

September 15, 2008

State Route 840 Project-Level Alternatives Analysis

State Route 840 (SR-840) was developed under the state's Better Roads Program to stimulate economic growth around the Nashville metropolitan area and Middle Tennessee. To date, the majority of SR-840 South, excluding a 20.9 mile segment, has been completed. The proposed sections of SR-840 in Williamson County covered by this project will complete SR-840 South by connecting the sections that have already been completed or are under construction. When completed, SR-840 South will connect at its eastern terminus near Lebanon and at its western terminus near Dickson to Interstate 40. Without the completion of the sections of SR-840 included within this project, the overall purpose of maintaining and enhancing the economy of the Nashville area, improving regional accessibility and the movement of through traffic will not be met. SR-840 South was identified as a transportation need in several local, regional and statewide plans (Tennessee Highway System Plan, Better Roads Program, Nashville MPO long range transportation plan, and Williamson County's Major Thoroughfare Plan Update). Failure to address this need could impact the effectiveness of the regional transportation network and economic competitiveness of the region.

During construction of a previous segment of SR-840 South, numerous issues and concerns arose questioning the planning process used in the development of the final sections of the project in Williamson County. This final segment runs approximately ten miles in length from Bending Chestnut Road to east of Thompson's Station Road. As a result of these issues, the Tennessee Department of Transportation (TDOT) engaged the Center for Transportation Research at the University of Tennessee to independently assess the SR-840 Project. The conclusion recommended that TDOT use a Context Sensitive Design (CSD) process that would combine local community knowledge with technical expertise to define the natural features and other important resources of the area that are of high importance and to protect these resources from potential impacts by the roadway project. That process, which was implemented, also re-engaged the community/public input process to reach location and design decisions and re-examine the environmental assessment with respect to the minimizing the project's impact on the human and natural environment.

The SR-840 South project cannot be built without affecting the surface waters of the state of Tennessee. All of the project alignments that were evaluated in connecting the previously completed sections of the road are on new alignment through a largely rural area with scattered residential development. While the project is on new location and impacts surface waters, the overall design process for the project emphasized avoiding and minimizing impacts to sensitive human and natural environmental resources. A discussion of the overall project development process that was used during the development and refinement of project alternatives is included below. Avoidance and/or minimization of degradation of surface water resources was one of the primary factors considered during the project development process and the refinement of the selected alternative.

In moving SR-840 forward and implementing these recommendations, TDOT initiated the CSD approach during the first part of 2004. The main goal was to develop a safe and economically viable alternative to complete the remaining SR-840 segment. The proposed alternative would also need to protect the highly valued resources within the project area while maintaining harmony with the existing environment.

A Citizens Resource Team (CRT) was created to evaluate nine corridors for the remaining segment of SR-840. The charge of the CRT was to objectively weigh the benefits and impacts of each of the nine corridors, identifying the necessary balancing of burdens and benefits for each alternate and reaching consensus for a preferred alternative. As the project plans were developed by TDOT, various design features were incorporated into the project through the use of CSD to minimize anticipated burdens and impacts and potential degradation. Some of the major issues that were identified during the process and were addressed included:

- Cultural Resources – Cemeteries, Historical Sites, and Archeological Sites.
- Natural Resources – Wildlife Passages, Franklin Springs Area
- Water Quality – Stream Crossings, Storm Water Treatment, and Erosion Control
- Design Issues – Structures/Retaining Walls, Interchanges, Road Crossings, Frontage Roads, Bike and Hike Paths, Excess ROW, and Design Speeds

Reasonable Alternatives Analysis

Over a two year period, analysis was conducted on the nine reasonable alternatives, which included 15 public meetings. As part of the reasonable alternative analysis, close attention was given to the preservation and enhancement of areas that were identified as high value for the community. Although the no-build scenario was analyzed and would allow conditions to remain the same by preventing potential impacts associated with the construction alternatives, it did not meet the purpose and need of addressing access and safety issues, as well as providing economic growth for this area. Alternative 1 was chosen as the recommended alignment and approved by TDOT in February 2006. Alternative 1 extends between Bending Chestnut Road past the Natchez Trace Parkway crossing to near Thompson's Station Road. It was designed to reduce the number of crossings of the Garrison Creek and other headwaters to one crossing and to explore utilizing city-owned property instead of private property for a portion of the alignment. It also avoided cultural and prehistoric sites identified near the eastern terminus between Carter's Creek Road and Thompson's Station Road.

Alternative Alignment 1 was recommended by the CRT and selected by TDOT as the build alternative due to its balancing positive and negative impacts, and minimizing impacts to the human and natural environment. As this alternative moved into final design, additional minimization efforts were undertaken at the specific permit locations to further reduce the impacts and degradation as outlined in the site-specific alternatives analyses.

The CRT remained diligent in the development of the project even after the preferred alternative had been chosen. Great strides were taken by the CRT to further reduce impacts to the existing environment. These include shifting the alignment in certain areas to prevent impacts to several archeological sites near Johnson Hollow and Fry Roads, and including missing the Beard Cemetery. The CRT also played a key part in assisting the Department in the review of side road plans, which ultimately reduced the use of frontage roads by thousands of feet. However, one of the most important issues the CRT was concerned with was the number of stream crossings and impacts to the water quality within the project area. It was very important that the preferred alternative avoid and minimize impacts to the water resources as much as possible. The use of an alignment shift on the Franklin Springs property alone allowed for reducing the water resource impacts by approximately half within this area. Where avoidance was not possible the use of bridges and bottomless culverts was proposed, where feasible, to further reduce impacts as much as possible.

Permits

In conjunction with the efforts of the CRT, ecological surveys were also completed for the remaining sections of SR-840. Numerous “Waters with Available Conditions” and Exceptional Tennessee Waters (ETW) streams, wetlands, seeps, and springs were identified to be impacted by the preferred alternative. “Waters with Available Conditions” (WAC) streams refer to surface waters that have not been designated as high quality, but have water quality better than the applicable criteria for specific parameters. ETW streams are identified as high quality waters and are protected from degradation. Some degradation of WAC streams may be allowed if it is demonstrated that reasonable alternatives to degradation are not feasible. Some degradation of ETW streams may be allowed if reasonable alternatives to degradation are not feasible and it is deemed as economically and socially necessary. These resources are protected by federal and state laws requiring that permits must be acquired prior to any construction activities. These permits include the Section 404 U.S. Army Corps of Engineers Permits for construction activities, Tennessee Valley Authority Section 26a Permit, and TDEC Aquatic Resource Alteration Permit/Section 401 Water Quality Certification. These permits provide for the protection of these natural resources and ensure that all measures are taken to avoid, reduce, and mitigate impacts associated with the project.

As part of the permit application, TDOT has requested using the Tennessee Stream Mitigation Program (TSMP) as part of the mitigation for impacts associated with this project. At this time, it is the Department’s understanding that the TSMP has found mitigation projects in the SR-840 project area that would mitigate for all stream degradation impacts.

Water quality impacts and stream degradation will be kept to a minimum. Efforts will be made to maintain wildlife crossings within the areas and reduce impacts to the stream and biological ecosystem for the area.

To determine stream sediment moving capabilities and other characteristics, the US Geological Survey has been retained by TDOT to monitor / study selected, representative

streams along the proposed alignment of SR-840 and submit reports to our office and TDEC.

Design Features for Minimization and Mitigation of Impacts

As the project plans were developed by TDOT, various design features were incorporated into the project through the CSD process to minimize anticipated impacts, burdens and potential degradation.

The “non-degradation” alternative is the “Do-Nothing” Alternate, which was determined not to be an acceptable option for this project.

As part of the CSD process, the following resources that would be potentially affected were identified and potential impacts quantified:

- Land Cover
- Cultural Resources
- Natural Resources
- Noise Impacts
- Wetlands
- Water Resources
- Geologic Features
- Land Use (Williamson County)
- New Residential Displacements
- Previously Displaced Residents
- Commercial Displacements
- Agricultural Properties Impacted
- Acquired Right of Way Utilized
- Acquired Right of Way Not Utilized
- Right of Way to be purchased
- Total Right of Way for Alternate
- Land Locked Parcels
- Acres Land Locked
- Length of Alternative
- Costs

To provide citizen perspective and input into the evaluation of alternatives using a decision making process (which appropriately balanced the human and natural environment with engineering factors to achieve the project goals), the CRT worked with TDOT to identify possible benefits and impacts of each of the nine alternatives as well as public support and concerns. Using input from the CRT and resource agencies, TDOT was able to reach a well documented, publicly acceptable decision that balanced the human environment, natural environment, engineering considerations, and fiscal budgets.

Each member of the CRT selected preferred alternatives, and from this process, two final alternatives (in addition to the original alignment) were selected and recommended for final decision-making.

Alternative 1 was selected because it:

- Protected Franklin Springs
- Protected Indian burial grounds
- Utilized more of the previously acquired right of way
- Stayed within the approved Natchez Trace Crossing
- Had less impact on new residential displacements
- Had more public support
- Did not create a dynamic change in the alignment
- Did not have a significant difference in impacts on stream head waters when compared to Alternative 2.

As noted above, to minimize impacts to the natural and human environment, TDOT incorporated a CSD approach. It incorporates the following features into the project:

- Use of rock fill to steepen slopes to reduce the width of fill areas
- Retaining walls to reduce the width of fill slopes
- Box culverts were used instead of some pipes
- Bridges and “CON/SPAN”-type structures were used in place of some box culverts
- Changes in span arrangements and bridge pier locations
- Shifts in alignment to avoid designated resources identified by SR-840 Citizens Resource Team
- Changes in grade to avoid designated resources
- Consideration of different pavement types for noise reduction
- Use of an Interdisciplinary Team to identify resources, alternatives, impacts, avoidance opportunities, and mitigation strategies
- Context Sensitive Solutions (CSS) decision making
- Inclusion of wildlife crossings into the project at appropriate locations

To minimize impacts to archeological sites, WAC and ETW streams, wetlands, and other aquatic resources, the alignment was shifted and roadway grades modified. As a result, nine bridges were redesigned and five additional bridges replaced culverts in order to span ETW streams. The additional project cost to span streams with either longer bridges or new bridges is projected to be over \$38 million. Also, the cost of a new alignment shift to avoid an archaeological site is projected to be approximately \$1.2 million. In addition, TDOT will pay in-lieu fees for stream restoration where stream degradation was unavoidable, and will provide compensatory mitigation for unavoidable wetland losses by debiting at a 2:1 ratio from the Harpeth Wetland Mitigation Bank. TDOT is also making a concerted effort to find on-site mitigation for as many streams as possible. Measures to minimize impacts incorporated into this project will not decrease safety of the highway facility.