

Reevaluation
of the
Draft Environmental Impact Statement
for
Pellissippi Parkway Extension (SR 162)
From SR 33 (Old Knoxville Highway) to
US 321/SR 73/Lamar Alexander Parkway
Blount County, Tennessee
(Circulated May 7, 2010)

Prepared By:
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
and
TENNESSEE DEPARTMENT OF TRANSPORTATION

Cooperating Agencies:
U. S. ARMY CORPS OF ENGINEERS
TENNESSEE VALLEY AUTHORITY

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7/17/14

Date of Approval



Federal Highway Administration

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Acronyms

AADT	Average Annual Daily Traffic
ARAP	Aquatic Resource Alteration Permit
BA	Biological Assessment
CAPPE	Citizens Against Pellissippi Parkway Extension
CBER	Center for Business and Economic Research
CFR	Code of Federal Regulations
CH ₄	Methane
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	Environmental Protection Agency
ETW	Exceptional Tennessee Waters
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
GHG	Greenhouse Gas
HCS	Highway Capacity Software
IAC	Interagency Consultation (for PM _{2.5})
LOS	Level of Service
MSAT	Mobile Source Air Toxics
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act of 1969
N ₂ O	Nitrous Oxide
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
PA	Programmatic Agreement
PM	Particulate Matter
PND	Pond
PPM	Parts per million
ROW	Right-of-Way
SHPO	State Historic Preservation Office
SR	State Route
STR	Stream
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TESA	Tennessee Environmental Streamlining Agreement
TIP	Transportation Improvement Program
TNM	FHWA Traffic Noise Model
TPO	(Knoxville Region) Transportation Planning Organization
TVA	Tennessee Valley Authority

TWRA	Tennessee Wildlife Resources Agency
U.S.	United States
USACE	United States Army Corps of Engineers
USDOT	United States Department of Transportation
USFWS	United States Fish & Wildlife Service
USGS	United States Geological Survey
VPD	Vehicles per Day
VMT	Vehicle Miles Traveled
WTL	Wetland

Executive Summary

The Federal Highway Administration (FHWA) and the Tennessee Department of Transportation (TDOT) are preparing an Environmental Impact Statement (EIS) for the proposed Pellissippi Parkway Extension from its current terminus at State Route (SR) 33 (Old Knoxville Highway) to US 321/SR 73 (Lamar Alexander Highway) in Blount County, Tennessee. The FHWA approved the Draft EIS (DEIS) for this project on April 14, 2010; the Notice of Availability was published in the *Federal Register* on May 7, 2010. Due to the time that has elapsed (more than three years) since the approval and circulation of the DEIS, a reevaluation of the DEIS is required to determine whether a supplement to the DEIS or a new DEIS is necessary prior to approval of the Final EIS (FEIS) (23 CFR 771.129 (a)).

This reevaluation describes changes in conditions in the project area and the impact assessments conducted since the DEIS was circulated in 2010. The reevaluation considers impacts to the following alternatives evaluated in the DEIS as well as those considered since the DEIS was circulated:

- Preferred Alternative (DEIS Build Alternative A) – four-lane roadway on new location
- DEIS Build Alternative C – four-lane roadway on new location
- DEIS Build Alternative D – improved two-lane roadway on existing and new location
- Preferred Alternative with West Shift
- Preferred Alternative with East Shift

Substantial Changes since the Circulation of the DEIS

Selection and Modification of Preferred Alternative: Following the circulation of the DEIS and the July 2010 Public Hearing, TDOT selected Alternative A as the Preferred Alternative in 2012. During the preparation of the technical studies for the Final EIS (FEIS), a National Register of Historic Places eligible archaeological site was identified within the footprint of the Preferred Alternative (A). TDOT identified and evaluated two minor modifications (East Shift and West Shift) of the Preferred Alternative's alignment between Davis Ford Road and US 321/SR 73 to avoid the sensitive archaeological site. TDOT held a Community Briefing on May 30, 2013 to discuss the proposed modifications and impacts, and to receive public input. In July 2013, TDOT selected the Preferred Alternative with West Shift.

Major Update of Regional Traffic Model: In June 2013, the Knoxville TPO adopted a major update of the regional travel demand model, which was the first major model update since the initial traffic study for this project was prepared in 2007. Future travel volumes for the project would be substantially lower under the new model than they were under the previous model and the previously prepared forecasts for the project. With the availability of the new travel demand model and the age of the original traffic forecasts for the project (prepared in 2006 with minor updates in 2011), TDOT decided to update the traffic forecasts and analysis for the project.

Results of Technical Studies

Key findings of the technical studies for the reevaluation are summarized in Table S-1.

Table S-1: Comparison of Impacts for Entire Project Limits from SR 33/Old Knoxville Highway to US 321/SR 73/Lamar Alexander Parkway

Issues	Preferred Alternative (A)	Preferred Alternative with East Shift	Preferred Alternative with West Shift	DEIS Alternative C	DEIS Alternative D
Traffic forecasts & operations	<ul style="list-style-type: none"> Traffic volumes declined with new model. The LOS on proposed route is D or higher. The level of service and delay key intersections is improved. 				<ul style="list-style-type: none"> While volumes have declined with new model, they still exceed the carrying capacity of a two-lane road.
Displacements	<ul style="list-style-type: none"> 5 residences & 1 business 	<ul style="list-style-type: none"> 6 residences & 1 business 	<ul style="list-style-type: none"> 11 residences (including 6 mobile homes in Kensington Place) & 1 business 	<ul style="list-style-type: none"> 27 residences (affecting Tara Estates subdivision and Hubbard community) & 1 business 	<ul style="list-style-type: none"> 41 residences (affecting Peppermint Hills community) & 2 businesses
Farmlands	<ul style="list-style-type: none"> 107 acres in ROW / 54% of total acres 	<ul style="list-style-type: none"> 107 acres in ROW / 54% of total acres 	<ul style="list-style-type: none"> 110 acres in ROW / 55% of total acres 	<ul style="list-style-type: none"> 74 acres in ROW / 40% of total ROW 	<ul style="list-style-type: none"> 45 acres in ROW / 38% of total ROW
Environmental Justice (EJ) impacts	<ul style="list-style-type: none"> No effect 	<ul style="list-style-type: none"> No effect 	<ul style="list-style-type: none"> Noise, visual and displacement impacts to Kensington Place mobile home park Noise barrier will be constructed to mitigate impacts. 	<ul style="list-style-type: none"> No effect 	<ul style="list-style-type: none"> No effect
Noise impacts (receptors)	<ul style="list-style-type: none"> 81 	<ul style="list-style-type: none"> 80 	<ul style="list-style-type: none"> 103 	<ul style="list-style-type: none"> 64 	<ul style="list-style-type: none"> 85
Noise impacts for EJ community as-built	N/A	No barrier: <ul style="list-style-type: none"> Substantial Increase – 28 Approach NAC – 2 Increase higher than West Shift – 8 	With barrier: <ul style="list-style-type: none"> Substantial Increase- 20 Approach NAC – 2 Increase higher than East Shift – 45 	N/A	N/A
Floodplains	<ul style="list-style-type: none"> 8.1 acres 	<ul style="list-style-type: none"> 7.4 acres 	<ul style="list-style-type: none"> 11.0 acres 	<ul style="list-style-type: none"> 9.0 acres 	<ul style="list-style-type: none"> 8.1 acres
Stream / wet weather conveyance impacts	<ul style="list-style-type: none"> 4,525 / 0 linear feet 	<ul style="list-style-type: none"> 3,755 / 0 linear feet 	<ul style="list-style-type: none"> 4,962 / 0 linear feet 	<ul style="list-style-type: none"> 2,622 / 735 linear feet 	<ul style="list-style-type: none"> 1,695 / 650 linear feet
Wetland impacts	<ul style="list-style-type: none"> 5.01 acres (due to beaver activity) 	<ul style="list-style-type: none"> 6.99 acres (due to beaver activity) 	<ul style="list-style-type: none"> 8.72 acres (due to beaver activity) 	<ul style="list-style-type: none"> 0.925 acres 	<ul style="list-style-type: none"> 0.025 acres
Sinkholes	<ul style="list-style-type: none"> 0 	<ul style="list-style-type: none"> 0 	<ul style="list-style-type: none"> 0 	<ul style="list-style-type: none"> 0 	<ul style="list-style-type: none"> 1

Confirmation of Preferred Alternative with West Shift

Based on the results presented in this reevaluation, TDOT has concluded that the Preferred Alternative with West Shift continues to be the Preferred Alternative. Table S-2 demonstrates the advantages and disadvantages of each alternative in comparison with the Preferred Alternative with West Shift.

Table S-2: Advantages and Disadvantages of Alternatives

Alternatives	Advantages	Disadvantages
Preferred Alternative with West Shift	<ul style="list-style-type: none"> Noise barrier would help mitigate adverse impacts to Kensington Place mobile home community; TDOT has committed to build the barrier. Shorter length 	<ul style="list-style-type: none"> Adverse impacts on Kensington Place mobile home community (noise, displacement (6 mobile homes), and visual), but impacts are not disproportionately high and adverse. Increased wetland (due to beaver activity), stream and floodplain impacts, but impacts will be mitigated.
Preferred Alternative with East Shift	<ul style="list-style-type: none"> No land acquisition or displacements in Kensington Place mobile home community. Less wetland, stream and floodplain impacts than West Shift. 	<ul style="list-style-type: none"> The Kensington Place mobile home community would experience substantial noise impacts but a noise barrier is not reasonable. Would take five farm buildings between Davis Ford Road and US 321, and reduce access for 2 active farms.
Preferred Alternative (A)	<ul style="list-style-type: none"> No displacements in Kensington Place mobile home community. 	<ul style="list-style-type: none"> Adverse impact to NRHP eligible archaeological site.
Alternative C	<ul style="list-style-type: none"> No effect on Kensington Place mobile home community. Less wetland, stream and floodplain impacts than West Shift. 	<ul style="list-style-type: none"> High number of residential relocations (27); 23 of the relocations are in two clusters (Tara Estates and Hubbard community). Would reduce community cohesion in Tara Estates and Hubbard community. Affecting more downstream reaches of larger tributaries of Little River than the Preferred Alternative with West Shift.
Alternative D	<ul style="list-style-type: none"> No effect on Kensington Place mobile home community. Less wetland, stream and floodplain impacts than West Shift. 	<ul style="list-style-type: none"> The forecasted traffic volumes for Alternative D exceed the carrying capacity of a two-lane road; thus this alternative would not serve the traffic demands that are anticipated in future years. Highest number of residential relocations (41); 17 of the 41 are clustered in the vicinity of the Peppermint Hills Drive community. Would reduce community cohesion in this area. Proximity to the Little River, a designated Exceptional Tennessee Water that is Blount County's primary source for drinking water. Sinkhole identified within ROW.

Finding of Reevaluation

Based on the discussion presented in this reevaluation:

- The changes to the alternatives considered in the DEIS as well as modifications to the Preferred Alternative would not result in significant environmental impacts that were not evaluated in the DEIS.

- The new information or circumstances relevant to environmental concerns and bearing on the alternatives considered in the DEIS as well as modifications to the Preferred Alternative would not result in significant environmental impacts that were not identified in the DEIS.

Therefore, a supplement to the approved 2010 DEIS or a new DEIS is not required.

Environmental Commitments

In addition to following the standard requirements of the TDOT *Standard Specifications for Road and Bridge Construction*, the following commitments are proposed:

- **Environmental Justice.** TDOT will build a noise barrier for the Kensington Place mobile home community to mitigate the predicted noise impacts. TDOT also will seek input from community residents regarding the landscaping and color/pattern of the barrier in order to minimize possible visual impacts to the community as a result of the barrier and the new roadway.
- **Noise.** During final design, TDOT will conduct outreach with the affected residents. A design public hearing will be held at which residents and the general public will be encouraged to provide input. Final decisions regarding the use of noise abatement measures will be made following the public involvement.
- **Threatened and Endangered Species.** TDOT will coordinate with TWRA regarding methods to minimize potential impacts to terrestrial and aquatic species under TWRA's authority in the event species of concern are discovered during TWRA's future aquatic species surveys near proposed stream crossings. TDOT will protect groundwater resources if previously unknown species are identified by TWRA or other resources agencies.

Removal of trees with loose bark and greater than six inches in diameter at breast height will occur only between October 15 and March 31 to avoid the summer roosting time for the Indiana bat.

Erosion and siltation control best management practices will be stringently adhered to since several of the threatened or endangered species noted in this reevaluation have been found downstream of the project.

The contractor will be required to prepare and implement a revegetation plan that has been approved by TDOT. If an area of mixed forest must be permanently removed for temporary use (i.e., construction staging), it will be replaced with plantings of native tree species within the affected area. The contractor will adhere to project requirements identified in the Biological Assessment and agency concurrence letters.

- **Wetland and Streams.** TDOT will provide the USACE with a copy of the Environmental Boundaries Study and Mitigation Memorandum prior to submitting the permit application. Prior to submitting a permit application, TDOT will invite the USACE to participate in a field review to make a jurisdiction determination for any of the streams and wetlands that will be impacted by the project, at the USACE's discretion. TDOT will carry out any required mitigation for jurisdictional stream and wetland impacts, which is a condition of the permit.
- **Karst Topography.** During final design and during construction, TDOT will take special care to minimize unnecessary impacts to the habitat of the numerous karst features (specifically sinkholes) in the study area. TDOT will abide by all permit terms, including those through the Underground Injection Control (UIC) program.
- **Farmlands.** TDOT will work with farmers during final design of the project to reduce the impacts on farmlands as much as possible based on available design solutions.

- **Historic Resources.** If the project involves relocating the Anne Elizabeth Thompson Pershing historic marker (identified by the Tennessee Historical Commission as Blount (BT).2361) along Buchanan Road, the marker will be re-erected in a pull-off (instead of just by the road), which is safer and makes the marker more accessible to the public.
- **Archaeological Resources.** Pursuant to TCA 11-6-107(d), if human remains are identified, construction work must be halted, and the state archaeologist, the county coroner and local law enforcement must be contacted immediately. In addition, a representative of Native American tribes will be notified in the event they wish to be present.
- **Airport Coordination.** Since the northern half of the project area is within six miles of the McGhee Tyson Airport, once the selected alternative is under design, TDOT will inform the FAA Memphis Airports District Office of the nature of construction. TDOT will provide to the FAA detailed layout drawings and elevations along with the completed FAA Form 7460-1.
- **Construction impacts.** Construction activities will be confined within the permitted limits to prevent unnecessary disturbance of adjacent wetland areas.
- **Design Features.** TDOT will follow a Context Sensitive Solutions (CSS) design process to develop the appropriate design features such as speed, median type and width, and right-of-way width. TDOT also will investigate the provision of bicycle and pedestrian facilities within the project right-of-way, as part of the CSS design process.

1. Introduction

The Federal Highway Administration (FHWA) and the Tennessee Department of Transportation (TDOT) are preparing an Environmental Impact Statement (EIS) for the proposed Pellissippi Parkway Extension from its current terminus at State Route (SR) 33 (Old Knoxville Highway) to US 321/SR 73 (Lamar Alexander Highway) in Blount County, Tennessee. The FHWA approved the Draft EIS (DEIS) for this project on April 14, 2010; the Notice of Availability was published in the *Federal Register* on May 7, 2010. Due to the time that has elapsed (more than three years) since the approval and circulation of the DEIS, a reevaluation of the DEIS is required to determine whether a supplement to the DEIS or a new DEIS is necessary prior to approval of the Final EIS (FEIS) (23 CFR 771.129 (a)).

This reevaluation describes changes in conditions in the project area and the impact assessments conducted since the DEIS was circulated in 2010.

The project is listed in the Knoxville Regional Transportation Planning Organization (TPO) 2014-2017 Transportation Improvement Program (TIP) as project 2014-025, described as “construct new 4-lane.” It is also included in the TPO’s *Long Range Regional Mobility Plan 2040* as project 09-232, described as “construct new 4-lane freeway.” Appendix A contains a copy of the project page from the 2014–2017 TIP as well as the project page from the *Regional Mobility Plan*.

2. Changes since Circulation of the 2010 DEIS

The activities and changes that have occurred since the FHWA approved the DEIS in April 2010 are described in the following sections.

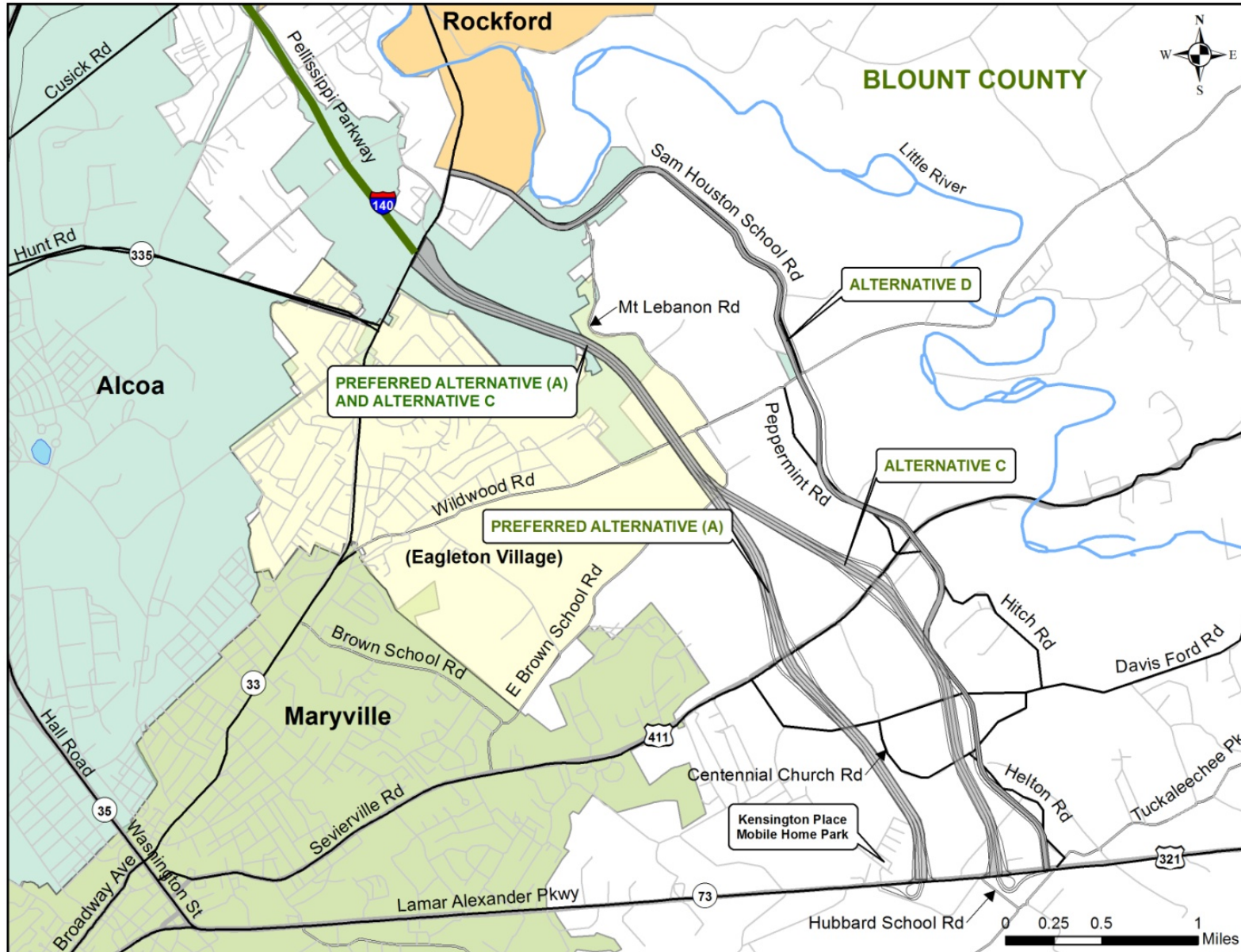
2.1. DEIS Public Hearing

The DEIS evaluated four alternatives—the No-Build Alternative, two four-lane Build Alternatives (A and C), and one enhanced two-lane Build Alternative (D)—shown in Figure 1.

TDOT held a public hearing at the Heritage High School on East Lamar Alexander Parkway in Maryville on Tuesday, July 20, 2010, with approximately 400 members of the public and local officials in attendance. The original comment period close date for the DEIS was August 11, 2010, but at the request of the organization, Citizens Against Pellissippi Parkway Extension (CAPPE), TDOT extended the comment period to August 30, 2010. During the comment period, TDOT received more than 600 public comments. In addition, the following five federal and state agencies provided written comments on the DEIS: Federal Aviation Administration, U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), U.S. Army Corps of Engineers (USCAE), and Tennessee Wildlife Resources Agency (TWRA).

A summary of the public hearing and the public and agency comments received are included in Appendix B.

Figure 1: Preferred Alternative and DEIS Alternatives



Source: Parsons Brinckerhoff, May 2013

2.2. Activities Prior to the Selection of the Preferred Alternative

Following the close of the DEIS comment period, TDOT reviewed and considered the comments received from the various stakeholders. Several review comments related to the traffic operations analysis of the Build Alternatives. The concern expressed was that the DEIS did not provide sufficient traffic data to understand Alternative D, the improved two-lane option. Based on these and other comments received, TDOT determined that more-detailed traffic forecasts would be prepared for Alternative D to the same level as Alternatives A and C, and that these revised forecasts should include the data necessary to calculate the levels of service (LOS) for Alternative D. TDOT determined that this additional analysis would be conducted prior to the selection of the Preferred Alternative. The *Addendum to the Traffic Operations Technical Report* (dated June 2011) is summarized in Section 3.1.1. A copy of the addendum is included in Appendix C.

On September 1, 2011, TDOT met with local officials to provide project information and emphasize the importance of local government commitment and public support for the proposed transportation solution. TDOT also emphasized the importance of supporting community goals while minimizing the impacts to the natural and cultural environments. Subsequently, TDOT received resolutions by the governing bodies of the cities of Maryville and Alcoa and Blount County (dated October 4, October 11, and October 20, 2011, respectively). Each resolution supported Alternative A as the Preferred Alternative. Copies of the resolutions are included in Appendix B.

In addition, on October 5, 2011, TDOT officials, including the Commissioner, met with members of the CAPPE group. The Commissioner listened to the group's concerns about the project, and explained the process for selecting the Preferred Alternative. TDOT committed to providing status updates to keep stakeholders informed of the selection of the Preferred Alternative and future meetings; the status updates would be provided via website, local media outlets, newsletters, and other sources.

2.3. Selection of the Preferred Alternative

Based on the analysis of environmental consequences and public and agency comments received during the DEIS public hearing and comment period, TDOT determined that the Preferred Alternative should be Alternative A, a four-lane divided roadway extending approximately 4.38 miles between SR 33 and US 321. The Preferred Alternative is illustrated in Figure 1.

On April 2, 2012, pursuant to the Tennessee Environmental Streamlining Agreement (TESA) for the Environmental and Regulatory Coordination of Major Transportation Projects, TDOT distributed the Concurrence Point 4 Package, *Preferred Alternative and Preliminary Mitigation*, to TESA signatory agencies. Before finalizing the Preferred Alternative and initiating the FEIS, TDOT requested formal concurrence on the selection of Alternative A as the project's Preferred Alternative. The six TESA agencies that reviewed the package were EPA, USACE, USFWS, Tennessee Valley Authority (TVA), TWRA, and Tennessee Department of Environment and Conservation (TDEC); in addition, TDOT provided a copy to the Great Smoky Mountains National Park (U.S. Department of Interior, National Park Service) for comments. In May 2012, four agencies (TWRA, TDEC, USFWS and EPA) provided written concurrence with the determination of the Preferred Alternative. In June 2012, the USACE provided written comments on the project but did not provide official concurrence. The National Park Service

also provided comments regarding the project. The TVA did not respond to the request for concurrence. Appendix B contains a summary of the agency comments and TDOT's responses.

TDOT noted the following as reasons for selecting Alternative A as the Preferred Alternative over Alternatives C and D and the No-Build Alternative. Alternative A:

- Displaces the least number of residences in comparison to Alternatives C and D.
- Has the greatest physical distance/separation from Little River, a designated Exceptional Tennessee Water, when compared to Alternatives C and D.
- Has the support of local officials. Resolutions were received in 2011 from the legislative bodies of the cities of Maryville and Alcoa and Blount County, each stating support for the selection of Alternative A as the Preferred Alternative.

Alternative A meets the purpose and need for the project by:

- Completing Pellissippi Parkway (SR 162/I-140) as envisioned by local and regional plans.
- Creating a non-radial transportation route in the growing area of northeastern Blount County where such a route has been lacking.
- Producing a substantial decrease in delays in most of the intersections in the Alcoa/Maryville core.

In June 2012, TDOT formally announced the selection of the Preferred Alternative for the project. To inform the public of this decision, TDOT issued a media release in the local newspaper, *Maryville Daily Times*, and in the regional paper, *Knoxville News Sentinel*. A Knoxville news station, WBIR, reported on the announcement. TDOT posted the notice on the project website. In addition, TDOT prepared a newsletter that was distributed to more than 800 individuals and organizations included in the project's public participation database. The newsletter announced the selection of the Preferred Alternative and explained why it was selected, provided a description and schedule of upcoming activities, and summarized the 2011 Traffic Addendum. TDOT also posted the newsletter and the 2011 *Traffic Addendum* to the project website, <http://www.tdot.state.tn.us/pellissippi/>.

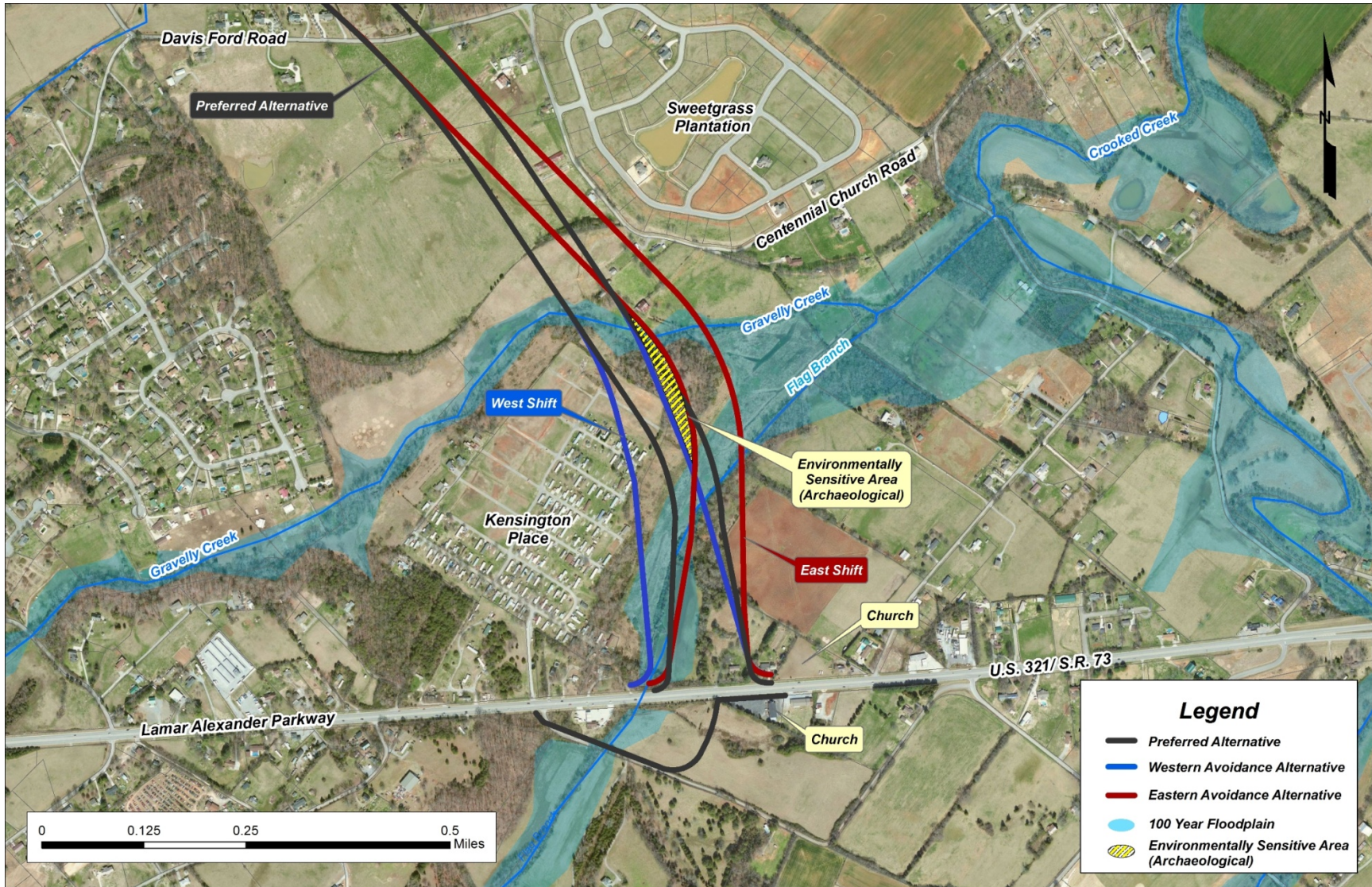
2.4. Modification of the Preferred Alternative, 2013

Following the selection of the Preferred Alternative, Phase II archaeological investigations conducted for the Preferred Alternative revealed one site to be eligible for the National Register of Historic Places (NRHP). Since the Preferred Alternative had already been analyzed and selected over the other Build Alternatives, TDOT focused on identifying potential avoidance options via minor alignment shifts near the sensitive portion of the eligible archaeology site rather than major shifts of the alignment. TDOT identified and investigated two possible minor shifts in the route of the Preferred Alternative between Davis Ford Road and US 321/SR 73 (the southern terminus of the project).

The two minor alignment shifts are described below and are illustrated in Figure 2:

- The East Shift would move the right-of-way (ROW) about 300 feet eastward, away from the Kensington Place mobile home community and toward the developing Sweetgrass Plantation subdivision.

Figure 2: Preferred Alternative and Proposed Alignments Shifts



Source: Parsons Brinckerhoff, May 2013.

- The West Shift would move the ROW about 150 feet to the west, which would encroach into the northeastern corner of the Kensington Place mobile home community.

The typical section of each alignment shift would be the same as defined for Preferred Alternative (DEIS Alternative A): a four-lane divided roadway with a 48-foot depressed median. The avoidance shifts would each be about 1.4 miles in length.

In the first half of 2013, TDOT investigated potential archaeology, noise, ecology, farmland, relocations, and environmental justice impacts for each shift. Table 1 summarizes the preliminary environmental impacts identified for each shift in the area between Davis Ford Road and US 321/SR 73. (Please note that the impacts presented in Table 1 do not cover the entire length of the project.)

Table 1: Preliminary Impacts for Minor Alignment Shifts to Preferred Alternative, from Davis Ford Road to US 321/SR 73/Lamar Alexander Parkway

Potential Resources Affected	East Shift	West Shift
Length of Shift	1.44 miles	1.39 miles
Total New Right-of-Way	52.4 acres	50.5 acres
Estimated Cost ⁽¹⁾	\$40.94 million	\$40.95 million
Displacements	1 home and 5 barns / other outbuildings on 2 working farms	6 homes in mobile home community
Noise Receptors Affected	70 (8 in Sweetgrass area; 62 in Kensington Place)	70 (9 in Sweetgrass area; 61 in Kensington Place)
Potentially Eligible for Noise Wall?	No	Yes (for Kensington Place)
Floodplain impacts	6.7 acres	10.3 acres
Stream Impacts	1,635 feet	2,842 feet
Wetland – number of wetlands affected ⁽²⁾	1	3
Wetlands – acres likely eliminated or drained ⁽²⁾	6.39 acres	8.12 acres
Environmental Justice impacts to mobile home community	None	Potential, but minimized by mitigation

(1) Planning level costs in 2013 dollars. The West Shift includes estimated cost for a noise barrier.

(2) Both shifts would substantially affect one wetland (WTL-6), a seasonally saturated to semi-permanently flooded beaver impounded scrub-shrub wetland located immediately north of US 321/SR 73. During the 2008 field surveys, this was a small (0.34 acre) wetland that occurred within a man-made swale surrounded by a pasture partially used for grazing livestock. Since then, beavers have moved into the area and have created multiple dams in and along Flag Branch. As a result of the beaver activity, WTL-6 is now a much larger wetland that encompasses an area of approximately 9.5 acres. The East Shift would likely eliminate or drain 6.39 acres or 67 percent of WTL-6, while the West Shift would affect 7.96 acres, or 84 percent of a single wetland, and 0.16 acres of two additional wetlands.

Community Briefing

TDOT held a community briefing on Thursday, May 30, 2013, to engage those persons and businesses potentially affected by the proposed minor alignment shifts. The briefing was held from 5:00 to 7:00 p.m. at the Rio Revolution Church on US 321/SR 73 in the vicinity of the

project. More than 1,000 notices, in English and Spanish, were mailed to persons and organizations on the project database, to property owners in the area, and to addresses in the potentially affected Kensington Place mobile home community. A total of 136 people signed in at the briefing.

TDOT representatives, including ROW representatives, were present to answer questions and explain project displays. Meeting materials and the slideshow presentation were available in both English and Spanish. A Spanish translator was available for those with limited English proficiency to sign in for the meeting and understand the concepts presented. The translator assisted several families and individuals during the meeting.

TDOT received more than 150 comments. Appendix B contains a summary of the Community Briefing comments and TDOT responses.

Determination of Alignment Shift for Preferred Alternative

In making the determination of the alignment shift, TDOT considered the number and types of impacts of each shift and the potential to mitigate adverse effects. TDOT also considered public input received during the May 30, 2013 Community Briefing and the associated comment period.

Table 2 contains the analysis of beneficial and adverse impacts of each proposed alignment shift that was used in making the decision in 2013.

Table 2: Comparison of East and West Alignment Shifts, 2013

East Shift:	West Shift:
<i>Pros:</i> <ul style="list-style-type: none"> Reduces impacts (noise, visual, and property and residential takes) to the Kensington Place mobile home community. Has lower level of impact on adjacent streams, wetlands, and floodplains. Has unanimous support by the Maryville City Council. 	<i>Pros:</i> <ul style="list-style-type: none"> Reduces noise and visual impacts to Sweetgrass Plantation by moving the alignment away from the neighborhood. A noise barrier would minimize noise and visual impacts to the Kensington Place mobile home community.
<i>Cons:</i> <ul style="list-style-type: none"> Displaces one residence and five additional barns and farm buildings. Increases noise impacts to the Sweetgrass Plantation subdivision; a noise barrier has been determined not to be warranted. Kensington Place would also experience increased noise impacts, although not as much as under the West Shift, but a noise barrier was determined not to be warranted. 	<i>Cons:</i> <ul style="list-style-type: none"> Displaces six homes in the mobile home community. Increases noise levels in the mobile home community, but the area would be “potentially eligible” for a noise barrier to mitigate noise impacts. The noise barrier may create a visual impact, but as potential mitigation, mobile home community residents would have input into landscaping and the color/pattern of the barrier. Increases impacts to streams, wetlands and floodplains.
<i>Estimated Cost:</i> \$40.94 million (2013 dollars)	<i>Estimated Cost:</i> \$40.95 million (2013 dollars), which includes a noise barrier

TDOT determined that the alignment of the Preferred Alternative would be best modified by the West Shift for the following reasons:

- The West Shift minimizes impacts to the operations of two active farms.

-
- The West Shift is farther away from a recently constructed church, thus minimizing potential access impacts to the church.
 - With either alignment shift, Kensington Place residents would experience increased noise levels. With the eastern shift, the mobile home community would not be eligible for a noise barrier. With the western shift, the predicted noise levels make the Kensington Place mobile home community potentially eligible for a noise barrier that will minimize both noise and visual impacts. TDOT is committed to building a noise barrier for this community, and to allowing the Kensington Place residences to have input into the landscaping and color/patterns for the noise barrier.
 - While the West Shift would increase impacts to streams, wetlands and floodplains, these will be minimized during the design and permitting phases of the project.
 - Since the mobile home community is not completely occupied, any displaced resident who wants to stay within their existing community may be able to relocate to one of the numerous site pads available, if they so choose.
 - While there would be adverse impacts within Kensington Place with the West Shift, TDOT and FHWA have determined through an environmental justice analysis that these impacts would not change the finding of the approved DEIS, and that the project would have no disproportionately high and adverse impacts to minority and low-income populations compared with the rest of the corridor pursuant to Title VI of the 1964 Civil Rights Act and Executive Order 12898.

TDOT made a public announcement—with a media advisory issued on July 29, 2013—that the Preferred Alternative has been modified by the west alignment shift. The announcement was picked up by several local and regional television stations (e.g., WVLT, WBIR, and WATE in Knoxville) and by the *Maryville Daily Times* newspaper. TDOT prepared and mailed postcards announcing the selection of the west alignment shift to those persons and organizations that attended the community briefing and/or provided a written comment, and to all addresses within the Kensington Place mobile home community. TDOT also posted the announcement on the project website.

2.5. Major Update to Knoxville TPO Traffic Model, June 2013

In June 2013, the Knoxville TPO adopted a major update of the regional travel demand model, which was the first major model update since the initial traffic study for this project was prepared in 2007. TDOT and the TPO compared the updated Knoxville model to the model outputs that were used in the last traffic forecasting effort to determine if the new travel demand model had produced any meaningful changes to the traffic forecasts for the Pellissippi Parkway Extension project. That assessment revealed that future travel volumes for the project would be substantially lower under the new model than they were under the previous model and the previously prepared forecast for the project. Among the reasons for the lower forecasts for the project was the lowered expectation for overall growth in population and employment in the region since the 2007-2009 economic recession. A June 9, 2014 memorandum summarizing the changes that were made during the update process for the updated Knoxville model is included in Appendix C.

With the availability of the new TPO travel demand model and the age of the original traffic forecasts for the project (prepared in 2006 with minor updates in 2011), TDOT decided in August 2013 to update the traffic forecasts and analysis for the Preferred Alternative and the

No-Build Alternative. The forecasts were developed using the new model outputs as well as new ground counts for turning movements at key intersections in the corridor.

3. Technical Studies Updates

This section describes the technical and other studies that have been updated since the DEIS was circulated. These studies examined the original Preferred Alternative (DEIS Alternative A), Preferred Alternative with West Shift, Preferred Alternative with East Shift, DEIS Alternative C, and DEIS Alternative D.

3.1. Transportation and Safety

Since the DEIS was published, TDOT has prepared two updates to the traffic operational analysis that was reported in the DEIS. The first update was prepared in 2011 to address several comments from members of the public and two agencies; this analysis was completed before TDOT determined the Preferred Alternative in 2012. In 2013, following the TPO's adoption of a new travel demand model, TDOT initiated a new traffic forecasting effort and an update of the traffic operational analysis based on the new forecasts. In addition, TDOT has updated the crash analysis to address the latest years of crash data available (2010 through 2012). The results of these analyses are summarized in the following sections.

3.1.1. 2011 Traffic Operations Analysis Update

In 2011, TDOT prepared an addendum to the original *Traffic Operations Technical Report* to address updates resulting from public and agency comments provided during the DEIS review period. The purpose of the updates was to clarify the traffic volumes used in the analysis and more specific levels of improvement resulting from the Build Alternatives. The analysis was conducted and reported in the updated traffic report, *SR 162 (Pellissippi Parkway Extension) Addendum to the Traffic Operations Technical Report* (June 30, 2011, with minor corrections September 7, 2011). The report is in Appendix C.

Corridor Level of Service

During the public review period for the DEIS, several comments were made relating to the traffic operations analysis of the Build Alternatives. The concern was that the DEIS did not provide sufficient traffic data to understand Alternative D. Based on these comments, TDOT determined that more-detailed traffic forecasts should be prepared for Alternative D in order to provide the same level of detail as the four-lane Alternatives A and C, and these revised forecasts should include the data necessary to calculate the levels of service for the two-lane roads near Alternative D. Also following the review period for the DEIS, some minor changes were proposed by the Knoxville TPO and the City of Alcoa related to the traffic volumes and truck percentages along US 129.

The results of the 2011 corridor-level analysis for Alternatives A and C confirmed the finding reported in the DEIS that construction of a four-lane Pellissippi Parkway Extension (referred to as Alternative A/C since the model is not sensitive enough to determine differences between Alternatives A and C) would not degrade the level of service. The 2011 addendum provided more specific findings for Alternative D:

- For Build Alternative D, several sections of Alcoa Highway and Wildwood Road would operate at a level of service below the acceptable threshold (below LOS D). By

comparison, these sections would operate at acceptable levels under the No-Build Alternative and Alternative A/C in the year 2035.

- Sam Houston School Road, Peppermint Road, Hitch Road, and Helton Road would all operate at a level of service below the desired threshold in the year 2035 for Alternative D. These two-lane roadways would not have the capacity to accommodate the projected traffic under Alternative D.

Intersection Level of Service

The 2011 *Traffic Addendum* addressed intersection level of service analysis for the years 2015 and 2035. The report confirmed that the four-lane alternative (Alternative A/C) would improve the level of service at several key intersections. For all the re-aligned intersections as part of Alternative D, the level of service for both 2015 and 2035 would be below the acceptable threshold given the high traffic volumes projected to use the intersections.

Intersection Delay

The 2011 *Traffic Addendum* also included information on the anticipated percentage reduction or increase in delay at intersections for Alternatives A/C and D in 2035. The delay associated with the intersection level of service is another measure that determines changes in traffic operations and thereby evaluates the impacts of the project alternatives. Intersection delay is the amount of additional time (measured in seconds) it may take a driver to travel through an intersection. The analysis is used to determine if there was any significant reduction in the intersection delay time between the Build Alternatives and the No-Build Alternative.

Table 3 shows the changes in delay for the year 2035 for the Alternative A/C, and Table 4 shows the changes for Alternative D. Alternative A/C would substantially reduce delay at most of the intersections in the Alcoa/Maryville core. The improvements would range from 1 percent to 150 percent reduction in delay (compared to the No-Build Alternative). In actual terms of seconds of delay, these improvements would correspond to a reduction in delay of between 11 seconds and 141 seconds over the No-Build Alternative. Two intersections would have a small increase in delay (between 11 and 19 seconds). The greatest improvement is predicted to occur at the intersection of SR 33/Old Knoxville Highway and Wildwood Road. Of the eight intersections examined, only two would operate worse under Alternative A/C compared with the No-Build Alternative: one during the morning peak (SR 33 at US 321) and another during the afternoon peak (US 321 at SR 335). The morning peak period is generally 6 to 8 AM, and the afternoon peak period is generally 4 to 6 PM.

At key intersections evaluated for Alternative D, most of the intersections in the Maryville core would experience an increase in the amount of delay. The increase in delay would be moderate at most intersections, ranging from 2 percent (a 1-second increase over the No-Build Alternative) to 59 percent (a 128-second increase over the No-Build Alternative). The most-extreme increase in delay would occur at the SR 33 and Sam Houston School Road intersection, where the increase in delay would be between 627 and 845 seconds during the peak hours.

Table 3: Intersection Delay Change for Alternative A/C

Intersection	2035	
	AM Change in Delay (seconds)	PM Change in Delay (seconds)
SR 115/US 129 @ SR 73/US 321	20.0	35.3
SR 33 @ Wildwood Rd	669.5	773.1
SR 33/E Broadway Ave @ SR 35/S. Washington St	50.2	68.2
SR 33 @ SR 73/US 321	19.0	11.0
SR 35/S. Washington St @ Sevierville Rd	1.4	2.1
S. Washington St/SR 35 @ High St/SR 35	68.0	140.6
S. Washington St. @ SR 73/US 321	68.2	167.0
SR 73/US 321 @ SR 335/Old Glory Rd	-	11.2
Build Alternatives A/C operates better than No-Build		
Build Alternatives A/C operates worse than No-Build		

Source: Parsons Brinckerhoff, *Traffic Operations Technical Report Addendum*, September 2011.

Table 4: Intersection Delay Change for Alternative D

Intersection	2035	
	AM Change in Delay (seconds)	PM Change in Delay (seconds)
SR 115/US 129 @ SR 73/US 321	105.0	-103.0
SR 33 @ Wildwood Rd	71.0	76.0
SR 33/E Broadway Ave @ SR 35/S. Washington St	-127.6	-125.0
SR 33 @ SR 73/US 321	-67.0	-22.0
SR 35/S. Washington St @ Sevierville Rd	-0.1	-4.1
S. Washington St/SR 35 @ High St/SR 35	-41.8	-108.1
S. Washington St. @ SR 73/US 321	6.1	-53.0
SR 73/US 321 @ SR 335/Old Glory Rd	-	-61.0
SR 33 @ Sam Houston School Road	-844.9	-626.9
Build Alternative D operates better than No-Build		
Build Alternative D operates worse than No-Build		

Source: Parsons Brinckerhoff, *Traffic Operations Technical Report Addendum*, September 2011.

3.1.2. Updated Traffic Forecasts and Operations Analysis 2013-2014

The traffic forecasts were updated for the Preferred Alternative with West Shift, Preferred Alternative with East Shift, DEIS Alternative A/C (since the travel model is not sensitive enough to distinguish among the four-lane alternatives), and DEIS Alternative D. Two factors led to the decision by TDOT in the second half of 2013 to update the traffic forecasts for the project and prepare a new traffic operational analysis for the Preferred Alternative. The first factor was the age of the traffic forecasts used for the traffic analysis of the DEIS since those traffic estimates were based on turning movement field counts collected in 2006. The traffic forecasts were

initially produced in 2007 and updated in 2011. The second factor was the Knoxville TPO's adoption in June 2013 of a new regional travel demand model for horizon year 2034.

Updated Traffic Forecasts

To assist in the development of the traffic volume forecasts, TDOT gathered traffic volume counts at intersections and interchanges in the study area in late October and early November 2013. The intersection traffic counts collected in the field were supplemented with data from TDOT's roadway segment volume database. TDOT prepared forecasts for future traffic volumes for horizon years 2020 and 2040 with and without the proposed Pellissippi Parkway Extension (No-Build Alternative and Preferred Alternative, respectively). By comparison, the base and design years presented in the DEIS were 2015 and 2035. A copy of the December 2013 *Traffic Forecast Study* is included in Appendix C. For the traffic analysis, the Preferred Alternative represents the four-lane alternatives investigated for this project—Preferred Alternative with West Shift, Preferred Alternative with East Shift, and DEIS Alternative A/C—since the travel model is not sensitive enough to distinguish among the four-lane alternatives.

The Knoxville travel demand model update that was approved in 2013 included significant revisions to the model's structure, network, socio-economic assumptions, and calibration. The enhancements aimed at improving the accuracy of the model's forecasts. Combined, the changes in the model resulted in lower forecasted traffic volumes for the Pellissippi Parkway Extension but those forecasts are based on a sound modeling process that was reviewed and approved by the Knoxville TPO. The changes to the model are summarized in a memo dated June 9, 2014, which is included in the Appendix C.

A comparison of the previous forecasts shown in the 2011 study and the current forecasts illustrates a substantial decrease (40 to 52 percent) in the projected volumes on the proposed Pellissippi Parkway Extension to the horizon year 2040. The latest projections for 2040 for Pellissippi Parkway Extension are 38,040 vehicles per day (vpd) between SR 33 and US 411, and 25,240 vpd from US 411 to US 321. Table 5 illustrates the changes in traffic forecasts by roadway sections with the No-Build and Preferred Alternatives.

Other comparisons of the 2011 and 2013 forecasts include the following:

- Pellissippi Parkway (I-140) between Topside Road and the proposed Relocated Alcoa Highway shows an increase in traffic volumes with the new forecasts.
- The new forecasts for the proposed Relocated Alcoa Highway are lower than previously projected; for the section north of existing Pellissippi Parkway; the forecasts for 2040 are about 40 percent lower than what had been previously projected for 2035.
- Wildwood Road between the new Pellissippi Place Access Road and Sam Houston School Road has a substantial increase in average annual daily traffic (AADT) (over 200 percent higher) under the No-Build Alternative for 2040 compared with the previous 2035 projection. With the Preferred Alternative, the projected traffic on Wildwood Road would still be substantially higher under the new forecasts (62 percent) but not high as under the No-Build Alternative estimate.
- US 321/SR 73 from its junction with SR 33 east past Foothill Parkway shows a decline in traffic forecasted for 2040 with the Preferred Alternative.

Table 5: Comparison of 2011 and 2013 Traffic Forecasts, No-Build Alternative and Preferred Alternative

Segment	No Build			Build (Preferred Alternative)			% change No Build to Build
	2011 Forecasts	2013 Forecasts	2011-2013 % change	2011 Forecasts	2013 Forecasts	2011-2013 % change	
	2035 ADT	2040		2035 ADT	2040		
Wildwood Road							
E. Broadway / Old Knoxville Hwy (SR 33) to Reservoir Rd [Pellissippi Place Access Rd]	6,250	7,640	22%	4,720	7,180	52%	-6%
Reservoir Rd [Pellissippi Place Access R.] to Sam Houston School Rd	5,570	17,870	221%	4,720	7,630	62%	-57%
Sam Houston School Rd to End of Study Area	5,800	7,390	27%	4,720	6,600	40%	-11%
Pellissippi Parkway							
Topside Rd to Alcoa Hwy (SR 115/US 129)	62,310	67,480	8%	63,690	73,980	16%	10%
Alcoa Hwy (SR 115/US 129) to Relocated Alcoa Highway	39,240	40,850	4%	28,410	51,750	82%	27%
Relocated Alcoa Highway to E. Broadway / Old Knoxville Hwy (SR 33)	60,080	34,230	-43%	76,720	55,330	-28%	62%
E. Broadway / Old Knoxville Hwy (SR 33) to US 411 (SR 35)	-	-	-	63,380	38,040	-40%	-
US 411 (SR 35) to Lamar Alexander Pkwy (SR 73/US 321)	-	-	-	52,880	25,240	-52%	-
Lamar Alexander Parkway (SR 73 / US 321)							
Beginning of Study Area to Alcoa Hwy (SR 115/US 129)	45,270	N/A		45,980	N/A		
Alcoa Hwy (SR 115/US 129) to E. Broadway / Old Knoxville Hwy (SR 33)	37,430	N/A		37,320	N/A		
E. Broadway / Old Knoxville Hwy (SR 33) to Jones Ave	48,380	38,020	-21%	49,000	32,580	-34%	-14%
Jones Ave to Merritt Rd	38,610	39,200	2%	34,190	30,680	-10%	-22%
Merritt Rd to Tuckaleechee Pk [Merritt to Preferred Alt]	41,200	33,860	-18%	34,560	28,120	-19%	-17%
Tuckaleechee Pk to Tuckaleechee Pk [Preferred to Tuckaleechee Pk]	25,560	33,110	30%	42,820	37,420	-13%	13%
Tuckaleechee Pk to Foothills Pkwy	32,620	23,860	-27%	37,000	28,160	-24%	18%
Foothills Parkway to Townsend	19,200	11,650	-39%	19,940	12,970	-35%	11%
Hall Road (SR 35)							
Alcoa Hwy (SR 115/US 129) to Bessemer St	23,220	35,370	52%	17,730	31,200	76%	-12%
Bessemer St to E. Broadway / Old Knoxville Hwy (SR 33)	27,460	32,530	18%	21,520	23,930	11%	-26%
Washington Street (SR 35)							
E. Broadway / Old Knoxville Hwy (SR 33) / US 411 (SR 35)	25,990	29,900	15%	22,090	20,130	-9%	-33%
US 411 (SR 35) Lamar Alexander Pkwy (SR 73 / US 321)	37,890	25,570	-33%	33,060	18,630	-44%	-27%
US 411 (SR 35)							
Washington St (SR 35) to S. Everett High Rd	16,910	15,400	-9%	14,920	13,780	-8%	-11%
S. Everett High Rd to Westfield Dr [S. Everett High to PPE]	14,240	15,080	6%	13,610	14,800	9%	-2%
Westfield Dr to Hitch Rd [PPE to Hitch Road]	9,670	14,140	46%	10,650	19,800	86%	40%
Hitch Rd to End of Study Area	8,710	15,670	80%	10,650	15,590	46%	-1%

Table 5: Comparison of 2011 and 2013 Traffic Forecasts, No-Build Alternative and Preferred Alternative (con't.)

Segment	No Build			Build (Preferred Alternative)			% change No Build to Build
	2011 Forecasts	2013 Forecasts	2011-2013 % change	2011 Forecasts	2013 Forecasts	2011-2013 % change	
	2035 ADT	2040		2035 ADT	2040		
E. Broadway / Old Knoxville Hwy (SR 33)							
Beginning of Study Area to Montgomery Lane	46,990	N/A		46,770	N/A		
Montgomery Lane to Hall Rd	30,940	N/A		30,080	N/A		
Hall Rd to Wildwood Rd	25,060	21,510	-14%	18,550	19,130	3%	-11%
Wildwood Rd to Hunt Rd	24,310	19,470	-20%	18,350	17,210	-6%	-12%
Hunt Rd to Pellissippi Pkwy	65,850	36,330	-45%	74,860	36,130	-52%	-1%
Pellissippi Pkwy to Sam Houston School Rd	29,910	17,050	-43%	27,280	19,240	-29%	13%
Sam Houston School Rd to County Line	23,140	11,940	-48%	27,280	N/A		
Alcoa Highway (SR 115 / US 129)							
Broadway Ave to Lamar Alexander Pkwy (SR 73/US 321)	37,280	N/A		37,250	N/A		
Lamar Alexander Pkwy (SR 73 / US 321) to Louisville Rd	56,090	N/A		53,740	N/A		
Louisville Rd to Hall Rd	48,910	62,250	27%	44,430	61,380	38%	-1%
Hall Rd to Hunt Rd	69,570	94,460	36%	60,970	88,800	46%	-6%
Hunt Rd to Relocated Alcoa Hwy	71,500	97,820	37%	67,780	92,470	36%	-5%
Relocated Alcoa Hwy to Pellissippi Pkwy	40,280	45,270	12%	39,980	44,950	12%	-1%
Pellissippi Pkwy to County Line	26,060	35,820	37%	30,120	37,100	23%	4%
Relocated Alcoa Highway							
US 129 (S) to Pellissippi Pkwy (I-140)	38,430	39,440	3%	36,690	37,520	2%	-5%
Pellissippi Pkwy (I-140) to US 129 (N)	62,590	36,390	-42%	65,930	39,230	-40%	8%
Sam Houston School Road							
SR 33 to Wildwood Rd	7,720	5,030	-35%	N/A			
Peppermint Road							
Wildwood Rd to Sevierville Rd	4,820	5,960	24%	N/A			
Hitch Road							
Sevierville Rd to Davis Ford Rd	1,980	2,450	24%	N/A			
Helton Road							
Davis Ford Rd to Lamar Alexander Pkwy	520	640	23%	N/A			
Tuckaleechee Pike							
Lamar Alexander Pkwy to Hubbard School Rd	2,360	N/A		N/A			

Source: Parsons Brinckerhoff, February 2014.

- Hall Road has an increase in traffic to 2040 while Washington Street's traffic forecasts are lower for the Preferred Alternative.
- SR 33 (Old Knoxville Highway) shows a decrease in forecasted volumes for both the No-Build Alternative and the Preferred Alternative from Wildwood Road north through the project area.
- US 129/SR 115 (Alcoa Highway) shows higher forecasts (between 12 and 46 percent) between Louisville Road and the Knox County line under both alternatives.

A comparison of the current 2040 forecasts between the No-Build Alternative and Preferred Alternative yields the following observations:

- The traffic on Wildwood Road with the Preferred Alternative in 2040 is forecasted to be lower than under the No-Build Alternative. The traffic between the Pellissippi Place Access Road and Sam Houston School Road would be nearly 60 percent lower under the Preferred Alternative.
- Existing Pellissippi Parkway traffic would be higher with the Preferred Alternative. The traffic between US 129 and the proposed Relocated Alcoa Highway is expected to be 62 percent higher than with the No-Build Alternative.
- The traffic from US 321/SR 73 (Lamar Alexander Parkway) through the project area (SR 33 to Tuckaleechee Pike) would be lower with the Preferred Alternative, although from the proposed interchange of Pellissippi Parkway Extension with US 321/SR 73 toward the Foothills Parkway and Townsend, traffic would be slightly higher for the Preferred Alternative.
- Traffic on Hall Road and Washington Street would be lower under the Preferred Alternative.
- US 411 traffic would be lower under the Preferred Alternative, with the exception of the section from the proposed interchange with Pellissippi Parkway Extension to Hitch Road where the traffic would be 40 percent higher under the Preferred Alternative.
- Most sections of SR 33 would be lower under the Preferred Alternative, except between the proposed intersection with the new roadway and Sam Houston School Road.
- Traffic on Alcoa Highway (US 129/SR 115) between Louisville Road and Pellissippi Parkway (I-140) would be slightly lower (1 to 6 percent) under the Preferred Alternative.
- The traffic on the section of Relocated Alcoa Highway south of Pellissippi Parkway (I-140) would be slightly lower under the Preferred Alternative and slightly higher on the northern section.

Existing volumes and the updated travel demand model were used to prepare forecasts for Alternative D for years 2020 and 2040. The revised forecast volumes are shown in Table 6. For comparison, the table includes the previously prepared forecasts for the four roads in Alternative D (2015 and 2020).

Table 6: Comparison of Forecasts for Alternative D

Route	From	To	2011 Study		2014 Study		Change 2015- 2020	Change 2035- 2040
			2015 AADT Forecast	2035 AADT Forecast	2020 AADT Forecast	2040 AADT Forecast		
Sam Houston School Rd	SR 33	Wildwood Rd	15,740	20,840	9,340	16,800	-41%	-19%
Peppermint Rd	Wildwood Rd	Sevierville Rd	20,890	27,550	9,620	20,580	-54%	-25%
Hitch Rd	Sevierville Rd	Davis Ford Rd	13,880	21,850	6,360	14,890	-54%	-32%
Helton Rd	Davis Ford Rd	US 321/SR 73	13,880	21,850	6,130	15,790	-56%	-28%

Source: *Memorandum: Updated Traffic Analysis for Alternative D*, May 14, 2014.

Under the new model, forecasted volumes on the local roads that are part of Alternative D are shown to be substantially lower than those forecasted under the previous model. Not accounting for the 5-year difference in forecasts, the volumes show a 41- to 56-percent decline for the new base year (2020) compared with the old base year (2015). The horizon year volumes (2040) under the new model declined 19 to 32 percent from the volumes forecasted for 2035.

Traffic Operations

To evaluate the effects of the project on traffic in the study area, the traffic operations analysis included a level of service analysis at the corridor level (roadway sections) for the No-Build Alternative, Preferred Alternative (including all the four-lane alternatives), and Alternative D for the years 2020 and 2040. Existing (2013) level of service was determined for comparison purposes. The traffic operations analysis for the Preferred Alternative also examined level of service at key intersections and identified the expected change in the amount of delay (in terms of seconds of delay) at key intersections. An intersection level of service analysis was not prepared for Alternative D because the forecasted traffic would exceed the carrying capacity of these roads.

Corridor Level of Service – Preferred Alternative

The updated traffic analysis shows that the Preferred Alternative from SR 33 to SR 73/US 321 would operate at an acceptable level (LOS D or higher) through the design year 2040. In the earlier traffic operations analysis for DEIS Alternative A/C, the four-lane new roadway between SR 33 and US 411/Sevierville Road would operate at LOS F in 2035, and the section between US 411/Sevierville Road and US 321 would operate at LOS D. The acceptable level of service predicted for the Preferred Alternative in 2040 is due in large measure to the reduction in the traffic forecasts for the new roadway.

The section of SR 115/US 129 (Alcoa Highway) between Louisville Road and the Knox County line shows higher forecasted traffic volumes under the new travel demand model. Alcoa Highway south of Pellissippi Parkway (I-140) is projected to operate at a failing level of service (LOS F) through the design year 2040. The section of Alcoa Highway north of Pellissippi Parkway (I-140) is projected to operate at LOS C through the design year (see Table 7). The analysis assumes that SR 115/Alcoa Highway north of Pellissippi Parkway (I-140) to Cherokee Trail would be improved and that the Relocated Alcoa Highway would be built by the design year for the Pellissippi Parkway Extension.

Table 7: Comparison of Corridor Levels of Service, 2035 and 2040

Route	Section	Begin Milepoint	End Milepoint	2035 No-Build	2035 Build Alternative A/C	2040 No-Build	2040 Preferred Alternative
Pellissippi Parkway	1	Topside Rd	Alcoa Hwy (SR 115/US 129)	F	F	F	F
	2	Alcoa Hwy (SR 115/US 129)	Relocated Alcoa Hwy	D	C	C	D
	3	Relocated Alcoa Hwy	E. Broadway / Old Knoxville Hwy (SR 33)	F	F	C	E
	4	E. Broadway/Old Knoxville Hwy (SR 33)	US 411 (SR 35)	Not Determined	F	N/A	C
	5	US 411 (SR 35)	Lamar Alexander Pkw (SR 73/US 321)	Not Determined	D	N/A	B
Wildwood Road	1	E. Broadway / Old Knoxville Hwy (SR 33)	Reservoir Rd	C	C	C	C
	2	Reservoir Rd	Sam Houston School Rd	C	C	E	C
	3	Sam Houston School Rd	End of Study Area	C	C	C	C
Lamar Alexander Parkway (SR 73 / US 321)	3	E. Broadway / Old Knoxville Hwy (SR 33)	Jones Ave				
	4	Jones Ave	Meritt Rd	D	C	D	C
	5	Meritt Rd	Tuckaleechee Pk	C	C	C	C
	6	Tuckaleechee Pk	Tuckaleechee Pk	B	D	C	D
	7	Tuckaleechee Pk	Melrose Station Rd	C	C	B	B
	8	Melrose Station Rd	Foothills Pkwy	B	B	A	A
Hall Road (SR 35)	1	Alcoa Hwy (SR 115 / US 129)	Bessemer St	B	B	D	C
	2	Bessemer St	E. Broadway / Old Knoxville Hwy (SR 33)				
Washington Street (SR 35)	1	E. Broadway / Old Knoxville Hwy (SR 33)	US 411 (SR 35)				
	2	US 411 (SR 35)	Lamar Alexander Pkw (SR 73 / US 321)				

Table 7: Comparison of Corridor Levels of Service, 2035 and 2040 (con't.)

Route	Section	Begin Milepoint	End Milepoint	2035 No-Build	2035 Build Alternative A/C	2040 No-Build	2040 Preferred Alternative
US 411 (SR 35)	1	Washington St (SR 35)	S. Everett High Rd				
	2	S. Everett High Rd	Westfield Dr	E	E	E	E
	3	Westfield Dr	Hitch Rd	E	E	E	E
	4	Hitch Rd	End of Study Area	E	E	E	E
E. Broadway / Old Knoxville Highway (SR 33)	3	Hall Rd	Wildwood Rd				
	4	Wildwood Rd	Hunt Rd				
	5	Hunt Rd	Pellissippi Pkwy				
	6	Pellissippi Pkwy	Sam Houston School Rd				
	7	Sam Houston School Rd	County Line	F	F	E	F
Alcoa Highway (SR 115 / US 129)	3	Louisville Rd	Hall Rd (SR 35)	D	D	F	F
	4	Hall Rd (SR 35)	Hunt Rd	E	D	F	F
	5	Hunt Rd	Cusick Rd	F	F	F	F
	6	Cusick Rd	Pellissippi Pkwy	D	D	E	E
	7	Pellissippi Pkwy	County Line	C	C	C	C
Relocated Alcoa Highway	1	Alcoa Hwy (SR 115 / US 129)	Pellissippi Pkwy	C	C	B	B
	2	Pellissippi Pkwy	Alcoa Hwy (SR 115 / US 129)	D	E	B	B
		LOS E - F					
		LOS A - D					
		Speed <45, Not Analyzed					

Source: Parsons Brinckerhoff, *Addendum to the Traffic Operations Technical Report*, February 2014.

Notes: The traffic analyses prepared for the DEIS and the 2011 update (with design year 2035) examined a single four-lane Build Alternative (referred to as Alternative A/C) because the travel-demand model was not sensitive enough to differentiate between the two four-lane Build Alternatives A and C.

Gray shading indicates that the LOS could not be calculated due to the inability of the software modules to determine the corridor LOS for urban streets with speeds less than 45 mph.

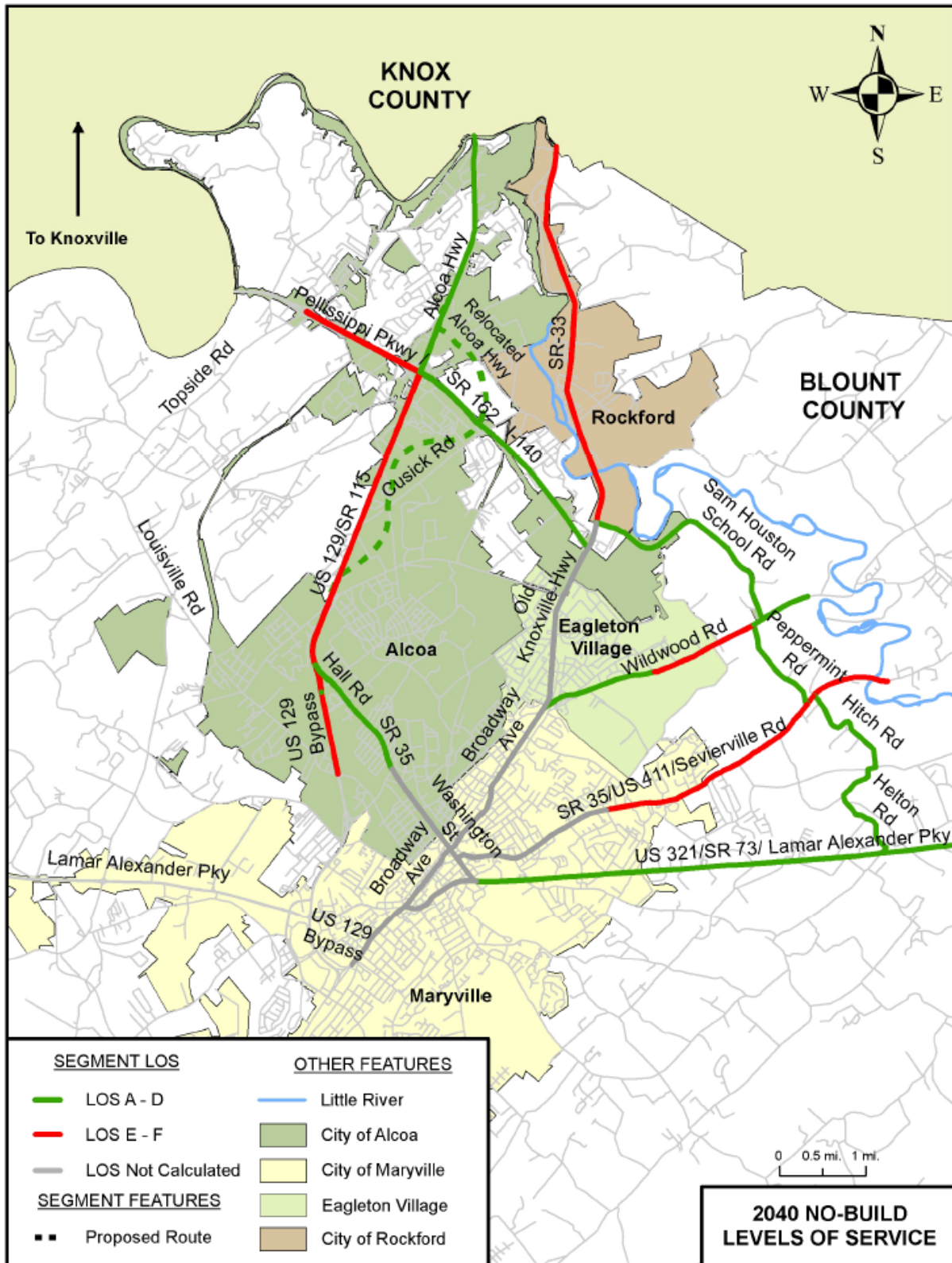
Other results for the updated traffic operations analysis include the following:

- Traffic operations would remain generally at an acceptable level of service (LOS D or better) on Lamar Alexander Parkway (US 321/SR 73) through 2040.
- Wildwood Road would decline to LOS E (poor) by 2040 under the No-Build Alternative; under the 2040 Preferred Alternative, it would operate at LOS C (acceptable).
- Traffic operations by 2040 would decline on existing Pellissippi Parkway to below a desirable level of service just west of Alcoa Highway for both the Preferred and No-Build Alternatives. Between the proposed Relocated Alcoa Highway and SR 33 in 2040 the level of service would decline to LOS E under the Preferred Alternative.

The results of the corridor level of service analysis for the No-Build and Preferred Alternatives for 2040 are illustrated in Figure 3 and Figure 4.

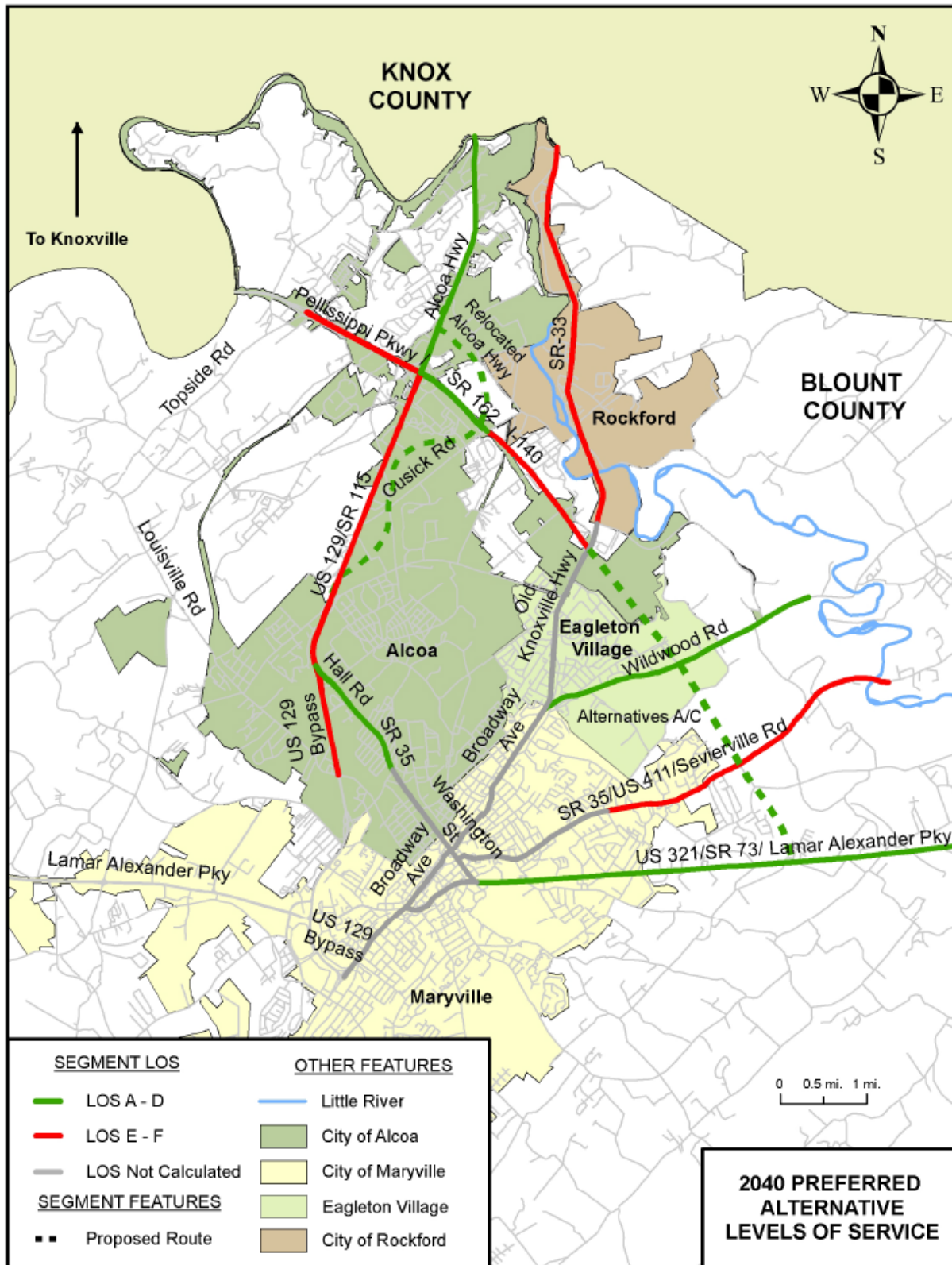
Table 7 shows the corridor level of service results for the No-Build and Preferred Alternatives for the previous design year (2035) and the results for the current analysis using the 2040 traffic forecasts. Since the 2011 update to the project's traffic operations report, the Highway Capacity Software (HCS) has undergone a substantial update to the operating system, which is based on the updates to the *Highway Capacity Manual 2010* (HCM 2010). The current version is HCS 2010, which replaces the HCS Plus version used for the previous analysis. Because there are some differences in the analysis methodology, the previous and current operations analysis results cannot be directly compared for a magnitude in change.

Figure 3: No-Build Alternative Corridor Levels of Service (2040)



Source: Parsons Brinckerhoff, Addendum to the Traffic Operations Technical Report, February 2014.

Figure 4: Preferred Alternative Corridor Levels of Service (2040)



Source: Parsons Brinckerhoff, Addendum to the Traffic Operations Technical Report, February 2014.

Corridor Level of Service – Alternative D

An updated traffic analysis for Alternative D was prepared to address the question as to whether forecasted traffic volumes for Alternative D with the updated regional model have been reduced enough to make this improved two-lane alternative operate at an acceptable level of service in the design year. Segment volume AADTs were forecasted with the 2013 Knoxville TPO model and were analyzed in the same manner as the Preferred Alternative to assess the quality of traffic operations that can be expected in 2020 and 2040.

The results of the analysis are documented in the memorandum, *Updated Traffic Analysis for Alternative D*, dated May 14, 2014 (included in Appendix C). Table 8 compares corridor levels of service for the updated traffic volumes with Alternative D versus existing and No-Build conditions.

Table 8: Alternative D Level of Service Analysis

Route	Begin Milepoint	End Milepoint	Existing	2020 No-Build	2040 No-Build	2020 Alternative D	2040 Alternative D
Sam Houston	SR 33 MP 0.000	Wildwood Rd MP 2.650	C	C	C	E	F
Peppermint Road	Wildwood Rd MP 0.000	Sevierville Rd MP 1.100	C	C	D	E	F
Hitch Road	Sevierville Rd MP 1.202	Davis Ford Rd MP 0.000	B	B	C	E	E
Helton Road	Davis Ford Rd MP 0.875	Lamar Alexander Pkwy MP 0.000	A	A	A	E	F

Source: *Memorandum: Updated Traffic Analysis for Alternative D*, May 14, 2014.

Even with lower forecasted traffic volumes based on the current regional model, Alternative D would operate poorly (LOS E or F) in the 2020 and 2040 horizon years. The corridor LOS analysis indicates that the projected volumes for Alternative D would exceed the carrying capacity of a two-lane road. This would be true even if that network of two-lane roads were improved by wider lanes, improved shoulders, and the straightening of substandard curves.

Given that the level of service analysis indicates that the forecast volumes for Alternative D would exceed the carrying capacity of a two-lane road, an intersection-level analysis is expected to yield poor results similar to the corridor LOS analysis. Even if some intersection movements would be acceptable with Alternative D, the overall corridor would provide poor traffic operations as demonstrated by the corridor LOS. Thus, an intersection level of service analysis would be unnecessary to demonstrate that Alternative D is not a viable alternative from a traffic operations perspective.

Intersection Level of Service – Preferred Alternative

Turning movement volumes for the AM and PM peak hours were provided in the updated 2013 *Traffic Forecast Study*. Using these volumes, intersection level of service was developed for the existing (2013), 2020 and 2040 No-Build Alternative, and the 2020 and 2040 Preferred Alternative scenarios. The results of the intersection level of service analysis are shown in Table 9.

It should be noted that since the 2011 *Traffic Addendum* was prepared, the *Highway Capacity Manual* and software were updated. The changes were substantial enough between versions such that direct comparisons should not be made between previous values and those provided in this update.

Table 9: No-Build and Preferred Alternatives Intersection Levels of Service, 2020 and 2040

Intersection	AM Peak Hour					PM Peak Hour				
	2013 Existing	2020 No-Build	2040 No Build	2020 Preferred Alternative	2040 Preferred Alternative	2013 Existing	2020 No-Build	2040 No Build	2020 Preferred Alternative	2040 Preferred Alternative
SR 33 @ I-140 Off-Ramp	C	E	F	-	-	F	F	F	-	-
SR 33 @ I-140 On-Ramp	F	F	F	-	-	C	E	F	-	-
SR 33 @ Wildwood Rd	D	F	F	F	F	F	F	F	F	F
SR 33 / E. Broadway Ave @ SR 35 / S. Washington St	C	D	D	C	C	E	F	F	D	F
SR 35 / S. Washington St @ Sevierville Rd	B	B	B	B	B	C	C	D	C	C
S. Washington St / SR 35 @ High St / SR 35	C	C	D	C	C	C	D	E	C	F
S. Washington St @ SR 73 / US 321	F	F	F	F	F	F	F	F	F	F
SR 33 @ Sam Houston School Road	B	B	C	D	D	B	B	B	B	B
Sam Houston School Road @ Wildwood Road	B	C	F	B	B	B	C	F	B	B
Peppermint Road @ Wildwood Road	B	F	F	C	D	B	F	F	C	C
SR 35 / US 411 / Sevierville Road @ Peppermint Road	C	F	F	C	B	C	F	F	C	C
SR 35 / US 411 / Sevierville Road @ Hitch Road / Peppermint Hills Drive	C	D	F	C	B	C	D	F	C	C
Davis Ford Road @ Hitch Road	B	B	B	A	A	A	B	B	B	B
Davis Ford Road @ Helton Road	A	A	A	A	A	A	A	A	A	A
SR 73 / US 321 @ Helton Road / Tuckaleechee Pike	F	F	F	F	F	D	F	F	D	D
LOS E - F										
LOS A - D										

Source: Parsons Brinckerhoff, *Addendum to the Traffic Operations Technical Report*, February 2014.

The Preferred Alternative would improve the LOS at the following eight intersections:

- SR 33/E Broadway Avenue and SR 35/S Washington Street intersection. Improvements include LOS D to a LOS C in the AM peak hour and LOS F to LOS D in the 2020 PM peak hour.
- SR 35/S Washington Street and Sevierville Road intersection. The level of service improves from LOS D to LOS C in the 2040 PM peak hour.
- SR 35/S Washington Street at High Street/SR 35 intersection. The level of service improves from LOS D in the No-Build Alternative to LOS C in the Preferred Alternative in the 2040 AM peak hour. In the PM peak hour, the level of service for the year 2020 is LOS C for the Preferred Alternative, which is an improvement over the LOS D for the No-Build Alternative. However, for the year 2040 in the PM peak hour, the level of service declines to a LOS F in the Preferred Alternative compared to a LOS E for the No-Build Alternative.
- Sam Houston School Road at Wildwood Road. The Preferred Alternative improves to LOS B in both the AM and PM peak hours for both analysis years (2020 and 2040).
- Peppermint Road at Wildwood Road. The Preferred Alternative would improve to LOS C for both the AM and PM peak hours in the year 2020. In the year 2040, the level of service would improve to LOS D for the AM peak hour and would remain at a LOS C in the PM peak hour.
- US 411/Sevierville Road at Peppermint Road. The Preferred Alternative improves to LOS C for both the AM and PM peak hours for the analysis year 2020. In the year 2040, the level of service improves to LOS B for the AM peak hour and remains at LOS C for the PM peak hour.
- US 411/Sevierville Road at Hitch Road/Peppermint Hills. The Preferred Alternative improves to LOS C for both the AM and PM peak hours for the analysis year 2020. In the year 2040, the level of service improves to LOS B for the AM peak hour and remains at LOS C for the PM peak hour.
- US 321/SR 73 at Helton Road/Tuckaleechee Pike. In the year 2040 in the PM peak hour, the Preferred Alternative improves to LOS D.

The construction of the Preferred Alternative would degrade the level of service at one intersection, SR 33 and Sam Houston School Road. The level of service for the intersection degrades from a LOS B in the 2020 No-Build Alternative to a LOS D in the 2020 Preferred Alternative and from a LOS C in the 2040 No-Build Alternative to a LOS D in the 2020 Preferred Alternative during the AM peak hour.

The new interchanges created by the Preferred Alternative at SR 33 and US 411 would operate at an acceptable level in the year 2020. By the year 2040, some of the movements/operations begin to degrade given the volumes forecasted for these intersections. Further consideration would need to be given to the specific design for these interchanges during the design phase of the project. The new interchange of the Preferred Alternative and US 321/SR 73 was not evaluated since it will have no intersections; it may be designed with directional loop ramps.

Intersection Delay

The Preferred Alternative shows substantial reduction in delay in most of the intersections in the Alcoa / Maryville core. The improvements range from an 8-percent to a 50-percent reduction in

delay (compared to the No-Build). In actual seconds of delay, these improvements correspond to a reduction in delay of between 1 second and 85 seconds over the No-Build Alternative.

The average intersection delay per movement is detailed in Tables 11–19 in the 2014 *Addendum to the Traffic Operations Technical Report*. Table 10 below summarizes the expected change in the amount of delay (in seconds of delay) at key intersections in 2040 under the Preferred Alternative in comparison with the No-Build Alternative.

Table 10: 2040 Intersection Delay Change, Preferred Alternative

Intersection	2040	
	AM Change in Delay (seconds)	PM Change in Delay (seconds)
SR 33/E Broadway Ave @ SR 35/S Washington St	19.2	85.1
SR 35/S Washington St @ Sevierville Rd	1.4	9.4
S Washington St/SR 35 @ High St/SR 35	15.8	-11.3
S Washington St @ SR 73/US 321	106.4	162.7
	Preferred Alternative operates better than No-Build	
	Preferred Alternative operates worse than No-Build	

Source: Parsons Brinckerhoff, *Addendum to the Traffic Operations Technical Report*, February 2014.

Summary of Updated Traffic Forecasts and Operational Analysis

The June 2013 Knoxville travel demand model update included some significant revisions to the model's structure, network, socio-economic assumptions, and calibration. All of these changes were enhancements aimed at improving the accuracy of the model's forecasts. Combined, they have resulted in lower forecasted traffic volumes for the proposed Pellissippi Parkway Extension.

Using the new travel demand model, the projected traffic volumes on the Preferred Alternative, including all four-lane alternatives, are expected to be between 25,240 and 38,040 vehicles per day (vpd) by 2040, a reduction of 40 to 52 percent compared with previously predicted volumes. Project volumes for Alternative D are expected to be between 14,890 and 20,580 vpd by 2040, which represents a reduction of 19 to 32 percent from the volumes forecasted for 2035 under the previous model.

Under the previous analysis, the section of the Preferred Alternative from SR 33 to US 411 would operate at LOS F by 2035 while the section between US 411 and US 321/SR 73 would operate at LOS D in 2035. Under the current analysis, the predicted level of service for the Preferred Alternative is LOS C from SR 33 to US 411 and LOS B between US 411 and US 321/SR 73, by 2040. For Alternative D, the predicted levels of service were E or F under the previous model and would operate at unacceptable levels (E or F) under the current model.

The change in forecasted traffic on the Pellissippi Parkway Extension does not alter the need for the project, the selection of the Preferred Alternative with West Shift, or the conclusion that Alternative D performs poorly and needs no further evaluation. The Pellissippi Parkway Extension project, as a four-lane roadway, continues to be justified even with the reduction in

traffic forecasts from the new model. The project still attracts sufficient traffic volumes to justify a four-lane roadway.

Improvement in level of traffic service on the roadway network is not the sole or primary purpose for this project. As articulated in the project's Purpose and Need statement, there are limited mobility options in the northeastern portion of Blount County because of the county's primarily radial roadway network. The existing road network in the northeastern portion of the county (east of Alcoa and Maryville) radiates out of Maryville, with connections between the primary radial routes (SR 33, Wildwood Road, US 411 and US 321/SR 73) being a series of disconnected and circuitous two-lane local roads. A northwest/east connection is lacking to help serve expanding residential development in eastern Alcoa and Maryville and northeastern Blount County. The project, as a new four-lane roadway, would complete Pellissippi Parkway (SR 162) as envisioned by local and regional plans since the 1970s. The proposed extension is included in current local and regional plans and is an important project to improve mobility. The project would also assist in achieving acceptable traffic operations on the transportation network.

3.1.3. Crash Analysis

During the preparation of the DEIS, crash data was originally analyzed for a 3-year period from January 1, 2003, through December 31, 2005, then subsequently for the 2-year period from January 1, 2006, through December 31, 2007. The 2006–2007 crash data was reported in the DEIS. A new crash analysis was conducted in 2014, using the last three full years of available data—January 1, 2010, to December 31, 2012.

The crash data includes information such as location, date, time of day, severity (including the total number of involved vehicles, injuries, and fatalities), crash events, weather conditions, and lighting conditions. Table 11 shows the types of crashes that were reported during the analysis period.

Table 11: Crash Types 2010-2012

	# Crashes	% Total Crashes
Total crashes	1,916	
Property crashes only	1,442	75%
Non-capacitating injury	386	20%
Incapacitating injury	77	4%
Fatality	11	1%

Source: Parsons Brinckerhoff, *Crash Analysis Report Update*, February 2014.

Of the 11 fatal crashes, the majority (seven) were multi-vehicle crashes while four were single-vehicle crashes. Most of these fatal crashes occurred under clear, daylight conditions, and the majority (seven) occurred along SR 115/US 129. Most crashes were rear-end or angle crashes between multiple vehicles at intersections.

For the crash analysis, TDOT uses several factors to define the frequency and severity of crashes during the specific study period, identify any statistical trends in the crash data, and determine if any segments, spots, or intersections within the study area are eligible for funding for safety improvements. These factors include the following:

-
- Exposure rate (E) is the distance traveled by vehicles in a segment of roadway and measured in the analysis by million vehicle-miles.
 - Actual crash rate (R) is the number of crashes per million vehicle-miles.
 - Average crash rate (R_A) is the average crash rate on roadways with similar lane configurations and functional classifications throughout the state of Tennessee.
 - Critical crash rate (R_C) is a limit above which the difference between the actual and average crash rates becomes statistically significant and is not due to normal variation.
 - Critical Crash Rate Ratio is the proportion of actual crash rate to critical crash rates.

Table 12 presents the crash analysis for each segment, including the number of total crashes for each section during the study period, the exposure rate, the actual crash rate for the segment plus the average crash rate for similar roads in the state, the critical crash rate, and the ratio of actual to critical crash rates.

As noted in Table 12, portions of three roadways exceeded the critical crash rate (having an R/R_C ratio of greater than 1):

- US 321/SR 73 (Lamar Alexander Parkway) in Maryville from US 129/SR 115 (Alcoa Highway) to SR 73 (Washington Street);
- Hall Road (SR 35) from US 129/ SR 115 in Alcoa to US 411 (Sevierville Road) in Maryville; and
- SR 33 (Broadway Avenue) from Henry Street in Maryville to Pellissippi Parkway (I-140) in Alcoa.

The analysis did not indicate a high crash rate on US 129/SR 73; however, this highway had a high number of crashes throughout the study area. The high number of crashes indicates there could be some safety issues related to the high volume of traffic and lack of access management on the northern portion of the highway.

Table 12: Crash Rate Analysis, 2010 - 2012

Route	Start Log Mile	End Log Mile	Total Crashes	Exposure Rate (E)	Actual Crash Rate (R)	Average Crash Rate (R _A)	Critical Crash Rate (R _C)	Critical Crash Rate Ratio (R/R _C)
Cusick Rd.	0.00 (Airport Hwy, SR 115)	1.76 (Pellissippi Pkwy)	10	7.865	1.271	2.895	4.370	0.291
Wildwood Rd.	0.00 (E. Broadway, SR 33)	3.75 (Little River Bridge)	27	13.979	1.931	2.895	3.990	0.484
Pellissippi Parkway (I-140)	0.00 (Alcoa Hwy, SR 115)	2.54 (SR 33)	4	30.294	0.132	0.981	1.416	0.093
Lamar Alexander Pkwy (SR 73 / 1US 231)	10.57 (Alcoa Hwy, SR 115)	11.65 (W Broadway, SR 33)	96	26.814	3.580	1.777	2.394	1.495
	11.66 (W Broadway, SR 33)	11.83 (Montvale Rd)	27	4.527	5.964	1.777	3.345	1.783
	11.84 (Montvale Rd)	12.52 (Washington St, SR 73)	59	15.284	3.860	1.777	2.603	1.483
	12.53 (Washington St, SR 33)	17.21 (Knox Urban Boundary)	170	103.104	1.649	1.777	2.087	0.790
	17.22 (Knox Urban Boundary)	22.33 (Foothills Pkwy)	46	79.667	0.577	0.733	0.963	0.600
Hall Road (SR 35)	0.00 (Alcoa Hwy, SR 115)	2.02 (Lincoln Rd)	189	44.535	4.244	1.777	2.253	1.884
	2.03 (Lincoln Rd)	2.97 (Sevierville Rd, US 411)	110	23.134	4.755	2.466	3.247	1.464
	2.98 (Sevierville Rd, US 411)	7.93 (Little River Bridge)	88	53.010	1.660	2.334	2.832	0.586
Washington St (SR 447 / US 35)	0.00 (Lincoln Rd)	0.16 (Lamar Alexander Pkwy)	15	28.429	4.254	2.466	4.554	0.934

Table 12: Summary of Crash Rate Analysis 2010-2012 (con't)

Route	Start Log Mile	End Log Mile	Total Crashes	Exposure Rate (E)	Actual Crash Rate (R)	Average Crash Rate (R _A)	Critical Crash Rate (R _C)	Critical Crash Rate Ratio (R/R _C)
SR 33 (Broadway and Old Knoxville Hwy.)	10.38 (SR 115)	10.67 (north of Henry St)	12	5.477	2.191	1.777	3.193	0.686
	10.68 (north of Henry St)	12.34 (SR 35, Hall Rd)	96	31.354	3.062	2.334	2.985	1.026
	12.35 (SR 35, Hall Rd)	13.16 (Everett High Rd)	34	8.961	3.794	2.334	3.578	1.061
	13.17 (Everett High Rd)	14.18 (Wildwood Rd)	55	14.732	3.733	2.334	3.295	1.133
	14.19 (Wildwood Rd)	15.47 (Hunt Rd)	70	20.204	3.465	2.334	3.150	1.100
	15.48 (Hunt Rd)	15.86 (Pellissippi Pkwy, SR 162)	35	6.462	5.417	2.334	3.810	1.422
	15.87 (Pellissippi Pkwy, SR 162))	18.75 (Caney Branch Rd)	62	20.003	3.099	2.334	3.154	0.983
	18.76 (Caney Branch Rd)	20.64 (Knox County Line)	22	10.337	2.128	2.334	3.488	0.610
SR 115 / US 129)	10.45 (W Broadway,	20.40 (Knox County Line)	672	471.854	1.424	1.777	1.921	0.742
Lincoln Road	0.42 (Hall Rd, SR 35)	0.84 (Wright Rd)	4	3.679	1.087	2.895	5.095	0.213
	0.85 (Wright Rd)	1.41 (Harding St)	7	4.906	1.427	2.404	4.135	0.345
	1.42 (Harding St	2.14 (Wildwood Rd)	6	6.308	0.951	2.895	4.551	0.209

Source: Parsons Brinckerhoff, *Crash Analysis Report Update*, February 2014.

Summary of Crash Analysis

The existing transportation system requires travelers moving between the northwestern portion of Blount County and the eastern portions of the county to use a route that includes sections of US 321/SR 73, Hall Road (SR 35), Washington Street (SR 35/SR 447), US 129/ SR 115 Bypass, or SR 33. A transportation option that would divert some through travelers away from Hall Road/Washington Street, portions of US 129/SR 115, and portions of US 321/SR 73 in the center of Maryville could help to reduce the number of crashes. Other opportunities to lower the crash rates would be the planned improvements to US 129/SR 115 north of Pellissippi Parkway and the proposed Relocated Alcoa Highway project. The Relocated Alcoa Highway project, however, would not resolve the crash issues in the Maryville core.

The proposed project would be expected to divert traffic from roadways in the study area to the proposed Pellissippi Parkway Extension. This transfer would result in a decreased exposure rate (previously defined as the distance traveled by all vehicles traversing a segment of roadway) for roadways in the study area with a corresponding increase for the proposed roadway. However, the statewide average crash rate for roadways similar to the proposed roadway (four-lane divided freeway) is 0.981, which is less than the average or calculated crash rates for most of the roadways in the study area. As such, assuming crash rates for the study area remain similar to those during the study period, transferring traffic volumes from roadways in the study area to the proposed roadway may reduce the total crashes in the area.

3.2. Land Use and Community Facilities

Since the approval of the DEIS, there have been minor changes in land use in the project vicinity. As reported in the DEIS, the Pellissippi Place technology research and development park at the northwestern terminus of the project (east side of SR 33 at the half interchange with existing Pellissippi Parkway) was expected to open in 2010 and 2011. The first phase of Pellissippi Place broke ground in November 2008 and the basic infrastructure was completed in 2010, but many of the targeted technology businesses have not expanded given the recent economic downturn. In February 2013, the anchor tenant, specializing in proton technology, was announced. Company officials indicated their intention to construct their project in two phases. By 2015, the completion of Phase 1, the company expects to have 110 employees and 30,000 square feet of testing and assembly area. With anticipated completion of Phase 2 in 2018, there will be 150,000 square feet in two buildings and 500 employees.

The 96-acre Sweetgrass Plantation subdivision on Centennial Church Road, near the southern terminus of the project, was planned prior to the publication of the DEIS. Since 2010, ten new homes have been built and occupied. These residences are scattered throughout the subdivision. The estimated value of the homes is between \$300,000 and \$500,000.

A new church, Rio Revolution Church, was recently constructed and opened on the north side of US 321/Lamar Alexander Parkway, just east of the proposed westbound ramp for the Preferred Alternative.

While scattered new homes have been constructed in the project area, no other new subdivisions or major developments have occurred in the project vicinity.

3.3. Social and Economic Conditions

Since the approval of the 2010 DEIS, the U.S. Census Bureau made available 2010 census data. In addition, relevant economic data has been updated yearly. The following section of this reevaluation highlights the most recent census update and economic data now available for the project area.

3.3.1. Population Trends and Forecast

According to the 2010 census, the population in Blount County has grown from 105,823 persons in 2000 to 123,010 persons in 2010; this represents an average annual growth rate of 1.6 percent. This period's growth rate is substantially lower than the population increase between 1990 and 2000 (2.3 percent). Recent projections of population growth by the University of Tennessee's Center for Business and Economic Research (CBER) in 2013 indicate that the county's population will continue to grow but at lower pace by 2030. The CBER projects the county's 2030 population to be 155,543 individuals, for an average annual growth rate of 1.3 percent; that growth rate is somewhat lower than what the CBER projected in 2009 for the year 2030 (1.8 percent).

3.3.2. Race and Ethnicity

The 2010 census reports that 15,322 people were living in the three census tracts that cover the project area (Tracts 109, 110.01, and 110.02). (Refer to Figure 5 for the census geography.)

Whites comprise approximately 95 percent of the population while minorities comprise 5 percent. Hispanics are the largest minority group represented in these census tracts, followed by Black/African American and those persons classifying themselves as "Some Other Race." In the project area, the Hispanic population has surpassed other minority groups in population since 2000. The Hispanic population within the study area is highest in Census Tract 110.01 Block Group 1, at 5.9 percent; this block group encompasses the Kensington Place mobile home community on the west side of the southern terminus of the project.

Minority residents are fairly dispersed across the three census tracts, although the highest concentration of minorities is seen in Census Tract 109 Block Group 3, at 9.1 percent. The lowest share of minority residents is in the block groups to the south and southeast of the study area.

Legend

- Census Tracts
- Block Groups
- City of Maryville
- City of Alcoa
- Eagleton Village
- City of Rockford

Map Labels:

- Rockford
- Alcoa
- Eagleton Village
- Maryville
- Census Tract 109 Block Group 1
- Census Tract 109 Block Group 2
- Census Tract 109 Block Group 3
- Census Tract 109 Block Group 4
- Census Tract 110.01 Block Group 1
- Census Tract 110.01 Block Group 2
- Census Tract 110.01 Block Group 3
- Census Tract 110.02 Block Group 1
- Census Tract 110.02 Block Group 2
- Preferred Alternative (A) and Alternative C
- Alternative D
- Alternative C
- Preferred Alternative (A)

Scale: 0 0.275 0.55 1.1 Miles

Reevaluation of 2010 DEIS, July 2014

3.3.3. Personal Income and Poverty Levels

Income levels (median household income and per capita income) in Blount County continue to be higher than the statewide average. Two of the three census tracts that comprise the project area (Tracts 109 and 110.02) have average income levels exceeding that of Blount County. These census tracts also have substantially lower percentages of persons living below the poverty level than the state and Blount County averages.

Census Tract 110.01, in the southern portion of the study area, has lower income levels and higher proportions of residents living below the poverty level when compared to the state, Blount County, and the rest of the project area. The median household and per capita incomes for Census Tract 110.01 are about 20 percent lower than for Blount County.

3.3.4. Existing Economic Characteristics

According to the U.S. Census Bureau, approximately 77 percent of the available labor force in Blount County worked in Blount County in 2010, up from the estimate of 64 percent of Blount County workers working in the county in 2000. The vast majority of those who work outside of Blount County commute to Knox County for their employment (<http://www.planeasttn.org/Newsroom/NewsArchive/ArticleView/ArticleId/48/New-Census-Figures-Confirm-Regional-Connections.aspx>).

The Tennessee Department of Labor and Workforce Development in its 2012 *Labor Force Estimates Summary* (<http://www.tn.gov/labor-wfd/lmi.shtml>) reported the labor force within Blount County in 2012 averaged 63,860 individuals, with an unemployment rate of 6.8 percent compared to that of Tennessee, which had an average unemployment rate of 8.0 percent.

Tourism continues to be an important part of Blount County's economy due in large measure to its proximity to the Great Smoky Mountains National Park. In 2011, Blount County ranked eighth in Tennessee for visitor spending; tourism expenditures were approximately \$305.28 million, which represented a 12 percent increase from 2010. Blount County experienced the second-highest percent increase in tourism expenditure in East Tennessee, behind Jefferson County. About 2,800 people were employed in the tourism industry in the county in 2011, with an annual payroll of approximately \$72 million. Annual local sales tax receipts for Blount County in 2011 were about \$9.5 million (Research Department of the U.S. Travel Association, *The Economic Impact of Travel on Tennessee Counties*, 2011).

3.3.5. Economic and Fiscal Impacts

For the DEIS, an Economic and Fiscal Impact Study was prepared (Parsons Brinckerhoff, June 2009). The overall finding was that the project is expected to have a positive effect on the economic stability of the project area and Blount County. The 2009 study was reviewed in June 2014 to confirm whether the findings remain valid.

The implications of the new traffic forecasts are the reduced potential for land use change (induced growth). Per the earlier analysis, change in accessibility and expected growth were identified as key factors influencing induced development. It appears that both accessibility benefits (in terms of travel-time reduction) and growth potential are estimated to be lower than previous estimates. This has a downward pull on induced growth. By extension, fiscal impacts of the project would also be lower than estimated previously. Fiscal impact is calculated as the difference between revenue generated and the cost of providing service to the new

development. For the original fiscal analysis, a standard Cost of Community Service multiplier was used to estimate the cost of providing service using the tax revenue generated by the new development. Therefore, if the tax revenue is lower (because of reduced growth), the difference between revenue and the cost of providing additional services will also be a lower number.

Given the revised lower estimates for traffic volumes and economic growth potential, it is highly likely that induced growth potential, and thus fiscal impact of the project, would be even lower than those estimated by the 2009 Fiscal Impacts Analysis study. These changes do not result in a substantial change from initial findings in the 2009 study.

3.4. Displacements and Relocations

An update of the Conceptual Stage Relocation Plan in 2014 identified the number of homes and businesses that would be relocated as a result of the project alternatives (see Appendix D for a copy of the plan). The results are summarized in Table 13. The number of homes that would be displaced by Alternative D has nearly doubled since the DEIS was published, indicating some new development along the corridor. The DEIS reported that 21 single-family homes and three mobile homes would be displaced, compared with 39 single-family residences and two mobiles home currently.

Table 13: Displacements and Relocations

Displacement	Preferred Alternative (A)	Preferred Alternative with East Shift	Preferred Alternative with West Shift	Alternative C	Alternative D
Single-Family Units	5	5	5	25	39
Mobile Homes	0	1	6	2	2
Businesses	1	1	1	1	2
Total (2014 update)	6	7	12	28	43
Total reported in DEIS	6	N/A	N/A	28	24

Source: TDOT, Conceptual Stage Relocation Plan, May 2014.

The Preferred Alternative (A) and the Preferred Alternative with East Shift would displace five single-family residences each, and the East Shift would displace one mobile home. In addition to five single-family residences elsewhere in the project area, the Preferred Alternative with West Shift would displace six mobile homes that are clustered in the northeast corner of the Kensington Place mobile home community. The impacts to the mobile home park are discussed in greater detail in Section 3.5, Environmental Justice.

Results of the 2014 survey indicate that the supply of available property in the project area appears to be adequate to satisfy the relocation requirements of the six to eleven households and one business affected by the Preferred Alternative (A), Preferred Alternative with East Shift, and Preferred Alternative with West Shift. Alternatives C and D would have a greater impact with between 27 and 41 households requiring relocation. While research indicates that the supply of available housing in the area should be adequate to meet the residential relocation requirements, it would take more time to identify and secure available housing for the larger number of households under Alternative D. No problems are anticipated with relocation of the affected business or businesses on each of these alternatives.

3.5. Environmental Justice

The approved DEIS included the finding that the project would have no disproportionately high and adverse impacts to minority and low-income populations compared with the rest of the corridor, pursuant to Title VI of the 1964 Civil Rights Act and Executive Order 12898.

In 2014, TDOT updated the Environmental Justice (EJ) analysis for the project alternatives in conformity with the U.S. Department of Transportation's (DOT) 2012 Departmental Order 5610.2(a), *DOT Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*.

The updated analysis focused on the Preferred Alternative (A), Preferred Alternative with East Shift, Preferred Alternative with West Shift, and DEIS Alternatives C and D. The analysis is documented in the memorandum dated June 9, 2014, *Updated Environmental Justice Analysis as Part of the Reevaluation of the Draft Environmental Impact Statement (DEIS)*. A copy of the memorandum is in Appendix E.

The updated EJ analysis:

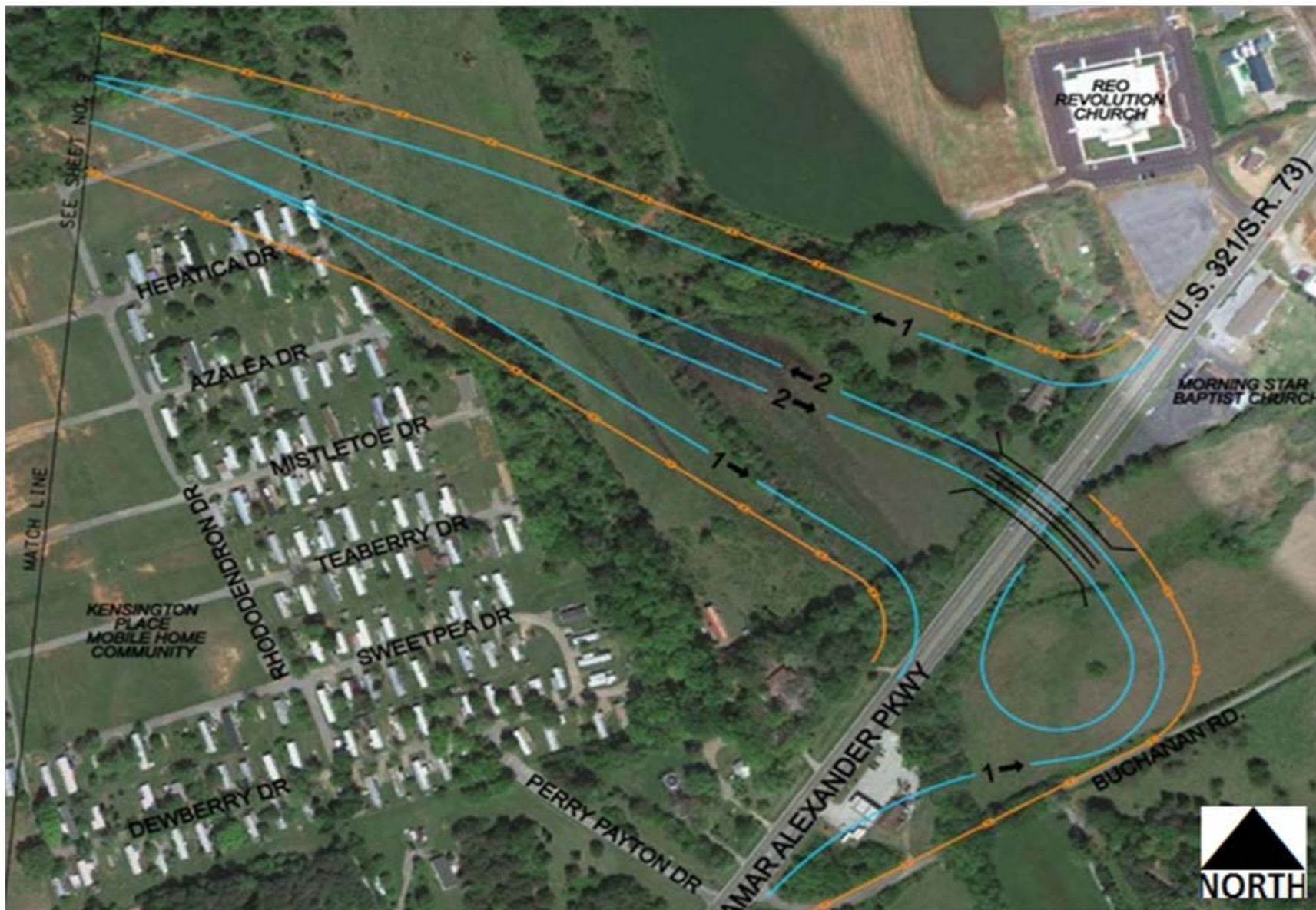
- Identified potential low-income and minority populations in the project area, which was defined in the DEIS and has not changed;
- Described potential impacts to identified EJ communities as well as mitigation measures to minimize impacts to those communities;
- Described coordination activities to achieve public participation and input from low-income and minority persons; and
- Addressed alternatives considered to avoid or minimize impacts to the protected populations.

3.5.1. Identification of Potential Environmental Justice Communities in the Project Area

Within the project area there are scattered locations of low-income and/or minority persons. Only one area, however, has a concentration of the protected populations (low income and minority) that would be directly affected by the project. The EJ community is the Kensington Place mobile home community.

The Kensington Place community is on the north side of US 321/SR 73, to the east of the Maryville city limits, at the southern end of the proposed project. The development, owned by the Kensington Place MHP, LLC, in Royal Oaks, Illinois, has 163 mobile home site pads with electric hook-ups. Over 70 percent of the site pads have a mobile home on the pad. Most of the mobile homes are occupied, and most are owner occupied, according to the mobile home park manager in a May 30, 2014 telephone conversation. Figure 6 illustrates the layout of the mobile home community.

Figure 6: Kensington Place Mobile Home Community



Source: Parsons Brinckerhoff, September 2013. Alignment shown is Preferred Alternative with West Shift.

Census Tract 110.01, Block Group 1 (CT 110.01 BG 1), which encompasses the mobile home community has a substantially higher percentage of population below the poverty level (27.7 percent)) compared with the county and most of the other block groups in the vicinity of the project. This block group is crossed by all project alternatives considered in this reevaluation. There are, however, concentrations of low-income persons elsewhere in the county. Figure 5 shows the location of census tracts and block groups in the project area. The memorandum in Appendix E provides detailed tables and figures showing the analysis of census data.

Other block groups in the project area have higher percentages of minority persons than the block group in which the Kensington Place community is located. Looking more in detail at the census block level, there are scattered individual blocks in the project area with greater than 10 percent minority concentrations, and one block along Wildwood Road has 50 percent minority residents. The blocks that comprise the Kensington Place mobile home community have a concentration of minority persons. This community has a much larger share of minority residents (23.7 percent) compared with the vast majority of the surrounding area. Most of the minority population within the community is Hispanic. Overall, Hispanic persons comprise about 20 percent of the total population of the community.

With the higher ethnicity reported in the southern portion of the project area, another factor to consider is that of limited English proficiency, although this is not a protected category under Executive Order 12898. There are concentrations of Spanish speakers in two of the census block groups in the vicinity of the project alternatives. In the census block group encompassing the Kensington Place mobile home community (CT 110.01, BG 1), 9.7 percent of people speak Spanish or Spanish Creole as their primary language. Another block group in the project area (CT 109, BG 3) has a higher portion of persons speaking Spanish or Spanish Creole (12.5 percent) as their primary language. This block group also has the highest concentration of minority residents in the project area. While CT 109, BG 3 is crossed by the combined alignment of the Preferred Alternative (A), Preferred Alternative with East Shift, and Preferred Alternative with West Shift, and Alternative C, there are only scattered individual homes in the immediate vicinity of the combined alignment. The concentrations of the limited English proficiency population of this block group are farther west, closer into Maryville.

3.5.2. Potential Impacts to Environmental Justice Communities

The No-Build Alternative and Alternatives C and D would have no direct effect on the Kensington Place community. The impacts of the Preferred Alternative (A), the Preferred Alternative with East Shift, and the Preferred Alternative with West Shift on Kensington Place are discussed below. The primary impacts would be displacements and relocation, visual, and noise.

Land Acquisition and Relocations

As analyzed in the DEIS, Alternative A (Preferred Alternative) would have an effect on the low-income and minority mobile home community, taking about 1.5 acres of land from the northeastern edge of the community, but not acquiring any of the mobile homes. The West Shift would move the ROW of the Preferred Alternative farther into the mobile home community, taking about 4.8 total acres. This alternative would acquire six occupied mobile homes. The East Shift would move the ROW of the Preferred Alternative outside the community boundary.

Visual Impacts

The Preferred Alternative (A) would result in a visual impact by placing a major new transportation facility within the northwestern corner of the Kensington Place community property. The ROW edge would be about 80 feet from the closest mobile home. Some of the residents, primarily those in the northeastern portion of the mobile home community, would experience a substantial change in their existing view, from natural vegetation and agricultural activities to a new roadway.

The Preferred Alternative with West Shift would move the new transportation facility farther into the community boundary than the Preferred Alternative (A). Six mobile homes would be removed, and the remaining residents in the northeastern portion of the mobile home community would experience a substantial change in their existing view, from natural vegetation and agricultural activities to a new roadway. The new edge of ROW would be within 10 to 50 feet of several mobile homes along Hepatica Drive.

With the Preferred Alternative with East Shift, the new roadway would be outside of the community, and would be farther away both physically (about 400 feet) and visually from the mobile homes.

Noise Impacts

The three Preferred Alternatives would result in noise impacts to the Kensington Place community. The Preferred Alternative (A) and the Preferred Alternative with East Shift would result in noise impacts to 29 and 28 residences in the Kensington Place community, respectively. The West Shift would affect more residences (50) in Kensington Place, assuming a noise barrier would not be built.

In compliance with TDOT's 2011 Noise Policy, noise barriers were evaluated to mitigate the predicted noise impacts in the Kensington Place community. The results of this preliminary analysis indicate that a noise barrier would not be feasible and reasonable at this location under the Preferred Alternative with East Shift, but would be feasible and reasonable under the Preferred Alternative with West Shift. To minimize adverse impacts to the mobile home community, TDOT has committed to build a noise barrier for the community with the Preferred Alternative with West Shift, provided that benefited residences and property owners give their approval.

Table 14 summarizes the as-built impacts expected to occur in the Kensington Place community with the East Shift (with no noise barrier) and the West Shift (with a barrier). Under the West Shift with a noise barrier, 20 residences would experience a substantial increase in noise. With the East Shift, 28 homes within the community would experience a substantial noise increase without the benefit of a noise wall. Under either alternative, two homes would approach or exceed the Noise Abatement Criteria (NAC) of 67 dBA; that is, noise levels would be 66 dBA or higher. These two homes are along Lamar Alexander Parkway, not technically a part of the mobile home park, and their current noise levels are 62 to 63 dBA due to the existing noise on Lamar Alexander Parkway. Noise levels with either shift would be between 66 and 68 dBA at these residences.

Table 14: As-Built Noise Impacts

Alternative	Substantial Increase	Approach or Exceed NAC	Increases Higher than the Other Shift
West Shift (with barrier)	20	2	45
East Shift (no barrier)	28	2	8

Source: Bowlby and Associates, Preliminary Findings of Noise Analysis, May 2014.

Both alternatives would result in increased noise for residents of the mobile home community. Sound levels would be higher with the West Shift with a barrier for 45 residences; under the East Shift without a barrier sound levels would be higher for eight residences. The differences in noise level increases between the two alternatives is primarily 3 dBA or less; 3 dBA is usually the smallest change in traffic noise levels that people can detect without specifically listening for the change. The West Shift would cause a higher increase (4 to 5 dBA) at three residences while the East Shift would cause a 4 to 5 dBA increase at four residences. Twelve of the residences would have the same level of increase for either alternative. Based on this assessment, the differences in the as-built noise impacts of the East and West Shifts do not appear to be significant.

3.5.3. Coordination, Access to Information, and Participation

Throughout the EIS process there have been substantial efforts to achieve public participation along the proposed corridor and in the project area. In 2010, copies of the announcement of the availability of the DEIS and the public hearing were hand delivered to the Kensington Place mobile home park manager for distribution to the community. As part of the community briefing TDOT held on May 30, 2013 to provide information about the potential shifts in the alignment of the Preferred Alternative, TDOT provided announcements and materials in English and Spanish. TDOT also sent direct mailings printed in both English and Spanish to the mobile home community residents and provided a Spanish translator to ensure full understanding of the concepts presented.

The meeting was attended by 136 persons (those who signed in), and TDOT received more than 150 comments, including comments from persons residing in Kensington Place. Appendix B contains a summary of the Community Briefing comments and TDOT responses.

3.5.4. Environmental Justice Summary

Consistent with Executive Order 12898 on Environmental Justice and the Final DOT Environmental Justice Order 5610.2(a), FHWA must ensure that any of its respective programs, policies, or activities that may have a disproportionately high and adverse effect on populations protected by Title VI ("protected populations") will only be carried out if:

- (1) A substantial need for the program, policy, or activity exists, based on the overall public interest; and
- (2) Alternatives that would have less adverse effects on protected populations (and that still satisfy the need identified in part (1)), either
 - a. Would have other adverse social, economic, environmental or human health impacts that are severe; or
 - b. Would involve increased costs of extraordinary magnitude.

The Preferred Alternative with West Shift would result in adverse impacts to the low-income and minority residents in the Kensington Place mobile home community. Residents of Kensington Place would experience adverse impacts due to increased noise, changes in the views, and displacements. To mitigate for the adverse impacts to the protected population TDOT has committed to build a noise barrier for the Kensington Place mobile home community to mitigate the predicted noise impacts. TDOT also will seek input from community residents regarding the landscaping and color/pattern of the barrier in order to minimize possible visual impacts to the community as a result of the barrier and the new roadway.

The other alternatives would minimize or avoid adverse impacts to the mobile home community; however, TDOT determined that the other alternatives would result in other adverse social, economic, environmental, or human health impacts that would be substantial.

The Preferred Alternative (A) would adversely affect a National Register eligible archaeological site.

The Preferred Alternative with East Shift would have the following impacts:

- Operations of two active farms – The East Shift would take five farm buildings and reduce access to agricultural fields in active production.
- A recently constructed church (Reo Revolution Church) is on the north side of US 321 immediately east of the proposed on-ramp for the East Shift – The alignment would reduce access to the church by members during heavy traffic times and may result in increased visual and noise impacts to external activities of the church.
- Increased noise levels for Kensington Place residents for both alignment shifts – With the eastern shift, the mobile home community would not be eligible for a noise barrier. As shown in Table 14, the differences in the as-built noise impacts of the East and West Shifts do not appear to be significant.

DEIS Alternative C would avoid direct impacts to the protected populations in Kensington Place, but it would result in other impacts that would be severe if the EJ community were avoided. Adverse impacts include the following:

- Displacing 25 single-family homes and two mobile homes (total of 27 residences). Twenty-three of the 27 residences to be displaced are in two clusters. One cluster is in the footprint of the proposed interchange with Sevierville Road (US 411) in which 11 homes would be displaced in the vicinity of the Tara Estates subdivision. The second cluster is in the footprint of the proposed interchange with US 321, in which 12 residences would be displaced north and south of US 321 in the Hubbard community. This alternative would adversely affect community cohesion in these areas.
- Affecting more downstream reaches of larger tributaries of Little River than the Preferred Alternative with West Shift.

DEIS Alternative D would avoid direct impacts to the protected populations in Kensington Place, but it would result in other impacts that would be severe if the EJ community were avoided. Adverse impacts include the following:

- Displacing 39 single-family residences and two mobile homes (total of 41 residences). The displaced residences are scattered along the alignment, but 17 of the 41 are

clustered in the vicinity of the Peppermint Hills Drive community. The alternative would adversely affect community cohesion in this area.

- The forecasted traffic volumes for Alternative D exceed the carrying capacity of a two-lane road; thus, this alternative would not serve the traffic demands that are anticipated in future years.
- Proximity to the Little River, a designated Exceptional Tennessee Water that is Blount County's primary source for drinking water.

This analysis is presented in the June 9, 2014, updated *Environmental Justice Technical Memorandum*, in Appendix E to this reevaluation.

The TDOT Civil Rights Office has reviewed the Environmental Justice memorandum and found that the assessment and methodology used is in keeping with the laws that govern projects that are federally funded, specifically Title VI of the 1964 Civil Rights Act. The letter (dated June 10, 2014) is included in Appendix E.

3.6. Farmlands

During the DEIS, TDOT coordinated with the Natural Resource Conservation Service (NRCS) and completed a Form NRCS-CPA-106 for the three DEIS Alternatives (A, C, and D). With the identification of the proposed avoidance shifts for the Preferred Alternative, TDOT coordinated again with the NRCS and completed a new Form NRCS-CPA-106 for the Preferred Alternative (A), Preferred Alternative with East Shift, and Preferred Alternative with West Shift (see Appendix F). In reevaluating the farmlands, the NRCS excluded areas within the city limits of Alcoa and the census-designated area of Eagleton Village from area and acreage calculations since urbanized areas are exempt from the provisions of the Farmland Protection Policy Act. The results of the 2013 coordination are summarized in Table 15. The differences in impact among the Preferred Alternative (A) and the two alignment shifts are minor.

Table 15: Farmland Impacts

	Preferred Alternative (Alternative A) ¹	Preferred Alternative with East Shift ¹	Preferred Alternative with West Shift ¹	DEIS Alternative C ²	DEIS Alternative D ²
Total land in ROW (acres)	197	198	200	187	120
Total farmland in ROW (acres)	107	107	110	74	45
Farmland as % of total land in ROW	54%	54%	55%	40%	38%
Total prime farmland in ROW (acres)	31	30	34	44	23
Total Statewide and Local Important Farmland (acres)	49 ³	50	48	0 ³	0 ³
% of Blount County farmland to be converted	0.01%	0.01%	0.01%	0.01%	0.01%
Total Corridor Assessment Score	141	140	141	122	127

¹ NRCS, 2013, and Parsons Brinckerhoff, May 2013.

² NRCS, 2009, and Parsons Brinckerhoff, 2009.

³ In 2008, NRCS reported 0 acres for all of the DEIS Alternatives on the CPA-106.

In May 2014, TDOT contacted the NRCS to request assistance in updating the evaluation of the previously considered DEIS Alternatives C and D. In an email response from NRCS to TDOT dated May 16, 2014, the NRCS indicated that there were no significant differences with the information previously submitted for these alternatives; the spatial data included with the 2014 request is identical to the data used for the 2009 evaluation. Thus, the NRCS did not see the need to update the information on these two alternatives.

For all alternatives, the total corridor assessment score is less than 160 points. Thus, no other alternatives need to be evaluated.

All project alternatives would have direct impacts to farmlands and farming operations in the project area; however, little has changed since the DEIS was circulated. TDOT has committed to work with farmers during the final design of the project to reduce the impacts on farmlands as much as possible based on available design solutions.

3.7. Cultural Resources

3.7.1. Archaeology

During the DEIS, five archaeological sites within the footprint of Preferred Alternative (A) were recommended as potentially eligible for the NRHP pursuant to 36 CFR 60.4, Criterion D. Following the selection of the Preferred Alternative, TDOT conducted a Phase II investigation of these five sites to determine whether any were eligible for the NRHP. The testing revealed that one of the five sites (40BT122) is eligible for the NRHP. This site was determined to be a high-density prehistoric lithic quarry/workshop dating predominantly to the Woodland Period. No human remains were found at this site. The findings of the investigation are documented in the report, *Phase II Archaeological Testing of Sites 40BT100, 40BT122, 40BT125, 40BT202, and 40BT203 along the Proposed Pellissippi Parkway Extension, Preferred Alternative (Alternative A)*, which is on file at TDOT's Environmental Division office. The SHPO concurred with the determination in a letter dated December 17, 2012; a copy of the letter is included in Appendix G.

TDOT then explored measures to avoid the eligible site found within the proposed ROW of the Preferred Alternative. Two minor alignment shifts were identified and additional Phase I assessments of the two shifts were conducted. The archaeological survey and testing demonstrated that no potentially eligible or eligible archaeological sites or deposits are within the two minor shifts. The results of that study are documented in the report, *Addendum A, B, and C: Archaeological Assessment of 40BT122 Eastern and Western Avoidance Alternatives*, which is on file at TDOT's Environmental Division office. The SHPO concurred with the findings in a letter dated July 8, 2013; a copy of the letter is included in Appendix G.

The findings of the studies have also been coordinated with the Eastern Band of the Cherokee, the only tribe to request to be a consulting party to the project. TDOT also provided the findings to the Muscogee (Creek) Nation, a recent addition to the list of tribes for this area and that had not previously received correspondence on the project. To date, no comments have been received from either tribe.

Since TDOT has been able to avoid the eligible site through a minor alignment shift in the southern portion of the project, the project will have no effect on archaeological resources.

3.7.2. Historic Resources

The findings of the *Historical and Architectural Survey and Assessment of Effects under 36 CFR 800* and the SHPO determination letter of “No Effect” dated May 5, 2009, remains valid for the project alternatives. (See email confirmation dated June 17, 2014 in Appendix G.)

3.8. Air Quality

TDOT prepared an update to the *Air Quality Technical Report* for this project in 2014. The proposed alternatives are not predicted to cause or exacerbate a violation of the National Ambient Air Quality Standards (NAAQS). The current *Air Quality Technical Report Update* is included in Appendix H.

3.8.1. Transportation Conformity

The project is in the Knoxville Nonattainment Area and is included in the *Regional Mobility Plan 2040* as project 09-232 and in the 2014-2017 TIP as TIP # 2014-025. The TIP describes the project as a “new four-lane road from Old Knoxville Hwy (SR 33) to SR 73 (US 321).” This project description and termini are consistent with all of the alternatives except for the two-lane Alternative D. Therefore, the Preferred Alternative (A), Preferred Alternative with East Shift, Preferred Alternative with West Shift and DEIS Alternative C are in conformity with the State Implementation Plan. Appendix A contains a copy of the current TIP project sheet and the *Regional Mobility Plan* project page.

Particulate Matter (PM) 2.5 Coordination

Since the project is in an area designated as being in nonattainment for particulate matter, an analysis for PM_{2.5} was required for the DEIS. TDOT completed a PM_{2.5} Hot-Spot Determination for the project that concluded that the project was “not a project of air quality concern.” TDOT submitted this determination to the Knoxville Area Interagency Consultation (IAC) group, and the IAC group members concurred with TDOT’s determination in January 2009.

Following the update of the design year 2040 traffic projections in 2013, TDOT asked the IAC to review the 2009 decision and validate the finding. The updated 2040 traffic projections are substantially lower than the previous design year 2035 projections used for the 2009 PM_{2.5} Hot-Spot Determination. Under the 2040 forecasts, the projected percentage of trucks remains the same. During a conference call on January 27, 2014, the IAC agreed that the previous determination (“not a project of air quality concern”) remains valid. Appendix H contains a copy of the January 30, 2014, email documenting the IAC’s concurrence with the 2009 finding.

3.8.2. Carbon Monoxide (CO) Hot-Spot Analysis

Blount County is an attainment area for carbon monoxide (CO), a colorless, odorless gas that interferes with the delivery of oxygen to a person’s organs and tissues. However, a CO evaluation is needed since an EIS is being prepared for the project.

The NAAQS for CO include a 1-hour standard of 35 parts per million (ppm) and an 8-hour standard of 9 ppm. The *Guideline for Modeling Carbon Monoxide from Roadway Intersections* published by EPA (EPA Guideline) indicates that signalized intersections that operate at LOS A, B, or C do not require further analysis because the delay and congestion would not likely cause or contribute to an exceedence of the CO NAAQS. As a result, CO modeling is only required at signalized intersections that operate at LOS D or worse during any hour.

The alternatives under consideration would involve modifications to the following signalized intersections:

- Pellissippi Parkway (SR 162/I-140) and Old Knoxville Highway (SR 33): the four-lane alternatives (under Preferred Alternative (A), Preferred Alternative with East Shift, Preferred Alternative with West Shift, and Alternative C)
- Old Knoxville Highway (SR 33) and Sam Houston School Road (under Alternative D)

Since both intersections are predicted to operate at LOS D or worse in 2040 during the morning and afternoon peak hours, CO modeling of those intersections was completed.

Dispersion modeling for the intersections was conducted using the CAL3QHC computer model recommended by EPA for predicting CO concentrations near roadway intersections.

Table 16 summarizes the highest predicted 1-hour and 8-hour average CO concentrations for each intersection. The predicted 1-hour concentrations are well below the NAAQS of 35 ppm and the predicted 8-hour concentrations are well below the NAAQS of 9 ppm. Thus none of the alternatives are predicted to cause new violations or contribute to existing violations of the NAAQS in the design year 2040. Violations of the CO NAAQS would also not be predicted in any interim year since the maximum traffic volumes and worst congestion would occur in the design year.

Table 16: Maximum 1-hour and 8-hour CO Concentrations, Design Year 2040

Intersection	No-Build		4-lane Alternatives		Alternative D	
	AM	PM	AM	PM	AM	PM
1-Hour CO Concentrations						
Pellissippi Parkway (SR 162/I-140) and Old Knoxville Highway (SR 33)	1.6	1.7	1.7	2.0	2.1	2.0
Old Knoxville Highway (SR 33) and Sam Houston School Road	1.2	1.2	1.3	1.3	1.6	1.6
8-Hour CO Concentrations						
Pellissippi Parkway (SR 162/I-140) and Old Knoxville Highway (SR 33)	1.5		1.7		1.8	
Old Knoxville Highway (SR 33) and Sam Houston School Road	1.1		1.2		1.4	

Source: Parsons Brinckerhoff, *Air Quality Technical Report Update*, June 2014

3.8.3. Mobile Source Air Toxics

After the DEIS was published, the FHWA released its *Interim Guidance Update on Air Toxic Analysis in NEPA Documents*, December 6, 2012. As with the previous version (September 30, 2009), the guidance is intended to advise when and how to analyze Mobile Source Air Toxics (MSATs) in the NEPA process for highways. This guidance is interim because MSATs science is still evolving. As the science progresses, the FHWA will update the guidance.

As part of this reevaluation TDOT conducted a qualitative analysis to provide a basis for identifying and comparing the potential differences among MSATs emissions, if any, for the No-

Build Alternative and the Preferred Alternative. The assessment was derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*. Appendix H provides additional information regarding MSATs.

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

1. Exempt Projects and Projects with no Meaningful Potential MSATs Effects
2. Projects with Low Potential MSATs Effects
3. Projects with Higher Potential MSATs Effects

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

The Preferred Alternative (A), Preferred Alternative with East Shift, Preferred Alternative with West Shift, and Alternative C would construct a new four-lane divided highway with three new interchanges. Design-year traffic projections on the proposed extension are projected to be between 25,240 and 38,040 vehicles per day (vpd) in 2040. These volumes are substantially lower than the FHWA criterion. As a result, the project is considered to be a "Project with Low Potential MSATs Effects."

For the No-Build Alternative and the four-lane alternatives, the amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT), assuming that other variables such as fleet mix are the same for each alternative.

The VMT of the four-lane alternatives was determined for the affected roadway network as shown in Table 17. The link-by-link VMT analysis, provided in the *Air Quality Technical Report Update* in Appendix H, indicates that there would be no appreciable difference in overall MSATs emissions between the No-Build Alternative and the four-lane alternatives.

**Table 17: Design Year VMT Projections on Affected Roadway Network
(Four-Lane Alternatives)**

Alternative	Previous Design Year 2035 VMT	Current Design Year 2040 VMT	Change From Previous Design Year	Change from No-Build 2040
No-Build	1,876,068	1,359,807	-28%	n/a
4-lane alternatives: Preferred Alternative (A), Preferred Alternative with East Shift, Preferred Alternative with West Shift, and Alternative C	2,098,188	1,476,516	-30%	8.6%

Source: Parsons Brinckerhoff, *Air Quality Report Technical Update*, June 2014.

The traffic projections for the project were developed using the Knoxville TPO's updated travel demand model, which uses travel time rather than travel distance as an impedance. The calculated increase in VMT with the project likely occurs because the four-lane alternative would offer a more efficient travel route and would divert traffic from other more congested routes. New routes that utilize one of the four-lane alternatives might be longer than existing routes but would have shorter travel times. So while the VMT in the area might increase, the vehicle hours of travel would likely not increase and might actually decrease. Additionally, the new capacity of

the four-lane alternatives would free up capacity on existing travel routes making the entire system more efficient even though travel distances might increase.

With any of the four-lane alternatives there may be localized areas where VMT would increase, and other areas where VMT would decrease. The localized increases in MSATs concentrations would likely be most pronounced along the new roadway sections that would be built near or adjacent to area subdivisions such as Jackson Hills, Sweetgrass Plantation, and Kensington Place. However, even if these increases do occur, they too would be substantially reduced in the future due to implementation of the EPA's vehicle and fuel regulations.

A full analysis of Alternative D's impact on the broader study area's roadways was not conducted since the forecast volumes for Alternative D exceed the carrying capacity of a two-lane road. This is true even if that network of two-lane roads is improved by wider lanes, improved shoulders, and the straightening of substandard curves. However, the traffic projections for Alternative D only included projections for the improved two-lane roads (Sam Houston School Road, Peppermint Road, Hitch Road and Helton Road) that are incorporated into Alternative D. Traffic projections for existing roads from which traffic would be diverted, including Wildwood Road, Riverford Drive, Tuckaleechee Pike, and East Brown School Road, were not developed, although it is likely that a significant portion of the projected trips on Alternative D would be rerouted from these roads. As a result, the reduced VMT on these roads is not accounted for in Table 18 and the projected increase in VMT of 94.3 percent is significantly overestimated. The link-by-link VMT analysis is provided in the *Air Quality Report Update* in Appendix H.

Table 18: Design Year VMT Projections for Alternative D Roadways

Alternative	Year 2040 VMT	Change over No-Build
No-Build	49,889	n/a
Alternative D	98,921	94.3%

Source: Parsons Brinckerhoff, *Air Quality Report Technical Update*, June 2014.

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 annual MSATs emissions by over 80 percent from 2010 to 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 MSATs emissions in the study area are likely to be lower in the future in virtually all locations.

Under the proposed project it is expected there would be reduced MSATs emissions in the immediate area of the project, relative to the No-Build Alternative, due to the reduced VMT associated with more direct routing, and due to EPA's MSATs reduction programs. Substantial construction-related MSATs 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 MSATs emissions in the project area.

3.8.4. Greenhouse Gas Emissions (Climate Change)

Climate change is an important national and global concern. While the earth has gone through many natural changes in climate in its history, there is general agreement that the earth's

climate is currently changing at an accelerated rate and will continue to do so for the foreseeable future. Anthropogenic (human-caused) greenhouse gas (GHG) emissions contribute to this rapid change. Carbon dioxide (CO₂) makes up the largest component of these GHG emissions. Other prominent transportation GHGs include methane (CH₄) and nitrous oxide (N₂O).

Many GHGs occur naturally. Water vapor is the most abundant GHG and makes up approximately two-thirds of the natural greenhouse effect. However, the burning of fossil fuels and other human activities are adding to the concentration of GHGs in the atmosphere. Many GHGs remain in the atmosphere for time periods ranging from decades to centuries. GHGs trap heat in the earth's atmosphere. Because atmospheric concentration of GHGs continues to climb, our planet will continue to experience climate-related phenomena. For example, warmer global temperatures can cause changes in precipitation and sea levels.

To date, no national standards have been established regarding GHGs, nor has the EPA established criteria or thresholds for ambient GHG emissions pursuant to its authority to establish motor vehicle emission standards for CO₂ under the Clean Air Act. However, there is a considerable body of scientific literature addressing the sources of GHG emissions and their adverse effects on climate, including reports from the Intergovernmental Panel on Climate Change, the U.S. National Academy of Sciences, the EPA, and other federal agencies. GHGs are different from other air pollutants evaluated in federal environmental reviews because their impacts are not localized or regional due to their rapid dispersion into the global atmosphere, which is characteristic of these gases. The *affected environment* for CO₂ and other GHG emissions is the entire planet. In addition, from a quantitative perspective, global climate change is the cumulative result of numerous and varied emissions sources (in terms of both absolute numbers and types), each of which makes a relatively small addition to global atmospheric GHG concentrations. In contrast to broad-scale actions such as actions involving an entire industry sector or very large geographic areas, it is difficult to isolate and understand the GHG emissions' impacts for a particular transportation project. Furthermore, presently there is no scientific methodology for attributing specific climatological changes to a particular transportation project's emissions.

Under NEPA, detailed environmental analysis should be focused on issues that are significant and meaningful to decision-making.¹ The FHWA has concluded, based on the nature of GHG emissions and the exceedingly small potential GHG impacts of the proposed action, that the GHG emissions from the proposed action will not result in "reasonably foreseeable significant adverse impacts on the human environment" (40 CFR 1502.22(b)). The GHG emissions from the project's Build Alternatives will be insignificant and will not play a meaningful role in a determination of the environmentally preferable alternative or the selection of the Preferred Alternative. More detailed information on GHG emissions "is not essential to a reasoned choice among reasonable alternatives" (40 CFR 1502.22(a)) or to making a decision in the best overall public interest based on a balanced consideration of transportation, economic, social, and environmental needs and impacts (23 CFR 771.105(b)). For these reasons, no alternatives-level GHG analysis has been performed for this project.

The context in which the emissions from the proposed project will occur, together with the expected GHG emissions' contribution from the project, illustrate why the project's GHG emissions will not be significant and will not be a substantial factor in the decision-making. The transportation sector is the second-largest source of total GHG emissions in the U.S., behind

¹ See 40 CFR 1500.1(b), 1500.2(b), 1500.4(g), and 1501.7

electricity generation. The transportation sector was responsible for approximately 27 percent of all anthropogenic (human-caused) GHG emissions in the U.S. in 2009.² The majority of transportation GHG emissions are the result of fossil fuel combustion. U.S. CO₂ emissions from the consumption of energy accounted for about 18 percent of worldwide energy consumption CO₂ emissions in 2010.³ U.S. transportation CO₂ emissions accounted for about 6 percent of worldwide CO₂ emissions.⁴ However, while the contribution of GHGs from transportation in the U.S. as a whole is a large component of U.S. GHG emissions, as the scale of analysis is reduced the GHG contributions become quite small.

Mitigation for Global GHG Emissions

To help address the global issue of climate change, USDOT is committed to reducing GHG emissions from vehicles traveling on our nation's highways. USDOT and the EPA are working together to reduce these emissions by substantially improving vehicle efficiency and shifting toward lower carbon intensive fuels. The agencies have jointly established new, more stringent fuel economy and first-ever GHG emissions standards for model year 2012–2025 cars and light trucks, with an ultimate fuel economy standard of 54.5 miles per gallon for cars and light trucks by model year 2025. Further, on September 15, 2011, the agencies jointly published the first-ever fuel economy and GHG emissions standards for heavy-duty trucks and buses.⁵ Increasing use of technological innovations that can improve fuel economy, such as gasoline- and diesel-electric hybrid vehicles, will improve air quality and reduce CO₂ emissions in future years.

Consistent with its view that broad-scale efforts hold the greatest promise for meaningfully addressing the global climate change problem, the FHWA is engaged in developing strategies to reduce transportation's contribution to GHGs—particularly CO₂ emissions—and to assess the risks to transportation systems and services from climate change. In an effort to assist states and metropolitan planning organizations (MPO) in performing GHG analyses, the FHWA has developed a *Handbook for Estimating Transportation GHG Emissions for Integration into the Planning Process*. The handbook presents methodologies reflecting good practices for the evaluation of GHG emissions at the transportation program level, and will demonstrate how such evaluation may be integrated into the transportation planning process. The FHWA has also developed a tool for use at the statewide level to model a large number of GHG reduction scenarios and alternatives for use in transportation planning, climate action plans, scenario planning exercises, and in meeting state GHG reduction targets and goals. To assist states and MPOs in assessing climate change vulnerabilities to their transportation networks, the FHWA has developed a draft vulnerability and risk assessment conceptual model and has piloted it in several locations.

² Calculated from data in U.S. Environmental Protection Agency, Inventory of Greenhouse Gas Emissions and Sinks, 1990-2009.

³ Calculated from data in U.S. Energy Information Administration (EIA) International Energy Statistics, Total Carbon Dioxide Emissions from the Consumption of Energy, <http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=90&pid=44&aid=8>, accessed 9/12/11.

⁴ Calculations from 2009 data in EIA Emissions of Greenhouse Gases in the United States 2009, March 2011, Table 7 <http://ftp.eia.doe.gov/environment/057309.pdf> (US data) and EIA International Energy Statistics, Total Carbon Dioxide Emissions from the Consumption of Energy <http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=90&pid=44&aid=8> (World data)

⁵ For more information on fuel economy proposals and standards, see the National Highway Traffic Safety Administration's Corporate Average Fuel Economy website: <http://www.nhtsa.gov/fuel-economy/>.

Greenhouse Gas Summary

This document does not incorporate an analysis of the GHG emissions or climate change effects of each of the alternatives because the potential change in GHG emissions is very small in the context of the affected environment. Because of the insignificance of the GHG impacts, those impacts will not be meaningful to a decision on the environmentally preferable alternative or to a choice among alternatives. As outlined previously, the FHWA is working to develop strategies to reduce transportation's contribution to GHGs—particularly CO₂ emissions—and to assess the risks to transportation systems and services from climate change. The FHWA will continue to pursue these efforts as productive steps to address this important issue.

3.9. Noise

Two events have occurred since the DEIS was circulated that have affected the noise results disclosed in the DEIS: TDOT's adoption of a new Noise Policy in 2011, and the Knoxville TPO's adoption of a new travel demand model in 2013 that resulted in new traffic forecasts for the project.

After the DEIS was published, TDOT revised its noise policy and its noise modeling guidance procedures for the FHWA's Transportation Noise Model (TNM) noise to be consistent with updated federal regulations, *Procedures for Abatement of Highway Traffic and Construction Noise*, 23 CFR 772 (July 13, 2010). TDOT's current regulations are contained in the TDOT *Policy on Highway Traffic Noise Abatement*, which became effective July 13, 2011.

In 2014 TDOT prepared a new noise analysis for the Preferred Alternative (A), Preferred Alternative with East Shift, Preferred Alternative with West Shift, Alternative C, and Alternative D, based on the 2011 Noise Policy. Eighteen noise analysis areas containing noise-sensitive land uses were identified that might be affected by these alternatives. The detailed results of the noise analysis are documented in the June 2014 *Noise Technical Report* (Bowlby and Associates) contained in Appendix I.

Table 19 summarizes the number of impacts for each Noise Analysis Area for each alternative. An indication of "n/a" means that the Noise Analysis Area is not affected by that alternative.

The Preferred Alternative (A), Preferred Alternative with East Shift, and Alternative D each result in a comparable number of noise impacts (80, 81, and 85, respectively). The vast majority of these impacts are due to substantial increases in the existing sound levels by the project. Alternative C is predicted to result in the fewest impacts (64); however, 26 residences would be displaced under Alternative C. Preferred Alternative with West Shift is predicted to result in the most impacts (103) due to the shift of the alignment closer to Area 4 (Kensington Place mobile home community).

Table 19: Noise Impact Summary

Noise Analysis Area	Preferred Alternative (A)	Alternative A with East Shift	Alternative A with West Shift	Alternative C	Alternative D
1	9	9	9	9	n/a
2	5	5	5	5	n/a
3	6	6	6	2	0
4	29	28	50	n/a	n/a
5	11	11	11	11	n/a
6	0	0	0	0	n/a
7	7	7	7	6	n/a
8	2	2	2	n/a	n/a
9	6	6	6	n/a	n/a
10	6	6	6	10	n/a
11	n/a	n/a	n/a	n/a	32
12	n/a	n/a	n/a	n/a	11 ⁽²⁾
13	n/a	n/a	n/a	n/a	8
14	n/a	n/a	n/a	n/a	9
15	n/a	n/a	n/a	7	n/a
16	n/a	n/a	n/a	5	12
17	n/a	n/a	n/a	n/a	8
18	n/a	n/a	n/a	9 ⁽³⁾	5
Total	81	80	103	64	85

Source: Bowlby and Associates. *Noise Technical Report*, June 2014.

(1) An "n/a" indicates that a Noise Analysis Area is not affected by that alternative.

(2) Includes the Mt. Lebanon Baptist Church playground and baseball field.

(3) Includes the Misty Meadow Driving Range.

Noise abatement in the form of noise barriers was evaluated for all affected areas in accordance with TDOT's Noise Policy. The noise barrier analysis resulted in the identification of two locations where noise barriers would be preliminarily feasible and reasonable in accordance with TDOT's Noise Policy:

- Area 4 for Preferred Alternative with West Shift. A noise barrier for Area 4 (Kensington Place mobile home community) is considered "likely" as design and engineering issues are not anticipated.
- Area 11 (Belfair Lane) for Alternative D. A barrier for Area 11 (Belfair Lane, in the north western portion of the project area) under Alternative D could pose sight distance and other design or construction issues that cannot be fully assessed at this time. These issues would need to be much more thoroughly evaluated if Alternative D were constructed. As a result, a barrier for this part of Area 11 (Belfair Lane) has been identified as "possible."

Section 3.5.2 of the Environmental Justice analysis provides more detail on the noise abatement analysis for the Preferred Alternative (A), Preferred Alternative with East Shift and Preferred Alternative with West Shift. Although the noise analysis is based on functional project plans, TDOT has committed to a noise barrier for the Kensington Place community (Area 4) with the Preferred Alternative with West Shift, to mitigate noise and visual impacts for this low-income and minority community.

3.10. Hazardous Materials

The *Phase I Preliminary Assessment Study* for this project, dated November 2008, identified four sites that would require further investigation, depending on which alternative was chosen as the Preferred Alternative. Those four sites are identified in Table 20.

Table 20: Potential Contamination Sites Requiring Further Investigation

Site Name	Storage Tank(s) Currently in Service	Alternative Requiring ROW for Expansion
Hackney Amoco/Aztec Food Shop	Yes	D
Sunoco/D.T.'s Market and Deli	Yes	C
Thrift Shop and Former A and M American Gas	Yes	A
Dump Site - Located 850 feet west of Sevierville Road	No	C

Source: Parsons Brinckerhoff, *Phase I Preliminary Assessment Study*, 2008.

Following the selection of the Preferred Alternative, in November 2012, TDOT conducted a *Phase II Preliminary Site Investigation Report* to further investigate one of the sites identified in the 2008 *Phase I Preliminary Assessment Study*. The more-detailed analysis was recommended because of the potential acquisition of ROW from this site and the nature of past or current business operations of the site; the site is currently a thrift shop, but it historically housed a fueling station and automotive service garage. The Phase II report included additional field screening, the collection of soil samples and laboratory analysis of the samples. Appendix J contains a copy of the Phase II report.

Based on the analytical results, further action regarding the soil on this property under the Preferred Alternative with East Shift and the Preferred Alternative with West Shift is not currently warranted prior to commencement of construction activities.

If Alternative C or D is selected, a Phase II Preliminary Site Investigation would be required on the affected sites listed in Table 20.

In the event hazardous substances/wastes are encountered within the proposed ROW, their disposition will be subject to all applicable regulations, including the applicable sections of the Federal Resource Conservation and Recovery Act, as amended; and the Comprehensive Environmental Response, Compensation, and Liability Act, as amended; and the Tennessee Hazardous Waste Management Act of 1983, as amended.

Prior to the commencement of construction activities at this site, an asbestos and lead-based paint survey will be performed by an EPA Asbestos Hazard Emergency Response Act trained Asbestos Building Inspector prior to any demolition or alteration of the building structure or canopy on the site.

In May 2014, TDOT's Environmental Facilities Compliance Office reviewed the 2008 *Phase I Preliminary Assessment Study*. The review of the proposed alternatives (Preferred Alternative (A), Preferred Alternative with East Shift, Preferred Alternative with West Shift, Alternative C, and Alternative D) and Google Earth imagery dated November 11, 2013, indicate that very little has changed. The finding of the review is that the Phase I study evaluation is still valid (May 7, 2014 email is included in Appendix J).

3.11. Floodplains

The floodplain impacts of the project alternatives are shown in Table 21.

Table 21: Floodplain Impacts

Resource Name	Alternative				
	Preferred Alternative (A)	Preferred with East Shift (acres)	Preferred with West Shift (acres)	Alternative C (acres)	Alternative D (acres)
Unnamed Tributary to Little River (STR-1 D)	0	0	0	0	0.9
Unnamed Tributary to Little River (STR-2 D)	0	0	0	0	1.4
Peppermint Branch	0.8	0.7	0.7	1.2	0.5
Crooked Creek	0	0	0	0	0
Unnamed trib. to Little River (STR-8 C; STR-6 D)	0	0	0	0.7	0.3
Gravelly Creek	1.8	1.3	1.7	0	0
Flag Branch	5.5	5.4	8.6	7.1	0
Crooked Creek/Gravelly Creek*	0	0	0	0	5.0
Total Floodplain Impacts (linear feet)	8.1	7.4	11.0	9.0	8.1

Source: Parsons Brinckerhoff, *Ecology Report*, revised 2010, and *Addendum to 2009 Ecology Report*, 2013.

* = Alternative D intersects the floodplains of Crooked Creek and Gravelly Creek where the floodplains of these streams converge.

The impacts to floodplains for the Preferred Alternative and the East and West Shift Alternatives were updated during the surveys and reported in the 2013 *Addendum to Ecology Report*. The floodplain impacts of Alternatives C and D were confirmed through a review of the Flood Insurance Rate Maps.

Protection of floodways and floodplains is required under 23 CFR 650A, as well as by Executive Order 11988 Floodplain Management and USDOT Order 550.2 Floodplain Management and Protection. The intent of these regulations is to avoid or minimize highway encroachments within the 100-year (base) floodplains, where practicable, and to avoid supporting land use development that is incompatible with floodplain values. While the Preferred Alternative with West Shift has the highest potential impact to floodplains, this alternative and the other project alternatives do not involve a significant encroachment on floodplains in the study area because construction of the proposed project would not:

- Represent a significant risk to life or property;
- Have a significant impact on natural and beneficial floodplain values;
- Support incompatible floodplain development; and
- Interrupt or terminate a transportation facility that is needed for emergency vehicles or provides a community's only evacuation route.

Avoidance and minimization measures are being evaluated and will be implemented during the design and construction of the proposed project to reduce the direct impacts to the 100-year floodplain. Avoidance and minimization measures include crossing the floodplain at or near a

perpendicular angle, with an appropriately sized bridge/culvert, and/or placing a parallel highway alignment out of the floodplain or as far away from the stream as possible.

3.12. Natural Resources

After the selection of the Preferred Alternative, TDOT undertook an assessment of the potential impacts to the ecological resources along the Preferred Alternative and the proposed East and West Shifts. The assessment included an updated survey for aquatic resources and threatened and endangered species. TDOT also conducted a mist net survey and an Anabat survey for the federally endangered Indiana bat (*Myotis sodalist*) and prepared a new Biological Assessment of four federally listed threatened or endangered species. Results of these updated surveys have been incorporated into the 2013 *Addendum to 2009 Ecology Report* (Parsons Brinckerhoff). An update of the DEIS Alternatives C and D was conducted in April 2014 and the results are incorporated in the 2014 *Ecology Report* (Civil and Engineering Consultants). Sections 3.12.1 through 3.12.7 summarize the findings of the two ecology studies. For additional information, including an indirect and cumulative impact analysis for the natural resource impacts, see Appendix K.

3.12.1. Aquatic Resources

In April and May 2013 and April 2014, field surveys were conducted to reevaluate the aquatic resources identified during the 2008 field surveys and to determine and map aquatic resources that may be present within the project area. Table 22 summarizes the updated impacts to aquatic resources.

Table 22: Summary of Aquatic Resources

Waterbodies	Preferred Alternative (A)	Preferred Alternative with East Shift	Preferred Alternative with West Shift	Alternative C	Alternative D
Streams (linear feet)	4,525	3,755	4,962	2,622	1,695
Wet Weather Conveyances (linear feet)	0	0	0	735	650
Ponds (acres)	0.42	0.42	0.42	0.42	0.02
Identified Sinkholes	0	0	0	0	1
Wetlands (acres)	5.01	6.99	8.72	0.925	0.025

Source: Parsons Brinckerhoff, *Addendum to 2009 Ecology Report*, 2013. Civil and Environmental Consultants, *Ecology Report*, 2014.

The selected alternative will be designed to avoid major impacts to waters of the state to the extent 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. Mitigation is discussed further in this reevaluation in the sections addressing streams and wetlands. In an effort to minimize sedimentation impacts, erosion and sediment control plans will be included in the project construction plans. TDOT will also implement its *Standard Specifications for Road and Bridge Construction*, which includes erosion and sediment control standards for use during construction. The State of Tennessee sets water quality criteria for waters of the state and these standards must be met during the construction of the highway improvement.

3.12.2. Non-Wetland Waters of the U.S.

Non-wetland waters of the U.S. occurring within the project alternatives include ponds (man-made and impounded), perennial streams, intermittent streams, and certain ephemeral streams (wet weather conveyances). The determinations as to which of these are waters of the state and/or of the U.S. have not been confirmed by TDEC and the USACE. These determinations will be made during the final design phase of the Preferred Alternative. All aquatic impacts identified as project development continues will be avoided, minimized, or mitigated to the extent possible, and mitigation commitments will be incorporated into the applicable permit applications.

Preferred Alternative (A) and East and West Shifts

During the 2013 field surveys for the Preferred Alternative (A), Preferred Alternative with East Shift, and Preferred Alternative with West Shift, it was discovered that some of the non-wetland waters determined in 2008 to be wet weather conveyances (WWCs) are now more representative of a wetland, intermittent stream, or a perennial stream. In addition, some streams (STR 6 and 7) characterized in 2008 as intermittent are now characterized as perennial stream channels. These changes are most likely because 2008 precipitation was well below average for the region, resulting in no water flow in watercourses that, under normal conditions, may have intermittent to continuous water flow. Furthermore, a large wetland system (the result of beaver activity) now encompasses the area where WWC 3 was identified in the 2008 surveys.

Streams, springs, seeps, impoundments and other watercourses and waterbodies (i.e., non-wetland waters of the U.S.) that were surveyed in 2013 and are known to be potentially affected by Preferred Alternative (A), Preferred Alternative with East Shift and Preferred Alternative with West Shift are described in Tables 3.1 to 3.3 in the *2013 Addendum to 2009 Ecology Report* in Appendix K.

Alternatives C and D

The streams, springs, seeps, impoundments and other watercourses and waterbodies that were surveyed in 2014 for Alternative C (the section discrete from the combined alignment with Alternative A) and Alternative D are described in Tables 2 and 4 in the *2014 Ecology Report* in Appendix K.

Determinations and Mitigation of Non-Wetlands Water Resources

At this time in the NEPA phase, with the design being preliminary and conceptual, construction limits and culvert and bridge locations have not yet been determined. Therefore, the exact impact type (e.g., culvert placement, bridge crossing, channel relocation, etc.) and the amount of impact at the individual non-wetland waters of the U.S. sites cannot yet be determined. Because the exact impact type and amount is not yet known, the ecology reports represent the anticipated worst-case impact (linear feet/acre of non-wetland water within proposed ROW limits), with the assumption that these impacts will be reduced where possible during further project design.

Potential direct impacts to fish and other aquatic organisms from project construction can be minimized by conducting work in and around perennial streams outside the spawning season of species common to the proposed project area (i.e., during the months of September through January). Long-term impacts to aquatic organisms can occur through the loss of natural

streambed by culvert construction, bank clearing, the placement of rip-rap, and the removal of trees lining the channel.

TDOT will make every effort to avoid or minimize impacts to perennial streams at highway crossings. Construction of culverts will be staged during the drier portions of the year, late summer and fall, when stream flows are reduced. If bridges are constructed, they will be designed to span the entire stream channel, where possible. The fording of streams by construction equipment at bridge locations will be prohibited.

Stream channels requiring relocation or channelization will be replaced on-site to the extent possible, using techniques that will maintain existing stream characteristics such as channel profile, elevation, gradient, and tree canopy. Use of "Natural Channel Design" may be required if the portion of affected stream is generally greater than 200 feet long. Stream or water body impacts that cannot be mitigated on-site—such as impacts of culverts greater than 200 feet or impacts to springs or seeps that require rock fill to allow for movement of water underneath the roadway—will be mitigated off-site by either improving a degraded system or by making a comparable payment to an in-lieu-fee program or mitigation bank, which will perform such off-site mitigation under the direction of state and federal regulatory and resource agencies.

3.12.3. Wetlands

During the 2013 and 2014 field surveys, all wetland areas that were delineated and mapped in 2008 and are within the proposed ROW of the project alternatives were revisited to evaluate the current condition of the wetland. Furthermore, the field surveys identified and delineated any new areas within the Preferred Alternative and proposed alignment shifts that displayed evidence and/or presence of the three wetland parameters (hydrophytic vegetation, hydric soils, and wetland hydrology) outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (effective April 2012). The delineations included those wetlands identified on the NWI maps as well as those wetlands identified during field surveys but not indicated on NWI mapping. Isolated wetlands were also included in the delineations and will be included in additional discussions and reports until TDEC and the USACE have confirmed or refuted the jurisdictional applicability of these wetlands.

The 2013 field surveys identified two additional small wetlands (WTL 5A and 5B associated with Gravelly Creek near the southern terminus of the project) that were not either present or observed during the 2008 field surveys. The Preferred Alternative (A) and the Preferred Alternative with West Shift would affect WTL 5A (0.06 acre). In addition, one previously identified wetland (WTL 6, east Flag Branch and north of US 321) had increased substantially in size (from 0.4 ac to 11.1 ac) as a result of beaver activity in the area.

The conditions of the other wetland areas within the project alternatives have not significantly changed since the 2008 field surveys were completed. The following observations about the wetlands in the area were made during the 2013 and 2014 field surveys:

- The wetlands encountered were primarily associated with intermittent and perennial stream corridors that traverse pastureland or abandoned livestock watering ponds.
- The location of these wetlands allow for frequent disturbances from livestock and other anthropogenic activities that have severely degraded and reduced the size of the wetland habitats.

-
- Past and current agricultural activities and land uses have also contributed to the reduction and/or loss of important functions provided by wetlands that include floodwater abatement, pollutant filtration, maintenance of stream and pond base flow, and wildlife habitat.

The estimates of affected wetland acres are based on a worst-case scenario and the actual impact may be less once final design plans have been developed. The proposed project will be designed to avoid and minimize impacts to wetlands to the extent possible. Efforts to further minimize impacts will continue throughout the design, permitting, and construction process.

Mitigation

Mitigation is required for all wetland impacts that do not meet requirements for general Aquatic Resource Alteration Permits (ARAP) (State of Tennessee) or for certain Nationwide Section 404 permits (USACE). The minimum replacement ratio for wetlands is 2:1 and may be higher depending on hydro-geomorphic analyses or whether optimum mitigation sites are unavailable. The first option for any substantial replacement mitigation is on-site (near the project and within the watershed). The mitigation option most favored by regulatory agencies is that of restoration of a former wetland. Enhancement of an existing but degraded wetland may also be an option, but higher replacement ratios are generally required. Both the site selection and the mitigation, when proposed, will be subject to the approval of regulatory agencies. In the event that no acceptable mitigation site can be obtained locally, the regulatory agencies may allow mitigation farther away or allow use of credits in a mitigation bank.

3.12.4. Water Quality

The 2010 DEIS reported that within the project's general study area the Little River, Peppermint Branch, Crooked Creek, Gravelly Branch, and Flag Branch were listed on the 2008 303(d) list of streams for not meeting their designated uses. Since that time, TDEC has published an updated 2012 303(d) list of streams. Gravelly Branch is no longer included on the 303(d) list. According to the 2010 303(d) list, Peppermint Branch, Crooked Creek and Flag Branch do not meet their designated use due to pasture grazing and stormwater discharges from municipal separate storm sewer systems areas.

The potential direct and indirect impacts on water quality from the project alternatives include water quality degradation from roadway-induced development. Construction of roads, buildings, and parking lots reduces the ability of land to absorb and filter rainwater, resulting in a higher potential for contaminated runoff to directly enter streams and other surface waters. The contributing factors to water quality degradation include sediment runoff from precipitation events during construction and the increased amounts of pollutants flowing into the waters of the U.S. as a result of the increased amount of impervious surfaces.

3.12.5. Exceptional Tennessee Waters

While not addressed in the 2010 DEIS, Exceptional Tennessee Waters (ETW) have been analyzed and documented in the 2013 *Addendum to 2009 Ecology Report*. Tennessee water quality standards require the incorporation of the antidegradation policy into regulatory decisions (Chapter 1200-4-3-.06). The TDEC Water Resources Division has been delegated the responsibility of identifying ETWs (previously known as Tier 2) and Outstanding National Resource Waters (Tier 3). In ETWs, degradation cannot be authorized unless (1) there is no reasonable alternative to the proposed activity that would render it non-degrading; and (2) the activity is in the economic or social interest of the public. In Outstanding National Resource

Waters, no new discharges, expansions of existing discharges, or mixing zones will be permitted unless such activity will not result in measurable degradation of the water quality.

The proposed project lies within the Fort Loudoun Lake watershed and comprises approximately 911 stream miles, some of which are designated ETWs. One of these designated ETWs includes the Little River, which is close to the proposed project. The Little River has been designated as an ETW because a portion of the river flows through the Great Smoky Mountains National Park and also supports federal and state threatened and endangered species that include the fine-rayed pigtoe, marbled darter (formerly duskytail darter), Virginia spiraea, snail darter, longhead darter, and the ashy darter.

The potential direct and indirect impacts to the Little River are similar to the direct and indirect impacts the proposed project would have on the overall water quality conditions. These impacts include water quality degradation from roadway-induced development. Construction of roads, buildings, and parking lots reduces the ability of land to absorb and filter rainwater, resulting in a higher potential for contaminated runoff to enter directly into the Little River and other surface waters. The contributing factors to water quality degradation include sediment runoff from precipitation events during construction, and the increased amounts of pollutants that could be introduced into the waters of the U.S. as a result of the increased amount of impervious surfaces.

In addition, the factors identified as potential causes of water quality degradation can also have negative impacts on the federal and state threatened and endangered species listed as occurring in the Little River. Many of the listed threatened and endangered species require clean and clear water to survive and have specific habitat requirements for spawning and reproduction. Some of the required habitats include clean-swept gravel shoals, gravel and bedrock substrate with boulders, and various degrees of stream flow velocities. The listed water quality degradation factors can suffocate the listed species, bury potential habitat and food from sediment accumulation, alter stream flow velocities, and in some cases alter stream morphology.

While all alternatives have the potential to affect the Little River, Alternative D is closer to the Little River in an area where it could adversely affect drinking water and known habitat of several threatened and endangered aquatic species. It also closely approaches a major tributary of Little River (Crooked Creek) in a steep area.

3.12.6. Threatened and Endangered Species

In 2008, field surveys were conducted along the proposed alternative corridors to identify state and federally protected species and their habitat. Per Section 7 of the Endangered Species Act and the TESA, TDOT requested concurrence (or non-concurrence) from the USFWS on the effect determination that the proposed project is “Not Likely to Adversely Affect” the federally protected Indiana bat, snail darter, marbled darter, and the fine-rayed pigtoe. In a letter dated July 30, 2010, the USFWS concurred with the findings for the snail darter, marbled (formerly duskytail) darter and fine-rayed pigtoe, but withheld Section 7 concurrence for the Indiana bat until TDOT fully addressed the potential impacts to the Indiana bat due to the removal of suitable summer roosting habitat within the Preferred Alternative.

In response to the USFW’s concerns about the Indiana bat, TDOT conducted a mist net and acoustical survey in the project area in the summer of 2012. No Indiana bats were captured or acoustically detected during the survey. The results are documented in the *2012 Indiana Bat*

Mist Net and Acoustical Survey Report, which is incorporated into the *2013 Ecology Report Addendum*. The USFWS provided a letter dated October 11, 2012, stating that it agreed with TDOT's determination of "Not Likely to Adversely Affect" for the Indiana bat, thus concluding Section 7. The letter is included in Appendix K. According to USFWS, one bat survey will meet the USFWS' needs to fulfill Section 7 during the NEPA phase of a project.

The northern long-eared bat has similar habitat requirements to the Indiana bat, so it is unlikely that the proposed project would jeopardize the existence of the northern long-eared bat. However, while awaiting additional information from USFWS, TDOT will assume the bat may be present, and will do whatever USFWS deems necessary, including addressing northern long-eared bats by either avoiding, minimizing, or mitigating potential effects, and adhering to all USFWS requirements prior to the letting and construction of the project.

The Preferred Alternative, Preferred Alternative with East Shift, and Preferred Alternative with West Shift were re-surveyed in April 2013 to reevaluate the state and federally protected species and their habitat findings previously documented in *2009 Ecology Report*. Results of the 2013 surveys are included in the *2013 Addendum to 2009 Ecology Report*. DEIS Alternatives C and D were re-surveyed in May 2014, the results of which are included in the June 2014 *Ecology Report*. These reports are in Appendix K.

Prior to conducting the 2013 and 2014 field surveys, information from the USFWS, TDEC, and the TWRA was requested, TDEC and USFWS databases were consulted, and books and/or databases of cave records were reviewed.

A response from the TDEC Division of Natural Heritage was received on March 1, 2013, which identified three federally protected species and two state protected species as known to occur within 1 mile of the proposed project and one federally protected species as known to occur within 4 miles of the proposed project.

In addition, the TDEC Division of Natural Heritage database documents state rare species, species of concern, species deemed in need of management, and species commercially exploited within a 1- and 4-mile radius of the proposed project. The threatened and endangered species that potentially occur in Blount County are listed in Table 23.

The TWRA responded to TDOT's request for additional coordination on June 6, 2013. The response stated support for the East Shift due to the reduced amount of stream and wetland impacts as compared to the West Shift. The letter also stated that both alignment avoidance shifts would affect the same streams. Therefore, the same species would be affected but the habitat impacts would differ.

The USFWS responded to TDOT's request on June 10, 2013, confirming that four federally listed species may be affected by this project: the federally endangered Indiana bat, marbled darter, fine-rayed pigtoe, and the federally threatened snail darter. The USFWS stated a preference for the East Shift Alternative because it would have fewer stream and wetland impacts when compared to the West Shift Alternative.

Appendix K contains copies of all coordination letters with the USFWS, TDEC, and TWRA.

Table 23: Protected Species Potentially Occurring in Project Area

Common Name	Scientific Name	Regulatory Status	Project Right-of-Way	USFWS Species Determination
Snail Darter	<i>Percina tanasi</i>	Federal Threatened	Habitat Not Present	"Not Likely to Adversely Affect"
Fine-rayed Pigtoe	<i>Fusconaia cuneolus</i>	Federal Endangered	Habitat Not Present	"Not Likely to Adversely Affect"
Marbled Darter (formerly Duskytail Darter)	<i>Etheostoma marmoripinnum</i> (formerly <i>Etheostoma percnurum</i>)	Federal Endangered	Habitat Not Present	"Not Likely to Adversely Affect"
Ashy Darter	<i>Etheostoma cinereum</i>	State Threatened	Habitat Not Present	"No effect"
Longhead Darter	<i>Percina macrocephala</i>	State Threatened	Habitat Not Present	"No effect"
Indiana Bat	<i>Myotis sodalis</i>	Federal Endangered	Summer Habitat Present	"Not Likely to Adversely Affect"

Source: Parsons Brinckerhoff, *Addendum to the 2009 Ecology Report*, July 2013.

Direct Impacts

As documented in the 2013 *Addendum to 2009 Ecology Report* and the 2014 *Ecology Report*, no individual protected aquatic species or suitable habitat was found within the limits of the project alternatives. The primary impact that the proposed project could have on the listed protected aquatic species is the potential to increase silt and sediment within the crossed stream channels. This introduction of silt and sediment to the Little River tributaries could migrate to the main channel of the Little River where there are known occurrences of the listed protected aquatic species.

Although suitable Indiana bat summer roosting habitat is present within the project area, no individual Indiana bats were captured or calls recorded during the 2012 Indiana bat mist net and acoustical surveys. In addition, no Indiana bat hibernaculum is known to occur within the project area. All known Indiana bat hibernacula are 5 miles or farther away from the project area—Bull Cave (9.2 miles), Kelly Ridge Cave (8.25 miles), and White Oak Blowhole Cave (11.5 miles). The primary impact that the project could have on the Indiana bat is the removal of trees that potentially provide summer roosting habitat.

Summary of Habitat Findings

The 2013 and 2014 field surveys revealed that the overall habitat conditions had, for the most part, not changed since the 2008 field surveys were completed. The primary difference from 2008 was the increased water levels in some of the larger stream crossings. This change in water levels was most likely because 2008 precipitation was well below average for what is typical to the region. The other reported stream conditions in 2008 and observed in 2013 included lack of sufficient riparian buffer adjacent to stream corridors, streams affected by livestock (i.e., trampling, grazing, etc.), silt and sediment deposition, and other sources of water quality degradation from various nonpoint sources. Therefore, based on the current stream conditions and no known records for the ashy darter, longhead darter, snail darter, duskytail darter, and fine-rayed pigtoe, no potentially suitable habitat for these species exists within the proposed project corridor.

In addition, the area has limited foraging for the Indiana bat as most of the area comprises open fields or is residential with few stream corridors with large intact riparian buffers. While no hibernaculum (winter habitat) is known to exist within 5 miles of the proposed project, summer habitat for the Indiana bat exists within the corridor.

2013 Biological Assessment

During the preparation of the 2013 *Addendum to 2009 Ecology Report*, it was noted that an update to the 2001 *Biological Assessment* (BA) was needed due to the document's age. The 2001 BA was prepared for the Indiana bat, snail darter, duskytail darter (now referred to as marbled darter), fine-rayed pigtoe, ashy darter, and longhead darter. TDOT prepared a new BA (dated June 21, 2013) to evaluate the six federally listed species.

There are numerous records for the snail darter, marbled darter, fine-rayed pigtoe, ashy darter, and longhead darter from the Little River, downstream of the proposed project. Although the project will not cross the Little River, it will cross several small tributary streams 1 to 2 miles upstream of their confluences with the Little River. There are no records for any of the above listed darter or mussel species from these tributary streams.

Project construction may result in some temporary stream disturbances at the proposed crossing locations. However, installation and maintenance of effective erosion and siltation control measures throughout project construction will minimize impacts to these streams, which will in turn minimize potential impacts to the Little River and the aquatic fauna present there. Provided the necessary best management practices for erosion and sediment control are implemented and maintained throughout project construction, it is TDOT's opinion that the proposed project is "Not Likely to Adversely Affect" any protected aquatic species.

No individual Indiana bats were captured or calls recorded during the 2012 surveys, and no Indiana bat hibernaculum is known to occur within the project area. Although suitable roosting habitat appears to be present in the project area, very little would be affected by project construction. Even if a suitable tree is removed, there are sufficient suitable trees present outside the project limits to accommodate any Indiana bats that might use the area. The USFWS concurred with TDOT's findings in the 2012 *Indiana Bat Mist Net and Acoustical Survey Report* in a letter dated October 11, 2012. Therefore, based on the information provided, it is still the opinion of TDOT that the proposed project is "Not Likely to Adversely Affect" the Indiana bat.

The USFWS concurred with TDOT's species determinations for all of the federally listed species on July 25, 2013. In addition, the USFWS stated that in light of TDOT's commitments to improved water quality measures and negative surveys for Indiana bats in the project area, that the requirements under the Section 7 of the Endangered Species Act of 1973, as amended, are fulfilled. See Appendix K for a copy of the current BA and correspondence from the USFWS.

3.12.7. Sinkholes

During the 2013 field surveys, an opening to a potential cave site was identified near the southern terminus of the proposed project north of US 321/SR 73 that was not observed during the 2008 field surveys. After further investigation, TDOT determined that the opening was not a cave and/or karst topography, and it does not pose any concern to the proposed project. No other sinkholes and/or cave sites were identified during the 2013 field surveys that were not previously identified during the 2008 field surveys.

During the 2014 surveys, one sinkhole was identified within the footprint of Alternative D, south of US 411 (Sevierville Road). This sinkhole, greater than 0.1 acre, would be affected by fill and/or runoff from the project.

As per conventional practice, during the design phase, TDOT will conduct a subsurface investigation program (with auger drilling and potential core drilling) along the selected alignment and will develop a project-specific geotechnical and geological design. TDOT will make every effort to minimize unnecessary impacts to the habitats of the numerous karst features in the project study area, since many areas of the state rich with karst have not been surveyed for rare species. The design will address the protection of aquatic species and groundwater in the area during and after project construction.

3.12.8. Required Permits

The following permits will be required from the USACE, the TVA, and the TDEC to implement the Preferred Alternative:

- Individual or general ARAP from the State of Tennessee;
- Individual or Nationwide Permit for impacts to waters of the U.S. (including wetlands and aquatic resources) from the USACE pursuant to Section 404 of the Clean Water Act. Other *agencies* such as the USFWS and the EPA may be involved in the permitting process;
- TVA 26a permit for construction activities that occur in floodplains and perennial streams and rivers within the Tennessee River Watershed;
- National Pollutant Discharge Elimination System Stormwater General Permit for Construction Activities for construction projects disturbing one or more acres of land; and
- Underground Injection Control permit if water is flowing into an open sinkhole or cave, or for any impact that may affect the ground water via a sinkhole.

4. Summary and Findings

This reevaluation has revealed that there are minor changes in the impact assessment presented in the 2010 DEIS as a result of changes in the project area or in recent decision regarding the project area. The changes that have occurred since 2010 include the following:

- The selection of DEIS Alternative (A) as the Preferred Alternative in 2012 based on the DEIS evaluation and comments on the DEIS received from agencies and the public.
- Two minor alignment modifications (East Shift and West Shift) of the Preferred Alternative were identified in 2013 to avoid an NRHP-eligible archaeology site that was identified during the Phase II archaeological investigation. The East Shift would move the Preferred Alternative's alignment outside of from the Kensington Place mobile home park, while the West Shift would move the alignment about 150 feet to the west, extending into the northeastern corner of the Kensington Place mobile home community.
- TDOT's selection of the West Shift to modify the Preferred Alternative in July 2013.
- TDOT's adoption of a new Noise Policy in 2011.

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- Additional estimated impacts to streams and wetlands. The increase is explained in part by the changed conditions at the time of the 2013 field surveys compared to the 2008 field surveys; in 2008, precipitation was well below average for the region. In addition, the 2013 field surveys revealed hydrological changes that have occurred as a result of substantial beaver activity near the southern terminus of the project. A previously identified small wetland is now substantially larger due to beaver activity in the area, and would be affected by the Preferred Alternative (A), Preferred Alternative with East Shift and Preferred Alternative with West Shift.
 - The Knoxville TPO adopted a new travel demand model in June 2013, which included significant revisions to the model's structure, network, socio-economic assumptions, and calibration. The changes were enhancements aimed at improving the accuracy of the model's forecasts. Combined, the changes in the model have resulted in lower forecasted traffic volumes for the Pellissippi Parkway Extension alternatives.

Table 24 compares the recently identified or confirmed impacts for the five alternatives considered in this reevaluation.

Table 24: Comparison of Alternatives

Issues	Preferred Alternative (A)	Preferred Alternative with East Shift	Preferred Alternative with West Shift	DEIS Alternative C	DEIS Alternative D
Traffic forecasts & operations	<ul style="list-style-type: none"> Traffic volumes declined with new model. The LOS on proposed route is D or higher. The level of service and delay at key intersections is improved. 				<ul style="list-style-type: none"> While volumes have declined with new model, they still exceed the carrying capacity of a two-lane road.
Displacements	<ul style="list-style-type: none"> 5 residences & 1 business 	<ul style="list-style-type: none"> 6 residences & 1 business 	<ul style="list-style-type: none"> 11 residences (including 6 mobile homes in Kensington Place) & 1 business 	<ul style="list-style-type: none"> 27 residences (affecting Tara Estates subdivision and Hubbard community) including & 1 business 	<ul style="list-style-type: none"> 41 residences (affecting Peppermint Hills community) & 2 businesses
Farmlands	<ul style="list-style-type: none"> 107 acres in ROW / 54% of total acres 	<ul style="list-style-type: none"> 107 acres in ROW / 54% of total acres 	<ul style="list-style-type: none"> 110 acres in ROW / 55% of total acres 	<ul style="list-style-type: none"> 74 acres in ROW / 40% of total ROW 	<ul style="list-style-type: none"> 45 acres in ROW / 38% of total ROW
Environmental Justice impacts	<ul style="list-style-type: none"> No effect 	<ul style="list-style-type: none"> No effect 	<ul style="list-style-type: none"> Noise, visual and displacement impacts to Kensington Place mobile home park Noise barrier will be constructed to mitigate impacts. 	<ul style="list-style-type: none"> No effect 	<ul style="list-style-type: none"> No effect
Noise impacts (receptors)	<ul style="list-style-type: none"> 81 	<ul style="list-style-type: none"> 80 	<ul style="list-style-type: none"> 103 	<ul style="list-style-type: none"> 64 	<ul style="list-style-type: none"> 85
Noise impacts for EJ community as-built	N/A	No barrier: <ul style="list-style-type: none"> Substantial Increase – 28 Approach NAC – 2 Increase higher than West Shift – 8 	With barrier: <ul style="list-style-type: none"> Substantial Increase- 20 Approach NAC – 2 Increase higher than East Shift – 45 	N/A	N/A
Floodplains	<ul style="list-style-type: none"> 8.1 acres 	<ul style="list-style-type: none"> 7.4 acres 	<ul style="list-style-type: none"> 11.0 acres 	<ul style="list-style-type: none"> 9.0 acres 	<ul style="list-style-type: none"> 8.1 acres
Stream / wet weather conveyance impacts	<ul style="list-style-type: none"> 4,525 / 0 linear feet 	<ul style="list-style-type: none"> 3,755 / 0 linear feet 	<ul style="list-style-type: none"> 4,962 / 0 linear feet 	<ul style="list-style-type: none"> 2,622 / 735 linear feet 	<ul style="list-style-type: none"> 1,695 / 650 linear feet
Wetland impacts	<ul style="list-style-type: none"> 5.01 acres (due to beaver activity) 	<ul style="list-style-type: none"> 6.99 acres (due to beaver activity) 	<ul style="list-style-type: none"> 8.72 acres (due to beaver activity) 	<ul style="list-style-type: none"> 0.925 acres 	<ul style="list-style-type: none"> 0.025 acres
Sinkholes	<ul style="list-style-type: none"> 0 	<ul style="list-style-type: none"> 0 	<ul style="list-style-type: none"> 0 	<ul style="list-style-type: none"> 0 	<ul style="list-style-type: none"> 1

Table 25 provides a brief summary of these findings as well as the name of the associated technical report that was recently updated.

Table 25: Summary of Reevaluation Findings

Impact Category	Findings
Traffic	Due to the age of the traffic analysis presented in the DEIS (2006) and the new travel model adopted by the Knoxville TPO in June 2013, new traffic forecasts were prepared (December 2013). Forecasts for Pellissippi Parkway Extension (4-lane scenarios) for 2040 are 40 to 52 percent lower than forecasts presented in the DEIS. A new 4-lane roadway would operate at acceptable levels of service through 2040. While travel forecasts for the 2-lane Alternative D would also decline for 2040, the capacity of an improved 2-lane roadway would be exceeded and LOS would be unacceptable (E or F).
Safety	No significant change in findings. Updated <i>Crash Analysis Technical Memorandum</i> completed in 2014.
Transportation Plans	The Knoxville Regional TPO adopted a new regional long range transportation plan (<i>Regional Mobility Plan 2040</i>). The proposed project continues to be a part of the regional plan. The project is also included in the 2014–2017 TIP.
Land Use and Community Facilities	No significant change in findings.
Social and Economic Conditions	No significant change in findings. Updated text to reflect 2010 census data and more recent economic information.
Economic and Fiscal Study	The level of expected economic impact and fiscal impact would be less than reported in the 2009 study as a result of the updated socio-economic expectations in the new travel demand model. However, the updated model's socio-economic assumptions do not substantially alter the overall findings of the 2009 study.
Displacements and Relocations	Substantial increase in number of relocations with Alternative D since the DEIS. Six mobile homes to be displaced with West Shift. <i>Revised Conceptual Stage Relocation Plan</i> completed in 2014.
Environmental Justice	The Kensington Place mobile home community, with a substantial low-income and minority population, is a potential EJ community. As a result of the West Shift, six residences will be displaced and there will be additional noise impacts. TDOT has committed to build the noise barrier for the community to minimize impacts to the community and to allow the residents to provide input into the landscaping and pattern/color of the noise barrier to minimize potential visual impacts from the barrier. With the mitigation, the amount of impact for the community will not reach the threshold of "disproportionately high and adverse." An <i>Environmental Justice Technical Memorandum</i> was completed in 2014.
Farmlands	No significant change in findings. Additional coordination in 2013 conducted with the NRCS regarding shifts to the Preferred Alternative.
Archaeological Resources	One site was determined eligible for the NRHP within Preferred Alternative (A), but the site has been avoided by a minor alignment shift. <i>Phase II Archaeology Report</i> was completed in 2013 and the SHPO concurred with the findings.
Historic Resources	A review of the 2009 Historic and Architectural report and the current study area confirms that the 2009 TN-SHPO letter remains valid.
Air Quality	<i>Air Quality Technical Report Update</i> was completed in 2014. The project is included in the conforming plan, <i>Regional Mobility Plan 2040</i> . None of the alternatives would cause new violations or contribute to existing violations of the NAAQS in the design year 2040.

Table 25: Summary of Reevaluation Findings (con't)

Impact Category	Findings
Greenhouse Gas Emissions (Climate Change)	Language for Greenhouse Gas Emissions (Climate Change) has been updated since approval of the DEIS, but there are no significant changes that would affect this project.
Noise	Project evaluated using 2011 TDOT Noise Policy, and using 2040 traffic forecasts (December 2013). <i>Noise Technical Report Update</i> was completed in 2014. Two potential barriers were identified (one for Preferred Alternative with West Shift and one for Alternative D). TDOT has committed to build the noise barrier in Kensington Place for the West Shift.
Hazardous Materials	<i>Phase II Contamination Assessment</i> completed in 2012 for one site, determined not to be of concern.
Floodplains	Preferred Alternative with West Shift has greatest floodplain impacts but mitigation, including design, would reduce the level of impact. Results are included in 2013 <i>Addendum to 2009 Ecology Report</i> .
Streams	Increases in stream impacts noted from 2008 to 2013 due to 2008 being a very dry year. Preferred Alternative with West Shift has greatest stream impacts but mitigation would reduce the level of impact. Results are included in 2013 <i>Addendum to 2009 Ecology Report</i> and 2014 <i>Ecology Report</i> .
Wetlands	Increase in amount of wetland impact but no significant change. Results are included in 2013 <i>Addendum to 2009 Ecology Report</i> and 2014 <i>Ecology Report</i> .
Water Quality	No additional impact. Results are included in 2013 <i>Ecology Report Addendum</i> and 2014 <i>Ecology Report</i> .
Exceptional Tennessee Waters	No impact. A discussion of Exceptional Tennessee Waters was not included in the DEIS or 2009 <i>Ecology Report</i> . Results are included in the 2013 <i>Addendum to 2009 Ecology Report</i> .
Threatened and Endangered Species	No adverse impacts to threatened and endangered species. Further coordination was undertaken with resource agencies regarding potential design shifts. Results are included in the 2014 <i>Ecology Report</i> (for Alternatives C and D), 2013 <i>Addendum to 2009 Ecology Report</i> (for Preferred Alternative (A), and East and West Shifts), 2012 <i>Indiana Bat Mist Net and Acoustical Survey Report</i> , and 2013 <i>Biological Assessment</i> .
Sinkholes	One sinkhole identified in Alternative D in 2014 <i>Ecology Report</i> .
Required Permits	No change.

4.1. Confirmation of Preferred Alternative with West Shift

Based on the results presented in this reevaluation, TDOT has concluded that the Preferred Alternative with West Shift continues to be the preferred alternative for the project. Table 26 demonstrates the advantages and disadvantages of each alternative in comparison with the Preferred Alternative with West Shift.

Table 26: Advantages and Disadvantages of Alternatives

Alternatives	Advantages	Disadvantages
Preferred Alternative with West Shift	<ul style="list-style-type: none"> Noise barrier would help mitigate adverse impacts to Kensington Place mobile home park; TDOT has committed to build the barrier. Slightly shorter in length. 	<ul style="list-style-type: none"> Adverse impacts on Kensington Place mobile home park (noise, displacement (6 mobile homes), and visual), but impacts are not disproportionately high and adverse. Increased wetland (due to beaver activity), stream and floodplain impacts, but impacts will be mitigated.
Preferred Alternative with East Shift	<ul style="list-style-type: none"> No land acquisition or displacements in Kensington Place mobile home park. Less wetland, stream and floodplain impacts than West Shift. 	<ul style="list-style-type: none"> The Kensington Place mobile home park would experience substantial noise impacts but a noise barrier is not reasonable. Would take five farm buildings between Davis Ford Road and US 321, and reduce access for 2 active farms.
Preferred Alternative (A)	<ul style="list-style-type: none"> No displacements in Kensington Place mobile home park. 	<ul style="list-style-type: none"> Adverse impact to NRHP eligible archaeological site.
Alternative C	<ul style="list-style-type: none"> No effect on Kensington Place mobile home park. Less wetland, stream and floodplain impacts than West Shift. 	<ul style="list-style-type: none"> High number of residential relocations (27); 23 of the relocations are in two clusters (Tara Estates and Hubbard community). Would reduce community cohesion in Tara Estates and Hubbard community. Affecting more downstream reaches of larger tributaries of Little River than the Preferred Alternative with West Shift.
Alternative D	<ul style="list-style-type: none"> No effect on Kensington Place mobile home park. Less wetland, stream and floodplain impacts than West Shift. 	<ul style="list-style-type: none"> The forecasted traffic volumes for Alternative D exceed the carrying capacity of a two-lane road; thus this alternative would not serve the traffic demands that are anticipated in future years. Highest number of residential relocations (41); 17 of the 41 are clustered in the vicinity of the Peppermint Hills Drive community. Would reduce community cohesion in this area. Proximity to the Little River, a designated Exceptional Tennessee Water that is Blount County's primary source for drinking water. Sinkhole identified within ROW.

4.2. Finding of Reevaluation

Based on the discussion presented in this reevaluation:

- The changes to the alternatives considered in the DEIS as well as modifications to the Preferred Alternative would not result in significant environmental impacts that were not evaluated in the DEIS.
- The new information or circumstances relevant to environmental concerns and bearing on the alternatives considered in the DEIS as well as modifications to the Preferred Alternative or their impacts would not result in significant environmental impacts that were not identified in the DEIS.

Therefore, a supplement to the approved 2010 DEIS or a new DEIS is not required.