would be affected by the project. This area does not appear to be included in the area where debris was noticed.

Field visits revealed that tires, vehicles, and junk are scattered throughout most of the site, but not the front area. Trucks and construction equipment are visible, and conversations with area residents indicated that a potential landfill exists. The materials in the fill could include tires and potential automotive fluids including fuel, oil and other materials associated with vehicles. The site was chained and inspections were limited to views from a property on the eastern perimeter of the property and from the roadway.

If alignment changes are made and the proposed new roadway is shifted to the north, minor environmental concerns for the project might occur. Information pertaining to the owner is available and was provided for TDOT in the Hazardous Materials/Underground Storage Tank technical study; however, the speculative nature of the materials at the site means that photographs that would identify the site and specific information will not be published in this document.

9. Auto Repair; 5637 Memorial Boulevard, Blountville, TN 37617

This is a former gasoline station that has re-opened since the field study was conducted. It currently provides automobile service, but does not supply automobile fuel. Current plans indicate that a partial acquisition of the property would avoid all areas associated with hazardous materials. If the plans change or a total acquisition is required, this site might present environmental concerns, and a Phase II ESA investigation could be necessary.

The field visit and walking inspection of the site revealed three rusting 55 gallon drums labeled "used antifreeze" in the side lot on the west side of the building. The drums were sealed, almost filled, and no leakage was evident in the gravel underneath the drums or on the surfaces of the drums themselves. An above ground storage tank (AST) was detected on the back side of the building. The partially filled AST is connected to the structure via a PVC pipe. This AST stored used motor oil. Some spillage was evident on the tank and immediately underneath the tank. A kerosene AST is located on the east side of the building and appeared to still contain some of the kerosene. No leakage was evident.

The garage area has two hydraulic lifts which show evidence of some leakage of hydraulic fluids on the lift posts and the floor area immediately surrounding the posts. It appears that two UST tanks could remain in the ground in the area between the front of the building and SR 126 (Memorial Boulevard), and a vent pipe was detected at the entrance to the facility. In the area just west of the three drums, a small crater was noticed. Next to the small crater was a broken vent pipe. Although no stains were evident, it is likely that an UST could have been removed from this area.

It is likely that one or two USTs are located between the canopies and the area of the property adjacent to the existing state right-of-way limits along SR 126 (Memorial Boulevard). Further investigations were recommended for Build Alternatives A and B. The Johnson City TDEC Environmental Field Offices Petroleum Underground Storage Tank Facilities Division conducted a follow-up investigation in the spring of 2010. The three drums containing antifreeze liquid were removed, and no fuel tanks remain in the ground. The site was cleared of concerns in relation to the proposed project by TDEC.

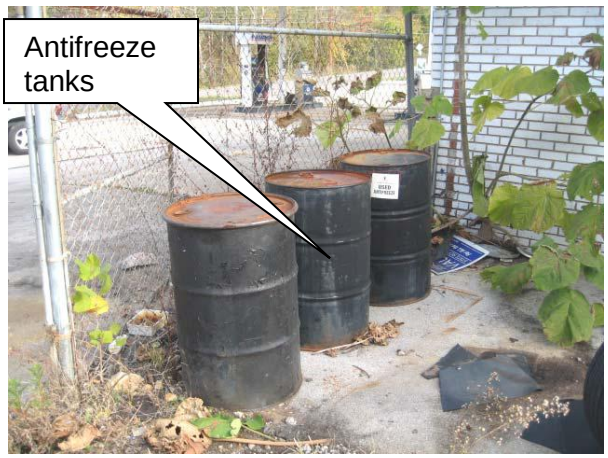


FIGURE 4.16.5: AUTO REPAIR; 5637 MEMORIAL BOULEVARD

4.16.3 Sites Recommended for Phase II Investigations

Site 2 – Fuel and Convenience Store (4001 Memorial Boulevard, Kingsport, TN)

This site is an active store that sells gasoline. A total of five fuel tanks are located at this site. Two are in use and three are permanently out of use. None of the tanks have been reported to leak, and no visual signs of leakage are evident (stains, oil sheens or odors). Both Alternative A and Alternative B would require acquisition of the property requiring removal of the tanks. If a Build Alternative is selected, a scope of work will be written by TDOT and bid packages will be assembled for removal of the A&B, the USTs, product lines, and vent pipes prior to site demolition. The UST removal will be conducted under TDEC Division of Underground Storage Tanks (DUST) rules, but without seeking DUST fund reimbursement. An access agreement, if necessary, will be sought with the site owner prior to removal activities. The UST removal project will be conducted by TDOT.

Site 5 – Dry Cleaning Service (3200 Memorial Boulevard, Kingsport, TN)

Site 5 will be impacted by both Build Alternative A and B. All substances are contained within the building. Site investigations did not indicate leakages or stains and no odors were evident. Since this business contains ignitable substances, further evaluation is needed prior to removing the structure. The disposition of any chemicals will comply with both Federal and State rules and regulations.

Site 7 – Fuel and Convenience Store (5121 Memorial Boulevard)

This active site indicated that two gasoline fuel tanks are located and currently in use. Each tank is a fiber reinforced plastic tank, asphalt coated, and the interiors are lined. No leaks have been detected, and field trips confirmed this site during a visual inspection of the grounds. An inactive kerosene tank was reported as leaking in the past, but appears to be corrected. A fourth tank, a 2000 gallon diesel tank, was identified, but no leaks have been reported or were evident during the site visit. Alternative A would avoid the site, but Alternative B would impact the site requiring removal of all tanks. If Alternative B is selected, a scope of work will be written by TDOT and bid packages will be assembled for removal of the A&B, the USTs, product lines, and vent pipes prior to site demolition. The UST removal will be conducted under TDEC

Division of Underground Storage Tanks (DUST) rules, but without seeking DUST fund reimbursement. An access agreement, if necessary, will be sought with the site owner prior to removal activities. The UST removal project will be conducted by TDOT.

TABLE 4.16.4: SUMMARY OF UST AND HAZARDOUS MATERIALS IMPACTS

Alternative	Site	Site	Site	Total Sites
A	#2	#5	NA	**2**
B	#2	#5	#7	**3**

Site 2 and 5 would be impacted by Alternative A, while Sites 2, 5, and 7 would be impacted by Alternative B. **Figure 4.16.5** provides a comprehensive map of identified hazardous materials sites.

The majority of the properties associated with the proposed Build Alternatives have low or no potential for environmental impact. Three (3) sites have the potential to contain hazardous material. A Phase II Environmental Site Investigation will be performed on these parcels prior to commencement of construction activities. A Phase II Environmental Site Investigation consists of soil and/or groundwater sampling to determine the extent of potential or know contamination.

In the event hazardous substances/wastes are encountered within the proposed right-of-way prior to or during construction activities, the appropriate authorities will be notified, permits will be secured, and cleanup activities will take place. Their disposition shall be subject to the applicable sections of the Federal Resource Conservation and Recovery Act (RCRA), as amended; the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended; and the Tennessee Hazardous Waste Management Act of 1983. A copy of the Phase I Preliminary Site Investigation is on file in the TDOT Environmental Division Office in Nashville.

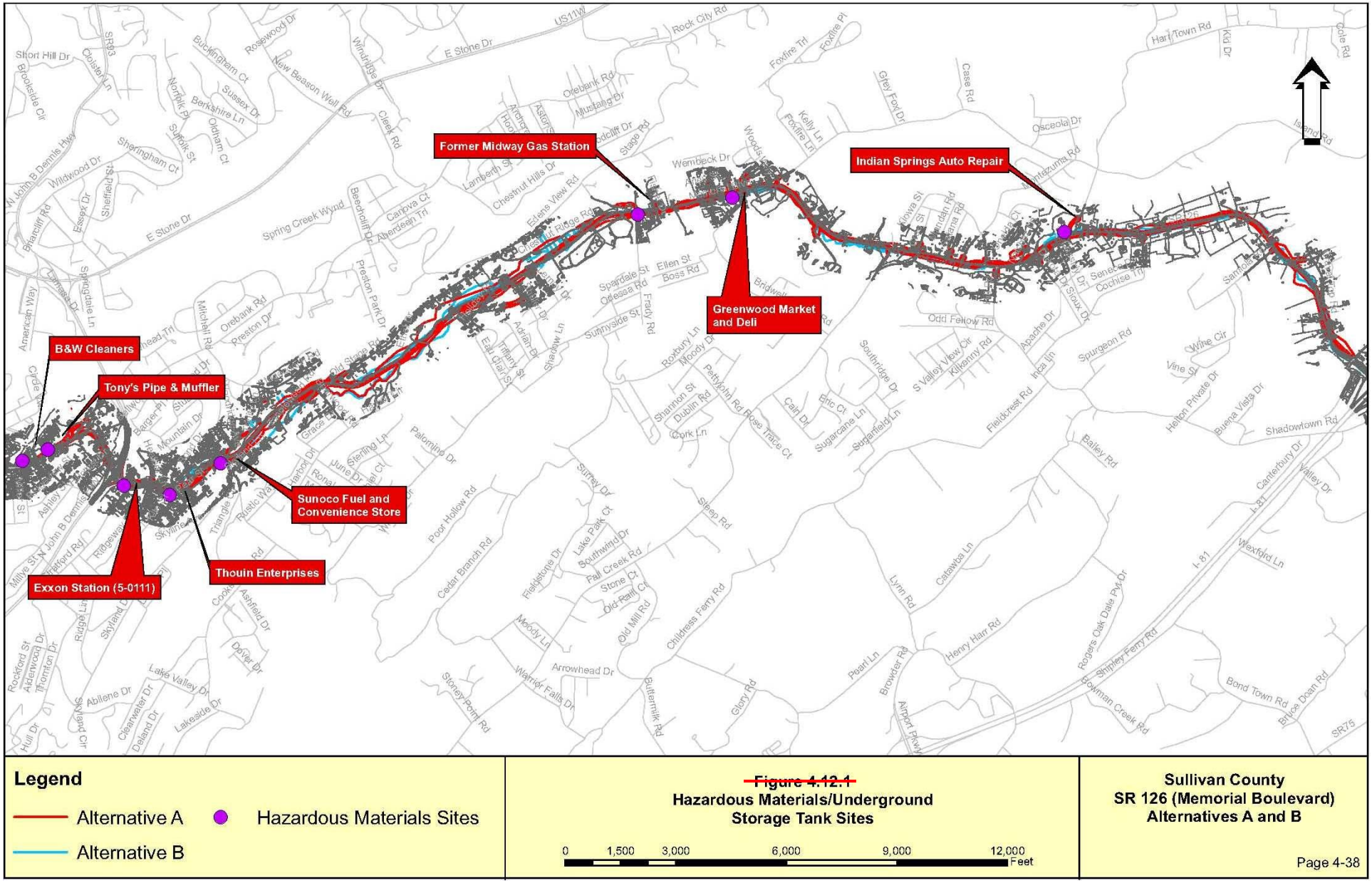


FIGURE 4.16.5 HAZARDOUS MATERIALS/UST SITES

4.17 VISUAL IMPACTS

A visual impact assessment was conducted to evaluate the affects of the project on the area's visual resources. The SR 126 (Memorial Boulevard) project was the initial Context Sensitive Solutions (CSS) Project for Tennessee. A Community Resource Team (CRT) was assembled for the SR 126 (Memorial Boulevard) CSS project. During the CSS Project, the public expressed concerns about diminished visual and rural aesthetics in the corridor if a continuous four-lane roadway was constructed. As a result, the CRT expressed preferences for blending four-, three-, and two-lane sections of the roadway. The Build Alternatives incorporate these preferences.

Visual impacts can be defined as changes to the visual landscape. Visual impacts can be categorized as minimal, moderate or high. Minimal impacts generally occur when existing transportation facilities are already part of the viewshed, the view has few or no visually sensitive resources and the proposed project would introduce few, if any noticeable changes to the viewshed. Moderate visual impacts occur when changes to the existing viewshed would be noticeable, but not substantial and/or there are visually sensitive resources that would undergo a noticeable change in view. High visual impact occurs when substantial changes are made to the existing viewshed that would result in a greatly changed view and/or there are visually sensitive resources that would undergo a substantial change in view.

Viewer groups in the project area fall into two categories; persons with a view of the surrounding area from the existing roadway and person with a view of the existing roadway from the surrounding area. The proposed project passes through commercial, residential, and agricultural areas. The western portion of the Build Alternatives, extending from East Center Street to SR 93 (John B. Dennis Highway), follows existing SR 126 (Memorial Boulevard). The dominant visual elements in this area are buildings. The development is typical of built up areas found around cities and does not indicate visual sensitivity or unique visual importance. Few changes other than widening shoulders and providing some additional sidewalk will occur in this area; therefore, no adverse visual impact is anticipated.

Beginning at SR 93 (John B. Dennis Highway) and extending to east of Old Stage Road, the proposed project will widen existing SR 126 (Memorial Boulevard) from two to four lanes. The widening of the roadway through this area will cause a minimal impact to moderate impact since there is an existing facility in place. The dominant visual element through this area is predominantly commercial developments with scattered residential developments.

In the last segment of the Build Alternatives, from near Old Stage Road to the end of the project, the dominant visual element through this segment is predominantly residential with some commercial and agricultural property and the local cemetery. The widening of the existing roadway will cause a minimum to moderate impact on the visual environment since an existing facility is in place. The viewshed will change with the adding of additional lanes, shoulders and sidewalks. The visual effect would generally not be adverse. However, The State Historic Preservation Office has reviewed the project and in a letter dated November 3, 2008 stated that an adverse visual effect to the historic Yancey's Tavern would occur if either Build Alternative was selected (See **Appendix B** from SHPO letter). Please refer to **Section 4.12 Historic Impacts** for a more detailed discussion of the impacts to Yancey's Tavern.

4.18 WILD & SCENIC RIVERS

4.18.1 Wild & Scenic River Legislation

The Wild & Scenic Rivers Act established a National Wild & Scenic Rivers System in 1968 for the protection of certain selected rivers of the Nation which, with their immediate environments, possess "outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values." These rivers are to be preserved in free-flowing condition and their immediate environments are to be protected for the benefit and enjoyment of present and future generations.

The Obed River and its two main tributaries, Clear Creek and Daddys Creek, located in Cumberland County and Morgan County, is the only federally designated Wild & Scenic River in the State of Tennessee.

4.18.2 Impacts to Wild & Scenic Rivers

There are no rivers or streams in the project impact area designated as Wild or Scenic Rivers. No impacts to federally-designated Wild & Scenic Rivers will occur as a result of the proposed project.

4.19 ENERGY IMPACTS

Construction of the Build Alternatives will involve the commitment of energy resources both during the short-term construction period and throughout the long-term operation of the facility. The energy requirements of the Build Alternatives are greater than the energy requirements of the No-Build Alternative.

The energy used by the Build Alternatives can be characterized as follows:

Construction: Energy would be used for the manufacturing and transport of the construction components and by the heavy equipment utilized for roadway and bridge construction.

Maintenance: The project would require routine maintenance that could result in energy use for the maintenance actives. Traffic delays could accompany the maintenance activities and could result in temporary increases in energy use.

Motor Vehicle Use: Improved traffic flow and reduced travel time could result in a decrease from existing energy use.

In summary, the amount of energy required to construct a roadway project of this type is substantial, but temporary in nature, and generally leads to reduced operating cost once the project is completed. A reduction in cost and energy use could come from improved access, reduced travel time and increased safety (i.e. less accidents on local roads that hold up traffic and require emergency services).

4.20 CONSTRUCTION IMPACTS

A major construction project, public or private, will likely inconvenience or disturb residents, businesses and business customers. In the case of improvements to an existing highway,

inconvenience to highway users also occurs. The maintenance of traffic and access to properties adjoining the road and utility relocations are particular construction-related impact issues that must be addressed with this project.

Without proper planning and implementation of controls, traffic disruption, loss of access and utility relocation could adversely affect the comfort and daily life of residents and disrupt the flow of customers, employees and material/supplies to and from businesses. Construction impact controls would be integrated into the project's contract specifications and traffic control plans. The Build Alternative would have physical construction-related impacts, but with implementation of appropriate controls, no cumulative or secondary impacts are foreseeable. The following construction issues are addressed below:

- Maintenance of Traffic and access
- Economic benefits
- Waste disposal
- Utility relocation
- Discovery of unknown archaeological sites
- Erosion control
- Air quality
- Noise

Maintenance of Traffic and Access: Traffic will be maintained on existing roadways during construction or detours will be developed. Access to all properties will be maintained during construction.

Economic: The construction activities may result in short-term economic benefits to the local area that would include increased revenue to local businesses through the sale of construction supplies and material and retail/service purchases by construction personnel. Construction jobs also could be available for persons residing in the area. These short-term revenues and jobs are not expected to be significant locally or regionally.

Construction could result in adverse economic impacts to the local businesses along the corridor that are not relocated as a result of the project due to some motorists avoiding the corridor during construction, thus lessening the potential number of customers for some businesses. The construction related adverse impacts would be minimal and short-term.

Waste Disposal: Solid waste will be generated by project construction (i.e. through removal of structures that cannot be relocated). The quantity of disposed waste would represent a negligible proportion of the total load directed toward local landfills.

Any toxic and hazardous materials would be handled and used in accordance with package labels and manufacturer's directions. Wastes would be segregated, labeled and stored in a manner that would prevent their release into the environment from an accident or spill. The contractor would dispose of these materials and their containers in accordance with applicable state and federal regulations.

Disposal of excess material would be the responsibility of the contractor, who will be contractually required to handle and dispose of the material in accordance with the TDOT *Standard Specification for Road and Bridge Construction.* These specifications require that the contractor comply with open burning regulations and be supervised by a competent watchman; that material is disposed of in accordance with all applicable laws and ordinance and that material disposed on private property have a signed agreement with the property owner.

Utility Relocation: The relocation of utilities will be included in final design plans. As appropriate, TDOT and the City of Kingsport will coordinate with the appropriate officials to avoid or minimize damage or disruption of existing service.

Discovery of Unknown Archaeological Sites: If archaeological materials are uncovered during construction, all construction work in the area of the find will cease. The Tennessee Division of Archaeology (615-741-1588) and the recognized Native American Tribes previously coordinated with will be immediately contacted so a representative of their office may have the opportunity to examine and evaluate the materials.

Borrow Pits: Should earth fill be required for this project, the applicable TDOT borrow provisions will be followed.

Erosion Control: The Build Alternatives will disturb land that has a tendency to erode when disturbed. The contractor will be required to employ FHWA Best Management Practices for Erosion and Sediment Control (1995) to minimize the impacts of point and non-point source pollution resulting from increased siltation and highway runoff. A sediment control plan will be formulated in accordance with the TDOT *Standard Specifications for Road and Bridge Construction* and will include the following measures:

- Temporary erosion control devices, such as silt fences, straw bales, burlap, jute matting, grading, seeding and sodding will be used to minimize erosion and sedimentation.
- Removal of vegetation will be minimized.
- Fill slopes should be constructed and stabilized during the growing season through the establishment of non-invasive vegetation.
- The planting of native woody and herbaceous vegetation should be encouraged.

Air Quality: Even though the National Ambient Air Quality Standards (NAAQS) are not exceeded in the design year, all phases of construction operations could temporarily contribute to air pollution. Particulates would increase slightly along the project as dust from construction activities collects in the air surrounding the project. The construction equipment would temporarily produce slight amounts of exhaust emissions. The emission of air pollutants would be reduced by the use of properly maintained equipment and the use of tarp covers on trucks transporting refuse and construction waste products.

Any burning of wastes and control of dust will be the responsibility of the construction contractor. The contractor must meet the burning and dust control requirements of TDOT's *Standard Specifications for Road and Bridge Construction* and is required to comply with applicable state and local laws, ordinances and regulations regarding these emissions.

Construction Noise Abatement: Temporary noise impacts will occur within the immediate vicinity of the construction activities. The exact noise levels cannot be predicted because the specific types of construction equipment, methods and schedule are unknown at this time.

The following noise abatement measures will be incorporated into the contract plans and specifications in order to prevent adverse construction noise impact in the vicinity of the proposed project:

- The contractor shall comply with all state and local sound control and noise level rules, regulations and ordinances that apply to any work performed pursuant to the contract.
- Each internal combustion engine used for any purpose on work related to the project shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without such muffler.

4.21 SHORT-TERM IMPACTS VERSUS LONG-TERM BENEFITS

Short-term impacts related to highway improvements will occur during construction operations. Some interruption to vehicular traffic flow is inevitable; however, appropriate maintenance of traffic phasing will be employed to minimize inconvenience. Traffic control plans will be developed to minimize congestion and delays during construction.

Temporary air impacts from dust and exhaust fumes, and noise associated with construction operations cannot be avoided. Every effort will be made to minimize these effects by using best management practices.

Many long-term benefits are anticipated to result from the proposed project, such as a decrease in travel time and traffic congestion and an improved level of service. Accidents along segments of existing highways may also decrease over the long term. Elimination of congestion is expected to result in more efficient use of energy. In the long term, the construction of the roadway through the area will provide a better modal connection and could provide an economic benefit through establishment of new businesses along the corridor.

4.22 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irretrievable resources necessary to build the proposed roadway include energy (fossil fuel), concrete, aggregate and steel. None of these materials are in short supply. Implementation of the proposed project involves a commitment of a range of natural, physical, human and fiscal resources. Land used in the construction of the proposed facility is considered an irreversible commitment during the time period that the land is used for a highway facility. However, if the highway facility is no longer needed, the land can be converted to another use.

Considerable amounts of fossil fuels, labor and roadway construction materials such as cement, aggregate and bituminous materials will be expended. Additionally, large amounts of labor and natural resources will be used in the fabrication and preparation of construction materials. These materials are generally not retrievable. However, they are not in short supply and their use will not have an adverse effect upon continued availability of these resources. Construction will require a one-time expenditure of both state and federal funds, which are not retrievable.

The commitment of these resources is based on the concept that residents in the immediate area, state and region will benefit by the improved quality of the transportation system. These benefits will consist of improved accessibility and safety, savings in time and greater availability of quality services that are anticipated to outweigh the commitment of these resources.

4.23 INDIRECT AND CUMULATIVE IMPACTS

The purpose of an Indirect and Cumulative Impacts Assessment is to present an evaluation of the reasonably foreseeable potential indirect and cumulative impacts expected as a result of this project. By United States Code of Federal Regulations (CFR) definition, *direct effects (or*

impacts) are caused by the action and occur at the same time and place (40 CFR § 1508.8). *Indirect effects (or impacts)*, are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR § 1508.8). *Cumulative effects (or impacts)* are impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR § 1508.7).

Indirect and Cumulative Impacts for the Human and Natural Environments associated with the SR 126 (Memorial Boulevard) project include:

- Land Use
- Farmland Conversion
- Terrestrial Habitat
- Aquatic Habitat
- Historic Resources
- Archaeological Resources.

Reviews of project area mapping were conducted using aerial photographs from the 1950s through 2006. The maps have been combined with field visits, and with conversations in the company of local officials to determine the types of growth that have been experienced in East Kingsport and Sullivan County. The area of potential effect was defined as the area circumscribed by US 11, SR 126 at East Center Street, Falls Creek Road and the intersection of SR 126 with I-81. This area has experienced steady residential growth throughout a fifty-year period. Additionally, residential development is ongoing throughout the area. Neighborhoods between SR 126 (Memorial Boulevard) and Falls Creek Road are currently adding an estimated 100 to 125 new homes in the area. Local officials indicate that this rate of growth and type of development will continue whether the improvements to SR 126 (Memorial Boulevard) are implemented using either Build Alternative, or if the No-Build Alternative is selected.

Due in part to both Build Alternatives not adding travel lanes to approximately half of the study corridor, implementation of the improved facility would likely not result in an increase in land use development pace, nor would it be likely to induce a change in the types of land uses (i.e. shifting to industrial development from residential development and light commercial development).

When reviewing the historic aerial maps and combining the lack of measurable growth around the I-81 Interchange, it is evident that development activities in the eastern portions of this project are minimal and not expected to substantially increase in the next 20 to 25 years. Overall the area is either already saturated with business and residential land use or is converting at a steady and sustained rate. The implementation of an improved SR 126 (Memorial Boulevard) with additional lanes and new shoulders will not measurably increase or decrease the current patterns.

It can be safely concluded by the age of the structures, and by reviewing the historic aerial maps on file at the TDOT Environmental Division Office in Nashville, TN, that the residential growth that has occurred in the area began several decades ago. This growth has been continual over the fifty-year period. Conversations with the local officials indicate that the improvements to SR 126 (Memorial Boulevard) are in response to the increased traffic

throughout the project area. Most of the surrounding neighborhoods, communities, and scattered farm residences between US 11W and Falls Creek Road use SR 126 (Memorial Boulevard) as their main roadway for accessing shopping, work and government service needs in Kingsport, and to I-81. As residential development continues in this area, traffic is anticipated to continue to increase causing additional burdens on the existing facility. The established land use changes from agricultural to residential applications and improvements to the existing SR 126 (Memorial Boulevard) facility indicate that very little indirect or cumulative impacts are anticipated for the human or natural environments within the area served by the project area. The roadway itself is not, nor would be, a major influence of land use patterns, but is more of a solution to changing conditions of the land uses. It would not result in a measurable change of impacts for either of the two Build Alternatives, A or B.

The residential and agricultural activities in the area have already displaced forested areas, natural habitat areas and farmland. These rates will not appreciably change, whether the new road is constructed or the No-Build Alternative is selected. Therefore additional pressures to animals, plants, wetlands and streams are not expected to substantially increase. Impacts to the human environment will improve due to reduced accidents and more efficient facility for transportation within the corridor. However, no substantial increase to the current rate of land use transition from agricultural to residential applications is anticipated. Commercial applications in the rural sections of the corridor are very lightly represented; many occupy older structures, such as an upholstery shop that has occupied a former gas/market company. Other older structures also are occupied by gas/food marts. Those sites not relocated by the project will be better served with the increased efficiency and improved safety conditions of a new roadway.

Many of the sites are geographically dependent. This means that they provide a variety of services, including convenience/gasoline businesses, groceries, veterinary services, clothing, and auto repairs to the smaller communities that are situated within the Area of Potential Effect. These sites will continue these services with some interruption from the construction of the improved facility, and they will experience some business losses from the improvements to SR 126 (Memorial Boulevard) or due to land use changes associated with an improved roadway in this area of Sullivan County.

It is believed that land use changes will continue even if the No-Build Alternative is selected. The difference of impact on land use change would likely be immeasurable. If a Build Alternative is selected, losses of floral and faunal habitat, degradation of water quality in streams, conversion of farmland, and potential impacts to historic and archaeological resources in the area are not anticipated to experience additional cumulative or indirect pressures from proposed action.

In general roadway projects most commonly result in indirect impacts to land use, farmland, community and economic resources, water quality, wetland and terrestrial ecology. Future construction activities along the corridor may result in a decline in the local wildlife populations due to the removal of habitat. Increased noise levels may also affect wildlife populations in the vicinity.

The cumulative impacts to land use in the study area as a result of past and future transportation and infrastructure projects has been anticipated by local governments for many years. Local land use plans have identified areas for future growth and local services. The Build Alternatives, as previously discussed in this document, are located mostly along the existing roadway. Future land use changes in the project impact area would be influenced by

other factors in addition to the proposed project. Changes in the local economy, changes in land use by local jurisdictions and other infrastructure changes can all affect how, when, and to what degree land is developed and redeveloped. A positive cumulative effect in transportation service to the surrounding area will occur with the proposed improvements to SR 126 (Memorial Boulevard). The project will provide a safer, less congested roadway for local travelers. As well as a safer environment for pedestrians and bicyclist.

Chapter 5:

Public Input and Agency Coordination

5.0 PUBLIC INPUT AND AGENCY COORDINATION

This section describes the agency coordination process and public involvement activities that were conducted for this project. In addition, the key issues that have been identified through those efforts are included in this section of the DEIS.

5.1 AGENCY COORDINATION

5.1.1 Initial Coordination

The initial coordination for the SR 126 (Memorial Boulevard) project was initiated with a package describing the project area, and sent to approximately 45 federal, state, and local agencies in December 2008. The initial package included a description of the proposed improvements to SR 126 (Memorial Boulevard) and goals of the project. A project data summary was attached along with an overview map of the area showing the project location that is under study, a data summary (which provided a description of the project and a list of potential environmental, economic and social concerns associated with the construction of the project), and a Coordination Plan. The agencies were invited to cooperate, participate or provide comments relative to the project and their appropriate levels of participations. The package included a letter requesting the recipient's review and comments on the project.

The following is a list of those agencies, officials, and organizations receiving the initial coordination package. An asterisk indicates a response was returned to TDOT. Local government representatives were also asked to contact any local, social or civic groups that might be concerned with the project. **Section 5.2** provides summaries of each response received during the initial coordination process, and the Letters of Response are provided in **Appendix A**, Initial Coordination.

5.1.2 Federal Agencies

Appalachian Regional Commission
Environmental Protection Agency
Federal Emergency Management Agency
Federal Energy Regulatory Commission
Federal Railroad Administration, Office of Economic Analysis
Federal Aviation Administration*
Tennessee Valley Authority, Environmental Services and Programs*
U.S. Army Corps of Engineers, Nashville District*
U.S. Department of Agriculture;
- Natural Resources Conservation Service*
- Wetland Reserve Program,

U.S. Department of the Interior;
- National Parks Service
- Office of Surface Mining*
- U.S. Fish and Wildlife Service*
- Water Resources Division, District Chief, Nashville, TN

U.S. Geological Survey, National Center, Reston, VA

5.1.3 State of Tennessee Agencies

Tennessee Department of Agriculture
Tennessee Department of Economic and Community Development
Tennessee Department of Education*
Tennessee Historical Commission, State Historic Preservation Office*
Tennessee Wildlife Resources Agency*
Tennessee Department of Environment and Conservation;
- Division of Air Pollution Control
- Division of Natural Heritage
- Division of Groundwater Protection
- Division of Solid/Hazardous Waste Management
- Division of Water Pollution Control
- Division of Water Supply

Tennessee Housing Development Agency

5.1.4 Local Agencies

City of Kingsport;
- Mayor Dennis Phillips, City of Kingsport

Kingsport MPO*;
- William Albright and Chris Campbell

Sullivan County*;
- County Mayor Steve Godsey, Sullivan County, TN
- Ambre Torbett, Director of Planning

Local and Regional Organizations:
- First Tennessee Development District
- Sullivan County Industrial Board
- Sierra Club, Knoxville
- The Nature Conservancy

5.2 SUMMARIES AND DISPOSITION OF COMMENTS

5.2.1 Federal Agencies

Federal Aviation Administration

Comment: *We have reviewed the proposed study area and found no issue or concerns that could affect the nearest airport (Tri-Cities Regional Airport) in that area. We feel, from your proposal, that this project will have no environmental impact for future airport development nor is this project located within Airport Clear Zones. We would like to be notified if changes should occur from the original studies.*

Response: None required.

Tennessee Valley Authority

Comment: *TVA is pleased to participate as a cooperating agency in the development of the Environmental Impact Statement for this road project. Depending on the final alignment, the proposed highway improvements may require a TVA Section 26a permit.*

As a cooperating agency under SAFETEA-LU and the Tennessee Environmental Streamlining Agreement, we would be pleased to work with you on defining the purpose and need, range of alternatives, and environmental analysis needs. We are not aware of unusual or unique environmental resources in the project area that should be addressed in the environmental review.

Response: TDOT will continue to coordinate with TVA throughout the project development process.

U.S. Army Corps of Engineers, Nashville District

Comment: *Based on the information provided and a brief explanation of the Kingsport, TN and Indian Springs, TN/VA USGS quadrangle maps, we anticipate that Sougan Branch, Fall Creek and other unnamed tributaries to the South Fork Holston River (SFHR) would be impacted by the construction of the Build Alternative. Impacts could result from culvert extensions and/or new road crossings.*

The regulatory authorities and responsibilities of the Corps of Engineers (Corps) are based mainly on two laws: Section 404 of the Clean Water Act (33 USC 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403). Section 404 requires a Corps permit for any discharge of dredged or fill material into waters of the United States. Section 10 prohibits the obstruction or alteration of navigable waters of the United States without a Corps permit. Sougan Branch, Fall Creek, and other unnamed tributaries to the SFHR are considered navigable waters of the US. No navigable waters of the US exist within the project study area. We do not have enough information at this time to estimate whether jurisdictional wetlands are present and would be affected by this proposal.

Our specific permitting requirements for construction of road crossings over jurisdictional waters would depend on the specific installation methods and associated impacts. Road crossings that would not involve substantial aquatic habitat alternation may qualify for authorization under our Nationwide Permit (NWP) program (33 CFR 330). Activities that do not qualify for NWP authorization would require approval under a Standard Department of the Army (DA) permit.

Finally, our permit review would include application of the Section 404(b) (1) Guidelines (40 CFR 230). The Guidelines require that no discharge of dredged or fill material may be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.

Response: All applicable State and Federal permits will be acquired prior to project construction. No wetlands were identified within the project corridor during field surveys or reviews of NWI maps. No navigable waters are located in the project impact area.

U.S. Department of Agriculture, Natural Resources Conservation Service, Knoxville.

Comment: *This information was compiled using a corridor of 1,000 ft. on either side of existing SR 126 as specified in the information you sent. This project will result in the conversion of 132 acres of Prime Farmland as defined in the Farmland Protection Policy Act. Form AD-1006 is attached to this letter to document this determination. Prime farmland is land that has the best combination of physical and chemical characteristics, growing season, and moisture supply for producing agricultural crops. Generally, land may be pasture, forestland, or cropland but may not be urban built-up land or waterways. Additionally, construction within an existing right-of-way purchased on or before August 4, 1984, is not subject to the Farmland Protection Policy Act.*

Concerning Hydric Soils, there are 54 map units of Bloomingdale silty clay loam, 0 to 2 percent slopes, occasionally flooded within the corridor. These 4 map units occupy about 47 acres of the total 2,100 acres. Hydric soil criteria is only one of the 3 factors used in determining a wetland. Areas of hydric soils may or may not meet all of the requirements of a wetland.

Response: The farmland impacts will be included in the Draft DEIS.

U.S. Department of the Interior, Office of Surface Mining

Comment: *As a coal regulatory agency, our area of interest is generally limited to the coalfields of East Tennessee and this project lies well outside the coalfield area. This in combination with the fact that mineable coal is not known to exist in the Sullivan County area, and the fact that Federal regulations at 30 CFR Section 707 provide for a broadly based exemption from complying with Federal mining regulations for coal extraction incident to government financed highway construction, make it unlikely that our agency would have any jurisdiction or authority with respect to this proposed project. As such, we must decline your invitation to participate.*

Response: None required.

U.S. Department of the Interior, Fish and Wildlife Service

Comment: *We have reviewed the project summary and the possible role that our agency would have in the development of the State Route 126 improvement project. We accept the invitation to be a participating agency in the development of this project. We have also reviewed our existing database for any records of federally listed species near the proposed project. Our collection of records does (sic) not indicate that federally listed or proposed endangered or threatened species occur within the proposed study area of the project. We note, however, that collection records available to the Service may not be all-inclusive. Our data base is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitat and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality.*

Response: An ecology study has been completed and is on file at TDOT's Environmental Division Office in Nashville, TN. No threatened or endangered species have been identified in the project impact area.

5.2.2 State of Tennessee Agencies

The Tennessee Department of Education

Comment: *The Department of Education does not intend to submit comments on the project pertaining to the, from East Center Street in Kingsport, to Interstate 81 in Sullivan County, TN. P.I.N. 105467.00.*

Response: None Required.

Tennessee Historical Commission (State Historic Preservation Office)

Comment: *Considering available information, we find, after applying the Criteria of Adverse Effect codified at 36 CFR Part 800, that the project as currently proposed will ADVERSELY AFFECT YANCEY'S TAVERN, A PROPERTY THAT IS ELIGIBLE FOR LISTING ON THE NATIONAL REGISTER OF HISTORIC PLACES. You should now, through FHWA, inform the Advisory Council on Historic Preservation of this adverse effect determination and begin immediate consultation with our office. Please enclose a copy of this determination in your notification to the Council as delineated at 36 CFR Part 800. Until you have received a final comment on this project from this office and the Council, you have not completed the Section 106 review process. Please direct questions and comments to Joe Garrison, (615) 532-1550-103. We appreciate your cooperation.*

Response: TDOT initiated and is continuing the Section 106 process as communicated by the TN SHPO. The adverse visual impacts have been included in **Chapter 4**. An MOA between FHWA and the SHPO will be prepared prior to approval of the FEIS. Letters received from the SHPO are included in the Cultural **Appendix B** at the end of the DEIS.

Tennessee Wildlife Resources Agency

Comment: *The Tennessee Wildlife Resources Agency had received and reviewed the information your office provided to us regarding the invitation to be a participating agency for State Route 126 (Memorial Boulevard) from East Center Street, in Kingsport (sic), to Interstate 81 in Sullivan County, Tennessee. Our current concerns are potential environmental impacts associated with potential stream and wetland impacts due to the construction of this project. We accept the invitation to participate in this process and encourage continued consultation with our agency in future phases of this project to further reduce impacts to fish and wildlife resources.*

Response: TDOT will continue to coordinate with TWRA throughout the project development process.

5.2.3 Local Agencies

Kingsport Metropolitan Planning Organization

Comment: *We are in receipt of your letter to us concerning the initiation of an Environmental Impact Statement of the CSS-based State Route 126 project within the City of Kingsport and Sullivan County. Please note the City of Kingsport, in cooperation with the Kingsport MPO, enthusiastically agrees to, and accept, your invitation to become a participating agency in this process and will work to provide staff time and/or any input you may need from our resources to complete the review. This includes, but is not limited to, providing early input in determining the range of alternatives for improvements to SR 126, and participation in coordination meetings and joint field reviews.*

As we look forward to working with your agency on this phase, we also want to express our appreciation for your willingness to advance one of the MPO's priority projects. In addition, if you need further information or have additional questions concerning this matter, please feel free to call our offices.

Response: TDOT will continue to coordinate with the Kingsport MPO throughout the project development process.

Sullivan County Offices of Land Use, Department of Planning, Zoning & GIS

Comment: *As a previous member of the Local Resource Team on the SR 126/Memorial Blvd. study, representing Sullivan County, I would like to continue my service on this project. I am the county's Director of Planning, and would be happy to continue to serve on this city-county-state planning project.*

Response: TDOT will continue to coordinate with the Sullivan County Department of Planning throughout the project development process.

5.3 TENNESSEE ENVIRONMENTAL STREAMLINING AGREEMENT, CONCURRENCE POINTS 1 AND 2

The Tennessee Department of Transportation (TDOT) has implemented the *Tennessee Environmental Streamlining Agreement* (TESA) to facilitate understanding and interagency participation throughout the NEPA process. TESA is a four-step process that allows the participating and coordinating agencies on federal, state and local levels to review and participate in the decision making process. The four steps of TESA review process are:

1. Project Purpose and Need;
2. Evaluation of Alternatives;
3. Preliminary Draft Environmental Impact Statement;
4. Preferred Alternative and Preliminary Mitigation.

The TESA Process for SR 126 (Memorial Boulevard) was initiated by combining Steps 1 and 2, Project Purpose and Need and Evaluation of Alternatives. These steps were combined

because the project and its public involvement/stakeholders involvement participation was begun prior to the implementation of TESA process.

A field trip was conducted in June 2009 and a package summarizing the conditions, the surrounding environment, and options for alternatives were reviewed and discussed. Results of these efforts supported the decision to include two Build Alternatives, A and B, for review and comparison in the DEIS.

The TESA package for Concurrence Steps 1 and 2 was mailed in February 2009, to all agencies who requested to participate in or coordinate on this project asking for their comments and their concurrences with the project's purpose and need, and for alternatives to be evaluated.

The TESA package for Concurrence Step 3 was sent electronically in August 2011 to all agencies who requested to participate in or coordinate on this project asking for their comments and their concurrences with the Preliminary DEIS. Comments were received from the participating agencies and responses were sent to the agencies in October 2011.

Concurrence Step 4 will be completed prior to completion of the FEIS.

5.4 SECTION 106 COORDINATION

Section 106 of the National Historic Preservation Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office (SHPO) before they carry out their proposed undertakings. Consultation letters with the Tennessee Historical Commission's SHPO are provided in **Appendix B, Cultural Resources**.

Pursuant to Section 106, a letter and project data summary were sent to Native American Groups and local officials inviting these parties to be a Section 106 consulting party for the project. The letter was sent on November 19, 2003. The following is a list of those Native American Groups receiving the Section 106 coordination package. An asterisk indicates a response was returned to TDOT. **Section 5.4.1** provides summaries of each response received during the Section 106 Coordination, and the Letters of Response are provided in **Appendix B, Cultural Resources**.

The following parties were invited to be Section 106 consulting parties for the project:

- Eastern Shawnee Tribe of Oklahoma*
- Muscogee (Creek) Nation*
- Eastern Band of Cherokee Indians*
- Chickasaw Nation
- Choctaw Nation of Oklahoma
- Seminole Nation of Oklahoma
- United Keetowah Band of Cherokees
- Quapaw Tribe of Oklahoma
- Thlopthlocco tribal town of east-central Oklahoma

On March 16, 2008, TDOT mailed a copy of the Architectural Assessment to each of the owners of surveyed properties and local groups with historic interests. Listed below are the property owners of sites that are listed in or eligible for the National Register. TDOT mailed a copy of the

Documentation of Effect Report to the two property owners whose sites are either listed in or eligible for the National Register.

Jack and Shirley Jarvis
NRE Shipley-Jarvis House
3309 Memorial Boulevard
Kingsport, TN 37664

Rann Vaulx
NRL Yancey's Tavern
405 Wine Circle
Blountville, TN 37617

The Environmental Division of TDOT prepared a list by counties of historic groups and similar organizations that might be interested in the proposed project. This list was compiled using the following sources:

- The State Historic Preservation Office's list of current county historians;
- The State Historic Preservation Office's list of Historic Sites and Museums;
- The State Historic Preservation Office's list of Historical Societies;
- The National Trust for Historic Preservation's list of member organizations in Tennessee, the American Association for State and Local History *Directory of Historical Societies and Agencies in the United States and Canada* (Twelfth Edition, 1982);
- Interested State Review Board Members;
- A questionnaire mailed to each of Tennessee's 95 County Executives

County Executives

- Steve M. Godsey, County Mayor, Sullivan County, TN

Mayor

- Dennis Phillips, Mayor, Kingsport

The following parties with identified historic preservation interests were also sent a letter and information package asking for their comments on the proposed project's potential effects to cultural resources:

- Mr. Sam Stuffle, Sullivan County Historical Society
- Mr. Ken Weems, CLG/Historic Commission, City of Kingsport
- Dr. Tom Maher, Tennessee Valley Authority, Cultural Resources
- Dr. Dale Royalty, East Tennessee State University, Department of History
- Ms. Claudia Moody, Northeast Heritage Tourism Area
- Ms. Deborah Montanti, The Heritage Alliance of Northeast TN & Southeast VA.
- Ms. Shelia Hunt, Sullivan County Historian, Department of Archives & History

5.4.1 Section 106 Responses

Section 106 Consultation letters are provided in **Appendix B, Cultural Resources**.

Advisory Council on Historic Preservation (ACHP)

Comment: *Based upon the information you provided, we have concluded that Appendix A, Criteria for Council Involvement in Reviewing Individual Section 106 Cases, of our regulations, "Protection of Historic Properties" (36 CFR Part 800), does not apply to this undertaking. Accordingly, we do not believe that our participation in the consultation to resolve adverse effects is needed.*

Response: None required.

Eastern Shawnee Tribe of Oklahoma

Comment: *Consult only if there is an inadvertent find.*

Response: None required.

Muscogee (Creek) Nation

Comment: *Consult only if there is an inadvertent find.*

Response: None required.

Eastern Band of Cherokee Indians

Comment: *Consult only if there is an inadvertent find.*

Response: None required.

Since the initial consultation with the Native American Tribes, two (2) additional tribes have been recognized, The Cherokee Nation and the Shawnee Tribe. Consultation with these additional Native American Tribes will be completed prior to submittal of the FEIS.

5.5 PUBLIC INVOLVEMENT, CONTEXT SENSITIVE SOLUTIONS PROCESS

This section documents and provides information on public, FHWA, TDOT, and local official efforts which led to the development of a concept for SR 126 (Memorial Boulevard) based on concerns, conditions, and early information. This synopsis is based on the culmination of a 21-month effort composed of meetings, field trips, and discussions between the various agencies and the public.

The Context Sensitive Solutions (CSS) Process

In September 2003, data collection such as gathering of mapping, traffic data, geometric features, and traffic accident reports initiated the CSS process. While the technical data gathered for the project provided an important piece of the information needed, it was not

completed until context was received by the local community. The CSS process requires that additional considerations be given to non-technical information and viewpoints. TDOT asked the City and County Mayors to appoint a community resource team to assist the project management team, people who reside in the local community, in gathering and understanding local concerns. This resulted in the assembly of a team of individuals from the community who provided insights and assistance throughout the project as a Community Resource Team (CRT).

The CRT was comprised of elected officials, City and County staff, and citizens who live in the study area. Since they were assembled specifically for this project and had not worked together previously as a team, it was necessary to begin with education. TDOT provided a two-day team building workshop facilitated by a professional team building consultant. This resulted in the definition of the study area boundary for the SR 126 (Memorial Boulevard) project.

Throughout the project, the CRT assisted the project managers with collection of information relative to citizen characteristics, concerns, and values. These subjective data were obtained through a combination of public involvement techniques. These techniques included surveys, one-on-one conversations, workshops, a focus group, and public involvement sessions. The community resource team served a valuable purpose by voicing local concerns for consideration by the project team.

Throughout the project, the basic process for gathering and evaluating data included a feedback loop. The project management team reviewed information, identified problems or issues, checked the validity of those conclusions by engaging the local team or community, revisited understandings, developed proposals, presented those proposals to the local team or community, and made modifications as necessary prior to final presentation.

CSS Process Overview

The process followed by TDOT and the project management team for this project was based on open communication, inclusion, and flexibility. This allowed the project management team freedom to try new things and develop a workable procedure.

The SR 126 (Memorial Boulevard) project was led by a project management team, which was assisted throughout the project by the CRT which provided local knowledge and guidance to the project management team. The CRT was consulted before any major project decisions were made.

Throughout the project the public was given information through a variety of outreach techniques that included: a project newsletter, website, postcards, local media, and three series of public involvement sessions. The public was encouraged to provide input to the project management and Community Resource Team through surveys, a toll free phone line, email, question and answer sessions, and face-to-face discussions.

The primary objectives of the Context Sensitive Solutions process that was followed for SR 126 (Memorial Boulevard) were:

- Provide multiple opportunities and methods for gathering community input
- Work closely with leaders and citizens from the local community
- Gather information to identify community values and concerns
- Build trust through listening and responding with integrity
- Maintain open, two-way communication
- Facilitate the Community Resource Team's ability to prepare a recommendation for improving SR 126 (Memorial Boulevard)

Summary of Community Resource Team (CRT) Recommendations

During the 21-month study process there was unanimous support among the members of the CRT for a large number of "Common Ground" recommendations. Majority decisions were made regarding design elements and roadway cross sections. Public opinion was surveyed at each Public Involvement Session, and the results of those surveys were reviewed and discussed by the CRT and used to guide their decision making.

This process resulted in the development of "Alternative A," which is one of the two Build Alternatives being evaluated and compared in the Environmental Impact Statement. It was developed by TDOT and its consultants during the Context Sensitive Solutions phase of the project based on the public input and concerns. Alternative B is a refinement of Alternative A, and was developed to further minimize impacts, and to provide a more feasible maintenance of traffic plan while remaining respective to the public's concerns in the project corridor.

CRT recommended:

The CRT provided ten (10) safety improvements, seven (7) points of interest to the community, eleven (11) enhancement features in the design plan, as well as four (4) other special issues. A summary of the considerations is provided below.

Safety Improvements:

1. Safety is the number one priority on this project.
2. Wide Shoulders are desirable
3. Improve sight distance and address geometric deficiencies at all intersections of side streets
4. Provide left turn lanes at major intersections:
    a. Orebank Road
    b. Harbor Chapel Road
    c. Stratford Road
    d. Old Stage Road
    e. Amy Avenue /Glenwood Street
    f. Cooks Valley Road
    g. Island Road
    h. Fall Creek Road
    i. Hill Road
5. Provide right turn lanes at major intersections:
    a. Cooks Valley Road
    b. Fall Creek Road
    c. Hill Road

6. Consider using center line and shoulder rumble strips and reflective thermal markings where appropriate
7. Special attention should be given to intersection improvements at the intersection of Carolina Pottery and Overhill Road to improve safety
8. Plan development needs to be mindful of pedestrian safety and connectivity, providing a safe and separate walkway for pedestrians where feasible. Specific areas where sidewalks are desired include East Center Street to Old Stage Road (within the City limits) and within the Indian Springs community
9. Use side facing mailbox placement along SR 126 (Memorial Boulevard) to improve safety for residents
10. The CRT would like to avoid a "one size fits all" solution for SR 126 (Memorial Boulevard)

Points of Interest to the Community

The CRT wants to minimize impacts to and protect the integrity of community treasures in the SR 126 study area. Sites that are considered treasures include:

1. Cherry Point Animal Hospital
2. White House at the corner of Santana Road and SR 126 (Memorial Boulevard)
3. East Lawn Cemetery
4. Old Indian Springs Post Office
5. Chestnut Ridge view shed
6. Anything within the historic boundary of Yancey's Tavern, including the tavern, barn, and trace of Old Island Road
7. Shipley Mansion (near East Center Street)

Enhancements

The CRT support the incorporation of the following enhancement features in the design plans for SR 126

1. Use of natural elements for retaining and buffering walls
2. Landscaping to a human scale with native plant species
3. Decorative guardrail where appropriate
4. Use of decorative lighting where appropriate with sensitivity to residential areas
5. Underground utilities instead of overhead
6. Use of mast arms rather than span wire where traffic signals are installed
7. Use of Texas rail instead of Jersey barrier type of railing on bridges
8. Bridge design needs to be an enhancement and fit within the context of the community
9. Include irrigation with major landscaping
10. Landscape design that is appropriate to the speed limit
11. Inclusion of a roundabout at the intersection of SR 126 and East Center Street if adequate capacity can be provided for forecasted traffic volumes.

Other Issues

1. Where roadway widening is undertaken, use as much of the existing roadway as possible.
2. Where the roadway is widened from two to four lanes, consider leaving the existing road in place and constructing the new lanes to one side (asymmetrical widening)
3. The CRT identified two major benefits of asymmetrical widening: improved traffic flow during construction, and enhanced constructability.

4. Asymmetrical widening should not preclude making improvements to horizontal and vertical alignment deficiencies.

Working together, the CRT developed recommendations for roadway cross sections. The recommendations are divided into eight sections, identified by intersecting cross streets.

- For five of the eight sections, the CRT developed consensus design recommendations.
- For three of the eight sections, the CRT developed design recommendations that were supported by a majority of team members.

Consensus design recommendations include:

- Improve these segments to a four-lane median divided facility with curb, gutter and sidewalks
  - Segment 1 West – East Center Street to Orebank Road
  - Segment 1 East – Orebank Road to West of Hawthorne Street
  - Segment 3 West – Harbor Chapel Road to east of Old Stage Road
- Improve this section to four travel lanes and a center turn lane with curb and gutter and sidewalks
  - Segment 2 – West of Hawthorne Street to Harbor Chapel Road
- Provide an improved two-lane roadway with paved shoulders, wide centerline, and rumble strips
  - Segment 4 East – Harrtown Road to Cochise Trail

Majority design recommendations with minority objection statements include:

- Improve this segment to a four-lane median divided facility with shoulders
  - Segment 3 East – East of Old Stage Road to Cooks Valley Road
- Improve this segment to provide two travel lanes and a center turn lane with curb, gutter and sidewalks
  - Segment 4 West – Cooks Valley Road to Harrtown Road
- Provide an upgraded two-lane roadway with paved shoulders, wide centerline, and rumble strips
  - Segment 5 – Cochise Trail to I-81

Community Character & Values

A sampling of residents highly value the following:

- The scenic quality
- Quiet neighborhoods
- A feeling of safety and security within the neighborhoods
- Historic aspects
- Nearby family recreation and sports opportunities

A sampling of residents highly value the following visual characteristics:

- The rural setting (pastures, woodlands)
- Trees, shrubs and landscaping
- Historic houses, barns and other structures

Road Safety

- Accident rates exceed statewide averages for similar roads
- The public ranked the following safety concerns in order of importance
  - Limited sight distance
  - Dangerous curves
  - Speeding traffic
  - Difficulty turning left
  - Unsafe for bicycles and pedestrians
- The following problems and roadway deficiencies were identified:
  - Varied travel speeds that increase conflict between vehicles
  - Travel speeds that exceed the posted speed limits and/or design speed
  - Substandard horizontal and vertical curves (inadequate sight distance)
  - Lack of turn lanes at major intersections
  - Skewed intersection angles
  - Substandard superelevation in sharp curves
- Local resource team members identified additional problems such as:
  - Very narrow shoulder widths.

Access Management

- The public also ranked access onto SR 126 (Memorial Boulevard) as a major concern.
- Difficulty entering or exiting business parking lots was identified as a significant problem, i.e., uncontrolled access to businesses along the roadway.
- School busses have difficulty maneuvering and turning onto side streets while on SR 126 (Memorial Boulevard), and turning onto SR 126 (Memorial Boulevard) from side streets.

Modal Interrelationship

- Need for safe pedestrian mobility and bikeways

CSS Process Chronology

Table 5.5.1 provides a summary of major tasks and meetings that were conducted during the CSS phase of the project. After the table, more detailed information is provided concerning milestone events.

TABLE 5.5.1: CHRONOLOGICAL SUMMARY OF THE CSS PROJECT (1 OF 2)

Date	Task
September 2003	Project Kickoff Meeting - Presentation of Consultants to Kingsport / Sullivan County
	Identification of Local Resource Team members by Mayors Blazier and Venable
October 2003	First Team Meeting (TDOT/Local Resource Teams)
	Complete Stakeholder Identification
	Establish a mailing list for households in the project area
	Issued Team Roles & Responsibilities document for review
	Define methods of communication and protocols
October/November 2003	Collect & review information of record
November 2003	Stakeholder Kick-off Meeting • Introduce CSS process • Dialogue about the community & desires for Memorial Boulevard
	Team Building in Kingsport Defined study area boundary
	CSS Training at TDOT
December 2003	Collect speed data on SR 126 Analyze traffic accident data from TRIMS
January 2004	Analyze horizontal and vertical curve data
	Requested information of record from environmental specialists
	CSS Training in Kingsport Consultant conducted field review and meetings with utility providers
	Team Meeting
February 2004	Consultant investigated local contacts with low income and minority population groups
February & March 2004	Preparation of traffic forecasts Capacity analyses Tabulation of additional traffic accident data
February 2004 through February 2005	Weekly Telephone Conference Calls (held on most Fridays)
February 20, 2005	Requested controlled aerial survey
March 2004	Team Meeting (TDOT/Local Resource Teams)
	Team Meeting
April 2004	Letter to Elected Officials
	Issued Press Release
May 2004	Project Website activated
	Postcard announcement of First Public Involvement Session mailed
	First Public Involvement Sessions

TABLE 5.5.1: CHRONOLOGICAL SUMMARY OF THE CSS PROJECT (2 OF 2)

Date	Task
June 2004	Postcard thank you mailed with summary of First Public Involvement Session
July 23, 2004	Team Meeting (TDOT/Local Resource Teams)
October 2004	Team Meeting – Design Charette (TDOT/Local Teams)
	Newsletter #2
November 2004	Second Public Involvement Sessions
December 2004	Team Meeting (TDOT/Local Teams)
January 2005	Team Meeting (Local Team)
February 2005	Team Meeting (Local Team)
March 2005	Team Meeting – Plan Review Workshop (TDOT/Local)
April 2005	Focus Group
May 2005	Third Public Involvement Sessions
June 2005	Team Meeting – Team Recommendation Workshop
August 2005	Website updated with Team Recommendation
	Road Safety Audit training course in Kingsport
	Draft Context Sensitive Solutions Report submitted to TDOT for review
October 2005	TDOT Comments on Draft Report sent to consultant
	Demonstration of digital video & radar speed enforcement equipment on SR 126
	Announcement by Governor Bredesen & Commissioner Nicely accepting the Community Resource Team Recommendation
	Website Updated with interim improvements list, project timeline, Public Involvement Session summary from May 2005, and press release
February 2006	Final Context Sensitive Solutions Report submitted to TDOT

Community & Technical Resource Teams (September 2003)
Appointment of the Community Resource Team was made by the Mayors of Kingsport and Sullivan County. Appointed members included various members of the local governments and citizens. Additional team members included TDOT and consultant project managers.

In addition to the Community Resource team, TDOT assembled a Technical Resource Team to provide expertise and assistance.

Project Website (activated April 2004)
A project website was prepared and hosted on TDOT's main website. Content for the website was prepared by the project management team with input from the Community Resource Team.

Team Recommendation Meeting (June 21 and 22, 2005)
A two-day meeting was held for the Community Resource Team at the Renaissance Center in Kingsport to facilitate the development of a team recommendation.

- Public input and survey results from the May 2005 Public Involvement Sessions were reviewed and discussed.
- Team members turned in individual scoring of an evaluation matrix for compilation.

- Composite team scores from the evaluation matrix were reviewed and discussed. It was determined that the scoring did not provide enough variation between the different concept plans to be useful to the team.
- Team members discussed and agreed upon a list of "common ground" recommendations that were supported by all team members.
- The consultant facilitated the team's discussion of each roadway segment and development of either a consensus or majority recommendation for each segment.
- Team members who opposed a majority recommendation were given the opportunity to write a minority opinion statement.
- Group decisions and minority reports were reviewed, and all team members were asked to sign a statement of support for the team recommendation with objections noted by the minority reports.

Concepts A, B, and C were presented to the public at the November 2004 Public Involvement Session. Citizens were asked to express a preference for one concept or "no build" in each of the five segments. Concepts A, B, and C are a combination of various cross section options along the corridor. Concepts A, B, and C are listed in **Appendix E CSS Alternatives**.

Concepts A, B, and C were revised after the November 2004 public involvement session based on comments from the public and the Community Resource Team. These revisions were presented to the team at a design review workshop in March 2004, and were later refined again to incorporate the team's comments. The plans were shaded and color coded to make them more easily understood by the public. The revised and reformatted plans were presented to the public at the May 2005 Public Involvement Sessions. Visualizations of existing and future conditions with each concept plan were provided for four locations: Orebank Road, Harbor Chapel Road, Old Stage Road, and Island Road. Typical cross sections, reformatted to a consistent scale and color coded to match the concept plans, were also presented. The public was asked to complete a preference survey to indicate which of the concept plans they preferred in each of the eight segments of the corridor.

Public Preferences for the Concept Plans

At the May 2005 Public Involvement Sessions, a detailed preference survey was included at the end of the handout material. Each person who signed the attendance roster upon entering the sessions was asked to view the concept plans, review the handout material, listen to a formal presentation, and then complete the preference survey.

The preference survey began by asking questions concerning the adequacy of information provided at the Public Involvement Sessions and the level of comfort that citizens felt in expressing a preference. Citizens were then asked to express a preference for one of the concept plans (A, B, or C) or the No-Build alternative in each of eight project sections. The concept plans A, B, and C retained the same center-line. The plans varied in cross-section design. The cross sections for each concept plan The preferences are included in **Table 5.5.2**.

During the question and answer session of the Public Involvement Session that occurred at Sunnyside Baptist Church on May 26, 2005, a petition was presented by a citizen from the study area to the project management team. The petition was accepted and entered into the official transcript. It included a total of 1,167 signatures, of which 43 were duplicates. The total number of unique signatures on the petition was 1,124. The petition included the following statement:

"We, as citizens who live on and/or use SR-126, do not want the 2-lane section of the highway to become a 4-lane highway. We firmly believe a 4-lane highway would increase the number

and severity of accidents. It would destroy the community with the loss of most of the houses, apartments, and businesses along the highway. We support improvements to make the highway safer. We offer our signatures as a vote to support keeping the 2-lane section."

TABLE 5.5.2: PREFERENCE MATRIX
Preference Survey Results from Public Involvement Sessions, May 2005

SEGMENT	Concept A	Concept B	Concept C	No-Build	No Response	Other	Total Comments
Section 1 West **E Center to Orebank**	40	71	157	23	12		303
Section 1 East **Orebank to west of Hawthorne**	42	63	159	24	15		303
Section 2 **Hawthorne to Harbor Chapel**	48	35	181	21	16	2	303
Section 3 West **Harbor Chapel to Old Stage Rd**	59	50	161	20	13		303
Section 3 East **Old Stage to Cooks Valley Rd**	92	60	126	15	9	1	303
Section 4 West **Cooks Valley to Harr Town**	87	76	111	17	10	2	303
Section 4 East **Harr Town to Cochise Trail**	109	65	101	15	13		303
Section 5 **Cochise Trail to I-81**	118	48	106	16	15		303
TOTALS	**595**	**468**	**1102**	**151**	**103**	**5**	**2424**

Announcement of a Recommended Alternative for SR 126 (Memorial Boulevard)
On October 27, 2005, TDOT announced the CSS defined "Concept C" as the Recommended Alternative for the SR 126 project. Concept C has been renamed "Alternative A" for the NEPA documentation process. As mentioned throughout the DEIS, Alternative B is a refinement of Alternative A. Alternative B has been developed to minimize impacts associated with Alternative A, and with regard for the CSS recommendations. These recommendations include community concerns and comments for both an improved facility and the least amount of impact associated with a Build Alternative, preservation to the greatest extent possible of the viewshed, and improved safety and travel efficiency.

Chapter 6: References

6.0 REFERENCES

Haworth, Meyer and Boleyn (HMB) Professional Engineers, Inc.

2008 Phase I Site Assessment of Underground Storage Tanks and Hazardous Material Sites. SR 126 (Memorial Boulevard), Sullivan County, Tennessee. March 2008.

2008 Terrestrial and Aquatic Technical Report. SR 126 (Memorial Boulevard), Sullivan County, Tennessee. December 2008.

2008 Air Quality Analysis. SR 126 (Memorial Boulevard), Sullivan County, Tennessee. October 2008.

2009 Traffic Noise Impact Analysis SR 126 (Memorial Boulevard), Sullivan County, Tennessee. October 2008.

2009 Traffic Analysis Report Addendum. SR 126 (Memorial Boulevard), Sullivan County, Tennessee.

Sain & Associates/PBS&J

2006 Context Sensitive Solutions Report for State Route 126 (Memorial Boulevard), in the City of Kingsport/Sullivan County.

Tennessee Department of Transportation

2010 Phase 1a and 1b Archaeological Survey of the Proposed SR 126 (Memorial Boulevard), Sullivan County, Tennessee. March 2010.

2008 Historical and Architectural Survey and documentation for effect under 36 CFR 800 evaluation. SR 126 (Memorial Boulevard), Sullivan County, Tennessee. October 2008

2010 Conceptual Relocation Plan for SR 126 (Memorial Boulevard), Sullivan County, Tennessee, March 2010.

2008 TDOT Design Division Roadway Design Guidelines, Design Division, August 2008.

Kingsport/Sullivan County

2006 Sullivan County Regional Plan: A Guide for Future Land Use and Transportation Development, Planning Period 2006 – 2026.

2008 Kingsport Metropolitan Area 2030 Transportation Plan (Amended January 10, 2008), Kingsport MPO

2008 Kingsport Area Transportation Improvement Program, Fiscal Years 2008 through 2011, January 2008.

2010 Kingsport Area Transportation Improvement Program, Fiscal Years 2011 through 2014, October 2010.

American Association of State Highway and Transportation Officials

2001 A Policy on Geometric Design of Highways and Streets, Fourth Edition

Transportation Research Board

2000 Highway Capacity Manual

United States Bureau of Census

2010 Profiles for Census Tracts 408, 409, 410, 411, 422, 423, 424

Chapter 7: List of Preparers

7.0 LIST OF PREPARERS

Federal Highway Administration - Tennessee Division

Leigh Ann Tribble
Environmental Program Engineer

Charles O'Neill
Planning and Program Management Team Leader

Tennessee Department of Transportation Environmental Planning Division

Ann Andrews
TDOT Project Manager

JonnaLeigh Stack, Esq.
Attorney, J.D., Environmental Law
Transportation Coordinator

Alan Longmire
Archaeological Investigation

Martha Carver
Historic and Cultural Architecture

Florence & Hutcheson

Jon Storey, P.E.
B.S. Civil Engineering, MS Civil Engineering
Project Manager - DEIS Revision, Traffic Analysis Engineer
14 years transportation experience

Ray Brisson
B.S. Political Science
Senior Planner – DEIS Revision
40 years experience in NEPA studies and DEIS documentation.