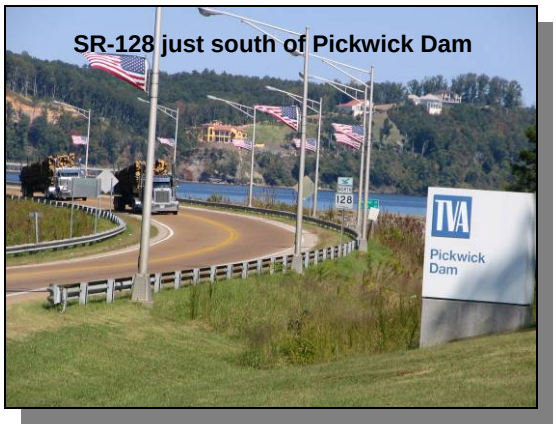
PROJECT ALTERNATIVES TO BE EVALUATED
IN THE ENVIRONMENTAL ASSESSMENT (CONCURRENCE POINT 2)

STATE ROUTE 128 from STATE ROUTE 57 to STATE ROUTE 226 (AIRPORT ROAD) in HARDIN COUNTY, TENNESSEE

Project Description



SR-128 just south of Pickwick Dam

The Tennessee Department of Transportation (TDOT) in conjunction with the Federal Highway Administration (FHWA), in cooperation with the U.S. Army Corps of Engineers (USACE), U.S. Coast Guard (USCG), and the Tennessee Valley Authority (TVA), are preparing an Environmental Assessment (EA) for the proposed reconstruction of State Route (SR)-128 from SR-57 to SR-226 (Airport Road) located south of the City of Savannah in Hardin County, Tennessee. Figure 1 shows a map of the project vicinity.

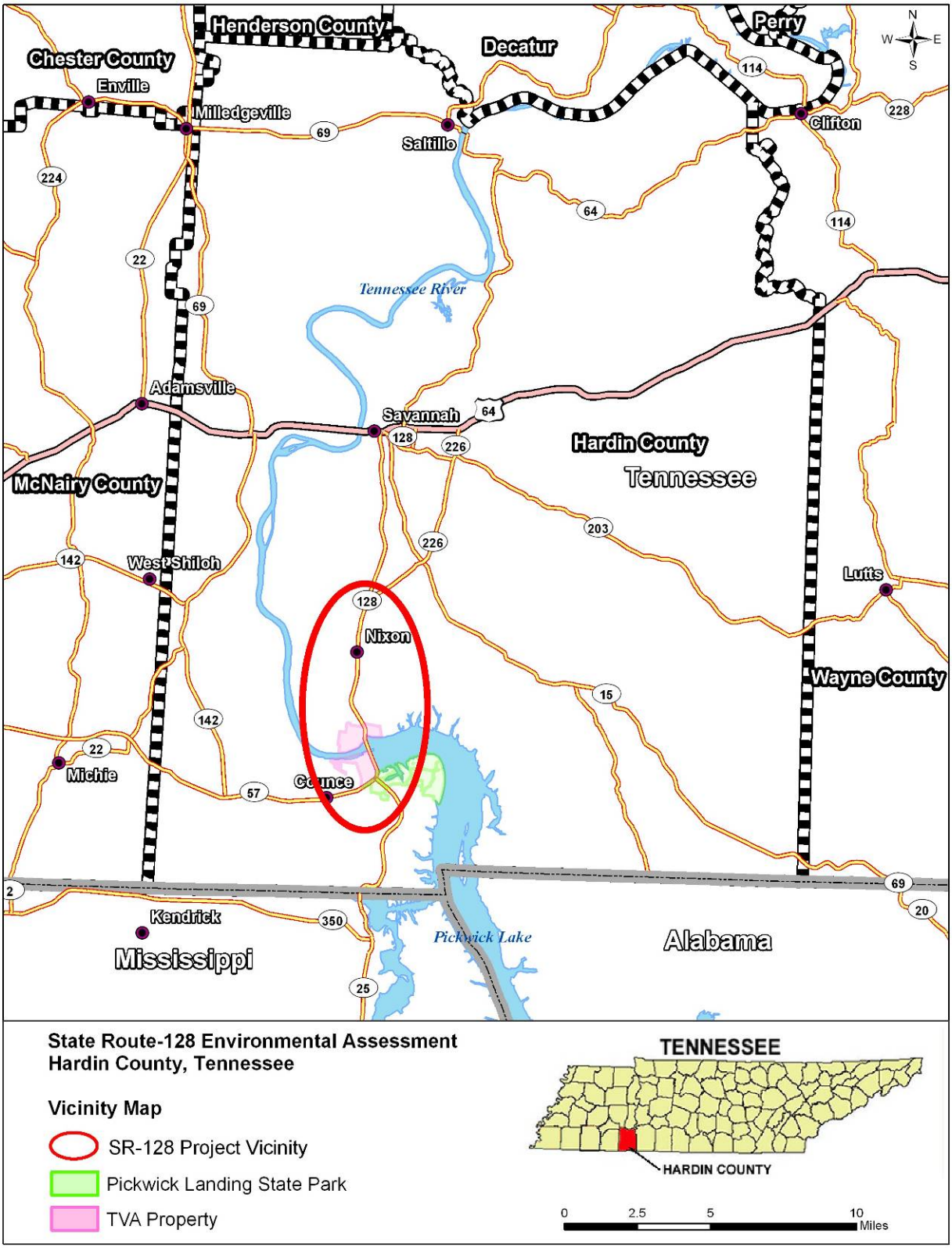
This project is being considered to provide four traffic lanes, two in each direction, throughout the approximately 6.54-mile project area. The proposed SR-128 improvements would meet current arterial design standards. The following improvements are proposed along two sections of SR-128:

- Realign SR-128, between SR-57 and Pyburns Drive, to the west of its current location creating a new crossing of the Tennessee River; and
- Improvements (widening) of the section of SR-128 between Pyburns Drive and SR-226 (Airport Road) along the existing route.

This project is the second part of an overall improvement for the 12.27 mile long SR-128 corridor that begins just south of the Pickwick Dam and ends at SR-15 (US-64) in Savannah, Tennessee. In November 2003 a Finding of No Significant Impact (FONSI) statement was approved for improvements to SR-128 from SR-226 northward to SR-15 (US-64) in Savannah. The improvement of SR-128 for that section is scheduled for letting in 2010.

An Advance Planning Report (APR) for SR-128, from State Route 57 to US-64 (SR-15) in Savannah was prepared and submitted on June 6, 2001. The report was inconclusive on establishing a proposed location for the Tennessee River crossing (either above or below Pickwick Dam). On June 26, 2002, representatives from the TVA, FHWA, USCG, USACE, and TDOT met to determine the best location for a new river crossing. It was determined that construction of a new bridge below Pickwick Dam would provide the best option.

Figure 1. Vicinity Map for Proposed State Route 128 Improvements from State Route 57 to State Route 226 (Airport Road) in Hardin County, Tennessee.



A Transportation Planning Report (TPR) that was approved in February 2008 provided a more detailed look at the option of constructing a new SR-128 bridge below Pickwick Dam as well as other potential options. The objectives of the TPR were to define the preliminary purpose and need for the SR-128 improvement project and provide guidance for the implementation of options to meet the purpose and need. The document also provided a preliminary look at traffic data, project costs, and other data to aid in the decision-making process. Figure 2 shows the general project study area for the SR-128 improvement project. This is the area being considered for placement of potential Build Alternative alignments.

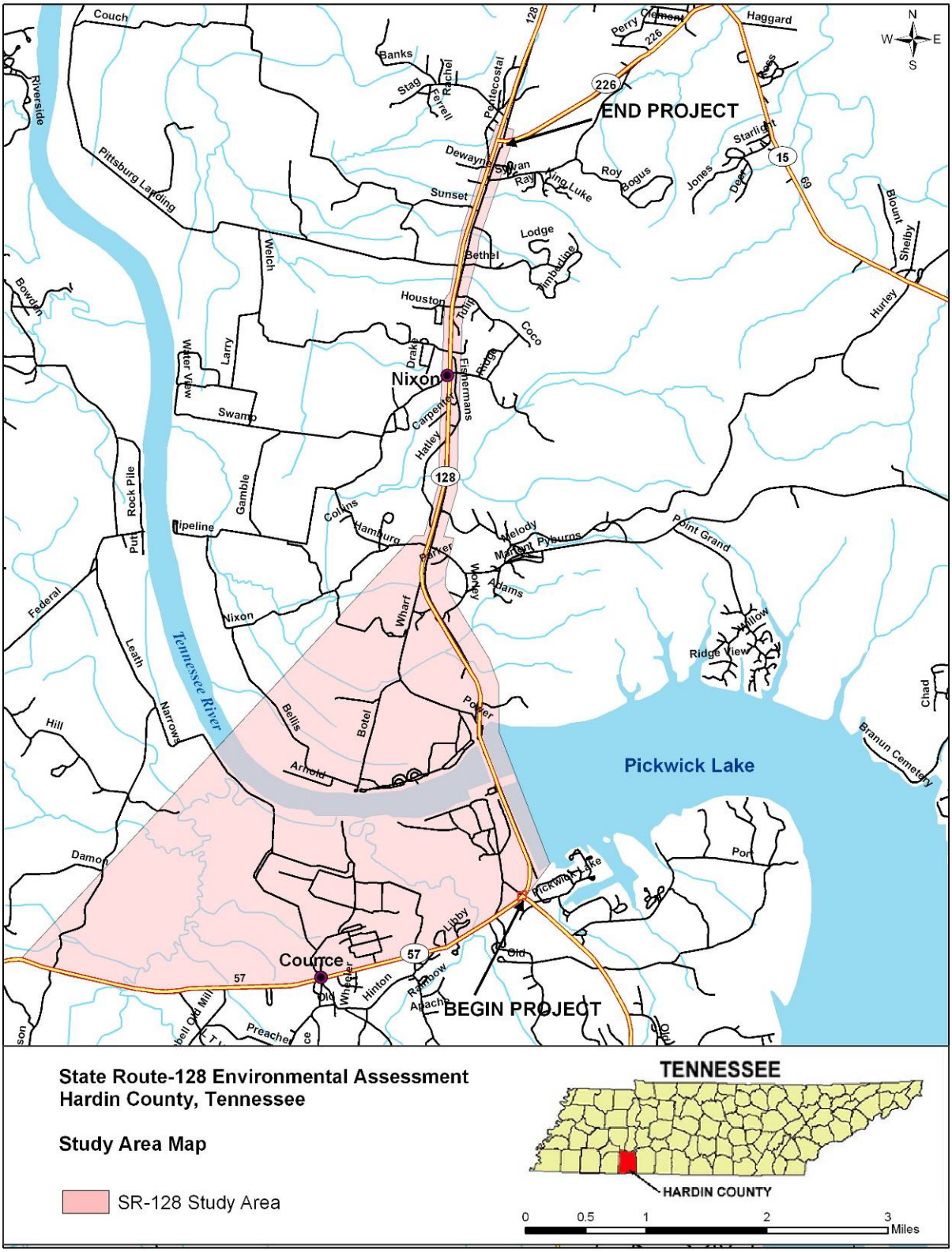
The purpose and need for the project was presented during the Concurrence Point 1 portion of this project. The Concurrence Point 1 package was sent out to all signatory agencies participating in the Tennessee Environmental Streamlining Agreement (TESA) planning process for this project on March 23, 2009. TDOT received signed concurrences for Concurrence Point 1 from four agencies during the comment period. Three of those agencies submitted advisory comments along with their signed Concurrence Point 1 signature page, which were summarized in a separate document distributed to all TESA agencies on June 5, 2009. That document provided responses to all advisory comments received during the Concurrence Point 1 comment period, which ended on May 7, 2009.

A Field Review meeting was held on July 28, 2009 at the Pickwick Landing State Park in Counce, Tennessee. Fifteen people were present at the meeting, including representatives of most of the TESA agencies, FHWA, TDOT, and TDOT consultants. Any additional information and data gathered as part of the Field Review process was considered during development of the Concurrence Point 2 package.

This Concurrence Point 2 package contains all of the requested information from the Field Review and Concurrence Point 1 advisory comments that is available to date. Some of the more detailed data related to the affected environment and environmental consequences will be provided as part of Concurrence Point 3. This Concurrence Point 2 package also contains the required discussions of the proposed reasonable alternatives to be carried forward for analysis in the EA along with discussions of other alternatives that were previously considered but are proposed not to be carried forward. Reasons for not carrying those alternatives forward are provided in the document. Maps are provided of all proposed alternatives.

Additional copies of the materials contained in the Concurrence Point 1 package or Initial Coordination package are available upon request. If any new information becomes available following completion of Concurrence Point 2, it will be distributed as part of the preliminary EA that will be reviewed by signatory agencies prior to public release of the document (TESA Concurrence Point #3).

Figure 2. Study Area Map for Proposed State Route 128 Improvements from State Route 57 to State Route 226 (Airport Road) in Hardin County, Tennessee.



Evaluation Criteria Used for Identification of Reasonable Alternatives

The identification, consideration, and analysis of alternatives are critical to the NEPA process and a primary goal of objective decision-making. Consideration of alternatives leads to a solution that satisfies the transportation needs and protects environmental and community resources. If an alternative does not meet the project purpose or need, then the alternative is typically not considered reasonable. Many other factors exist that could render an alternative unreasonable, including cost and environmental impacts.

A full range of reasonable alternatives will be considered during the development of the SR-128 Improvement project. The goal of this alternatives development process is to identify potential alternative alignments for the project that are constructible, environmentally sound, support local and regional goals and plans, cost effective, and that meet the overall purpose and need for the project.

The primary purpose of the proposed project is to provide an improved arterial highway connection between the City of Savannah and southwest Hardin County, Tennessee. State Route 128 is used by the local community, commercial business, tourism, and through traffic. Trucks account for approximately 10 percent of the traffic volumes on SR-128 in the study area. The primary need on SR-128 in Hardin County is for improved local and regional mobility in the future. Several specific goals of the project are to:

- Promote the potential for economic growth in the City of Savannah and Hardin County, Tennessee by providing improvement to the transportation system;
- Provide an improved north/south route to serve demand for regional accessibility to the national highway system (US 64) and protect that provision in the future;
- Increase the capacity on existing SR-128 in order to improve safety and mobility;
- Provide a roadway designed to handle increased traffic demand spurred by commercial and residential development;
- Provide a higher Level of Service (LOS) for motorist comfort levels; and
- Remove traffic from Pickwick Dam for improved safety and maintenance.

A geographic information system (GIS) database has been developed for this project. The GIS is continually populated and updated with known constraints data, such as environmental constraints, cultural sites, hazardous materials locations, etc., as it becomes available. The GIS data layers have been incorporated into the initial efforts to help identify alignments that avoid or minimize the potential impacts to known constraints or sensitive areas to the extent possible.

All potential alternatives identified were evaluated to determine if they were reasonable alternatives. Objective evaluation criteria were developed based on input from various agencies and project stakeholders to help identify and screen potential reasonable alternatives for the project.

Although the Concurrence Point 2 process will help identify the general layout of potential Build Alternatives to be studied in the EA, the details of the roadway design will continue to be refined throughout the planning stages for the project, including the NEPA and design phases. It is usually preferable that some of the more general items, such as specific project termini and

primary type of facility to be constructed be determined early in the planning process so that impacts can be evaluated in as much detail as possible from the beginning. Other items such as context sensitive design features that may be recommended by the public and/or local officials that are aimed at enhancing the final roadway alignment within the overall project corridor will likely be finalized later in the process. These types of modifications are typically minimal and would not be expected to have a substantial change in terms of impacts to the environment. Typically they result in beneficial social impacts by providing a facility that fits better into the community.

Table 1 lists the main evaluation criteria and rationale utilized to determine if the various alternatives proposed for this project would be considered reasonable. These criteria may be revised based on input received during the Concurrence Point 2 process and based on any other agency or public input received during the alternatives development process.

Table 1. Evaluation Criteria utilized in Identifying Reasonable Alternatives to be considered in the SR-128 Improvement EA.

Criteria ID	Evaluation criteria:	Method/Measurement used to determine reasonableness of alternative:
1*	The alternative must meet the stated Purpose and Need for the project. In particular the alternative should provide an improved Highway connection between Savannah and southwest Hardin County that has more traffic capacity, is more efficient, and safer than the existing route.	Design year LOS on SR-128 should be better than would occur under No-Build conditions and the design of the roadway should meet current design standards throughout the length of the proposed project.
2*	Any build alternative that requires crossing the Tennessee River on new alignment should be constructed downstream of the existing Pickwick Dam at a distance sufficient to not adversely impact navigation.	The alternatives should be consistent with the determination made at the June 2002 interagency meeting between TDOT, FHWA, USCG, USACE, and TVA that determined the best location for a new Tennessee River crossing would be downstream of the existing Pickwick Dam. TVA would like to see traffic removed from the Pickwick Dam for improved safety and operational considerations.
3**	The overall costs of implementing the alternative must not be substantially higher than other reasonable alternatives that meet Criteria 1 and 2.	If a given build alternative utilizing new alignment is determined to cost substantially more than other constructible alternatives on new alignment that have been identified as reasonable based upon Criteria 1 and 2, then the alternative would not be considered reasonable due to costs and may be eliminated from further consideration.
4**	To the extent practical, the alternative should avoid or minimize impacts to known environmental constraints or sensitive areas identified during the environmental planning process.	GIS constraints data is currently being utilized to help map potential build alternative alignments that will avoid and/or minimize environmental impacts to the extent possible. Other potential alternatives identified by agencies or the public will be analyzed to determine the potential impacts to known constraints or sensitive areas. All potential alternatives will be compared to determine severity of environmental impacts. Although alternatives can be considered reasonable based on Criteria 1, 2, and 3, even if they result in some substantial environmental impacts, alternatives that successfully avoid known constraints or sensitive areas will be

		considered more reasonable than those that result in direct impacts to such resources. If the more environmentally sound alternatives are reasonable (meet criteria 1, 2, and 3), constructible, and of comparable costs, then the less environmentally sound alternatives may be eliminated from further consideration, unless there are other reasons to continue studying the alternative.
**Criteria 1 and 2 must be met in order for an alternative to be considered reasonable.* ***Although an alternative may be considered reasonable because it meets Criteria 1 or 2, if other reasonable alternatives are identified that are more environmentally sound and/or are less expensive than the alternative in question, then the alternative may be eliminated from further consideration.*		

Description of Alternatives

A No-Build Alternative and three Build Alternatives are proposed to be considered in the EA. Additional build alternatives were previously considered, but are proposed to not be carried forward for further analysis in the EA, because they are not expected to meet the purpose and need of the project, or because they would involve more substantial environmental impacts and/or costs than other similar, but reasonable alternatives that will be carried forward. Other potential reasonable alternatives for design options, location, and transportation system management (TSM) type improvements that have been considered are discussed as well. If additional reasonable alternatives are identified during the public involvement and/or agency coordination efforts that would meet the purpose and need of the project, not result in substantially more enviromental impacts and/or costs than the proposed alternative presented below, then such alternatives may be carried forward for more detailed study in the EA

No-Build Alternative

Existing SR-128 at SR-226 (top right).

SR-128 is functionally classified as a Rural Minor Arterial on the state highway system. The existing route is two lanes, which are a minimum of 11-foot and a maximum of 12-foot with a minimum 2-foot and maximum 10-foot outside shoulders and approximately 100-foot right-of-way (ROW). Existing State Route 128 crosses the Tennessee River over Pickwick Dam. The bridge at Pickwick Dam is approximately 0.69 miles in length and consists of two 12-foot traffic lanes, 2-foot shoulders, and 5-foot sidewalks on either side. The roadway lacks center turn lanes, has narrow shoulders, and several areas with sight limitations due to the existing terrain and other features that cause blind spots near connecting roadways and driveways.

The No-Build Alternative would mean that no substantial improvements would be made to SR-128 between SR-57 and SR-226 (Airport Road), including the bridge over Pickwick Dam. Normal maintenance activities would continue to occur to keep the existing roadway and bridge operational. It is possible that minor TSM related projects, such as addition of turn lanes, implementation of traffic signals at roadway intersections, and other minor improvements to the existing roadway could be made in the future. However, it is not anticipated that TSM projects alone would be capable of meeting the purpose and need of the SR-128 improvement project in terms of improving the safety and efficiency of the entire section of roadway between SR-57 and SR-226 (Airport Road), which includes the section of roadway that occurs on top of Pickwick Dam.

The No-Build Alternative would not result in any major construction efforts on new alignment that would potentially result in substantial adverse impacts to the environment. However, the beneficial impacts to local and regional traffic flow and safety offered by the proposed State Route 128 improvement project would also not occur. It is likely that continued residential growth in the Pickwick Lake vicinity will result in increased traffic volumes that will result in continued reductions in levels of service (LOS) and reduced safety on the existing roadway.

Analyses conducted for the No-Build Alternative will consider what, if any, consequences would occur in the project area if the State Route 128 improvement project were not constructed. The No-Build Alternative will serve as a baseline comparison for the proposed Build Alternatives, which would have inherent adverse and beneficial consequences.

Potential Build Alternatives

In addition to the No-Build Alternative, up to three Build Alternatives are currently being considered to be carried forward for further study in the EA. These three alternatives are considered reasonable and are capable of meeting the purpose and need of the proposed project. The Build Alternatives consist of construction of SR-128 on new alignment between SR-57 and Pyburns Drive and widening of the existing section of SR-128 following the existing route between Pyburns Drive and SR-226 (Airport Road). Figure 3 contains a depiction of the approximate centerlines proposed for each of the potential Build Alternative discussed in this document. Figure 4 shows a more detailed view of the southern half of the Build Alternatives where they would be on new alignment.

All of the proposed Build Alternatives being considered would include construction of a four-lane, partial-access controlled arterial extending from SR-57 in Counce northward to SR-226 (Airport Road). Two potential southern termini are being considered along SR-57 for the project as discussed under each of the proposed alternatives below.

The proposed alignment would include two separate sections of roadway, each with its own design characteristics. Section one will begin at SR-57 and continue on a new location for a distance of approximately 3.11 miles to near Pyburns Drive. The new location is necessary due to the need to provide a new bridge crossing over the Tennessee River. This section will consist of four 12-foot travel lanes, a 12-foot continuous left turn lane, and 12-foot outside shoulders on 200 feet of ROW. The new river structure would include a 2-foot center concrete barrier and 7-foot inside shoulders in place of the continuous left turn lane. Due to the existence of floodplains on each side of the river, the structure may be approximately 9,640’ or 1.83 miles in length. Detailed hydraulic studies will determine the requisite length on structure.

Section two of the SR-128 Improvements will begin near Pyburns Drive and continue along the existing location for a distance of approximately 3.43 miles to SR-226 (Airport Road). The widening of this existing alignment will result in a facility with four 12-foot travel lanes with 12-foot outside shoulders and a 48-foot depressed, grass center median, on 250 feet of ROW. This proposed design would allow for continuation of the design of SR-128 north of SR-226 (Airport Road), which is slated to be widened to four lanes beginning in 2010.

The design speed of the roadway will be 60 mph, but the actual posted speed could be lower based on input from local officials. Figure 5 contains a graphical depiction of the typical section of the proposed roadway.

Figure 3. Potential Build Alternatives for the State Route 128 Improvement project in Hardin County, Tennessee.

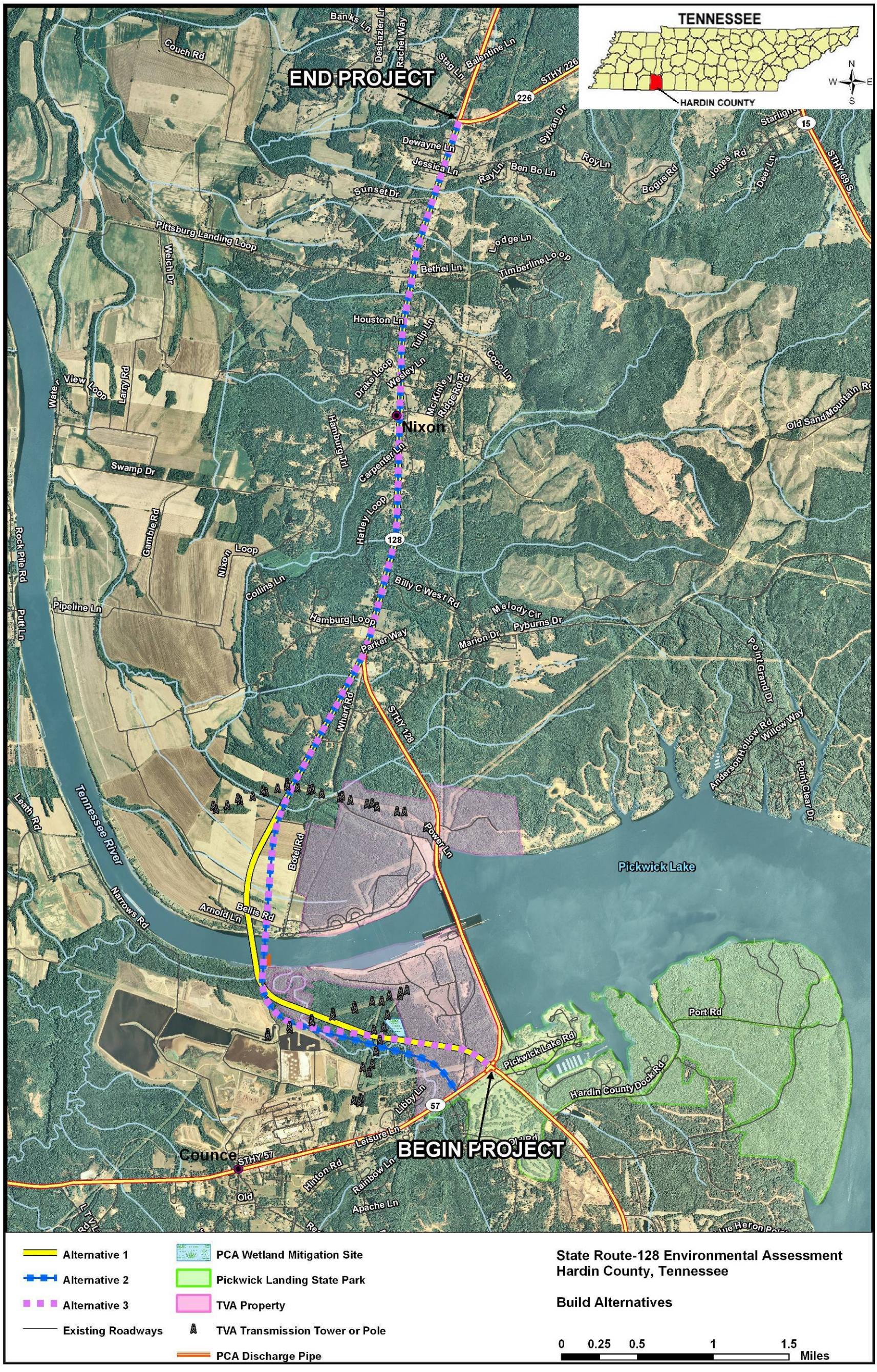


Figure 4. Southern portion of the Build Alternatives for the State Route 128 project in Hardin County, Tennessee.

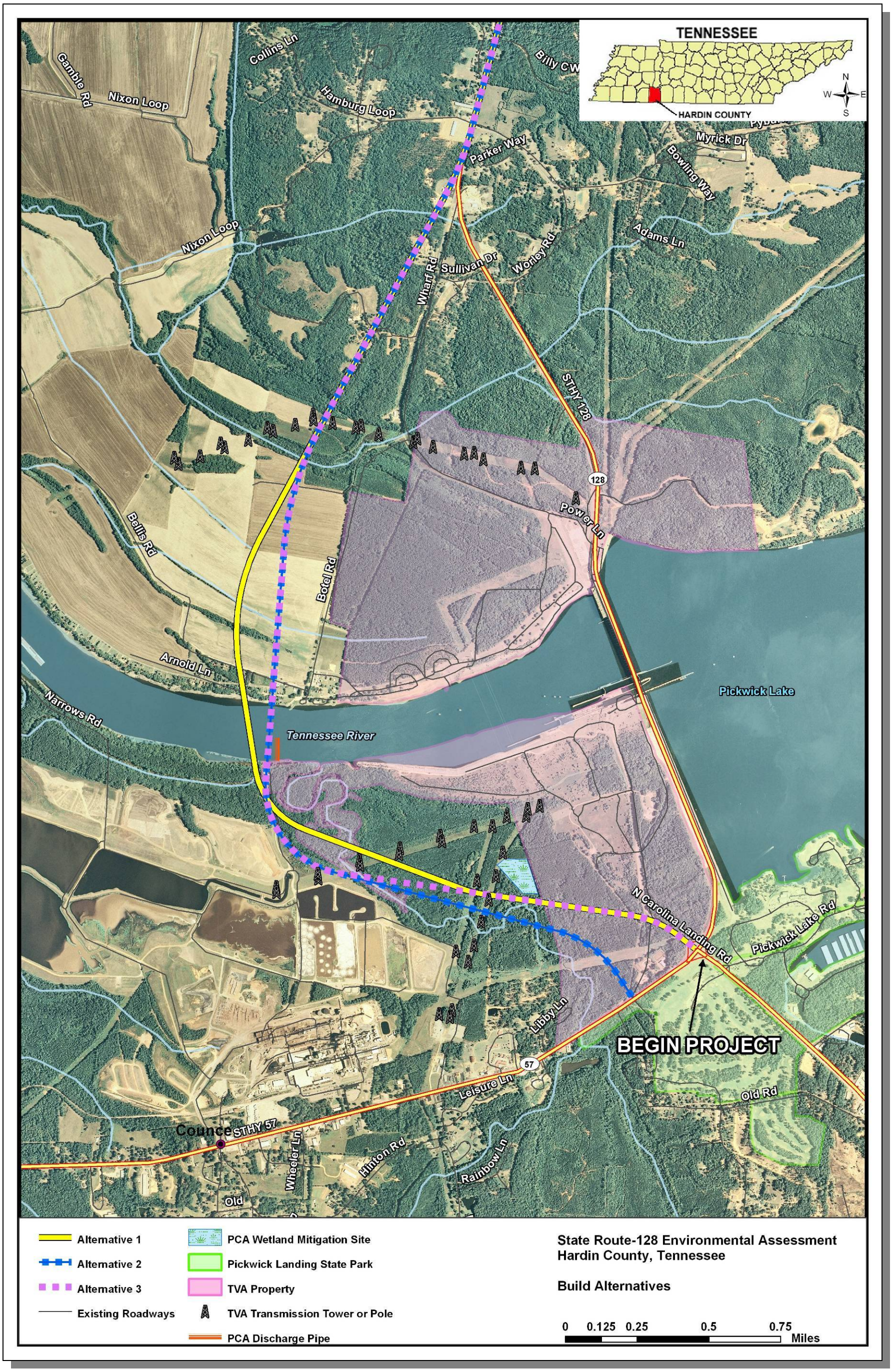
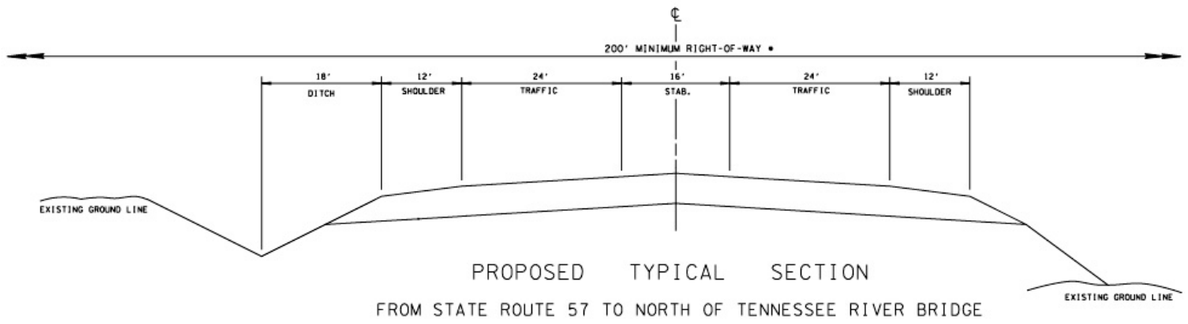


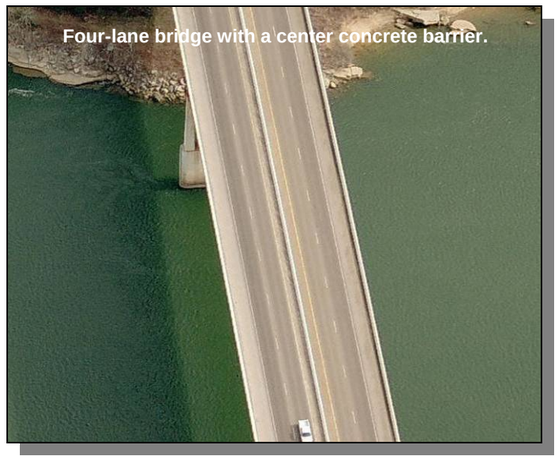
Figure 5. Typical Section for the Build Alternatives for State Route 128 in Hardin County, Tennessee.

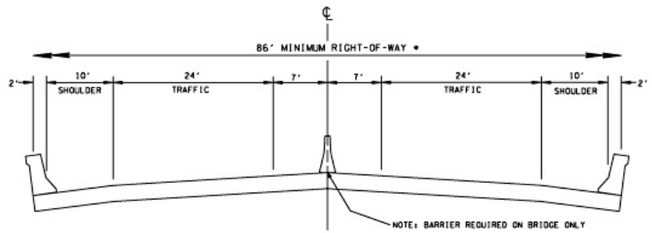


PROPOSED TYPICAL SECTION

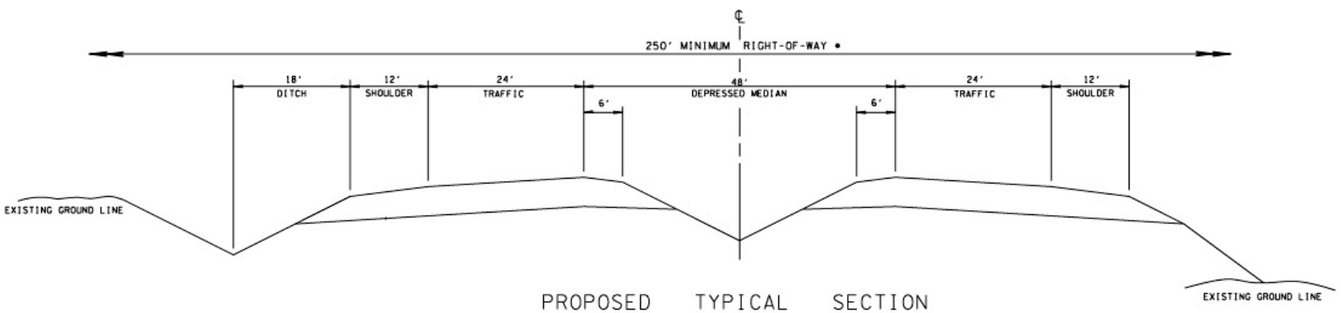
FROM STATE ROUTE 57 TO NORTH OF TENNESSEE RIVER BRIDGE


Four-lane highway with a continuous center turn lane.


Four-lane bridge with a center concrete barrier.



PROPOSED TYPICAL BRIDGE SECTION



PROPOSED TYPICAL SECTION

FROM NORTH OF TENNESSEE RIVER BRIDGE TO AIRPORT RD.


Four-lane highway with a depressed median.

Following are more detailed descriptions of each of the potential Build Alternatives. A summary note is contained at the end of each alternative description as to whether TDOT recommends carrying the alternative forward for more detailed study in the EA.

Alternative 1

Figure 3 above showed the layout of all three Build Alternatives. Figure 4 showed a more detailed view of the southern portion of Alternative 1 that would be on new alignment. Alternative 1 begins at the existing intersection of SR-128 and SR-57. This location would provide good system continuity for SR-128 users traveling to and from SR-57 to or from the southeast. Utilizing the existing intersection location would provide the most convenient route for traffic traveling to and from Pickwick Landing State Park and surrounding areas via SR-128. This location would cross over a water pipeline running between a water intake in Pickwick Lake and a water treatment facility located just northwest of the existing intersection. However, the treatment facility would remain intact and normal operation would be expected to continue during and after construction.

From the intersection of SR-128 and SR-57, Alternative 1 extends to the northwest between TVA property to the northeast and Packaging Corporation of America (PCA, a manufacturer of containerboard) property to the southwest. This area is currently undeveloped and consists of forested areas and a meandering stream. A PCA wetland mitigation site is located to the north of the proposed alignment, but this site would be avoided by the new roadway.

The Alternative 1 alignment turns to the north just before crossing over the Tennessee River below Pickwick Dam at Tennessee River mile (TRM) 205.3. This proposed new river crossing is considered feasible in terms of engineering and environmental constraints considered including navigation, hydraulics, and structures associated with the PCA facilities. This location also avoids many of the potential environmental and engineering constraints identified to date. Those constraints include the Pickwick Lock and Dam, TVA recreation areas including campgrounds and fishing areas just downstream of the dam on both sides of the river, the PCA wastewater effluent, and the historic Botel. The new river crossing location would bisect an area considered to be a mussel sanctuary established to protect mussels, including endangered species, known to inhabit the Tennessee River. The mussel sanctuary extends from Pickwick Dam at TRM 206.7 downstream to a Tennessee Gas pipeline located at TRM 201.9. TDOT will continue to coordinate with the USFWS, TWRA, and TVA to determine the best way to avoid or minimize impacts to mussels and/or their habitats in the area. It is likely that a combination of impact minimization measures would be necessary. Some of these measures may include placing bridge piers within the river in areas less likely to contain mussels, consider longer bridge spans to reduce the number of in-stream piers, minimize the pier footprints, and relocate mussels from the area prior to construction. A combination of these mitigation measures could be implemented as a way to minimize potential adverse affects on populations of mussels in the area. FHWA will make a determination as to whether the mussel sanctuary constitutes a "wildlife refuge" and would therefore be a potential Section 4(f) issue. This will be evaluated and discussed further during the Concurrence Point 3 phase of the project. At this time, no other reasonable alternatives have been identified that would result in meeting the purpose and need of this project without a new Tennessee River crossing being constructed downstream of Pickwick Dam and in the portion of the river containing the mussel sanctuary. However, if the mussel sanctuary is determined to be a Section 4(f) issue, TDOT will fully evaluate potential avoidance alternatives, including the potential for constructing a bridge that spans the entire length of the river channel and would have minimal impact on aquatic habitats for mussels.

During on-site interviews with PCA, they indicated their strong concern over potential safety issues associated with fog. Their primary concern involves fog from their treatment facilities coupled with fog from the Tennessee River and Pickwick Lake. They fear that the public would perceive fog on the roadway as being from PCA facilities alone and are concerned with this liability citing the Bowater Calhoun Mill case in eastern Tennessee. PCA would prefer the alignment to be as far from their treatment facilities as possible. Alternative 1 is located farthest to the northeast from the PCA facilities.

A detailed hydraulic flood study will determine how much of the Alternative 1 alignment would remain elevated on a bridge structure through the 100-year floodplain area located north and south of the Tennessee River. The structure would cross a small stream on the south side of the river. The area north of the river is currently used for row crops with some residential property immediately adjacent to the River. The new bridge would be located far enough west to avoid the historic Botel located at the corner of Botel Lane and Bellis Road.

Alternative 1 would gradually turn to the northeast before exiting the Tennessee River floodplain. The alignment would remain west of Wharf Road before reconnecting with existing SR-128 near Pyburns Drive. From Pyburns Drive northward to SR-226 (Airport Road), SR-128 would be widened following the existing alignment. The roadway will be designed in a manner that minimizes impacts to as many existing structures, including houses and businesses, located along the existing roadway as feasible without compromising the integrity of the roadway design.

It is recommended that Alternative 1 be carried forward for further analysis in the EA, because the alternative would meet the purpose and need of the project and would provide an alignment with reduced environmental impacts and costs when compared with other alternatives that have been considered but are proposed not to be carried forward in the EA. Those alternatives are discussed under the ”Alternatives Previously Considered” section below.

Alternative 2

Figure 4 above showed a view of the southern portion of Alternative 2 that would be on new alignment. Alternative 2 begins approximately 0.25 miles west of the existing SR-128/SR-57 intersection. This new intersection location is considered in order to provide an option for avoiding crossing over a water pipeline running between a water intake located in Pickwick Lake and a water treatment facility located just northwest of the existing intersection. Placement of the SR-128/SR-57 intersection at this location would not provide optimal system continuity as would be provided under Alternative 1 because SR-128 traffic traveling to or from the southeast via SR-57, including Pickwick Landing State Park traffic, would be required to make an extra turn where the existing SR-128/SR-57 intersection is located. Due to the golf course located in the southwest quadrant of the existing intersection, it is not considered reasonable to try to extend the SR-128 alignment southward to SR-57 south of the golf course to provide better alignment with the existing route.

From the proposed new intersection of SR-128 and SR-57, Alternative 2 extends to the northwest between TVA property to the northeast and PCA property to the southwest. This area is currently undeveloped and consists of forested areas and a meandering stream. A PCA wetland mitigation site is located to the north of the proposed alignment, but the site would be avoided by the new roadway. This alignment would be located adjacent to the PCA property and settling ponds located in the northeast portion of their property.

The Alternative 2 alignment turns to the north just before crossing over the Tennessee River below Pickwick Dam at TRM 205.4. This proposed new river crossing is considered feasible in terms of engineering and environmental constraints considered including navigation, hydraulics, and structures associated with the PCA facilities. This location also avoids many of the potential environmental and engineering constraints identified to date. Those constraints include the Pickwick Lock and Dam, TVA recreation areas including campgrounds and fishing areas just downstream of the Dam on both sides of the river, the PCA wastewater effluent, and the historic Botel. Similar to Alternative 1, the new river crossing location would be located in the area considered to be a mussel sanctuary established to protect mussels, including endangered species, known to inhabit the Tennessee River.

A detailed hydraulic flood study will determine how much of the Alternative 2 alignment would remain elevated on a bridge structure through the 100-year floodplain area located north and south of the Tennessee River. The Alternative 2 alignment would be located slightly east of the Alternative 1 alignment through the crop fields located in the area. The new bridge would be located far enough west to avoid the historic Botel located at the corner of Botel Lane and Bellis Road. However, this alignment would be located slightly closer to the Botel than the Alternative 1 alignment.

Alternative 2 would gradually turn to the northeast as it exits the Tennessee River floodplain and crop fields and follows the same route as Alternative 1 for the remainder of the alignment. The alignment would remain west of Wharf Road before reconnecting with existing SR-128 near Pyburns Drive. From Pyburns Drive northward to SR-226 (Airport Road), SR-128 would be widened following the existing alignment. The roadway will be designed in a manner that minimizes impacts to as many existing structures, including houses and businesses, located along the existing roadway as feasible without compromising the integrity of the roadway design.

Alternative 2 would only be expected to have minor differences in terms of environmental impacts due to its overall similarity to the Alternative 1 alignment. However, it is recommended that Alternative 2 be carried forward for further analysis in the EA, because the alternative would meet the purpose and need of the project and would provide another option for placement of the southern portions of the alignment including a different location for the bridge and a new location for the SR-128/SR-57 termini.

Alternative 3

Figure 4 above showed a view of the southern portion of Alternative 3 that would be on new alignment. Alternative 3 would combine portions of Alternative 1 with portions of Alternative 2. Alternative 3 begins at the existing SR-128/SR-57 intersection where Alternative 1 begins. The alternative alignment would follow the Alternative 1 alignment before splitting off and heading west to follow the Alternative 2 alignment just after passing the PCA wetland mitigation site. This alternative provides the option to allow SR-128 to begin at the existing intersection with SR-57, but then avoid some of the extra stream impacts that would likely be associated with the Alternative 1 alignment in the area just south of the Tennessee River. The Alternative 1 alignment runs slightly closer to the stream than Alternative 2 and would likely result in additional channel modifications than would be required under Alternative 2 in that area. Alternative 3 would then follow the Alternative 2 alignment across the Tennessee River at TRM 205.4 and throughout the remainder of the alignment. Alternative 2 and Alternative 3 would

require a slightly tighter curve just beyond the southern end of the proposed new Tennessee River Bridge.

Alternative 3 would only be expected to have minor differences in potential impacts when compared with either of the other alternatives; however, it is recommended that Alternative 3 be carried forward for further analysis in the EA, because the alternative would meet the purpose and need of the project and would provide another option for placement of the southern portions of the alignment. Studying the combined areas of all three proposed Build Alternatives will result in studying an overall wider area. This will provide decision-makers additional information to help make final determinations regarding final placement of the roadway through the area. It is possible that other alternatives could be developed from the proposed alignments, such as following the Alternative 3 alignment, but then crossing back over to the Alternative 1 alignment just south of the Tennessee River to provide an option for crossing the Tennessee River further west should that crossing be determined to be better than the Alternative 2/Alternative 3 crossing. The data gathered and analyzed for the EA will provide enough information to determine the best route through the area, whether it be one of the proposed Build Alternatives or a combination of two or more alternatives. It is likely that the final alignment would be further refined to minimize impacts during the design phase of the project, after the environmental studies are complete and all potential impacts have been defined and assessed.

As with Alternative 1 and Alternative 2, Alternative 3 would have reduced environmental impacts and costs when compared with other alternatives that have been considered but are proposed not to be carried forward in the EA. Those alternatives are discussed under the" Alternatives Previously Considered" section below.

Alternatives Previously Considered but Eliminated

In addition to the Build Alternatives discussed above, several additional alternatives were previously considered, but determined to not be reasonable alternatives for the current study. The primary reasons those alternatives are recommended to be eliminated from further study is based on their not being capable of meeting the purpose and need for the project, or because they are considered to have substantial higher cost or environmental impacts when compared to other alternatives being considered to be carried forward for more detailed analysis in the EA.

<u>Other Previously Considered Build Alternatives</u>

Originally, the remaining sections of SR-128 that are being considered for improvement between SR-57 and SR-226 (Airport Road) were slated to be studied as two separate projects, one that included the section between Pyburns Drive to SR-226, and a second that included the section between SR-57 and Pyburns Drive. The current project being studied in the EA includes the entire section of SR-128 between SR-57 to the south and SR-226 to the north so that the project would be considered to have logical termini including a beginning and ending at existing State routes. Although this SR-128 improvement project is being studied as one project for NEPA purposes, it is possible that the improvements could be broken into sections and constructed in phases.

Widening SR-128 on Existing Alignment for the entire length, including the Pickwick Dam

Widening existing SR-128 over the existing Pickwick Dam is not considered a feasible option due to engineering constraints. It would not allow for the section of SR-128 over Pickwick Dam to be widened to four lanes. Also, this would not allow SR-128 traffic to be removed from the Pickwick Dam. Removal of all traffic from TVA dams is a long-term homeland security goal for TVA. Therefore, this option would not be capable of meeting the purpose and need of the project and is not considered reasonable

Crossing of Pickwick Lake above Pickwick Dam

Although it would be possible to build a new bridge across Pickwick Lake just above Pickwick Dam, this option is not considered reasonable at this time. Construction of a new bridge above Pickwick Dam is not considered reasonable primarily due to construction costs, which would be substantially higher due to the length of the bridge and the depth of the piers that would be required in the lake. Also there would be potential impacts to navigation and unavoidable impacts to the Pickwick Landing State Park located along the shore on the south side of the lake just above Pickwick Dam. This area is also in the vicinity of two water intakes, which supply water to surrounding areas, including the PCA facility.

Moving the SR-128 Alignment West of the PCA Facilities and Counce.

In order to avoid PCA and TVA properties, an option for moving the southern terminus of the project further west along SR-57 was considered. However, it was determined that going west of the PCA property was not feasible for several reasons. Some of the limitations for a western alternative included: capped hazardous waste sites and numerous monitoring wells at the Geo Specialty Chemicals site just west of the PCA property; the potential for numerous wetland and stream impacts; and substantial changes in travel patterns. A western alternative would require north-south motorists on SR-128 to be re-routed through Counce causing an increase in traffic on the section of State Route 57 (SR-57) between a new SR 128/SR-57 intersection and the existing SR-128/SR 57 intersection. This would not meet the purpose and need for the project.

Transportation Management System (TSM) Improvements

Improvements to Existing SR-128

TSM Alternatives, such as minor improvements to existing SR-128 like adding center turn lanes or right hand turn lanes and/or traffic signals at certain intersections, or widening just the shoulders of the road were considered. However, it was determined that a two-lane roadway through the area would not be capable of meeting the overall purpose and need for the project and would result in decreased LOS by the design year. Also, TSM alternatives would not provide the option to remove traffic from Pickwick Dam by providing a new river crossing.

Transit Alternatives

Transit Alternatives would not be anticipated to provide enough of a reduction in vehicular traffic to meet the purpose and need of this project. The traffic utilizing SR-128 typically consists of a combination of local daily commuters traveling to and from Savannah to the north and PCA (the largest employer in Hardin County) to the south, recreational traffic associated with Pickwick

Lake, and through traffic traveling between various points outside of Hardin County. The PCA facilities generate a large number of trucks that use SR-128 on a daily basis. Improvements to area highways will continue to be essential to keep up with the transportation needs of the area.

Other Reasonable Alternatives

Although no other options have been identified to date that are expected to be capable of meeting the purpose and need of the proposed project, if any other ideas or suggestions are identified during the alternatives development process that could potentially meet the purpose and need for the project, they will be evaluated in more detail for possible consideration to be carried forward to be studied in the EA as reasonable alternatives.

Study Methodologies and Study Area

In general, the alternatives studied in the EA will be developed and conducted in accordance with established procedures as documented in TDOT"s latest edition of the Tennessee Environmental Procedures Manual (TEPM); with TDOT Environmental Division's scopes of work for performing specific types of studies, such as ecology, historic architecture and archaeology, hazardous materials, air quality, noise, and permits; and with all other Federal and State regulations and requirements.

The TEPM contains technical guidance as well as background information on federal and state environmental regulation, FHWA guidance and policies, interagency agreements, and TDOT policies. The TEPM provides guidance for the preparation of environmental analysis and documentation for federally-funded and state-funded transportation projects. Projects that are funded in whole or in part with federal funds or have major federal actions must follow the requirements of NEPA, as well as related federal and state environmental regulations. The TEPM helps ensure that TDOT adheres to the requirements set forth in those regulations.

The primary study area for many of the resources anticipated to be impacted by this project will include a 500-foot radius surrounding the centerlines of the Build Alternatives. For certain resources, a larger area surrounding the proposed alignments will be studied. For instance, impacts to social and economic environments will likely be studied at the county level.

The size of the study area for the indirect and cumulative impacts analyses will also extend beyond 500-feet of the immediate footprint of the project. The size of the study area for indirect and cumulative impacts will vary by resource category depending on the resources identified in the project vicinity that may potentially be impacted. For instance, the impact analyses for water resources will be done on a watershed level so that potential impacts to existing water resources downstream of the project area can be thoroughly considered. Impacts to social and economic environments would be studied at the county level; whereas impacts to other resources, such as cultural resources, would be studied at a smaller, more localized scale surrounding the project area.

The anticipated extent of potential impacts associated with other past, present, or reasonably foreseeable projects that may be identified in the general project vicinity, which could contribute to cumulative impacts in combination with those impacts associated with the new roadway, will be considered when determining the appropriate study area for cumulative impacts.

The study area for indirect impacts will include areas most likely to be impacted by secondary developments promoted by construction of the project, such as highway-oriented commercial/retail developments like gas stations, hotels, and fast-food restaurants that could be promoted by improved transportation and or continued growth of the area. Land use zoning restrictions will be considered in determining the potential for such developments and the impacts associated with them.

TDOT will continue to work with various regulatory agencies throughout the development of the EA to ensure that all potential direct, indirect, and cumulative impacts are considered at the appropriate scale and level of detail. Those agencies are invited to provide guidance on the appropriate extent of the study area boundaries that they recommend for individual resources that fall under their jurisdiction.

Preliminary Affected Environment and Consequences Discussions

Social or Economic Conditions

According to a 2006 Census estimate, Savannah has a population of 7,284 and is the county seat of Hardin County. In 2006, the annual average unemployment rate for Savannah was 6.2%, which is higher than the statewide average of 5.2% for Tennessee. Agricultural products that come from this area of West Tennessee include corn, cotton, soybeans, and small grains. Savannah is also home to companies such as PCA, Clayton Homes Inc., and American Food Service Company.

The area now known as Pickwick Landing State Park once served as homes for the Tennessee Valley Authority (TVA) construction crews and their families. The Tennessee States Park system acquired the property from the TVA in the 1970's. Today the park includes cabins, camp sites, a conference center, golf course, lodging, a restaurant, and picnic areas. In 2005, the park had over 1.3 million visitors.

This project would be anticipated to have both social and economic impacts due to the existing residential developments and businesses in the general project vicinity. More detailed analysis of the social and economic impacts of the project will be included as part of the EA.

Alternatives involving construction of SR-128 on new alignment would directly impact some residences and businesses that are located within the proposed ROW and would be displaced. Therefore, some adverse impacts to the social environment would be anticipated. However, improved safety and efficiency of the transportation system in southern Hardin County would also be anticipated with construction of the new roadway. This could result in long-term beneficial impacts to the social environment and local community as a whole.

In terms of economic impacts, the project would be expected to have both adverse and beneficial impacts. Some existing businesses, especially those along SR-128 and SR-57, could be potentially impacted by construction of a new roadway that could result in shifting traffic to new areas and possibly result in loss of some existing business. However, the region as a whole could benefit economically due to the improved transportation options and access that would be provided. Economic benefits would occur due to increased property values anticipated due to the improved traffic conditions. Some potential adverse impacts may result

from loss of open space, increased noise in some locations, and land use changes in the immediate area surrounding the improved roadway, including some loss of farmland.

The SR-128 improvements could promote additional economic development or growth in the southern Hardin County region due to better traffic conditions that may spur additional industrial, retail, and residential development in the vicinity. It is anticipated that the area will continue to be developed with residential, commercial, and possibly some industrial developments regardless of this project. However, this project may promote quicker development of the area due to improved transportation allowing better movement of people and goods throughout the region.

The project area will be studied to determine if any Environmental Justice impacts would occur due to residential or business displacements. In general, social impacts would likely be beneficial due to an improved transportation system, which could result in improved safety and better commuting conditions for local residents. Efforts will be made to avoid dividing neighborhoods and/or communities during the alternative development process.

Land Use

The project area consists of a combination of urban, suburban, and rural land uses. Much of the project area contains rolling terrain dissected with scattered areas of low density residential land uses and associated local roadways. Commercial land uses occur along SR-128 and SR-57 corridors. Much of the terrain is undeveloped and is either covered by forests or agricultural land.

It is anticipated that construction of the SR-128 project may promote or accelerate the timeframe in which some of the growth and development occurs within southern Hardin County. Improved traffic flow and access from Savannah to southern Hardin County and adjacent areas provided by the project may lead to increased residential, commercial, and/or industrial development. Local land use planning and zoning restrictions can be implemented to help control the location, amount, and types of developments that occur. Potential developments and land use changes expected to be promoted by the project will be considered in more detail in the EA.

Secondary developments would be expected to occur if SR-128 project is expanded southward. Highway-oriented commercial development, to include service stations, fast food restaurants, truck stops, and motels, would most likely be the initial types of development. Additional residential, commercial, and industrial developments may also be promoted in the immediate surrounding area as well due to improved access and transportation capabilities. Potential impacts anticipated to be associated with those developments will be discussed in the EA along with the impacts associated with construction and use of the roadway itself.

Air Quality

The Clean Air Act (CAA), which was last amended in 1990, requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly.

Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

The EPA Office of Air Quality Planning and Standards has set NAAQS for six principal pollutants including:

- Carbon Monoxide;
- Lead;
- Nitrogen Dioxide;
- Particulate Matter (PM10 and PM2.5);
- Ozone; and
- Sulfur Oxides.

These six are called criteria pollutants. Areas in which air pollution levels persistently exceed the NAAQS may be designated as "nonattainment." States in which a nonattainment area is located must develop and implement a State Implementation Plan (SIP) containing policies/regulations that will bring about attainment of the NAAQS.

Currently the project area is in an attainment area for all air quality parameters. Air Quality studies will be conducted for the study area to determine the potential for the SR-128 project to impact air quality. The air quality study will include an analysis of the potential project impacts in relation to Mobile Source Air Toxics (MSATs).

Mobile Source Air Toxics

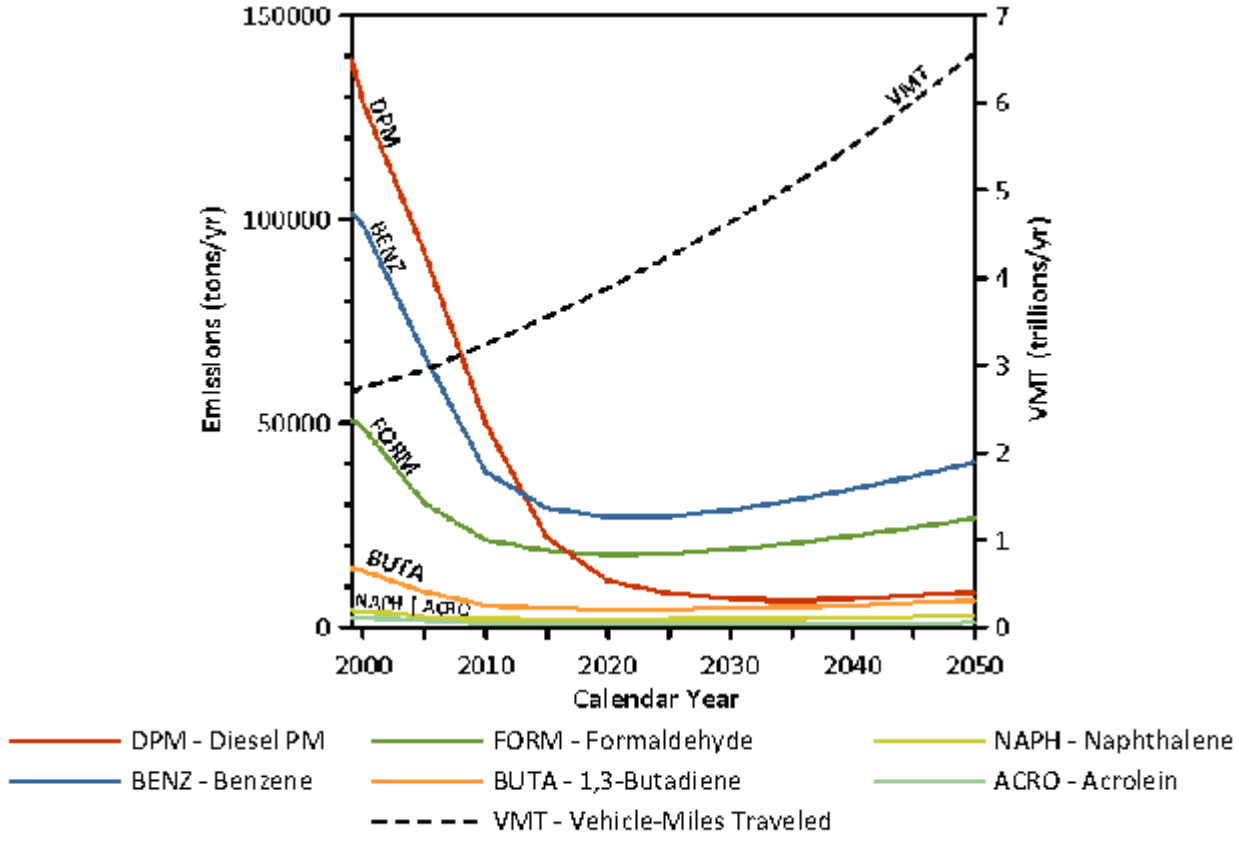
In addition to the criteria air pollutants for which there are NAAQS, the EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

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

The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (vehicle-miles travelled, VMT) increases by

145% as assumed, a combined reduction of 72% in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in Figure 6.

Figure 6. U.S. Annual Vehicle Miles Traveled (VMT) vs. Mobile Source Air Toxics Emissions, 1999-2050*



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

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

define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field.

On February 3, 2006, the FHWA released "Interim Guidance on Air Toxic Analysis in NEPA Documents" (http://www.fhwa.dot.gov/environment/airtoxic/020306guidmem.htm). This guidance was superseded on September 30, 2009 by FHWA's "Interim Guidance Update on Air Toxic Analysis in NEPA Documents" (http://www.fhwa.dot.gov/environment/airtoxic/100109guidmem.htm). The purpose FHWA's guidance is to advise on when and how to analyze Mobile Source Air Toxics (MSATs) in the NEPA process for highways. This guidance is interim, because MSAT science is still evolving. As the science progresses, FHWA will update the guidance.

Incomplete or Unavailable Information for Project Specific MSAT Health Impacts Analysis

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

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

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

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts with each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is

unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

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

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM.

The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

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

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the

uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision-makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Qualitative Analysis

Technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions of this project. However, even though reliable methods do not exist to accurately estimate the health impacts of MSATs at the project level, it is possible to qualitatively assess the levels of future MSAT emissions. The qualitative assessment presented below has been prepared in accordance with FHWA's Interim Guidance derived in part from a study conducted by the FHWA entitled "A Methodology for Evaluating Mobile Source Air Toxic Emissions among Transportation Project Alternatives." (www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm). A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives.

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

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

FHWA's Interim Guidance provides examples of "Projects with Low Potential MSAT Effects." These projects include minor widening projects and new interchanges, such as those that replace a signalized intersegment on a surface street or where design year traffic projections are less than 140,000 to 150,000 AADT. The Build Alternatives for this project, which include primarily the widening of an existing roadway and construction of a small segment of new alignment, meets the definition of a project with low potential MSAT effects as the highest design year AADT on SR-128 is much lower than the FHWA criterion.

For both the Build and No-Build 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. The VMTs will be estimated for the Build Alternatives and the No-Build Alternative to determine how the new roadway will affect MSATs. Results of the qualitative studies for MSATs will be included in the EA.

Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by 72% from 1999 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 MSAT emissions in the study area are likely to be lower in the future in virtually all locations.

The travel lanes contemplated as part of the project alternatives will have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore under the Build Alternatives there may be localized areas where ambient concentrations of MSAT would be higher than the No-Build Alternative. However, the magnitude and the duration of these potential increases cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. Furthermore, under all Alternatives, overall future MSAT are expected to be substantially lower than today due to implementation of EPA's vehicle and fuel regulations.

In sum, under both the No-Build and Build Alternatives in the design year, it is expected that there would be little or no change in MSAT emissions in the immediate area of the project due to little change in VMT, and due to EPA's MSAT reduction programs. In comparing the Build and No-Build alternatives, MSAT levels could be higher in some locations than others, but current tools and science are not adequate to quantify them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

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

Climate Change

FHWA's current approach on the issue of global warming is summarized in this section. To date, no national standards have been established regarding greenhouse gases, nor has EPA established criteria or thresholds for greenhouse gas emissions. On April 2, 2007, the Supreme Court issued a decision in Massachusetts et al v. EPA et al that the EPA does have authority under the CAA to establish motor vehicle emissions standards for CO2 emissions. The EPA is currently determining the implications to national policies and programs as a result of the Supreme Court decision. However, the Court's decision did not have any direct implications on requirements for developing transportation projects.

FHWA does not believe it is informative at this point to consider greenhouse gas emissions in an EA. The climate impacts of CO2 emissions are global in nature. Analyzing how alternatives evaluated in an EA might vary in their relatively small contribution to a global problem will not result in better-informed decisions. Further, due to the interactions between elements of the transportation system as a whole, emissions analyses would be less informative than ones conducted at regional, state, or national levels. Because of these concerns, FHWA concludes that they cannot usefully evaluate CO2 emissions in an EA in the same way that we address other vehicle emissions.

FHWA is actively engaged in many other activities with the DOT Center for Climate Change to develop strategies to reduce transportation's contribution to greenhouse gases, particularly CO2 emissions, and to assess the risks to transportation systems and services from climate change. FHWA will continue to pursue these efforts as productive steps to address this important issue. FHWA will review and update its approach to climate change at both the project and policy level as more information emerges and as policies and legal requirements evolve.

Noise Evaluation

A noise analysis will be completed in accordance with FHWA noise standards, *Procedures for Abatement of Highway Traffic and Construction Noise, 23 CFR 772* [2], and the TDOT's *Policy on Highway Traffic Noise Abatement* and will include the following tasks:

- Identification of noise-sensitive land uses adjacent to the project;
- Determination of existing sound levels at sensitive receivers to characterize the existing noise environment in the project area;
- Determination of future sound levels with and without the project;
- Determination of impacts;
- Evaluation of noise abatement;
- Discussion of construction noise; and
- Coordination with local officials.

Identification of Noise-Sensitive Land Uses

Noise sensitive land uses will be identified and review of available electronic mapping and field reconnaissance will be used to reveal potential sensitive receptors.

Determination of Existing Equivalent Sound Levels

Noise measurements will be collected at appropriate locations throughout the project area to characterize the existing noise environment. These measurements will be used as a baseline comparison for projected noise levels for each alternative.

Determination of Future Equivalent Sound Levels

Future Peak Hour Equivalent Sound Levels Without Project

Sound levels without the project can be reasonably estimated by evaluating existing and future traffic volumes on existing roadways.

Future Peak Hour Equivalent Sound Levels With Project

Noise modeling of the project area will be completed using the FHWA Traffic Noise Model (TNM 2.5) computer program. The program is used to calculate peak hour equivalent sound levels in the design year with the project for sensitive receptors in the project area.

Determination of Traffic Noise Impacts

Noise impact is determined by comparing future sound levels with the project to: (1) a set of Noise Abatement Criteria (NAC) for a particular land use category, and (2) existing sound levels.

The FHWA noise standards (contained in 23 CFR 772) and TDOT noise policy state that traffic noise impacts warrant consideration of abatement when worst-hour equivalent sound levels approach or exceed the NAC listed in Table 2. TDOT policy defines "approach" as one decibel below the NAC, or 66 dBA for Category B land uses.

Table 2. Noise Abatement Criteria in 23 CFR 772

Activity Category	L_{eq} (1h)	Description of Activity
A	57 (Exterior)	Land on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	---	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

The FHWA noise standards and TDOT policy also define impacts to occur if there is a substantial increase in design year equivalent sound levels above the existing equivalent sound levels when the predicted design year equivalent sound levels are between 57 and 67 dBA. Table 3 presents the TDOT criteria used to define noise increase.

Table 3. TDOT Criteria to Define Noise Increase

Increase (dB)	Subjective Descriptor
0 to 5	Minor Increase
6 to 9	Moderate Increase
10 or more	Substantial Increase

Sound level increases due to the project will be analyzed for each of the modeled receivers to determine where substantial noise increases may occur or where those levels approach or exceed the NAC.

Noise Abatement Evaluation

For Federal projects, abatement must be evaluated when noise impacts are predicted. Noise abatement measures may include alteration of horizontal and vertical alignment and traffic management measures (such as reducing speed limits, prohibition of heavy trucks, etc.). Potential noise abatement or attenuation measures will be discussed in the EA once noise impacts have been determined for the project. In order for noise barriers to be included in a project, they must be determined to be both feasible and reasonable in accordance with TDOT noise policy. For fully access controlled highways constructed adjacent to existing neighborhoods where several homes may be impacted near the same location by project related noise increases, noise barriers are often reasonable and feasible. However, where only one or two residences are predicted to be impacted in a given area, it is often determined that noise barriers are considered cost prohibitive based on TDOT noise policy. Final decisions on noise abatement measures are often made during the design phase of the project, once more detailed design plans are available. TDOT will continue to work with residents through the NEPA process and again during the design phase of the project to identify measures that can be implemented to reduce overall noise impacts associated with the project.

Construction Noise

Construction procedures shall be governed by the *Standard Specifications for Road and Bridge Construction* as issued by TDOT and as amended by the most recent applicable supplements. In this case, the contractor will be bound by Section 107.01 of the Standard Specifications to observe any noise ordinance in effect within the project limits. Detoured traffic shall be routed during construction so as to cause the least practicable noise impact upon noise-sensitive areas.

Coordination with Local Officials

TDOT encourages local communities and developers to practice noise compatible land use planning in order to avoid future noise impacts. The following language is included in TDOT's noise policy:

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

As part of the noise analysis for this project, TDOT will develop future noise level contours for undeveloped areas along the proposed Build Alternative alignments. This information will be included to make local officials and planners aware of anticipated highway noise levels so that future development will be compatible with these levels. For instance, areas expected to be at NAC levels above those recommended for sensitive land uses such as residential areas, should

be designated for other uses that may be compatible with higher noise levels. The predicted noise level values will be for general planning purposes only and will not represent predicted levels at every specific location at a particular distance back from the roadway. Sound levels will vary by location and will be affected by the shielding of terrain features and objects such as buildings.

Additionally, TDOT's noise policy states that *"noise abatement will also not be considered reasonable for land uses constructed after the date of adoption of this noise policy (based upon local Assessor's records), except for projects involving construction of a roadway on a new alignment."*

TDOT's policy was adopted in April 2005. Development constructed after this date will not be eligible for noise abatement.

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

- The neighborhood must be located along a limited-access roadway;
- The neighborhood must be primarily residential;
- The majority (more than 50%) of residences in the neighborhood near the highway pre-dated the initial highway construction;
- A noise barrier for the neighborhood must not have been previously determined to be not reasonable or not feasible as part of a new highway construction or through-lane widening study (Type I project);
- Existing noise levels measured in the neighborhood must be above the Noise Abatement Criteria (NAC) of 66 dB (1-hour equivalent sound level);
- A barrier must be feasible to construct and will provide substantial noise reduction; and
- A barrier must be reasonable (barrier cost per benefitted residence) in accordance with TDOT's Noise Policy. A residence is considered "benefitted" if the noise barrier will reduce the traffic noise by at least 5 dB.

Hydrological Impacts

Surface Waters

There is potential for impacts to water resources in the project vicinity. The study area will be investigated for presence of other watercourses or aquatic habitats and potential impacts will be discussed in the EA. Impacts to floodplains will be evaluated in a flood study. Impacts could potentially arise from soil disturbance and sedimentation during construction as well as direct channel modifications or changes in hydrology. Downstream sediment loading could increase during precipitation events. Impacts to water quality would be minimized using the water quality protection measures described in the following documents:

- Erosion and Sediment Control Handbook (Wang, 1992);

- Riparian Restoration and Streamside Erosion Control Handbook (Thompson, 1994);
- Reducing Non-point Source Water Pollution by Preventing Soil Erosion and Controlling Sediment on Construction Sites Manual (Smoot, 1992); and
- Tennessee Department of Transportation, Standard Specifications for Road and Bridge Construction (TDOT).

Groundwater and Karst Features

In addition to surface waters, groundwater impacts will be evaluated including potential impacts to aquifers that may supply well water for nearby residences. Springs and other features will be documented in the study area and impacts of the project will be considered. The presence of any karst features in the area such as sinkholes or caves will be documented and evaluated. Should such features be identified, potential impacts due to surface and/or groundwater flows entering into these features will be evaluated.

Ecological Impacts

There is potential for ecological impacts due to construction of new roadway alignments through existing non-developed lands. The project would require clearing of forested areas and loss of other habitats. The ecology of the area will be documented and potential impacts will be analyzed and discussed in more detail in the EA. Table 4 contains a list of rare or protected species known to occur in Hardin County, Tennessee.

Table 4. List of State and Federal Listed Species in Hardin County.

Tennessee Natural Heritage Program
Rare Species Observations For
Tennessee Counties

Hardin County — **Known Species: 43**

Invertebrate Animals: 13		St. Rank	Global Rank	St. Prot.	Fed. Prot.
Cumberlandia monodonta	Spectaclecase	S2S3	G3	--	C
	Medium to large rivers; in substrates from mud and sand to gravel, cobble, and boulders; Cumberland and Tennessee river systems.				
Cyprogenia stegaria	Fanshell	S1	G1Q	E	LE
	Medium to large streams and rivers with coarse sand and gravel substrates; Cumberland and Tennessee river systems.				
Hemistena lata	Cracking Pearlymussel	S1	G1	E	LE
	Medium-sized rivers of mod current, deeply buried in mud, sand, gravel, and cobble substrates; Tennessee & Cumb. river systems.				
Lampsilis abrupta	Pink Mucket	S2	G2	E	LE
	Generally a large river species, preferring sand-gravel or rocky substrates with mod-strong currents; Tennessee & Cumberland river systems.				
Lithasia salebrosa	Muddy Rocksnail	S2	G3G4Q	--	--
	Formerly occurred in portions of lower Cumberland and lower Tennessee systems; may be limited to dam tailwaters currently.				
Obovaria retusa	Ring Pink	S1	G1	E	LE
	Large rivers in gravel and sand bars; Tennessee & Cumberland river watersheds; many historic locations currently inundated.				
Ophiogomphus acuminatus	Acuminate Snaketail	S2	G3	--	--
	Clear, mostly shaded streams with at least pockets of sandy gravel; Western Highland Rim & Western Uplands.				
Orconectes wrighti	Hardin Crayfish	S2	G2	E	--
	Small-medium sized streams with cobble-sand substrates, under rocks or in leaf litter; western tribs of the Tennessee River in Hardin & McNairy counties.				
Plethobasus cicatricosus	White Wartyback	S1	G1	E	LE
	Presumed to inhabit shoals and riffles in large rivers; Tennessee & Cumberland river systems. Very rare & poss extirpated in TN.				
Plethobasus cooperianus	Orangefoot Pimpleback	S1	G1	E	LE
	Large rivers in sand-gravel-cobble substrates in riffles and shoals in deep flowing water; Cumberland & Tennessee river systems.				
Pleurobema clava	Clubshell	SH	G2	E	LE
	Small/med-sized rivers and streams; deeply buried in sand/fine gravel or in clean, coarse sand/gravel runs; lower Cumb. & Tenn. rivers.				
Pleurobema plenum	Rough Pigtoe	S1	G1	E	LE
	Medium to large rivers in sand, gravel, and cobble substrates of shoals; Tennessee & Cumberland river systems.				
Quadrula cylindrica cylindrica	Rabbitsfoot	S3	G3G4T3	--	--
	Large rivers in sand and gravel; Tennessee & Cumberland systems; big river form of Q. cylindrica.				

Other Types: 1		St. Rank	Global Rank	St. Prot.	Fed. Prot.
Heron rookery	Heron Rookery	SNR	GNR	--	--

Vascular Plants: 12		St. Rank	Global Rank	St. Prot.	Fed. Prot.
Acmella oppositifolia	Creeping Spot-flower	S3	G5	S	--
	Swamps And Wetlands				

Tennessee Natural Heritage Program
Rare Species Observations For
Tennessee Counties

Hardin County . . . Continued — **Known Species: 43**

Vascular Plants: 12 . . . Continued		St. Rank	Global Rank	St. Prot.	Fed. Prot.
Carex lacustris	Lake-bank Sedge Alluvial Woods	S1	G5	T	--
Didiplis diandra	Water-purslane Swamps	S1	G5	T	--
Erythronium rostratum	Beaked Trout-lily Mesic Woods And Slopes	S2	G5	S	--
Hydrastis canadensis	Goldenseal Rich Woods	S3	G4	S-CE	--
Iris brevicaulis	Lamance Iris Bottomlands	S1	G4	E	--
Lysimachia fraseri	Fraser's Loosestrife Dry Open Woods	S2	G3	E	--
Melanthium virginicum	Virginia Bunchflower Wet Woods And Fields	S1	G5	E	--
Panax quinquefolius	American Ginseng Rich Woods	S3S4	G3G4	S-CE	--
Polygala mariana	Maryland Milkwort Sandy Alluvial Woods And Disturbed Areas	S1	G5	S	--
Salvia azurea var. grandiflora	Blue Sage Barrens	S3	G4G5T4?	S	--
Silene ovata	Ovate Catchfly Open Oak Woods	S2	G3	E	--

Vertebrate Animals: 17		St. Rank	Global Rank	St. Prot.	Fed. Prot.
Carpiodes velifer	Highfin Carpsucker Large rivers, mostly in Tennessee River drainage.	S2S3	G4G5	D	--
Chondestes grammacus	Lark Sparrow Open habitats with scattered bushes and trees, prairie, cultivated areas, fields with bushy borders; ground nester.	S1B	G5	T	--
Cryptobranchus alleganiensis	Hellbender Rocky, clear creeks and rivers with large shelter rocks.	S3	G3G4	D	No Status
Cycleptus elongatus	Blue Sucker Swift waters over firm substrates in big rivers.	S2	G3G4	T	--
Egretta caerulea	Little Blue Heron Bodies of calm shallow water; colonial nester.	S2B,S3N	G5	D	--
Etheostoma tuscumbia	Tuscumbia Darter Ponded spring-fed habitats of valley floor springs; lower Tennessee River; probably extirpated from TN.	SX	G2	D	--
Haliaeetus leucocephalus	Bald Eagle Areas close to large bodies of water; roosts in sheltered sites in winter; communal roost sites common.	S3	G5	D	--

Tennessee Natural Heritage Program
Rare Species Observations For
Tennessee Counties

Hardin County . . . Continued **Known Species: 43**

Vertebrate Animals: 17 . . . Continued		St. Rank	Global Rank	St. Prot.	Fed. Prot.
Hemitremia flammea	Flame Chub	S3	G3	D	--
	Springs and spring-fed streams with lush aquatic vegetation; Tennessee & middle Cumberland river watersheds.				
Ichthyomyzon gagei	Southern Brook Lamprey	S1	G5	D	--
	Gravel and sand riffles and runs of small rivers and creeks; Conasauga & lower Tennessee river watersheds.				
Limnothlypis swainsonii	Swainson's Warbler	S3	G4	D	--
	Mature, rich, damp, deciduous floodplain and swamp forests.				
Myotis grisescens	Gray Myotis	S2	G3	E	LE
	Cave obligate year-round; frequents forested areas; migratory.				
Noturus fasciatus	Saddled Madtom	S2	G2	T	--
	Rocky riffles, runs, and flowing pools of clear creeks & small rivers; Duck River system and nearby tributaries of the Tennessee River.				
Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	S2S3	G5T5	T	--
	Usually near water in river floodplains, swamps, marshes, and wet prairies; occas drier wooded uplands; W half of Tenn., generally.				
Sorex longirostris	Southeastern Shrew	S4	G5	D	--
	Various habitats including wet meadows, damp woods, and uplands; statewide.				
Thryomanes bewickii	Bewick's Wren	S1	G5	E	--
	Brushy areas, thickets and scrub in open country, open and riparian woodland.				
Typhlichthys subterraneus	Southern Cavefish	S3	G3G4	D	--
	Aquatic cave obligate; cave streams, karst waters, and water supply wells; reported from all karst regions excluding RV & BR.				
Zapus hudsonius	Meadow Jumping Mouse	S4	G5	D	No Status
	Open grassy fields; often abundant in thick vegetation near water bodies; statewide.				

-- End of Hardin --

The new river crossing locations under each of the proposed Build Alternatives would be located in an area considered to be a mussel sanctuary established to protect mussels, including endangered species, known to inhabit the Tennessee River. The mussel sanctuary extends from Pickwick Dam at TRM 206.7 downstream to a Tennessee Gas pipeline located at TRM 201.9. TDOT will continue to coordinate with the USFWS, TWRA, TDEC, and TVA to determine the best way to avoid or minimize impacts to mussels and/or their habitats in the area. It is likely that a combination of placing bridge piers within the river in areas less likely to contain mussels, minimizing the footprint of piers, as well as efforts to relocate mussels from the area prior to construction, could be implemented to minimize potential adverse affects on populations of mussels in the area. At this time, no other reasonable alternatives have been identified that would result in meeting the purpose and need of this project without a new Tennessee River crossing being constructed downstream of Pickwick Dam.

There would likely be additional impacts to ecological resources due to secondary developments that may be promoted by provision of the new roadway and potential improved access to additional developable land. Secondary developments would be most likely to occur near intersections or access points. Such impacts will be considered as part of the indirect and cumulative impacts analyses conducted for the EA.

The EA will contain information regarding any unique or important ecological resources discovered or known to occur in the general project area that would be important to protect from future developments. As part of the NEPA process, local planning organizations, officials, and communities will be provided the opportunity to review the EA and would therefore be presented with such information. Any information regarding locations of important ecological resources contained in the EA may be helpful to local planners who would ultimately be responsible for development of land use plans or approval of developments in the general project area.

Cultural Impacts

Pursuant to regulations set forth in "36 CFR 800: Protection of Historic Properties" the project area will be surveyed to identify National Register-included or eligible properties or archaeological sites which could be impacted by the proposed project. Avoidance and mitigation efforts would be studied for adverse impacts to these sites or properties.

Section 4(f) Properties

There are potential Section 4(f) properties in the project vicinity including TVA recreational areas located on TVA property north of the Tennessee River below Pickwick Dam. The Pickwick State Park property located south of the river would also be a considered a Section 4(f) property due to its recreational uses. The current proposed Build Alternatives avoid the recreational areas located on the TVA property and those associated with Pickwick Landing State Park.

Other Section 4(f) concerns would be related to any cultural resources sites located along the study area. Once cultural resources surveys have been conducted all sites will be evaluated to determine whether Section 4(f) applies to any of those sites. TDOT will continue to work with FHWA and the SHPO regarding any cultural resources sites located in the area.

Finally, the mussel sanctuary, located in the project area in the Tennessee River from Pickwick Dam at TRM 206.7 downstream to a Tennessee Gas pipeline located at TRM 201.9, will be

further evaluated as to whether it would be considered a “wildlife refuge” and therefore a possible Section 4(f) issue. FHWA and TDOT will continue to coordinate with TWRA, USFWS, and TVA regarding the mussel sanctuary. FHWA will make the final determination as to whether the mussel sanctuary is a Section 4(f) issue. If it is determined to be a Section 4(f) issue, TDOT will fully evaluate any potential avoidance alternatives, including the potential for constructing a bridge that would span the entire length of the river channel. Additional information regarding this and other Section 4(f) issues will be discussed in more detail in the Concurrence Point 3 package.

Farmland Impacts

Farmland Impact Rating Forms (Form AD 1006) will be sent to the U.S. Department of Agriculture, Natural Resources Conservation Service for their input. It is anticipated that some farmland would be impacted by this project, both directly from construction of the roadway and indirectly due to secondary developments anticipated to occur due to new or improved access provided in some areas. The main area of farmland impacts will be in the Tennessee River floodplain just north of the new river crossing where large crop fields are located. Because it is anticipated that much of this area will be bridged due to it being located in the floodplain, impacts to farmland may not be as substantial as would occur if the roadway was not elevated in the area. The bridge will require a narrower ROW than a four lane divided highway. It is likely that farmers will be provided access to farmland on both sides of the bridge by driving under the new bridge. These details will be determined during the final design phase of the project.

Bicycle and Pedestrian Considerations

Although no bicycle or pedestrian lanes or sidewalks are currently being considered as part of this project, the shoulders of the roadway, including the new bridge, will be wide enough to accommodate users who wish to use the roadway for such purposes. Due to the amount of vehicular and truck traffic anticipated on the roadway, safety of all users will need to be considered. Considerations will be made during the design of the project to ensure that existing facilities are maintained to allow crossing of the new roadway as needed. Local plans will be reviewed to determine where existing bicycle and pedestrian facilities are located and where additional facilities may be planned or proposed. Plans such as the Tennessee Trails and Greenways Plan and other available information will be reviewed to determine where proposed bicycle and pedestrian facility improvements may occur and how they can be incorporated into the design of the improved SR-128. Such features will be incorporated into the design of the roadway as appropriate and feasible while maintaining the design integrity of the roadway itself.

Summary

This section provides a summary of the alternatives analyses to date. Based on all available information, TDOT proposes to carry three Build Alternatives, as described in this document, and the No-Build Alternative into the EA for further detailed environmental analyses. Should other reasonable alternative locations or design concepts be identified during this TESA concurrence effort that would be capable of meeting the agreed upon purpose and need of the project, TDOT would consider including them in the EA. In addition, if it is determined that the proposed Build Alternatives would result in substantial impacts to any of the resources being studied, TDOT would attempt to identify an avoidance alternative to reduce those potential impacts.

Table 5 contains basic summary information for the alternatives considered for this project. This table is meant to show how each of the alternatives considered would support the purpose and need of the project and what the anticipated environmental consequences of selecting each alternative would be based on available information to date. Please keep in mind that the information presented in this table is based on information gathered to date and is subject to change as more detailed technical studies are conducted for this project. The results of those studies will be incorporated in the EA.

Table 5. Summary of Alternatives Considered for the SR-128 EA.

	Purpose and Need Related Components			Environmental Considerations
Alternative Considered	**Provides Improved Transportation Efficiency for the Region in terms of Travel Times.**	**Results in a roadway that meets modern design standards and is capable of supporting anticipated increases in traffic demand.**	**Potential to Improve Roadway Safety**	**Summary of Anticipated Environmental Impacts**
No-Build Alternative	No	No - The current design deficiencies would remain and increased traffic would not be adequately accommodated by only minor TSM improvements that would occur under the No-Build Alternative.	No – Although some safety improvements may occur with TSM projects, overall design deficiencies would remain resulting in potential long-term safety issues, especially as traffic continues to increase.	<u>Social</u> – It is anticipated that the No-Build Alternative would result in: • Increased travel times due to increased traffic and limited sight distances for safe passing, • decreased safety due to worsening LOS on existing routes, and • increased response times for emergency vehicles due to reduced LOS. <u>Land Use</u> – Current land use trends would continue under the No-Build Alternative. Development of some areas may occur more slowly than would occur if the SR-128 improvement project is constructed. However, it is expected that the area will continue to become more populated regardless of SR-128 being improved resulting in additional traffic volumes. <u>Economic</u> – The No-Build Alternative is anticipated to result in: • highway infrastructure that would not readily support additional economic growth in southern Hardin County and surrounding areas; • stagnant or more slowly increasing property values due to declining transportation facilities that would not readily support new growth or make the area desirable for additional developments. <u>Cultural Resources</u> – No change from baseline conditions. <u>Ecological</u> – No major changes from baseline conditions. <u>Air Quality</u> – No substantial changes anticipated, but VMT may increase as LOS decreases on existing roadways and alternative routes are used. If congestion becomes a problem due to increased traffic it could lead to additional air quality impacts due to longer idling times and stop-and-go traffic conditions. <u>Noise</u> – No major changes from baseline conditions, except increased traffic volumes may result in additional noise for residences and other sensitive receptors located along the existing route. <u>Farmland</u> – No impacts to farmland would occur under this alternative.

	Purpose and Need Related Components			Environmental Considerations
Alternative Considered	**Provides Improved Transportation Efficiency for the Region in terms of Travel Times.**	**Results in a roadway that meets modern design standards and is capable of supporting anticipated increases in traffic demand.**	**Potential to Improve Roadway Safety**	**Summary of Anticipated Environmental Impacts**
Build Alternatives	Yes	Yes – The new roadway would provide increased traffic capacity due to provision of a roadway that meets modern design standards. The roadway would result in acceptable LOS in the design year for the length of the project area.	Yes – Construction of a four-lane roadway that meets modern design standards would improve safety by improving sight distances, providing adequate shoulder widths, and removing traffic from Pickwick Dam.	<u>Social</u> – Each of the Build Alternatives may result in: • displacement of residences and businesses; • decreased travel times due to construction of a four lane highway capable of moving traffic through the area more efficiently; • increased safety due to improved LOS and elimination of current design deficiencies; and • decreased response times for emergency vehicles due to improved traffic conditions. <u>Land Use</u> – The Build Alternatives may result in: • adverse impacts to land use due to potential land use changes promoted by the improved transportation facilities. <u>Economic</u> –Build Alternative 1 may result in: • improved travel efficiency and traffic capacity between Savannah and southern Hardin County and points to the south, which would support and promote economic growth in those areas; • property values would likely increase at a faster pace due to improved traffic conditions making the area a more desirable place for those who plan to commute to and from Savannah; • increased residential growth would lead to increased retail growth and possibly industrial growth; and • increased growth would result in a need to expand existing utilities and public services in some areas. <u>Cultural Resources</u> - Historic Architecture and Archaeology studies will be conducted along the proposed corridor if this alternative is carried forward in the EA. <u>Ecological</u> – Each of the Build Alternatives may result in: • potential impacts to the sensitive species, including state and/or federally-listed species due to the potential impacts to the Tennessee River mussel sanctuary (potential Section 4(f) resource) located below Pickwick Dam due to the required new river crossing; • several stream crossings and possible channel relocations; • potential impacts to springs and ponds; • short-term impacts to water quality during construction due to runoff; • additional development in surrounding areas, which may adversely affect streams and existing habitats such as upland forests. Many of those impacts would occur regardless of the SR-128 project, but growth could occur faster if the area's transportation system is improved. Local planning and zoning could be utilized to protect some ecologically important areas, including stream corridors, caves, and other features. <u>Air Quality</u> – Detailed air quality studies will be conducted to determine the extent of air quality impacts associated with the project. It is anticipated that this project may result in potential: • beneficial impacts to local and regional air quality. It is anticipated that improved traffic flow would reduce some of the vehicle emissions that occur when traffic is congested or is forced to remain idle for long periods. <u>Noise</u> – Detailed noise analyses will be conducted once alternative alignments have been finalized. Once impacts have been determined noise abatement or other mitigation efforts will be studied. This project may result in: • increased noise impacts for residences located adjacent to the new alignment portions of the project; and • short-term construction noise will impact some residential areas. <u>Farmland</u> –Farmland impacts will be coordinated with the USDA-NRCS. It is expected that some farmland would be permanently lost due to this project. <u>Bicycles and Pedestrians</u> – TDOT will continue to work with local planners, local residents, and other stakeholder groups to determine how this project may affect existing or planned bicycle or pedestrian facilities and/or what opportunities may exist for improving those facilities as part of this project.

	Purpose and Need Related Components			Environmental Considerations
Alternative Considered	**Provides Improved Transportation Efficiency for the Region in terms of Travel Times.**	**Results in a roadway that meets modern design standards and is capable of supporting anticipated increases in traffic demand.**	**Potential to Improve Roadway Safety**	**Summary of Anticipated Environmental Impacts**
Previously Considered Alternative extending from Pyburns Drive to SR-226 (Airport Road) (i.e, no new Tennessee River crossing.)	Yes, but may involve bottlenecks in the future due to the four lane roadway ending at Pyburns Drive and only providing two lanes of traffic between SR-57 and Pyburns Drive, including the existing bridge on the Pickwick Dam...	No, although the project would result in improvements north of Pyburns Drive, there would still be design deficiencies on the remaining two lane section south of Pyburns Drive to SR-57.	No – Although some safety improvements may occur due to improved traffic conditions between Pyburns Drive and SR-226, there would still be safety issues on sections between Pyburns Drive and SR-57. This alternative would not remove traffic from Pickwick Dam, which would also limit the potential for safety improvements when compared to other Build Alternatives that involve a new Tennessee River crossing.	<u>Social</u> – This alternative would have resulted in: • little improvement to overall travel times for commuters coming from or and going toward areas south of Pyburns Drive; • residential and business displacements; • decreased safety due to worsening LOS on southern portions of SR-128, and • increased response times for emergency vehicles due to congestion/reduced LOS on southern section of SR-128 that would remain a two lane roadway. <u>Land Use</u> – It is likely that there would be a continued transition of land uses including continued residential developments in the Pickwick Lake area. Development of some areas may occur more slowly than would occur if the full SR-128 project is constructed all the way to SR-57. However, it is expected that the area will continue to become more developed regardless of SR-128 being improved all the way to that SR-57. These continued land use changes will result in additional traffic volumes. <u>Economic</u> – Build Alternatives that do not extend to SR-57 are anticipated to result in: • highway infrastructure that would not readily support additional development or usage of the Pickwick Lake area; and • stagnant or more slowly increasing property values due to declining transportation facilities that would not readily support new growth or make the area as desirable for residential developments. <u>Cultural Resources</u> – Historical architecture and archaeological impacts would be studied as technical studies and incorporated into the EA if this alternative were to be carried forward. <u>Ecological</u> – There would be impacts to natural resources including streams, wildlife habitats, and other resources associated with widening of the existing roadway. Local planning efforts and zoning restrictions could be developed to protect ecologically important areas in the vicinity. <u>Air Quality</u> – No substantial changes anticipated, but VMT may increase as LOS decreases on existing SR-128 south of Pyburns Road if alternative routes are used. Any congestion issues could lead to additional air quality impacts due to longer idling times and stop-and-go traffic conditions. <u>Noise</u> – Some noise impacts may occur due to widening of SR-128 north of Pyburns Road resulting in moving traffic noise closer to existing residences and other sensitive receptors. <u>Farmland</u> – Minor impacts would occur to farmland due to the widening of existing SR-128 north of Pyburns Drive. This potential alternative would not impact farmland in the Tennessee River floodplain.

	Purpose and Need Related Components			Environmental Considerations
Alternative Considered	**Provides Improved Transportation Efficiency for the Region in terms of Travel Times.**	**Results in a roadway that meets modern design standards and is capable of supporting anticipated increases in traffic demand.**	**Potential to Improve Roadway Safety**	**Summary of Anticipated Environmental Impacts**
Previously Considered Alternative Construction of a New Bridge Above Pickwick Dam across Pickwick Lake	Yes.	Yes.	Yes	<u>Social</u> – This alternative would have resulted in: • displacement of residences and businesses; • decreased travel times due to construction of a four lane highway capable of moving traffic through the area more efficiently; • potential impact to water supplies due to water intakes in Pickwick Lake where the new bridge would be constructed; • potential interference with recreational and navigational uses on Pickwick Lake; • increased safety due to improved LOS and elimination of current design deficiencies; and • decreased response times for emergency vehicles due to improved traffic conditions. <u>Land Use</u> – This alternative would have resulted in: • adverse impacts to recreational land uses (Section 4(f) resources) due to impacts to Pickwick Landing State Park; and • adverse impacts to land use due to potential land use changes promoted by the improved transportation facilities. <u>Economic</u> –This alternative would have resulted in: • much higher costs associated with a new bridge over the wide lake; • improved travel efficiency and traffic capacity between Savannah and southern Hardin County and points to the south, which would support and promote economic growth in those areas; • property values would likely increase at a faster pace due to improved traffic conditions making the area a more desirable place for those who plan to commute to and from Savannah; • increased residential growth would lead to increased retail growth and possibly industrial growth; and • increased growth would result in a need to expand existing utilities and public services in some areas. <u>Cultural Resources</u> - Historic Architecture and Archaeology studies would have been conducted along the proposed corridor if this alternative was carried forward in the EA. <u>Ecological</u> – This alternative would have resulted in: • potential impacts to the sensitive species, including state and/or federally-listed species due to the potential impacts to the Tennessee River mussel sanctuary below Pickwick Dam due to disturbance upstream; • several stream crossings and possible channel relocations; • loss of upland forest along the north shore of Pickwick Lake; • potential impacts to springs and ponds; • short-term impacts to water quality during construction due to runoff; • additional development in surrounding areas, which may adversely affect streams and existing habitats such as upland forests. <u>Air Quality</u> – Detailed air quality studies would have been conducted to determine the extent of air quality impacts associated with this alternative. It is anticipated that this project may result in potential: • beneficial impacts to local and regional air quality. It is anticipated that improved traffic flow would reduce some of the vehicle emissions that occur when traffic is congested or is forced to remain idle for long periods. <u>Noise</u> – Detailed noise analyses would have been conducted once the final alignment was determined. This alignment may have resulted in: • increased noise impacts for residences located adjacent to the new alignment portions of the project; • noise impacts to portions of Pickwick Landing State Park; and • short-term construction noise will impact some residential areas. <u>Farmland</u> –Farmland impacts would have been coordinated with the USDA-NRCS. <u>Bicycles and Pedestrians</u> – TDOT would need to continue to work with local planners, local residents, and other stakeholder groups to determine how this project may affect existing or planned bicycle or pedestrian facilities and/or what opportunities may have existed for improving those facilities as part of this project.

	Purpose and Need Related Components			Environmental Considerations
Alternative Considered	**Provides Improved Transportation Efficiency for the Region in terms of Travel Times.**	**Results in a roadway that meets modern design standards and is capable of supporting anticipated increases in traffic demand.**	**Potential to Improve Roadway Safety**	**Summary of Anticipated Environmental Impacts**
Previously Considered Alternative Construction of SR-128 to west side of PCA and Counce.	No.	Yes.	Yes and No. Although the new SR-128 would be safer, SR-57 may become less save in Counce due to traffic from SR-128 needing to travel through Counce to get to southbound SR-57 and the Pickwick Landing State Park vicinity.	<u>Social</u> – This alternative would have resulted in: • displacement of residences and businesses; • potential decreased travel times due to construction of a four lane highway capable of moving traffic through the area more efficiently, however this may be outweighed by slow movement through Counce; • increased safety due to improved LOS and elimination of current design deficiencies along SR-128, but some decreased safety in Counce along SR-57; and • decreased response times for emergency vehicles due to improved traffic conditions on SR-128. <u>Land Use</u> – This alternative would have resulted in: • adverse impacts to land use due to potential land use changes promoted by the improved transportation facilities. <u>Economic</u> –This alternative would have resulted in: • potential economic impacts to businesses west of PCA; • improved travel efficiency and traffic capacity between Savannah and southern Hardin County and points to the south, which would support and promote economic growth in those areas; • property values would likely increase at a faster pace due to improved traffic conditions making the area a more desirable place for those who plan to commute to and from Savannah; • increased residential growth would lead to increased retail growth and possibly industrial growth; and • increased growth would result in a need to expand existing utilities and public services in some areas. <u>Cultural Resources</u> - Historic Architecture and Archaeology studies would have been conducted along the proposed corridor if this alternative was carried forward in the EA. <u>Ecological</u> – This alternative would have resulted in: • potential impacts to the sensitive species, including state and/or federally-listed species due to the potential impacts to the Tennessee River mussel sanctuary (potential Section 4(f) resource) located below Pickwick Dam; • several stream crossings and possible channel relocations; • loss of upland forest along the north shore of Pickwick Lake; • potential impacts to springs and ponds; • short-term impacts to water quality during construction due to runoff; • additional development in surrounding areas, which may adversely affect streams and existing habitats such as upland forests. <u>Air Quality</u> – Detailed air quality studies would have been conducted to determine the extent of air quality impacts associated with this alternative. It is anticipated that this project may result in potential: • beneficial impacts to local and regional air quality. It is anticipated that improved traffic flow would reduce some of the vehicle emissions that occur when traffic is congested or is forced to remain idle for long periods; however traffic congestion may increase in Counce. <u>Noise</u> – Detailed noise analyses would have been conducted once the final alignment was determined. This alignment may have resulted in: • increased noise impacts for residences located adjacent to the new alignment portions of the project. • noise impacts to residences in Counce due to more traffic; and • short-term construction noise will impact some residential areas. <u>Farmland</u> –Farmland impacts would have been coordinated with the USDA-NRCS. Some farmland impacts would have occurred; <u>Bicycles and Pedestrians</u> – TDOT would need to continue to work with local planners, local residents, and other stakeholder groups to determine how this project may affect existing or planned bicycle or pedestrian facilities and/or what opportunities may have existed for improving those facilities as part of this project.

	Purpose and Need Related Components			Environmental Considerations
Alternative Considered	**Provides Improved Transportation Efficiency for the Region in terms of Travel Times.**	**Results in a roadway that meets modern design standards and is capable of supporting anticipated increases in traffic demand.**	**Potential to Improve Roadway Safety**	**Summary of Anticipated Environmental Impacts**
Transportation Management System (TSM) Improvements (i.e, minor improvements to existing roadways and/or improvements to the public transit system)	No, although TSM improvements including addition of turning lanes or widening of shoulders may slightly improve travel times in the area, it would not be capable of meeting the overall purpose and need of this project.	No, TSM related improvements, including minor improvements to existing SR-128 as a stand-alone alternative is not anticipated to be enough to improve design deficiencies of the existing roadway and safety for the majority of commuters in the region. The improvements would not add much additional traffic capacity in terms of LOS improvements to meet the purpose and need of this project.	No – Although some safety improvements may occur with implementing TSM improvements, some design deficiencies along existing SR-128 will remain. Also, a two lane roadway would be considered less safe than a four lane roadway that would include improved visibility, wider shoulders, and adequate turning lanes were required. TSM improvements would not remove traffic from Pickwick Dam, which would also limit the potential for safety improvements when compared to other Build Alternatives.	<u>Social</u> – It is anticipated that TSM Improvements as a stand-alone alternative would result in: • Increased travel times due to increasing traffic on SR-128; • decreased safety due to worsening LOS on existing SR-128; • increased response times for emergency vehicles due to reduced LOS. <u>Land Use</u> – TSM Improvements as a stand-alone alternative would have little effect on land use trends in the area. Development of some areas may occur more slowly than would occur if the full SR-128 Improvement project is constructed. However, it is expected that the area will continue to see some new residential development regardless of the SR-128 Improvement project being completed all the way to SR-57. This will result in additional traffic volumes on SR-128. <u>Economic</u> – The TSM Improvements alternative is anticipated to result in: • highway infrastructure that would not readily support additional economic growth in the southern Hardin County area, especially around Pickwick Lake; • stagnant or more slowly increasing property values due to declining transportation facilities that would not readily support new growth or make the area desirable for residential developments. <u>Cultural Resources</u> – No substantial changes from baseline conditions anticipated with TSM Improvements, although any TSM-related construction that requires clearing of new ROW would pose potential threats to cultural resources. <u>Ecological</u> – No major changes from baseline conditions would be expected under the TSM Improvements Alternative. <u>Air Quality</u> – No substantial changes anticipated, but VMT may increase as LOS decreases on existing roadways and alternative routes are used. Increased congestion on SR-128 due to decreased LOS could lead to additional air quality impacts due to longer idling times and stop-and-go traffic conditions. <u>Noise</u> – No substantial noise impacts would be anticipated with TSM improvements. <u>Farmland</u> – Farmland impacts due to TSM projects would be minor.