

ENVIRONMENTAL ASSESSMENT

(File No. 200201957)

Applicant: Tennessee Department of Transportation

State Route (SR) 91 Improvements between US 421 and Cold Springs Road (Wills Road)
Application for Proposed Channel Relocations and Culverts Affecting Wills Branch,
Goose Creek, Johnson Hollow, Laurel Creek, Drystone Branch and Tributaries to These
Streams
Johnson County, Tennessee

Jointly Prepared By:

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1.0 Proposed Activity

1.1 Background. On November 18, 2002, the Tennessee Department of Transportation (TDOT) submitted an application for an individual Department of the Army (DA) permit pursuant to Section 404 of the Clean Water Act for channel relocation and adjacent wetlands fill on Wills Branch associated with the construction of SR 91 between Mountain City and Laurel Bloomery. In addition, the application anticipated that stream impacts in other locations would qualify for nationwide permits. The application was advertised in Joint Public Notice (JPN) 03-10, dated March 6, 2003 (Appendix A). The application was revised on November 29, 2004, to include an additional wetland fill adjacent to Laurel Creek where a channel relocation was previously proposed. Following further evaluation and review of public comments on the draft EA, TDOT eliminated the Laurel Creek wetland fill from its application, by letter of October 5, 2005. The stream relocations, culverts and wetland fills are associated with TDOT's proposal to construct 4.85 miles of SR 91, partially along a new alignment. The proposed construction consists of two 12-foot lanes, turn lanes, and truck climbing lanes depending on the location and topography. The locations for which TDOT has active permit applications are listed below:

US 421 (SR 34/67 widening):

- Station 10+256. Spring box installation adjacent to Goose Creek, US 421 widening in Mountain City (31 feet of stream impacts). State General Permit site.
- Station 11+068. Fill in 0.22 acres of wetlands and temporary impacts to 0.04 acre of wetlands.

SR 91 Construction on New Alignment:

- Station 12+486 to 12+560 (left). Stream relocation of unnamed tributary above a pond at station 12+640 (256 feet of stream impacts)
- Station 12+493 and 4+815 to 4+918. Channel relocation and stream encapsulation in Johnson Hollow associated with construction of SR 91 on new alignment and realignment of Johnson Hollow Road (602 feet of stream impacts).
- Station 14+638. Proposed piping of unnamed tributary to Wills Branch (262 feet of stream impacts).
- Station 15+010 to 15+220. Channel relocation and wetland fill along Wills Branch. (712 feet of stream impacts, 1.033 acres of permanent wetland impact and 0.04 acres of temporary wetland impact)
- Station 15+295. Spring box installation adjacent to Wills Branch (87 feet of stream impact) State General Permit site.
- Station 15+390 to 15+540. Channel relocation on tributary to Wills Branch (538 feet of stream impacts)
- Station 15+580 to 15+625. Channel relocation and box culvert on tributary to Wills Branch (180 feet of stream impacts)
- Station 15+780 to 15+890. Wetlands fill adjacent to Wills Branch, 0.346 acres permanent and 0.038 acres temporary).

- Station 16+351 to 16+385. Two springs to be covered with riprap for a rock buttress (144 feet of stream impacts). State General Permit site.
- Station 17+270 to 17+600. Channel relocation on Drystone Branch and box bridge construction (1229 feet of stream impacts).

As proposed, construction would result in 3923 feet of open stream impacts requiring individual permits, including channel alterations, channel encapsulations, or stream losses. The three sites covered by a General Permit (which have impacts less than 200 feet) do not require mitigation under the Tennessee Stream Mitigation Guidelines. The remaining stream and wetland impact sites require mitigation. A total of 1.599 acres of wetlands would be permanently filled and 0.118 acres would be temporarily filled.

The purpose of the project is to improve traffic flow in the Mountain City area. Traffic volumes are increasing along the SR 91 corridor. In addition, the current roadway exhibits sharp curves and steep grades which slow traffic. Finally, existing SR 91 passes through a residential community, and turning movements further slow traffic.

1.2 Decisions Required. Section 301 of the Clean Water Act prohibits the discharge of dredged or fill material into waters of the United States unless authorized by the DA pursuant to Section 404 of the same Act. The U.S. Army Corps of Engineers (USACE) considers Wills Branch, Goose Creek, Johnson Hollow, and Drystone Branch and tributaries as streams that are “waters of the United States” as the term is defined by 33 CFR Part 328. A Section 404 permit is required for the work; therefore, USACE must decide on one of the following:

- a. issuance of a permit for the proposal
- b. issuance of a permit with modifications or conditions
- c. denial of the permit

1.3. Other Approvals Required. Other federal, state and local approvals required for the proposed work are as follows:

- a. Tennessee Valley Authority (TVA) approval under Section 26a of the TVA Act for obstructions located on the Tennessee River and its tributaries. TVA is the lead agency for compliance with Section 106 of the National Historic Preservation Act (Section 106) and is a joint lead agency in the preparation of this National Environmental Policy Act (NEPA) document.

- b. Water quality certification from the State of Tennessee, Division of Water Pollution Control (TWPC), in accordance with Section 401(a)(1) of the Clean Water Act. The TWPC reviewed the proposal and issued the required certification on August 7, 2003 (Appendix B). TWPC has considered the impacts resulting from the additional site described in the November 29, 2004 revisions (Station 16+351 to 16+385). On January 25, 2006, TDEC determined that the permit modification was covered under the terms and conditions of the General Permit for the Construction and Removal of Minor Road Crossings. Finally, an additional wetland impact site of 0.22 acres was discovered in 2006. This impact qualifies for Nationwide Permit 14, which was certified on March 21, 2002.

1.4 Scope of Analysis. The USACE determines its action area under 33 CFR 325 Appendix B and C. Normally, the action area includes all waters of the U.S., as well as any additional area of non-waters over which the agencies conclude that there is adequate federal control and responsibility. For transportation projects, the scope of analysis addresses the federal action. For most state-funded linear transportation projects, the agencies limit the scope of analysis to the area of the stream crossings where the agencies have some ability to control potential impacts. However, because of the relatively short length of the project and the number of stream crossings, the agencies have voluntarily expanded the scope of analysis to the entire length of the roadway project.

1.5 Site Inspection. Ruben Hernandez and Kyle Wright (USACE) visited the Johnson Hollow Historic District (JHHD) and Wills Historic District (WHD) on 30 October 2003. TVA staff and consulting parties visited the JHHD on June 4, 2004. TVA and TDOT staff visited the wetlands along Wills Branch and Laurel Creek on December 17, 2004. TVA staff conducted a growing-season site visit to the wetlands along Wills Branch and Laurel Creek on August 11, 2005.

2.0 Public Involvement Process. Public Notice 03-10 was issued on March 6, 2003, to advertise the proposed work. All responses are included in Appendix A. A summary of the responses is as follows:

2.1 Public Notice Comments

a. The US Fish and Wildlife Service (FWS) responded to the public notice by letter dated April 4, 2003, expressing concerns about the stream mitigation proposal. FWS requested more information on the details of stream channel construction, width of forested riparian corridors, and culvert substrates to be used. In response, TDOT provided additional information on their proposed mitigation, which was verified by the permit agencies.

b. The Tennessee Historical Commission (THC) responded to the public notice by letter dated March 24, 2003, stating that based on the documentation submitted, the undertaking may adversely affect properties that are eligible for listing in the National Register of Historic Places (NRHP). Upon review of the historic properties issues associated with the project, TVA and USACE agreed that TVA would serve as the lead agency in the consultation process required by Section 106. During the consultation, TDOT requested on July 24, 2003 that TVA determine that historic resources would fall outside of the Area of Potential Effect (APE), since the permits would be issued solely for the stream crossings and not for the entire roadway project. Ordinarily, the Section 106 review would be so limited to the area of the stream crossings. However, based on the short length of the project, the number of stream crossings, and the fact that 6 of the 10 proposed stream permit locations fell within the boundaries of eligible historic districts, TVA and USACE have considered the entire roadway project as the APE.

TVA and TDOT developed a draft a Memorandum of Agreement (MOA), which was circulated to the USACE, State Historic Preservation Officer (SHPO) and Advisory Council on Historic Preservation (ACHP). While the draft MOA was circulating, TVA learned that one contributing

structure to the JHHD had been dismantled by a TDOT contractor without TDOT direction to do so and before the involvement of USACE and TVA. In addition, two cattle ponds and historical fence lines had also been affected. TDOT has shut down the activities of this contractor pending review of its proposal and decisions by USACE and TVA. In December 2003 and January 2004, Ms. Becky Johnson, acting on behalf of Rebecca Johnson Reece, the owner of the NRHP-listed Alfred Johnson farm, requested formal consulting party status in the Section 106 process. TVA granted consulting party status to Ms. Johnson in a letter dated February 9, 2004.

In order to better understand the issues and alternatives available to the permitting agencies, TVA and the SHPO jointly held a Section 106 consultation meeting on June 4, 2004 in Mountain City. Following the meeting, the agencies left open the comment period for two weeks (June 18, 2004). During this comment period, a letter was submitted from Joe W. McCaleb on behalf of Charles Johnson and Becky Johnson. Following evaluation of comments received at the June 4, 2004 meeting and in the letter from Joe W. McCaleb, two additional alternatives were screened and evaluated for impacts on the JHHD and other environmental resources. The results of this alternative evaluation and impact analysis are described in Chapter 3.

c. On 18 November 2003, Mr. Bob Sutherland, landowner of property along Wills Branch that would be affected by the proposed road project, sent in a request to move the road further up the slope on his property in order to avoid stream and wetland impacts and to minimize impacts on farm operations. He indicated concerns with state-listed rare plants, the bog turtle, water supply, wetlands maintenance, and erosion. These issues are discussed further below.

d. On April 7, 2004, Mr. Joe W. McCaleb, representing the Johnson family, asserted that the streams affected by the SR 91 project are tributaries to Goose Creek and Laurel Creek, which are high quality waters and naturally reproducing trout streams, and should be entitled to special precautions to prevent siltation. The letter indicated that the new erosion and sedimentation standards that are now in effect should supersede those in the August 2003 Water Quality Certification, as a result of a recent consent order. Extensive mud deposition was described affecting the Alfred Johnson farm and the adjacent Johnson/Waggoner farm. In addition, the letter indicated that bog turtle habitat is present in one of the wetlands to be affected. These issues are discussed further below.

Prior to issuance of the Joint Public Notice in 2003, TDOT also provided extensive opportunities for public involvement. At the request of Johnson County, TDOT conducted a preliminary feasibility study in 1987. After coordination with local officials, a new location alternative was developed and included in the evaluation. Historical and architectural reports for the new location and other alternatives were coordinated with property owners in 1996. A public hearing was held in Mountain City on March 10, 1998. These and other public involvement opportunities resulted in the identification by TDOT of a new location alternative.

2.2 Consideration of Public Notice Comments.

Fish and Wildlife Service. In response to the April 4, 2003 letter from FWS, TDOT provided additional information on stream channel mitigation, riparian zones and the use of natural substrate at culvert locations. TDOT indicated that the morphology and geometry of the affected channel sections would be approximated in the relocated channel sections. With regard to riparian zones, the stream channel sections to be relocated are currently used as pasture and have no tree canopy. The replacement streams will have a single row of trees planted along each bank. TDOT also indicated that natural substrate will be provided in both new and replacement culverts planned as part of this project. As additional mitigation, TDOT will compensate for its stream impacts through payment into the Tennessee In-Lieu Fee Stream Mitigation Program. The agencies believe the mitigation proposed is appropriate to replace the function and values of the impacted streams.

Tennessee Historical Commission. As a result of the Section 106 consultation meeting held on June 4, 2004 in Mountain City, two additional alternatives were screened and one additional alternative was evaluated in detail. The agencies believe that one alternative suggested, the new location ridgeline alternative H, would not offer any environmental advantages over the applicant-proposed alternative and would cost substantially more. However, the Ridgeline-Route 91 Alternative (designated as Alternative I) would offer some advantages in avoiding wetlands and in causing lesser impacts to the JHHD since the alternative would traverse the edge of the district. By the same token, Alternative I may result in certain contributing buildings within the WHD being taken. Additionally, Alternative I would cause adverse visual and audible impacts to the Reverend William Marsh House, a structure eligible for inclusion in the National Register of Historic Places (NRHP).

Bob Sutherland. The road alignment has been designed to minimize stream and wetland impacts on Mr. Sutherland's property. The concerns with state-listed rare plants are addressed by minimization of wetland impacts. Concerns with water supply and erosion would be addressed by use of stringent erosion control measures in future construction.

Joe W. McCaleb. Concerns about extensive erosion and sedimentation were expressed in Mr. McCaleb's letters of April 7, 2004 and June 17, 2004 on behalf of the Johnson family, and in the June 4, 2004 consultation meeting and site visit. TDOT explained to TVA and USACE representatives that some of this was due to the unexpected shutdown of construction and a delay in stabilization associated with the confusion this caused. These areas are now stabilized and the erosion stopped. The agencies will require special precautions to prevent further siltation of streams in the Johnson Hollow and Wills areas. Mr. McCaleb also expressed concerns about bog turtle habitat. Bog turtles were not found in surveys of the area.

Water Quality Certification. Water quality certification from the state of Tennessee in accordance with Section 401(a)(1) of the CWA is required for this activity. A copy of Public Notice 03-10 was forwarded to the Tennessee Department of Environment and Conservation (TDEC), and the certification was issued on August 11, 2003 (Appendix B). After modification of the project in the vicinity of Laurel Creek, TDEC confirmed, by letter of January 25, 2006, that these additional 144 feet of stream impacts were covered under the terms and conditions of the General Permit for the Construction and Removal of Minor Road Crossings. The August 11, 2003 letter and the ARAP General Permit constitute the Section 401 certification for this project. Further, the work to be

done in the wetland adjacent to Goose Creek qualifies for Nationwide Permit 14, for which water quality certification was issued on March 21, 2002.

2.3 EA Distribution.

On May 23, 2005, the EA was distributed to state and federal agencies and the public for comment. It was also posted on the TVA web site. The Tomahawk, a Mountain City newspaper, provided a front page article on the availability of the EA and its findings on June 8, 2005. As a result of these public involvement efforts, 21 comment letters were received by mail or e-mail. These comments resulted in a change to the proposal and improvements to the impact analyses in the draft EA. TDOT has modified the proposal to eliminate impacts to the Sutherland wetland. Responses to comments are an attachment to this EA.

2.4 Additional Coordination.

In January 2006, Johnson County Government sent a letter to property owners along the SR 91 project inviting them to submit comments for transmittal to TDOT. The March 24, 2006 response of Becky Johnson was sent to the federal permitting agencies. The letter stressed the importance of the Johnson Farm as a National Register historic site and raised questions about the need to consider alternative alignments that would have less impact on the Johnson Farm. In the EA, the agencies have taken a hard look at other alternatives, as described in the next section. These comments, along with responses, are included in Appendix E.

In order to resolve adverse effects to historic properties, TVA prepared and circulated an MOA for signature of consulting parties. On March 31, 2006, Becky Johnson, a consulting party to the agreement, submitted measures to be included in a landscaping plan and also requested measures for historic mitigation related to buildings on the Johnson farm. In response to her comments, certain criteria for the landscaping plan were included as commitments in the EA. Her request for historic mitigation of buildings on the Johnson Farm were outside the scope of this NEPA and NHPA review since they involve maintenance activities on the farm house and associated structures.

3.0 Alternatives

3.1. Introduction. The alternatives that were given consideration are listed in the following section. Prior to submitting permit applications to TVA and USACE for the stream crossings, TDOT deliberated on the design and other considerations for this project over a 15-year period. A preliminary feasibility study completed in 1987 evaluated six alternatives, including three variations of widening along the existing SR 91 and three alternatives to the west of the current SR 91. As a result of a public meeting in 1996 and through discussions with local government officials, a new location alignment (Alternative D) to the west of existing SR 91 was identified for state-funded construction. The agencies, upon receiving TDOT's application for permits in November

2002, evaluated the alternatives originally considered by TDOT, as well as two new alternatives proposed at the June 6, 2004 Consulting Party Meeting. As indicated in the screening analysis summarized in the Alternatives Comparison Table (Table 1), many of these alternatives would cost substantially more or have greater environmental impacts than the Applicant's Proposed Action (Alternative D). However, Alternative I appears to be similar in cost and impact. Alternatives D and I, as well as No Action, have been analyzed further in this EA.

Table 1. SR 91-Mountain City Bypass Comparison of Alternatives

Alternative	Advantages	Disadvantages
No Action (all roads remain 2 lanes)	<ul style="list-style-type: none"> • Avoids stream and wetland impacts • Avoids Johnson Hollow HD 	<ul style="list-style-type: none"> • Ongoing noise impacts to Wills HD and Marsh house • Poor horizontal and vertical alignment • Deficient drainage • Safety concerns • Level of service worsens with time
A-Improve Existing Alignment-west of Wills House and barn (5 lanes)	<ul style="list-style-type: none"> • Avoids wetland impacts • Avoids Johnson Hollow HD • Avoids Wills House by routing traffic to west of house and barn 	<ul style="list-style-type: none"> • Costs greater than D (\$22-\$28 million)* • Divides main farm of Wills HD • 44-63 houses displaced, some low and moderate income • Likely noise and aesthetic impacts to Wills HD and Marsh House • Stream impacts (Furnace Creek)
B-Improve Existing Alignment between Wills House and barn (5 lanes)	<ul style="list-style-type: none"> • Avoids wetland impacts • Avoids Johnson Hollow HD • Avoids taking farmland from Wills HD 	<ul style="list-style-type: none"> • Costs greater than D (\$22-\$28 million)* • 44-63 houses displaced, some low and moderate income • Likely noise and aesthetic impacts to Wills HD and Marsh House • Alignment isolates Wills House from barn (between house and barn) • Stream impacts (Furnace Creek)
C-Improve Existing Alignment-east of Wills House and barn (5 lanes)	<ul style="list-style-type: none"> • Avoids wetland impacts • Avoids Johnson Hollow HD • Minimizes harm to Wills house and HD 	<ul style="list-style-type: none"> • Costs greater than D (\$22-\$28 million)* • 44-63 houses displaced, some low and moderate income • Likely noise and aesthetic impacts to Marsh House • Stream impacts (Furnace Creek)
D-New Location (2 lanes with climbing lanes)	<ul style="list-style-type: none"> • Minimizes impacts to houses in Wills HD • Cost less than A, B, or C (\$20 million) • Improves level of service on existing SR 91 • Community expectation for road location over last 10 years 	<ul style="list-style-type: none"> • Intersects Wills HD • Bisects Johnson Hollow HD • Impacts Alfred Johnson Farm (on NRHP) • Wetland and stream impacts (Wills Branch) • 15 structures displaced

<p>E-Cold Springs-Wilcox (4 lanes)</p>	<ul style="list-style-type: none"> • Existing road corridor • Avoids Johnson Hollow HD • Cost \$13 million* 	<ul style="list-style-type: none"> • Does not remove local traffic or improve level of service on existing SR 91 (too far to west to meet purpose and need) • Wills HD affected • 15 displacements • Likely stream and wetland impacts, especially to Goose Creek
<p>F-Jenkins Hollow (4 lanes)</p>	<ul style="list-style-type: none"> • Existing road corridor • Avoids Johnson Hollow HD • Cost \$11 million* • 8 displacements 	<ul style="list-style-type: none"> • Does not remove local traffic or improve level of service on existing SR 91 (too far to west to meet purpose and need) • Wills HD affected • Likely stream and wetland impacts, especially to Goose Creek • Likely cave impacts
<p>G-Johnson Hollow Rd. (4 lanes along new alignment segment/5 lanes existing alignment segment)</p>	<ul style="list-style-type: none"> • Existing road corridor • Cost \$10 million* • Diverts traffic from existing SR 91 	<ul style="list-style-type: none"> • 16 displacements and demolition of historic properties along road • Johnson Hollow HD, Marsh house impacted • Likely stream impacts
<p>H-Ridgeline-all new location (2 lanes with climbing lanes)</p>	<ul style="list-style-type: none"> • Minimizes impacts to houses in Wills HD • Fewest displacements (8 structures) • Improves level of service on existing SR 91 	<ul style="list-style-type: none"> • Greater cost than D (\$25 million) • Intersects Wills HD • Divides the Johnson Hollow HD • Impacts Johnson/Wagner Farm • Stream and wetland Impacts (Wills Branch) • Displacements in Johnson Hollow HD • Undesirable grade (7 percent) • Large road cuts (up to 60 feet) with aesthetic impacts to Johnson Hollow HD and Mountain City; views from Stone Mountain and North Carolina viewsheds affected.
<p>I-Ridgeline-Route 91 (2 lanes with climbing lanes on new alignment/5 lanes existing alignment)</p>	<ul style="list-style-type: none"> • Avoids displacement of houses close to Mountain City • No buildings displaced in Johnson Hollow HD • Similar in cost to D (\$21 million) • County would not have to assume maintenance responsibility for all of old SR 91 	<ul style="list-style-type: none"> • Noise and aesthetic impacts to Wills HD and Marsh House • Displacement of contributing buildings in Wills HD (takes barn) • Up to 14 structure displacements • Impacts eastern edge of Johnson Hollow HD • Aesthetic impacts--views from Stone Mountain and North Carolina will be affected

*Costs of A, B, and C are from 1996 Documentation of Effects by TDOT. Costs of E, F, and G are from 1987 Preliminary Feasibility Study. Costs of D, H, and I are from 2004 TDOT estimates provided to TVA and USACE.

3.2. Description of Alternatives Considered in Greater Detail.

a. No Action. Under no action, USACE and TVA would not issue permits for stream modifications needed to construct SR 91 on existing and new alignment between Mountain City and Laurel Bloomery.

b. Action Alternative D (the Applicant's Proposed Action). The proposed alignment for SR 91 begins at the junction of SR 67 and US 421 in Mountain City and proceeds north along the alignment of US 421 for 0.6 miles. It then proceeds northeast for about 4 miles on new alignment, crossing Johnson Hollow Road, Fox Ridge, and Wills Branch before rejoining SR 91 north of Cold Springs Road (Wills Road). Under this alternative, USACE would issue Section 404 permits, and TVA would issue Section 26a permits, for stream obstructions at 10 locations.

c. Action Alternative I (Ridgeline-Route 91 alternative). This alternative turns northeast of Alternative A at the southern boundary of the JHHD and extends northeast along the ridgeline at the district boundary, rejoining existing SR 91 south of the Johnson Hollow Road junction. North of Johnson Hollow Road, this alternative would involve improvements to the horizontal and vertical alignment of existing SR 91. This alternative was not designed in detail by TDOT, but it is likely that construction would require stream crossings or relocations on tributaries to Laurel Creek.

3.3. Comparison of Alternatives.

a. No Action. This alternative consists of denying the applicant's request to perform the proposed work at the stream crossings. Absent the ability to receive permits, TDOT would have to abandon its road improvement plans or make more limited improvements to the existing alignment that would not involve work in the water. Neither outcome would satisfy the purpose and need for the project.

b. Build Alternatives. *Alternative D* would bisect the JHHD and WHD, and take land from the NRHP-listed Alfred Johnson Farm. *Alternative D* also would impact wetlands along Wills Branch and Laurel Creek, which are considered rare wetland types. TDOT is proposing to mitigate adverse historic effects through a landscaping plan, primarily involving the planting of indigenous trees along the road right-of-way to screen the roadway embankments from buildings on the Alfred Johnson Farm. In addition, wetland impacts would be mitigated through purchase of 3.2 acres of credit from the Shady Valley Wetland Mitigation Bank, located nearby in the same county. Stream impacts would be mitigated through the planting of trees along 2713 feet of open channels to be constructed and 1999 feet of existing channels, i.e., a total of 4,712 feet.

Alternative I shifts the alignment to the southeast away from the Alfred Johnson Farm but continues to take land from within the NRHP boundaries of the JHHD and WHD, adversely affecting both districts. It is also likely that one or two contributing buildings would be taken from within the WHD. Further, alternative I would affect the NRHP-eligible Reverend William Marsh house, causing adverse visual and audible effects to this property. Channel impacts would occur at several places along this alternative. However, it is possible that channel relocation and forest cover removal impacts could be less with this alternative. No wetlands were observed along this route. Detailed roadway design plans have not been developed for this alternative.

Special permit conditions have been developed (see below) to minimize the impacts identified to the extent practicable. These would be applied should Alternative D or I be selected. The conditions would be enforceable through the Section 404 permit and would afford appropriate and practicable environmental protection. Conditions have been specifically added to the Section 404 permit to minimize impacts on water quality, the aquatic environment, and other environmental resources.

- The work must be in accordance with any plans attached to this permit.
- A copy of this permit must be available on-site and all contractors must be made aware of its conditions and abide by them.
- Discharges shall consist of suitable material free from toxic pollutants in toxic amounts.
- All temporary fills in waters of the U.S. including wetlands shall consist of nonerodible materials.
- A strict erosion and sediment control program for the life of the project must be instituted that ensures that all disturbed areas are properly seeded, riprapped, or otherwise stabilized as soon as practicable to prevent erosion.
- All new channels shall be excavated in the dry with the exception of tie-ins to the existing stream and the slopes of the new channels shall be properly stabilized prior to diversion of the existing stream through the new channels.
- All channel work shall be performed during low flow periods.
- Where appropriate geotechnical site conditions exist, bottomless culverts shall be preferred over standard box culverts. If box culverts are used, the bottom slab must be constructed even with, or lower (preferred), than the existing stream bottom.
- All temporary structures and excess fill material associated with the construction of the culverts shall be removed from the waterway and the channel shall be restored to preconstruction contours.
- Riprap material shall be quarry-run stone or its equivalent, i.e., clean material free of waste metal products, organic materials, unsightly debris, etc.
- The disturbance to riparian vegetation shall be kept to a minimum during construction.
- Stream loss and encapsulation impacts attributed to this project shall be mitigated by planting of trees on new channels and payments into the Tennessee Stream Mitigation Program.
- To mitigate for the wetland loss, credits must be obtained from the Shady Valley Wetland Mitigation Bank account at a 2:1 ratio (Alternative D only condition).
- A preconstruction meeting must be held among representatives of the Nashville District Corps of Engineers, TVA, permittee, and contractor to discuss the conditions of this permit. The contractor must present its method of operation for the work at this meeting. If the method of operation includes additional work such as temporary access roads, fills, structures, etc., another permit may be required before construction. Ruben Hernandez of the USACE, telephone number 615-369-7519, should be contacted to arrange the required preconstruction meeting.

In addition to Best Management Practices to prevent sedimentation and protect the aquatic environment, the following measures would be required for approval of Alternative D, and will be conditions of TVA's Section 26a approval:

- Credits must be debited for wetland impacts at a ratio of 2:1 from the Shady Valley Wetland Mitigation Bank. Temporary wetland impacts will be mitigated by returning the areas to their original elevations, seeding with native perennial rye grass, and mulching.
- Stream mitigation will be accomplished by payment of \$182,200 into the Tennessee In-Lieu Fee Stream Mitigation Program.
- Development of the landscaping plan under the Memorandum of Agreement (MOA) (Appendix C) shall be started within 6 months of awarding a new contract for the SR 91 project and finalized (with TVA and USACE approval) before the highway can be opened to traffic. The landscaping plan will be developed by a qualified landscape architect. The draft landscaping plan will be coordinated with the SHPO and consulting parties (including Becky Johnson) by providing them 30 days for review and comment. The landscaping plan developed by TDOT will have the following minimum criteria:
 - The plan will apply to those sections of SR 91 right-of-way that traverse the Johnson Hollow and Wills Historic Districts.
 - The footprint of the road within the historic districts will be no wider than two twelve-foot traffic lanes with climbing lanes (three lane cross section) and eight-foot shoulders.
 - Where a guard rail is part of the roadway design in the historic districts, tree plantings will take place ten (10) feet from the guard rail. A guard rail will be installed on the same side of the new SR 91 as the Johnson house (west side of SR 91), and on both sides of Johnson Hollow Road at its junction with the new SR 91. Guard rails will be installed at the back of the eight foot shoulder (eight feet from the edge of the traffic lane as marked by the white line).
 - Trees will be planted beginning ten feet from the guard rails and extending to the base of the slope.
 - Trees closest to the guard rail (ten feet) will be a type that exceeds 35 feet in height at maturity. A mix of at least three different species will be planted closest to the guard rail. Trees will be arranged in informal groupings of three or more using like species in each grouping. Single trees may be used between groupings. Species will be alternated in each staggered grouping.
 - In areas of the historic districts where a guard rail is not included in the design, 30 feet of clear zone will be allowed on each side of the traffic lanes. Trees will be planted between the edge of the clear zone and the edge of the right-of-way.
 - Aesthetically treated guard rail shall be installed wherever guard rail is specified by the plans within the boundaries of the Johnson Hollow and Wills historic districts.

- Trees will be a mixture of evergreen and deciduous species.
- At least 60 percent of the trees will be of a minimum height of nine to ten feet when planted. The remainder may be smaller to enhance survivability and a natural look. Canopy trees (those that would mature at a height of 60 to 70 feet) such as oaks and maples will be planted a maximum of 20 feet apart, except those that are planted in groups. Understory trees such as dogwood, redbud, and sourwood (those that would reach a mature height of 30 to 35 feet) will be planted a maximum of 15 feet apart.
- All trees will be staked and guyed at the time of planting with a minimum of three wooden stakes. The stakes may be removed after two growing seasons but only after ascertaining that the root ball is capable of supporting the tree.
- A minimum survival rate of 90% at the end of five years will be insured for each species. Surveys will be conducted by TDOT on an annual basis to confirm progress with this survival rate, and plants that do not survive will be replaced. Results of the annual surveys will be documented and made available to TVA and USACE upon request.

3.4 Preferred Alternative. After consideration of the impact analyses and comparison of Alternatives D and I, TVA finds that there are benefits and disadvantages to each alternative. Both alternatives result in similar impacts to the two historic districts. Alternative D would result in greater impacts to the aquatic environment than Alternative I. However, Alternative I has other substantial adverse environmental effects that would outweigh the overall impact to the aquatic environment. Alternative I would result in the displacement of 14 structures, slightly greater construction costs (\$1 million or 5 percent greater), more noise impacts to existing houses because a portion follows the existing SR 91 corridor, and greater disturbance to wildlife habitat (0.4 miles longer alignment). In addition, Alternative I would affect the NRHP-eligible William Marsh house. The local community strongly prefers Alternative D. TDOT also prefers Alternative D because from an engineering perspective this alternative satisfies the project purpose and need better than Alternative I through the movement of traffic off of the old highway corridor. The aquatic environment impacts resulting from Alternative D can be adequately minimized and mitigated. In light of these considerations, the agencies have selected Alternative D as the preferred alternative.

4.0 Environmental and Public Interest Factors Considered

4.1 Introduction. 33 CFR 320.4(a) states the decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest. All factors that may be relevant to the proposal must be considered. Public Notice 03-10 listed factors that may be relevant to the proposal. The SR 91 improvement project near Mountain City is located in the Blue Ridge Mountains ecoregion, as designated by EPA (Griffith, Omernik, and Azevedo, 1997). Most of the western slopes of the Blue Ridge region consist of metamorphic rocks such as quartzite and gneiss or sedimentary rocks

such as sandstone and shale; however, the Mountain City lowland area traversed by the proposed highway is one of 11 large limestone valley and cove areas found in the Blue Ridge. Others include Shady Valley and Cades Cove. The area was originally forested, but today is mostly cleared for hay and pasture. Knolls and slopes are dominated by oaks, with some mixed hardwoods and pine. For the purposes of this review, the project area for the analysis of direct, indirect, and cumulative effects to terrestrial resources is the Mountain City lowland and other nearby limestone valley and cove areas, including Shady Valley and the lowland along Stony Creek in Carter County. Patterns of human development also tend to be related to the ecosystem in which such developments occur, and therefore, the Mountain City lowland will also be used as the analysis area for direct, indirect, and cumulative effects to human communities. All alternatives considered affect the Mountain City lowland region.

Streams in the northern part of the project area drain into Laurel Creek, which leaves the Mountain City lowland and flows northward into Virginia. Laurel Creek joins the South Fork Holston River (South Holston Reservoir) in Virginia. Streams in the southern part of the project area drain into Roan Creek, which in turn is a tributary to the Watauga River (Watauga Reservoir). The Watauga River is a tributary of the South Fork Holston River in Tennessee. For the purposes of this review, the project area for the analysis of direct, indirect, and cumulative effects to aquatic resources are the watersheds of Laurel and Roan Creeks in Johnson County, Tennessee, especially those portions found in the limestone valley and cove subdivision of the Blue Ridge Mountains ecoregion, referred to as the Mountain City lowland in the text of this document.

4.2. *Physical/Chemical Characteristics and Anticipated Changes.* The relevant blocks are checked with a description of the impacts.

(x) substrate. The substrate of Johnson Hollow, Wills Branch, and unnamed tributaries affected by Alternative D consists mainly of cobble and boulders in runs and riffles and fines (silt, sand, and gravel) in slow flowing areas. Streams affected flow through pasture. As a result, stream banks have been affected by cattle grazing and other use adjacent to and in the streams. Work activities under Alternative D would eliminate approximately 3669 feet of stream channel. However, there would be a small channel loss because 2858 feet of new channel would be created. While the new channel would not initially be of the same quality as the original channel, close application of best management practices would result in substantial replacement of stream habitats. The stream in Johnson Hollow has been affected by both cattle grazing and channelization in roadside ditches adjacent to the roadway. In addition, water line construction has taken place within the stream banks. Substrate impacts are expected to be relatively minor because of the degraded nature of the streams and mitigation provided. Alternative I would involve widening of the existing SR 91 north of Johnson Hollow Road and would affect substrate in Drystone Branch. The net channel loss would likely be similar because the roadway parallels the stream for more than a mile.

(x) currents, circulation or drainage patterns. Under Alternative D, road construction would likely alter water flow in the immediate subwatersheds of Johnson Hollow and Wills Branch. Drainage in local areas would be affected by the cuts and fills involved in highway

construction through mountainous terrain. However, runoff and local drainage now flowing into Johnson Hollow, Wills Branch, or other tributaries would not be diverted to other watersheds. Similarly, under Alternative I, water flow would be altered in the Johnson Hollow and Drystone Branch watersheds, but water flow would not be diverted to other watersheds.

(x) suspended particulates, turbidity. Construction on the Alternative D alignment began before permits were applied for, and road grading has largely been completed between Mountain City and Johnson Hollow Road. Upon learning of the need to obtain Section 404 and Section 26a permits, construction was halted by TDOT. North of Johnson Hollow, clearing of vegetation took place, but little grading was observed. Site inspections in early and mid-2004 indicated extensive erosion in portions of the JHHD. However, this situation had stabilized by mid-2004. For future construction under either Alternative D or I, the agencies will require adherence to TDOT's Standard Specifications for Road and Bridge Construction. These measures include installation of temporary concrete diversion berms (to keep the live stream from entering the relocated channel before it is stable), one equipment crossing point per site (to minimize disturbance of riparian vegetation which results in erosion), and use of sedimentation basins (to reduce turbidity). With implementation of these measures, long-term adverse effects on water quality and watersheds in the area would be negligible.

(x) water quality. Streams in the Mountain City area are on the state list of impaired streams, generally due to cattle grazing and trampling of vegetation along the banks and cattle loitering in the streams. Streams proposed for the impaired stream list due to 'pasture grazing' are Laurel Creek, Waters Branch, Roan Creek, Sink Creek and Campbell Creek. Town Creek is proposed to be on the impaired list because of the discharge of the Mountain City Sewage Treatment Plant, while Goose Creek and Furnace Creek have experienced loss of stream-side or littoral vegetative cover due to channelization and land development. In the future, scattered rural residential and subdivision development is anticipated to continue to affect these streams. The project is near Goose Creek on its southern end but would not cross it. Of the above streams, Laurel Creek is closest to Alternative D and springs feeding Laurel Creek would be affected by the roadway project. A spring feeding Goose Creek would be affected by Alternatives D and I. Under Alternative D, as mitigation for the stream channel impacts, TDOT proposes to pay \$182,200 into the Tennessee In-Lieu Fee program. The certification required under Section 401 of the Clean Water Act was issued on August 11, 2003. Following changes to the proposal in the area of the Sutherland wetland, TWPC confirmed by letter of January 25, 2006 that remaining impacts are covered under a General Permit. Further, the work to be done in the wetland adjacent to Goose Creek qualifies for Nationwide Permit 14, for which water quality certification was issued on March 21, 2002. With the implementation of mitigation measures contained in the Water Quality Certification, the construction of SR 91 under Alternative D is not expected to further affect water quality in existing impaired streams in the Mountain City lowland. Under Alternative I, Laurel Creek tributaries and Goose Creek tributaries would be affected by road construction. The construction of SR 91 under Alternative I is not expected to further affect water quality in existing impaired streams.

(x) flood control functions. Under Alternative D, road construction would likely alter water flow in the immediate subwatersheds of Johnson Hollow and Wills Branch. However, once the runoff finds the receiving streams of Goose Creek and Laurel Creek, flooding potential would not likely be affected. Similarly, under Alternative I, road construction in the Drystone Branch and Johnson Hollow watersheds would likely alter water flow in the immediate subwatersheds. However, once the runoff finds the receiving streams of Goose Creek and Laurel Creek, flooding potential would not likely be affected. Flooding in larger streams is related to the nature and timing of rainfall events rather than the minor topographic alterations created by road construction.

(x) storm, wave and erosion buffers. Storm and wave buffers are not applicable to the proposed action. For a discussion of temporary and permanent erosion and sedimentation measures that would be employed, see "suspended particulates and turbidity" in this section.

(x) shore erosion and accretion patterns. Construction under Alternative D would require channel relocations in the Wills Branch area. Construction under Alternative I would likely require channel relocations in the Drystone Branch area. Construction design for new open channels seeks to match the existing characteristics of the original channels. Therefore, the effects on erosion and accretion patterns would be negligible under either alternative.

(x) baseflow and water supply. Under Alternative D, two springs feeding Laurel Creek would be covered with a rock buttress. However, spring flow would still emerge from the hillside in the same quantities and at the same location. Also, a spring box would be constructed near Goose Creek along US 421 in Mountain City. This would also not limit spring flow. As a result, Alternative D would have negligible effects on the normal dry-weather flow which is mainly derived from groundwater. Under Alternative I, springs or seeps are likely to be affected along Drystone Branch, depending upon final design, and a spring box would be constructed near Goose Creek in Mountain City.

4.3. Biological Characteristics and Anticipated Changes. The relevant blocks are checked with a description of the impacts.

(x) special aquatic sites (wetlands, mudflats, pool and riffle areas, vegetated shallows, sanctuaries and refuges, as defined in 40 CFR 230.40-45) The Alternative D corridor affects two wetlands and runs adjacent to a third. From south to north, the first wetland is located adjacent to existing US 421 near Goose Creek. This wetland appeared while the review was underway and was most likely created by a landowner through removal of topsoil adjacent to the corridor under construction. A second wetland is located along Wills Branch at the base of a hillside. A third wetland, not directly affected, is adjacent to the corridor along Laurel Creek downstream from its confluence with Wills Branch. The Laurel Creek wetland is considered to contain a globally rare wetland community, similar to another wetland nearby in Shady Valley, and is described by NatureServe as an "Appalachian Calcareous Artesian Seepage Fen." The other location of this community is known as Schoolhouse Springs and is protected as a Nature Conservancy preserve. The Laurel Creek wetland is fed by springs at the base of the hill,

although most of the water supply comes from Laurel Creek itself. Extensive beaver activity was also observed at the site. The Route 91 corridor under Alternative D would affect the seeps with a rock buttress and potentially would minimally affect the wetland. The seeps do not directly drain into the wetland, but contribute to a tributary that confluences with Laurel Creek downstream of the wetland. TDOT has made an effort to avoid and minimize impacts to the Laurel Creek wetland through construction of a retaining wall to avoid filling the wetland.

The Wills Branch wetlands would be partially filled by the SR 91 project, for a total of 1.38 acres. These are not as unique in terms of wetland characteristics, but are still considered to be globally rare, with less than 200 acres remaining. These wetlands also contain some of the same rare plant species (see discussion under endangered and threatened species). The classification has been described as a Southern Appalachian Herb Bog. TDOT proposes to mitigate the unavoidable permanent wetland impacts by debiting 3.2 acres (2:1 ratio) from available wetland credits at the Shady Valley Wetland Mitigation Bank in Johnson County. This is in the South Fork Holston Watershed and in the same limestone valley and cove ecoregion as the wetlands being impacted. Temporary wetland impacts would be mitigated by returning the areas to their original elevations, seeding with native perennial rye grass (*Elymus virginicus*), and mulching. No wetlands have been identified along the Drystone Branch corridor which would be encroached upon by the widening of existing SR 91 under Alternative I.

(x) habitat for fish and other aquatic organisms. Under both Alternative D and I, streams along the Route 91 project area are tributaries to Goose Creek and Laurel Creek, which are naturally reproducing trout streams. Beaver activity is occurring in the Wills Branch area. These habitats are being influenced by unrestricted cattle access to streams and the recent road construction for SR 91. Recent erosion stabilization efforts on the SR 91 corridor have reduced siltation, and from recent observations, it appears that little siltation has been transported along Goose Creek or Laurel Creek out of the Mountain City lowland. Once the roadway area is stabilized, these streams are expected to return to their former conditions, with no long-term adverse impact. Alternative D would likely have more stream impacts than Alternative I; however both alternatives primarily affect first order tributaries of Goose Creek and Laurel Creek. With appropriate protective measures enforceable through the Section 401 permitting process, neither alternative would adversely affect the larger streams which contain the primary habitats for aquatic life.

(x) wildlife habitat. Mountain City is located in a deep valley surrounded by steep mountains. Ridge top property to the west and north of the project area on Iron Mountain, and property to the east of the project area from Bald Knob north to the Virginia state line is part of the Cherokee National Forest. The Iron Mountain Range is an unspoiled and naturally wild area containing hundreds of different plant and animal species and dozens of different natural communities including old growth forests. South of the project area, Doe Mountain State Wildlife Management Area provides public hunting opportunities. North of the project area, the 20-acre Laurel Creek Nature Conservancy preserve protects a bog similar to the wetlands along the Alternative D corridor. The area of the project, as well as the Mountain City lowland area, is currently pasture and small farms with scattered woodland patches, primarily on the ridges. Under

both Alternatives D and I, road corridor construction activities would decrease the woodland and pasture areas. However, these impacts would not be substantial due to the relative abundance of these habitats in surrounding areas and the present disturbed and fragmented nature of these habitats in the Mountain City lowland.

(x) endangered or threatened species. No federally-listed endangered or threatened species are found in the project area. The bog turtle is federally listed as threatened due to similarity of appearance to a northern species. However, no bog turtles were found to be present in the SR 91 corridor during a search by experts from the Knoxville Zoo. The wetland habitat was not found to be of good quality to sustain this species by the zoo evaluators. Thus, no federally listed species would be affected by this project. Six state-listed plants are found in the Laurel Creek (Sutherland) wetland, adjacent to Alternative D. These are

- Godfrey's sandwort (*Minuartia godfreyi*, or *Arenaria godfreyi*), state endangered, federal species of concern, globally rare. This is a regional endemic to the southeastern U.S., found in isolated occurrences in Arkansas, Florida, North Carolina, South Carolina, and Tennessee. The habitat is listed as moist slopes of creek banks, roadside ditches, and tidal freshwater marshes.
- Skunk cabbage (*Symplocarpus foetidus*), state endangered, globally secure.
- Narrow-leaved meadow sweet (*Spiraea alba*), state-endangered, globally secure.
- Branching bur-reed (*Sparganium angrocladum*), state endangered, globally secure.
- Marsh bellflower (*Campanula aparinoides*), state threatened proposed special concern, globally secure.
- Marsh marigold (*Caltha palustris*), state endangered and globally secure.

Several of these plants are also found in the Wills Branch wetlands. However, the Wills Branch wetlands are a small portion of the total habitat for these plants; therefore, the loss of these individuals due to road construction would not affect a significant portion of the population.

While a few individuals of these state-listed species would likely be indirectly affected by the road project, the plants in the rare Laurel Creek wetland would not be affected because the roadway has been designed to avoid wetland impacts. Springs, streams, and seeps maintaining the wetland would continue to provide water supply because there is no blasting proposed that would disrupt groundwater flow. There is some potential for beaver activity along Laurel Creek to change the habitat for these plants by changing the water levels. Because only a few scattered individuals of the area population would be affected and the population in the Sutherland/Laurel Creek wetland would not be affected, any impacts from the roadway project on these species would be insignificant. The above rare wetland plants have not been identified within the Drystone Branch area and would not be affected by construction within the Alternative I corridor.

The TDOT Ecological Study Draft Summary Report of March 1996 reports that Canada barberry (*Berberis canadensis*), a state-listed plant species of special concern, was found to occur within the Alternative D and I corridor between US 421 and Johnson Hollow Road. Because road grading has already taken place south of Johnson Hollow, individuals within this population along

this corridor have been impacted. However, scattered individuals are found within the surrounding forest areas and have not been affected. Overall, the species is not adversely affected by this action.

(x) biological availability of possible contaminants in dredged or fill material. The SR 91 project corridor is generally a new location corridor except near Wills in the north and the widening of US 421 in the south. The levels of contaminants would likely be minimal in the existing road corridors where the highway is proposed to be widened. Contamination would not be expected in new location areas of the project under either Alternatives D or I.

4.4 Human Use Characteristics and Anticipated Impacts. The relevant blocks are checked with a description of the impacts.

(x) existing and potential water supplies; water conservation. Public water supply in the Mountain City lowland primarily comes from springs, Vaught Creek, and Laurel Creek. These resources are not expected to be affected by the SR 91 construction project under Alternatives D or I.

(x) recreation. Ralph Stout City Park occurs along US 421 (SR 34/67) at the south end of the project corridor for Alternatives D and I. Some minimal loss of park property has occurred due to the roadway widening. Recreational fishing occurs along Laurel, Goose, and Roan Creeks in the project area. Turnouts are located along Route 91 within the Laurel Creek corridor to facilitate these activities. Laurel Creek is considered by the Tennessee Rivers Assessment Report as being excellent for recreational fishing. Its natural and scenic qualities are considered by the same report to be of regional significance. Goose Creek is considered to be of regional significance in natural and scenic qualities but its value for recreational fishing is not described. Roan Creek is listed as an excellent resource for recreational fishing. Recreational fishing for trout is expected to continue whether or not the project is completed. Canoeing and kayaking take place along the lower part of Laurel Creek in the vicinity of Camp Ahistadi and downstream. With erosion stabilization, the project would have negligible adverse effects on the recreational uses occurring on streams within the Mountain City lowland or flowing out of the lowland.

Other forms of recreation, such as hiking and hunting likely occur on the private properties in the Mountain City lowland. The U.S. Department of Agriculture-Forest Service has recently approved construction of a new multi-use trail along Laurel Creek on Cherokee National Forest and Mount Rogers National Recreation Area lands to the north of the project area. The trail would be open to hiking, mountain biking, and horseback riding. This trail is anticipated to eventually connect Damascus, Virginia with Mountain City, Tennessee. Construction of this trail would not be affected by the Route 91 project.

Driving for pleasure and scenic viewing also likely occurs along US 421, SR 91, SR 67, SR 167 and other rural roads in the area. By straightening out curves in the area between Mountain City

and Laurel Bloomery, the proposed SR 91 project would likely lend some encouragement to these activities. Alternatives D and I would not differ in their recreational impacts.

(x) aesthetics. The scenic beauty of the Mountain City lowland area is outstanding. Historic farmsteads surrounded by the Blue Ridge Mountains create a bucolic setting. The cut and fill slopes required to build a highway in this terrain would introduce visual contrast into this area. However, because of the design features incorporated into the highway, such as the planting of trees along open stream corridors, the impacts on the viewsheds in the area would be minimal. Parts of Iron Mountain are visible from the roadway corridor under Alternative D. However, the project would be two to three miles downhill from the Iron Mountain Trail in the Cherokee National Forest and would not likely be noticeable to hikers along the trail. Alternative I, because it is on the ridgeline near Johnson Hollow, may be more visible from the Iron Mountain area on its south end.

(x) traffic/transportation patterns. Access to Mountain City from the rest of Tennessee, Virginia, and North Carolina is constrained due to steep grades and sharp curves. The SR 91 improvement project would enable improved access from Abingdon and I-81, via US 58 east to Damascus and SR 91 south to Mountain City.

(x) energy consumption or generation. Due to the short length of the highway improvement, the proposal is not likely to encourage additional trips or otherwise affect energy consumption under either Alternative D or I.

(x) navigation. Lower portions of Laurel and Roan Creek are large enough to support canoeing, rafting or kayaking. There is considerable whitewater, and canoeing and kayaking take place along the lower portion of Laurel Creek north of the project area. The SR 91 improvement project would not affect the potential development of these uses because no impacts to these streams are expected under Alternative D or I.

(x) safety. Existing SR 91 between Mountain City and Laurel Bloomery contains steep grades and sharp curves. The new location construction under Alternative D would enhance safety by eliminating these curves for through traffic. If Alternative I were chosen, curves would be straightened along a segment of the existing roadway between Johnson Hollow Road and Laurel Bloomery.

(x) air quality. Mountain City and Johnson County are in attainment for all pollutants regulated by the National Ambient Air Quality Standards (NAAQS). The proposal is not likely to generate enough additional traffic to affect the NAAQS designation for Johnson County under either Alternatives D or I. Because Johnson County is designated as attainment for the NAAQS, transportation conformity does not apply to this proposal. As part of standard construction practices, TDOT would require the contractor to control fugitive dust and maintain equipment to reduce exhaust emissions during construction. No structures remain to be demolished in the roadway corridor. Any remaining wood waste would be disposed of in

demolition landfills or burned according to the Tennessee open burning regulations at Chapter 1200-3-4 of Air Pollution Control regulations.

(x) noise. There are several residences and businesses along the existing SR 91 corridor that could be subjected to increased noise from highway construction, especially if Alternative I were chosen. Based on studies conducted for other highway projects, noise levels generally do not substantially increase above ambient levels when highways are widened along the same alignment. Thus, areas near Wills and Mountain City would not experience increased noise. However, rural areas not now traversed by a roadway would likely experience marginal noise increases under Alternatives D or I.

(x) historic properties and cultural values. The roadway corridor under Alternatives D and I crosses two National Register-eligible historic districts. The Johnson Hollow and Wills Historic Districts are representative of late nineteenth and early twentieth century settlement patterns and agricultural practices in upper East Tennessee. The districts also contain period farms that retain their original outbuildings and spatial distribution. JHHD contains eight farm complexes, five of which continue to be owned and operated by descendants of the Johnson family. Of these, 3 farms are directly affected by highway construction under Alternative D. WHD contains two farm complexes associated with the Wills family since 1797. Of these, one is directly affected by highway construction under Alternatives D and I. These effects would be minimized by implementation of the landscaping plan. The dwellings within the farm complexes of the historic districts retain their original architectural integrity, and numerous outbuildings have been retained. The National Register evaluation considered the Historic Districts as a whole and determined their eligibility. Although construction of the roadway under Alternatives D and I would have an adverse effect on both historic districts, the individual farms and dwellings within the districts would continue to retain their eligibility for the National Register.

Other National Register properties in the vicinity include the Butler House at 309 North Church Street, Mountain City and the Morrison Farm and Store on SR 91 in Laurel Bloomery. Neither of these properties would be affected by the proposed road improvements.

Public comment on the project expressed particular concern about impacts to the Alfred Johnson Farm, which is located within the NRHP-eligible JHHD but was also individually listed on the NRHP. The two-story house was build ca. 1880, and intact outbuildings include a smokehouse, a milkhouse, a root cellar, a delco house, a garage, a wash house, an outhouse, a wood shed, a barn, a tractor shed, a tobacco grading house, a cattle barn, a silo, a blacksmith's shop, a turkey house, and a granary. A tenant house, ca. 1910, was dismantled by a TDOT contractor without TDOT direction to do so, and before the involvement of USACE and TVA. In addition, the farm was bisected and a road graded. This affected cattle ponds on the farm and farm operations. However, the historic value and location of these contributing properties are documented in the archives, which tends to preserve the historic value for future generations. The proposed corridor and finished roadway (Alternative D) would have visual impacts on the Alfred Johnson Farm, and would also have continuing effects on farm operations by the filling of a cattle pond and changing of the access to the side of the farm across the road. Access would still exist because farm

equipment could be driven down the road and the road right-of-way would not be fenced. Visual impacts would be mitigated through implementation of a landscaping plan, thus enabling NRHP eligibility to be retained. Similar impacts would occur to farms in the Wills Historic District.

Because of the adverse effects to the Johnson Hollow and Wills Historic Districts, TVA and USACE initiated consultation under NHPA and have prepared a MOA to address adverse effects (Appendix C). As part of this consultation, the agencies evaluated other action alternatives to determine whether the adverse effects could be avoided. These evaluations revealed that the other alternatives (see table comparison of alternatives) would cost substantially more or have greater environmental impacts. Alternative I was similar in cost to Alternative D. However, Alternative I would continue to take land from within JHHD and WHD, and would likely take one or two contributing buildings from within WHD. Further, Alternative I would affect the NRHP-eligible Reverend William Marsh House, causing adverse visual and audible effects to this property.

The visual impact to the historic districts and on the individual farms within these districts has been considered and addressed as part of this review. A minimal footprint of two lanes is proposed, with climbing lanes where required for hilly terrain. The section of the project within the historic districts would be landscaped to complement the natural trees and growth of the area. Landscaping through the historic districts would be coordinated with the SHPO and consulting parties to the MOA prior to further construction. The agencies have reviewed the TDOT landscaping suggestions as submitted on project drawings. Because of the sensitivity of the historic districts, the agencies would require specific screening efforts in the historic districts. Trees would be planted in clumps using occasional single plantings to mimic natural regeneration. Tree survival rate and species would be specified. By request of consulting party Becky Johnson, the draft landscape plan will be closely coordinated between TDOT and consulting parties prior to construction. In addition, TVA would require that Development of the landscaping plan under the Memorandum of Agreement (MOA) shall be started within 6 months of awarding a new contract for the SR 91 project and finalized (with TVA and USACE approval) before the highway can be opened to traffic. The landscaping plan will be developed by a qualified landscape architect. The draft landscaping plan will be coordinated with the SHPO and consulting parties (including Becky Johnson) by providing them 30 days for review and comment. The landscaping plan developed by TDOT will have the following minimum criteria:

- The plan will apply to those sections of SR 91 right-of-way that traverse the Johnson Hollow and Wills Historic Districts.
- The footprint of the road within the historic districts will be no wider than two twelve-foot traffic lanes with climbing lanes (three lane cross section) and eight-foot shoulders.
- Where a guard rail is part of the roadway design in the historic districts, tree plantings will take place ten (10) feet from the guard rail. A guard rail will be installed on the same side of the new SR 91 as the Johnson house (west side of SR 91), and on both sides of Johnson Hollow Road at its junction with the new SR 91. Guard rails will be installed at the back of the eight foot shoulder (eight feet from the edge of the traffic lane as marked by the white line).

- Trees will be planted beginning ten feet from the guard rails and extending to the base of the slope.
- Trees closest to the guard rail (ten feet) will be a type that exceeds 35 feet in height at maturity. A mix of at least three different species will be planted closest to the guard rail. Trees will be arranged in informal groupings of three or more using like species in each grouping. Single trees may be used between groupings. Species will be alternated in each staggered grouping.
- In areas of the historic districts where a guard rail is not included in the design, 30 feet of clear zone will be allowed on each side of the traffic lanes. Trees will be planted between the edge of the clear zone and the edge of the right-of-way.
- Aesthetically treated guard rail shall be installed wherever guard rail is specified by the plans within the boundaries of the Johnson Hollow and Wills historic districts.
- Trees will be a mixture of evergreen and deciduous species.
- At least 60 percent of the trees will be of a minimum height of nine to ten feet when planted. The remainder may be smaller to enhance survivability and a natural look. Canopy trees (those that would mature at a height of 60 to 70 feet) such as oaks and maples will be planted a maximum of 20 feet apart, except those that are planted in groups. Understory trees such as dogwood, redbud, and sourwood (those that would reach a mature height of 30 to 35 feet) will be planted a maximum of 15 feet apart.
- All trees will be staked and guyed at the time of planting with a minimum of three wooden stakes. The stakes may be removed after two growing seasons but only after ascertaining that the root ball is capable of supporting the tree.
- A minimum survival rate of 90% at the end of five years will be insured for each species. Surveys will be conducted by TDOT on an annual basis to confirm progress with this survival rate, and plants that do not survive will be replaced. Results of the annual surveys will be documented and made available to TVA and USACE upon request.

With the implementation of these commitments, the agencies conclude that the impacts of the SR 91 project on historic properties will be minimized.

(x) land use classification. No zoning ordinances exist in Mountain City or Johnson County. The land uses, which consist of a mix of pasture, woodland, and rural residential, would not be expected to change along the corridor following completion of the highway construction under Alternatives D or I.

(x) socioeconomics. Census data for Mountain City indicate that the year 2000 population was 2383, 97.9 percent of which were White. The population of Johnson County was 17,499, 96.4 percent of which were White. No minority communities were observed along the SR 91 corridor. The per capita income for Johnson County was 13,388, which is below the national

average of 21,857. Approximately 18.7 percent of families in the county have incomes below the poverty level, which is above the national average of 12.4 percent. The Johnson Hollow and Wills communities along the SR 91 corridor appear to be a mixed community of various income levels. The project would not disproportionately impact minority or low-income populations under Alternatives D or I.

The visual impact to the historic districts could also be considered a socioeconomic impact. As mentioned under historic properties and cultural values, special landscaping measures would be implemented to minimize visual impacts.

(x) consideration of private property. TDOT concluded the highway right-of-way acquisition phase prior to applying for permits for the Alternative D route. Therefore, the permit process had no bearing on property ownership negotiations if Alternative D is the route selected and requested permits were approved. Displacements are comparable under Alternatives D and I, but TDOT has not acquired right-of-way sufficient to support the entirety of Alternative I.

(x) floodplain values. Johnson County and Mountain City participate in the National Flood Insurance Program administered by the Federal Emergency Management Agency. Alternatives D and I have been designed to minimize any impacts to floodplains in the Laurel Creek, Wills Branch, Johnson Hollow, Drystone Branch, and Goose Creek areas. Minimization occurs by perpendicular crossings, stream mitigation, and impact avoidance techniques. It would not be possible to construct roadway improvements between Mountain City and Laurel Bloomey without some floodplain impacts. Accordingly, there is no practicable alternative to construction in the floodplains in the Mountain City area, and Alternatives D and I minimize any floodplain impacts.

4.5 Cumulative and Secondary Impacts. The following is a summary of relevant anticipated cumulative or secondary impacts. As indicated above, the geographic area within which resources could be cumulatively affected is the Mountain City lowland and other areas similar in ecological characteristics such as Shady Valley and the lowland along Stony Creek in Carter County. Because of the small human population and low intensity of land use in the Johnson County area, terrestrial and aquatic resources are in generally good condition in the project area. However, agricultural uses, such as cattle grazing along stream banks, have resulted in stream degradation. Roadway construction has the potential to further degrade streams and may have indirect effects through induced development; however, any impacts associated with such development would likely be beyond the control of TVA and USACE, and are speculative at this time. In addition, other actions which stress environmental resources that are taking place in the same area could result in adverse effects to terrestrial and aquatic resources, when added to the stress created by road construction. Other past, present, and reasonably foreseeable actions which have affected or may affect the same resources include:

- US 421 improvements. While improvements to US 421 in Watauga County are listed in the North Carolina Transportation Improvement Program (TIP) (<http://www.ncdot.org/planning/development/TIP/TIP/trans/>), no improvements to US 421 or other roadways in Johnson County are listed in the Tennessee TIP (http://www.tdot.state.tn.us/Chief_Engineer/pdpm/docs/stip2006-08.pdf).

- US 58 improvements. The Virginia DOT proposes to add parallel lanes to US 58 between Damascus and Abingdon, along Laurel Creek, as part of a legislative mandate to upgrade US 58 across Virginia. A segment near Abingdon is under construction.
- Route 91 improvements. The state of Tennessee has constructed upgrades to State Route 91 in the Stony Creek area of Carter County. According to a commenter, wetlands impacts to Hunter Bog occurred from this project. However, according to TDOT staff, Hunter Bog has changed over time and does not provide good habitat for rare species currently. This is partly because of landowner vegetation management activity and not because of the road project.
- Ralph Stout Park Streambank Stabilization. The City of Mountain City is implementing a streambank restoration project along Goose Creek adjacent to US 421 in Mountain City. The eroding banks are being stabilized by installation of a rock toe under existing riprap, installation of rock vanes and crossvanes, and installation of native vegetation. The purpose of this project is to improve water quality in Goose Creek.
- Rural Subdivision Development. Development pressure in Johnson County is generally low, with the possible exception of property on Watauga Reservoir outside of the Mountain City lowland. A new subdivision has recently been constructed along Johnson Hollow Road in the project area.

The Route 91 improvement project in Carter County, and the current proposal, both affect wetlands containing Godfrey's sandwort and therefore have the potential to cumulatively affect rare wetland habitats and the plants they contain. With the exception of Godfrey's sandwort, the state-listed rare plants found in the wetlands are considered globally secure or apparently secure by the network of heritage databases (<http://www.natureserve.org/explorer/>). The plants are state-listed in Tennessee because they are at the edge of their range. In general, the plants are more abundant elsewhere, especially further north. Godfrey's sandwort is also found elsewhere in the area. The US 58, US 421, and Route 91 projects have not and are not expected to adversely affect the wetland habitats harboring these plants. Taken together, these proposals have minimal potential to cumulatively affect the terrestrial and aquatic resources of the Mountain City lowland area. No resource is likely to be stressed to the point of no return, and these projects would not add to any adverse effect on resources that are occurring in the Mountain City lowland area. The agencies' decision to expand the scope of this review beyond just the stream crossings where they have some ability to control potential impacts also constitutes consideration of cumulative impacts since the expanded review covers those impacts associated with construction of the highway away from the stream crossings.

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