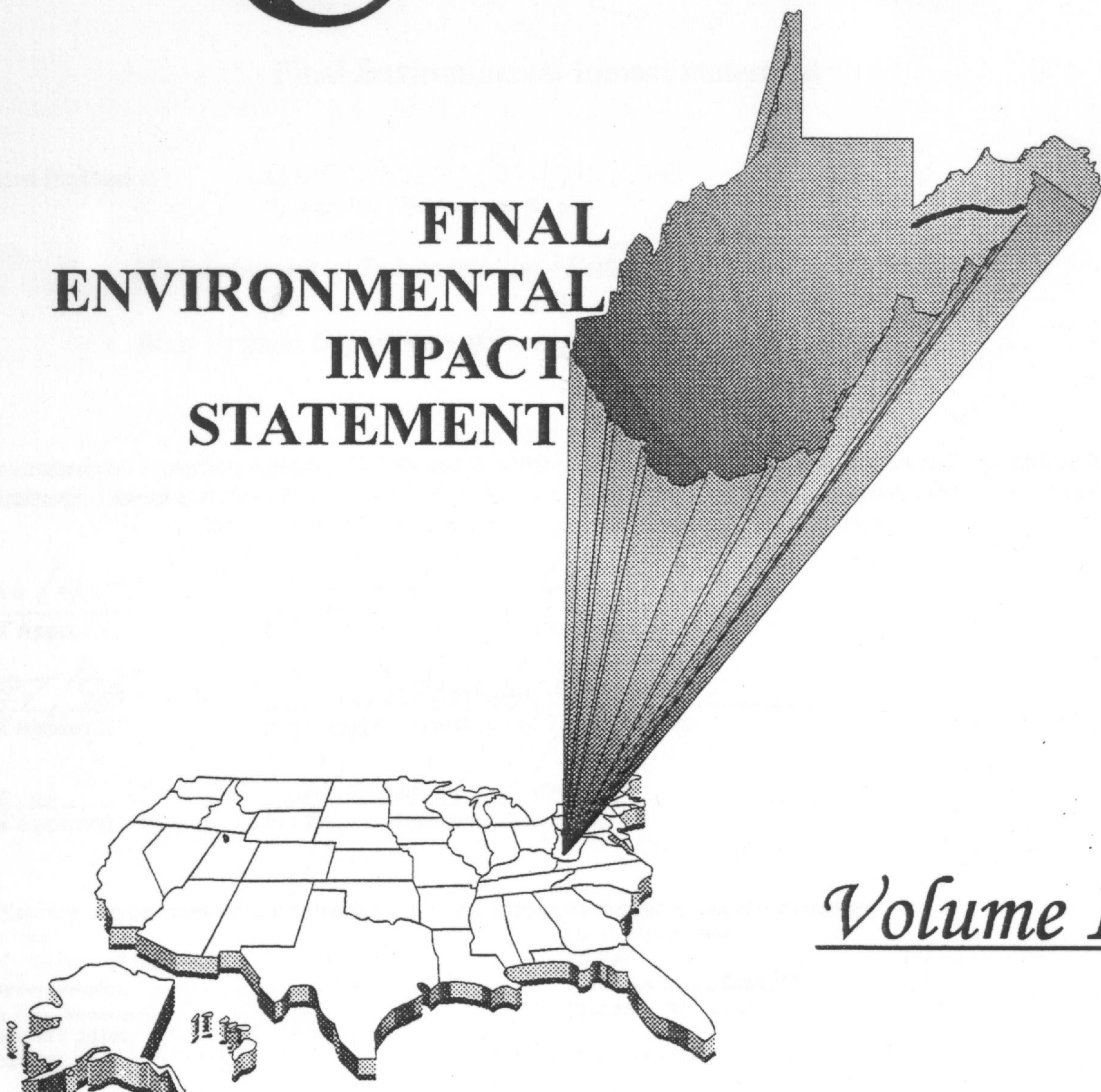
# Appalachian Corridor H

## FINAL ENVIRONMENTAL IMPACT STATEMENT



## *Volume I*

WVDOT
DIVISION OF HIGHWAYS

State Project: X142-H-38.99 C-2
Federal Project: CHHD-484 (59)

FHWA-WV-EIS-92-01-F
State Project: X142-H-38.99 C-2
Federal Project: CHHD-484 (59)

# APPALACHIAN CORRIDOR H
# Elkins, West Virginia to Interstate 81, Virginia

## Final Environmental Impact Statement

Submitted Pursuant to : 42 U.S.C. 4332(2)(c), 23 U.S.C. 128(a), 80 Stat. 931, Public Law 89-670

*US Department of Transportation - Federal Highway Administration*
and
*West Virginia Department of Transportation - Division of Highways*

Cooperating Agencies:
US Environmental Protection Agency, US Fish and Wildlife Service, US Forest Service, US Army Corps of Engineers - Pittsburgh District and Norfolk District, US Park Service, US Natural Resources Conservation Service, Virginia Department of Transportation, Virginia Council on the Environment

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|---|---|
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The West Virginia Department of Transportation - Division of Highways (WVDOT), in conjunction with the Federal Highway Administration (FHWA), is proposing to construct an approximately 161 kilometer (100 miles) long highway from just west of Elkins, West Virginia to the West Virginia-Virginia state line. The project also incorporates existing Route 55 from the West Virginia-Virginia state line to an interchange with Interstate 81 near Strasburg, Virginia. The proposed facility in West Virginia will provide a four-lane highway with partial control of access on new and existing location.

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# GLOSSARY OF COMMONLY USED TERMS

**30-Minute Contour:** Boundary line or counter created by connecting the end points of all 30-minute vehicular trips along existing roadways within the study area; used as project area of influence.

**Acid Drainage:** Is a low pH, sulfate-rich water with high amounts of acidity. The acidity is comprised of mineral acidity (iron, aluminum, manganese, and other metals depending on the geologic deposit) and also hydrogen acidity. Acid drainage results from the oxidation of metal disulfide minerals upon exposure to air and water.

**Alignment:** Refers to the proposed routing of either the Improved Roadway Alternative (ASDEIS IRA) or the Build Alternative and associated option areas.

**Alternative:** General term that refers to possible approaches to meeting the project purpose and need. Typically refers to the No-Build Alternative, the Improved Roadway Alternative (ASDEIS IRA), and the Build Alternative.

**Anticline:** A convex fold in bedrock.

**Aquifer:** A water-bearing unit of permeable rock, sand or gravel which yield considerable quantities of water to springs and wells.

**Benthic:** Located on the bottom of a body of water or in the bottom sediments, or pertaining to bottom-dwelling organisms.

**Biodiversity:** The variety and abundance of species, their genetic composition, and the communities, ecosystems, and landscapes in which they occur.

**Biotic:** Of or pertaining to life and living organisms.

**Carbon Monoxide (CO):** A colorless, odorless, poisonous gas that is formed as a product of the incomplete combustion of carbon and is emitted directly by automobiles and trucks.

**Groundwater:** Naturally occurring water that moves through the ground and underlying rock, at a depth of several feet to several hundred feet.

**Karst:** The occurrence of limestone as the first bedrock unit beneath the soil in which cavities form due to the solubility of limestone under certain conditions. Surface characteristics include sinkholes and sinking streams.

**Level of Service (LOS):** Operating conditions within a stream of traffic describing safety, traffic interruptions, speed, freedom to maneuver, comfort and convenience. Six levels of service are defined, designated A through F, with A representing the best conditions and F the worst.

**Line:** Refers to a specific, designated alignment under the Build Alternative (e.g., Line A, Line S, etc.)

Line A (VA): Refers to Line A in Virginia.

**Local Project Watershed:** The subwatershed which directly "surrounds" the alignments.

**Nitrogen Oxide ($NO_x$):** Colorless, sweet-tasting gas emitted directly by automobiles and trucks.

**Option Area:** Area in which two or more alignments are under consideration for the Build Alternative.

**Ozone:** Unstable blue gas with a pungent odor formed principally in secondary reactions involving volatile organic compounds, nitrogen oxides and sunlight.

Preferred Alternative (WV): Refers to Line A in West Virginia, except within the Option Areas I, S, F, B and 5-D, where the alternative line was selected.

**Regional Project Watershed:** The portion of the major river watershed bounded by the 30-Minute-Contour.

**Riparian:** Pertaining to anything connected with or immediately adjacent to the banks of a stream.

**Syncline:** A concave fold in bedrock.

**Watershed:** A specific geographic area drained by a major stream or river.

**Zones of Sensitivity:** Water recharge areas underlain by a combination of limestone and sandstone; the sensitivity of such recharge areas was classified as high, moderate, or low.

# GLOSSARY OF COMMONLY USED ACRONYMS

| | |
|---|---|
| **AASHTO** | American Association of State Highway and Transportation Officials |
| **ACHP** | Advisory Council on Historic Preservation |
| **ACOE** | United States Army Corps of Engineers |
| **APD** | Appalachian Development Highway System |
| **ADT** | Average Daily Traffic |
| **ARC** | Appalachian Regional Commission |
| **ASDEIS** | Corridor H Alignment Selection Supplemental Draft Environmental Impact Statement (November, 1994) |
| **BNA** | Block Numbering Area (US Census) |
| **CEQ** | President's Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| **CHA** | Corridor H Alternatives |
| **CMS** | Congestion Management System |
| **CSDEIS** | Corridor H Corridor Selection Supplemental Draft Environmental Impact Statement (October, 1992) |
| **CTB** | Virginia Commonwealth Transportation Board |
| **DOI** | United States Department of the Interior |
| **EPA** | United States Environmental Protection Agency |
| **FEIS** | Final Environmental Impact Statement |
| **FHWA** | Federal Highway Administration |
| **FWS** | United States Fish and Wildlife Service |
| **GIS** | Geographic Information Systems |
| **GWNF** | George Washington National Forest |
| **HEP** | Habitat Evaluation Procedure |
| **HUD** | United States Department of Housing and Urban Development |
| **IRA** | Improved Roadway Alternative |
| **ISTEA** | Intermodel Surface Transportation Efficiency Act |
| **LOS** | Level of Service |
| **LWCFA** | Land and Water Conservation Fund Act |
| **MIS** | Major Investment Study |
| **MNF** | Monongahela National Forest |
| **MPO** | Metropolitan Planning Organization |
| **NEPA** | National Environmental Policy Act |
| **NRCS** | United States Natural Resources Conservation Service |
| **NRHP** | National Register of Historic Places |
| **O/D** | Origin and Destination |
| **ROD** | Record of Decision |
| **SDEIS** | Supplemental Draft Environmental Impact Statement |
| **SOV** | Single Occupancy Vehicle |
| **TAZ** | Traffic Analysis Zone |
| **TMA** | Transportation Management Areas |
| **TMV** | Turning Movement Volumes |
| **TSM** | Transportation Systems Management |
| **USDA** | United States Department of Agriculture |
| **VAC** | Virginia Advisory Committee |

# GLOSSARY OF COMMONLY USED ACRONYMS (CONT.)

**VDCR** Virginia Department of Conservation and Recreation
**VDEQ** Virginia Department of Environmental Quality
**VDGIF** Virginia Department of Game and Inland Fisheries
**VDHR** Virginia Department of Historic Resources
**VDOT** Virginia Department of Transportation
VMT Vehicle Miles Traveled
**VMRC** Virginia Marine Resources Commission
**WHPA** Wellhead Protection Area
**WVDCH** West Virginia Division of Culture and History
**WVDEP** West Virginia Division of Environmental Protection
**WVDHHS** West Virginia Department of Health and Human Services
**WVDNR** West Virginia Division of Natural Resources
**WVDOH** West Virginia Department of Transportation, Division of Highways

# COMMONLY USED METRIC CONVERSIONS

| QUANTITY | METRIC UNIT | ENGLISH UNIT | FACTOR TO CONVERT ENGLISH UNITS TO METRIC UNITS | FACTOR TO CONVERT METRIC UNITS TO ENGLISH UNITS |
|---|---|---|---|---|
| LENGTH | Kilometer (km) | Mile (mi) | Miles x 1.61 = Kilometers | Kilometers X 0.62 = Miles |
| | Meter (m) | Foot (ft) | Feet x 0.30 = Meters | Meters X 3.28 = Feet |
| AREA | Square Kilometer ($km^2$) | Square Mile (sq mi) | Sq. Mile x 2.59 = Sq. Kilometer | Sq. Kilometers X 0.39 = Sq. Miles |
| | Hectare (ha) | Acre (ac) | Acres x 0.40 = Hectares | Hectares X 2.47 = Acres |
| VOLUME | Liter (l) | Gallon (gal) | Gallons x 3.79 = Liters | Liters x 0.26 = Gallon |
| MASS | Kilogram (kg) | Pound (lb) | Pound x 0.45 = Kilograms | Kilograms x 2.21 = Pounds |
| VELOCITY | Kilometer per Hour (kph) | Mile per Hour (mph) | mph x 1.61 = kph | kph X 0.62 = mph |

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# SUMMARY

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# *SUMMARY*

## A. PROJECT HISTORY

This portion of the Appalachian Corridor H project, from Elkins, West Virginia to Interstate 81 in Virginia, has a long history. Numerous studies have been conducted to evaluate the potential impacts of the proposed project since its inception in 1965 as part of the Appalachian Development Highway System (APD System). The first alignment and impact studies were initiated in the late 1970s and culminated in the 1981 *Appalachian Corridor H: Elkins WV to Interstate 81, Virginia - Draft Environmental Impact Statement* (DEIS). In 1984, the project was put on hold; thus, a Final EIS (FEIS) and a subsequent Record of Decision (ROD) were never prepared. In 1995 Corridor H was included as a component of the National Highway System adopted by Congress and signed in to law.

In 1990, the West Virginia Department of Transportation - Division of Highways (WVDOH) and the Federal Highway Administration (FHWA) resumed the project. Following the initial re-evaluation efforts, WVDOH and FHWA agreed that subsequent project development would require the preparation of a Supplemental Draft Environmental Impact Statement (SDEIS). Recognizing that this portion of Appalachian Corridor H is a large, complex transportation project and realizing the immense size of the project study area, WVDOH and FHWA agreed that an effective method of assessing the environmental impacts for the project had to be developed.

## B. CORRIDOR H STUDY PROCESS

On the basis of guidelines established in the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR Parts 1500-1508) and FHWA's Environmental Impact and Related Procedures (Federal Register, Vol. 52, No. 167; August 28, 1987, Section 777.111), WVDOH and FHWA agreed that a "tiered" approach to the project would break the project into manageable steps. Issues would be addressed at appropriate levels of detail at each step in the process. As per CEQ regulations, "tiering" refers to the coverage of general matters in broad environmental impact statements with subsequent, narrower environmental impact statements incorporating by reference the general discussions and concentrating solely on the issues specific to the statement subsequently prepared. Tiering is appropriate when it helps the lead agency focus on the issues that are ripe for decision and exclude from consideration issues that have already been decided or are not yet ripe (40 CFR Part 1508.28).

The Corridor H study process consisted of the preparation of two Supplemental Draft Environmental Impact Statements (SDEIS) and this Final Environmental Impact Statement (FEIS). The first SDEIS focused on the broad issue of corridor location, analysis and identification. It is incorporated by reference into this

FEIS and is referred to as the Corridor Selection SDEIS or CSDEIS. The second SDEIS focused on the narrower issue of alignment location, analysis and identification within the preferred corridor. The second SDEIS is incorporated directly into this FEIS and is referred to as the Alignment Selection SDEIS or ASDEIS. The study process is detailed in Section II of this FEIS.

This study process is consistent with the CEQ and FHWA tiering regulations. The CEQ regulations encourage agencies, "to tier their environmental impact statements to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision at each level of environmental review." The regulations further state that, whenever a broad environmental impact statement has been prepared and a subsequent statement follows, the subsequent environmental impact statement need only summarize the issues discussed in the broader statement by reference and shall concentrate on the issues specific to the subsequent action (40 CFR Parts 1502.20 and 1508.28). Furthermore, the FHWA's regulations that implement the CEQ regulations authorize the tiering procedure used in this case (23 CFR 771.111 (q)), in which issues such as general location are addressed in an initial draft EIS, and site specific issues are addressed in a second draft EIS, with a final EIS responding to comments on both the general and specific draft EISs.

This project was conducted following the guidelines and philosophy of the integrated NEPA/404 process as detailed in FHWA Region 3's agreement with federal agencies entitled Integrating NEPA/404 for Transportation Projects (July, 1992) and the FHWA and federal agency agreement entitled Applying the Section 404 Permit Process to Federal-Aid Highway Projects (September, 1988). State agencies were also integrated in the process for this project. A complete list of agency coordination meetings is included in Table VII-1 (Vol. II).

## C. SDEIS STEP 1: PURPOSE AND NEED AND CORRIDOR SELECTION

Pursuant to the tiering process, the preparation of the SDEIS for the Corridor H project was divided into two steps (Volume II, Exhibit S-1). Step 1 (Purpose and Need and Corridor Selection) was initiated in 1990 and began at the corridor location planning stage. The purpose of Step 1 was to determine if a transportation need existed and, if so, to provide a corridor-level evaluation in which sensitive resources within both the existing (No-Build) condition and 24 potential 600 meter (2,000 foot) wide corridors were inventoried and the potential project-related involvements were identified and compared. By identifying sensitive resources and potential involvements before the development of specific alignments, roadway designers could more easily avoid such resources during the project design stage (Step 2-Alignment Selection). The Step 1 establishment of purpose and need is documented in the *Transportation Need Study* (1992). The Step 1 environmental inventories and comparisons are documented in the 1992 *Appalachian Corridor H: Corridor Selection*

*Supplemental Draft Environmental Impact Statement/Section 4(f)/6(f) Evaluation* (CSDEIS) and the supporting Technical Reports.

## 1. PURPOSE AND NEED

The purpose and need study found that the study area's current highway system between Elkins, West Virginia and Strasburg, Virginia is composed of winding, two-lane mountainous US and state routes with unacceptable levels of service, deficient roadway geometric features, and higher accident rates than similar facilities elsewhere. It also found that the current system of highways between the project termini in West Virginia will not meet that state's current design standards for the forecasted design year of 2013. Further, the purpose and need study found that the current highway system is detrimental to the economic viability and growth of the West Virginia Appalachian Highlands region because the highway system does not efficiently support the transportation of goods or of people in need of services. Finally, additional traffic analyses discussed in Section IV indicate that construction of the Preferred Alternative in West Virginia and not in Virginia will serve the project purpose and need for the facility in West Virginia.

## 2. CORRIDOR SELECTION

Step 1 also served as a way to identify the single most prudent and feasible corridor that best met the project need with the least degree of sensitive resource involvement. On the basis of information in the CSDEIS and associated Technical Reports, comments from the public involvement process, and comments and coordination with cooperating and other resource agencies, WVDOH recommended proceeding with detailed alignment studies for Scheme Option D5 as the preferred corridor for the future development of Appalachian Corridor H from Elkins, West Virginia to Interstate 81 in Virginia. The basis for recommending more detailed review of Scheme Option D5 is presented in the *CSDEIS Decision Document*, a document that WVDOH, FHWA, and the Cooperating Agencies identified as a logical transition from the Corridor Selection SDEIS (Step 1) to the Alignment Selection SDEIS (Step 2). On May 20, 1993, Virginia's Commonwealth Transportation Board adopted a resolution concurring with WVDOH's recommendation for further evaluation of Scheme Option D5 and, on July 26, 1993, FHWA approved the *CSDEIS Decision Document*.

## D. SDEIS STEP 2: ALIGNMENT SELECTION

The *Alignment Selection SDEIS* (ASDEIS) document was the culmination of the studies and processes undertaken for Step 2. With the study area narrowed to a single, 2,000 foot-wide corridor, it was feasible to develop specific alignments within the preferred corridor (Scheme Option D5), taking into account the sensitive environmental resources identified in Step 1. Because purpose and need was addressed in Step 1, the analyses conducted on the affected environment (social, economic, and environmental) were only used in determining potential impacts and should not be interpreted as further analysis of purpose and need. The ASDEIS presented the following efforts and studies undertaken in the Step 2 process:

- The development of feasible highway alignments within the general limits of Scheme Option D5 that would most avoid or minimize adverse impacts to sensitive resources.

- The documentation of the steps taken to develop possible alignments (the Build Alternative), as well as to develop other possible Corridor H alternatives (the Improved Roadway Alternative and the No-Build Alternative).

- The evaluation and comparison of detailed, site-specific and cumulative impacts that would result from the Build Alternative, the Improved Roadway Alternative, and the No-Build Alternative.

- The documentation of the public involvement processes and resource agency coordination throughout project development.

## E. FINAL EIS (FEIS)

This FEIS incorporates, by reference, the analysis contained in the CSDEIS, and responds to comments on that document. The FEIS incorporates directly the text of the ASDEIS, with certain revisions, and also responds to the comments on that document This approach is consistent with the FHWA Technical Advisory T6640.8 (1987), which states in part: "Under this approach, the final EIS incorporates the draft EIS (essentially in its entirety) with changes made as appropriate throughout the document to reflect the selection of an alternative, modifications to the project, updated information on the affected environment, changes in the assessments of impacts, the selection of mitigation measures, wetland and floodplain findings, the results of coordination, comments received on the draft EIS and responses to these comments....". In addition to findings presented in the ASDEIS, the FEIS presents the following:

- Additional detailed engineering analysis carried out in Section 6 to verify project GIS and determine feasibility of implementation of mitigation measures (e.g. reduction of excess excavation).

- The identification of the Preferred Alternative and the basis for its selection. The Preferred Alternative includes Lines A, I, F, B and the 5-D Build Alternatives in West Virginia.

- A discussion of project implications of the Commonwealth of Virginia's decision not to select any of the four-lane Build Alternatives or the Improved Roadway Alternatives as presented in the ASDEIS.

Text that is underlined in the FEIS represents instances where new text has been added to the ASDEIS based on comments received on the ASDEIS from the public and interested agencies. All documents (e.g. CSDEIS, ASDEIS) related to this project are available for viewing at those public and government agencies specified in Section VI (Distribution of Statement). Additionally, copies of documents are available upon request from the WVDOH in Charleston, West Virginia.

## F. PROPOSED ACTION

The original project analyzed in the CSDEIS and the ASDEIS was longer than the project as it is currently proposed for construction by WVDOH and FHWA. The original project was referred to as the Build Alternative in the ASDEIS. Additional discussion of this issue is found in Section IV of this document.

### 1. ORIGINAL PROJECT: CSDEIS AND ASDEIS

In the original project, the WVDOH in conjunction with the FHWA and VDOT was proposing to construct an approximately 183 kilometer (114 miles) long highway from Elkins, West Virginia to I-81 in Virginia, completing the final portion of Corridor H in the Appalachian Development Highway System. The original project would have traversed portions of the West Virginia Counties of Randolph, Tucker, Grant, and Hardy as well as the Virginia Counties of Frederick and Shenandoah. This FEIS carries forward the environmental impacts of constructing the entire length of the original project, but also specifically identifies impacts and benefits in West Virginia and Virginia of constructing the project only in West Virginia, as it is currently proposed.

### 2. CURRENT PROJECT - WEST VIRGINIA

Because of the Commonwealth of Virginia's decision not to proceed with the Build Alternatives or the Improved Roadway Alternative as presented in the ASDEIS, the proposed project was re-defined. It is described as follows: The WVDOH and the FHWA are proposing to construct an approximately 161 kilometer (100 mile) long highway from Elkins, West Virginia to just west of the West Virginia/Virginia state line on WV 55. The proposed Corridor H facility would provide a divided, four-lane highway with partial control of access on new and existing location. The design speed of this facility would be 97 kph (60 mph). The area through which the currently proposed project would traverse includes portions of the West Virginia Counties of Randolph, Tucker, Grant and Hardy.

### 3. CURRENT PROJECT - VIRGINIA

Following a review of all agency and public comments received, the Virginia Commonwealth Transportation Board passed a resolution in February, 1995 (Volume II, Appendix A). In that resolution, the Commonwealth Transportation Board did not select any of the four-lane Build Alternatives or the Improved Roadway Alternative for construction in Virginia. The resolution directed the VDOT to, "...study the Route 55 corridor's safety aspects such as horizontal and vertical alignments, possible need for truck climbing lanes, intersection safety improvements and other safety related features of the roadway." ( See Vol. II, Appendix A).

Because of this resolution, additional traffic impact analyses were conducted. Additionally, system linkage issues were also examined further. These additional investigations determined that:

- The staged construction of the Preferred Alternative from Elkins, West Virginia to the Virginia state line is not expected to adversely impact existing traffic operations on Route 55 in Virginia; and
- The purpose and need of the proposed action, including system linkage, will be met by the construction of the Preferred Alternative (WV).

A detailed discussion of these analyses is included in Section IV of this document.

## G. ALTERNATIVES CONSIDERED

Three primary alternatives for the construction of Appalachian Corridor H were evaluated and compared at both the Step 1 (CSDEIS) and Step 2 (ASDEIS) of the Corridor H study process. Evaluation and comparison of these alternatives during Step 1 was detailed in the CSDEIS and summarized in Section II of this FEIS. The three primary alternatives are the No-Build Alternative, the Improved Roadway Alternative, and the Build Alternative.

In the ASDEIS and the FEIS, the Improved Roadway Alternative (ASDEIS IRA) is defined as an improved two-lane, uncontrolled access, 80 kph (50 mph) facility from Elkins, West Virginia, to I-81 in Virginia, that upgrades or widens local roadways within the selected corridor where such upgrading or widening can be accomplished so that the resulting facility meets current design standards. Where upgrading and widening can not be accomplished so that the resulting facility meets current design standards, a two lane facility on new alignment was developed to meet those standards. (Please refer to the *CSDEIS Decision Document* for a discussion of the selection of Corridor Scheme Option D5.)

The Build Alternative is defined as a four-lane, partially controlled access, 100 kph (60 mph) facility on new location between Elkins, West Virginia and I-81 in Virginia. It is made up of one primary alignment, Line A, and nine relatively short (1.5 to 5.6 miles, 2.4 to 9.0 kilometers) Option Area alignments. This definition of the Build Alternative reflects the project as originally proposed; however, the discussion of the Build Alternative in this FEIS specifically distinguishes between the West Virginia and Virginia portions of the project. The Alignment Selection process focused on the development of the No-Build, Improved Roadway, and Build Alternatives. In accordance with 40 CFR 1502.14, these three alternatives were developed to a comparable level of detail to evaluate their merits and impacts.

While neither the No-Build Alternative nor the ASDEIS IRA meets the needs of the project, they have been retained for consideration as a benchmark for comparison, enabling decision-makers to evaluate the magnitude of the environmental effects of the Build Alternative. Table S-1 (Vol. II) provides a comparison of the alternatives under study relative to the purpose and need of the proposed project.

### 1. THE NO-BUILD ALTERNATIVE

The No-Build Alternative consists of a continuation of the existing routes between Elkins and I-81. This alternative includes such short-term, minor restoration activities as safety and maintenance improvements, resurfacing, bridge repairs, minor widenings, and intersection improvements. These improvements are already a part of both WVDOH's and VDOT's ongoing plan for the continued safe operation of the existing roadway system.

### 2. THE IMPROVED ROADWAY ALTERNATIVE

The Improved Roadway Alternative examined in the ASDEIS and the FEIS (ASDEIS IRA) consists of improving the existing route within Scheme Option D5 which best connects Elkins, West Virginia, to I-81 in Strasburg, Virginia. The design objective of the IRA is to reconstruct existing roads, or construct relocated sections, so that the resulting facility meets current established design criteria. Reconstruction consists of adding climbing lanes, widening roadways and shoulders, reducing grades, flattening curves, and realigning to improve sight distance. The ASDEIS IRA would consist of a two-lane facility with a design speed of 80 kph (50 mph). The ASDEIS IRA is approximately 206 kilometers (128 miles) in length and would cost approximately $416 million to construct. Mitigation costs and right-of-way acquisition costs are estimated at $6,080,000 and $29,926,300, respectively, for the ASDEIS IRA.

### 3. THE BUILD ALTERNATIVE

The Build Alternative consists of a divided, four-lane highway between Elkins, West Virginia and I-81 in Virginia, with partial control of access on primarily new location with a design speed of 97 kph (60 mph). Detailed alignments for the Build Alternative were developed within the preferred corridor (Scheme

Option D5) identified in the *CSDEIS Decision Document*. Development of these alignments took into consideration resources previously identified in the Corridor Selection process and resources identified in the detailed ASDEIS investigations. Of the 52 possible alignments developed, a single alignment (Line A) and nine possible Option Areas (seven in West Virginia and two in Virginia) were retained for further evaluation. Through a series of coordination meetings, the participating resource agencies provided concurrence on the alignment and option areas carried forward under the Build Alternative. The Build Alternative ranges in length from 181 kilometers (112 miles) to 183 kilometers (114 miles), depending on the option area(s) under consideration. Construction costs range from a low of $1,025,337,000 to a high of $1,075,163,000. Mitigation costs and right-of-way acquisition costs are estimated at $51,952,500 and $30,132,000, respectively, for the Build Alternative.

## H. MAJOR ENVIRONMENTAL IMPACTS

A summary of the major environmental impacts, both beneficial and adverse, is presented in Tables S-2 through S-4 (Vol. II). Table S-2 presents a summary of the potential involvements associated with Corridor D5 as a whole (the preferred corridor identified in the *CSDEIS Decision Document*) and compares the results with the impacts associated with the No-Build, ASDEIS IRA, and Build Alternatives. Table S-3 presents a comparison of the social and environmental impacts for the No-Build, Improved Roadway, and Build Alternatives in West Virginia and Virginia. A summary of the social and environmental impacts by Option Area is provided in Table S-4. Detailed discussions on methodologies and impact assessment results are contained in Section III of this document.

### 1. BENEFICIAL IMPACTS

#### a. No-Build Alternative

The primary beneficial impact of the No-Build Alternative is that no cost, beyond that of normal, programmed maintenance and improvements, is associated with this alternative. This alternative would preserve the existing environment but would otherwise involve no beneficial impacts to the natural, social, or cultural environment.

#### b. Improved Roadway Alternative

The ASDEIS IRA provides for a continuous, two-lane roadway system with an 80 kph (50 mph) design speed. Although it would not meet the purpose and need of the project, this alternative would improve the level of service and would reduce high accident rates common on the existing roads by adding climbing lanes and turning lanes, where possible.

### c. Build Alternative

The Build Alternative, from which the Preferred Alternative is derived, addresses all factors of the established need by completing a regional system of four-lane roads and providing the transportation infrastructure for economic development. The construction of this alternative would improve the safety and efficiency of the highway network. Truck traffic would be diverted to the proposed highway, thus allowing use of the existing roads for local and tourist travel. The existing roadway network would remain intact, except for a few short reaches that must be relocated for safe access to the proposed facility. Refer to Section I of this FEIS for a discussion of Purpose and Need.

## 2. ADVERSE IMPACTS

### a. No-Build Alternative

Selection of this alternative would involve adverse economic impacts, in that there would be a continuation of the negative trends in population, employment, and income in most communities and counties. This alternative would allow for the continuation of the high accident rates and level of service problems associated with the existing roadways. This alternative can not accommodate the year 2013 predicted traffic volumes on Routes 33 and 219 near Elkins.

### b. Improved Roadway Alternative

By simply upgrading existing roads, there is no ability to control access. An AASHTO study of rural roads related the number of accidents to the number of access points. Under the ASDEIS IRA, future travelers would encounter the same number of access points (driveways, intersections) but at a higher travel speed on approximately 75% of its length. The resultant roadway system could be less safe than the existing roads. Further, the traffic analysis shows that a two-lane road can not accommodate the future traffic, resulting in poor levels of service. The ASDEIS IRA would not provide for transportation access at the regional level (system linkage), one of the primary factors of need for the proposed project.

The ASDEIS IRA would cost approximately $452,000,000 to construct (including right-of-way and mitigation costs). Table S-3 (Vol. II) presents the social, cultural, and environmental impacts of the Improved Roadway Alternative in West Virginia and Virginia. The ASDEIS IRA would not impact communities as a whole in terms of cohesion. However, certain neighborhoods such as Porterwood would experience substantial relocations. Further, future traffic on the ASDEIS IRA could result in impacts to the communities through which it passes.

### c. Build Alternative

The Build Alternative would range in cost from $1,107,421,500 to $1,157,247,500, which includes right-of-way acquisition and mitigation costs as well as construction costs. Table S-3 (Vol. II) presents the social, cultural, and environmental impacts of the Build Alternative.

### d. Comparison of the ASDEIS IRA and the Build Alternative

In many cases, the impacts expected under the ASDEIS IRA or the Build Alternative are similar. This would be the case for impacts associated with sensitive visual resources, hazardous materials, Threatened and Endangered Species, Wild and Scenic Rivers, and secondary impacts such as stormwater runoff. The similarity exists even though the Build Alternative would be almost entirely on new alignment while the ASDEIS IRA would remain largely on existing alignment. This reflects the level of effort taken during the alignment development process to avoid and minimize involvements with sensitive resources. Where considerable differences exist between the ASDEIS IRA and the Build Alternative, the differences are summarized below.

#### (1) Social Impacts

In general, relocations under the ASDEIS IRA would be greater than under the Build Alternative. The ASDEIS IRA would require more residence and business relocations than would the Build Alternative. Exceedances of the FHWA Noise Abatement Criteria would be greater under the ASDEIS IRA compared to the Build Alternative. However, the Build Alternative would have more "substantial increase" exceedances than would the ASDEIS IRA.

Based on the above, the ASDEIS IRA would generally have a greater magnitude of impact on these social resources than would the Build Alternative. As is typical with social resources, they tend to be located in close proximity to the existing roadway network. The primary reason that the ASDEIS IRA would have a greater magnitude of impact is that by remaining on the existing roadway sensitive resources cannot be avoided. Furthermore, the ASDEIS IRA impacts are still greater than the Build Alternative even though the ASDEIS IRA involves no construction through Wardensville or Parsons. Conversely, because the Build Alternative is on new alignment, it was possible to avoid or minimize the level of involvement with or impact to social resources.

#### (2) Cultural Resource Impacts

The ASDEIS IRA would have potential adverse effect on considerably more cultural resource buildings and structures/sites than would the Build Alternative. With regard to the prehistoric settlement pattern probability zones, the relative percentage proportions of high, medium, and low probability zones are quite similar between the Build Alternative and the ASDEIS IRA. However, in terms of the acreage impacts among the zones, the Build Alternative would impact more acreage of prehistoric settlement area probability zones than would the ASDEIS IRA simply because of its greater area of construction.

**(3) Environmental Impacts**

Farmland impacts would be greater under the Build Alternative compared to the ASDEIS IRA. Wetland impacts would also be greater under the Build Alternative compared to the ASDEIS IRA. Over twice as many wildlife Habitat Units would be lost under the Build Alternative compared to the ASDEIS IRA. The Build Alternative would have nearly twice as many stream enclosures as would the ASDEIS IRA and would have more length of stream relocations as would the ASDEIS IRA. Many impact areas are nearly double under the Build Alternative as compared to the ASDEIS IRA due to the greater width required to construct a four-lane highway.

### 3. SUMMARY OF PROPOSED MITIGATION MEASURES

Mitigation measures proposed for the Preferred Alternative (WV) are included in a document entitled *Corridor H FEIS Mitigation Document (Vol. III)*. That document is incorporated into this FEIS. It contains a discussion of mitigation measures that will be employed and/or developed for this project as final engineering is completed for each section of the project. The level of detail presented in the *Corridor H FEIS Mitigation Document (Vol. III)* is consistent with FHWA regulations (23 CFR 771.125 (a)(1)). The *Corridor H FEIS Mitigation Document (Vol. III)* also includes a detailed resource agency involvement strategy through project design and into construction.

## I. PREFERRED ALTERNATIVE

The Build Alternative; from which the Preferred Alternative (WV) was derived, is the only remaining alternative that meets the project purpose and need while avoiding or minimizing impacts to the social, natural and cultural environment. The Preferred Alternative, as shown in Exhibit II-5 (Vol. II), follows Line A and Options Area I, S, B, F and 5-D of the Build Alternative but does not include the construction of a new four-lane highway in Virginia; instead, the Preferred Alternative would end just west of the state line, and would tie into West Virginia/Virginia Route 55, which would connect to I-81 near Strasburg, Virginia. The selection of the Preferred Alternative was based on the comments obtained from the public and the state and federal resource agencies during the official comment periods on the CSDEIS and the ASDEIS.

The Virginia Commonwealth Transportation Board passed a resolution on the CSDEIS and the ASDEIS in February of 1995. It did not select the ASDEIS IRA or Build Alternative as discussed in Section IV. At this time VDOT has not proposed any construction projects along the Corridor H route in Virginia, although it is studying possible safety improvements on Route 555 from the Virginia state line to I-81. Should VDOT elect to proceed with any proposed actions within Virginia, additional environmental studies and documentation may be required.

## J. AREAS OF CONTROVERSY

Several groups have formed to express various positions on the proposed project, including groups in favor and in opposition. The most prominent and active opposition group is Corridor H Alternatives, which was formed from smaller groups spread geographically across the Corridor H area. The concern of the group has been the reevaluation of an alternative that would consider improvements (upgrades) of local roads. This alternative would essentially be a no-build scenario and include certain safety improvements (e.g., straightening curves, intersection grades) and construction of passing and truck climbing lanes at certain locations.

## K. OTHER GOVERNMENT ACTIONS REQUIRED FOR THIS PROJECT

As previously discussed, a Section 404 permit would be required from the US Army Corps of Engineers for construction activities in waters of the United States. Associated with this is the need to obtain Section 401 Water Quality Certifications from West Virginia. Although there are no rivers presently listed as navigable in the study area, such designations may be made on a case by case basis. Therefore, a Section 10 permit from the US Army Corps of Engineers and/or a Section 9 permit from the US Coast Guard for construction activities in navigable waters may be required. A more detailed discussion of the types of environmental permits which would be required is provided in Section III-U: *Environmental Permits*.

Because of the size and complexity of the proposed project and the desirability of prioritizing both final highway design and remaining cultural resource investigations with proposed schedules, the FHWA, WVSHPO, and the Advisory Council on Historic Preservation developed a Section 106 Programmatic Agreement. This agreement sets forth stipulations in thirteen areas ranging from project sequencing to monitoring. These stipulations detail responsibilities and procedures to be followed for completing the Section 106 process. The Section 106 Programmatic Agreement is found in Volume II, Appendix B of this FEIS.

Right-of-way acquisition for either the Build Alternative or the ASDEIS IRA would be necessary from the Monongahela National Forest and the George Washington National Forest.

## L. OTHER GOVERNMENT ACTIONS

### 1. MOOREFIELD FLOODWALL PROJECT

A Moorefield Local Flood Protection Study was initiated in September of 1986 and completed in October of 1987. The second phase of the study, the feasibility phase, was conducted jointly by the US Army Corps of Engineers (COE) and the Interstate Commission on the Potomac River Basin. The objectives of the feasibility phase were to evaluate the specific engineering, environmental, and economic effects of the proposed construction solutions, to identify the best project for Moorefield, and to recommend a project for construction. The results of the study recommended construction of 6,400 linear meters (21,000 linear feet) of earthen levy and 381 linear meters (1,250 linear feet) of floodwall. Construction of these flood protection facilities would eliminate the dangers from flooding, such as those experienced by the Moorefield community in 1985. Total construction costs are estimated at $18.7 million.

### 2. STONY RUN WATERSHED WATER SUPPLY DAM

In 1994, a study was conducted to determine the feasibility of constructing a dam on Stony Run. The study was conducted by Hardy County, the Potomac Valley Soil Conservation District, and the West Virginia State Soil Conservation Committee with the assistance of the USDA's Soil Conservation Service. The purpose of the project is to provide additional public water supply capacity to Moorefield. Moorefield currently draws water from the South Fork River. The study concluded that the Stony Run watershed has limitations for a water supply dam and reservoir but that, "its proximity to the Moorefield water treatment plant and the relatively pristine condition of the watershed make the site worthy of consideration for water supply" (*Stony Run Watershed Feasibility Study*, 1994). Construction costs for this project would be approximately $13.5 million. Because the project is not eligible for assistance under USDA Soil Conservation Service programs, funding would have to be obtained from other Federal sources or through state and local sources.

### 3. CANAAN VALLEY NATIONAL WILDLIFE REFUGE

The Canaan Valley National Wildlife Refuge was officially dedicated by the US Fish and Wildlife Service in October of 1994. The Canaan refuge is the nation's 500th national wildlife refuge and the only such refuge to be located completely within West Virginia's boundaries. Located in Tucker County, the US Fish and Wildlife Service's *Final Environmental Impact Statement* (1979) indicates that the refuge will eventually encompass 9,710 hectares (24,000 acres) of Canaan Valley's 12,545 hectares (31,000 acres). In November of 1993, Congress approved funds of $2 million towards the purchase of the refuge (1994 Interior Appropriations Bill). Canaan Valley is the largest wetland in the central and southern Appalachian Mountains. With an average altitude of 975 meters (3,200 feet), it is one of the highest valleys east of the Rocky Mountains and is home to more than 580 plant and 280 animal species.

## 4. MONONGAHELA NATIONAL FOREST MANAGEMENT PLAN

The Monongahela National Forest (MNF) is currently managed under the guidelines, goals, and objectives in the Forest Service's adopted 1986 *Land and Resource Management Plan and Final Environmental Impact Statement, Monongahela National Forest.* This plan was developed with a high level of public involvement and input. The MNF management direction specifically designates that 75 percent of MNF lands emphasize remote wildlife habitat and semi-primitive, non-motorized recreation in a natural setting. This forest plan guides all natural resource management activities on the MNF.

## 5. GEORGE WASHINGTON NATIONAL FOREST MANAGEMENT PLAN

The USDA Forest Service completed and received approval of the *Final Revised Land and Resource Management Plan* for the George Washington National Forest in January of 1993. In May of 1993, a coalition of environmental groups filed an appeal, seeking that the entire plan be re-evaluated. Representatives of the environmental coalition claim that the currently approved plan contradicts the Clinton Administration's plan to phase out uneconomic timber sales. At the same time, a logging industry coalition has filed an appeal to the plan, claiming it does not allow for enough timber harvesting. The plan covers 1.1 million acres across 13 counties in western Virginia, including Frederick and Shenandoah, and four Counties in eastern West Virginia, including Hardy and Hampshire.

## 6. PROPOSED ELKINS BYPASS

WVDOH and FHWA are in the early stages of studying the possibility of constructing a bypass around the town of Elkins. The purpose of the study is to identify and correct transportation deficiencies (traffic congestion and roadway design deficiencies) in the Elkins area in Randolph County. The western limit of the proposed project is approximately 4.5 kilometers (2.8 miles) west of Elkins, in the vicinity of Aggregates. The eastern limit of the project is located in the vicinity of the four-lane section of US 33, near Canfield. Four alternatives will be evaluated as part of the study: the No-Build Alternative, the Transportation Systems Management Alternative, the Improved Roadway Alternative, and the New Alignment Alternative.

WVDOH held an agency Scoping Meeting to kick off the project in September of 1994. The "Project Overview" prepared for the Scoping Meeting states that, "The purpose and need for the project will be investigated during the initial phases of the project. The existing transportation system, existing and future capacity of the roadway network, social demands of the area, existing roadway deficiencies, and safety concerns will be among the topics investigated". The impacts will be discussed in the environmental documents which will be prepared for the project.

## 7. BLACKWATER RIVER WATERSHED STUDY

In March of 1994, West Virginia Congressman Allen B. Mollohan and Tucker County Commission president Dewey Rice announced the start of a $500,000 study to improve the wetlands and water quality within the already damaged Blackwater River watershed. This study would involve a portion of an original proposal presented to the U. S. Environmental Protection Agency by the West Virginia University and Wheeling Jesuit College. The exact scope of the study has not yet been determined. The goal of the original study, at a cost of approximately $1.5 million, was to show how Tucker County's Blackwater River watershed could be restored during the construction of Corridor H. Mollohan stated the study will show how such improvements incorporated during the Corridor H construction process can be a highly cost-effective way to perform environmental remediation.

## 8. WATERSHED MANAGEMENT PROGRAM

In August of 1993, federal and state funding was approved for the creation of a statewide watershed management program. The West Virginia Watershed Conservation and Management Program received $98,000 in a US Environmental Protection Agency grant augmented by $24,000 in funds from the WV Division of Natural Resources. An initial goal of the Watershed Program was to build consensus for the conservation, management, and prudent use of West Virginia's rivers and wetlands and to implement a comprehensive plan to care for the state's aquatic resources. During the Watershed Program's first year, a team of representatives from the West Virginia Division of Natural Resources (DNR), Division of Environmental Protection and Division of Parks and Tourism, as well as 90 statewide stakeholder groups, began developing a 10-year strategic plan for managing the state's watersheds. The Watershed Program is based at the DNR's Operations Center in Elkins.

## 9. PROPOSED AMERICAN DISCOVERY TRAIL

The proposed American Discovery Trail is an east/west transcontinental hiking trail that has been developed by hiking enthusiasts throughout the country. Approximately 482 km (300 miles) of the proposed trail are in West Virginia. The National Park Service is currently conducting a feasibility study for this trail in regard to recommending it for designation as a National Scenic Trail. Alternate corridors for the proposed trail within the project area have been proposed, but a final corridor has not been selected.

## 10. WILD AND SCENIC RIVER STUDY REPORT

The Monongahela National Forest is conducting a study of twelve rivers or segments of those rivers to determine which, if any, of the rivers or river segments should be recommended for designation as components of the National Wild and Scenic Rivers System. One segment of Shavers Fork along the Preferred Alternative is being considered for recommendation. It has been determined to be eligible for Scenic status. In three of the eight alternatives being considered by the MNF this segment of Shavers Fork would be recommended for designation as a Scenic River (*Monongahela National Forest Draft Environmental Impact Statement*, 1995).

### 11. ADDITIONAL DETAILED ENGINEERING

Additional detailed engineering was authorized by FHWA for Section 6 of the Build Alternative, which would be located west of Moorefield, West Virginia. This engineering was undertaken to determine possibilities of reducing the amount of excess excavation (waste) predicted at the ASDEIS stage as well as to determine the feasibility of other mitigation measures proposed in the ASDEIS and later developed for inclusion in the *Corridor H FEIS Mitigation Document (Vol. III)*.

## M. STATUS OF ADDITIONAL ISSUES

### 1. SECTION 4(f)

In accordance with Section 4(f) of the 1966 Department of Transportation Act and Section 6(f) of the 1965 Land and Water Conservation Fund Act, overall evaluations were conducted for properties determined to be qualified for Section 4(f) and Section 6(f) evaluations. The Preferred Alternative (WV), as presented in the FEIS, avoids the use of all known Section 4(f) property. The avoidance includes publicly owned parks and recreation areas and wildlife and waterfowl refuges, and sites and properties officially eligible for inclusion in or listed on the National Register of Historic Places. Additionally, the avoidance includes the "Considered Eligible" properties, which were considered during the alignment phase to maximize the avoidance of adverse effects to historic and prehistoric resources (refer to Section III-L, for the definition of "Considered Eligible" employed for this project). Finally, the FHWA has determined that the Preferred Alternative does not use any designated parks, recreation areas, wildlife or waterfowl refuge areas from trails or MAs/MPAs or historic properties.

If, during final design activities, any Section 4(f) properties are encountered, a separate 4(f) evaluation will be completed. This action would be consistent with 23 CFR 771.135 (m), which states in part that, "Circulation of a separate action 4(f) evaluation will be required when: (1) a proposed modification of the alignment or design would require the use of Section 4(f) property after the...final EIS has been processed; (2) the Administration determines after processing...the final EIS that section 4(f) applies to a property."

### 2. MITIGATION

General mitigation measures are detailed throughout Section III of this document. Specific mitigation measures, to the extent permitted by the level of design, are detailed in the *Corridor H FEIS Mitigation Document (Vol. III)*, which is incorporated into the FEIS. Mitigation measures described in Section III and the *Corridor H FEIS Mitigation Document (Vol. III)* have been designed to the level of detail permitted by the level of design presented in the FEIS. Specific mitigation measures will be designed as additional levels of engineering detail are developed. Deferring specific designs for mitigation measures is consistent with the intent of 23 CFR 771.125.

## N. ONLY PRACTICABLE ALTERNATIVE FINDING

In accordance with Executive Orders 11988 and 11990, this portion of the FEIS documents the basis for the finding that the Preferred Alternative (WV) as described herein is the only practicable alternative and that no alternative exists that can avoid construction in floodplains and wetlands.

### 1. FLOODPLAIN FINDING

The construction of the Preferred Alternative (WV) must occur in floodplains. To the extent possible, the impacts to floodplains have been avoided or minimized, through the interdisciplinary, interagency approach and utilization of the Geographic Information System prepared for the project. Due to the great length of the project in the east-west direction and the north-south direction of the Appalachian Mountains which the project must cross, total avoidance of floodplain impacts would not be possible. The ASDEIS IRA also impacts the 100-year floodplain and flood hazard zones. The total impacts to flood zones in West Virginia is 19.8 hectares (48.9 acres) for the ASDEIS IRA and 15.0 hectares (37.0 acres) for the Preferred Alternative (WV). The only alignment that could result in an overall lower floodplain encroachment would be the selection of Line S in the Shavers Fork Option Area. This alignment skirts the slope of the mountain above Shavers Fork and avoids the floodplain. However, due to this higher elevation, a safe access down to US 219 into Porterwood to serve an industrial facility as well as to serve Parsons, a severely economically depressed community, is not possible. This alternative would not be practicable in that it would not meet the project purpose and need of safe access and economic development.

The No-Build Alternative would not impact floodplains but it is not practicable in that it does not meet the project purpose and need.

The Preferred Alternative (WV) does not encroach upon designated or proposed regulatory floodways. Construction of the Preferred Alternative (WV) would conform to applicable state and local floodplain protection standards.

In accordance with Executive Order 11988 and 23 CFR 650 Subpart A, it has been determined that based on the above considerations, there is no practicable alternative to the proposed construction in floodplains, and the proposed action includes all practicable measures to minimize harm to floodplains which may result from such use.

## 2. WETLAND FINDING

The construction of the Preferred Alternative within West Virginia must occur in wetlands. To the extent possible, the impacts to wetlands have been avoided or minimized, through the interdisciplinary, interagency approach and the utilization of the Geographic Information System prepared for the project. The watersheds associated with the overall project area for Corridor H include extensive wetland systems, including Canaan Valley, the largest wetland complex in the state of West Virginia. On the basis of the CSDEIS, it was determined that Corridor Scheme Option D5 offered nearly the greatest potential to minimize impacts to wetlands. Background information identified over 280 hectares (700 acres) of wetlands in the corridor. The avoidance approach taken for this project, as well as the measures already included in the design to minimize harm to wetlands, has resulted in less than 16 hectares (40 acres) of wetland impacts. The alternative analysis prepared in accordance with Section 404 of the Clean Water Act describes in detail the minimization efforts employed. This analysis is contained in Appendix G of the ASDEIS. This wetlands finding is presented in accordance with Executive Order 11990.

Based upon the above considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands and that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.

# PURPOSE AND NEED

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# *SECTION I: PURPOSE OF AND NEED FOR ACTION*

Text that is underlined in Section I represents instances where new text has been added to the ASDEIS based on comments received on the ASDEIS from the public and interested agencies.

## A. PROJECT DESCRIPTION

The original project analyzed in the CSDEIS and the ASDEIS was longer than the project as it is currently proposed for construction by WVDOH and FHWA. The original project was referred to as the Build Alternative in the ASDEIS. Additional discussion of this issue is found in Section IV of this document.

### 1. ORIGINAL PROJECT: CSDEIS AND ASDEIS

In the original project, the WVDOH in conjunction with the FHWA and VDOT was proposing to construct an approximately 183 kilometer (114 miles) long highway from Elkins, West Virginia to I-81 in Virginia, completing the final portion of Corridor H in the Appalachian Development Highway System. The original project would have traversed portions of the West Virginia Counties of Randolph, Tucker, Grant, and Hardy as well as the Virginia Counties of Frederick and Shenandoah. This FEIS carries forward the environmental impacts of constructing the entire length of the original project, but also specifically identifies impacts and benefits in West Virginia and Virginia of constructing the project only in West Virginia, as it is currently proposed.

### 2. CURRENT PROJECT - WEST VIRGINIA

Following a review of all agency and public comments received, the Virginia Commonwealth Transportation Board passed a resolution in February, 1995 (Volume II, Appendix A). In that resolution, the Commonwealth Transportation Board did not select any of the four-lane Build Alternatives or the Improved Roadway Alternative for construction in Virginia. The resolution directed the VDOT to "...study the Route 55 corridor's safety aspects such as horizontal and vertical alignments, possible need for truck climbing lanes, intersection safety improvements and other safety related features of the roadway." (See Vol. II, Appendix A).

Because of the Commonwealth of Virginia's decision not to proceed with the Build Alternatives or the Improved Roadway Alternative as presented in the ASDEIS, the proposed project was re-defined. It is described as follows: The WVDOH and the FHWA are proposing to construct an approximately 161 kilometer (100 mile) long highway from Elkins, West Virginia to just west of the West Virginia/Virginia state line on WV 55. The proposed Corridor H facility would provide a divided, four-lane highway with partial control of access on new and existing location. The design speed of this facility would be 97 kph (60 mph). The area through which the currently proposed project would traverse includes portions of the West Virginia Counties of Randolph, Tucker, Grant and Hardy.

### 3. CURRENT PROJECT - VIRGINIA

Because of this resolution, additional traffic impact analyses were conducted. Additionally, system linkage issues were also examined further. These additional investigations determined that:

- The construction of the Preferred Alternative from Elkins, West Virginia to the Virginia state line is not expected to adversely impact existing traffic operations on Route 55 in Virginia; and
- The purpose and need of the proposed action, including system linkage, will be met by the construction of the Preferred Alternative (WV).

A detailed discussion of these analyses is included in Section IV of this document.

## B. PROJECT PURPOSE AND NEED

FHWA guidelines suggest the analysis of seven factors to establish project need for a transportation system such as Corridor H. These seven factors are:

1. Social Demand and Economic Development.
2. Capacity and Level Of Service.
3. Safety Considerations.
4. Roadway Deficiencies.
5. System Linkage.
6. Regional Planning Demands.
7. Legislation.

The *Transportation Needs Study* for Corridor H analyzed these seven factors and showed that a transportation need exists. In addition, the Resource Agency Workshops (May 5-6, 1992 and September 23-24, 1992) on the Preliminary CSDEIS resulted in the overall recognition by resource agency representatives that a need for transportation improvements exists. (Minutes from both Resource Agency Workshops are contained in Section VII of the CSDEIS). Based on its finding that a need for the project existed, the *Transportation Needs Study* evaluated several methods to meet the project need and determined that building a new four-lane highway was the only alternative that fully meets the established project need. The following is a summary of the findings of the *Transportation Needs Study*:

**Social Demand and Economic Development**

- The industries that are not in coal-extracting counties are unable to utilize the existing railroad system because county roads are not designed to accommodate truck traffic to counties with rail terminal facilities.
- The study region lies within 300 miles of 35 percent of the United States population.
- Substantial market opportunities exist outside the study region.
- External markets have the capacity to absorb the study region's goods.
- The study region's availability of raw materials would benefit the external markets' diverse economies.
- With five railroads and over 50 motor freight carriers in operation, large product distribution capabilities exist in the study region.
- The growing recreation and tourism industries have added to the economic vitality of the study region's economy.
- The growth rate of the tourism industry in the study region is approximately nine percent per year.
- Effective transportation of commodities from the study region and improved access to its resources will save energy and lower transportation costs.
- Inadequate transportation access increasingly isolates the study region from the economic activity and influence of regional market centers in the Midwest and the Atlantic Coast regions.
- The increasing growth in the tourism industry places additional stress on the already deficient, east/west highway network.
- The continued deterioration of mobility in the study region will likely deter prospective tourists, who can turn elsewhere for recreational opportunities.
- Substandard access to I-81 and I-66 hinders economic opportunities of the tourism industry to take full advantage of the large East Coast markets.

**Capacity and Level of Service**

- Through the mountainous terrain, overall traffic flow is adversely affected by truck traffic.

- Most of the roads in the study region will not meet current West Virginia design standards for the forecasted design year 2010 traffic volumes.

- The existing Elkins to Strasburg route has been classified on WVDOH's Functional Classification Map as an expressway, even though the route is not designed to expressway standards.

- Existing levels of service along the two main study routes considered at the corridor level are unacceptable. On the Elkins to Winchester route, 1990 levels of service are unacceptable between Parsons and Davis, West Virginia (LOS E), as well as between Scherr, West Virginia and the Virginia state line (LOS D/E). On the Elkins to Strasburg route, 1990 levels of service are unacceptable between Alpena and Wardensville, West Virginia (LOS D/E). These conditions will continue to deteriorate based on projections of increasing traffic demand.

**Safety**

- In the study area, the overall deficiency of roadway geometric features accounts for the higher accident rates than on similar facilities elsewhere. Accident rates on the existing routes are higher than those on improved facilities within the state. The historic accident rates per million vehicle miles traveled are 2.63 on the Elkins to Winchester route and 3.24 on the Elkins to Strasburg route. On a rural primary, four-lane, controlled access facility the accident rate is only 0.99 accidents per million vehicle miles traveled.

**Roadway Deficiencies**

- The existing route between Elkins, West Virginia and the West Virginia/Virginia state line consists of narrow, curving and winding US routes and state routes. Posted speed limits of 55 mph are present but numerous curves are signed from 15 to 50 mph. Grades are as steep as 9 percent.

**System Linkage**

- The existing routes between Elkins and Strasburg are two-lane, winding mountainous United States (US 33) and State Routes (SR55/28) which link small communities.

- Movement into and through the study area from outside the area is hindered due to the lack of a high speed roadway network through the study area.

- Goods bound for air freight distribution must be transferred to trucks and hauled over the deficient roadway network within the study region to access the nation's air traffic system.

- US 50 is the only prominent east/west link between I-77 and I-79 in northeastern West Virginia. The only other four-lane, controlled access facility in northeast West Virginia is US 33, which runs east from its interchange with I-79 near Weston, WV to Elkins, West Virginia and is a completed section of Corridor H.

**Regional Planning Demands**

- An evaluation of the study area's potential indicates the following: the study region has the capacity to support and absorb increased economic activity; industrial and commercial utilization of areas identified with a growth potential will help to reduce or reverse the out-migration trends of the region's labor force; and current highway deficiencies preclude the utilization of areas having a high growth potential.

- The identified transportation deficiencies were determined to have the following adverse effects on economic growth: improved market relationships within the study region are constrained by transportation access difficulties; even though a large production capability exists within the region, the existing east/west access deficiencies have resulted in increased transportation and shipping costs within the study region, safety concerns, and the travel time constraints; current east/west transportation access deficiencies reduce the competitiveness of the industries within the study region; and the large product distribution capabilities of the study region are inhibited by east/west transportation deficiencies across the Allegheny Front and the Appalachian Mountains.

- An assessment of the market and recreational aspects of the study region and its market base revealed the following: the study region has abundant natural resources such as hardwood timber, coal, limestone, forests, and streams; and industries within the study region produce and provide a wide range of manufactured goods and services including lumber, wood products and fixtures, leather products, poultry products, coal products, printing services, and recreation services.

**Legislation**

- In 1965, the United States Congress passed the Appalachian Regional Development Act. The Act made provisions for the funding and the development of an Appalachian Development Highway System (ADP). Corridor H is one component of the APD.

## C. PROJECT HISTORY

Detailed descriptions of the project history are contained in the CSDEIS (Section I, pages I-3 through I-8) and the *CSDEIS Decision Document* (*Abstract* and Section I, pages 1 through 7).

## D. PROJECT STATUS

As noted in the Summary, the SDEIS for Corridor H was developed in a two-step study process. The first step (Corridor Selection) was documented in the CSDEIS and culminated in the selection of a preferred corridor. Scheme Option D5 was identified as the preferred corridor on the basis that it best meets the established project purpose and need and has the least involvement with sensitive resources. The identification of Scheme Option D5 for further study ended SDEIS Step 1 (CSDEIS) and began SDEIS Step 2 (ASDEIS). The ASDEIS began with the development of highway alignments at a scale of 1"=200'. It was based on the resource inventory developed and maintained for the CSDEIS. All resources within the preferred corridor (Scheme Option D5) were transferred from the GIS database onto current mapping prepared from 1992 aerial photography. This initial resource inventory was used to develop specific alignments that avoid the use of known Section 4(f) lands, avoid or minimize impacts to other known sensitive social and environmental resources, as well as other resources identified through the photo interpretation of the 1992 aerial photography. This resource inventory was also used to document the existing condition (No-Build Alternative) and to develop the Improved Roadway Alternative.

Because of the increased level of detail required for the ASDEIS, detailed field evaluations and studies were conducted throughout 1993 and early 1994 specifically to assess the potential impacts of various alternatives and alignments. Additionally, detailed engineering design was undertaken in one section (Section 6), located west of Moorefield, West Virginia. This engineering was undertaken to verify the project's GIS database, and determine the feasibility of implementing mitigation measures (e.g. excess excavation reduction) necessary to meet NEPA and Section 106 requirements addressed in this document, the *Corridor H FEIS Mitigation Document (Vol. III)*, and the 106 Programmatic Agreement.

In some instances, it became necessary to develop a specific alternative alignment outside, but in the general vicinity of, the selected corridor for the express purpose of avoiding important sensitive resources or meeting acceptable, safe design criteria. This situation occurred in response to additional information that became available only during the ASDEIS stage.

Following a review of all agency and public comments received, the Virginia Commonwealth Transportation Board passed a resolution in February, 1995 (Volume II, Appendix A). In that resolution, the Commonwealth Transportation Board did not select any of the four-lane Build Alternatives or the Improved Roadway Alternative for construction in Virginia. Virginia's decision, which is briefly discussed in the

Summary section and detailed in Section IV, does not negate the need for the project or invalidate its purposes relative to West Virginia. Even if Virginia does not construct its portion of the Build Alternative, Corridor H is viewed by FHWA, WVDOH, and the Appalachian Regional Commission (ARC) as being the most practical transportation option available to effectively alleviate east/west transportation deficiencies and economic isolation within the Appalachian Highlands Region of northeastern West Virginia. The Preferred Alternative (161 km highway from Elkins to West Virginia/Virginia state line) constitutes almost 90% of the total length of the Build Alternative as it was originally defined (183 km from Elkins, West Virginia to I-81 in Virginia). See Section IV for further discussion of how the Preferred Alternative satisfies the purpose and need of the project.

Specific activities of the project are shown on Exhibit I-2 (Vol. II). Activities completed to date are in shaded boxes and activities yet to be completed are in unshaded boxes. The current schedule indicates that, following FHWA's approval of the Final EIS, a Record of Decision will be prepared to document officially the decisions reached throughout the CSDEIS and the ASDEIS study process.

## E. FUNDING STATUS

The Intermodal Surface Transportation Efficiency Act of 1991, also known as "ISTEA", contained authorization for the entire Appalachian Regional Commission Corridor Highway System. In August 1994, Congress approved the Fiscal 1995 Energy and Water Appropriations Bill that included $75 million for the engineering, right-of-way acquisition, and start of construction for the remaining portion of Corridor H, from Elkins to I-81. In September 1994, Congress also approved the Fiscal 1995 Transportation Appropriations Bill that included an additional $35 million for the construction of Corridor H. Moneys from both bills are to be used for construction of Corridor H in West Virginia. There are currently no funds appropriated for project construction in Virginia. Prior to 1994, Congress appropriated $160.5 million for Corridor H construction. The total funding appropriated for Corridor H is $270.5 million.

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# ALTERNATIVES CONSIDERED

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# SECTION II
# ALTERNATIVES CONSIDERED: CORRIDORS & ALIGNMENTS

## A. INTRODUCTION

The Corridor H project followed two processes that facilitate development of large projects. These processes are:

1. Tiering as defined by CEQ and FHWA guidelines and consisting of:
   - Corridor Selection Supplemental Draft Environmental Impact Statement (October, 1992)
   - CSDEIS Decision Document (July, 1993)
   - Alignment Selection Supplemental Draft Environmental Impact Statement (November, 1994)
   - Final Environmental Impact Statement
2. Integration of the National Environmental Policy Act of 1969 and Section 404 of the Clean Water Act of 1977 as amended, commonly referred to as the NEPA/404 process.

## B. TIERING

The tiering of environmental documents is discussed in the Council of Environmental Quality regulations (40 CFR 1502.20 and 1508.28). Section 1502.20 states in part that, "Agencies are encouraged to tier their environmental impact statements to eliminate repetitive discussion of the same issues and to focus on the actual issues ripe for decision at each level of environmental review (Section 1508.28). Whenever a broad environmental statement has been prepared ....... and a subsequent statement ...... is then prepared on an action included in the entire program ....... the subsequent statement ...need only summarize the issues discussed in the broader statement ...........". Section 1508.28 states in part that tiering, "refers to the coverage of general matters in broader environmental impact statements ....... with subsequent narrower statements or environmental analyses ......... incorporating by reference the general discussions and concentrating solely on the issues specific to the statement subsequently prepared. Tiering is appropriate when the sequence of statements or analyses is: ......... (b) From an environmental impact statement on a specific action at an early stage (such as need and site selection) ....... or a subsequent statement or analysis at a later stage (such as environmental mitigation). Tiering in such cases is appropriate when it helps the lead agency to focus on the issues which are ripe for decision and exclude from consideration issues already decided or not yet ripe".

The Federal Highway Administration's regulations (23 CFR Part 771) that implement the CEQ regulations discuss tiering (771.111 (g)) stating, "For major transportation actions, the tiering of EISs as discussed in the CEQ regulation (40 CFR 1502.20) may be appropriate. The first tier EIS would focus on broad issues such as general location .....of the major alternatives. The second tier would address site-specific details of project impacts, costs, and mitigation measures."

The Federal Highway Administration in its response to comments on its Notice of Proposed Rulemaking for 771.111(g) stated in part that, "It should be noted that this progressively, more focused look at a project embodied in the concept of tiering may also be accomplished with a supplemental draft EIS. If project details are developed before a final EIS has been issued ...... site-specific environmental effects can be addressed in a supplemental draft EIS. In this case, the process would be concluded with a final EIS responding to comments on both the general and site-specific draft EISs." The study process and documents prepared for the Corridor H project are consistent with the tiering process as discussed by both CEQ and FHWA regulations.

The Corridor H project followed a tiering process as outlined above. The first study, a corridor selection Supplemental Draft EIS, was prepared and signed on October 21, 1992. That document, the Corridor H Corridor Selection Supplemental Draft Environmental Impact Statement (CSDEIS), is incorporated by reference into this document, the FEIS for the project. The second study, an alignment selection Supplemental Draft EIS, was prepared and signed November, 1994. That document, the Alignment Selection Draft Environmental Impact Statement (ASDEIS) is incorporated directly into this FEIS. Copies of the CSDEIS, the ASDEIS, and their companion technical reports are available from the Office of the WV Commissioner of Highways, WVDOH, 1900 Kanawha Boulevard East, Building Five, Room 109, Charleston WV 25305-0430.

## C. CORRIDOR ANALYSIS (CSDEIS): STEP 1 OF TIERING PROCESS

Initially, in addition to the Build and No-Build Alternatives, the CSDEIS considered three broad transportation alternatives - Transportation System Management, Mass Transit and an Improved Roadway Alternative. The CSDEIS considered how, or if, each would meet the purpose and need of the proposed project. The CSDEIS concluded that none of these three alternatives would meet the purpose and need for the project, and therefore eliminated them from detailed consideration, as allowed by CEQ regulations. Following the elimination of these alternatives, the CSDEIS focused on the selection of a broad corridor for the determination of the general location of a four-lane highway facility. The latter was accomplished by the analysis of 24 separate 600 meter (2,000 foot) wide corridors (referred to in the CSDEIS as Scheme Options) all having western termini just west of Elkins, West Virginia and eastern termini at either Winchester, or Strasburg, Virginia.

## 1. ALTERNATIVES ELIMINATED FROM DETAILED CONSIDERATION IN THE CSDEIS

In accordance with 23 CFR 771.123 and FHWA Technical Advisory T6640.8A, the CSDEIS presented the results of an analysis of three broad range transportation alternatives in addition to the No-Build and Build alternatives. Those three broad range transportation alternatives analyzed were:

- Transportation System Management (TSM)
- Mass Transit
- Improved Roadway Alternative

The details of the analyses and the conclusions are presented in the CSDEIS (Section II: Alternatives Considered, pp. II-1 through-II-7) and are summarized below.

### a. Transportation Systems Management

#### (1) Alternative Considered

The goal of the Transportation Systems Management (TSM) Alternative would be to make the existing system as efficient as possible. Typically, the TSM approach includes low-cost roadway improvements such as: adding widened shoulders and warning signs in areas where they are needed; constructing minor realignments of sharp horizontal curves; installing traffic signals at intersections experiencing substantial delays; and establishing flexible work schedules and promoting carpooling at major employers in the area. TSM measures are generally considered appropriate in urban areas where the existing facilities operate beyond the designed capacity limits. However, capacity constraints along the existing West Virginia highways are not caused by a large volume of traffic, but rather the relationship between traffic volumes and the physical constraints of the mountainous terrain.

#### (2) Basis for Elimination

Implementation of TSM measures within the rural study area would not adequately address the purpose and need for the proposed project. That is, TSM measures would not provide improved access within and through the northeastern portion of West Virginia, would not substantially improve the level of service provided by the existing Elkins to I-81 routes, and would not substantially improve the overall highway system network. Although many of the TSM measures would result in traffic safety and operational improvements, they would not provide an effective solution to the identified project need. Based on all of these factors, the TSM Alternative was not considered to be a viable alternative to meet the needs of the project and was eliminated from further study in the CSDEIS .

### b. Mass Transit Alternative

#### (1) Alternative Considered

The Mass Transit Alternative includes such options as providing either bus or rail service within the area to alleviate congestion. Typically, mass transit is considered a viable alternative to roadway construction in urban areas with populations over 200,000 and requires a fairly large user level to support such a service. Bus-based mass transit depends on an adequate highway system already in place. Existing rail lines do not provide direct access to the widespread communities and industries in the study area. In addition, access to the existing rail lines/terminal facilities is difficult due to the documented deficiencies of the roadway system (*Transportation Needs Study*, March, 1992).

#### (2) Basis for Elimination

Given the relatively low population density, rural character, and overall size of the study area; the tourist and truck traffic which would not use mass transit system; and the operation and maintenance costs associated with such a system, it was determined that the Mass Transit Alternative would not adequately serve the purpose of and need for the project. Therefore, the Mass Transit Alternative was eliminated from further study in the CSDEIS.

### c. Improved Roadway Alternative (CSDEIS IRA)

#### (1) Alternative Considered

The Improved Roadway Alternative, as described in the CSDEIS, would consist of spot improvements to an existing Elkins to I-81 route. These improvements would include adding truck climbing lanes, widening roadways and shoulders, re-grading where slopes are steep, and realigning where sight distance is poor. Because the CSDEIS IRA would consist of spot improvements to existing roads the CSDEIS IRA would not create a single, continuous, improved roadway connecting Elkins, WV and I-81 in Virginia. The CSDEIS IRA would not involve construction of new roadway on new location. In contrast, the IRA considered in the ASDEIS (ASDEIS IRA) would involve both upgrading of existing roadways similar to the CSDEIS and construction on new location where upgrading existing roadways would be ineffective in addressing roadway deficiencies. The ASDEIS IRA would result in a single, continuous improved roadway from Elkins, WV to I-81 in Virginia.

In addition to the CSDEIS IRA composed of spot improvements, the construction of a three lane highway (as opposed to a four-lane, divided highway) also was evaluated as an IRA. In accordance with the Transportation Research Board's *Highway Capacity Manual* when two-lane highways are experiencing operational problems, three-lane roadways are sometimes considered appropriate as a temporary alternative to four-lane expansions.

The construction of three-lane highways was common during the 1940's and 1950's. During that period, the center lane of three-lane roadways was typically used as a passing lane by vehicles in either direction. However, this practice was found to be especially hazardous due to the increased number of head-on collisions and subsequent fatalities; thus, the practice generally was discontinued in the 1960's.

In the mid 1980's, the use of three-lane roadways become more common as safer designs were incorporated into their operation. Some safer uses of three-lane roadways that were considered in the CSDEIS included:

- Use of the third (center) lane as a passing lane: Several options are available, including alternating the travel direction of the center lane (approximately 1-mile segments), thereby providing exclusive passing lanes for each direction of travel at periodic intervals.

- Use of the third lane as a climbing lane: This generally applied as a spot improvement, most often on steep, sustained grades which cause heavy vehicles to travel at slow speeds.

- Use of a long segment of three-lane highway: This three-lane facility operates with two lanes in one direction and one lane in the other direction.

The *Highway Capacity Manual* (1985) provides several general reasons that three-lane roadways are not favored:

1. Where the second lane in the preferred direction on a three-lane highway exists for short segments, it is generally used less efficiently than the second lane on a full, four-lane facility. The added lane is typically used to pass slower moving vehicles and execute left turns. While the extra lane adds to the capacity of the highway by providing more efficient passing and reducing left-turn conflicts, it still does not approach the capacity levels of a four-lane highways, even in the preferred (two-lane) direction of travel.

2. Where the third lane of a three-lane highway is permanently assigned to one direction for a distance of several miles, the operation of the preferred direction can approach that of a four-lane highway. However, capacity levels of the two-lane section are

reduced 10 to 15 percent to reflect the somewhat reduced efficiency compared to the full, four-lane case.

3. Three-lane highways (even safely designed ones) are not considered to be the ultimate development of a roadway facility. Rather, they are described by the *Highway Capacity Manual* (1985) as "intermittent" solutions. Therefore, in considering the impact of the proposed project, it is necessary to evaluate the ultimate facility developments throughout the planning period.

**(2) Basis for Elimination of the CSDEIS IRA**

While implementation of the CSDEIS IRA would address some localized problems, it would still not meet the need for the project. The CSDEIS IRA would not address the issues of roadway deficiencies, safety considerations, and regional system linkage. The following provides specific data to substantiate the basis on which the CSDEIS IRA (including the use of three-lane roadways) was eliminated from further consideration in the CSDEIS.

**(a) Roadway Deficiencies**

Implementation of the CSDEIS IRA would require that any improvements implemented meet current highway design standards for the specific roadway classifications along the route. The roadways on the Elkins to Winchester route are currently classified as feeder routes between Elkins and Scherr and as trunkline routes between Scherr and the Virginia state line. The Elkins to Strasburg route is classified as an expressway even though it is not designed to expressway standards.

The existing conditions on the Elkins to Winchester and Elkins to Strasburg routes are typical of roadways constructed through mountainous terrain; roadways follow the terrain, grades are steep, curves are sharp, lanes and shoulders are narrow, straight portions are limited, and homes and businesses are usually built in close proximity to the roads. Depending on the route, from 27 to 40 percent of roadway grades are over 4 percent; between 34 and 38 percent of all curves are greater than $3^{\circ}$-30'; and over 50 percent of the lanes are less than 3.35 meters (11 feet). When these conditions are blended with steep hillsides that come down to narrow shoulders, the end result is a roadway with many areas of inadequate sight distance, blind spots, and potentially dangerous intersections.

To reconstruct the existing routes to current design standards would likely result in the following impacts:

- A considerable number of relocations (300-460) would be required in order for the horizontal alignment to conform to the 80 kph (50 mph) design speed. A 80 kph (50 mph) design speed is the "Acceptable" design speed for a two-lane rural principal arterial as defined in the AASHTO publication entitled *A Policy on Geometric Design of Highways and Streets* (1990).

- The widening of the roadway for truck climbing lanes, passing lanes and/or widening shoulders would require the removal of almost all of the residences and businesses immediately adjacent to the existing routes.

- Homes and businesses not directly adjacent to the roadway improvement would be affected by the earthwork cut or fill slopes.

- The profile grade of some of the intersecting side roads could be made steeper because of the widening, and re-grading of these could further impact adjacent properties.

- Reconstruction and reconfiguration of all existing intersecting roadways along the improved roadway would be needed, adding to the cost of the CSDEIS IRA.

**(b) Safety Considerations**

The CSDEIS IRA would include maintaining the existing two-lane facilities and constructing truck climbing lanes or passing lanes in locations of steep grades. WVDOH's historical experience with two-lane, controlled facilities, or facilities with similar operating experience, has not been favorable. Examples of such facilities include Tolsia Highway, Appalachian Corridor L (US 19), and the original West Virginia Turnpike. On all three, the overall accident and injury rates are similar to four-lane highways and the Interstate System. However, the fatality rate exceeds the Statewide Rural Primary Highway Average (Refer to Appendix E of *CSDEIS Traffic and Transportation Technical*).

The high fatality rate seems to occur for two reasons. The first is that two-lane roadways do not separate traffic and thus fail to prevent head-on crashes, the most severe type of rural collision. In 1990, the percentage of fatalities resulting from head-on collisions on the Tolsia Highway and US 19 were 60 and 78 percent, respectively. The high speeds typical of modern rural highways make such crashes severe and more likely to result in death or serious injury (Refer to Appendix E of *CSDEIS Traffic and Transportation Technical Report*).

The second reason for the high fatality rate involves problems that occur at certain intersections on two-lane, rural highways. Drivers find it difficult to estimate the speed of fast-moving vehicles, particularly when trying to cross the through highway or to make a left turn onto it. In addition, once threshold traffic volumes are reached, at-angle accident problems begin to occur. (At-angle accidents are collisions between vehicles moving in different direction, not opposing direction, usually at a right angle.) Construction of a four-lane facility with medians wide enough to protect most turning vehicles would reduce or eliminate these problems, allowing drivers to be concerned with one through-traffic stream at a time.

In mountainous terrain, two-lane roadways generally function at less than acceptable levels of service and, as a result, have higher than average accident rates. Two-lane expressways typically do not meet motorist expectations for an expressway-type facility. These drivers can be intolerant of delays caused by trucks and other slower moving vehicles and end up engaging in risky passing maneuvers. While truck-climbing lanes can be added to accommodate passing needs, they are only partially successful in reducing the above average accident rates. The addition of passing lanes creates other accident related problems associated with the ending of passing lanes at the top of a grade, especially where climbing lanes may be provided in opposing directions on either side of a mountain.

**(c) System Linkage**

The CSDEIS IRA would not address the system linkage deficiency. Only a consistent, four-lane highway would directly link the East Coast to central Ohio and the Midwest as well as provide a consistent four-lane highway link to Appalachian Corridors E, D, and L (Vol. II, Exhibit I-1). The purpose of the APD System is to develop a primary highway system network in conjunction with the Interstate System. The Interstate System and its supporting system of primary highways are essential for travel between the East Coast and the Midwest regions. However, these systems do not currently offer the shortest direct access which is through West Virginia. The CSDEIS IRA would not aid in the completion of the APD System identified as necessary to promote the economic well-being of the region.

## 2. ALTERNATIVES CONSIDERED IN DETAIL IN THE CSDEIS (SCHEME OPTIONS)

After eliminating the three broad-range transportation alternatives from detailed consideration, the CSDEIS conducted further analysis of the Build and No-Build Alternatives. In developing the Build Alternative, the CSDEIS considered 24 separate 600 meter (2,000 foot) wide Scheme Options. The CSDEIS evaluated the 24 Scheme Options for the Build Alternative according to the following general criteria:

- Ability to meet transportation needs as analyzed in the *Transportation Needs Study*
- Impacts on environmental resources

- Ability to respond to the expressed desires of the public most affected by the construction of Corridor H

After completing the analyses, the *Corridor H Corridor Selection Supplemental Draft Environmental Impact Statement* (CSDEIS) was produced and circulated (October, 1992).

## D. CSDEIS DECISION DOCUMENT: END OF STEP 1 OF TIERING PROCESS

Following receipt of comments on the CSDEIS, the *CSDEIS Decision Document*, was produced. The document presented the rationale for the selection of Scheme Option D5 as the corridor within which the site-specific details for the project would be addressed. The *CSDEIS Decision Document* also served to transition between the first tier corridor scheme option selection and the development of the ASDEIS. The rationale for the selection of Scheme Option D5 as the general location within which to develop a preferred alignment is presented in the *CSDEIS Decision Document*, in addition to the stages through which the corridor selection process progressed. The stages in corridor selection are summarized below to better present the "flow" of the decisions made in the *CSDEIS Decision Document*.

FHWA guidelines suggest the analysis of the following seven factors in establishing project need: legislation; social demand and economic development; system linkage; capacity and level of service; regional planning demands; safety considerations; and roadway deficiencies. The *Transportation Needs Study* for Corridor H analyzed these seven factors and determined that a transportation need existed in the project area. The legislation establishing Corridor H recognized the need to provide a transportation system to support economic development. The *Transportation Needs Study* evaluated several different methods to meet the project need and determined that building a new four-lane highway (the Build Alternative) was the only alternative that met the transportation needs of the region. The CSDEIS evaluated 24 different Scheme Options (corridors), along with the No-Build Alternative. Each Scheme Option met the overall project purpose and need. The decision process for selecting a preferred corridor considered three questions:

- Transportation Needs - From an operational point of view, which Scheme Option best meets the identified transportation-related needs in the study area?

- Environmental Resources - Considering the important sensitive environmental resources identified in the CSDEIS, which Scheme Option best meets the transportation needs in the study area while avoiding or minimizing adverse environmental and social impacts, and providing positive economic benefits?

- Public Involvement - Considering the input from the public involvement process, which Scheme Option best meets the transportation needs in the study area in an environmentally responsible manner, and appropriately responds to the expressed desires of the public most affected by the construction of Corridor H?

## 1. CORRIDOR SELECTION STAGE 1- INITIAL SELECTION

### a. Transportation Needs

In considering the ability of any of the 24 corridors (Scheme Options) to meet the transportation-related needs identified in the project area, six primary elements of the existing transportation system were evaluated: total length; vertical alignment (grades); horizontal alignment (curves); average travel speed; average accident rates; and Level of Service (LOS). Level of Service is a qualitative measure that describes operational conditions of a traffic stream along a roadway. Levels of Service are defined as A, B, C, D, E, or F, with LOS A being the best and LOS F being the worst. In general, highway designers strive to provide the highest LOS that is both feasible and consistent with anticipated conditions. For acceptable degrees of congestion, rural arterials should be designed for LOS B. In mountainous areas, LOS C is considered acceptable. Table 3 in the *CSDEIS Decision Document* presents the results of an evaluation of the existing roads that presently carry traffic between Elkins and Strasburg, and Elkins and Winchester.

The shortest distance between Elkins and I-81 is along the existing Elkins to Strasburg route. Additionally, for every primary factor listed in Table 3, the existing roads along this route collectively exhibit more deficiencies than those currently existing between Elkins and Winchester. In comparing the existing Elkins to Strasburg route (via US 33 and State Route 55) with the existing Elkins to Winchester route (via US 219, State Route 93, and US 50), US 33 and State Route 55 between Elkins and Strasburg represent the greatest need for improvement and are characterized by the following:

- Existing poorest grades (vertical alignment)
- Existing worst curves (horizontal alignment)
- Existing slowest overall travel speeds
- Existing poorest overall Level of Service
- Existing highest overall accident rate

From an operational viewpoint alone, Scheme Option A1, the most direct route from Elkins to I-81 at Strasburg, best satisfies all of the transportation-related needs in the project area. Scheme Option A1, the preferred option in the 1981 DEIS, would provide an improved transportation network that would best make use of the existing roads in the project area, including the existing 6.6-mile section of four-lane highway between Canfield and Bowden. The area to the west of the four-lane section, between Elkins and Canfield, would experience the combined highest traffic volumes and the worst LOS of any single existing segment in the project area if the No-Build Alternative was selected (13,700 vehicle per day at LOS F). Scheme Option A1 could also utilize the 8.8 kilometers (5.5 miles) of right-of-way between Bowden and Alpena purchased nearly twenty years ago by the West Virginia Division of Highways.

Scheme Option A1 also meets the legislative, social and economic, and regional planning needs in the project area. Scheme Option A1 best meets all the needs based on the seven factors discussed previously and analyzed in the *Transportation Needs Study*. However, several other corridors, including Scheme Options D and E, also met the purpose and need.

The No-Build Alternative would not address the overall regional need for transportation improvements in the project area, and, as stated in the CSDEIS, would not meet the purpose and need of the project.

**b. Section 4(f)**

As described in the CSDEIS and at all of the public meetings and hearings, Section 4(f) applies to any "significant" publicly owned parks, recreation areas, and wildlife and waterfowl refuges, as well as historic and archaeological sites listed or considered eligible for listing on the National Register of Historic Places. The Secretary of the US Department of Transportation cannot approve the use of federal funds for the construction of a highway that would use a Section 4(f) property unless it has been conclusively demonstrated that there are not any prudent or feasible alternatives to the use of such property, and that all steps have been taken to minimize harm to the Section 4(f) land.

The known Section 4(f) properties within the study area for the CSDEIS are:

- The Spruce Knob-Seneca Rocks National Recreation Area (NRA),(affected by Scheme Options A1, A4, A7, and A8)
- Canaan Valley State Park (affected by all Schemes B and C Options)
- Individual historic sites or districts listed or eligible for listing on the National Register of Historic Places (located within the 2,000 foot-wide corridor of all Scheme Options).

Additionally, lands designated within the Monogahela National Forest as Management Prescription 6.2 (MP 6.2) areas may be Section 4(f) land based on the use of each specific 6.2 area. These areas are located within all the Scheme A Options.

The Spruce Knob-Seneca Rocks NRA is a Section 4(f) property that could not be avoided during the development of alternative alignments for the ASDEIS if Scheme Options A1, A4, A7, or A8 were selected.

In accordance with the FHWA's regulations governing Section 4(f) evaluations, an analysis required by Section 4(f) may involve different levels of detail where the Section 4(f) involvement is addressed in an EIS using a tiering process, such as the two-step process being used for the development of Corridor H. Pursuant to these regulations, the CSDEIS was limited to an evaluation of potential impacts that the project may have on Section 4(f) land, and whether those impacts could have a bearing on the decision to be made (23 CFR 771.135 (o)).

The FHWA regulations further provide that the information contained in the CSDEIS may be used to make a determination as to whether prudent and feasible locations or alternatives exist to avoid the use of the Section 4(f) land. Such planning at the corridor selection stage is normally limited to ensuring that opportunities to first avoid, then minimize, harm at subsequent stages in the development process, have not been precluded by decisions made at the corridor selection stage.

While Scheme Option A1 best meets the transportation needs in the project area, significant lengths of this Scheme Option, as well as Scheme Options A4, A7, and A8, are entirely within and bordered by the NRA. The selection of any of these Options would have precluded the possibility of developing an avoidance alternative and opportunities to minimize harm to Section 4(f) land during the development of the ASDEIS.

There are four Scheme A Options that could avoid the NRA: Scheme Option A2, A3, A5 and A6. Any of these would generally provide the same transportation improvements as Scheme Option A1 without increasing the likelihood of additional adverse environmental impacts. In fact, these Options potentially affect fewer residences, fewer known potential historic sites, less total wetland acreage, less exceptional resource value wetland acreage, and fewer streams than Scheme Option A1. However, the construction costs of these Options range from $539,000,000 (A2) to $655,000,000 (A6) more than Scheme Option A1. Additionally, Scheme Options A2, A3, A5, and A6 could impact MP 6.2 areas that are potentially Section 4(f) properties.

**c. Public Involvement**

The CSDEIS was approved by FHWA on October 21, 1992, and filed with the Environmental Protection Agency on November 12, 1992. That same week, the CSDEIS was mailed to all the parties listed in Section VI of the CSDEIS. The following week, the CSDEIS *Executive Summary* was mailed to everyone on the project mailing list that had been maintained by the WVDOH since the inception of the re-evaluation effort in 1990. Altogether, the WVDOH has distributed over 4,000 CSDEIS *Executive Summaries*, 1,000 copies of the CSDEIS and 100 sets of CSDEIS Technical Reports.

During December 1992, and January and February 1993, WVDOH and VDOT held a combination of eleven public meetings and hearings in the project area in West Virginia and Virginia. Table 2 of the *CSDEIS Decision Document* summarizes the dates, locations, attendance and format of these meetings.

Representatives of the WVDOH, along with the VDOT in Virginia, conducted these meetings and hearings and provided information in the form of displays, presentations and open question and answer periods. In West Virginia, the format of the public meeting involved an overall discussion of the project, an in-depth discussion of the contents of the Executive Summary, funding, and a discussion of recent project activity. The WVDOH informed the public that all Scheme B and C Options had been eliminated from further consideration due to involvement with Canaan Valley State Park, an area protected by Section 4(f) of the Department of Transportation Act. As stated previously, these Options were evaluated in the 1981 DEIS and warranted evaluation in the CSDEIS. Additionally, the public was informed that certain Scheme A Options (A1, A4, A7, and A8) required the use of property located within the Spruce Knob - Seneca Rocks National Recreation Area (NRA), a protected Section 4(f) area, and could only be selected if there was conclusive evidence to indicate that there were no other prudent and feasible alternatives. The general schedule for the Corridor H project was explained, including the selection of the preferred corridor.

The public response and interest in the project were extensive, with the meetings generally running for three to four hours. In all, the WVDOH and the VDOT met with nearly 3,000 people during this three month public involvement period. Requests for additional meetings and extension of the comment period were acknowledged by the addition of a public meeting in Keyser, West Virginia, and the extension of the CSDEIS comment period from January 25, 1993 to February 20, 1993. The CSDEIS was available for review approximately 110 days, instead of the required 45 days. Comment sheets to provide written testimony on the project were distributed at all meetings. These comment sheets, written letters and stated testimony during the hearings have been made part of the project record at the WVDOH. This record is public information and is available for review at the WVDOH offices in Charleston, West Virginia. A summary of the public comments received is discussed in the Section IV of the *CSDEIS Decision Document*.

The Virginia Department of Transportation prepared a summary of the meetings and hearings held in the Virginia project area and provided a copy to WVDOH. This information is also part of the project record and is available for review at VDOT or WVDOH. Approximately 15% of the citizens attending the Virginia meetings were residents of West Virginia. Additionally, West Virginia residents representing organizations formed on the Corridor H issue were present at these meetings. Further information on the response at the Virginia meetings is contained in Section VII of this document.

## 2. CORRIDOR SELECTION STAGE 2 - PRUDENT AND FEASIBLE SCHEME OPTIONS

The *CSDEIS Decision Document* contained an analysis of prudent and feasible alternatives to the use of the NRA property, and provided supporting information to demonstrate whether or not there are any unique problems or unusual factors involved in the use of those alternatives. Unique problems or unusual factors are considered to be cost, social, economic, and environmental impacts, or community disruption of extraordinary magnitude (23 CFR 771.135 (a) (2)).

Four Scheme A Options (A2, A3, A5 and A6) would avoid use of Section 4(f) property within the NRA. The six Scheme D Options and the two Scheme E Options would also avoid the use of the Section 4(f) property within the NRA. However, the Scheme D and E Options cost from $590,000,000 to $693,000,000 less than the least expensive Scheme A Option, A2, which also avoids the NRA.

The Scheme D Options provide an Elkins to Strasburg route, as do the Scheme A Options that avoid the NRA. Although the total length of the Scheme D Options ranges from 5 to 8 miles longer than these Scheme A Options, they cost $600 to $700 million less than the Scheme A Options. The six Scheme D Options range in cost from $840,000,000 to $913,000,000 while the Scheme A Options which avoid the NRA range in cost from $1,533,000,000 to $1,649,000,000.

Additional comparisons between the Scheme D Options and the four Scheme A Options which avoid the NRA include:

- The potential number of displacements along Scheme Options A2, A3, A5, and A6 is nearly equal to or higher than any of the Scheme D Options.
- Scheme Options A2, A3, A5, and A6 have potential major involvements with the Monongahela National Forest's MP 6.2 areas, which have been determined to be potential Section 4(f) resources; none of the Scheme D Options involve MP 6.2 areas.
- Scheme Options A2, A3, A5, and A6 involve nearly 400 more acres of 100-year floodplain than any of the Scheme D Options.
- The Scheme D Options contain nearly 600 more acres of wetlands than Scheme Options A2, A3, A5, and A6.

With the exception of the total potential wetland inventory, the Scheme D Options provide more advantages than the Scheme A Options, and do so at a considerable cost savings. Therefore, the Scheme D Options were considered to be the only prudent and feasible Elkins to Strasburg Options, and Scheme Options A2, A3, A5, and A6 were dropped from further consideration for the location of Appalachian Corridor H.

The Scheme E Options, with an I-81 terminus at Winchester, Virginia, also remain as prudent and feasible, because they do not require the use of property within the NRA. Scheme Options E1 and E2 would cost $943,000,000 and $944,000,000, respectively.

The prudent and feasible alternatives to the use of any Section 4(f) property were the six Scheme D Options, the two Scheme E Options, and the No-Build Alternative.

## 3. CORRIDOR SELECTION STAGE 3 - NARROWING THE PRUDENT AND FEASIBLE CORRIDORS

The *CSDEIS Decision Document* contained the results of additional analyses using the Geographic Information System (GIS) developed for the project to further narrow the remaining prudent and feasible alternatives to a single Scheme Option that neither precludes opportunities to avoid known Section 4(f) property, nor creates any unique problems regarding cost, social, economic, or environmental impacts, or community disruption of extraordinary magnitude.

### a. Narrowing the Scheme D Options

There are two primary environmental issues affecting the Scheme D Options: the town of Montrose, West Virginia, and the Greenland Gap, a National Natural Landmark.

Montrose is a small community (population 140) located north of Elkins, and just south of Parsons, West Virginia. The entire community is located within the 2,000 foot-wide corridor of Scheme Options D1, D2, and D3. Although alternative alignments could be developed along Scheme Options D1, D2, and D3 that would avoid disruption to Montrose, Scheme Options D4 and D5 would avoid the community by use of SubScheme KP. The community has strongly supported the use of SubScheme KP to avoid the town, should a northern route be chosen.

Scheme Options D4, D5 and D6 utilize SubScheme KP, an alternative developed specifically to avoid Montrose. While avoiding Montrose, Scheme Option D6 would require construction through

Greenland Gap, an area of unique geological features in the study area, and a registered National Natural Landmark. Scheme Options D4 and D5 were specifically developed to avoid Greenland Gap.

Scheme Options D4 and D5 essentially follow the same alignment except in the area just southeast of Scherr. In this area, Scheme Option D4 uses SubScheme L2 to avoid Greenland Gap. Scheme Option D5 uses SubScheme L2 to avoid Greenland Gap and also uses SubScheme L to avoid Falls Gap and the unincorporated community of Falls, West Virginia. The use of SubScheme L avoids the potential displacement of 20 residential or commercial structures and avoids two high quality streams. Therefore, of the two Scheme D Options, D5 is less environmentally and socially damaging.

Based on the desire to avoid disrupting the communities of Montrose and Falls, West Virginia, and the geologic formations of Greenland Gap and Falls Gap, Scheme Option D5 was selected as the most viable Scheme D Option.

### b. Narrowing the Scheme E Options

There are two Scheme E Options, E1 and E2. Scheme Option E1 would involve the community of Montrose. Scheme Option E2 uses SubScheme KP, thus avoiding disruptions to Montrose. Neither Scheme Option E1 nor E2 would involve Greenland Gap. Scheme Options E2 remains as the most viable Scheme E Option, since it avoids both Montrose and Greenland Gap.

## 4. CORRIDOR SELECTION STAGE 4 - SELECTING A SINGLE CORRIDOR

Stage 3 of corridor selection process identified Scheme Option D5 and E2 to be the most viable of the prudent and feasible alternatives to use of Section 4(f) property within the NRA. Stage 4 of the corridor selection process is the selection of a single Scheme Option as the Preferred Corridor. This stage involved additional comparisons and studies, as well as incorporation of additional public comment into the decision making process.

### a. Environmental Comparisons

Between Elkins and Bismark, Scheme Options D5 and E2 follow the identical corridor. In this corridor, the Scheme Options have a potential involvement with Shavers Fork, a National Resource Water, and a known population of running buffalo clover, a federally designated Endangered plant species. The WVDOH has determined, based on additional information provided by aerial photography, that relocation of Shavers Fork can be avoided and that necessary crossing could be perpendicular. The US Fish and Wildlife Service (USFWS) has determined that the population of running buffalo clover along Shavers Fork is relatively small. The location of this population is near the junction of SubScheme KP and Schemes D and E, and can be avoided during the ASDEIS process.

At the time of preparation of the *CSDEIS Decision Document*, none of the streams in Scheme Options D5 or E2 were federally designated Wild and Scenic Rivers and none contained Threatened or Endangered Species. Subsequently, it was determined that one segment of Shavers Fork within the project area is considered eligible for Scenic status. That issue is discussed in this FEIS (Section III, S - Wild and Scenic Rivers).

Because Scheme Options D5 and E2 are identical west of Bismarck, natural, social and cultural resources need only be compared east of Bismarck (Vol., Table II-1B).

**(1) Natural Resources**

While the total wetland acreage difference between the two Schemes is only 14 acres, the difference in potential involvement among the wetland types is important. Scheme Option E2 has the potential to involve more than twice the acreage of palustrine forested wetlands than Scheme Option D5 (36 acres vs. 17 acres). Forested wetlands are important because of the maturation time required for these systems to develop their unique set of functions and values.

The possibility of avoiding wetland systems is greater within Scheme Option D5 than Scheme Option E2. Scheme Option E2 contains 30 acres of wetlands that have a high probability of being impacted by any highway due to their location in the corridor and the topography of the corridor itself. Scheme Option D5 contains 3 acres of wetland systems with a high probability of being impacted.

Scheme Option D5 contains significantly fewer high quality stream and floodplain involvements than Scheme Option E2. National Resource Water (NRW) is a West Virginia stream classification. The closest equivalent Virginia classification is Outstanding State Resource Waters (OSRW). The OSRW designation differs from the NRW designation in that a stream does not qualify due only to its location in a forest or recreation area. Streams are designated as National Resource Waters if they have one or more of the following characteristics:

- Located within a National or State Forest or National or State Recreation Area
- Federally designated Wild and Scenic River
- Contain Threatened or Endangered Species
- Contain naturally reproducing trout populations

All 16 of the NRW streams in these Scheme Options are designated as such due in part to their location in either a National Forest or National or State Recreation Area. It was previously determined that there were no OSRW in the Virginia project area. However, recent information provided by the Virginia Department of Game and Inland Fisheries identifies Duck Run, located in the Virginia portion of Scheme Option D5, as a Class II native brook trout stream, qualifying Duck Run as an OSRW. A total of 4 of the 16 streams in question contain populations of naturally reproducing trout: Edwards Run located in Scheme Option E2; and Elk Lick Run, Trout Run, and Duck Run located in Scheme Option D5. Elk Lick Run extends longitudinally within Scheme Option D5 and can be avoided during the development of highway alignments. However, Edwards Run in Scheme Option E2 and Trout Run and Duck Run in Scheme Option D5 cross the entire width of each corridor and cannot be avoided.

The Lost River, located within Scheme Option D5, is a National Resource Water due to its location within the George Washington National Forest. This river is important due to its unusual flow characteristics. The Lost River parallels the Scheme Option D5 corridor for approximately six miles. The WVDOH has determined, based on additional information provided by recent aerial photography and field reviews, that relocation or channelization of the Lost River can be avoided and that necessary crossings can be perpendicular.

East of Bismarck, Scheme Option E2 has the potential to involve twice the acreage of forested wetlands, ten times more acreage of wetlands with a high probability of being impacted by alignments, more high quality streams and floodplains than does Scheme Option D5. There is a greater likelihood of creating unique problems by the development of alternative alignments in Scheme Option E2 than Scheme Option D5.

**(2) Section 4(f) Properties**

Within Scheme Option D5 east of Bismarck there are up to 36 properties which may qualify as Section 4(f) lands: 9 properties currently eligible for listing on the National Register of Historic Places, and 27 properties which are potentially eligible for listing. There are no known archaeological sites or historical districts within Scheme Option D5 that are currently listed on the Register. Subsequent investigations undertaken during the ASDEIS and FEIS studies found that all historic properties and 4(f) resources could be avoided and no use would be made of them by the Preferred Alternative (WV). Details concerning these issues are found in Section III J., K., and L. of this FEIS.

Within Scheme Option E2 east of Bismarck there are up to 86 known historical properties that may qualify as Section 4(f) land: four are currently listed on the National Register of Historic Places and 82 are potentially eligible for listing.

All of the known historic sites, whether listed on, eligible for listing, or potentially eligible for listing, are included in the Geographic Information System used for the development of the CSDEIS. Based on the topographic characteristics of both Scheme Option D5 and E2, it is possible to develop alternative alignments in either Scheme Option that would avoid the use of these known and potential Section 4(f) properties. These historic sites are the only known or potential Section 4(f) lands within Scheme Option D5 and E2.

**(3) Additional Cultural Resource Investigations**

During the course of a Section 106 Programmatic Agreement project meeting held in Richmond, Virginia, on October 18, 1993, representatives of the WVDCH, the VDHR, and the Advisory Council on Historic Preservation (ACHP), expressed reservations concerning the level of cultural resource documentation provided in the CSDEIS and accompanying *CSDEIS Historic & Archaeological Resources Technical Report*. It was agreed that additional cultural resource studies would be performed for Scheme Option D5 and Scheme Option E2. Since Scheme Option D5 and E2 consist of the same corridor between Elkins and Bismarck, West Virginia, it was decided that only the portion of each Scheme Option east of Bismarck would be compared in the additional studies.

This additional study included the examination of historical aerial photography (1937/38 and 1952) for both Scheme Options and the comparison of identified historic resource/building locations to the same locations on modern aerial photography and 7.5' U.S.G.S. quadrangle maps. The purpose of this assessment was to provide a comparison of the preservation rate of potentially significant historic resources in Scheme Options D5 and E2. In addition, these Scheme Options were prioritized into zones of high, medium, and low probability for the preservation of prehistoric archaeological resources, based on a field-tested prehistoric settlement pattern model developed for this project. The results of this study were published in an addendum to the *CSDEIS Historic & Archaeological Resources Technical Report*.

The study found that within Scheme Option D5 (east of Bismarck) 253 out of 286 historic buildings or other historic resources identifiable in the historical photographs were still in existence. Analysis of Scheme Option E2 revealed that 488 out of 542 historic buildings or other historic resources identified in historical aerial photography were still in existence. Scheme Option D5 has a greater potential for avoiding historic structures because there are 50 percent fewer historic structures within Scheme Option D5 than within Scheme Option E2. The assessment of the probability of occurrence of prehistoric sites indicated that the Scheme Options were essentially equal although Scheme Option E2 did contain approximately 280 hectares (700 acres) more of high probability area than Scheme Option D5. This study supported the earlier assessment that Scheme Option D5 offered greater potential for avoidance of cultural resources (particularly historic buildings or other historic structures) than Scheme Option E2.

**(4) Socioeconomics**

Scheme Option D5, east of Bismarck, West Virginia, has fewer negative social and economic involvements than Scheme Option E2. There are 370 residences and commercial establishments located within Scheme Option D5 east of Bismarck, while there are 1,081 within Scheme Option E2. Additionally, information obtained during the public involvement phase has revealed that while Scheme Option E2 serves the most people, those citizens and communities located along or close to Scheme Option D5 (Moorefield, Wardensville, Petersburg) have the greatest need for improved access to health care facilities.

Social demand and economic development, and regional planning demands are two of the seven factors studied to determine the project need in *the Transportation Needs Study*. Social demand and economic development refer to the types of social and economic traffic generators, existing and future, that exert a demand on a facility. The level of social demand would be relative to a Scheme Option's proximity to population centers, employers, and public facilities and services. Economic development is a region's potential for growth, normally indicated by its availability of infrastructure such as water supply and wastewater facilities, land use plans and controls, and land suitability. Regional planning demand is determined by regional planning organizations such as the Region 7 and Region 8 Planning and Development Councils which cover the Corridor H project area. These councils have identified a new regional highway as an important element in their development plans and agree that improved east/west access would open markets to the east coast and midwest business and tourism opportunities.

Scheme Option D5 and Scheme Option E2 reach similar numbers of population centers and population. However, Scheme Option D5 reaches these population centers and also demonstrates potential for development in the form of industrial parks. Scheme Option D5 would serve five of the seven industrial parks east of Bismarck. These five parks have 500 acres available to support development. These parks include Hardy County Industrial Park in Moorefield, Wardensville Industrial Park, the new Moorefield Industrial Park, the new Hardy County Industrial Park, and the Grant County Industrial Park located in Petersburg. Along Scheme Option E2, east of Bismarck, there are two industrial parks containing a total of 170 acres available for development: Hampshire County Industrial Park in Romney and the Mineral County Industrial Park in Keyser.

Additionally, Scheme Option D5 would provide the best access to the Virginia Inland Port, located in Front Royal, Virginia. The Virginia Inland Port is a truck-rail intermodal facility whose success relies on incoming motor carriers. Truck traffic from northeastern West Virginia is a small but growing part of the Inland Port business. The *Transportation Needs Study* indicates that a beneficial relationship could be developed between the Corridor H study area in West Virginia and the Inland Port. Increased access to the Inland Port would be provided by the construction of Corridor H with a Strasburg terminus. This access would open up a customer market for raw natural resources such as timber, coal, and limestone that would be delivered by the 50 motor carriers based in the study area to this port facility. Additionally, the largest frozen food customer of the Inland Port is Wampler-Longacre Chicken, Inc. This company's current plans include a $42 million expansion of their Moorefield, West Virginia facility, which is expected to create 850 direct jobs and over 500 additional secondary jobs. Increases in additional personal income generated by these jobs are estimated at $28 million.

**(5) Corridor Selection**

In consideration of potential natural, social, and economic resource impacts, both positive and negative, Scheme Option D5 is the least environmentally damaging of the remaining prudent and feasible alternatives that meets most of the project's transportation-related needs. Additionally, alternative alignments developed within Scheme Option D5 present the most apparent opportunities to avoid all known Section 4(f) land without creating any unique cost, social, economic, or environmental problems.

**b. Public Involvement**

The WVDOH and the VDOT have received over 6,700 letters or signatures on petitions from private citizens, local governments, special interest groups, public officials, businesses and other concerned parties since the circulation of the CSDEIS. Each letter has been acknowledged by the WVDOH and the party's name has been placed on the Corridor H mailing list to receive future documents and project information. In addition to written comments, concerns raised verbally during the public meetings have been noted and made a part of the project record. The form and content of the comment letters on the CSDEIS varied but could be categorized as follows:

- Preference for the "Southern" Alternative (Options under Scheme A, or the eastern portion of Scheme D)
- Preference for the "Northern" Alternative (Options under Scheme E, or the western portion of Scheme D)
- Preference for the No-Build Alternative
- General inquiries requesting information or extension of the comment period
- Questions or comments concerning the SDEIS (summarized in Section III of this document)
- Scheme D could be considered a northern route from Elkins to Bismarck, and a southern route between Moorefield and Interstate 81.

Special interest groups representing the four general positions on the project developed: the Go South Corridor H - Southern Coalition, the North Corridor H Alliance, the H - No Fix Local Roads, and the Down the Road Highway Alternative. These groups utilized media such as newspaper ads, flyers, and bumper stickers to gain support for their position. Some of these groups distributed form letters and circulated petitions that were signed by private citizens

Single issue groups also developed. For example, virtually the entire town of Montrose, West Virginia, sent form letters urging the use of SubScheme KP to avoid their town, should a northern route be chosen. Some organized environmental groups, such as Trout Unlimited and the West Virginia Chapter of the Sierra Club, specifically objected to the use of any of the Scheme A, B, or C Options, but did not specifically support the selection of another Scheme Option. These objections focused primarily on potential disruptions to the Monongahela National Forest, the NRA, the Bowden National Fish Hatchery, the Otter Creek Wilderness area, Dolly Sods, and native brook trout streams.

**(1) Preference for "Southern" Alternatives**

Those in support of construction of a southern alternative cited the following major reasons for their position:

- The southern alternative has less potential to impact wetlands than northern options.
- The southern alternative has better potential for economic development due to higher population than northern options.
- The southern alternatives would result in improved safety over northern options due to less severe weather conditions.
- Lower maintenance costs would result if southern alternatives were selected over northern options due to less severe weather conditions.
- Scheme A was the preferred scheme in 1981 DEIS.
- Existing 6.6 mile segment and 5.5 miles of right-of-way acquired from Bowden to Alpena could be utilized if Scheme A was selected.
- Scheme A is located more centrally between I-64 and I-68.
- Southern alternative would provide more direct route to I-81.
- Southern alternative would provide better access to health care facilities.

Scheme A was commonly referred to as the "southern" route. Most of the Go South citizens favored the use of the original Scheme A (now designated Scheme Option A1) as the corridor that would provide the most opportunity to meet all of the transportation needs in the project area and to realize the greatest economic growth. Some members of the organized Go South group also supported Scheme Options A2, A3, A5 and A6 as prudent and feasible alternatives to the use of Section 4(f) property located within the NRA.

Scheme Option D5 would provide some of the same Southern Route benefits as Scheme A since Scheme D follows the same corridor as Scheme A Options from Moorefield to I-81. However, Scheme D would not utilize the existing four-lane roadway or the right-of-way between Alpena and Bowden.

**(2) Preference for "Northern" Alternatives**

Those in support of construction of a northern alternative cited the following major reasons for their position:

- The northern alternatives are the least costly of all Scheme options.
- The northern alternatives reach more areas identified for growth compared to the southern options.
- There is reduced potential along northern alternatives for environmental impact to streams, wildlife, and Threatened and Endangered Species as compared to Scheme A Options.
- Lesser involvement with National Forests exists along northern alternatives.
- Scheme E would utilize existing four-lane section of Route 50 in Virginia.
- Schemes D or E would serve more people in more incorporated communities than options under Scheme A.
- Schemes D or E would avoid Bowden Fish Hatchery.

The most divided public opinion came from citizens who would be most affected by an option under Scheme E, the northern most route. The majority of the opposition to Scheme E was noted in the form of petition signatures from citizens who reside east of Bismarck.

Those who favored a northern route often cited that it would best serve future economic development, without the potential adverse environmental affects associated with the Scheme A Options. Several supporters of the northern route pointed out the ability of Scheme E to use the existing four-lane section of US 50 between Gore and Winchester, Virginia.

Scheme D is a northern route from Elkins to Bismarck, then turns southeast to join Scheme A, forming the southern route from Moorefield to I-81. Scheme Option D5 would provide some of the same Northern Route benefits as a Scheme E. Scheme Option D5 would avoid Bowden Fish Hatchery, serve more incorporated communities and cost less then a Southern Route.

**(3) Support for the No-Build Alternative**

Those respondents in support of the No-Build Alternative represented a wide variance in their positions. Some respondents clearly opposed the construction of Corridor H. Those in support of the No-Build Alternative cited the following general reasons for their position:

- All Scheme Options are environmentally damaging.
- There is no need for the project.
- The construction is too costly.
- The project will cause an increase in crime and pollution.
- The project will result in loss of character of the area.

The citizens of Virginia and West Virginia attending the Strasburg public hearing voiced nearly unanimous opposition to the construction of Corridor H. Their objections were primarily based on the opinion that any advantages of Corridor H would be outweighed by the disruption to homes, businesses and the environment. Like those Virginia and West Virginia residents who attended the Strasburg hearing, those who attended the Winchester public hearing spoke almost unanimously in favor of the No-Build Alternative.

**(4) Support for the Improvement of Existing Roadways**

Those opposed to the Build Alternative, but expressing support for some improved roadway alternative, cited these reasons for their position:

- The 20% state matching funds could be better spent by providing spot improvements such as localized widening, realignments and provision of passing lanes to improve safety.
- Spot improvements would cost less than the 20% state matching funds.
- The Build Alternative would be environmentally damaging.
- The Build Alternative would change the character of the area.

The improvement of local roads as a method of reducing potential environmental impacts was the subject of considerable discussion throughout the public involvement process.

The Improved Roadway Alternative is discussed in the CSDEIS (i.e. CSDEIS IRA) as an alternative that does not meet the purpose and need of the project. The potential displacement impact of improving local roads to current design standards is qualitatively discussed on page II-5 of the CSDEIS. Because of the interest in the improvement of local two-lane roads, these potential relocation impacts have been quantified to define the potential impact of widening, truck climbing lanes, and curve realignments on total residential and commercial displacements.

Improving local roads to include 12 foot lanes and shoulders would result in large numbers of displacements. For the existing southern routes, improving local roads could potentially result in over 300 displacements. This assumes that no widening would occur within the limits of Elkins, Seneca Rocks, Petersburg, Moorefield, Wardensville, or Lebanon Church.

For the northern routes, improving local roads would potentially require 460 displacements. This estimate assumes that nothing would be done through established neighborhoods in Elkins, Leadsville, Parsons, Thomas, Burlington, Romney, Capon Bridge, or along the four-lane section of US 50 from Gore to Winchester, Virginia.

Based on an average construction cost of $2,000,000 per mile, the cost of these spot improvements would likely range from $250,000,000 to $500,000,000, depending on the exact number of miles of existing local roads improved.

## 5. THE PREFERRED CORRIDOR

Scheme Option D5 was identified as the Preferred Corridor for the following reasons:

1. Scheme Option D5 addresses the identified transportation needs in the project area.
2. Scheme Option D5 best meets the social and economic development needs set forth in the *Transportation Needs Study*.
3. Scheme Option D5 can avoid the use of known Section 4(f) land.
4. Scheme Option D5 provides a greater opportunity to avoid and minimize potential impacts to sensitive environmental resources.
5. Scheme Option D5 best satisfies the combined public support for the construction of Corridor H, regardless of a northern or southern position.
6. Scheme Option D5 accomplishes all of the above, while being next to the least expensive of all the Scheme Options.
7. Scheme Option D5 does not require channelization or relocation of the Lost River.
8. Scheme Option D5 can avoid impacts to Shavers Fork, Greenland Gap, a known population of running buffalo clover, and the town of Montrose.

Sufficient information is contained in the CSDEIS, the CSDEIS Technical Reports, agency comments, and comments generated though the public involvement process, to support the selection of Scheme Option D5 as the Preferred Corridor to be carried forward into the ASDEIS stage of the project.

## E. ALIGNMENT ANALYSIS (ASDEIS): STEP 2 OF THE TIERING PROCESS

Consistent with the process of tiering, following the selection of the Preferred Corridor (i.e. Scheme Option D5), the site-specific alignment development process was undertaken. The purpose of this step of the study process was to determine the least environmentally damaging practicable alternative alignment that could be developed within Scheme Option D5 and to determine specific details of project impacts, costs and potential mitigation measures. These details were developed and presented in the *Corridor H Alignment Selection Supplemental Draft Environmental Impact Statement* (ASDEIS) which was circulated for comment in November, 1994.

### 1. DESIGN CRITERIA

The basic design criteria for the Appalachian Development Highway System are established within the framework of Section 201A-1 of the Appalachian Regional Commission Code. This Section states that, "the design of the development highway system shall be 'comparable' with prevailing Federal-Aid highway standards, specifications, policies, and guides applicable to the projected type and volume of traffic." The prevailing Federal-Aid highway standards for this facility are those which apply to principal rural arterials contained in the American Association of State Highway and Transportation Official's (AASHTO) *A Policy on Geometric Design of Highways and Streets* (1990).

Design criteria used to develop the Improved Roadway and the Build Alternatives are consistent with those used and accepted by FHWA, WVDOH, and VDOT. There are minor differences between West Virginia's and Virginia's roadway cross-section geometry including width of shoulders and ditches, and side slope ratios (Volume II, Table II-1C).

### 2. ALIGNMENT DEVELOPMENT

Alignments were developed for both the Build Alternative and the ASDEIS IRA. Various existing roadways and segments on new location were considered in the development of the ASDEIS IRA, as constrained by the current use and location of the existing roadway network. Alignments under the Build Alternative were developed within Scheme Option D5.

Preliminary alignments for the ASDEIS IRA (where it was on new location) and the Build Alternative were developed to avoid or minimize impacts to: wetlands (photo-interpreted from 1992 aerial photography); known historic and prehistoric sites; existing residential and commercial buildings; streams;

churches, schools, and other public facilities. In addition, the alignments were developed to cross streams as close to perpendicular as practicable and to avoid longitudinal stream impacts where practicable. Alignments were also developed so that existing roads remained in service and relocations of existing roads were minimal. The alignment development process focused on finding a single alignment that most avoided sensitive resources and environmental impacts.

The development of alignments for detailed study and evaluation required an 11-step process involving design engineers and transportation planning specialists; environmental, socioeconomic, and cultural resource specialists; state and federal resource agency representatives, and the public. The 11-step process is presented in Table II-4 (Vol. II). As the table indicates, input from participating resource agencies was an on-going process. Agency comments, concerns and suggestions were considered seriously in the development of alignments and options, and contributed to the decision-making process as to whether or not an alignment or option would be retained or eliminated from further consideration. Resource agency workshops were held in West Virginia and Virginia for the purpose of obtaining concurrence on the final alignments to be retained for further consideration. Additional resource agency workshops were held in West Virginia to develop the *Corridor H FEIS Mitigation Document (Vol. III)* which has been incorporated into this FEIS. Dates of these and other resource agency meetings are found in Table VII-1 (Vol. II). The end result of the alignment development process was:

- A two-lane (with climbing lanes in some locations) ASDEIS IRA made up of a single route on existing and, when required due to design standards, new location and
- A four-lane Build Alternative made up of a single alignment and eight possible option areas (six in West Virginia and two in Virginia) to be carried forward in the preferred alignment selection process.

Abbreviated descriptions of the alternatives considered are presented below.

## 3. ALIGNMENTS CONSIDERED

During the ASDEIS study process, three alignments were considered: the No-Build, the ASDEIS Improved Roadway Alternative (ASDEIS IRA) and the Build Alternative.

### a. No-Build Alternative

The No-Build Alternative consists of maintaining the existing routes between Elkins and I-81. This alternative includes such short-term, minor restoration activities as safety and maintenance improvements, resurfacing, bridge repairs, minor widening, and intersection improvements. These improvements are already a part of both WVDOH's and VDOT's ongoing plan for the continued safe operation of the existing roadway system.

The No-Build Alternative would not improve the efficiency and safety of the needs of the transportation system; would perpetuate a gap in the Corridor H system; and would not meet the goals or the intent of the Appalachian Regional Development Act of 1965. This alternative was eliminated in the CSDEIS but was carried forward into the ASDEIS for further comparison with the Improved Roadway Alternative and the Build Alternative as required by CEQ and FHWA regulations.

**b. ASDEIS Improved Roadway Alternative**

The Improved Roadway Alternative proposed in the CSDEIS (CSDEIS IRA) was eliminated from further consideration in the first tier of this study process because it did not satisfy the purpose and need for the project (CSDEIS pp. II-5-II-7). However, because an Improved Roadway Alternative was of continued public interest and was included in the Virginia Commonwealth Transportation Board Resolution, an Improved Roadway Alternative (ASDEIS IRA) was considered in the ASDEIS. Continued consideration of an alternative already dismissed is consistent with FHWA policy as detailed in FHWA's guidance paper entitled, *The Importance of "Purpose and Need" in Environmental Documents* (1990). That document states in part that, "If an alternative does not satisfy the purpose and need for the project, as a rule, it should not be included in the analysis as an apparent reasonable alternative. There are times when an alternative that is not reasonable is included based on the request of another agency or due to public expectation. In such cases, it should be clearly explained why the alternative is not reasonable (or prudent or practicable), why it is being analyzed in detail and that because it is not reasonable that it will not be selected."

During the alignment selection process, the ASDEIS IRA was developed to a similar level of detail as the Build Alternatives in order to allow a comparison of the environmental consequences of each alternative. The environmental consequences of the ASDEIS IRA are presented in the ASDEIS and this FEIS.

The ASDEIS IRA would consist of a two-lane road with completely uncontrolled access (driveways onto and off of the route). The ASDEIS IRA would be classified as a Rural Arterial Highway with a design speed of 80 kph (50 mph) consistent with AASHTO's design policy (AASHTO, 1990). That policy states in part that, "Rural arterials .... are normally designed for speeds of 40 to 70 mph depending on terrain ....... . .... design speeds of 50 to 60 mph are normally used in rolling terrain and design speeds of 40 to 50 mph are used in mountainous terrain." If an existing roadway would not support an 80 kph (50 mph) speed, the roadway would be reconstructed.

The ASDEIS IRA consists of improving the existing routes within Scheme Option D5 which best connect Elkins, West Virginia to I-81 in Strasburg, Virginia. The design objective of the ASDEIS IRA is to reconstruct existing roads, or construct new sections, so that the resulting facility meets current established design criteria for a two-lane rural principal arterial. Reconstruction consists of adding climbing lanes, widening roadways and shoulders, reducing grades, flattening curves, and realigning to improve sight distance.

The basic design criteria for the Appalachian Development Highway System are established within the framework of Section 201A-1 of the Appalachian Regional Commission Code. This Section states that, "the design of the development highway system shall be 'comparable' with prevailing Federal-Aid highway standard, specification, policies, and guides applicable to the projected type and volume of traffic." The recognized source for this information, as well as the basis upon which design criteria for Corridor H have been established, is the AASHTO's *A Policy on Geometric Design of Highways and Streets* (1990). Elements of the design, such as number of lanes, grade, alignment, and access control, may be varied to achieve the ARC's objective of continuity and reasonable uniformity throughout the system. Design criteria used to develop the ASDEIS IRA are consistent with those used and accepted by FHWA, WVDOH, and VDOT.

In developing the design of this alternative, there were many locations where reconstruction was possible without substantially varying the location of the roadway. However, in some locations, it was necessary to completely relocate the roadway in order to meet the design requirements. For example, a very tight curve on an existing roadway has this configuration because it is following the terrain as it winds up or down a mountain. Straightening such curves would shorten the overall length of the road up the mountain, and thereby make the "new" roadway segment excessively steep. In these situations, the improved roadway segment would be moved to another location in which the grade and curve criteria could be met.

The development of the ASDEIS IRA resulted in the following:

- 6 kilometers (4 miles) of the route had no location change;
- 72 kilometers (45 miles) were widened on current location;
- 79 kilometers (49 miles) consisted of minor relocations or shifts in the centerline; and
- 49 kilometers (31 miles) or 24% of the ASDEIS IRA would, because of design requirements, be on new location.

The ASDEIS IRA would not meet the purpose or need for the project. Specifically, the ASDEIS IRA does not allow for control of the number and frequency of at-grade connections, driveway and other points of access thus increasing safety concerns; provides fewer clear zones; provides less user benefits, continues to include passing zones limited by sight distance and opposing traffic volumes and would increase the probability of pedestrian and bicycle accidents (ASDEIS, P. II-89-91). Additionally, traffic studies indicate that by the year 2013 the ASDEIS IRA would require expansion to a four-lane facility (ASDEIS, P. II-71). Such an expansion would increase the impacts to the environment beyond those calculated for the four-lane Build Alternative.

### c. Build Alternative

The Build Alternative consists of a divided, four-lane highway between Elkins, West Virginia and I-81 in Virginia, with partial control of access on primarily new location with a design speed of 97 kph (60 mph). Detailed alignments for the Build Alternative were developed within the preferred corridor (Scheme Option D5) identified in the *CSDEIS Decision Document*. Development of these alignments took into consideration resources previously identified in the CSDEIS. Of the 52 possible alignments developed, a single alignment (Line A) and nine possible Option Areas (seven in West Virginia and two in Virginia) were retained for further evaluation. Through a series of coordination meetings, the participating resource agencies provided concurrence on the alignment and option areas carried forward under the Build Alternative. The Build Alternative ranges in length from 181 kilometers (112 miles) to 183 kilometers (114 miles), depending on the option area(s) under consideration.

## F. SELECTION OF THE PREFERRED ALTERNATIVE

At its February 1995 meeting, the Virginia Commonwealth Transportation Board passed a resolution concerning alignment selection and the Corridor H project (Volume II, Appendix A). In its resolution, the Commonwealth Transportation Board did not select the four-lane Build Alternative (Line A and/or the Option Areas) or the ASDEIS IRA, as presented in the ASDEIS. Rather, the Commonwealth Transportation Board instructed the Virginia Department of Transportation to, "... study the Route 55 corridor safety aspects such as horizontal and vertical alignments, possible need for truck climbing lanes, intersection improvements, and other safety issues of the roadway." Thus, there is no Preferred Alternative within Virginia.

The Preferred Alternative selected by WVDOH -- which is referred to as Preferred Alternative (WV) -- applies only to the State of West Virginia. The Preferred Alternative (WV) meets the project purpose and need as defined in the *Transportation Needs Study*. The Preferred Alternative (WV) was developed from Line A and the seven Option Areas in West Virginia. The Preferred Alternative (WV) is composed of Line A, except within Option Areas I, F, B and 5-D where the alternative line was selected. Details concerning cost and environmental impacts of each component of the Preferred Alternative (WV) are found in Section III of the FEIS and summarized in Table S-4 (Vol. II).

Within the Interchange Option Area, the selection of Line I as the Preferred Alternative instead of Line A was the result of comments made during the Alignment Selection Public Workshop/Hearing in Elkins

(January 3, 1995). One property owner testified that he would lose a newly constructed building as a result of Line A. This business relocation was not identified during the development of the ASDEIS because construction of the building occurred after mapping and field work had been completed. Line I was selected over Line A because Line I would avoid this additional relocation. Selection of Line I results in additional flood zone impacts and additional habitat units lost. However, Line I results in fewer wetland impacts, fewer farmland impacts, a lower total length of stream enclosures, is less likely to affect archaeological resources and carries a lower construction cost. The WVDOH, in conjunction with the appropriate resource agencies, have weighed these differences and determined that Line I provides the least environmentally damaging practicable alternative in this location. The WVDOH has recommended Line I as the Preferred Alternative within the Interchange Option Area.

In the *ASDEIS*, Line A was selected as the Preferred Alternative in the Shavers Fork Option Area. However, during completion of the FEIS, a modified version of Line S was selected as the Preferred Alternative in order to avoid use of Corricks Ford Battlefield. In addition the modified Line S would reduce the number of bridges over Shavers Fork, decrease the impacts on floodplains, and avoid relocation of proposed American Discovery Trail. Due to the need to avoid Corricks Ford Battlefield, a connection across the battlefield to the community of Porterwood, WV, is not proposed at this time.

In the Forman Option Area, overwhelming public support for Line F was the basis for its selection as a component of the Preferred Alternative(WV). Line F crosses Patterson Creek Road (County 5) at a location that involves fewer standing structures, and places greater distance between the proposed highway and several properties considered to be historically important by the community. Compared to Line A within the Forman Option Area, Line F results in an additional noise impact, encloses additional streams length, and results in additional stream relocations. However, Line F is less likely to affect archaeological resources, results in less impacts to farmlands and is less costly to construct. The impacts to wetlands, flood zones and wildlife habitat is virtually identical between the two alignments. Although the data in the ASDEIS shows Line F relocating one fewer residence than Line A, information obtained at the Moorefield Public Hearing and a letter in the official record show that Line F may also result in the relocation of a home that is currently under construction. Upon examination of the relative merits and impacts of the two alignments within the Forman Option Area, it was determined that opportunities exist to minimize or avoid completely the relocation of Patterson Creek at the Line F crossing. Based on all considerations, the WVDOH has recommended Line F as the Preferred Alternative within the Forman Option Area.

In the Patterson Creek Option Area, Line A was selected as the Preferred Alternative. Line A was selected instead of Line P because Line A would avoid four relocations, involve a smaller percentage of high probability areas for archeological resources, and impact fewer wetlands, streams, farmlands and wildlife habitat.

In the Baker Option Area, Line B was chosen as the Preferred Alternative. Line B would have slightly greater environmental impacts than Line A. However, Line B provides easier direct access to WV 55, which will facilitate more efficient traffic flow to Baker Run elementary and secondary schools as well as to the E. W. Hawse Continuing Care Center. Line B is also less costly to construct than Line A in this option area.

In the Hanging Rock Option Area, Line A was selected as the Preferred Alternative. Line A was selected over Line R because Line A would be located 1,000 further from Hanging Rock then Line R..

Although not presented as an Option Area in the ASDEIS, an alternative alignment west of Needmore was studied during preliminary alignment development. Line 5-D of the early alignment plans (see Table II-8 of the ASDEIS and Sheets 54 and 55 of 108 of the Alignment and Resource Location Plans), was originally eliminated due to wetland and stream impacts. However, the sole primary property owner affected by this alternative alignment location requested a re-evaluation of the merits and impacts to his property and the natural environment of Line A versus Line 5-D. After further examination and possibilities to further modify Line 5-D in the design process, it was determined that the relative impacts to the environment, when weighed against impacts to this farm operation, were not significant. Line 5-D results in a reduction of noise exceedances, relocated poultry facilities, prime farmland impacts, wetland encroachments, and a reduction in stream encroachments. However, Line 5-D would result in a small increase in the number of terrestrial habitat units lost. The WVDOH has modified the Preferred Alternative in this location to follow Line 5-D. The text and tables within the FEIS address this alignment shift as an Option Area in order to allow for comparison against the originally proposed location of Line A.

## G. INTEGRATED NEPA/404 PROCESS

The project was conducted following the guidelines and philosophy of the integrated NEPA/404 process as detailed in FHWA Region 3's agreement with various federal agencies (i.e., FWS, EPA and COE) entitled *Integrating NEPA/404 for Transportation Projects* (1992) and USDOT's publication *Applying the Section 404 Permit Process to Federal-Aid Highway Projects* (1988). This process integrates requirements of the National Environmental Policy Act as they pertain to highway projects with those requirements of Section 404 of the Clean Water Act to facilitate highway planning activities while encouraging the avoidance and minimization of encroachments into waters of the U. S., particularly wetlands. Additionally, state agencies were coordinated with and made part of the process. State and federal agencies were involved at all concurrence points of the project. A complete list of all coordination meetings, subjects and attendees at those meetings can be found in Table VII-1 (Vol. II). As part of the Integrated NEPA/404 Process, a Section 404 permit application has been completed and submitted to the COE. Additionally, the COE's public review process and comment period was integrated into the public review and public hearing process for the proposed highway project.

## H. DESIGN CONSIDERATIONS

In addition to the design criteria and the environmental constraints previously discussed, the following considerations affected the location and characteristics of the alignments studied for the ASDEIS IRA and the Build Alternative.

### 1. ACCESS

Under the Improved Roadway Alternative, access to local roads and private property would be maintained in the same manner as currently exists. To improve safety and operation characteristics, left-turn lanes would be provided at major crossroads. Entrances to private property would be reconstructed in their current location or, in certain cases, moved to improve sight distance.

Under the Build Alternative, access to and from Corridor H was a principal factor in setting the route location. Proper access considerations are an essential element in establishing a network of basic transportation facilities. In general, access to the four-lane facility would be partially controlled by at-grade connections or interchanges, where required by traffic projections. Access points would be generally limited to a maximum of two per side per 1.6 kilometers (per mile) of the proposed facility, with a limiting distance of approximately 3.2 kilometers (2 miles) between interchanges for safety purposes. A minimum distance of 610 meters (2,000 feet) would be maintained between access points, where possible. If warranted, the existing roads would be upgraded in the areas near an access point, to insure proper sight distances.

Property access roads have been shown at locations where they appear warranted at this time, so as not to land lock property. Frontage roads or new at-grade connections to property could be provided where the proposed project would sever private roadways (entrances to private property); and acquisition of all property is not feasible or practicable. During final design, an economic analysis would be completed to determine appropriate connections.

### 2. CLIMBING LANES

Climbing lanes would be provided where necessary for the ASDEIS IRA or the Build Alternative. Climbing lanes are typically provided where the grade, traffic volume, and heavy vehicle volume combine to degrade traffic operations from those on the approach to the grade. Climbing lanes were incorporated into the conceptual design of the proposed project for roadway segments with an uphill grade of 6 percent or greater. Exact locations and lengths of climbing lanes would be determined during final design.

Climbing lane design requirements would be similar to the design requirements of either the Improved Roadway Alternative or the Build Alternative. Climbing lanes would be the same width as the mainline through-lanes. A usable, 1.2 meter (4 feet) shoulder would be provided; 0.9 meters (3 feet) of the shoulder would be paved. In addition, a 0.6 meter (2 feet) offset would be provided from the 1.2 meter (4 feet) usable shoulder to the face of the guardrail.

### 3. CONTINUITY OF EXISTING ROADS

Maintaining the continuity of existing roadways would be achieved almost without exception under both the ASDEIS IRA and the Build Alternative. Because the ASDEIS IRA uses the existing road network, the continuity of the existing system would be preserved. The Build Alternative would not interrupt intra-community travel by residents. Conversely, residents would have the choice of whether or not to use the proposed four-lane facility for more distant trips, or inter-community travel. School buses would likely use the existing local road network; a network made safer, in part, by the re-routing of a portion of the existing traffic volumes to the four-lane facility.

### 4. SPECIAL BRIDGE STRUCTURES

Of the approximate 52 bridges that would be required for the Build Alternative, most would be designed as shown in Exhibit II-4 (Vol. II). Less than 10 bridges may require special bridge design considerations due to long spans and/or heights above existing ground. In these situations, design engineers might use arch bridges, cable-stayed bridges, or suspension bridges. These bridges would most likely be single structures and not the typical dual bridge. The decision on the exact bridge type depends on the final location and elevation of the highway. Once the location and elevation are determined, a number of conceptual bridge designs and costs would be developed during preliminary engineering. A final decision on bridge type would be made based on an evaluation of the conceptual designs.

### 5. SCENIC DESIGN FEATURES

It is the intent of WVDOH to incorporate scenic features in the design of Corridor H, given the natural beauty of the project area and the important role tourism plays in the economy of the region. In addition, the Corridor H resolution passed by Virginia's Commonwealth Transportation Board (May, 1993) included a statement in support of such design efforts. As part of the resolution, the Board directed that, "... the (alignment development) study seek to develop alternatives that could facilitate designs of the highway in keeping with the broad community goals to develop the region as a tourist and visitor attraction which highlights the unique historical and cultural attractions of the region ...". As a means to this end, the Board further resolved that "... in order to achieve such goals and accommodate desired traffic, the alignment and ultimate design of the highway should be more parkway in character in preference to traditional, four-lane interstate or arterial standard facility...".

As such, scenic design features have been incorporated into the design of the Build Alternative. The process by which scenic design features were incorporated was based on a literature search of parkway features, an evaluation of their application to Corridor H, and their implementation. The implementation of scenic design features would require specific approval from WVDOH or VDOT because such features are not among the designated design criteria and established standards of practice. In Virginia, scenic design feature implementation would also be based, in part, on guidance from the Virginia Advisory Committee.

**a. Literature Search**

Numerous sources and examples were evaluated as part of the literature search. Applicable design guidance was obtained from publications by such sources as the Transportation Research Board, the Virginia Transportation Research Council, AASHTO, FHWA, and the Virginia Department of Conservation and Recreation's Scenic Byway Program. Notable parkway facilities such as Skyline Drive, the Blue Ridge Parkway, and Vail Pass were also examined for design concepts that could be incorporated into Corridor H.

There are two basic types of scenic roadways: scenic byways and parkways. Scenic byways are typically low speed, low volume, two-lane roads that serve as an alternate route between or to points of interest. Parkways are typically arterial highways, often for non-commercial traffic only, generally operate at lower speeds, and are located within a park or a long, narrow, park-like area. Based on these definitions, the scenic design features used for Corridor H would be more parkway-like in character (AASHTO, 1970).

**b. Application to Corridor H**

The literature search resulted in 13 possible design features evaluated for implementation in the design of Corridor H. Of the thirteen features evaluated, 10 were determined to be applicable. These features and their applicability are presented in Table II-2 (Vol. II).

Design constraints for maximum gradient and degree of curvature eliminate the possibility of designing the roadway strictly to follow the terrain. In addition, because one of the primary purposes of the roadway is to be an economic development highway, it is not possible to restrict usage to non-commercial traffic.

**c. Implementation of Scenic Design Features**

Where appropriate, the applicable scenic design features identified in Table II-2 (Vol. II) would be incorporated into the final design of the Build Alternative or the ASDEIS IRA. The location of possible scenic overlooks and interpretive facilities are discussed in the Visual Analysis of Section III.

## 6. PEDESTRIAN AND BICYCLE FACILITIES

WVDOH and VDOT have given full consideration to bicycle alternatives and the aspect of providing reasonable alternatives for the bicycling public. The provision of bicycling facilities has become an important consideration in many urban areas nationwide as a result of increased interest in bicycling for transportation and recreation. Even though the proposed project is located entirely in a rural area, such facilities were considered in the design process as a possible mitigation measure in the event the Preferred Alternative would impact recreation resources.

WVDOH is committed to investigating the feasibility of incorporating bicycle and pedestrian facilities along state roadways. Guidelines established by AASHTO are used by WVDOH for the evaluation and design of bicycle and pedestrian facilities. Similarly, VDOT is committed to constructing bicycle facilities along state roadways provided that the following conditions are met:

- The bicycle facility will not impair the safety of the bicyclist, motorist, or pedestrian and is designed to meet current AASHTO Guidelines and/or VDOT guidelines.

- The bicycle facility will be accessible to users and will form a segment located and designed pursuant to a comprehensive plan that has been adopted by a local jurisdiction, or is part of the AASHTO-approved Interstate Bicycle Route System.

- The bicycle facility will have sufficient use to justify expenditure of public funding for construction and maintenance; or the bicycle facility is a significant link in a comprehensive bicycle system.

VDOT initiates bicycle facility construction only at the request of the affected local government, with the exception of the AASHTO-approved Interstate Bicycle Route System.

The existing roadway does not have continuous, separate facilities for pedestrians. It currently does not receive even moderate amounts of pedestrian traffic nor is it expected to in the future. Therefore, separate pedestrian facilities would not be provided under any of the proposed alternatives except for a pedestrian bridge for the Allegheny Trail at the Cheat River Valley Scenic Overlook (Section III. J) for the Preferred Alternative (WV). However, any bicycle facility constructed or provided under any of the proposed alternatives may be available for pedestrian use. Project-related impacts to existing or proposed pedestrian and bicycle facilities are discussed in Section III under Recreation Resources.

**a. Bicycle Facility Types**

The construction of several types of bikeway facilities within the construction limits of the proposed alignments was considered for this project. A bikeway is any road or path that, in some manner, is specifically designated as being open to bicycle travel; this is regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes. There are numerous methods to provide bicycle facilities. Two methods that best apply to this project are:

- **Bicycle Facilities Using a Shared Roadway** - Bikeways could be provided on the same travel lanes as motor vehicles. On such shared roadways, bicyclists would legally use the same travel lanes as motorists. Shared lanes would typically feature 3.7 meter (12 foot) lane widths or less with shoulders (including limited-width rumble strips designed to accommodate bicyclists); thus, allowing cars to safely pass bicyclists.

- **Bicycle Paths** - A bicycle path is a bikeway that is physically separated from a roadway by an open space or barrier. It would be located either within the highway right-of-way or within an independent right-of-way.

**b. Consideration of Bicycle Facility Types for each Alternative**

No additional project-related bicycle facilities would be provided under the No-Build Alternative. Bicycle facilities provided under the ASDEIS IRA could include shared roadway use and paved shoulder use. Bicycle facilities provided under the Build Alternative could include a separate facility or bicycle path.

Four screening criteria were used to identify suitable areas where bicycle facilities could be constructed under the ASDEIS IRA and Build Alternatives.

- Access - Presence of intersections or interchanges which would permit cyclists and pedestrians to access the facility safely.
- Grades - Existing or proposed roadway grades greater than 5 percent are not suitable. Steeper grades make ascent difficult and users may lose control during descent (AASHTO, 1991).
- Scenic Vistas - Access to scenic vistas or existing or planned scenic overlooks.
- Connections - The potential to connect to existing or planned bicycle or pedestrian trails.

Under the ASDEIS IRA, a separate bicycle facility could not be provided. The proximity of the ASDEIS IRA to existing structures would limit the taking of any additional right-of-way for the use of a separate bicycle path. Therefore, the ASDEIS IRA would need to be made as bicycle user-friendly as possible. The existing ASDEIS IRA travel lanes could be used as a shared roadway where the existing roadway would not be relocated. Where the ASDEIS IRA would be relocated, the 2.4 meter (8 foot) paved shoulders could be used to accommodate bicyclists. The actual locations of such facilities would be determined during final design of the ASDEIS IRA.

Under the Build Alternative (Preferred Alternative), a separate facility for bicycle and pedestrian traffic (a bike path) could be provided. Alignments under the Build Alternative were screened to identify potentially suitable locations for such facilities. Using the screening criteria, nine segments along Line A were identified as potential locations in which bikeway facilities could be incorporated. In addition, bicycle facilities could also be provided within the following Option Areas: Interchange (Line I, Preferred Alternative), Forman (Line F, Preferred Alternative), Baker (Line B, Preferred Alternative), Hanging Rock (Line R), and Lebanon Church (Line L). Portions of these alignments were determined to have suitable grades and access for the inclusion of a bikeway facility. The potential location of these facilities is described in Table II-3 (Vol. II).

Each concept has its distinct advantages and disadvantages that should be weighed carefully in the selection of the type of facility. As previously noted, further detailed evaluation of several design issues should be completed to evaluate fully the feasibility of constructing a bikeway facility along any of the segments identified in Table II-3 (Vol. II).

The actual locations of such facilities would be determined during final design. In addition, while it may be physically possible to construct a bikeway facility at the locations identified, provision of such facilities is not required, and the decision to fund and construct such a facility remains with WVDOH, VDOT, and/or other government agencies.

## I. DESCRIPTION OF THE NO-BUILD ALTERNATIVE

The No-Build Alternative consists of a continuation of the existing routes between Elkins and I-81. This alternative includes such short-term, minor restoration activities as safety and maintenance improvements, resurfacing, bridge repairs, minor widening, and intersection improvements. Such improvements are already a part of both WVDOH's and VDOT's ongoing plan for the continued, safe operation of the existing roadway system.

## J. DESCRIPTION OF THE IMPROVED ROADWAY ALTERNATIVE

The ASDEIS IRA is approximately 206 kilometers (128 miles) long. Approximately 184 kilometers (114 miles) would be in West Virginia and 23 kilometers (14 miles) would be in Virginia. Of the ASDEIS IRA's 206 kilometers, approximately 3 percent (6 kilometers or 4 miles) of the existing roadway would remain unchanged and 35 percent (72 kilometers or 45 miles) would require widening. Minor relocation would be required along approximately 38 percent (79 kilometers or 49 miles) of the ASDEIS IRA and would include such construction activities as straightening of curves and reducing grades. Roadway relocation would be required along approximately 24 percent (49 kilometers or 31 miles) of the proposed ASDEIS IRA. Table II-5 (Vol. II) provides a breakdown of the required construction activities along the ASDEIS IRA.

An overview of the ASDEIS IRA alignment is presented in Exhibit II-5 (Vol. II) with greater detail contained in the Alignment and Resource Location Plans. A descriptive overview of the ASDEIS IRA route is presented below.

The western terminus of the ASDEIS IRA would tie in to WV 33/US 250 in Aggregates, West Virginia. This tie-in would connect the ASDEIS IRA to the completed, four-lane Corridor H facility to the west. To maintain continuity of the existing Corridor H facility and due to projected traffic volumes near Elkins, the ASDEIS IRA would continue on four lanes to the interchange with US 219 and Laurel Mountain Road (County 11). This four-lane section of the ASDEIS IRA would be on new location. It would provide a northern bypass of Elkins, an at-grade crossing of Gum Road (County 14), and cross over Laurel Mountain Road (County 11). Following its diamond interchange with US 219, the ASDEIS IRA would begin its transition to a two-lane facility. The transition from four to two lanes would extend approximately 1,250 meters (4,100 feet) northeast of the US 219 interchange to a point where the ASDEIS IRA would tie in with existing US 219. The ASDEIS IRA would then continue as a two-lane facility.

The ASDEIS IRA would follow existing US 219 and provide at-grade connections at Israel Church Road (County 3), Gilman Road (County 1), Harpertown Road (County 1), County 219/1, and Stalnaker Road (County 9) via a connector road. The ASDEIS IRA would primarily follow US 219 to a point approximately 1,097 meters (3,600 feet) south of Kerens, West Virginia. From this point south of Kerens, the ASDEIS IRA would be on new location, bridging the Western Maryland Railroad and Leading Creek, providing an at-grade intersection with Triplett Road (County 7), and tying back in to US 219 north of Kerens.

North of Kerens, the ASDEIS IRA would primarily remain on existing US 219 to a point approximately 549 meters (1,800 feet) south of Cherry Fork. Here, the ASDEIS IRA would be on new alignment to cross

Cherry Fork, then tie in to US 219 approximately 610 meters (2,000 feet) north of the crossing. With the exception of minor straightening of curves, the ASDEIS IRA would primarily remain on existing US 219 from this point to the eastern side of Parsons, West Virginia. Existing at-grade connections would be maintained.

From the eastern side of Parsons, the ASDEIS IRA would primarily be on new alignment as it climbs Backbone Mountain to a point approximately 244 meters (800 feet) northeast of its crossing of Long Run. From this point to approximately 610 meters (2,000 feet) west of Thomas, WV, the ASDEIS IRA would alternate between new and existing alignment. The ASDEIS IRA would bypass Thomas to the south, tying in to WV 32 just east of town. The ASDEIS IRA would primarily follow WV 32 on existing alignment to the intersection of WV 93. From this point, the ASDEIS IRA would turn to the northeast and follow WV 93, primarily on existing alignment, to a point approximately 732 meters (2,400 feet) west of the Bismarck Road (County 50/3) intersection. Existing at-grade connections would be maintained where the ASDEIS IRA remains on existing roadways. Where the ASDEIS IRA would be on new alignment, at-grade connections would be provided at intersections with Wolf Run Road (County 31) and Mackeyville Road (County 219/4), as well as at several points along existing US 219.

West of Bismarck Road, the ASDEIS IRA would turn to the southeast on new location. Following its crossing of Abrams Creek, County 42/1 and Little Creek, the ASDEIS IRA would turn due south to ascend the Allegheny Front. The ASDEIS IRA would then pass along the base of Fore Knobs, ultimately turning to the east and crossing WV 42, approximately 152 meters (500 feet) south of the intersection of WV 42 and 93 and Scherr, West Virginia. The ASDEIS IRA would continue to the east on new alignment, paralleling the southern side of Greenland Road (County 1) and the North Fork of Patterson Creek. Through this area, at-grade intersections would be provided at County 42/1 and at the intersection with WV 42 and WV 93.

To avoid Greenland Gap, a National Natural Landmark, the ASDEIS IRA would cross and then parallel County 42/3 in a southward direction, along the base of New Creek Mountain. Continuing to the south for approximately 1,219 meters (4,000 feet), the ASDEIS IRA would then turn to the east through a narrow pass in New Creek Mountain. On the eastern side of the mountain, the ASDEIS IRA would then turn to the north, continuing in this direction to its connection with Greenland Gap Road (County 3/3).

Once tied back to Greenland Gap Road, the ASDEIS IRA would turn east, generally following these existing routes: Greenland Gap Road to Knobly Road (County 3); Knobly Road to Belle Babb Lane (County 2); Belle Babb Lane to a point approximately 122 meters (400 feet) west of its intersection with Martin Road (County 3/2). While basically following these routes, the ASDEIS IRA would be on new alignment along much of them. At-grade connections would be provided for all of the above roads.

West of Martin Lane, the ASDEIS IRA would turn to the southeast, bridge the North Fork of Patterson Creek, and cross County 5 approximately 1,219 meters (4,000 feet) south of the intersection of Belle Babb Lane and County 5. An at-grade intersection would be provided at the ASDEIS IRA crossing of County 5. The ASDEIS IRA would then turn to the northeast, continuing towards Williamsport Twin Mountain Road (County 5/2) as it ascends Patterson Creek Mountain. As it begins its descent of the mountain, the ASDEIS IRA would turn to the south just after the at-grade intersection with Williamsport Twin Mountain Road and Old Fields Road. This portion of the ASDEIS IRA would be on new alignment.

Remaining on new alignment, the ASDEIS IRA would cross Patterson Creek Mountain in a southeast direction. Approximately 107 meters (350 feet) west of the intersection of Old Fields Road with Delta 4, the ASDEIS IRA would cross Old Fields Road with an at-grade intersection and then generally follow the road to its intersection with WV 28/US 220. Through this area, the ASDEIS IRA would alternate between new and existing roadway; providing at-grade intersections with Old Fields Road in locations where the ASDEIS IRA would be on new alignment and providing an at-grade intersection with Fish Pond Road (County 220/8) and WV 28/US 220.

Once tied-in to WV 28/US 220, the ASDEIS IRA would continue to the south, remaining on this existing roadway to a point approximately 1,067 meters (3,500 feet) north of the County 55/3 intersection in Moorefield, WV. From this point, the ASDEIS IRA would turn to the east on new location and connect with WV 55. From its connection with WV 55 to the intersection of WV 55 and Cunningham Lane (County 15), the ASDEIS IRA would alternate between using existing WV 55 to being on new location. At-grade intersections would be provided at Powder Spring Road (County 23/1), County 23/15, and Cunningham Lane.

Approximately 183 meters (600 feet) south of Cunningham Lane, the ASDEIS IRA would turn to the east on new location, paralleling the southern side of WV 55, then turn to the northeast to cross over WV 55 and pass the Lawn Knob to the north. The ASDEIS IRA would tie-back in to WV 55 to the east of Lawn Knob. Alternating between new location and existing WV 55, the ASDEIS IRA would provide at-grade intersections to WV 55 where it would be on new alignment and would maintain existing intersections where it remains on WV 55.

The ASDEIS IRA would be on new location from its intersection with Upper Skaggs Run Road (County 23/3) to a point approximately 183 meters (600 feet) west of the WV 55 intersection with Luxemberg Road (County 23/4). Here, the ASDEIS IRA would rejoin WV 55, and generally remain along the existing road to its eastern terminus in Strasburg, Virginia. The ASDEIS IRA would maintain existing access as it passes the West Virginia communities of Needmore, Baker, McCauley, and Wardensville and the Virginia communities of Star Tannery, Wheatfield, and Lebanon Church.

## K. DESCRIPTION OF THE BUILD ALTERNATIVE

Various alignments and alignment options were considered in the development of the Build Alternative. The general location of the alignments developed for the Build Alternative is presented in Exhibit II-5. (Vol. II) The Alignment and Resource Location Plans present more specific location details of the Build Alternative. A descriptive overview of the alignments retained for further consideration is presented below.

The alignment development process resulted in a single alignment (Line A), from Elkins, West Virginia to I-81 in Virginia, to be carried forward in the alignment development and selection process. In locations where a single alignment could not be easily determined, option areas were developed: seven are in West Virginia and two are in Virginia. The West Virginia Option Areas include Interchange (Line I), Shavers Fork (Line S), Patterson Creek (Line P), Forman (Line F), Line 5-D (Line 5-D), Baker (Line B), and Hanging Rock (Line R). The Virginia Option Areas include Duck Run (Line D1 and Line D2) and Lebanon Church (Line L). An option area indicates that, within a specific area, there is more than one Build Alternative alignment from which to choose.

Lines A, I, S (modified), F, B and 5-D of the Build Alternative were selected for the Preferred Alternative (WV). VDOT did not select a preferred alternative nor have they identified a preferred alignment for the Build Alternative. Therefore, when references are made to Line A in Virginia -- also referred to as Line A (VA) -- no preference is associated with this alignment over any other alignment or alternative.

### 1. LINE A IN WEST VIRGINIA

Line A is approximately 183 kilometers (114 miles) long. Approximately 161 kilometers (100 miles) are in West Virginia.

The western terminus of Line A would tie in to WV 33/US 250 in Aggregates, WV. This tie-in would connect Line A to the completed, four-lane Corridor H facility to the west. This connection would result in a reconfiguration of the existing roadway. Line A would directly connect to the completed four-lane facility to the west and existing WV 33/US 250 would be provided an at-grade connection to Line A approximately 244 meters (800 feet) to the east of the tie-in. A parking area for access to fishing in the Tygart Valley River would be built along the portion of the existing WV 33/US 250 roadway no longer in service.

Line A would provide a northern bypass of Elkins. Continuing to the east, Line A would bridge Gum Road (County 14) north of Crystal Springs and would relocate and bridge Laurel Mountain Road and US 219 in the vicinity of Claylick Run. At this location, portions of both Laurel Mountain Road and US 219 would require minor relocations to improve the geometry of the proposed connection to Line A. To the east of Highland Park, Line A would provide an interchange with US 219. Turning to the northeast, Line A would then bridge Pearcy Run and Gilman Road (County 1) and provide an at-grade connection to Gilman Road. Line A would then bridge Leading Creek and the Western Maryland Railroad. An at-grade connection would be provided where Line A would cross US 219 west of Kerens.

Line A would bypass Kerens to the east, bridging Clifton Run Road (County 7). Continuing to the northeast, Line A would bridge County 3/4 and then turn to the east to enter the Monongahela National Forest. As it enters the Forest, Line A would be parallel to and south of Pleasant Run (also called Pheasant Run). It would bridge Slabcamp Run and County 47/1. Further to the east, Line A would bridge Shavers Fork near the confluence of Pleasant Run.

To the east of its crossing of Shavers Fork, Line A would turn to the northeast. Line A would then provide an at-grade connection to Government Road (County 41). In the vicinity of Porterwood, Line A would provide two additional at-grade connections with Government Road, bridge Shavers Fork twice, and provide an at-grade connection to US 219.

Line A would then proceed along the base of Fork Mountain, just south of Parsons. Through this area, Line A would bridge County 219/7 (part of the current route for the proposed American Discovery Trail). Further to the east and north of Hambleton, Line A would bridge the Black Fork and then provide an interchange for access to US 219, WV 72, and Mackeyville Road (County 219/4). To improve the geometry of the connection between Mackeyville Road and Line A, a minor relocation of Mackeyville Road would be required. Just after the Mackeyville Road relocation, Line A would turn to the north as it begins its ascent of Backbone Mountain.

As Line A traverses Backbone Mountain, Mackeyville Road would be bridged twice and would have two additional at-grade connections to the line. Its last at-grade connection to Line A would include an at-grade connection to US 219 and would require a minor relocation of a portion of Mackeyville Road to improve the roadway geometry. Continuing to the northeast, Line A would cross and then follow Olsontown Road (Forest Road 717 and 18). This portion of Line A would require the relocation of approximately 2.8 kilometers (1.8 miles) of Forest Roads 717 and 18. Further to the east, the relocated road would have a new at-grade connection to US 219, as well as to Line A.

Atop Backbone Mountain and traveling east towards Coketon, Line A would bridge Big Run, cross over Long Run, and provide at-grade connections to three unnamed roads. Once in the Coketon area, Line A would bridge the North Fork of the Blackwater River, Douglas Road (County 27), and the eastern and western sides of the abandoned Western Maryland Railroad. This alignment of Line A allows for the avoidance of the Douglas Highwall Reclamation Project to the south and the town of Thomas to the north.

Continuing on its eastward path, Line A would provide an at-grade connection with an unnamed road and an interchange at its crossing of WV 32 and its connection to WV 93; just north of the town of Davis. Line A would exit the Monongahela National Forest in the vicinity of the proposed interchange. Line A would use or parallel existing WV 93 from its connection just west of Davis to a point just west of Bismarck. Along this route, Line A would bridge the Western Maryland Railroad just west of Mount Storm Lake; provide an interchange with WV 93 approximately 1,158 meters (3,800 feet) east of the lake; and provide several at-grade connections to WV 93, several unnamed access roads, and County 42/1.

Approximately 1.6 kilometers (1 mile) to the east, Line A would bridge WV 42/93 and begin its descent of the Allegheny Front. Line A would require the relocation of a portion of WV 42/93. Along its descent, Line A would provide frontage road access to several unnamed roads. Upon reaching New Creek Mountain, Line A would turn to the south, following the western side of the mountain's base for approximately 7.2 kilometers (4.5 miles). Along this area, Line A would bridge both Elklick Run and Greenland Road (County 1) and then provide a connection to Greenland Road and WV 93. Continuing in a southerly direction towards Greenland, Line A would bridge and connect with Greenland Road a second time. Then Line A would bridge Greenland Road for a third time as well as bridge the North Fork of Patterson Creek. In this area, Line A would pass to the west of and avoid Greenland Gap.

Still following the western side of the base of New Creek Mountain, Line A would provide an at-grade connection with Cal Lyons-Tom Mason Road (County 42/3) and then remain in a southerly direction, parallel to Cal Lyons-Tom Mason Road. Line A would then turn to the east at a gap in New Creek Mountain. Bridging the Middle Fork of Patterson Creek, Line A would cross Knobly Mountain in the gap created by the creek. In a southeasterly direction, Line A would then cross the area between Knobly and Patterson Creek Mountains. Through this area, Line A would bridge then provide an at-grade connection to Knobly Road (County 3). Line A would provide an at-grade connection to an unnamed road and cross, then parallel Thorn Run to a point approximately 457 meters (1,500 feet) west of the line's interchange with County 5 in the Forman area.

Continuing to the southeast, Line A would ascend Patterson Creek Mountain through a gap in the mountain. Once through the gap, Line A begins its descent, bridging Toombs Hollow and County 10/5. Line A would cross the valley between Patterson Creek Mountain and South Branch Mountain. Across this valley, Line A would turn to the south and bridge both Delta 4 and Walnut Bottom Run, and provide an at-grade connection with Fish Pond Road (County 220/8). South of Old Fields, Line A would provide an interchange at the crossing of US 220/WV 28. Turning to the southeast, Line A would then bridge the South Branch of the Potomac River and its floodplain, bridge the South Branch Valley Railroad, and then bridge and provide an at-grade connection to Trough Road (County 6), just north of Cunningham Lane.

Continuing to the east, Line A would somewhat parallel WV 55, providing an interchange at WV 55 approximately 518 meters (1,700 feet) east of the base of Potato Row. Cunningham Lane would have access to this interchange via an at-grade connection to WV 55. Ascending South Branch Mountain, Line A would then bridge Clifford Hollow to the west of Lawn Knob. Additional access to WV 55 would be provided via access to an at-grade connection to North River Road (County 1). As it descends South Branch Mountain, Line A would provide an at-grade intersection with Upper Skaggs Run Road (County 23/3). West of Needmore, Line A would turn to the south and would bridge Luxemberg Road (County 23/4) and provide an at-grade connection to WV 55.

North of Needmore, Line A would bridge Long Lick Run and Rock Oak Road (County 8). Line A would then parallel Baker Run along the base of Short Mountain. Continuing to the southeast, Line A would bridge Baker Run and WV 55 in the vicinity of the newly realigned section of WV 55. South of Baker, Line A would provide an interchange with WV 259 at the base of Little Ridge. Baker Run would again be bridged, as would the Lost River. Crossing over North River Mountain toward McCauley, Line A would again bridge the Lost River, WV 55, and McCauley Road (County 23/7).

Crossing Lost River, Line A would then follow the southeastern side of Hanging Rock Ridge and then bridge Sauerkraut Run. Continuing approximately 457 meters (1,500 feet) east, Line A would provide an at-grade connection with WV 55. Line A would then bridge the Lost River and WV 55 in the vicinity of river sinks and enter the George Washington National Forest. Line A would proceed to cross Sandy Ridge and then exit the forest. From Sandy Ridge to Wardensville, Line A would provide an at-grade connection to Squirrel Gap Road (Forest Road 344), and provide a bridge and at-grade connections to Trout Run Cut Off (County 23/12), and Trout Run Road (County 23/10). Line A would also bridge Trout Run to the southwest of Wardensville.

Line A would pass south of Wardensville, following the base of Anderson Ridge. Cutting across the toe of Anderson Ridge, Line A would provide an at-grade connection to Waites Run Road (County 5/1), then bridge Waites Run. The at-grade connection to Waites Run Road would require the relocation of a portion of this road to improve the geometry of this connection. Line A would remain to the south of the J. Allen Hawkins Community Park.

To the east of the park and Wardensville, Line A would begin its ascent of Great North Mountain and re-enter the George Washington National Forest. From this area to the Virginia state line, much of Line A would be located within the forest. Line A would also provide an at-grade connection with WV 55 approximately 213 meters (700 feet) west of the Virginia state line.

## 2. LINE A IN VIRGINIA

Line A is approximately 183 kilometers (114 miles) long. Approximately 22 kilometers (14 miles) are in Virginia. As noted above, Virginia has decided not to proceed with the construction of this portion of Line A at this time. Nevertheless, the Virginia portion of Line A was considered as a part of the Build Alternative in evaluating the environmental impacts of this project. For purposes of clarity, the impacts of Line A in Virginia -- also referred to as Line A (VA) -- have been distinguished from the impacts of Line A in West Virginia.

Entering Virginia, Line A would begin its descent of Great North Mountain. Line A would also cross the Big Blue Trail, requiring the relocation of a portion of the trail, as well as a portion of Forest Road 93. Line A would run parallel to and then bridge Duck Run, along the base of Paddy Mountain. Line A would bridge Duck Run, then follow the base of Short Mountain, paralleling the northern side of VA 55. Continuing to the southeast, Line A would bridge VA 608, VA 603, and VA 600. An at-grade connection to VA 55 would be provided approximately 488 meters (1,600 feet) east of the VA 55 intersection with VA 600.

Continuing to the southeast, Line A would exit the George Washington National Forest then bridge VA 604 and Cedar Creek north of Star Tannery. Further east, Line A would provide access to VA 55 via an at-grade connection just east of Laurel Hill. East of this connection, Line A would bridge Turkey Run and VA 714 then turn to the southwest just south of Wheatfield. From this area, Line A would follow the base of Little North Mountain then bridge VA 623 requiring the relocation of VA 623's at-grade connection to VA 55. Continuing in its southwesterly direction, Line A would avoid Lebanon Church by passing to the west of it. Approximately 229 meters (750 feet) south of Lebanon Church, Line A would provide an at-grade connection to VA 55 via a connector road and an interchange. Continuing in its southwesterly direction, Line A would then bridge both VA 741 and VA 623. At its third bridging of VA 623, Line A would provide an at-grade connection to eastbound lanes.

Following its third bridging of VA 623, Line A would then turn to the southeast. Line A would bridge then provide an at-grade connection via a connector road to VA 622. From this point, Line A would turn towards the south and tie into VA 55 at the existing I-81 interchange.

## 3. OPTION AREAS IN WEST VIRGINIA

Within West Virginia, there are seven possible option areas which provide alternate alignments to Line A: Interchange Option Area (Line I), Shavers Fork Option Area (Line S), Patterson Creek Option Area (Line P), Forman Option Area (Line F), Line 5-D Option Area (Line 5-D), Baker Option Area (Line B), and Hanging Rock Option Area (Line R). The following provides a summary of each option area in West Virginia.

**a. Line I: Interchange Option Area**

Line I would remain on the same alignment as Line A as it crosses the existing intersection of US 219 and Laurel Mountain Road (County 11). The difference between Line I and Line A at this location is that, where Line A would bridge this intersection, Line I would provide access to it via an interchange. The interchange along Line I would require the relocation of a portion of US 219 and Laurel Mountain Road. In addition, the interchange along Line I would eliminate the need for the Line A interchange approximately 823 meters (2,700 feet) to the northeast.

Within the Interchange Option Area, Line I is approximately 2.4 kilometers (1.5 miles) long; approximately the same length as Line A.

**b. Line S (Modified): Shavers Fork Option Area**

Line S has been modified from the alignment presented in the ASDEIS, in order to avoid the boundaries of Corricks Ford Battlefield. Modified Line S would diverge from Line A and cross Shavers Fork south of Kalars Ford. Modified Line S would travel north along the flank of Fork Mountain. Unlike Line A, modified Line S would not provide a connection to US 219 near the Porterwood due to the need to avoid the Corricks Ford Battlefield. Modified Line S would converge with Line A to the west of Parsons.

Within the Shavers Fork Option Area, modified Line S is approximately 4.4 kilometers (2.7 miles) long compared to Line A, which is approximately 4.2 kilometers (2.6 miles) long.

**c. Line P: Patterson Creek Option Area**

Line P would diverge from Line A west of the gap in New Creek Mountain, just south of Greenland and Scherr. Line P would follow a more northerly route than would Line A in the area between New Creek Mountain and Knobly Mountain. Once at the base of Knobly Mountain, Line P would parallel the northern side of the Middle Fork of Patterson Creek. Continuing to the southeast, Line P would bridge and then provide an at-grade connection to Knobly Road (County 3). Line P would converge with Line A just to the east of Thorn Run.

Within the Patterson Creek Option Area, Line P would be approximately 6.8 kilometers (4.2 miles) in length compared to Line A, which would be approximately 6.5 kilometers (4.0 miles) in length.

**d. Line F: Forman Option Area**

Line F would diverge from Line A approximately 823 meters (2,700 feet) west of Line A's interchange with County 5, just south of Forman. In this area, Line F would follow a more northeasterly route than Line A. Line F would provide an interchange with County 5 to the south of Thorn Run. Line F would then turn to the southeast, towards Patterson Creek Mountain, and bridge County 5/3 and County 5/5. Line F would converge with Line A as it begins its ascent of Patterson Creek Mountain, to the east of Forman.

Within the Forman Option Area, Line F is approximately 5.1 kilometers (3.2 miles) long compared to Line A, which is approximately 5.0 kilometers (3.1 miles) long.

**e. Line 5-D**

Line 5-D separates from Line A near Luxemberg Road (County 23/4) just before it turns to the east and parallels Long Lick Run to the east. Line 5-D bridges Long Lick Run and Rock Oak Road (Co. 8) just north of where it connects back into Line A.

**f. Line B: Baker Option Area**

Line B would diverge from Line A north of Needmore, in the vicinity of the bridging of Long Lick Run and Rock Oak Road (County 8). Here, following an easterly route, Line B would pass to the north of Baker. An at-grade connection would be provided at an unnamed road to the north of Baker Church. In its entirety, Line B would remain north of Baker Run and WV 55 to the point at which it would bridge and provide an interchange with WV 55/WV 259. Line B would converge with Line A to the east of Baker, following its bridging of the Lost River.

Within the Baker Option Area, Line B is approximately 5.3 kilometers (3.3 miles) long compared to Line A, which is approximately 4.1 kilometers (2.5 miles) long.

**g. Line R: Hanging Rock Option Area**

Line R would diverge from Line A at a point approximately 1,524 meters (5,000 feet) southwest of the crossing of the Lost River near Hanging Rock. Here, Line R would cross the Lost River west of Line A, passing approximately 61 meters (200 feet) to the west of the formation known as Hanging Rock. Line R would continue to the northeast for approximately 1,067 meters (3,500 feet) to the point where the line converges with Line A.

Within the Hanging Rock Option Area, Line R is approximately 3.4 kilometers (2.1 miles) long compared to Line A, which is approximately 3.8 kilometers (2.3 miles) long.

### 4. OPTION AREAS IN VIRGINIA

Within Virginia, there are two possible option areas which provide alternate alignments to Line A: Duck Run Option Area (Line D1 and Line D2) and Lebanon Church Option Area (Line L). These option areas were considered in assessing the environmental impacts of the Build Alternative in Virginia and are not a component of the Preferred Alternative which consists solely of the Line A and associated options areas in West Virginia. The following provides a summary of each option area in Virginia.

#### a. Line D1 and Line D2: Duck Run Option Area

Line D1 would diverge from Line A in the vicinity of the Virginia state line. Line D1 would require the relocation of a portion of VA 55 in the vicinity of where it would be bridged. Continuing to the east, Line D1 would run north of and parallel to VA 55 to its bridging of VA 609. At this point, Line D1 would exit the George Washington National Forest and turn to the southeast to bridge Duck Run and VA 55. Here, Line D1 would follow the base of Paddy Mountain, pass to the south of Cold Spring, and then turn to the east to bridge Duck Run and VA 55 again. At the base of Short Mountain, Line D1 would follow the same alignment as Line A to the eastern side of the bridging of VA 600.

Line D2 would follow the same alignment as Line A from the Virginia state line to a point approximately 457 meters (1,500 feet) west of Line A's first crossing of Duck Run. Line D2 would not cross Duck Run at this location. At the point where Line D2 diverges from Line A, Line D2 would turn to the southeast, following the base of Paddy Mountain and remaining on the southern side of and parallel to Duck Run. Continuing to the east, Line D2 would then exit the George Washington National Forest as it bridges VA 603. Approximately 183 meters (600 feet) to the east, Line D2 would then bridge VA 55. Line D2 would converge with the alignment of Line A after the bridging of VA 600.

Within the Duck Run Option Area, Line D1 is approximately 9.0 kilometers (5.6 miles) long, Line D2 is approximately 8.4 kilometers (5.2 miles) long, and Line A is approximately 8.7 kilometers (5.4 miles) long.

#### b. Line L: Lebanon Church Option Area

Line L would diverge from Line A just west of the bridging of Turkey Run and VA 714. Line L would then continue in a more easterly direction, passing to the south of Wheatfield then bridging VA 55 and crossing over Eishelman Run. From here, Line L would turn to the south and provide an interchange at VA 628. At this interchange, Line L would turn to the south, passing to the east of Lebanon Church. Continuing in its southerly direction, Line L would terminate at a new interchange with I-81, to the north of Strasburg. Across this area, Line L would bridge Mulberry Run, the intersection of VA 629 and 631, provide an at-grade connection via a connector road to VA 631, bridge VA 622 and then provide an interchange at the I-81 terminus.

Within the Lebanon Church Option Area, Line L is approximately 7.3 kilometers (4.5 miles) long compared to Line A, which is approximately 8.5 kilometers (5.3 miles) long.

## L. ALIGNMENTS CONSIDERED BUT ELIMINATED UNDER THE BUILD ALTERNATIVE

Alignments considered but eliminated in developing the Build Alternative can be divided into two categories: those lines developed only to a centerline and those lines that were more fully developed. Lines developed only to a centerline had horizontal alignments set but did not necessarily have vertical alignments. In some instances, an acceptable vertical grade was not possible. Lines fully developed had both horizontal and vertical alignments set, as well as the construction limits calculated.

Table II-6 (Vol. II) presents the lines developed only to a centerline and the basis for eliminating them from further consideration. Fourteen alignment segments were eliminated at the centerline stage due to excessive impacts or undesirable design restrictions. Table II-7 (Vol. II) presents the lines that were fully developed and identifies their basis for elimination. Approximately 42 segments of fully developed alignments were eliminated due to excessive impacts, undesirable design restrictions, or excessive costs. Both the centerline and fully developed alignments eliminated from further consideration are shown in black on the Alignment and Resource Location Plans. While sections are numbered from east to west, project-related impacts are reported from west to east. As a result, the Sections presented in Tables II-6 and II-7 (Vol. II) are in descending order.

## M. TRAFFIC ANALYSIS

A traffic analysis was prepared for the three alternatives carried forward (the No-Build Alternative, the ASDEIS IRA, and the Build Alternative). The analysis identifies traffic volumes for a variety of development scenarios and identifies the facility improvements that would be necessary to provide an adequate level of service. Traffic volumes along the existing roadways within the study area were projected to present day 1993, opening year 2001, and design year 2013. These volumes represent the No-Build Alternative volumes. A traffic model was developed for each of these No-Build years that simulates the existing travel patterns within the roadway network. The roadway network represented in the models for years 2001 and 2013 was then adjusted to reflect transportation improvements associated with construction of the ASDEIS IRA or the Build Alternative. New traffic volumes for years 2001 and 2013 were developed based upon these improvements. These volumes are identified as ASDEIS IRA volumes or Build Alternative volumes. As the result of the Virginia's decision to not identify a Preferred Alternative, additional traffic analyses were carried out for WV55, which are discussed in Section IV of this FEIS.

The ASDEIS IRA involves upgrading existing roadways and constructing new roadway in some areas to provide an improved east-west routing through the study area. The Build Alternative involves the construction of a partially-controlled four-lane highway on new alignment. Existing crossroad connections to the ASDEIS IRA would be maintained and few new connections to the ASDEIS IRA would be required. The Build Alternative proposes new connections to state and county roads, where feasible. Each intersection was analyzed using the design year volumes predicted by the model and a decision was made regarding the type of connection that would be necessary to provide adequate serviceability.

The boundaries of the study area and corresponding network were developed by identifying the limits of a 30-minute commute from the proposed location of Corridor H. The limits of the 30-minute commute were determined by measuring the distance that would be traveled during 30 minutes. Interstates were assumed to have faster travel speeds than primary roads, and primary roads were assumed to have faster travel speeds than secondary roads. This 30-minute commute concept is discussed in detail in Section III-A, Economic Environment. The resulting study area extends east to I-81 and west to US 219 and WV 72, and includes all of Tucker, Grant, and Hardy Counties; parts of Preston, Mineral, Barbour, Hampshire, and Randolph Counties in West Virginia; part of Garrett County in Maryland; and parts of Frederick and Shenandoah Counties in Virginia.

## 1. BACKGROUND DATA AND METHODOLOGY

### a. Traffic Data

Traffic volume growth rates for West Virginia roadways were provided by WVDOH. The growth rates are specific to the county and roadway designation (i.e., interstate, state route, and county route). These growth rates were applied to the traffic volumes for the existing West Virginia roadways represented in the network. VDOT provided recent average daily traffic volumes (ADTs) and future 2010 daily traffic volumes for Virginia roadways. Annual growth rates were calculated and applied to the traffic volumes for the existing Virginia roadways represented in the network. The West Virginia growth rates were averaged according to roadway designation for the counties in the study area and applied to the roadways in Maryland. ADTs were projected to the present day 1993 and the design year 2013. The projected ADTs were used to verify the daily traffic volumes that are predicted by the traffic model for the No-Build Alternative.

An estimate of the number of trips that traveled completely through the study area was made to determine the percentage of existing trips in the network that would divert to an improved "through" route. The *Traffic and Transportation Technical Report* of the CSDEIS estimated this number to be equal to 50% of the volume of the least traveled link along the two existing primary routes through the study area. The primary east-west traffic movements through the study area are served by two routes: a northern route which follows US 219, WV 93, and US 50 between Elkins, West Virginia and Winchester, Virginia and a southern route which follows WV 55 and VA 55 between Elkins, West Virginia and Strasburg, Virginia. It was estimated that there were approximately 1,400 vehicles per day making this east-west trip in 1993 (using one of the two routes). This volume was projected to reach 2,000 vehicles per day in the year 2013.

In addition to the trips that currently travel through the study area, it was necessary to estimate the number of vehicles that would divert to a new or improved roadway through the study area if one were made available for such use. An Origin and Destination (O/D) survey of the vehicles which could use such a roadway was conducted. Survey stations were established at rest areas along Interstate 79 between Clarksburg, WV and Fairmont, WV and along Interstate 64, between Lewisburg, WV and Covington, VA.

At the I-79 survey station, 165 motorist were surveyed out of the 271 motorist which were present in the rest area where the survey was conducted. During the survey period, 3,921 vehicles passed the rest area northbound on the interstate. Sixteen percent of the vehicles entering the rest area were heavy vehicles. The motorists were asked their point of origin and destination. Each survey response was reviewed, and each origin and destination was evaluated to determine if the motorist could have used the study area to complete their trip but choose to travel around the study area. Motorists tend to choose their travel routes that require the least amount of time to travel. Therefore, drivers that are currently circumventing the study area would be expected to travel through the study areas because a travel time savings would result from a new four-lane roadway. Four percent of the heavy vehicles and almost seven percent of the passenger cars would be expected to have utilized the Corridor H area if a new highway was available for use at the time of the survey.

At the I-64 survey station, 135 motorists were surveyed out of the 182 motorists who were present in the rest area where the survey was conducted. During the survey period, 762 vehicles passed the rest area westbound on the interstate. Twenty-eight percent of the vehicles entering the rest area were heavy vehicles. The motorists were asked their point of origin and destination. Each survey response was reviewed, and each origin and destination was evaluated to determine if a travel time savings would result from an new four-lane roadway through the study areas. Fourteen percent of the heavy vehicles and nineteen percent of the passenger cars would be expected to have utilized the Corridor H area if a new highway was available for use at the time of the survey.

Using the collected information and the ADT volumes for these interstates, the number of daily trips that would be expected to utilize the study area over a 24 hour period was calculated. This "latent" demand was calculated to be approximately 5,500 vehicles per day for the year 2013. These volumes represent the maximum number of vehicles that could be expected to divert from outside the study area and travel through the study area on a new, four-lane facility.

It was also necessary to evaluate the latent demand for the ASDEIS IRA. While it is anticipated that an upgraded two-lane roadway may attract fewer vehicles than a new four-lane facility, there are no accepted criteria that would accurately represent this reduction. Both the Build Alternative and the ASDEIS IRA would offer a travel time savings when compared to the "round about" routing offered by Interstates 64 and 68. However, to account for what may be fewer volumes attracted to an improved two-lane facility, the latent demand volumes were reduced by 10% when applied to the ASDEIS IRA. Ten percent roughly corresponds to the percentage of heavy vehicles currently traveling Interstates 64 and 68 that would divert to a new four-lane facility but would not divert to an improved two-lane facility. The resulting latent demand volume for the ASDEIS IRA in the year 2013 was predicted to be approximately 5,000 vehicles per day.

### b. The Modeling Process

The study area was modeled using the Quick Response System (QRSII) computer program and involved a three-step process to forecast travel within a network. First, the entire study area was divided into the county Block Numbering Areas (BNA) identified by the US Census Bureau. Most of these areas were further divided into Traffic Analysis Zones (TAZs). Boundaries for the TAZs were developed by comparing the existing areas of development with the existing roadway network. The socioeconomic aspects of the TAZs and the roadway network can then be described in terms of nodes, links, and centroids: Nodes generally represent the intersection of two roadways; links connect one node to another representing the roadway segments between intersections; and centroids are connected to the links (or nodes) and represent the locations along the network where trips are generated from and are attracted to.

The roadways represented in the existing network included the principal through highways as noted on the official state map of West Virginia, and US and State highways as noted on the official state map of Virginia. These highways included multi-lane divided roads (controlled access and uncontrolled access) and two lane roads (uncontrolled access). In areas where principal through highways were not located, "important paved connecting road", as noted on the West Virginia map, and "two lane paved county highways", as noted on the Virginia map, were added to the network. Where important paved connecting roads were located close to each other, the roadway that connected more prominent communities was added as a link, and the other road's communities were represented with a centroid.

Input parameters that identify the number of people living and working in each TAZ, the number of households in each TAZ, along with the average auto ownership and the average income of the households in each TAZ were entered into the model. Each of the TAZs is represented in the network by a centroid connected to a network link. These TAZs can be seen in the exhibits prepared for the discussion of

"Highway Capacity Analysis" (Exhibits II-6 through II-9 (Vol. II)). The program determines the number of trips that are generated from and attracted to all of the TAZs in the network.

The second step of the process is the distribution of trips. Once the network has been described and a TAZs capacity to generate or attract trips is determined, the model distributes these trips throughout the network. The trip distribution identifies how many trips are attracted from one TAZ (centroid) to another TAZ (centroid).

The third step converts the trip distributions identified in step two into route assignments. The trips (vehicle trips at this point) are assigned to the route which represents the shortest travel time through the network. As a result of the trip assignments, vehicle volumes can be generated for individual links and turning volumes can be generated for individual nodes.

The QRSII program has the capability to do an "all or nothing trip assignment" or a "capacity constrained trip assignment". With an all or nothing trip assignment, vehicle trips for individual origin-destination pairs are assigned to the shortest route based upon the travel times assigned to the links along the route. These link travel times will be maintained regardless of the capacity a particular link may have to carry the volumes assigned to it. With a capacity constrained trip assignment, the program assigns trips to the individual links along a route until a link begins to approach capacity. As a link approaches capacity, the program will recalculate the travel time along the link based upon the number of vehicles assigned to it. The program will then use the revised link travel time to recalculate the shortest route for the remaining origin-destination pairs.

The all or nothing assignment technique was used in this model. The all or nothing assignment identifies the raw trip demand. If a particular O/D pair is overloading a link, it would become evident in an all or nothing assignment. This same overload, if modeled with a capacity constrained trip assignment, could become buried in an alternate route to which the overload trips were assigned. The all or nothing assignment technique is best used to determine the need for improvements for a network based upon motorist demand, whereas the capacity constrained assignment technique is best used to determine an existing network's capability to handle a traffic generating improvement (i.e. a land development project).

The QRSII program was designed to forecast trips in an urban area. By stripping away aspects of the program that do not pertain to a rural area and by revising some of the program defaults for trip generation and trip attraction parameters, QRSII can be used as a rural forecasting model. The key to this process is a diligent effort in calibrating the model. Socioeconomic data for 1993 was entered into QRSII and the program was run with the program default values for trip productions and attractions. The link volumes predicted by the program were compared to the ADTs projected for the represented roadways in 1993, the base year. The production and attraction parameters for the program were then revised and the program re-run until the link volumes predicted by the program generally matched those that were projected for the represented roadway segments for the base year. This included the number of trips produced per household, which is typically less in rural areas than in urban areas because of the greater distances that must be traveled in rural areas. In addition to revising the production and attraction parameters, adjustments were made in the proportions of the socioeconomic parameters of each TAZ within a BNA. If, within a BNA, the model was producing higher than average volumes on roads in one area and lower than average volumes in another area, then the proportion of socioeconomic parameters (number of households and the amount of retail employment and non-retail employment) was redistributed within the TAZs to represent better the characteristics of the BNA. The trip production and attraction parameters developed for the base year were then used to generate trip assignments for the 2013 No-Build scenario.

The study area is unique in the fact that, while it is predominately rural, there are pockets of urban development scattered throughout it. Trip-making characteristics for an urban area are not the same as those for a rural area. To account for these differences, the model was established and calibrated as a rural area and additional trips were added to or detracted from some of the links in the areas that exhibited characteristics of an urban community. The 2013 No-Build volumes resulting from the model was compared to roadway volumes projected to 2013 using historic growth trends provided by the WVDOH and VDOT. This comparison was used to draw out minor discrepancies that surfaced in both the 1993 and 2013 volumes. Minor adjustments were again made to the model. The results of the overall calibration process indicate that the model used for this study was able to predict 99.3% of the total vehicle volumes for the 1993 network. For the No-Build scenario in 2013, the model predicted 96.6% of the volumes projected for the traffic model.

### c. The Analysis Scenarios

Four independent analysis scenarios were modeled based on the existing (1993) and future (2013) conditions.

1. 1993 Existing. A model was constructed to represent the existing highway network within the study area. Socioeconomic parameters representing conditions for 1993 were used as input. The model was calibrated by making adjustments to the trip attraction and trip production parameters so the link volumes predicted by the model generally agreed with those that were actually counted on the roadways.

2. 2013 No-Build. This model was constructed from the calibrated 1993 base year model. It reflects the 1993 highway network for the study area. Socioeconomic input parameters representing conditions anticipated for 2013 No-Build were calculated using a straight line growth factor from 1993. A

comparison to the volumes projected in accordance with state growth rates for 2013 indicated that no further adjustment to trip attraction and trip production parameters was needed.

3. 2013 Improved Roadway Alternative. This model was constructed from the 2013 No-Build model. The highway network was revised to show a limited number of additional links that represented areas where the alignment of the ASDEIS IRA substantially departed from the existing roadways. Link travel times along roadway segments associated with the ASDEIS IRA were revised to show an improved travel time. Socioeconomic input parameters representing conditions anticipated for the 2013 ASDEIS IRA were similar to those used for 2013 No-Build. Existing volumes representing vehicles traveling through the study area (between Elkins and Strasburg) were reassigned from the existing roadway segments to the ASDEIS IRA. Vehicle volumes representing anticipated latent demand were also added.

4. 2013 Build. This model was constructed from the 2013 No-Build model. The highway network was revised to show the proposed Build Alternative. Socioeconomic input parameters representing conditions anticipated for 2013 Build were generated using the Corridor H Development Model which accounted for the secondary development that could occur due to the introduction of a four-lane facility into the study area. (See Section III-A, Economic Environment for details on the Corridor H Development Model.) Existing volumes representing vehicles traveling through the study area (between Elkins and Strasburg) were reassigned from the existing roadway segments to the Build Alternative. Vehicle volumes representing anticipated latent demand were also added.

#### d. Projected Traffic Volumes

The projected traffic volumes for the individual links representing the roadway segments within the study area are shown in Table II-8 (Vol. II). These volumes include the estimates for the existing through volumes and the anticipated latent demand volumes as they apply to each of the four analysis scenarios. The predicted volumes for this network analysis are rounded to the nearest thousand vehicles per day.

### 2. ANALYSIS

#### a. Highway Capacity Analysis

Level of Service (LOS) is a standard index of the relative service provided by a roadway. LOS can range from A through F, where LOS A indicates freeflow conditions and LOS F indicates forced flow beyond capacity. According to calculations derived from the *Highway Capacity Manual* (TRB, 1994) for mountainous areas like the study area, approximately 4,300 vehicles per day (ADT) results in a LOS of D for a two-lane facility and approximately 8,800 ADT results in LOS E. In contrast, a four-lane facility in mountainous terrain such as the project area would not reach LOS C until ADT approaches 26,000 (TRB, 1994).

Exhibits II-6 through II-9 (Vol. II) are schematic diagrams of the study area roadway network for each of the four analysis scenarios. The width of each link represents the existing or projected traffic volumes for each individual roadway segment that comprise the study area roadway network. Under the No-Build Alternative, some sections of the existing roadway network will require four lanes by the year 2013. Under the ASDEIS IRA, the entire length of the roadway from Elkins to Strasburg would require four lanes by the year 2013. Under the Build Alternative, the traffic volumes anticipated to use the facility in 2013 would justify the use of four lanes.

**b. Corridor H Connection Analysis**

The connections along Corridor H have been identified, and a determination has been made regarding the type of connection required to accommodate the traffic volumes predicted by the model for the design year. Average daily traffic volumes and Turning Movement Volumes (TMVs) were calculated for the design year.

Design criteria for Corridor H dictates that access to the proposed four-lane facility from crossroads be made from at-grade, stop-controlled approaches or from grade-separated interchanges. The Build Alternative is intended to provide a continuous and uninterrupted route for vehicles traveling the mainline. Consequently, signalized intersections along the Build Alternative have not been considered. The criteria used in this analysis to determine the need for grade separations are "signal warrants". Signal warrants test the design year ADTs. Warrant 1 tests the total volume of traffic entering an intersection and Warrant 2 tests the delay experienced on the minor streets (USDOT, 1988).

The following procedure for determining the crossroad connection requirements was used. If the volumes on the mainline and crossroad did not exceed either warrant, an at-grade connection was considered adequate. An at-grade connector would allow full movement at the intersection. Vehicles on the minor road would approach the main line from either direction and be allowed to turn right or left onto the main line or continue straight through and cross the main line. A grade separated crossing with a single connector roadway would provide an intersection onto the main line from one direction and would allow only right and left turns. The through movement would bridge or be bridged by the main line. If the conflicting traffic volumes at a proposed crossroad connection exceeded the volumes in either warrant, it was assumed that the roadways would require at least a grade-separated crossing with a single, at-grade connector roadway to accommodate the turning movements between the crossroad and the Build Alternative. If the traffic volumes at the intersection of the connector roadway and the Build Alternative met or exceeded either warrant, an interchange was provided at that location.

It is important to note that the above warrants served as a guide in determining the connection requirements. Other factors including the proximity of the connection to a town or developed area, the route designation of the crossroad, the type of terrain and geometry of the connection area, and the distance between interchanges, were also considered in determining the design requirements of the connection. Decision making in borderline cases generally would provide a facility with greater capacity rather than one with less capacity.

**c. Vehicle Miles Traveled**

To calculate the daily vehicle miles traveled, the ADT volumes for each section of the roadway were multiplied by the length of each section, then added together to arrive at daily vehicle miles traveled. This calculation was performed for each Alternative. To calculate the daily travel time, ADT volumes for each section of roadway was multiplied by the length of each section and the travel speed of that section, then added together to arrive at a daily travel time. This calculation was also performed for each Alternative. These calculations were usually shown to illustrate a savings that will be made with the construction of the project. The results of these analyses are presented in Table II-9 (Vol. II).

**d. User Benefit Analysis**

The benefits calculated are based solely on reduction in travel time and distance and do not attempt to quantify changes to the standard of living. This analysis is intended to illustrate the benefits associated with the existing user. Since one of the purposes of this road is to open the project area to outside markets, thus making economic development programs more viable, the project may create additional benefits beyond those included in this user benefit analysis. Such benefits may include increased employment, improved way of life, and increased tax base.

Using the results of the traffic model, a user benefit analysis of the alternatives was calculated. The procedure was based on the methodology described in AASHTOs 1977 manual, *A Manual on User Benefit Analysis of Highway and Bus-Transit Improvements.*

Traffic forecasts produced by the modeling process include two categories which influence the user benefits associated with each alternative. These categories are: 1) traffic generated by secondary development which is forecast to occur as a result of the Build Alternative; and 2) traffic that diverts to the Build Alternative or Improved Roadway Alternative and is expected to travel completely through the corridor.

To calculate the user benefits that are associated only with the existing users of the system, the additional traffic that is anticipated to be generated from the secondary development was removed from the 2013 Build Alternative network.

The link volumes calculated for the ASDEIS IRA and Build Alternative networks also include motorists attracted to the study area because both alternatives would result in a travel time savings between I-81 and I-79. It is estimated that approximately 5,500 vehicles per day will divert to the Build Alternative in 2013. The ASDEIS IRA is anticipated to attract slightly less at 5,000 vehicles per day in 2013.

User benefits occur when a transportation improvement results in a reduction in total user costs. Existing motorists (Internal Users) would experience a reduction in travel distance and travel time offered by the Build Alternative and the ASDEIS IRA. Travel benefits would also be realized by motorists from outside of the study area (External Users) who use the Build Alternative or the ASDEIS IRA. User Benefits for both the Internal and External Users were calculated.

The resulting user benefits (in 1993 dollars) for the ASDEIS IRA would be $49.5 million in 2013, whereas the user benefits for the Build Alternative would be $62.2 million in 2013. Amortizing these benefits over the design life of the project results in a total User Benefit as a result of a reduction in travel distance and travel time reduction. The total User Benefit would be $449.0 million for the ASDEIS IRA and $571.6 million for the Build Alternative. This total reflects an estimate of the economic benefit that would be received by individual users of the roadway; it does not reflect other economic and non-economic benefits that also would be generated by the project such as increased employment, expanded tax base and reduced accident rates.

### 3. SAFETY CONSIDERATIONS

#### a. Access

An access conflict is an accident that involves a vehicle turning onto or off of a side road and a vehicle traveling on the main road. In 1992, almost 20% of all West Virginia accidents were access conflicts and 21% were rear end collisions. One of the most probable causes for rear end collisions is that the driver is unaware of an upcoming intersection, according to *The Manual on Identification, Analysis and Correction of High-Accident Location* (Missouri Highway and Transportation Department, second edition, 1990).

Under the Improved Roadway Alternative, the number and frequency of at-grade connections would not be limited or controlled. On rural two-lane highways the rate of accidents per million vehicle miles traveled increases as the number of intersections per mile increases (Cirillo *et al.*, 1970). From 1987 to 1990, the study area was experiencing accident rates higher than those cited in Cirillo *et al.* (1970).

The Build Alternative would provide fully controlled access with interchanges located at US 219, US 219/WV 72, WV 32, WV 93, County 5, US 220/WV 28, WV 55, WV 259, VA 55, and I-81. Other access connections on the Build Alternative would partially control the access by providing direct at-grade connections with low volume roads and providing connector roads to higher volume roads. Also, all access points would be at least 610 meters (2,000 feet) apart and limited to two per side per 1.6 kilometers (1 mile) for safety reasons.

**b. Clear Zones**

Clear zone is the unobstructed area provided beyond the edge of the travel way for the recovery of errant vehicles (AASHTO 1990, p. 343). The width of this area is relative to the speed of the main road and the slope of the clear zone, but is generally considered to be 30 feet (AASHTO 1990, p. 112). In 1992, 25% of all accidents occurring in West Virginia were the result of the vehicle running off the road. The ASDEIS IRA could not always provide the appropriate amount of clear zones due to its proximity to existing potential hazards such as houses, walls, or other obstructions. Unlike the ASDEIS IRA, the Build Alternative would provide clear recovery zones to minimize the damage and hazard that would result from a vehicle leaving the road.

**c. Passing Zones**

The ASDEIS IRA would provide truck climbing lanes where determined to be warranted by grade and length of grade; however, passing zones would continue to be used in many areas. Even though the design speed would be 80 kph (50 mph), the opportunity to pass would still be limited by sight distance and opposing traffic volumes and could result in head-on collisions. In 1992, 4% of the accidents in West Virginia were head-on collisions (Crash Data, p. 8).

The Build Alternative would provide two lanes in each direction to enable faster vehicles to pass in the inside lane without opposing conflicts and, where warranted by grade and length of grade, truck climbing lanes would be provided for additional passing opportunities.

**d. Pedestrian and Bicycle Traffic**

Because the ASDEIS IRA would upgrade the existing roads where homes and business are located, pedestrian and bicycle traffic would be unrestricted. Conflicts between these modes of travel would increase with the increase in traffic resulting from the improved roadways. Refer to Page II-30, *Design Criteria,* for discussion of pedestrian and bicycle facilities for this project.

### e. Future Roadway Improvements

Traffic studies completed for the ASDEIS found that construction of Line A between Elkins and I-81 would not contribute to a deterioration in LOS on the roadway within the 30 minute contour. As the result of the decision by Virginia to not pursue construction of Line A or the IRA, additional traffic studies were conducted for the FEIS to determine the effect of construction of the Preferred Alternative in WV on the LOS of VA 55. Those studies indicated that some deterioration of LOS on VA 55 will occur without improvements to that facility (FEIS, Section IV).

## 4. CAPON SPRINGS

WVDOH was requested to investigate and analyze the potential traffic impacts that the Build Alternative and the Improved Roadway Alternative would have on Capon Springs and Farms. Specific concerns of Capon Springs and Farms relate to the potential for increased travel along County 16 through the resort area by motorists viewing County 16 as a short-cut between VA 55 and WV 259. The recent increase in residential development in Hampshire County is viewed by the resort managers as a contributing factor to these concerns.

Capon Springs and Farms is located along County 16 in Hampshire County, West Virginia, approximately 7 miles northeast of Wardensville. The two travel routes compared in this analysis include VA 55 to WV 55 to WV 259 and VA 609 to County 16 between the intersection of VA 609 and VA 55, southeast of Capon Springs and the intersection of County 16 and WV 259, west of Capon Springs. The VA 55 to WV 55 to WV 259 route is approximately 13 miles long and is posted with a 50 mph speed limit. The roadways along this route are constructed of bituminous concrete and are approximately 20 to 24 feet in width. The County 16 to VA 609 route is approximately 7 miles long and is posted with a 25 mph speed limit near Capon Springs and Farms but is unposted to the east of the resort. West Virginia state law states that prudent speed of 35 mph should be used on unposted gravel roads. However, a field view of this roadway showed that it would be difficult to maintain a speed of 35 mph on County 16 to VA 609, east of the resort. County 16, west of the resort, is a bituminous concrete roadway approximately 16 to 18 feet in width. County 16 to VA 609 east of the resort is an earthen and gravel roadway approximately 12 to 15 feet wide.

While the travel distance along County 16 to VA 609 is approximately 6 miles shorter; the travel time along this route was measured to be nearly the same (one minute longer) than the travel time along VA 55 to WV 55 to WV 259. This demonstrates that there is currently no travel time advantage to utilizing County 16 as a shortcut between VA 55 and WV 259. The mountainous terrain and poor roadway conditions along County 16 and VA 609 east of the resort also indicates that there is no apparent advantage by way of comfort or convenience for traveling along this route as opposed to the VA 55 to WV 55 to WV 259 routing.

A previous study conducted by the WVDOH in December 1992 states that, "Total traffic volumes along County Route 16 range from 360 ADT to the resort area to 110 ADT from the resort area to the Virginia State Line. The majority of these trips are assumed to be local trips to and from the Intermont, Yellow Springs and Capon Springs area." The relative magnitude of these volumes is supported by information contained on the West Virginia Traffic Volume Map. This source identifies an ADT of 550 vehicles per day along County 16 between WV 259 and the resort area for the year 1990. Neither the West Virginia Traffic Volume Map nor the Virginia Roadway Inventory identifies an ADT for County 16 to VA 609 east of the resort. Based upon the absence of ADT data, a recent field view of the roadway, and the traffic volumes documented in the December 1992 report, it can be concluded that the eastern segment of County 16 carries a very minimal amount of traffic. The substantial difference between the traffic volumes along County 16 west of the resort area and the traffic volumes along County 16 to VA 609 east of the resort area is an indication that most of the traffic along County 16 to VA 609 is local traffic, specifically destined for the Capon Springs Resort or the environs adjacent to it. This is the same conclusion drawn in the December 1992 report, "the majority of the traffic using County Route 16 is local traffic."

Construction of the Build Alternative or the ASDEIS IRA is not anticipated to alter the local nature of travel along County 16 to VA 609. The Build Alternative does not provide a direct connection with VA 609. Without improvements to County 16 to VA 609, there is no quantifiable reason to expect an increase in travel along this route from through traffic. Further, the Build Alternative would provide a third means of travel from VA 55 to the intersection of WV 259 and County 16. The travel time from Corridor H (Sta 8090) to WV 55 at Sta 7805 to WV 259 to County 16 would be shorter than either of the existing routes, from the same point on VA 55 (Sta 8090). Consequently, all traffic projected in 2013 would be allocated to this route.

## N. CONSTRUCTION COSTS

Table II-10 (Vol. II) presents a comparison of the preliminary construction cost estimates by alternative and option area. The No-Build Alternative would be the least expensive in that no project-related construction costs would be associated with it. In its entirety, the ASDEIS IRA would cost $415,797,000. The Preferred Alternative (WV) would cost $951,746,000 to construct, averaging $5,914,391 per kilometer ($9,510,340 per mile). Line A (VA), if it was to be constructed, would cost $122,583,000.

Within the Option Areas, Line A would be more costly to construct than the Option Area alignments, with the exception of Line L in Lebanon Church, although in many cases the differential cost is small. Note that the construction cost of Line L does not include the cost of an interchange that would be developed in conjunction with I-81 improvements.

## O. OTHER COSTS

The total cost of each alternative involves the costs of right-of-way acquisition and mitigation, as well as the construction costs. Table II-11 (Vol. II) identifies the right-of-way and mitigation costs associated with each alternative. Total costs by alternative are presented in the Table S-2 (Vol. II).

### 1. RIGHT-OF-WAY ACQUISITION COSTS

Costs of right-of-way acquisition have been developed in accordance with methods used by the WVDOH and VDOT. For projects of this magnitude, estimates for the acquisition of property are developed on a unit cost basis (per hectare or acre for land; per kilometer or mile for utilities). Costs of residential and industrial/business property acquisition are developed based on the type of displacements and average cost for each property type. In West Virginia, unit costs were obtained from WVDOH. Right-of-way costs in Virginia were estimated and provided by VDOT.

Table II-11 (Vol. II) provides a breakdown of right-of-way acquisition costs by alternative. Right-of-way costs estimates were not prepared by Option Area because the differences in land use/land cover and displacements were negligible.

### 2. MITIGATION COSTS

Various mitigation measures are discussed in the *Corridor H FEIS Mitigation Document (Vol. III)*, which has been incorporated into the Final EIS. For those mitigation measures that are quantifiable at this time, an estimate of the cost of these measures has been provided by alternative and are included in Table II-11 (Vol. II).

## P. ADDITIONAL ANALYSES

The Intermodal Surface Transportation Efficiency Act (ISTEA) states that transportation projects that provide a "significant increase in a single occupancy vehicle (SOV) capacity in air quality nonattainment Transportation Management Areas (TMAs)" must undergo congestion management system (CMS) planning and analyses based on Section 1024 of ISTEA and the FHWA/Federal Transit Administration Interim Guidance for metropolitan planning issued on April 6, 1992. The requirements to conduct a CMS analysis do not apply to this project for the following reasons: the entire Corridor H project area is in attainment for carbon monoxide and ozone and, the project area does not meet the definition of a TMA (an urbanized area with population greater than 200,000).

In addition to the CMS requirements, ISTEA requires that a Major Investment Study (MIS) be performed for all major metropolitan transportation investments. Because there are no Metropolitan Planning

Organizations (MPOs) within the project, and not having met the TMA definition, these new requirements are not applicable to Corridor H and, as such, were not carried out in the study efforts.

# EXISTING ENVIRONMENT AND IMPACTS

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# SECTION III: EXISTING ENVIRONMENT AND THE ENVIRONMENTAL IMPACTS

Text that is underlined in Section III represents instances where revisions have been made to the ASDEIS based on identification of the Preferred Alternative, modifications to the project, updated information on the affected environment, changes in the assessments of the impacts, the selection of mitigation measures, the results of coordination, comments received on the ASDEIS and responses to these comments. Such revisions are consistent with preparation of an FEIS as discussed in FHWA's 1987 Technical Advisory T 6640.8 entitled *Guidance for Preparing and Processing Environmental and Section 4(f) Documents.* This section combines the description of the existing environment with the discussion of the environmental impacts of the proposed project. The purpose of this format is twofold. First, it serves to eliminate the repetition of information which is common when these sections are separate. Second, in describing the existing conditions of each issue and immediately following with a discussion of the associated impacts, a more comprehensive understanding of the project effects can be obtained. The general format for each topic within this section includes a description of the assessment methodology; a description of the existing environment; a discussion of impacts; and a description of measures to avoid, minimize, or mitigate the impacts that would result from project implementation.

The discussion of impacts addresses impacts that would be caused by construction of the entire length of the Build Alternative, from Elkins, West Virginia to I-81 near Strasburg, Virginia. Because the Preferred Alternative (WV) consists solely of the West Virginia portion of the Build Alternative, discussions of impacts in the FEIS have been separated by state. The impacts described for Virginia and West Virginia were developed to the same level of detail prior to the Virginia Commonwealth Transportation Board Resolution of February 1995 (see Appendix A). In West Virginia, discussions are presented for the No-Build, for the ASDEIS IRA and for the Preferred Alternative (WV). In Virginia, impact discussions are presented for the No-Build, for the ASDEIS IRA, and for Line A and its option areas within Virginia. Should Virginia decide at a later date to pursue the development of an alternative additional, environmental studies might be required to satisfy NEPA and FHWA regulations.

Two technical approaches served as the foundation upon which the impact assessment process has been based. These approaches are: the use of a Geographic Information System (GIS) and the assessment of applicable secondary and cumulative impacts on a watershed basis. Because of the importance of these two approaches, brief descriptions are provided below.

- **Geographic Information System**

  Given the size of the project and the level of detail used in the evaluation of each issue, all project-related data were managed through a Geographic Information System (GIS). A GIS was used because of its ability to combine relational database management systems with high-performance computer graphics to manage geographically-referenced data. With geography as a common denominator, a GIS makes it possible to capture and integrate many types of data describing the locations, shapes, relationships, and descriptive facts and figures of objects or features into a single, logical data model. Software tools provided the data management, display, query, analysis, and output tools needed to maintain and understand the geography-based information.

- **Watersheds**

  A watershed approach has been taken to put the impacts of the proposed project in a broader ecological context. Two major river systems are crossed by the proposed project: the Monongahela River and the Potomac River. Each river system is composed of several major watersheds. Within West Virginia, the proposed project crosses five of these major watersheds: the Tygart Valley River and the Cheat River of the Monongahela River System; and the North Branch and South Branch of the Potomac River and the Cacapon River of the Potomac River System. Within Virginia, the proposed project crosses the Shenandoah River watershed of the Potomac River System. These major watersheds have been subdivided into smaller subwatersheds that immediately "surround" the proposed project. In this fashion, direct impacts can be evaluated based on their effects to "local project watersheds" and secondary and cumulative impacts can be addressed in terms of the "regional project watersheds." A detailed definition, discussion, and presentation of all watersheds are included in Section III-M: *Watershed Overview.*

- **Secondary Impacts**

  Secondary impacts (also known as 'indirect impacts') "are caused by an action and are later in time or farther removed in distance" from the construction of the proposed project "but are still reasonably foreseeable" (40 CFR 1508.8(b)). To refine and present more easily the results of secondary impact analyses, the impacts are typically discussed in the following two categories, defined for this project.

  1. Those impacts that are related to the construction, operation, and maintenance of the proposed facility. These would be considered highway-related secondary impacts (sometimes called indirect impacts) and would include such impacts as stormwater runoff.
  2. Those impacts that are related to development that occur as the result of the highway. These would be considered development-related secondary impacts, such as the possible relocation of a perennial stream associated with the construction of an industrial park.

- **Cumulative Impacts**

  Cumulative impacts are those impacts on the environment which result "from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions. . . They generally are "less defined than secondary effects" (Bank, 1992). To refine and present more easily the results of cumulative impact analyses, the impacts are typically discussed in the three categories below, also defined for this project.

  1. The sum of all direct impacts to a given resource, such as the total of all stream relocations within a watershed.
  2. The sum of direct and secondary impacts to a given resource, such as the total of direct and secondary impacts to streams in a watershed.
  3. The sum of all direct and secondary impacts to a given resource due to the proposed action, *plus* the potential impacts of past, present and reasonably foreseeable future actions, such as the construction of the proposed highway, in addition to the construction of the Moorefield Floodwall project.

The cumulative impacts of the project with the following five foreseeable future Federal actions have been identified and evaluated in this study: the Moorefield Floodwall Project, Stony Run Dam, Canaan Valley Wildlife Refuge, the Monongahela National Forest Management Plan, and the George Washington National Forest Management Plan. For descriptions of these Federal actions, refer to Summary-B: *Other Major Government Actions*. In addition, the cumulative impacts of other past, present, and reasonably foreseeable actions both federal and non-federal, also have been considered. For analysis of these impacts, refer to Section III, Y-Cumulative Impacts, of this FEIS.

## A. ECONOMIC ENVIRONMENT

The potential regional and local economic opportunities afforded to the study area by the completion of Appalachian Corridor H are documented in the *Transportation Needs Study*, and the CSDEIS. Those potential opportunities are again summarized in Section I of this Final EIS.

The ASDEIS economic analysis was not conducted as further justification of the project's purpose and need. The economic analysis was conducted to estimate the potential secondary and cumulative effects of Corridor H (e.g. impacts of induced development on the environment). Based on the 1994 economic analysis, a *Secondary and Cumulative Impacts Technical Report* was prepared in support of the information included in the ASDEIS. The preparation of a separate technical report during the Alignment Selection phase to address potential secondary and cumulative impacts was agreed to at the May and September, 1992 agency meetings where the use of a tiered process for the development of the CSDEIS and ASDEIS was discussed.

One of the keystones of the methodology used for the potential secondary and cumulative impact analysis was an assumption that industrial parks in the study area would build out to 100% occupancy. The remaining aspects of the secondary impact methodology included an assessment of additional employment; a determination of intersection/interchange development and associated employment; an assessment of housing development required to support the additional employment; an estimate of service-related employment and housing needs; and an assessment of the land available to support all of the induced development, including housing needs.

The secondary and cumulative impact assessment methodology, including the 100% industrial park build out, was presented to EPA in July, 1993, and to local and regional planning organizations in West Virginia, Virginia, and Maryland between October, 1993, and August, 1994. With the exception of the Lord Fairfax Planning District in Virginia, the EPA and the other planning organizations agreed that the use of the 100% build out was appropriate for the analysis of potential secondary and cumulative impacts.

The economic impacts of highways, both positive and negative, have been the source of much debate, discussion and study. Agencies charged with the responsibility of attracting business generally conclude that without an efficient highway system that they are fighting a losing battle. For example, interviews with West Virginia planning and economic development officials in the Corridor H project area all concurred that construction of the 4-lane facility will improve their areas' competitive ability relative to attracting new business (Meeting dates, locations and participants are found in Table VII-1). Studies analyzing the impacts on economic development as a result of highway construction demonstrate conflicting results. For example, Buffington *et al.* (1992) reviewed the results of 34 studies in Texas each of which analyzed similar economic impacts of highways on common business measures (e.g., changes in gross sales, business closings vs. new business openings) of traffic serving businesses and other retail/service businesses. For businesses that had been by-passed by a new highway they found that changes in gross sales by traffic serving businesses ranged from -65% to +39%. For other retail/service businesses bypassed gross sales changes ranged from -15% to +55%. The number of existing business closings vs. new business openings ranged from 13 closings to 49 openings. Hartgen *et al.* (1992) in their literature review of the economic impacts of highways found similar confounding conclusions relative to negative and positive impacts on business.

As indicated in Section I, Corridor H is one of the corridor highways that is part of the unfinished Appalachian Development Highway System. This highway system was authorized originally to open up the isolated core of the Appalachian region and to encourage economic development (Widner, 1990). In terms of the total Appalachian Region which covers parts of 13 states running from southern New York southwestward to eastern Mississippi, the highway system appears to have been in part responsible for economic development (Appalachian Regional Commission, 1981). This conclusion was reached by the Appalachian Regional Commission (ARC) as the result of two surveys conducted by that agency.

During 1981 the ARC surveyed the 13 Appalachian States and the 68 local development districts in Appalachia to assess the economic impact of the highway system on region. The survey results showed that since 1965, when the corridor system was first announced, 182,700 jobs had been created in 801 manufacturing plants with 50 or more employees within 30 minutes of a corridor. The survey also found that an additional estimated 32,300 jobs in smaller plants had been created for aggregate employment growth of 215,000 jobs. Applying a spin-off factor or multiplier of one service job created for each manufacturing job, ARC planners concluded that an additional 215,000 jobs in retail trade, commercial establishments and various services have been opened up along the corridors, for a total of over 430,000 jobs (ARC, 1993). Use of multipliers to estimate spin-off service jobs is standard practice with economic planners. In Pennsylvania for example a multiplier of four (4) was applied by that state's economic development experts to justify state tax incentives offered to a major automobile manufacturer and Virginia's economic development specialists recently used a multiplier of 1.25 when discussing a new electronics manufacturer which is locating a facility in the Richmond area.

The second study was conducted by the ARC in 1987. Again, a survey was conducted of ARC's 69 Local Development Districts to determine the gross number of jobs created from 1980 to 1986. "Districts in the region were unable to document plant closings and reductions in employment of existing firms due to the high cost of such an endeavor" (ARC, 1993). This survey found that:

- 695,000 new jobs were created in the Region as a whole. These jobs were generated by an estimated 12, 700 new firms and expansions of existing firms;

- 560,000 or 81% of those 695,000 new jobs were in the Appalachian counties along interstate highways or the Appalachian Development Highway System; and
- The average 1986 unemployment rate for all Appalachian counties was 8.9%. The average rate of unemployment for the counties with completed sections of the Appalachian Development Highway System and interstate highways was 8.5% compared to 10% for the remaining counties.

Corridor specific development data or studies is lacking except for anecdotal surveys. One completed by Widner (1990) for Appalachian Corridor B from Chiillicothe, Ohio to Greenville, South Carolina found dramatic differences relative to economic growth among communities but that economic development "has not happened to the extent originally hoped for." He attributes this disparity in development and the Appalachian Regions expectation lag to:

- A change in business strategy causing location of branch plants overseas;
- Failure to complete the highway network; and
- Lack of an opportunity seeking attitude among some local officials.

Widner (1990) concludes in part that, "The hopes for the development highways have been realized only partially. They do appear to have improved access to services and have facilitated commuting. They have improved access to the interstate highways for areas bypassed by that system- a major objective. It does seem apparent that, despite their unfinished state, that they have played an important part in restructuring the patterns of development and settlement in parts of the region. Some towns are now playing service-center roles that they could not play for their surrounding areas in the past."(Widner, 1990).

Based on the above and two studies cited below, the analysis of the potential secondary and cumulative impacts has been conducted in accordance with the methodology developed for the Corridor H study area which is discussed in detail in the *Secondary and Cumulative Impacts Technical Report* (1994). The results of the secondary and cumulative analysis are summarized below.

### 1. EXISTING ENVIRONMENT

Economic information and statistical data were used to establish baseline economic conditions. Principal sources for this data included the US Bureau of Economic Analysis; the US Bureau of the Census; the West Virginia University, College of Business and Economics; the West Virginia Division of Employment Security; the Virginia Employment Commission; various economic planning and development authorities serving the area; and various other sources, such as transportation research studies and economic development studies. The economic development studies used included:

- Appalachian Maryland Development Plan, 1993;
- Economic Adjustment Strategy for Grant County;
- Economic Adjustment Strategy for Hampshire County, 1990;
- Frederick County Comprehensive Plan 1990;
- Region 7 Development Plan, 1991-1993;
- Region 8 Development Plan, Fiscal Year 1991;
- Shenandoah County Comprehensive Plan: 2010, 1991;
- Tucker County Comprehensive Plan, 1992; and
- Draft Hardy County Comprehensive Plan, 1994.

The economic analysis focused on three main areas important to the economy: population, employment, and income. The analysis of population, employment, and income examines West Virginia communities relative to the state of West Virginia, Virginia communities relative to the state of Virginia, and comparisons between the respective communities of West Virginia and Virginia. In preparing the employment analysis, information on all industrial classifications was prepared using Standard Industrial Classifications (SIC). Most of these categories are self explanatory. However, for this project it is important to note that the poultry industry falls into the manufacturing classification, timber falls into the agriculture classification, and tourism falls into the service classification.

Data and a summary discussion of Randolph, Tucker, Grant, and Hardy Counties in West Virginia and Frederick and Shenandoah Counties in Virginia is presented below. Data is also presented for Barbour, Mineral, Hampshire, and Preston counties in West Virginia and Garrett County in Maryland.

### a. Randolph County (WV)

Figure III-1 (Vol. II) presents the economic statistics for Randolph County. Statistics on population and employment were analyzed for the county and for the two communities within five miles of the alternatives; Elkins and Montrose.

Figure III-1 (Vol. II) provides the employment statistics by economic sector for Randolph County, Elkins, and Montrose. For Randolph County, the economic sectors of agriculture; mining; manufacturing; finance, insurance and real-estate industries; and public administration all decreased substantially from 1980 to 1990. Increases occurred in the construction, transportation, and services sectors. Elkins had decreases in all sectors of the economy, with the greatest occurring in agriculture. Montrose had such a small employment base that the increase and decrease of individual sectors offset each other.

Randolph County has lost both people and jobs from 1980 to 1990. The losses were even greater for the community of Elkins, which lost one out of every five employees. In terms of the impact of such losses, decreases in population and employment illustrate a corresponding decrease in the tax base in Randolph County at a time when the unemployment rate is over 10%.

**b. Tucker County (WV)**

Economic data on Tucker County and several specific incorporated municipalities within the county were prepared. The specific communities included: Davis, Hambleton, Hendricks, Parsons, and Thomas. The population and economic statistics for Tucker County are presented in Figure III-2 (Vol. II).

The employment statistics for the incorporated municipalities illustrate that the decline is greater in these communities than in Tucker County overall. Tucker County only decreased in employment by 3% and all of the incorporated municipalities within five miles of the proposed alignments had employment declines of over 18%. Growth and development is not continuing in areas where infrastructure is already in place in Tucker County. The lack of additional infrastructure has been identified as a development constraint in the comprehensive plan for Tucker County (Tucker, 1993).

Figure III-2 (Vol. II) also shows the employment by sector for Tucker County. From 1980 to 1990, the greatest decline in employment was in the public administration and the agricultural sectors of the economy. Decreases also occurred in manufacturing, wholesale trade, retail trade, and finance, insurance and real-estate industries. The greatest increase (208%) was in the mining sector. Employment in the service sector increased 81% over the decade and construction increased 176%. This trend in increased construction employment is consistent with the development of vacation homes in the Canaan Valley area of Tucker County (Tucker, 1992). Within the municipalities analyzed, the data show a reliance on service jobs as the primary source of employment. This finding is consistent with the development of Tucker County as a tourism destination due to the abundance of parks located in the county. In all municipalities, employment in agriculture decreased by at least 75%.

**c. Grant County (WV)**

The economic statistics for Grant County and Bayard are presented in Figure III-3 (Vol. II). The data show different trends in the county as population remained stable from 1980 to 1990 with a 2% increase; however, employment experienced a 20% decrease. Bayard lost 23% in population and gained 9% in employment. The effects of these shifts are limited due to the small population and employment in Bayard.

Figure III-3 (Vol. II) shows the rapid development of Grant County. This rapid growth is the result of the increase in the second home market in the eastern portions of the 30-Minute Contour. Shifts in employment by industry that occurred in Grant County support this assertion, as construction jobs increased by 49%. Other industries that increased were manufacturing (75%), retail trade (10%), finance, insurance and real-estate industries (42%), and services (131%). The increases in service and retail jobs in Grant County were consistent with national trends, but were also a function of the increase in residents moving into the county. In Grant County, the industries that had decreases in employment between 1980 and 1990 included agriculture, mining, transportation, and utilities.

**d. Hardy County (WV)**

Figure III-4 (Vol. II) presents data for Hardy County, Moorefield, and Wardensville. Hardy County increased in population by 9% from 1980 to 1990, whereas population losses were experienced in Moorefield (5%) and Wardensville (50%). These losses were from a very small population base. Hardy County experienced an increase in employment (7%), whereas Moorefield remained relatively stable with a small reduction (2%) and Wardensville experienced a considerable reduction (43%).

Employment by industry showed increases in Hardy County for almost all categories. Only agriculture and public administration decreased between 1980 to 1990. An important component of the economy in Hardy County is the poultry industry, with employment increases occurring in Moorefield where Wampler Longacre and Hester Industries are based, the largest employers in the county. The increase in the poultry industry is represented by the 18% increase in manufacturing jobs in Hardy County and a 13% increase in Moorefield. Other substantial increases in employment occurred in the construction sector, transportation and utilities sector, and the services sector.

**e. Frederick County (VA)**

The proposed Corridor H alternatives would not directly effect any of the incorporated municipalities in Frederick County, and would only impact a small section of the southwest quadrant of the county. However, since the eastern boundary of the 30 minute contour is close to Winchester, statistics for this incorporated municipality have been included in Figure III-5 (Vol. II).

Population in Frederick County and Winchester increased by 34% and 9% respectively. Frederick County lost about 20% in employment, but that was offset by a 22% increase in Winchester. The decrease mainly resulted from a loss of almost 2,000 jobs in agriculture and public administration employment in the county. The strongest increases were in construction. From 1980 to 1990, with the exception of the manufacturing sector, Winchester did not experience declines in employment in any industry.

The greatest increase in employment was in construction, finance, insurance and real-estate industries, and retail trade.

#### f. Shenandoah County (VA)

Figure III-6 (Vol. II) shows the economic data gathered for Shenandoah County and Strasburg, just east of the project's eastern terminus. Shenandoah County and Strasburg both experienced population growth from 1980 to 1990. Shenandoah County gained 15% in population and 22% in employment and Strasburg gained 63% in population and 84% in employment. The 1990 unemployment rates were very low: Shenandoah County was under 4% and Strasburg was 5%. Per capita incomes for both were over $11,000.

The data on employment by industry shows that growth occurred in all sectors of the economy except for agriculture and public administration. Shenandoah County had strong increases in construction, services, finance, insurance and real-estate industries, transportation, and utilities. During the decade, Strasburg became more of an activity center with an employment growth of over 100% in construction, retail trade, finance, insurance and real-estate industries, and public administration. The rapid increase in employment in most sectors of the economy indicates a clustering of jobs and services in the municipalities.

#### g. Summary of the Economic Environment

Tables III-1 through III-4 (Vol. II) summarize the population, employment, and income statistics for all counties analyzed. For comparison purposes, data on state totals for West Virginia and Virginia are also provided.

##### (1) Population

The population trends vary widely from 1980 to 1990 within the West Virginia portion of the project (Vol. II, Table III-1). Hampshire and Hardy Counties experienced a population growth of about 10% while Tucker County suffered an 11% population loss over the same time frame. Between 1980 and 1990, these three West Virginia counties lost fewer than 1% of their population (about 1,600 persons) compared to a total state population decrease of 8%. In Virginia, both Frederick and Shenandoah Counties experienced population growth (15% and 34%, respectively). The combined population growth of Frederick and Shenandoah Counties is much higher than the growth experienced by the West Virginia Counties, as well as 16% higher than Virginia's overall population growth rate.

The data indicate trends in population growth within the study area. First, the population growth that occurred in the past decade is not evenly dispersed. Thus, some counties (Hardy, Frederick, and Shenandoah) grew while others declined (Tucker and Randolph). The growth that did occur was not in the established small communities within close proximity of the alternatives.

### (2) Employment

The county statistics in Tables III-2 and III-3 (Vol. II) demonstrate that there is diversity in employment trends and that overall employment section changes have occurred in the counties analyzed. Over the decade, the fringe counties (Hampshire, Mineral, and Preston) had employment gains compared to employment decreases experienced by all West Virginia counties (in particular those directly along the alignments). The greatest decrease was experienced in Grant County where 20% of the jobs were lost. The rapid growth in employment on the fringes of the study area caused the West Virginia county employment total to increase by 6%. Employment growth in the Virginia counties (38%) was higher than the overall employment growth rate for Virginia (34%).

In general, the bulk of employment within each county is concentrated in the manufacturing, retail, and services sectors. A number of the West Virginia communities continue to rely on the natural resource sectors of agriculture, forestry & fisheries, and the mining sectors. All West Virginia counties analyzed showed increases in services and retail. The totals for West Virginia show decreases in most economic sectors, especially for the mining industry which declined by 45%. These decreases were, in some sense, offset by the increasing rate of employment in retail and services. However, service and retail jobs do not have wage levels nearly as high as the jobs that they have replaced. In Virginia, all sectors of the economy experienced growth with the exception of agriculture and mining. The decrease in agricultural employment is considerable, since both counties had overall employment increases of over 20%.

There has been a movement in the economic base of the study area away from goods-producing activities such as agriculture, mining, and manufacturing (in some counties), to a heavier reliance on service and retail jobs. This trend is true throughout the study area in West Virginia and Virginia.

### (3) Income

Table III-4 (Vol. II) shows 1990 unemployment rates, percent of population below the US poverty level, and per capita incomes for the counties analyzed. Double digit unemployment was experienced in Barbour, Randolph, and Preston Counties in the western portion of the study area. In 1990, the West Virginia counties analyzed had an overall unemployment rate of 8.3%, which was slightly lower than that of West Virginia (9.6%). Within the West Virginia counties studied, the lowest unemployment rates were in Grant and Hardy Counties. In Virginia the unemployment rates for Frederick and Shenandoah Counties were below the state average for 1990.

The percent of the population with incomes below the US poverty level in the West Virginia counties analyzed ranges from 29% in Barbour County to 15% in Hardy, Mineral, and Grant Counties. Randolph County is experiencing the second highest percentage (22%) of its population below the poverty level. In Frederick and Shenandoah Counties, the percentage of the population below the poverty level are 7% and 11%, respectively. Shenandoah County is at a higher percentage than the Commonwealth of Virginia (9%). Overall poverty levels in the counties analyzed are higher in West Virginia (19%) than in Virginia (9%).

The average per capita income ($9,583) in the analyzed West Virginia counties was below the overall West Virginia per capita income ($10,520), with the exception of Hardy County, which was slightly higher. In Virginia, Frederick and Shenandoah Counties also had lower per capita incomes than the entire state. However, the Virginia counties' per capita income is nearly $3,600 higher than per capita incomes of neighboring counties in West Virginia.

Table III-4 (Vol. II) shows that although unemployment and the percentage of the population below the poverty level in 1990 in the West Virginia counties are slightly lower than West Virginia, the per capita incomes are lower. Although there are less people overall that are without jobs as compared to the state, the jobs that do exist pay less than the average for the state. The data also shows that the counties in West Virginia are consistently worse economically than the counties in Virginia. All of the counties in the West Virginia section of the project have higher rates of unemployment, higher percentages of persons living below the poverty level, and lower per capita incomes than the Virginia counties.

## 2. DIRECT ECONOMIC IMPACTS

### a. No-Build Alternative

There would be no direct economic impacts associated with the No-Build Alternative. However, there would be economic effects of this alternative in that the downward trends in population, employment, and income in some counties would continue.

### b. ASDEIS Improved Roadway Alternative

The direct impacts that would result from the ASDEIS IRA would be the impacts to those businesses displaced or impacted by its construction. The proposed plans show that there are eleven (11) businesses directly displaced. This number of displacements would not likely have long-term consequences on the economy.

Other direct economic impacts would occur during the construction period. Construction impacts would include an increase in employment due to the use of local labor and the impacts of construction on business traffic in the construction zone. Research shows that for every million dollars spent on construction, there are 9.75 on-site jobs and 12.7 off-site jobs created. At a preliminary cost of approximately $417 million for the ASDEIS IRA in WV, there could be 8,700 jobs created. However, at the same time there could be economic impacts to those businesses located along the ASDEIS IRA that might not be accessible during the construction period. Research shows that business sales drop between 4% and 12% during the construction period for upgrading an existing highway facility, based on projects across the United States (Buffington et al., 1992). A drop in business sales could be expected in the municipalities impacted by the ASDEIS IRA such as Montrose, Moorefield, Petersburg, and Wardensville.

**c. Preferred Alternative (WV) and Line A (VA)**

No direct adverse economic impacts on the local economy would be expected due to loss of jobs or relocation of businesses as a result of construction of the Preferred Alternative (WV).

Economic impacts resulting from construction activities would involve an increase in employment due to the use of local labor, and the impact on business traffic in the construction zone. The estimated economic impacts of the Preferred Alternative (WV) would include approximately 9.75 on-site jobs and 12.7 off-site jobs per million dollars spent on construction. At an estimated cost of approximately $1,075 million for the Preferred Alternative (WV), there would be approximately 9,300 on-site jobs and 12,050 off-site jobs. In addition, there would be minimal adverse traffic impacts during the construction phase of the Preferred Alternative because construction would generally not be conducted on the existing highway system.

## 3. SECONDARY DEVELOPMENT IMPACTS

Prediction of economic impacts beyond those directly attributable to the construction of the highway are largely speculative. Models do exist that attempt to relate development and land use changes to transportation facilities but these are generally limited to urban areas with existing land use controls (e.g., zoning). Only a few communities in the Corridor H project area have land use control. Over 90% of the 7,000 sq. km (2,800 sq. mi.) Corridor H Area of Influence (see discussion below) is rural with no land use controls. The following economic analysis and predictions were undertaken based on assumptions developed through discussions with local and regional planners and the use of the development concepts and guidance found in three recently developed land allocation models identified and discussed in *the Secondary and Cumulative Impacts Technical Report.*

The following economic development predictions were made so that stakeholders could develop a better understanding of ecological impacts that might occur if the Corridor H area were to follow the development scenario presented below. The predictions should not be interpreted or utilized for any other purpose. As pointed out (p. III-3), even 'before and after' analyses of the economic impacts of highways produce confounding data relative to economic development. Attempting to predict future economic impacts of a highway before it is built would be equally confounding. In West Virginia, development and its control is largely the responsibility of local governmental bodies. Resource protection is therefore by default within the province of the same local governmental bodies.

**a. Methodology**

Economic development that could be induced by the proposed project has been divided into three types: industrial, commercial, and service-oriented. Industrial development is analyzed with respect to industrial parks based on reasonable projections. Commercial development is predicted by various models for growth at interchanges or intersections of new rural highways. Based on job growth predictions, an estimate was made of new residential development required. This is followed by growth in the service areas to support residential needs.

The process used to predict development is presented in Exhibit III-1 (Vol. II). The aggregate of all models and processes included in the flow chart is termed collectively as the Corridor H Development Model, designed for this project. The process begins with the determination of an area of influence for the project, in accordance with guidance provided in FHWA's position paper entitled, "Secondary and Cumulative Impact Assessment in the Highway Development Process" (Bank, 1992). The area of influence is defined as the area within which the proposed project would affect development patterns or alter travel behavior. This area was determined by analyzing commute times in the project area and calculating the distance and location from the proposed project for a 30-minute commute. Data taken from the 1990 US Census for West Virginia indicates that currently 90% of all commute trips within the Corridor H census area require no more than 30 minutes. By plotting all 30-minute trips along existing roadways and connecting these points, a "commute contour" was defined in this study as the 30-Minute Contour. The area within this contour represents the area of influence for this study. Exhibit III-2 (Vol. II) presents the 30-Minute Contour.

The 30-Minute Contour encompasses an area of over 7,000 sq. km (2,800 square miles). This area includes all or part of the following counties: Barbour, Randolph, Tucker, Preston, Grant, Hardy, Mineral, and Hampshire in West Virginia; Frederick and Shenandoah in Virginia; and Garrett in Maryland. The 30-Minute Contour spans large parts of six watersheds defined as regional project watersheds (See Section III-M: *Watersheds*), as well as portions of the Back Creek and Opequon Creek watersheds in Virginia. In accordance with Bank (1992), the 30-Minute Contour also forms the limits of the transportation model.

That is, all principal through highways located within the 30-Minute Contour and noted on official state maps were included in the highway network. A complete discussion of the transportation model and results are included in Section II.

In order to predict land areas that could be developed for residential and service uses, it was necessary to make a determination of the total land area that is feasible and practicable to develop. The GIS was utilized to overlay several layers of geographic data within the 30-Minute Contour and queried to identify tracts of land that were free of the following features:

- 100-year floodplains;
- Slopes greater than 25%;
- Wetlands;
- Existing development; and
- Public parks, other public facilities, or National Forests.

The resulting areas were designated as *raw land* (Lapping *et al.*, 1989) available for development. The total raw land area is approximately 212,300 hectares (525,000 acres). Through GIS queries, the existing land cover of the raw land areas was determined to be 67% forested and 33% agricultural. Further models were employed to locate the residential development by census tract or Block Numbering Area (BNA). The GIS was then used to categorize these locations by watershed for ecological impact assessment.

**b. Preferred Alternative (WV) and Line A (VA)**

A complete discussion of the methodology and results of the development projections is contained in the *Secondary and Cumulative Impacts Technical Report*. The following is a summary of the procedures and the results for each development type. A summary of the job growth results are provided by county in Table III-6 (Vol. II).

**(1) Industrial Development**

Industrial development was assumed to take place at existing industrial parks or those that are planned. Thirteen (13) industrial parks were identified within the 30-Minute Contour, occupying a total land area of 753 hectares (1,860 acres). Currently, the aggregate occupancy rate is 36% providing work for over 6,000 employees. The current level of development of each industrial park was identified and a calculation of current employees per built-out hectare (acre) was made.

## B. LAND USE

FHWA Technical Advisory T 6640.8A recommends that land use impacts should be discussed relative to current development trends within the area that might be affected by the proposed project and the consistency of the proposed project with plans and policies that "are normally reflected in the area's comprehensive development plan." Additionally, FHWA advises that "the secondary social, economic and environmental impacts of any substantial foreseeable, induced development should be presented" when preparing land use impact analyses.

The discussion below focuses on the consistency of the proposed project with the comprehensive and economic development plans of those regions through which it passes, as well as the project's direct impacts to land use and land cover. The impact of the proposed project on current development trends and secondary impacts due to community and regional development is presented in Section III-A: *Economic Environment* of this document. Details concerning Land Use are contained in the *Socioeconomics Technical Report*.

### 1. METHODOLOGY

Comprehensive plans, development plans, and subdivision ordinances were requested from regional planning agencies, counties, and local governments. These documents were analyzed to assess the consistency of the proposed project with them. Additionally, meetings were held with local and regional planning officials and local elected officials to confirm the analyses and to assess the consistency of the proposed project with community and agency development goals.

The GIS was used to determine direct impacts to land cover and land use compartment types. Anderson Level II (Anderson *et al.*, 1976) land use/land cover mapping was prepared by photointerpretation of aerial photography. Photo-interpreted land use/land cover compartments were entered into the GIS. Mapping was then prepared, ground-truthed in the field, and adjustments were made to the land use/land cover compartments as necessary. Construction limits of each of the alternatives were superimposed on the completed land use/land cover mapping. The GIS then calculated the extent of direct impacts of the proposed project to each land use/land cover compartment.

### 2. CONSISTENCY WITH REGIONAL DEVELOPMENT PLANS

The West Virginia portion of the project is within State Planning Regions VII (Randolph and Tucker Counties) and VIII (Hardy and Grant Counties). The Planning and Development Councils for each of these regions have developed and published overall economic development plans that outline goals and strategies for regional development. In each of these plans, specific communities and areas are designated as desirable growth centers. The communities or areas identified include: Elkins; Davis and the Canaan Valley area; Moorefield; and Petersburg. The Preferred Alternative (WV), Line A (VA) and the ASDEIS IRA would provide additional and more efficient access to each of these designated growth centers (Section II-H: Traffic Analysis).

The Lord Fairfax Planning District Commission in Virginia serves much the same function as the Planning and Development Councils in West Virginia. Corridor H is not mentioned in the Lord Fairfax Planning District Commission's plans.

### 3. CONSISTENCY WITH COUNTY COMPREHENSIVE PLANS

Tucker and Hardy Counties in West Virginia and Shenandoah and Frederick Counties in Virginia are in the process of developing or have developed comprehensive plans. Additionally, in 1991, Grant County, West Virginia adopted an "Economic Adjustment Strategy."

The *Tucker County Comprehensive Plan* states that the construction of Corridor H would "greatly enlarge the number of potential industrial sites and enhance their development"(Chapter 5: Proposed Major Highway Improvements, 1992). Additionally, Tucker County has based its *Land Use and Development Plan* on construction of Corridor H. The *Tucker County Comprehensive Plan* makes no mention of the Improved Roadway Alternative but does present an optional or contingency land development plan under a No-Build scenario.

Hardy County's *Draft Comprehensive Plan* (1993) states that one of its goals is to "advocate the maintenance and improvement of the transportation system so that people and goods can move safely and efficiently throughout the County." Construction of either the Preferred Alternative (WV) or the ASDEIS IRA would be consistent with this goal. The *Hardy County Comprehensive Plan* recognizes the Corridor H project in "Section XIV: Existing Roads Systems" and discusses its proposed route throughout the County. The plan stresses the importance that agriculture plays in the economic and cultural facets of development in the county and that agricultural use be allowed in all parts of the county (Hardy, 1993). The plan also calls for orderly development and the protection of agricultural land from "scattered residential development." Commercial development is to be concentrated near the main existing retail centers (Hardy, 1993). Because of the importance of agricultural land use in Hardy County, conversion of agricultural land for the alternatives under study is of concern. Please refer to Section III-E: *Farmlands,* for a discussion of farmland impacts.

Grant County's "Economic Adjustment Strategy" (1991) assesses the county's economic strengths and weaknesses and presents a strategy for economic revitalization. The proposed Corridor H project is noted in this strategy as a planning element.

Frederick County adopted a comprehensive plan in May of 1990 which identifies Corridor H as a planning element. Corridor H would be located in the southwest corner of Frederick County, near existing VA 55. There are two components of the land use designation in this area according to the comprehensive plan: recreation and agriculture. The recreation use is associated with the George Washington National Forest. The agricultural use is to be protected from scattered residential development, industrial development, or commercial development. The *Shenandoah County Comprehensive Plan: 2010* (1991) does not refer to the proposed project.

## 4. CONSISTENCY WITH LOCAL PLANS

None of the municipalities in West Virginia that are directly impacted by the proposed project have comprehensive plans or land use ordinances. Hardy County's Planning Commission has adopted and sent to the County Commissioners a subdivision plan but, as of this writing, it has not been acted upon. An analysis of the ordinance revealed that, should it be adopted, it would not conflict with either the Preferred Alternative (WV) or the ASDEIS IRA. Communities in Virginia rely on the county plans discussed above and zoning ordinances for land use control.

## 5. LAND USE/LAND COVER IMPACTS

Data on land use and land cover impacts by the proposed Preferred Alternative (WV), Line A (VA), Option Areas, and ASDEIS IRA are presented in Table III-10A (Vol. II). Detailed analyses of the socioeconomic and ecological importance of these impacts are presented in the following sections of this document and in the *Socioeconomics Technical Report*.

## 6. DEVELOPMENT-RELATED SECONDARY AND CUMULATIVE IMPACTS

Secondary land use/land cover impacts were determined utilizing the GIS. The percentage of each land cover type was calculated for each BNA predicted to experience residential or service-oriented growth. These percentages were then applied to the total amount of land required for the specific form of development (e.g., commercial, residential, service-oriented) to determine the amount of each land cover type that would be impacted. Because the locations of industrial parks are known, land use impacts associated with them were analyzed specifically. The total amount of each land cover type predicted to be converted for the Alternatives is presented in Table III-10B (Vol. II). The ecological impacts associated with the conversion are discussed in the following subsections as they relate to that particular category of impact analysis (i.e., Vegetation and Wildlife, Wetlands and Streams). Refer to Section III, Y - Cumulative Impacts, of this FEIS regarding cumulative impacts.

## C. SOCIAL ENVIRONMENT

### 1. METHODOLOGY

Social impacts include changes in community cohesion, accessibility, travel patterns, and community resources. The data necessary for this analysis was obtained from the US Census Bureau and organized by Census Tract and Block Numbering Areas (BNAs). The statistics included data on racial composition, age characteristics, ethnicity, and automobile ownership. Data was also gathered from regional planning authorities, local economic development plans, and comprehensive plans. In addition, meetings were held with planning officials in the counties through which the alignments would pass.

The effects of the Improved Roadway Alternative on community cohesion were not analyzed since disruptions to existing communities would not occur where the ASDEIS IRA would follow existing roadways. In addition, where the ASDEIS IRA would not follow existing alignments, it would not pass through existing communities. However, communities through which the ASDEIS IRA passes could experience secondary impacts due to increased traffic.

The effects of the Alternative alignments on community cohesion were analyzed. Community characteristics were identified using the Gutman Graph Technique which is an economic development tool specifically designed to analyze data on small communities. The Gutman graphs identify the services available to each community in a given area. Information needed to complete this analysis was obtained through research and field verification. Social impacts may also result from the displacement of community facilities and businesses; those impacts are also addressed in this analysis. Information on the impacts of displacements is presented under Section III-D: *Relocations*. Refer to Section III, Y - Cumulative Impacts, of this FEIS regarding cumulative impacts.

### 2. EXISTING ENVIRONMENT AND IMPACTS

#### a. Changes in Neighborhoods and Community Cohesion

Community cohesion is defined as a community's level of commitment to itself, as shown by the extent of interaction among individuals, groups, and institutions within the community. The cohesive qualities of a community are often based on ethnic, social, and family ties; school enrollment; residential stability and longevity; population, employment, income, and the mix of local residents; community activities; use of public facilities and services; and cultural sites and events (USDOT, 1991).

Fifty communities were studied and are listed in Table III-11 (Vol. II). These communities were analyzed because they are located within five miles of the Preferred Alternative (WV) or Line A (VA) and would be the most likely to experience social changes due to their proximity to the alignments. Gutman graphs were developed to identify the economic facilities, social services, and municipal services present within each of the 50 communities. These graphs are included in the *Socioeconomic Technical Report*.

The impacts to the communities in the Corridor H study area were discussed in the community cohesion analysis of the *Socioeconomic Technical Report*. Table 17 of the *Socioeconomic Technical Report* (p. 88) identifies the 50 communities within five miles of the alignment that were inventoried as part of the community cohesion analysis. Other than the areas of Forman, Greenland, Baker, Wardensville, and Clary, all of the remaining communities would be by-passed by the Preferred Alternative (WV) and Line A (VA).

Table 18 of the *Socioeconomic Technical Report* (p. 98) identifies the economic related facilities that are located within each of these 50 communities. The majority of these communities do not have defined small business districts that could experience by-pass impacts due to businesses relocating along Corridor H. The following communities provide the majority of economic services and have business districts that could be by-passed: Elkins, Davis, Parsons, Thomas, and Moorefield. Each of these communities have businesses that are traffic-related such as motels, gas stations, or retail stores that could be attracted to the new Corridor H alternative.

The following communities do not have business districts as such, but do have gas stations or small grocery facilities that could be attracted to the Preferred Alternative (WV): Crystal Springs, Montrose, Bretz, Hambleton, Maysville, Mt. Storm, Scherr, Baker, McCauley, Old Fields, Clary, and Wheatfield.

The majority of the communities analyzed are service interdependent; that is, the residents rely on other communities for many services that are not available within their community. Four of the 50 communities analyzed as part of the Community Cohesion Analysis would be affected by the Preferred Alternative (WV) or Line A (VA).

**(1) West Virginia**

The four communities that would be directly impacted by the Preferred Alternative (WV) are: Greenland, Forman, Baker, and Wardensville. The presence of a new four-lane highway where one does not currently exist may create a barrier that would separate some residents from their communities. The effect of the Preferred Alternative (WV) on these communities is summarized below.

The Preferred Alternative (WV) would pass through the small community of Greenland by passing to the south of the intersection of Greenland Road (County 1) and Greenland Gap Road (County 3/3) and then crossing over Greenland Road to the west of that intersection. Several houses located at the intersection would be isolated. The barrier would be social in nature in that it would place a four-lane highway between these residents and Greenland Road, however, vehicular and pedestrian access would be maintained.

Forman is not a densely developed community, but there are residents along Patterson Creek Road (County 5) that may be impacted by the Preferred Alternative (WV). Residents who live on either side of the Preferred Alternative (WV) would have a physical barrier created. The Forman Community Center would be separated from a portion of the residents, however, vehicular access will be maintained.

The Preferred Alternative (WV) would pass directly through the community of Baker and bisect the community to the east of WV 259 near the Loudon Heights Fuel Company. The Preferred Alternative (WV) would bridge WV 55 however local access would be maintained by an interchange with WV 55. The E.A. Hawse Continuing Care Center, Baker Volunteer Fire Department, the Perdue Egg Processing Plant, and the Jehovah Witness Church would be located to the east of the Preferred Alternative (WV). The East Hardy High School and Middle School, the Hardy Library and Baker Church would be located to the west of the Preferred Alternative (WV). Access for pedestrian and vehicles will be maintained along WV 55, thus the barrier would be minor in nature.

The Preferred Alternative (WV) would pass south of the municipality of Wardensville and bisect Waites Run Road (County 5/1), Trout Run Road (County 23/10), and Trout Run Cut Off Road (County 23/12). The residents who live to the south of the alignment would be isolated from Wardensville and the resources that have developed around WV 55, including the J. Allen Hawkins Community Park, grocery stores, gas stations, the Veterans Memorial Community Center, restaurants, and other services. There are no services south of the Preferred Alternative (WV) that would be isolated from the rest of Wardensville. However, access would be maintained for all vehicular and pedestrian traffic via a proposed at-grade connection at Waites Run Road. Trout Run Road would be bridged and a connector road would be provided so that access to the community is maintained.

**(2) Virginia**

The small community of Clary is located near the intersection of VA 55 and VA 622. In Clary, Line A (VA) would intersect County 622 south of VA 55, isolating some of the residents who live along that road from the remaining community. The Shiloh United Methodist Church, a local grocery, and a gas station would be separated from Clary by Line A (VA); however, vehicular and pedestrian access would be maintained since Line A (VA) would pass under VA 622.

**b. Changes in Accessibility**

The Preferred Alternative (WV) would help to promote regional accessibility by providing better access between the 50 communities analyzed. As previously mentioned, many of the communities are service interdependent and lack many services such as banks, gas stations, retail outlets, stores, and health care facilities. Improving the transportation linkage between these communities would improve the ability to access these services. The Preferred Alternative (WV) would provide new and improved access between the communities in the study area and these service centers. The No-Build Alternative would not provide any increase in access to community facilities. The ASDEIS IRA would provide improved access to the area, but would not open-up access to new areas for development.

The Preferred Alternative (WV) would provide new access to employers and industrial parks that the ASDEIS IRA would not. Because of the new access to industrial parks, industrial type jobs are expected to result from the construction of the Preferred Alternative (WV). Since service jobs traditionally follow industrial jobs, communities would have the opportunity to reduce the service interdependency they now experience. These benefits have been addressed in Section III-A: *Economic Environment.*

The No-Build Alternative would not provide new access to undeveloped land. The ASDEIS IRA would provide slightly more efficient access, but not new access to employers and industrial parks.

**c. Impacts to Community Resources**

No schools, churches, police stations, fire stations, hospitals, or community centers would be directly impacted or taken by any of the alternatives studied. Impacts to recreation areas have been analyzed in Section III-J: *Recreation Resources.*

The displacement of businesses and residents within the project area would not have any impacts on these community facilities and services. As shown in the relocations analysis (Section III-D), the business displacements would be few and would not have long term negative ramifications on the economy. In addition, the relocations analysis shows that the vacancy rates in the project area would be high enough to provide relocation housing within the same geographic location. Therefore, indirect social impacts such as changes in school populations or increased unemployment rates due to the relocation or displacement of residents in the study area would not be anticipated.

### d. Impacts on Safety

Safety considerations have been addressed in Section II of this FEIS. As stated in that section, over 40% of the accidents that occur in West Virginia are attributed to access points. Although the ASDEIS IRA would provide safety improvements, it would follow existing roadways and not limit the access points to two per side per mile, except at points of significant relocations, such as between Bismarck and Greenland.

Safety features that are incorporated into the design of a partially controlled access, four-lane highway could also result in improvements to the social services that would use the highway network. These services include police, fire and ambulance services, government vehicles, trash collection, military vehicles, road maintenance vehicles, postal services, package delivery services, and school buses. Specifically, the Preferred Alternative (WV) would result in a reduction in travel times, meaning a reduction in response time. Any reduction in response time for emergency services would be a beneficial impact.

Additional safety discussions as they relate to Virginia's decision to not identify a Preferred Alternative are discussed in Section IV of the FEIS.

### e. Environmental Justice

Minority populations in the study area comprise approximately 1% of the total population. Additionally, the minority population is distributed throughout the study area and not clustered in any particular region or area. Similarly, the approximately 15% of the population over the age of 65 is distributed throughout the study area as is that part of the population, approximately 15%, below the poverty level. As discussed in b. Changes in Accessibility above, the proposed project will benefit these populations. Because of the dispersed nature of these demographic components of the population, the proposed project will not disproportionately impact minority, elderly or low income components of the population.

The public involvement process for this project, discussed in detail in Section VII, was carried out in a manner to assure that all interested citizens, including members of the minority, elderly and low income populations, had access to information, could participate in project related meetings and access project decision makers. Specifically:

- Project documents (CSDEIS, ASDEIS, Technical Reports, Decision Document, Executive Summaries) were distributed to all project area libraries, local governmental offices, high schools and post offices;

- Project documents (CSDEIS, ASDEIS, Technical Reports, Decision Document, Executive Summaries) were available free of charge and were given out at public meetings and were available upon written or telephonic (toll free number) request;

- A toll free number was established so that comments and requests could be easily made by any interested citizen. All documents were distributed free of charge;

- Public meetings were held throughout the project area at local facilities and hours convenient to the public.

## 3. AVOIDANCE, MINIMIZATION, AND MITIGATION

For the Preferred Alternative (WV), consideration has been given to the placement of intersections, the re-configuration of intersections, and the relocation of severed roadways to maintain existing vehicular and pedestrian access.

## D. RELOCATIONS

In Executive Order 12898 (Environmental Justice), President Clinton specifies that all activities that receive Federal funding, such as Corridor H be evaluated for their impacts to minority and low-income communities. This E.O. ensures that minority communities are not disproportionately impacted by Federal projects. As contained on page 110 of the *Socioeconomic Technical Report*, the social characteristics of the Block Numbering Area (BNA) which had displacements were analyzed to ensure that no special groups (either racially or ethnically defined, as well as by income levels) were disproportionately impacted by the relocation impacts.

In addition, one of the seven defined and accepted needs for Corridor H is for economic development, which was defined specifically as the creation of jobs or improvement of incomes in the study area. As discussed in the *Socioeconomic Technical Report*, the study area counties do have income levels that are below the national average. The job creation predicted to occur due to increased access to the study area, and particularly those counties in the center of the study area (Tucker, Grant and Randolph), will increase employment opportunities for all residents, including minority groups. In terms of Environmental Justice, the Corridor H project appears to promote justice since minority or special groups are positively affected, with no negative impacts associated.

Relocation impacts are discussed in the *Socioeconomic Technical Report*. In that analyses (pp. 113-116) no special groups were identified as having a disproportionate impact. This includes those areas with low income individuals, racial minorities, or ethnic concentrations. In addition, the housing characteristics were analyzed. For those BNAs that contain potential residential relocation impacts the vacancy rates are high enough that the families can be relocated within the BNA. Thus, there is available housing in each BNA that is similar in terms of owner occupancy and median value so that those persons displaced by Corridor H could be relocated within the BNA and in similar types of housing.

### 1. METHODOLOGY

The ASDEIS IRA, the Preferred Alternative (WV), and Line A (VA) would require right-of-way acquisition which may result in the displacement of residential, commercial, and industrial structures. Relocations were identified from the *Alignment and Resource Location Plans* and were field verified. The data necessary for this analysis was obtained from the US Census Bureau and was organized by Census Tract or Block Numbering Areas (BNAs), as defined by the 1990 Census. In addition, relocated businesses were reviewed based on size and type of facility, relocation requirements, and possible impact on the local community's social and economic structure. . Refer to Section III, Y - Cumulative Impacts, of this FEIS regarding cumulative impacts.

## 2. EXISTING ENVIRONMENT AND IMPACTS

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended, 1987) prescribes the procedures and provisions required for persons displaced as a result of federally assisted programs. In addition to providing payment of just compensation for property acquired, additional benefits are available to eligible displaced persons required to relocate from a residence, business or farm (including the relocation of personal property). Relocation resources would be made available to residential, commercial (including nonprofit) and farm displacements, and industrial relocatees without discrimination. The procedures established by the Uniform Relocation Assistance and Real Property Acquisition Policies Act would be followed.

### a. Residential Relocations

Tables III-12A, B, and C (Vol. II) present the information for residential relocations. No residential relocations are expected from the No-Build Alternative. The ASDEIS IRA would have the greatest number of residential relocations.

All residential relocations would be single family unit structures. No substantial concentrations of ethnic enclaves, minority populations, or elderly populations would be impacted by the Preferred Alternative (WV) and Line A (VA) or by the ASDEIS IRA. The vacancy rates in all of the zones are at a level at which housing should be available within the same Census Tract or BNA for all those displaced, as determined by the US Census Bureau data on social characteristics. Because there is decent, safe, and sanitary vacant housing available within each of the zones, housing would be of the same type and quality of the residences displaced. WVDOH is committed to last resort housing, if needed.

### b. Business Relocations

The No-Build Alternative would not require any business relocations. The ASDEIS IRA would have the most business relocations (Vol. II, Table III-12A). The relocations would all be small commercial operations including two stores, an ice cream store, two gift shops, two gas stations, an automotive repair shop, two restaurants, one poultry house, and a garage.

The Preferred Alternative (WV) would have seven business relocations. The businesses displaced are: an automotive repair shop, a turnkey chicken production facility, four poultry houses, and one ice cream store.

There is adequate commercial space available within the region for the relatively small number of business relocations under the ASDEIS IRA or under the Preferred Alternative (WV) and Line A (VA). The nature of the displaced business entities makes it likely that they would stay in the region rather than relocating outside the region.

**c. Other Relocations**

All of the proposed alignments would potentially impact several farms and outbuildings (Impacts to farmlands are discussed in the Section III-E: *Farmlands*.).

A small postal facility (roughly 120 square feet) would be avoided by the Preferred Alternative (WV) in Forman. There would be no other community facilities such as schools, churches, community centers, or health care facilities displaced by the Preferred Alternative (WV). The ASDEIS IRA would impact a cemetery located on VA 55, relocating 19 graves, and would potentially impact a nursing home and school building located on US 219 outside of Thomas.

## E. FARMLANDS

The Farmland Protection Policy Act (FPPA) of 1984 requires a farmland impact evaluation for applicable, federally funded projects. Because the Corridor H proposed project area is considered to be rural and is not a categorically excluded project, coordination with the United States Department of Agriculture, Natural Resources Conservation Service is required through completion of a Farmland Conversion Impact Rating Form (Form AD-1006) for each county impacted.

The purpose of the Farmland Protection Policy Act is "to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses . . ." Should the Natural Resources Conservation Service (NRCS) determine that the proposed action would adversely affect farmland, the agency funding the proposed action is required to consider alternatives to lessen them.

The Farmland Conversion Impact Rating Form is a tool used by the NRCS to evaluate the impact to soils the NRCS has designated as either prime, unique, statewide, or locally important. In accordance with the FPPA, the NRCS criteria for determining prime, unique, statewide, and locally important farmlands are based on soil type and slope, regardless of whether or not the land in question is currently used for agricultural purposes. Within each State, the NRCS District Conservationists are responsible for determining which soils are classified as such and are, therefore, afforded protection under the FPPA.

### 1. METHODOLOGY

The locations of soils determined to be either prime, unique, statewide, or locally important were taken from the *Soil Surveys* for the West Virginia Counties of Randolph, Tucker, Grant, and Hardy, and the Virginia Counties of Frederick and Shenandoah. The locations of these soils were entered into the Geographic Information System (GIS). Following the identification of alignments to be carried forward, the farmland conversions were determined on a county-by-county basis to facilitate completion of Form AD-1006. The applicable sections of Form AD-1006 were completed for each county involvement and then submitted to the appropriate NRCS State and District Conservationists for their review. Refer to Section III, Y - Cumulative Impacts, of this FEIS regarding cumulative impacts.

### 2. EXISTING ENVIRONMENT

In general, the steep terrain of the proposed project area reduces the occurrence of soils considered to be prime, unique, statewide, or locally important farmland soils.

Crops and pasture account for approximately 44 percent (120,868 hectares or 298,672 acres) of the area in Grant and Hardy Counties. Approximately 25 percent (27,303 hectares or 67,467 acres) of the area in Tucker County is in crops or pasture. In Randolph County, approximately 22 percent of the county's total area is in crops or pasture. In Frederick County, farmland makes up 44 percent (49,867 hectares or 123,220 acres) of the county's total area. In Shenandoah County, cropland and pasture make up 38 percent (50,426 hectares or 124,600 acres) of the total area.

## 3. FARMLAND IMPACTS

Farmland Conversion Impact Ratings (Form AD-1006) for this project were submitted to the appropriate West Virginia and Virginia NRCS offices.

A farmlands impact assessment was completed based on the conversion of prime, unique, statewide important, and locally important soils. Table III-13 (Vol. II) provides a breakdown of impacts by alternative. Table III-14 (Vol. II) provides a breakdown of farmland conversions by county.

### a. No-Build Alternative

There would be no project-related farmland conversions under the No-Build Alternative in either West Virginia or Virginia.

### b. ASDEIS Improved Roadway Alternative

#### (1) West Virginia

Approximately 32 percent of the total area within the West Virginia Counties of Randolph, Tucker, Grant, and Hardy is considered farmable. The ASDEIS IRA would convert approximately 0.05 percent (101 hectares or 250 acres) of farmlands within the West Virginia counties: of this, approximately 5 percent is classified as locally important, 30 percent is prime, and 65 percent is statewide important. The ASDEIS IRA would convert the greatest area of farmlands in Hardy County and the least in Randolph County.

#### (2) Virginia

The ASDEIS IRA would convert approximately 0.01 percent (17 hectares or 41 acres) of the total farmable land in Frederick and Shenandoah Counties. Much of the farmland conversion would be within Shenandoah County and would involve prime and statewide important soils.

**c. Preferred Alternative (WV)**

The Preferred Alternative (WV) would convert approximately 0.10 percent (177 hectares or 438 acres) of the total farmable land within the West Virginia Counties of Randolph, Tucker, Grant, and Hardy. Of the total farmable lands within each county, the Preferred Alternative (WV) would convert approximately 0.03 percent in Randolph, 0.09 percent in Tucker, 0.04 percent in Grant and 0.06 percent Hardy. In West Virginia, the majority (65 percent) of the converted farmland is classified as statewide important.

Within the Patterson Creek Option Areas, Line P would have a greater conversion of farmlands than would the Preferred Alternative (Line A). Within the Interchange and Forman Option Areas, the Preferred Alternative (Line I and Line F, respectively) would convert less area of farmland than Line A. Within the Baker Option Area, the Preferred Alternative (Line B) would convert greater area of farmlands than Line A. Within the Hanging Rock Option Area, farmland conversions under Line R would be comparable to the Preferred Alternative (Line A).

**d. Line A in Virginia**

Line A (VA) would convert approximately 0.03 percent (27 hectares or 67 acres) of the total farmable land within Frederick and Shenandoah Counties. The majority (62 percent) of this existing area is classified as prime farmland.

Within both the Duck Run and Lebanon Church Option Areas, Line A (VA) would convert fewer farmlands than would Line D2 and L, respectively. Within the Duck Run Option Area, Line D1 would convert fewer farmlands than would Line A (VA).

Concern has recently been expressed over the rapid loss of farmlands to development in Virginia's Northern Shenandoah Valley (which includes both Frederick and Shenandoah Counties). The American Farmland Trust (AFT), a national farming interest group, recently ranked the Shenandoah Valley as the 11th most endangered agricultural region in America. The AFT created their list by evaluating agricultural production, population growth, production per acre, and farmland loss. The Trust is noted as saying that population growth during the 1980s and urban edge sprawl from Northern Virginia are putting increasing developmental pressure on agricultural land in these two counties.

## 4. AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

The alignment development process incorporated measures to avoid and minimize farmlands identified as prime, unique, statewide important, and locally important. In response to the Farmland Conversion Impact Rating forms for Corridor Type Projects submitted to the Natural Resources Conservation Service, the NRCS replied that the Farmland Protection Policy Act amended in 1994 does not apply to this project. Rating forms and the response of the NRCS is found in Appendix H (Vol. II).

## F. PUBLIC WATER SUPPLY

### 1. METHODOLOGY

Impacts to sole-source aquifers have been evaluated in accordance with 40 CFR 149. The municipalities served by, and the sources of, public drinking water supplies were identified based on published *River Basin Plans* for the Potomac and Monongahela Rivers, as well as on communications with county and local officials. Public water supply systems were identified for the West Virginia towns of Wardensville, Moorefield, Mt. Top, Davis, Thomas, Hambleton, Hendricks, Parsons, and Elkins. No public water systems were identified in the Virginia portion of the proposed project. For each public water supply identified, the approximate location of the source or system intake was identified on project mapping. The distance between the proposed alignments and each water source or intake was then determined.

Identification and protection of sole source aquifers and wellhead protection areas are required by the Safe Drinking Water Act of 1986. Wellhead protection areas are defined in the Act as "the surface and subsurface area surrounding a water well or wellfield supplying a public water system through which contaminants are reasonably likely to move toward or reach such well or wellfield" (EPA, 1987). The West Virginia Department of Health and Human Resources and the Lord Fairfax Planning District in Virginia were contacted to identify any sole source aquifers or wellhead protection areas crossed by the proposed alignments. There are no sole source aquifer designations in the vicinity of the proposed project. There is one wellhead protection area within the project area. Refer to Section III, Y - Cumulative Impacts, of this FEIS regarding cumulative impacts.

### 2. EXISTING ENVIRONMENT AND IMPACTS

Nine communities are serviced by public water supplies. Seven of the nine obtain their water supply from surface water sources and two (Wardensville and Mt. Top) from springs. Daily demand among these nine public water supplies ranges from 5.5 l/sec (1,250 gal/min.) in Elkins to 0.21 l/sec (50 gal/min.) in the Hamrick Public Service District (Towns of Hambleton and Hendricks) intake.

Public water supplies and geographical relationships to the proposed alignments are discussed below and presented in Table III-15 (Vol. II). Of the nine public water supplies identified, the following seven would not be impacted by any proposed alignment: Moorefield, Mt. Top, Hambleton and Hendricks, Thomas, Davis, Douglas, and Elkins. These seven public water supplies would not be impacted because all of the proposed alignments are either located outside the water supply's watershed or are located downstream of the water supply's intake. Parsons water supply is discussed on the following pages. Because the water supply to Wardensville originates from groundwater, that discussion is contained in Section III-G: *Groundwater Resources*.

Parsons' water supply is drawn from Shavers Fork. The intake for this water supply is located on the west bank of Shavers Fork, just north of its confluence with Sugarcamp Run. In the Shavers Fork Option Area the Preferred Alternative (Line S) would not require bridging within the vicinity of the water intake but would require construction parallel to Shavers Fork on the east bank. Line A would require two bridge crossings upstream of the water intake; the closest crossing being 2.1 kilometers (1.3 miles) and the farthest being 5.6 kilometers (4.3 miles).

The ASDEIS IRA would require construction parallel to Shavers Fork on its western side but would not encroach into the river. The ASDEIS IRA, Preferred Alternative (WV), or Line A could cause minor and temporary construction-related impacts to the water supply related to possible erosion. No direct or permanent impacts would be expected from construction, operation, or maintenance of either the Preferred Alternative (WV) or ASDEIS IRA. The No-Build Alternative would not impact Parsons' water supply at Shavers Fork.

## 3. AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

The alignment development process for both the ASDEIS IRA and the Preferred Alternative (WV) included efforts to avoid public water supplies. At this time, there would be no impacts to public water supplies by any alternative. Construction activities in the Parsons area would be carried out using the practices described in WVDOH's *Erosion and Sediment Control Handbook for Developing Areas in West Virginia*. Application of these policies and practices would assure that erosion and sedimentation impacts would be controlled. Additionally, WVDOH would also have to obtain a National Pollution Discharge Elimination System (NPDES) permit, issued through the State, and a Stream Activity Permit, issued through West Virginia's Public Land Corporation.

## G. GROUNDWATER RESOURCES

Groundwater resources have been evaluated in accordance with FHWA Technical Advisory T 6640.8A. This discussion focuses on three groundwater topic areas: private wells, springs, and karst/sandstone recharge areas. Methodologies, existing environment, impacts, and mitigation measures are discussed by topic area in the sections below. Sources for information in this assessment include the West Virginia Geologic and Economic Survey, the Virginia Division of Minerals and Mines, and the US Geological Survey.

Most people in the project area obtain their drinking water from either private wells or springs. Wells are typically installed in the first water bearing rock formation encountered during well drilling. These wells, depending on the local geology, range in depth from a few to several hundreds of feet. Groundwater can be obtained from sedimentary rocks such as sandstones, siltstones, shales, and limestones. The water quality associated with these rocks varies as discussed below.

Groundwater quality is a function of the amount of time water is in the groundwater system and the rock type from which it is derived. Wells located on ridges composed of sandstone and limestone tap relatively "young" and pure groundwater. This is because the "young" groundwater has not had sufficient time in the groundwater flow system to accumulate dissolved mineral matter. Wells penetrating valleys formed by shales will obtain "older", less pure groundwater. This is because the groundwater has had sufficient time in the system to accumulate dissolved mineral matter. Groundwater obtained within shales or coal contains greater amounts of iron and sulfate, indicating reduced water quality.

Groundwater within the Appalachian Plateau physiographic province is obtained from sandstones, shales, siltstones, or limestones. The chemical character of the groundwater in these watersheds is variable, ranging from acidic to basic, and contains low to high concentrations of iron and chloride. East of the Allegheny Front, the proposed alignments enter the Valley and Ridge physiographic province. Most of the ridges are composed of limestones and sandstones that serve as recharge areas for groundwater. Valleys in this province are typically formed of shale. The groundwater quality in this province ranges from very poor to excellent depending on the aquifer.

### 1. PRIVATE WELLS

#### a. Methodology

Well locations and additional data regarding well construction and bedrock units in West Virginia were obtained from the USGS National Water Information System. The location of private water wells in Virginia was obtained from the EPA STORET groundwater database. Water quality data concerning private wells is described according to the geologic formation or rock units into which the wells were installed. When the available secondary data sources made no specific reference to water quality data for a formation or rock unit, the known water quality typical for that kind of sedimentary rock unit (i.e., sandstone, shale, siltstone, or limestone) was used.

All water wells within 152 meters (500 feet) of proposed construction limits were identified as being within the potential impact zone. The potential zone of impact was based on the best professional judgment of a certified hydrogeologist. In addition, well impacts were assumed to occur when residential relocations were required and were not currently served by a known public water supply.

**b. Impacts**

The No-Build Alternative would not impact existing wells. The ASDEIS IRA would directly impact 1 well, with an additional 24 wells within 152 meters (500 feet) of the ASDEIS IRA. All of these wells are located in West Virginia. There would be no impact to known wells in Virginia under the ASDEIS IRA. Six wells would be directly impacted by the Preferred Alternative (WV). These wells are all associated with residential relocations. Seventeen additional wells were determined to be within 152 meters (500 feet) of the Preferred Alternative (WV). In Virginia, there are no known wells within any of the Option Areas or along Line A (VA) which would be impacted.

**c. Avoidance, Minimization, and Mitigation**

The WVDOH will notify all utility companies, all pipeline owners or other parties affected and endeavor to have all necessary adjustments of the public or private utility fixtures, sewers, pipelines and other appurtenances within or adjacent to the limits of construction, made as soon as practicable. The Contractor shall secure and provide, until all work under the terms of the project are satisfactorily completed and accepted, the proper contractor liability insurance.

**2. SPRINGS**

This section discusses spring assessment methodologies, impacts and mitigation for springs associated with a public water supply, an important site, or farm or business operation. Other springs identified or brought to the attention of WVDOH are also discussed. The following discussion of methodologies covers the methods used in all or some of the springs discussed. Following the methodology discussion, each spring is discussed as a stand-alone topic due to the uniqueness of each situation.

**a. Methodology**

The locations of springs were identified based on three sources: publications from the West Virginia Geological and Economic Survey; springs encountered during field work; and information obtained from public meetings or public involvement. The location of each spring was assessed relative to its proximity to the alignments, its use, and the type of geologic unit involved. Dye tracer studies were conducted and are described later in this section.

Dye tracing technology involves the injection of nontoxic dyes into the groundwater system by various means. Sampling is conducted through the use of charcoal filter packets, placed at pre-designed areas downstream of the injection point. Highly sensitive detection equipment is used to measure the parts per million of the dye recovered. Background sampling is generally conducted two weeks prior to the injection of dye and normally for a six week period following injection. Ozark Underground Laboratories (OUL) conducted these studies for the proposed project. Results of the dye tracer studies can provide valuable information on groundwater flow patterns and time of travel. Tracer studies were conducted at Wardensville Spring and the springs associated with the Lost River, the Capon Springs and Farms Resort, and Greenland Gap. Reports prepared by OUL are included in Appendix B of the ASDEIS (Aley, 1994).

### b. Wardensville Spring

#### (1) Existing Environment

The Wardensville Spring is located at the nose of Anderson Ridge, approximately 61 meters (200 feet) east of Waites Run Road (County 5/1) and within the boundaries of the J. Allen Hawkins Community Park. The spring discharges from Oriskany Sandstone at a rate of 4.1 liters per second (65 gallons per minute) (McColloch, 1986). Wardensville's water plant is located at the discharge point of the spring and consists of a pump house, clear well, two high volume pumps, a spring water storage tank, an overflow pipe, and a chlorinator. Wardensville's daily water demand on this spring is approximately 190,000 liters (50,000 gallons).

In February 1994, the West Virginia Department of Health and Human Resources initiated a Wellhead Protection Program for the Wardensville Spring. One of the major elements of the Wellhead Protection Program was the determination of the preliminary boundaries of a wellhead protection area for the Wardensville Spring. The preliminary boundaries encompass an irregularly shaped area approximately 192 hectares (500 acres) in size. The preliminary boundaries extend 305 meters (1,000 feet) north of the discharge point of the spring and 2,286 meters (7,500 feet) southwest of its discharge point. These boundaries were determined based on a procedure described by EPA entitled, *Guidelines for Delineation of Wellhead Protection Areas* (EPA, 1987). As shown in Exhibit III-3 (Vol. II), the Preferred Alternative (WV) would cross Anderson Ridge 606 meters (2,000 feet) southwest of the spring discharge point, with a depth of fill of 3 meters (10 ft) just west of Waites Run and a cut of 47 meters (154 feet) at the highest point on the ridge.

(2) **Dye Tracing Results and Impact Assessment**

Ozark Underground Laboratories provided a preliminary assessment of the potential project-related impacts to the Wardensville Spring. The assessment was based on the preliminary wellhead protection area boundaries for the Wardensville Spring, information gained from field observations and other hydrogeological, geographic, and topographic information from secondary sources (McColloch, 1986; Hobba *et al.*, 1972; Hobba, 1985). This preliminary assessment concluded that, even though the Preferred Alternative (WV) would cross the Wardensville Spring wellhead protection area, the quantity of flow would most likely not be affected. The finished grade would be located 23 meters (77 feet) to 47 meters (154 feet) above the sandstone unit identified as one portion of the aquifer supplying groundwater to the spring. In order to obtain as much information as possible, and because this area is a sensitive recharge unit (see below), a dye tracer study was conducted by Ozark Underground Laboratories. The purpose of these additional studies was to:

- More precisely determine the recharge area for the Wardensville Spring;
- More confidently predict project-related impacts;
- Better understand the nature of groundwater flow to the spring; and
- Prescribe measures to mitigate predicted or possible impacts.

The dye trace involved the injection of one pound of rhodamine WT dye immediately adjacent to the Wardensville water tank on Anderson Ridge. As shown in Exhibit III-4 (Vol. II), eight monitoring stations were established to detect dye from this injection. This location was selected to test the scenario that water could move rapidly into the groundwater flow system and discharge from Wardensville Spring within a few hours or days.

After six weeks of sampling, no dye was recovered in any samples. The sampling was extended to 14 weeks with still no dye recovery. The results indicate that water infiltrating Anderson Ridge, located within the recharge area for the spring, do not rapidly contribute waters to the Wardensville Spring at the dye injection site and by inference, similar sites on Anderson Ridge (Aley, 1994). Because the dye is biodegradable after a period of time, it cannot and has not been concluded that surface waters recharging Anderson Ridge do not reach the Wardensville Spring.

A second dye trace was conducted at a sinking point on the Lost River located about 213 meters (700 feet) upstream of the WV 55 crossing of the Lost River. Four pounds of eosine dye powder were injected into a point were the river was flowing into the limestone on the east bank of the river. Sixteen monitoring stations were established to detect dye from this injection site as shown in Exhibit III-4 (Vol. II). Dye tracing results indicate that dye from this injection point discharged into the Cacapon River in a segment between monitoring stations 3 and 5. This indicated that there is little storage in the portion of the karst aquifer traversed by dye used in this tracing study (Ozark Underground Laboratory, 1994). Furthermore, any contaminants entering this sinking portion of the Lost River have the potential to enter the groundwater flow system throughout the year with rapid travel rates to a segment of the Cacapon River about 2,530 meters (8,300 feet) downstream. Eosine dye was not recovered from the Wardensville Spring which demonstrates that a hydrologic connection between the sinks in the Lost River and the Wardensville Spring does not exist.

Neither the No-Build Alternative nor the ASDEIS IRA would impact the Wardensville Spring or its associated wellhead protection area.

**(3) Avoidance, Minimization, and Mitigation**

Mitigation measures would be required to protect the Wardensville water supply from contamination due to construction activities associated with the Preferred Alternative (WV).

In advance of construction, a series of groundwater monitoring wells would be constructed on Anderson Ridge at the proposed location of the Preferred Alternative (WV) to obtain information on the elevation of the saturated zone of the aquifer. Well installation and monitoring would begin as soon as practical. Further, one monitoring well would be used as an injection point to introduce dye directly into the aquifer supplying the spring. This dye trace would provide important information for impact mitigation.

During construction, storage and use of fuels and other similar materials would not be permitted within the recharge area or across Anderson Ridge. Construction vehicles and equipment would be stored away from the wellhead protection area. Blasting programs would be designed so that excavation across the ridge would use the smallest effective charge and so that cuts would be made in the smallest incremental heights possible. Monitoring for short term turbidity would be conducted. Plans for the short term use of alternate water supplies would be developed and in place in advance of construction.

Measures would be taken to prevent contamination of the water supply due to operation of the highway, such as stormwater runoff, and accidental spills. Such measures would include the design and construction of impervious ditches and medians across Anderson Ridge, and a collection and retention system outside of the wellhead protection area. Impervious ditches could be constructed using traditional pavement materials such as asphalt or concrete, or could be designed using an impervious geotextile material that would be placed beneath a gravel layer. This would allow for a median and ditch that could be seeded as in typical highway construction. This arrangement would be more aesthetically pleasing, but would still function in the event of an accidental spill.

### c. Capon Warm Springs Complex

#### (1) Existing Environment

Capon Springs is a complex of several warm springs, including Old Man Spring and Beauty Spring. The spring complex is located 12 kilometers (7.5 miles) northeast of Wardensville, approximately 5.3 km (3.3 miles) north of the proposed alignments. Capon Springs and Farm Resort, which is listed on the National Register of Historic Places, was developed around these warm springs. The principal spring used at the resort discharges from a nearly vertical outcrop of the Oriskany Sandstone at a gap along the northwestern limb of the Great North Mountain Anticlinorium. This gap is located along Bear Ridge.

#### (2) Dye Tracing Results and Impact Assessment

As a part of the groundwater impact assessment, Ozark Underground Laboratories performed an independent assessment to define further the recharge area for the Capon Warm Springs Complex. It was determined that the Oriskany Sandstone, Tonoloway Limestone, and the Helderberg Group provide groundwater recharge to the springs. The results place the proposed alignments approximately 5.8 kilometers (3.6 miles) south of the newly defined southern boundary of the recharge area, removing the springs even further from a potential impact. The probable extent of the recharge area for this spring complex is presented on Exhibit III-5.

A dye trace was conducted between the Preferred Alternative (WV) and the Capon Warm Springs Complex along the sinking portion of an unnamed stream (Refer to Exhibit III-4 (Vol. II) for dye injection location and monitoring stations). This stream is located approximately 6.1 kilometers (3.8 miles) southwest of the Capon Warm Springs Complex just off Forest Road 502 that continues to the Hawk Campground. Three pounds of fluorescein dye powder were injected into the sinking portion of this stream which flows across the entire extent of the groundwater recharge units for the Capon Warm Springs Complex. Six monitoring stations were established to detect dye from this trace study.

Results from the dye trace indicate that little, if any, water from the sinking portion of the stream recharged groundwater supplies in the Oriskany Sandstone and the associated Helderberg and Tonoloway limestones. This conclusion was based on the very large amount of dye recovered at a monitoring station (Station 28) located down the topographic valley from the dye injection site. Furthermore, no dye was recovered at any stations located between the dye injection site and the Capon Warm Springs Complex. No dye was recovered at the Capon Warm Springs Complex. Neither this data nor any other hydrogeologic data indicate or suggest that waters entering the groundwater system along the Preferred Alternative (WV) would ultimately reach any of the springs in the Capon Warm Springs Complex (Ozark Underground Laboratory, 1994).

#### (3) Avoidance, Minimization, and Mitigation

About 457 meters (1,500 feet) of the Preferred Alternative (WV) would be located on the outcrop area of recharge units which are associated with the Capon Warm Springs Complex. Even though it has been demonstrated that the Preferred Alternative (WV) would be located beyond the recharge area for the springs, special care would be taken when crossing these recharge units to prevent contaminants from entering the groundwater system. Stormwater runoff would be diverted away from recharge units in this segment of the highway.

### d. Greenland Gap

#### (1) Existing Environment

Greenland Gap is located at New Creek Mountain (Wills Mountain Anticline) where the North Fork of Patterson Creek cuts through the resistant beds of the anticline. Limestone units comprise the eastern and western flanks of the anticline. The Preferred Alternative (WV) would pass up gradient of these limestone units on the western flank of New Creek Mountain to the east of County 1. This valley, located between Walker Ridge and New Creek Mountain, contains numerous sinkholes and "lost" streams. Two sinkholes along County 1 serve as groundwater recharge points and would be located about 150 meters (500 feet) from the Preferred Alternative (WV).

Another karst area on top of Walker Ridge contains a very large depressional sinkhole. A spring located 640 meters (2,100 feet) east provides a perennial supply of water into this sinkhole.

#### (2) Dye Tracing Results and Impact Assessment

Three dye injection sites formed the basis of this study. Two dye injections were located along County 1 (Southern Greenland Gap Trace [120] and Middle Greenland Gap Trace [121]) and another on top of Walkers Ridge (Northern Greenland Gap Trace [122]). Refer to Exhibit III-6 for dye injection locations and monitoring stations. Eosine dye (0.33 pounds) was injected into a sinkhole named the Southern Greenland Gap Trace site. This site is located about 1006 meters (3,300 feet) north of the intersection of County 1 and Greenland Road, on the eastern side of County 1. One pound of rhodamine WT dye was injected into a second sinkhole located about 978 meters (3,210 feet) north of the Southern Greenland Gap Trace site on the western side of County 1. The third dye injection, the Northern Greenland Gap Trace site, was located in a sinkhole on top of Walkers Ridge. One pound of fluorescein dye was injected into this sinkhole.

Dye trace studies were conducted in this karst area to determine if these sinkholes contribute recharge waters to springs located in the surface valley occupied by County 1. It was also important to determine which springs in the Patterson Creek watershed receive recharge waters from the selected dye injection sites.

Results from the three groundwater traces demonstrate that waters originating from the Preferred Alternative (WV) would enter the groundwater system and discharge from two locations. The primary discharge point is Muntzing Spring (Station 113), an important cold water tributary to Patterson Creek. A secondary discharge point is a spring or springs in, or tributary to Patterson Creek between monitoring stations 118 and 119. All three tracer dyes reached Muntzing Spring within seven days of dye injection. Rapid groundwater travel rates and the appreciable concentration of the dyes recovered indicate that the groundwater system is highly permeable and that it provides ineffective natural cleansing (Ozark Underground Laboratory, 1994). Any event which yields contaminants at Muntzing Spring would directly yield contaminants to Patterson Creek.

Residents along County 1 obtain their drinking water from wells and springs. Portions of this valley downstream of the dye injection points are drained by sinking streams. It was not possible to obtain water samples from all private water sources during the course of the study. However, it is likely that some water sinking in this valley downstream of the dye injection sites subsequently discharges at these drinking water springs (Ozark Underground Laboratory, 1994).

Inasmuch as existing roadways cross most of the same zones of sensitivity, contamination of groundwater due to accidental spills could occur due to the construction of the No-Build Alternative, the ASDEIS IRA, or the Preferred Alternative (WV) and Line A (VA).

**(3) Avoidance, Minimization, and Mitigation**

Dye tracing results have demonstrated that stormwater runoff and accidental spills in relation to the construction and use of the Preferred Alternative (WV) would enter the Greenland Gap karst groundwater system. Due to the rapid travel time of groundwater in this area, detention ponds would be constructed to contain spills. Additionally, peat sand filters would be constructed up gradient of the sinkholes to intercept and treat the highway runoff before entering the groundwater system. Peat sand filters have been successfully used by the Indiana Department of Transportation. The filters consist of layered sand and peat approximately three feet in depth, underlain by a drainage tile system to remove the filtered runoff. Highway runoff is diverted over the filter and allowed to percolate through, providing for the cation exchange of heavy metals and removal of suspended sediment. Planting the filter surface can further increase the filter's effectiveness.

**e. Knobly Road Spring**

Knobly Road Spring is located along the Middle Fork of Patterson Creek within the Patterson Creek Option Area, approximately 400 meters (1,310 feet) upstream from the point at which the Preferred Alternative (WV) would cross Knobly Road. A small structure is built around the spring which is located on the southern bank of Patterson Creek. This spring was located during field work and was further identified by a local resident. According to local residents, this spring provides water for five or six farms, two homes, livestock, and chickens. Based on geologic mapping (Reger, 1924), this spring discharges near a contact of the Oriskany Sandstone and the Helderberg Limestone. There are no published data available to verify the reported flow or chemical characteristics of this spring.

The No-Build and the ASDEIS IRA would have no impact on this spring.

Under the Build Alternative, both the Preferred Alternative (Line A) and Line P would impact the Knobly Road Spring. The Preferred Alternative (Line A) located up gradient of the spring could reduce the flow of groundwater to the spring. Line P would less likely impact the flow of groundwater to the spring due to its position on the opposite side of Patterson Creek and away from the limits of cut. However, because a recharge area for Knobly Road Spring has not been defined, groundwater may also be recharging the spring from the northern side of Patterson Creek. The extent of impact on groundwater flow to the spring would depend on the elevation of the top of the saturated zone relative to the elevation of the finished grade of the proposed highway.

**f. Cold Spring**

Cold Spring is located 10.6 kilometers (6.6 miles) east of Wardensville in a gap between Paddy Mountain and Short Mountain. The spring is approximately 38 meters (125 feet) south of VA 55, on the opposite side of the road from Duck Run. This spring is frequented by local residents and used as a discretionary source of drinking water. According to the Department of Health in Frederick County, Cold Spring is not a sole water source. Springs like Cold Spring are commonly used by local residents as a discretionary source of perceived clear, clean mountain water.

Cold Spring appears to be a contact spring where groundwater flowing through a permeable sandstone layer (the Oswego Formation) encounters the less permeable Martinsburg Shale (Butts and Edmundson, 1963). In the area of this encounter, the groundwater is forced to the surface at a fracture point to create a spring. Cold Spring does not function as a major water source to Duck Run, a native trout stream located approximately 100 meters (300 feet) to the north.

A recharge area for Cold Spring has not been calculated according to the US Geological Survey. However, it has been suggested that the recharge area would likely be located up gradient from the spring, along Paddy Mountain and to the west. The proposed alignments adjacent to Cold Spring are in the Duck Run Option Area. Both the ASDEIS IRA and the Build Alternative within the Duck Run Option Area would require construction within the spring's probable recharge area along Paddy Mountain.

The ASDEIS IRA would require the realignment of VA 55 along this section. As such, it would require construction within 16 meters (50 feet) of the spring, as well as within a portion of the assumed recharge area. The spring may still be used as a local potable water supply after construction, but would probably be inaccessible during construction. Because of the potential impact to Duck Run, it would not be possible to shift the ASDEIS IRA to the north of VA 55 to avoid Cold Spring.

Within the Duck Run Option Area, the construction limits of Line D1 would extend within 53 meters (175 feet) of the spring. While Line D1 would be the closest of the Build Alternative alignments to the spring, it would require the least amount of construction within the probable recharge area. Line D2 would be the farthest Build Alternative from the spring and would require construction limits extending within 122 meters (400 feet) of the spring. Line D2 would require the greatest amount of construction within the probable recharge area. Line A would require construction limits extending within 91 meters (300 feet) of the spring with construction limits also extending within the probable recharge area.

#### g. Other Springs

There are a number of springs located throughout the project area that were identified during field work and public meetings. None of these springs are known to be used as a drinking water supply. In the Cheat River Watershed a spring is located west of Mackeyville Road at the head of a small drainage way to Roaring Run. The Preferred Alternative (WV) would impact this spring while the ASDEIS IRA would avoid this spring.

In the North Branch of the Potomac River Watershed, there is an area of karst with sinkholes and springs along the western flank of New Creek Mountain. Three springs were identified on the eastern flank of New Creek Mountain ranging from 183 meters (600 feet) to 33 meters (100 feet) from the Preferred Alternative (WV) and the ASDEIS IRA.

There is a spring along the western bank of the Potomac River, 61 meters (100 feet) south of the Preferred Alternative (WV). Both the Preferred Alternative (WV) and the ASDEIS IRA would avoid impacts to this spring.

The Cacapon River Watershed contains a number of springs due to the geology of the area. The Preferred Alternative (WV) would impact a spring located along an unnamed tributary to the Lost River. This spring would be avoided by the ASDEIS IRA. Big Spring is a large spring located along Trout Run, upstream of the proposed crossing by the Preferred Alternative (WV) and the ASDEIS IRA. Neither the Preferred Alternative (WV) nor the ASDEIS IRA would impact Big Spring.

### 3. KARST/SANDSTONE RECHARGE UNITS

A karst aquifer is defined as an aquifer in which flow of water is or can be appreciable through one or more of the following: joints, faults, bedding planes, and cavities, all of which have been enlarged by dissolution of the bedrock (Quinlan, 1992). Groundwater in karst settings is more susceptible to contamination because surface water may pass directly into the subsurface with little or no filtration by soil. Because karst groundwater typically flows through relatively large fractures and conduits within the bedrock, it may transport contaminants rapidly from points of recharge (sinkholes) to distant cave streams, water wells, springs, and surface streams (Stephenson and Beck, 1995). Failure to recognize the nature of karst systems, and to plan accordingly, is likely to lead to the degradation of the aquifer, its springs, and its dependent aquatic ecosystem (Rubin, 1991). Surface water fisheries which receive discharge from cold water karst springs will suffer degradation. In order to protect groundwater quality, proper erosion and sedimentation control measures must be implemented.

#### a. Methodology

While karst is defined in the Geology section as areas involving only limestone, limestones and sandstones in the proposed project area typically serve as source areas for groundwater recharge. Being the most permeable rock units, they are also more susceptible to contamination. Areas underlain by a combination of limestone and sandstone were considered in this assessment for potential impacts to groundwater. The location and extent of nine limestone and two sandstone units were identified from secondary data sources (Reger, 1924; Butts and Edmundson, 1963). These units include Oriskany Sandstone, Williamsport Sandstone, Helderberg Group, Tonoloway Limestone, Greenbriar Limestone, Wills Creek Formation, McKenzie Formation, Beekmantown Group, Conococheague Formation, and the Elbrook Formation. The orientation and extent of each unit was superimposed over alignment mapping. This combined mapping was used to define the limits of areas termed *zones of sensitivity*. Three such zones were defined:

- **Zone 1**: Areas that provide groundwater recharge for a public water supply; areas that contain sinkholes and which provide recharge to a National Resource Water, a West Virginia High Quality Stream, a Virginia Outstanding State Resource Water; or any other important site. Zone 1 is of high sensitivity;

- **Zone 2**: Areas that contain sinkholes and provide groundwater supplies for private drinking water in moderately populated areas. Zone 2 is of moderate sensitivity; and
- **Zone 3**: Areas that contain no sinkholes and provide groundwater supplies for private drinking water in less populated areas. Zone 3 is of low sensitivity.

Zones of sensitivity were developed to identify areas of limestone bedrock within the Corridor H project area which function as sensitive recharge areas for groundwater supplies. The location of limestone bedrock is a concern because these rocks ultimately form lands commonly known as karst topography or karst terrain. Karst terrain is formed in and on soluble bedrock and its subsurface is characterized by surface water flow and groundwater flow through caves (or other dissolutionally enlarged cavities). Karst terrain forms distinctive surface landforms and hydrologic features (Quinlan, 1992).

Groundwater movement in karst aquifers differs from that found in porous media and is commonly orders of magnitude faster. Karst lands provide direct conduits into the groundwater flow system through sinkholes and sinking streams that provide pathways for the introduction of contaminants. In the case of water pollution investigations in soluble rock regions, most of the problems are associated with rapid groundwater movement through flow systems which provide ineffective natural cleansing (Aley, 1984).

### b. Existing Environment and Impacts

Construction of a highway through areas of karst may have an effect on the quantity of groundwater flowing through a karst aquifer if drastic changes are made to the surface and subsurface flow system. This can be accomplished by diverting surface drainage as a result of clearing and grubbing, or the possibility of changing groundwater flow routes from blasting of the bedrock. However, altering the groundwater flow system depends on:

- An understanding of the hydrogeology of a karst aquifer; and
- The position or depth to the local groundwater flow system in the effected area;

Diversion of surface water and subsequent reduction of recharge into the karst aquifer will reduce groundwater quantity into the local conduit system. Parizek (1971) reported that hydrogeologic effects of highways include the "beheading" of aquifers: creation of groundwater discharge zones where road cuts extend below the water table; changes in groundwater basins and divides; obstruction of groundwater flow by abutments, retaining wall, and sheet pilings; and changes in runoff and recharge characteristics.

The most common technical approach used to locate water bearing zones in porous media and subsequent mapping of the potentiometric surface of an aquifer (the depth to the top of the saturated zone) is by drilling and installing several groundwater monitoring wells. Quinlan (1992) provided rationale for the design of cost-effective groundwater monitoring systems in limestone and dolomite terrains. Their experience revealed that monitoring wells in karst terrains generally do not work. The extremely heterogeneous organization of groundwater flow in caves and dissolutionally enlarged fractures of a karst aquifer, an organization that is commonly dendritic or trellised and similar to that of tributaries of a surface river, is not adequately sensed by the number and size of wells drilled except by improbable good luck (Quinlan and Ray, 1989). However, if enough well data points are generated in concert with dye tracing, a potentiometric map of the karst aquifer can be constructed. For basin analysis, a minimum of 1 well per square kilometer (2.5 well per square mile) is recommended for most aquifers. A facility analysis could require more than 40 times this well density (Quinlan, 1989). Without enough data points, the map is just a gross generalization of the subsurface flow system.

It is correct to interpret the flow direction of groundwater to be perpendicular to the potentiometric contours and down gradient (Quinlan, 1989). Sometimes, however, flow lines appear to be parallel to the contours rather than perpendicular to them, as has been demonstrated in the Edwards Aquifer in Texas (Maclay and Small, 1984; Waterreus and Hammond, 1989). Once again, the main case of this problem is a lack of sufficient water well data in areas characterized by extreme heterogeneity in aquifer properties.

Predicting whether blasting will have any effect on the quantity of water flowing through a karst aquifer is dependent on the location of the subsurface flow system. If a highway cut is made above the conduit flow supplying the system, reduction of flow most likely will not result. If a highway cut intercepts conduit flow, changes in groundwater basin boundaries and supplies to private water wells with perennial flow may be altered. However, additional data needs to be collected in karst areas to properly characterized subsurface flow conditions and directions during final design.

Zone 1 areas include the Wardensville Spring, Capon Warm Springs Complex, and the Greenland Gap Karst area. Dye tracing studies were utilized to assess impacts for each of these areas. These areas are primarily underlain by the Oriskany Sandstone, Tonoloway Limestone, and the Helderberg Group. Anticlinal ridges underlain by the Oriskany Sandstone serve as recharge areas within the Potomac River Basin. Springs commonly discharge from the Oriskany at water gaps, noses of plunging anticlines, at the base of the ridges, or on upper slopes of the ridges. The Tonoloway Limestone and the limestones of the Helderberg Group are significant host units for caves and karst aquifers (Davies, 1958). As part of the karst system, caves often provide preferential flow routes for groundwater. Any introduction of contaminants into the groundwater system through these units can impact the quality of groundwater resources.

Zone 2 includes areas east of Little North Mountain underlain by limestone near the towns of Lebanon Church and Clary. These limestone formations include the Elbrook Formation, the Beekmantown

Group, and the Conococheague Formation. This zone is located within the Valley and Ridge Province of Virginia. The valley traversed by the Build Alternative commonly displays surface expression of groundwater recharge due to the presence of sinkholes. Disruption of surface hydrology from highway construction may result in an associated impact to the quality of groundwater resources. Any changes made to the groundwater flow routes during highway construction can result in the formation of new sinkholes.

Zone 3 areas include Laurel Mountain west of Elkins, Backbone Mountain, Allegheny Front, Patterson Creek Mountain, Hanging Rock, and Duck Run. Zones within the Appalachian Plateau Province are underlain by the Greenbriar Limestone. Zones in the Valley and Ridge Province are primarily underlain by the Oriskany Sandstone, Helderberg Group, Tonoloway Limestone, and the Wills Creek Formation. These zones currently exhibit no surface expressions of karst. Highway construction may or may not cause impacts to groundwater resources in these areas.

### c. Avoidance, Minimization, and Mitigation

Groundwater in karst settings is more susceptible to contamination because surface water may pass directly into the subsurface with little or no filtration by soil. Because karst groundwater typically flows through relatively large fractures and conduits within the bedrock, it may transport contaminants rapidly from points of recharge (sinkholes) to distant cave streams, water wells, springs, and surface streams (Stephenson and Beck, 1995). Failure to recognize the nature of karst systems, and to plan accordingly, is likely to lead to the degradation of the aquifer, its springs, and its dependent aquatic ecosystem (Rubin, 1991). Surface water fisheries which receive discharge from cold water karst springs will suffer degradation. In order to protect groundwater quality, proper erosion and sedimentation control measures must be implemented.

Erosion and sedimentation is the primary result of construction activities which lead to groundwater contamination. Most of the erosion begins shortly after vegetation is removed and is reduced after vegetation has been restored. These impacts can be minimized with proper design, installation, and maintenance of temporary erosion and sedimentation control structures (Smith, 1991). Basic functions of control structures can provide diversion, filtration, ponding, and flow spreading of stormwater runoff. These will be developed during final design activities.

#### (1) Zone 1 Areas

Mitigation measures for impacts to Zone 1 sensitivity areas (Wardensville, Capon Springs, and Greenland Gap) have been discussed under each of these topics.

### (2) Zone 2 Areas

One area, Lebanon Church, has been designated Zone 2 for sensitivity to groundwater resources and would be subject to Virginia's Stormwater Management Regulations (1993). Mitigation measures in Lebanon Church could also involve monitoring a private well every 1,000 meters (1,600 feet) along the selected alignment (Build or ASDEIS IRA) during construction. Information obtained from such monitoring or from other additional studies could determine time of groundwater travel and would assist in the preparation of an Emergency Response Program should an accidental spill occur. This measure should be considered regardless of the alternative selected since spills can occur on the existing roadway system.

### (3) Zone 3 Areas

Several areas discussed previously have been designated as Zone 3 or low sensitivity to groundwater resources. The Duck Run Zone 3 area in Virginia would be subject to Virginia's Stormwater Management Regulations (1993). Because this zone contains no surface expression of karst, impacts are not anticipated. However, in this and all other Zone 3 areas, special care would be taken during construction activities to prevent the introduction of contaminants through these recharge units into the groundwater system.

## 4. SECONDARY IMPACTS

### a. Highway-Related Impacts

In actuality, all impacts discussed in this section are highway-related secondary impacts. In addition to stormwater runoff and groundwater contamination due to accidental spills, additional roadway construction would increase the amount of impervious cover in each of the watersheds. While this would increase stormwater runoff volumes and peak discharges, no long-term impact to the quantity of groundwater would be expected. The area covered by the highway pavement would be small in comparison to the overall land available for recharge.

### b. Development-Related Impacts

#### (1) ASDEIS Improved Roadway Alternative

Because there are no housing unit increases predicted under the ASDEIS IRA, there would be no impact to groundwater resources due to private water wells.

#### (2) Preferred Alternative (WV) and Line A (VA)

Predicted residential and service-oriented development would generally occur in areas not supplied by a public water supply system. These homes and businesses would, therefore, have to rely upon wells for their water supply. Demand was calculated by multiplying the number of predicted housing units by an average daily usage of 567 liters (150 gallons). This figure was supplied by the West Virginia Department of Health. Utilizing a housing unit density of 125 single family units per square kilometer (1 unit per 0.80 hectare (2 acres)), water demand would equal approximately 70,000 liters per square kilometer per day.

Aquifer capacity (yield) data available for the 30-Minute Contour was available for the Counties of Mineral, Grant, Hardy and Hampshire (Ward and Wilmoth, 1968; Hobba *et al.*, 1972). Based on published information, it is reasonable to conclude that aquifers located in the other counties within the 30-Minute Contour would have a potential yield at least equivalent to those for which data are available. Yields in liters per day per square kilometer for those counties for which data are available range from 150,000 to 300,000. Based on these data, the additional housing units predicted to occur as the result of development would not adversely impact groundwater resources within the 30-Minute Contour.

## 5. CUMULATIVE IMPACTS

There are no anticipated cumulative impacts to groundwater resources from either the additive effects of secondary impacts or from the foreseeable future actions under consideration. <u>Refer to Section III-Y-Cumulative Impacts, of this FEIS for additional discussion of cumulative impacts.</u>

## H. AIR QUALITY

Under the Clean Air Act of 1970, the Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS) for the protection of public health and welfare. The NAAQS addresses six major pollutants: Carbon Monoxide (CO), Ozone ($O_3$), Nitrogen Dioxide ($NO_2$), Sulfur Dioxide ($SO_2$), Particulate Matter ($PM_{10}$) and lead (Pb). Of these six pollutants, FHWA requires a detailed evaluation of Carbon Monoxide (CO).

The primary source of air pollution emissions associated with the proposed project are those caused by motor vehicles using the roadway system. An air quality assessment was performed following the guidelines and recommendations received from the West Virginia Department of Transportation, the West Virginia Division of Environmental Protection, the Virginia Department of Environmental Quality - Division of Air Quality, the Virginia Department of Transportation, and the Environmental Protection Agency - Region 3 in Philadelphia.

This section discusses the assessment methodology, the existing mobile source (traffic-related) air quality in the proposed project area, and the predicted impacts to the local air quality from implementation of the Improved Roadway or the Preferred Alternative. Construction mitigation measures and other mitigation measures, if any, are also addressed. Details of the air quality analysis are contained in the *Air, Noise, and Energy Technical Report*. Refer to Section III, Y - Cumulative Impacts, of this FEIS regarding cumulative impacts.

### 1. METHODOLOGY

A microscale analysis was performed to predict the effects of CO changes to local air quality from the construction of either the ASDEIS IRA or the Build Alternative. The microscale analysis predicts the generation and transportation of CO in the immediate project area. The years 2001 (proposed opening year) and 2013 (proposed design year) were analyzed and compared to the NAAQS.

Motor vehicle emission rates were computed using EPA's MOBILE 5.0a emissions model (March, 1993). The emission factors were developed with conservative model inputs. Credits for a "Basic" Inspection/Maintenance Plan (I & M) were not taken. In addition, refueling emissions were not included in any of the scenarios. Carbon monoxide concentrations from highway vehicles were calculated by using CAL3QHC, a Gaussian dispersion model and hybrid of the CALINE 3 model.

All meteorological conditions were selected to result in the highest CO conditions. Three-hundred and sixty wind directions were analyzed at 1 degree intervals to determine the maximum CO concentrations.

Other factors included a wind speed of one meter per second, a neutral atmospheric condition (D), a mixing height of 1,000 meters (3,280 feet), and a worst case ambient temperature of -7°C (20°F).

Modeling was done for the peak 1-hour condition. A background concentration of 2.0 parts per million (ppm) for the 1-hour concentration was used to account for CO sources outside the proposed project area. Speeds for the roadways and the proposed highway were based on the functional type and location of the particular road.

Receptor sites along the roadway were chosen at locations where the highest CO concentrations could be expected and where the general public would have access during the analysis periods. These were placed at various representative points on adjoining property right-of-way lines where human activity may occur. The CO concentrations were compiled to include the project roadway, cross-street, and background concentrations.

A mesoscale or "regional" analysis was not performed for the project because the proposed project area is in attainment for both CO and $O_3$.

## 2. EXISTING ENVIRONMENT

West Virginia Counties of Randolph, Tucker, Grant, and Hardy, and the Virginia Counties of Frederick and Shenandoah are located within Region 3 of the EPA's jurisdiction. The agencies normally involved with air quality in this region are the EPA, the West Virginia Division of Environmental Protection, WVDOH, the Virginia Department of Environmental Quality - Air Division, and VDOT.

The Clean Air Act directed the Environmental Protection Agency to establish standards for clean air via the NAAQS. The NAAQS are shown in Table III-16 (Vol. II) and represent levels of these pollutants and exposure periods that pose no significant threat to human health or welfare. West Virginia and Virginia adhere to the same standards.

Currently, air monitoring is conducted for these pollutants at various locations throughout the State of West Virginia and the Commonwealth of Virginia by the National Air Monitoring System (NAMS) and the State and Local Air Monitoring System (SLAMS) program. As a result of the Clean Air Act Amendments, and based on historical monitoring data, all of the counties in the study area are designated as being in attainment for Carbon Monoxide (CO) and Ozone ($O_3$); pollutants most normally associated with mobile source (motor vehicle) emissions.

The term 'attainment' refers to the status of the various pollutants described in the above NAAQS table. If a pollutant does not exceed the standard more than once per year, then it is considered in attainment of the standard. If the pollutant exceeds the standard two or more times during the year, then it is considered in non-attainment of the standard. When a project is designated as non-attainment, it must be on an approved Transportation Improvement Plan (TIP) or meet a series of requirements in order for the project to be approved. As mentioned, the project is located in areas designated as being in attainment of the standard for both CO and $O_3$.

## 3. IMPACTS

The predicted impacts of the microscale analysis were imperceptible among the No-Build Alternative, the ASDEIS IRA, and the Preferred Alternative (WV).

### a. Microscale Analysis

Numerous CO sites were investigated for the microscale analysis. None of the predicted 1-hour analysis sites would exceed the 1-hour criteria of 35 ppm, as identified in the NAAQS. These predicted concentrations also did not exceed the 8-hour concentration criteria of 9 ppm. As a result, an 8-hour analysis was not performed because 8-hour concentrations are always less than 1-hour concentrations. Table III-17 (Vol. II) shows the predicted highest 1-hour CO receptor concentrations for the alternatives in the interim year 2001 and the design year 2013. These concentrations would be located in areas where the greatest traffic volumes would be at their closest to a property line, typical of where human activity may occur. These predicted concentrations include a conservative 1-hour background level of 2.0 ppm.

#### (1) West Virginia

The highest concentrations in West Virginia are predicted to occur near US 33 and US 219 near Elkins. These concentrations are the highest because the predicted traffic volumes would be the highest at this location.

Under the No-Build Alternative, the highest predicted 1-hour CO concentration for the years 2001 and 2013 would be 7.0 ppm and 7.9 ppm, respectively. Based on these results, no exceedance of either the 1 or 8-hour criteria is predicted to occur at any receptor for the No-Build Alternative.

Under the ASDEIS IRA, the highest predicted 1-hour CO concentration for the years 2001 and 2013 would be 5.4 ppm and 6.1 ppm, respectively. Based on these results, no exceedance of either the 1 or 8-hour criteria is predicted to occur at any receptor for the ASDEIS IRA.

Under the Preferred Alternative (WV), the highest predicted 1-hour CO concentration for the years 2001 and 2013 would be 5.2 ppm and 5.5 ppm, respectively. Based on these results, no exceedances of either the 1 or 8-hour criteria is predicted to occur at any receptor for any alignment under the Preferred Alternative (WV).

**(2) Virginia**

The highest concentrations in Virginia are predicted to occur along VA 55, between Wheatfield and I-81. These concentrations are the highest because the predicted traffic volumes would be the highest at this location.

Under the No-Build Alternative, the highest predicted 1-hour CO concentration for the years 2001 and 2013 would be 3.0 ppm and 3.6 ppm. Based on these results, no exceedances of either the 1 or 8-hour criteria is predicted to occur at any receptor for the No-Build Alternative.

Under the ASDEIS IRA, the highest predicted 1-hour CO concentration for the years 2001 and 2013 would be 4.8 ppm and 5.1 ppm, respectively. Based on these results, no exceedances of either the 1 or 8-hour criteria is predicted to occur at any receptor for the ASDEIS IRA.

Under the Build Alternative, the highest predicted 1-hour CO concentration for the years 2001 and 2013 would be 4.1 ppm and 4.4 ppm, respectively. Based on these results, no exceedances of either the 1 or 8-hour criteria is predicted to occur at any receptor.

**b. Mesoscale Analysis**

A mesoscale analysis was performed to analyze the proposed project's effect on the precursors of ozone, volatile organic compounds (VOCs) and Nitrogen Oxides (NOx). The NAAQS has an established standard of 0.12 ppm for ozone that is not to be exceeded more than once in any one year. Historical monitoring information was received from the EPA's National Dry Deposition Network (NDDN) for all these sites through the Northeastern Forest Experiment Station in Parsons. The last full year of monitored and summarized data was available through 1992.

For the design year 2013 the predicted VOC level for the ASDEIS IRA is 12.0% greater than the predicted VOC level for the No-Build Alternative. The predicted design year 2013 Preferred Alternative (WV) and Line A (VA) is 15.5% greater than the predicted design year 2013 No-Build Alternative level. The predicted NOx level for the design year 2013 ASDEIS IRA is 15.0% greater than the predicted design year 2013 No-Build Alternative level, and the predicted design year 2013 Preferred Alternative (WV) and Line A (VA) is 17.4% greater than the predicted design year 2013 No-Build Alternative level.

In a 1994 article "The Characterization of Ozone Exposures in Rural West Virginia and Virginia," (Lefohn *et al.*, 1994) evaluation of hourly-averaged data for all sites in the region from April 1988 to October 1992 showed that the Horton Station, VA experienced the highest W126 ozone exposures. The W126 exposure index is the sum of all hourly averaged concentrations, where each hourly concentration is weighted by a sigmoidal weighting function (Lefohn and Runeckles, as cited by Lefohn *et al.*, 1994).

The technical article references San Bernadino California as receiving "some of the highest ozone exposures in the world and the effects of ozone exposures in trees in the San Bernadino National Forest are well documented. In contrast, extreme tree growth reduction or injury, similar to those experienced in San Bernadino forests, at or near Horton Station in Virginia has not been reported."

In the same technical article "the number of hourly average concentrations between 0.05 and 0.087 parts per million (ppm) from the San Bernadino and Horton Station sites was 2027 and 2758, respectively. Because of the large number of hourly average concentrations above 0.10 ppm experienced at San Bernadino, there were fewer concentrations between 0.05 and 0.087 ppm at this site than at Horton Station. Thus the type of exposures experienced at the San Bernadino site (i.e., frequent occurrences of hourly average concentrations ≥ 0.10 ppm) appears to contradict the hypothesis proposed by Krupa *et al.* (as cited by Lefohn *et al.*, 1994) that concentrations between 0.05 and 0.087 ppm are more important than the hourly average values ≥ 0.10 ppm for affecting vegetation. The evidence appears to point toward the importance of the contribution of the higher hourly average concentrations in affecting tree growth."

Another test of the 0.05 to 0.087 ppm levels hypothesis was conducted at Auburn (reference 49), assessing the ozone effect on loblolly pine half-sibling families. Summarizing and quoting "These results [of the Auburn study], combined with the comparison of the ozone exposures that occurred at the San Bernadino and Horton Station sites, tend to confirm the importance of hourly average concentrations above 0.087 ppm."

In 1992, there were no hourly average concentrations for almost all locations in the study ≥ 0.10 ppm (National Ambient Air Quality Standard is 0.12 ppm). The percentiles were above Beardon Knob and the Parsons stations.

To quote further, "there are numerous experimental studies reported in the literature in which constant concentrations have been applied to vegetation for several hours a day. For some high-elevation sites used in our analysis, 'square-wave' exposures occurred for periods of 8 hours or longer; this implies that the results from 'square-wave' experiments may be useful for assessing ozone effects on vegetation. In addition, because few research studies identify ozone exposure regimes that result in vegetation effects, predicting effects using single-parameter exposure indices may be difficult. In a recent attempt to identify the relative importance of hourly average concentrations below 0.10 ppm, hourly average ozone concentrations between 0.05 and 0.087 ppm have been suggested as potentially more important than the higher hourly average concentrations for causing vegetation effects. However, our results indicate that occurrences of hourly average concentrations above 0.087 ppm appear to contribute to growth reductions in some tree species."

The corridor area is also considered as attainment for the ozone standard and West Virginia is also not considered to be part of the northeastern ozone transport area. There is no readily available or easily accomplished method to determine the amount of ozone that may occur as a result of the operation of the Preferred Alternative (WV). In addition, ozone is a long range transport pollutant that has maximum levels that occur in the hot, dry summer months. During this period, the winds are generally from the west and the pollutant can be carried hundreds of miles from its origination site.

Avoidance, mitigation or minimization measures for an attainment area may be minimal, particularly when point and area sources account for most of the ozone. There is no emissions burden in existence that indicates the amount of ozone that is produced by automobiles on a statewide level, but there is information on Wood County in the Parkersburg area and Kanawha- Putnam Counties in the Charleston area. In the Parkersburg area for 1990, highway mobile emissions accounted for 15.1% of the VOC emissions, excluding biogenic sources, versus 84.9% for point and area sources. NOx emissions from highway vehicles accounted for 22.5 % versus 77.5% for point and area sources. In the Charleston area for 1990, highway mobile source emissions accounted for 27.1% versus 72.9% for point and area sources, excluding biogenic sources. NOx emissions from highway vehicles accounted for 6.4% versus 93.6% for point and area sources (Note: When biogenic sources are included, the percentages are even less).

## 4. AVOIDANCE, MINIMIZATION, AND MITIGATION

The proposed project is in an attainment area for CO. Based on the predicted results, the construction of the Preferred Alternative (WV) or the ASDEIS IRA would not cause an exceedance of the NAAQS for CO in any of the analysis years. The predicted CO concentrations are below both the 1-hour and 8-hour criteria for all conditions. Therefore, no mitigation measures are required as a result of the microscale analysis. The proposed project is in an attainment area for $O_3$. It is also in an area where the SIP does not contain any transportation control measures. Therefore, the conformity procedures of 40 CFR Part 51 do not apply.

## I. NOISE

This noise analysis was prepared in accordance 23 CFR Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, that establishes a requirement for a noise study for any proposed Federal or Federal-aid project. This section presents a description of the methods used for analysis, applicable noise standards and criteria, an assessment of the existing noise environment, the predicted impact assessment of future levels, and a discussion of mitigation measures. Construction mitigation measures are also discussed. Details of the noise analysis are contained in the *Air, Noise, and Energy Technical Report*. Refer to Section III. Y - Cumulative Impacts, of this FEIS regarding cumulative impacts.

### 1. METHODOLOGY

Traffic noise calculations were performed using the FHWA approved STAMINA 2.0; a computer model derived from the FHWA Highway Traffic Noise Prediction Model, FHWA-RD 77-108, December 1978. The modeling accounted for soft/hard sites, traffic speed and design hour volumes for autos, medium trucks (2-axle, 6-tire) and heavy trucks (3 or more axles).

Noise prediction analyses were performed for the No-Build Alternative, the ASDEIS IRA, and the Build Alternative for the year 2013. Traffic volumes for the study were derived from WVDOH and from traffic reports prepared by Michael Baker Jr., Inc. The design directional hourly volumes (DHV) were used in the analysis, representing the loudest period of the day. Design speeds were used for the roadways. Traffic assumptions included a DHV of 10%. Recent traffic surveys indicate that the vehicle mix for the proposed highway would consist of 90% automobiles (including pickup trucks, vans, etc.), 3% medium trucks (2-axle/6-tires) and 7% heavy trucks (3 or more axles). Local roadways were predicted to consist of the same percentage vehicle mixes.

Sound intensity is normally presented as a sound level using the unit "decibel" (dB). The decibel is used to measure either sound power or sound pressure levels. These sound pressure levels are shown as dBA $L_{eq}(h)$. The term dBA refers to decibels on the A-weighted scale that represents the way the human ear perceives sound. The term $L_{eq}(h)$ refers to a representative of an average sound level over an hour's time period.

Table III-18 (Vol. II) shows the Federal Highway Administration (FHWA) Noise Abatement Criteria (NAC) for various land use Activity Categories. Activity Category B, representative of residences, schools, churches, parks, etc., was used as the criteria for sensitive receptors identified in the proposed project area. In situations where the NAC is approached or exceeded at any receptor location, noise abatement must be considered for that site. The Approach Criteria is defined as 1 dBA less than the NAC for any Activity Category.

The State of West Virginia also has a substantial increase criteria, based on one of the recommended standards established by FHWA: the predicted noise level increase over the existing condition. Abatement must be considered if, as a result of the proposed action, the existing noise level at a particular site increases by more than 15 decibels. The Commonwealth of Virginia has a substantial increase criteria based on 10 or more decibels.

Forty-two short-term measurements, approximately 10-20 minutes in length, were taken using a Metrosonics dB-308 Precision I integrating sound level meter during the peak traffic periods. Simultaneous traffic counts were recorded for nearby roadways, as applicable. The data was then extrapolated to one-hour volumes for calibration purposes. There were 35 measured sites in West Virginia and 7 measured sites in Virginia. More than 2000 locations were modeled to account for areas most likely affected as a result of the proposed action. The modeled locations conducted for the ASDEIS did not model shielding factors or terrain features in order to capture the greatest potential number of affected sites. Subsequently, the modeled locations analyzed for the FEIS included shielding and terrain features (discussed in subsection 5 of this section). The refinement of the modeled analyses are a result of identifying more specific placement of noise abatement features as a result of better defined cut and fill areas. The locations of the modeled and monitored sites are presented in the *Air, Noise, and Energy Technical Report*. Vehicle classification counts were taken during the measurement periods to determine the percentage of heavy trucks (3 or more axles), medium trucks (2-axle/6-tires) and passenger vehicles (including vans, pickup trucks and motorcycles).

## 2. EXISTING ENVIRONMENT

Noise is often defined as unwanted sound. It is emitted from many sources including highway vehicles, airplanes, factories, railroad cars and power plants. Highway vehicle noise is a composite of engine exhaust, drive train, and tire-roadway interaction.

Sound is a very subjective concept. Degrees of sound disturbance depend on several things; the amount and nature of the intruding noise, the relationship between the background noise and intruding noise and the type of activity occurring where the noise is heard. Time also enters into an individual's noise judgment. For example, a car horn is much more annoying at 2 AM than at 2 PM, even though the car horn has the same decibel level at both times. This is because the nighttime background levels (approximately 45 dBA) are lower than the daytime levels (approximately 55 dBA); consequently, the person notices the greater difference at night.

Activity interference can also occur depending on what the person is doing. For certain sound levels, normal conversation may be possible but sleep may be difficult. Work that involves a high degree of concentration may be affected by noise while manual labor may not be interrupted to the same level by the same sound. As mentioned, sound is a subjective concept. It is so subjective that a person may not consider a particular noise source to be intrusive if that person is subjected to the same or similar noise over a long period of time.

### a. Noise Sensitive Areas

Land use determines the sensitivity of an area to noise. Residential areas are the most sensitive to noise, particularly single family homes. Land uses which are less sensitive to noise include open land, wooded areas, commercial properties, and agricultural areas. Land use within the study area can be characterized as predominantly woodland and agricultural areas, occupying approximately 90% of the proposed project area. The remainder of the proposed project area is characterized as residential, commercial, industrial, other urban land, areas of mines/quarries/pits, transportation/commercial/utilities, other agricultural land, and water resources. Residential, commercial, and industrial areas are located mainly on the primary travel routes.

### b. Measured Noise Levels

Tables III-19 and III-20 (Vol. II) show existing noise levels, land uses, the measurement period and the dominant noise source(s) at each site. This was validated in the field for the 42 noise monitoring sites. Tables III-21 and III-22 (Vol. II) show the existing noise levels, the hourly vehicle volumes, the distances from existing roadways and the estimated travel speeds on these roads, as applicable. In each table, sites have been numbered. The location of each site can be viewed in the *Air, Noise, and Energy Technical Report.*

## 3. IMPACTS

Noise prediction analyses were performed for the existing (1993) and the design year (2013) scenarios. Table III-18 (Vol. II) identified the FHWA Noise Abatement Criteria (NAC) for various land use Activity Categories. The criteria used for the previously identified sensitive receptors was Activity Category B; representative of residences, schools, churches, and parks.

A traffic noise impact occurs when the predicted traffic noise levels in the design year approach or exceed the noise abatement criteria or when the predicted traffic noise levels in the design year substantially exceed the existing noise levels. In both West Virginia and Virginia, the 'approach' criteria is 1 dBA less than the noise abatement criteria for all categories. For Category B receptors that include residences, schools, and churches, the approach criteria is 66 dBA. In West Virginia, a 'substantial increase' criteria of greater than 15 dBA over the existing condition is applied. In Virginia, a 'substantial increase' criteria of 10 or more dBA is applied.

After a review of maps, preliminary plans, and field investigations, 42 noise locations were measured in the study area. These noise locations were representative of the various land uses and vehicle type and volume characteristics. Nearly 2,300 receptor locations were modeled to account for sensitive receptor locations most likely impacted by the proposed project.

**a. FHWA Criteria Exceeded in West Virginia**

In West Virginia, there are 118 receptors (114 residences, 2 churches, 1 clinic, and 1 volunteer fire department) that currently approach or exceed the FHWA Noise Abatement Criteria for the existing 1993 condition. In the year 2013, the predicted NAC would be exceeded at 200 receptors (195 residences, 3 churches, 1 clinic, and 1 volunteer fire department) under the No-Build Alternative, at 286 receptors (279 residences, 3 churches, 1 clinic, 1 cemetery, 1 care facility, and 1 volunteer fire department) under the ASDEIS IRA, and at 66 receptors under the Preferred Alternative (WV).

In the Interchange Option Area, the NAC would be exceeded at seven sites under the Preferred Alternative (Line I) compared with two under Line A. In the Shavers Fork Option Area, the NAC would not be exceeded under Line A, or the Preferred Alternative (Line S). In the Patterson Creek Option Area, the NAC would not be exceeded under Line P, or the Preferred Alternative (Line A). In the Forman Option Area, the Preferred Alternative (Line F) would have one predicted exceedance while Line A would have none. In the Baker Option Area, Line A and the Preferred Alternative (Line B) would have two exceedances. In the Hanging Rock Option Area, Line R would have two predicted exceedances while the Preferred Alternative (Line A) would have none. Table III-23 (Vol. II) summarizes the total number of receptors by FHWA Noise Activity Category each for each alternative in West Virginia.

**b. FHWA Criteria Exceeded in Virginia**

In Virginia, there are currently five receptors (4 residences and 1 church) which approach or exceed the FHWA Noise Abatement Criteria for the existing 1993 condition. In the year 2013, the predicted NAC would be exceeded at 18 receptors (17 residences and 1 church) under the No-Build Alternative, at 52 receptors (51 residences and 1 church) under the ASDEIS IRA, and at 8 receptors (8 residences) under Line A.

In the Duck Run Option Area, Line D1 and Line A would have one predicted exceedance, whereas Line D2 would have none. In the Lebanon Church Option Area, Line L would have five more predicted exceedances than would Line A (6 vs. 1). Table III-23 (Vol. II) summarizes the total number of receptors by FHWA Noise Activity Category each for each alternative in Virginia.

### c. Exceedance of the Substantial Increase Criteria in West Virginia

In West Virginia, the Substantial Increase Criteria does not apply for the existing condition. In the year 2013, the number of predicted exceedances would be zero under the No-Build Alternative, 27 receptors under the ASDEIS IRA, and 85 receptors under the Build Alternative.

In the Interchange Option Area, neither the Preferred Alternative (Line I) nor Line A would have predicted exceedances. In the Shavers Fork Option Area, neither Line A nor the Preferred Alternative (Line S) would have predicted exceedances. In the Patterson Creek Option Area, Line P would have 2 predicted exceedances while the Preferred Alternative (Line A) would have none. In the Forman Option Area, the Preferred Alternative (Line F) would have one predicted exceedance while Line A would have none. In the Baker Option Area, the Preferred Alternative (Line B) and Line A would have the same number of predicted exceedances (2). In the Hanging Rock Option Area, Line R would have 2 predicted exceedances while the Preferred Alternative (WV) would have none. Table III-24 (Vol. II) summarizes the total number of receptors by substantial increase for each alternative in West Virginia.

### d. Exceedance of the Substantial Increase Criteria in Virginia

In Virginia, the Substantial Increase Criteria does not apply for the existing condition. In the year 2013, the number of predicted receptor exceedances would be zero under the No-Build Alternative, 5 receptors (5 residences) under the ASDEIS IRA, and 49 receptors (49 residences) under Line A (VA).

In the Duck Run Option Area, Line D1 would have three more predicted exceedances than would Line A (15 vs. 12), whereas the number of predicted exceedances would be the same under Line D2 or Line A (12). In the Lebanon Church Option Area, Line L would have 46 more predicted exceedances than would Line A (54 vs. 8). Table III-24 (Vol. II) summarizes the total number of receptors by substantial increase for each alternative in West Virginia and Virginia.

### e. Natural Areas of Concern

In addition to the residences, schools, churches and parks that were modeled, other sensitive receptor locations were identified including Big Run Bog in the Monongahela National Forest, Great North Mountain in the George Washington National Forest and the Greenland Gap Conservancy. The areas in both National Forests have current measured dBA levels in the mid 40's. These levels are primarily generated from the local activities in the forests and from vehicle usage on State Route 55 (George Washington National Forest) and US Route 219 (Monongahela National Forest). The Greenland Gap Conservancy had measured dBA levels in the mid 50's because of the traffic sound echo on Greenland Gap Road (County 3/3).

For the proposed No-Build Alternative in the year 2013, the predicted levels for the Monongahela and Washington Forest sites increase by 1 dBA due to future minor traffic volume increases. The Conservancy site increases by 3 dBA to 59 dBA since the local traffic is predicted to double on Greenland Gap Road.

For the proposed ASDEIS IRA in the year 2013, the predicted levels for the Monongahela and George Washington National Forest sites increase by 3-4 dBA because of the predicted doubling of future traffic volumes on the nearby routes. The Conservancy site stays at a predicted level of 59 dBA because Greenland Gap Road remains the dominant sound generator at the Conservancy's closest point to the ASDEIS IRA roadway centerline (approximately 457 meters or 1500 feet) and the proposed alternative does not add to the total sound level at that distance. There are no predicted traffic noise impacts in these natural areas of concern (Monongahela and George Washington National Forests and Greenland Gap) according to the FHWA guidelines.

For the Preferred Alternative (WV) in the year 2013, the George Washington National Forest site increases by 7 dBA over the existing condition to 51 dBA. The Monongahela National Forest site increases by 5 over the existing condition to 48 dBA. Similar to the ASDEIS IRA, the Conservancy site stays at a predicted level of 59 dBA because Greenland Gap Road remains the dominant sound generator at the Conservancy's closest point to the Preferred Alternative (WV) roadway centerline (approximately 305 meters or 1000 feet) and the proposed alternative does not add to the total sound level at that distance. There are no predicted traffic noise impacts in these natural areas of concern (Monongahela and George Washington National Forests and Greenland Gap) according to the FHWA guidelines.

## 4. AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Avoidance, minimization, and mitigation measures would not be necessary under the No-Build Alternative. The alignment development process for both the ASDEIS IRA and the Build Alternative included efforts to avoid or minimize noise impacts to sensitive receptors through alignment shifts. However, avoidance and minimization measures under the ASDEIS IRA were not as effective as they were under the Preferred Alternative and Line A (VA). Efforts to shift the ASDEIS IRA alignment away from sensitive receptors were constrained by the fact that most sensitive receptors are in close proximity to the existing roadway.

### a. General Noise Reduction Measures

There are four general types of noise reduction measures used to mitigate noise impacts: highway plantings, structures (buildings), earth berms, and barrier walls. Existing dense highway vegetation can, under certain conditions, reduce traffic sound levels up to 5 dBA: to do so requires a vegetative cover of a minimum 30 meters (100 feet) in depth, 4.5 meters (14 feet) in height, and of sufficient density that no visual path through it exists between the highway and the adjacent land use area. A narrow width of vegetation would not provide any degree of effective sound level reduction. The use of highway plantings and existing vegetation alone would not be an effective solution for substantial noise reduction. However, where desirable vegetation exists between the proposed highway and the adjacent land use areas, every effort would be made to preserve and encourage its propagation.

Intervening buildings themselves may be used as noise barriers, providing up to 15 dBA of sound level attenuation. This amount would only occur when the buildings are continuous and there is no direct line-of-sight between the source and the observer. A row of houses, depending on their spacing, can typically reduce sound levels by 3 to 5 dBA. This shielding is most prevalent in the more populated areas where residential, neighborhood, institutional, commercial, and/or industrial buildings exist. Given the rural nature of the area, the use of structures would not be an effective means of noise attenuation.

Noise reduction measures such as earth berms and barrier walls would provide the greatest degree of noise attenuation. A graded, vegetated earth berm that blends with the surrounding topography is one of the more aesthetically pleasing noise barriers. The feasibility of berm construction would be considered as part of the overall grading plan for the proposed project. There may be instances where an effective earth berm can be constructed within normal right-of-way or with a minimal additional right-of-way purchase. If right-of-way is insufficient to accommodate a full height earth berm, a lower earth berm could be constructed in combination with a wall to achieve the necessary height and attenuation. An earth berm may also provide slightly more attenuation (up to 3 dBA more) than a vertical barrier wall of the same height because of the better absorptive quality of the earth.

A solid, acoustically opaque barrier (barrier wall) can theoretically reduce noise exposure of a property by as much as 15 to 20 dBA (one-third to one-fourth a reduction in noise level), although a typical reduction is 10 dBA (about one-half). The barriers can be constructed from common building materials such as concrete, wood, plastic, and recycled products. The design can range from relatively simple, straight-line walls to complex designs that blend in with local features such as terrain and neighborhood characteristics. The materials should be rigid and sufficient dense to provide adequate mitigation and drainage, while at the same time be attractive, durable, and relatively maintenance-free. Both the on-site cost and the degree of noise attenuation must be considered when selecting barrier wall materials. In addition, it is unlikely that any one barrier wall type or material would be applicable in every situation. Consideration must also be made for the on-site cost of the foundations, fabrication, erection, and maintenance of the wall, as well as for any additional drainage costs that may be associated with the construction of the barrier.

For maximum effectiveness, barriers should be as close as possible to either the source or the receiver and should be high and long enough to mitigate adequately the site. Space limitations and public involvement often determine the type of barrier used. A combination of earth mound topped by a wall can be visually pleasing as well as functional. In some cases, the wall may serve to control access and eliminate the need for and cost of right-of-way fencing. Barrier walls are typically not provided in areas where access to adjacent development is necessary. The walls become ineffective at noise attenuation when opened up to provide access on an uncontrolled access facility.

**b. Conditions for Implementing Mitigation Measures**

Mitigation measures (noise abatement) would be considered when one or more of the following conditions are met:

- The design year sound levels exceed or approach the FHWA Noise Abatement Criteria. The approach criteria for West Virginia and Virginia is 66 dBA for Category B receptors (representative of exterior sound levels for residences, schools, churches, parks and other institutional activities) or;
- The predicted design year level substantially increases over the existing sound level at the same site. In West Virginia, a substantial increase is defined as an increase greater than 15 dBA over the existing condition. In Virginia, it is defined as an increase of 10 or more dBA over the existing condition.

Mitigation considerations are comprised of two components: feasibility and reasonableness. The feasibility of mitigating noise impacts deals primarily with quantitative elements such as topography, access points, drainage, safety, maintenance requirements, other noise sources, and whether the proposed insertion of a barrier could reduce the sound levels by a minimum of at least 5 dBA. The reasonableness of mitigating noise impacts is a more subjective criteria. Reasonableness is based on such factors as the cost effectiveness of protecting an isolated or small number of receptors, exposed wall heights, distances to receptors from the mitigated source, a minimum decibel change of at least 3 dBA over the existing levels (when people can first notice a minor change in the sound environment), residential support or desires for noise abatement features, and concerns for physical and visual access to commercial establishments. Where noise abatement considerations are warranted, every reasonable effort would be made to achieve adequate noise level reductions for locations where the levels exceed the noise abatement criteria or where the projected noise levels exceed the substantial increase criteria.

A preliminary analysis addressed the receptors that required noise mitigation consideration. Some receptors were eliminated from further noise abatement consideration (sound barriers) because of the justifiable warrants identified below:

- Safety issues, including line-of-sight requirements, particularly where the proposed roadway and the local roads and driveways intersected at-grade;
- Isolated or single receptor locations that would not typically warrant further consideration because of the potential cost of protecting one site;
- Areas with only a few homes which did not have acceptable cost per receptor ratios;
- Areas where the predicted noise contributions coming from other streets would have predicted an insufficient Insertion Loss (IL) from any proposed solid wall structure;
- Overriding direct access requirements to the roadways, particularly along most of the ASDEIS IRA; and
- Other considerations, such as business visibility and access to the general public.

### c. Preliminary Identification of Sound Barrier Locations

Noise mitigation via sound barriers was evaluated for those receptors that were not eliminated from further study as a result of the justifiable warrants listed above. A preliminary location analysis identified the noise mitigation areas to be studied. The proposed sites would be studied in greater detail depending on the alternative and associated alignment selected. Detailed sound barrier justifications that deal with specific lengths, heights, materials, costs, distances from the roadway, community desires, and visual impacts would be analyzed in final design, in conjunction with the final alignment development.

Tables III-25 through III-27A (Vol. II) show the proposed preliminary sound barrier locations and construction costs for the ASDEIS IRA, Preferred Alternative (WV), Line A (VA), and the option area comparisons. The preliminary areas presented in Tables III-25 through III-27A (Vol. II) are very conservative in length and location and would typically be the maximum extent of solid wall sound barrier proposals. The cost estimates assume an average structure height of 6.1 meters (20 feet) and a cost of $16 per square foot in both West Virginia and Virginia. However, these estimates may be slightly higher where sections of proposed sound barriers cross bridges (due to the need for additional support requirements).

During final design some of the areas identified may be eliminated from further consideration for the same reasons or warrants as were the others. In addition to these warrants, these areas may be eliminated from further consideration because of proposed cut slopes and how the receptors may be shielded from the roadway by the natural terrain. The final length, height, and cost of sites to be mitigated will be addressed in the following section.

## 5. FINAL NOISE BARRIER CONSTRUCTION RECOMMENDATIONS

The need for noise barriers at the preliminary locations identified in the ASDEIS were studied in greater detail for the FEIS. The preliminary location of noise barriers for the Preferred Alternative (WV) and Line A (VA) are identified in Table III-27B (Vol. II).

There are approximately 2,300 receptors located along the Preferred Alternative (WV) and Line A (VA). Two-hundred and one (201) of these receptors were found to approach or exceed the FHWA NAC, exceed the West Virginia Substantial Increase Criteria or exceed the Virginia Substantial Increase Criteria, thereby warranting noise abatement consideration.

Of the 201 receptors, forty-four (44) receptors were dismissed from further consideration because either 1) the receptor will have intervening areas of "cut" which will partially or completely shield the receptor from highway generated noise, or 2) the receptor was located where there were too few receptors to justify a noise barrier as a cost effective solution. Fifty-seven (57) of 201 receptors are associated with barriers 29-39, which are located in Virginia. Since the project is currently proposed not be constructed in Virginia, final noise barrier locations for receptors in Virginia were not determined.

The remaining 100 receptors were found to warrant further noise abatement consideration. These receptors were associated with barrier locations 1, 3, 10, 11, 13, 16, 19, 23 and 26 (Table III-27B (Vol. II). These receptors were analyzed with refined barrier locations, lengths and elevations. The results indicate that of these 100 receptors, 22 are candidates for noise abatement, such as a solid structure acoustical feature.

The other proposed barrier locations were dismissed for various. Barrier 2 has receptors that are 50-60 feet below the highway. One half of the proposed barrier section is in cut. Barrier 4 has three receptors that are approximately 20-30 below the proposed roadway. Barriers 5, 6, 7, 8, 9 and 12 were eliminated because the alignment was changed in this area. Barrier 14 (formerly known as the Eisner Line) required a break in the proposed structure for relocated County Route 41, rendering this site as unfeasible. Barrier 15 had four residences that exist 20-80 feet below the grade of the proposed road. Barriers 17, 18 and 20 are mostly in cut areas. Barriers 20, 27 and 28 are completely in cut. Barrier 22 has two receptors located near the bridge where there is some cut on either side. Barrier 24 has receptors that are 120 feet below the bridge. Barrier 25 is one-half in cut and an access road from WV 55 would have to be cut off.

As mentioned, barrier locations 1, 3, 10, 11,13, 16, 19, 23 and 26 became candidates for further study. After completing a detailed barrier analysis on these areas, it was concluded that barrier 13 was the only location that warrants noise abatement with barriers under the established regulations. For the other locations, there are no practical, reasonable or feasible noise abatement measures which will eliminate or reduce the predicted impacts at these facilities. Mitigation measures were determined to be unfeasible and/or unreasonable due to the average cost per receptor incurred in protecting receptors that did not have a minimum reduction of at least 3 decibels. The original minimum reduction was noted as 5 dBA. However, in order to provide a more conservative cost per receptor and a more liberal capture of affected receptors, a lower minimum reduction was used. The results of the analysis are presented in Table III-27C (Vol. II). If, during this final design phase, any of the contingency conditions previously described cause abatement to be considered reasonable or feasible for a given location, such determination will be made prior to requesting approval for construction advertisement. Commitments regarding any proposed and exact abatement measure locations, heights and type (or approved alternatives) will be made during a project reevaluation and at a time before the construction advertisement is approved.

The WVDOH is committed to the construction of feasible noise abatement measures for the noise impacted receptors identified above, contingent upon the consideration of the following:

- Detailed noise analyses;
- Cost-effectiveness analyses;
- Community impact regarding desires, types, heights, and locations;
- Preferences regarding compatibility with adjacent land uses, particularly as addressed by officials having jurisdiction over such land uses; and,
- Safety and engineering aspects as related to the roadway user and the adjacent property owner.

WVDOH does not have an official policy regarding cost of noise barriers based on a maximum cost per receptor. Cost effectiveness analyses are based on WVDOH's internal guidelines of $25,000 per receptor. This guideline figure was derived from WVDOH through communications with the other state DOT's. It pertains to all acoustical abatement features such as earthen berms or solid wall structures.

## J. RECREATION RESOURCES

The proposed project's impact on recreation resources has been assessed. Details of the analysis are included in the *Socioeconomics Technical Report*. Refer to Section III, Y - Cumulative Impacts, of this FEIS regarding cumulative impacts.

### 1. METHODOLOGY

Recreational resources within a 30-minute drive of the proposed project area were inventoried through review of available mapping and coordination with Federal, state, and local government agencies, private organizations, and persons with knowledge of existing and proposed recreational facilities.

Mapping of the proposed alignments was reviewed to identify direct impacts with known recreational resources within the preliminary construction limits for the ASDEIS IRA, Preferred Alternative (WV) and Line A. Impacts to recreation resources were rated on the following basis:

- **No Impact**: The facility or recreational function of the facility would not be directly affected by construction and/or operation of the proposed project;
- **Minor Impact**: Impacts were considered minor when construction activities could temporarily, but not permanently, affect the recreational function of a specific resource; and
- **Major Impact**: The primary function of a specific recreation resource would be directly affected by construction and operation of a specific alignment, potentially resulting in the loss of the recreational opportunity.

### 2. EXISTING ENVIRONMENT AND IMPACTS

Recreational opportunities offered throughout West Virginia and Virginia are diverse in nature and include: water activities such as white water rafting, boating, and water skiing; fishing and hunting; hiking; bicycling; rock climbing and rappelling; spelunking; cross-country and downhill skiing; golfing and court sports; historical and environmental interpretive (educational) activities; jogging and walking; and scenic driving. Recreation resources within a 30-minute drive from the proposed project are identified on Table III-28(Vol. II). These resources are discussed in detail in the *Socioeconomics Technical Report*.

There will be no use of Section 4(f) recreational areas by the Preferred Alternative in West Virginia. Additionally, it has been determined that the Preferred Alternative (WV) does not use designated park, recreation, wildlife or waterfowl areas from the Allegheny, American Discovery or Big Blue Trails or from George Washington National Forest Management Areas, Monongahela National Forest Management Prescription Areas or any historic resources. Tables III-29 and III-30 (Vol. II) summarize the impact by alternative and option area. An overview of each alternative's impact on recreation resources is provided below, followed by a discussion of specific resource impacts.

The No-Build Alternative would not result in any impacts to recreation resources located in close proximity to the proposed project area. Without regional access improvements, travel times to and from recreation sites will increase as traffic volumes on major arterials increase. As access times increase, potential recreationists may opt to find other, more easily accessible recreation areas that provide the same type of activities. This could result in a loss of patronage and associated local, regional, and state revenues. Furthermore, the provision of safe access heavily influences use at those sites providing winter sports activities. Given the mountainous terrain of the area, heavy snows create problems for drivers traveling the winding, steep roadways of West Virginia. Such travel conditions may encourage potential users to seek out other facilities that provide similar recreation opportunities.

Under the ASDEIS IRA, or under the Preferred Alternative (WV) and Line A (VA), access to recreation resources would be an improvement over the No-Build Alternative. As noted in the *CSDEIS*, the determination of effects resulting from access improvements to developed and undeveloped recreation resources varies, depending upon the views of the recreation user and the recreation provider. One point of view would be that improved access would result in a reduction of recreational enjoyment as resource visitation increases in volume and frequency. This would likely be the case for those individuals who travel to or relocate to the area seeking a more remote and primitive recreation experience. However, to others, improved access would be positive, providing recreation opportunities that they might otherwise not have visited. To the recreation provider, improved access might place user demands on resources which the provider may be unable to meet. On the other hand, increased visitation could provide an opportunity for growth and development of natural and developed recreation resources within the area.

Specific impacts to recreation resources under the ASDEIS IRA, and under the Preferred Alternative (WV) and Line A (VA) are identified. For discussion purposes, these resources have been grouped into five categories: national forest land supporting dispersed recreation activities, hiking and bicycling trails, streams, local parks, and scenic driving.

### a. National Forest Lands

Roads within the Monongahela and George Washington National Forests that would be located within the construction limits of either the ASDEIS IRA, the Preferred Alternative (WV) or Line A (VA) would be affected by construction and operation of the proposed facility. Relocation of forest roads and intersections with these roads would be reconstructed to the standards of the Forest Service. However, no additional access roads would be reconstructed and therefore, impacts associated with changes in access (i.e.

loss of a recreational opportunity as a result of access denial, or increased demand on areas preserved for remote experiences associated with additional access) would not occur.

**(1) Monongahela National Forest**

The ASDEIS IRA would traverse the Monongahela National Forest. There will be no impacts to developed recreation resources or other 4(f) resources as a result of the ASDEIS IRA.

The Preferred Alternative (WV) would also traverse land within the Monongahela National Forest. The FHWA has determined that the Preferred Alternative (WV) will not use any designated recreation areas or Management Prescription Areas protected under Section 4(f) in the Monongahela National Forest.

**(2) George Washington National Forest**

The ASDEIS IRA would traverse portions of the George Washington National Forest. Through the Lost River area of Hardy County, West Virginia, the ASDEIS IRA would follow WV 55 on existing location, skirting the northern boundary of the Forest Service lands.

The Preferred Alternative (WV) and Line A would also traverse portions of the George Washington National Forest. Within the Duck Run Option Area Line A would pass through the northern end of the Forest Service lands. The impact would be limited to the perimeter of the area and within the same general vicinity as WV/VA 55. Therefore, the impact is considered to be minor. The FHWA has determined that the Preferred Alternative (WV) will not use any designated recreation areas or Management Prescription Areas protected by Section 4(f) in the George Washington National Forest.

**b. Pedestrian and Bicycling Trails**

The development of pedestrian and bicycle trails throughout West Virginia has gained momentum. Advocates note that there is a strong potential for the Tucker County region to become a major trail hub in the national trails area where hikers and cyclists may head onto major trails in the north, east, south, and west. Several trails cross the proposed alignments. Within the Monongahela National Forest, these trails include the Allegheny Trail, the proposed American Discovery Trail, and the Shingle Tree Run Trail. The Big Blue Trail is the only such trail within the George Washington National Forest.

**(1) Allegheny Trail**

The ASDEIS IRA would impact the Allegheny Trail where the trail passes through the Monongahela National Forest: FR 18/US 219, on Backbone Mountain; County 27, in Thomas; and WV 32, in Thomas and Davis. At the first location, the Allegheny Trail follows FR 18/US 219 to Sugarlands Road (County 25). Under the ASDEIS IRA, a 9,700 foot section of trail would be directly affected by the realignment of US 219, between FR 18 and County 25. At the other locations, no impacts to the function of the trail would occur. Where the Allegheny Trail follows County 27 into Thomas, the ASDEIS IRA would span the North Fork of the Blackwater River and CR 27. The Allegheny Trail now follows WV 32 through Davis. Under the ASDEIS IRA, this road would be widened, affecting a 7,500 foot section of the trail. Impacts at both locations would be limited to a temporary loss of use during construction.

Under the Preferred Alternative (WV), there would be four involvements with the Allegheny Trail where the trail passes through the Monongahela National Forest: County 27 in Coketon; Western Maryland Railroad in Coketon; WV 32 in Davis; and FR 18 and 717 on Backbone Mountain. Both crossings of the Allegheny Trail near Coketon by the Preferred Alternative (WV) would be on structure over the trail. Where the Preferred Alternative (WV) would span WV 32 and hence the trail, the trail remains on WV 32. The Preferred Alternative (WV) would also require the relocation of Forest Service Routes 18/717. The trail would be directly affected by the highway and the relocation of FR 18/717. The forest service roads would be relocated to the south and east of their present location and tie into US 219 approximately 3,000 feet northeast of the existing intersection. This would require the relocation of the trail in this area. A further discussion of the Allegheny Trail is provided in Section IV. The FHWA has determined that the Preferred Alternative (WV) will not use any designated park, recreation, wildlife or waterfowl areas from the Allegheny Trail and therefore has determined that the involvement of the Preferred Alternative (WV) with the Allegheny Trail does not constitute the sue of assertion 4(f) resource.

**(2) Proposed American Discovery Trail**

The National Park Service is currently conducting a Feasibility Study for the proposed American Discovery Trail in regard to its designation as a National Scenic Trail. A decision on its designation is expected in 1996. Alternative corridors for the trail through the Monongahela National Forest have been proposed and a final corridor has not yet been selected by the national trail coordinators and the National Park Service. Consequently, this analysis considers impacts to both the original corridor and the proposed relocations through the Monongahela National Forest. A further discussion of the proposed American Discovery Trail is provided in Section IV. The FHWA has determined that the Preferred Alternative (WV) will not use any designated park, recreation, wildlife or waterfowl areas from the trail and therefore was determined that the Preferred Alternative (WV)'s potential involvement with the proposed American Discovery trail through use of a Section 4(f) resource.

**(3) Shingle Tree Run Trail**

The trail head at US 219 west of Moore, West Virginia would be affected by roadway improvements proposed under the ASDEIS IRA. The improvements would not impact the function of the trail. None of the alignments under the Preferred Alternative (WV) would impact this trail.

**(4) Big Blue Trail**

Under the ASDEIS IRA, VA 55 would be widened where the Big Blue Trail now crosses the roadway. No changes to the crossing or function of the trail would occur as a result of construction of the ASDEIS IRA. Representatives of the George Washington National Forest have expressed concern that the existing crossing is not readily visible to motorists and the potential for a serious or fatal accident exists at this crossing. The retention of the existing crossing configuration is considered to be a major impact, due to increased traffic volumes predicted for the ASDEIS IRA. The FHWA has determined that the Preferred Alternative (WV) will not use any designated park, recreation, wildlife or waterfowl areas from the Big Blue Trail, because it would have no involvement with the trail.

Under Line A and within the Duck Run Option Area, the section of the Big Blue Trail which parallels the crest of the Great North Mountain near the West Virginia/Virginia state line would be directly impacted. This section of trail is located on private property and is maintained through a cooperative agreement between the George Washington National Forest and the Potomac Appalachian Trail Club. The Big Blue Trail would be impacted by Line A, Line D1, and Line D2 in the vicinity of the crossing of VA 55, near the West Virginia/Virginia state line. Line A, D1, and D2 would cross the trail approximately 600 feet southwest of the trail's existing crossing of VA 55. Concerns over the safety of the existing crossing were expressed by representatives of the George Washington National Forest during early coordination activities for this project. An improved crossing and development of a parking area for trail users were noted as potential benefits that the project could provide with respect to the Big Blue Trail. Potential relocation routes for the trail were developed with the assistance of representatives from George Washington National Forest. In addition to the permanent impacts described above, construction activities could result in a temporary loss of use of the trail.

**c. Streams**

Hunting and fishing are major recreational activities within West Virginia and Virginia. While there are several designated public hunting and fishing areas within the 30-minute drive area, none would be located near the proposed alignments. Outside of these designated areas, hunting and fishing are popular activities associated with the Monongahela and George Washington National Forest, as well as with most other public recreation areas.

The ASDEIS IRA, the Preferred Alternative (WV) and Line A (VA) would cross a number of streams that provide fishing and/or boating opportunities. Access to these streams would be improved under either alternative. Neither alternative would have a major impact on the recreational opportunities currently afforded by these streams.

**d. Local Parks**

Local parks primarily serve residents of the surrounding community; only a small percentage of total attendance comes from outside of the community. Therefore impacts to local parks have been considered for only those parks that are located adjacent to the proposed alignments or adjacent to a connecting roadway. Four local parks, River City Park (Parsons), Mill Race Park (Parsons), Moorefield City Park, and J. Allen Hawkins Park (Wardensville) are located near the proposed alignments.

Three local parks, Mill Race Park and River City Parks (both located in Parsons) and the Moorefield City Park are located in close proximity to the ASDEIS IRA. No right-of-way would be required from parcels associated with these parks. The ASDEIS IRA would improve access to these facilities. The current function of these local parks would not be affected by the ASDEIS IRA.

Under the Preferred Alternative (WV), there would be no use of the four local parks previously identified, nor would there be any impairment of park functions.

**e. Scenic Driving**

Given the natural beauty and diverse viewsheds across West Virginia and Virginia, scenic driving is considered to be an important major recreation activity in West Virginia and Virginia. There are currently no state designated scenic byways in West Virginia or Virginia that would cross or would be adjacent to any of the proposed alignments. In Virginia, preliminary information provided for the *1993 Outdoor Recreation Plan* indicates that VA 55 and VA 600 may be eligible for inclusion in the Virginia Scenic Byways Program. Both of these routes would be adjacent to or crossed by the proposed project.

In Virginia, much of the ASDEIS IRA would consist of upgrading existing VA 55. Scenic driving conditions on VA 55 under the ASDEIS IRA would likely improve as the safety of the facility is improved. The ASDEIS IRA's impact to scenic driving opportunities on VA 600 would likely be minor because VA 55 currently intersects VA 600 at-grade.

Construction of the Preferred Alternative (WV) would provide additional scenic driving opportunities within West Virginia.

### 3. AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Direct impacts to recreational resources resulting from construction and/or operation of the alignments now under consideration were reviewed. Reasonable measures that will be implemented to reduce or eliminate the identified impacts have been developed and are discussed below.

#### a. Pedestrian and Bikeway Facilities

Although there are no impacts to existing pedestrian and bicycle facilities, other than hiking trails, bikeway facilities would be provided as mitigation for recreation resource impacts in general. Under the Preferred Alternative (WV), a separate bikeway facility will be provided as discussed in Section II. Exact locations would be provided in the final design.

#### b. Trails

Final design of the ASDEIS IRA or the Preferred Alternative (WV) will include signing alerting motorists of trail crossings or shared right-of-way, where appropriate. Similarly, in those areas where trails would cross or parallel the ASDEIS IRA or the Preferred Alternative (WV), design will be sensitive to sight distance requirements to minimize the potential for vehicle-pedestrian conflicts. Finally, in those areas where trails and the ASDEIS IRA or the Preferred Alternative (WV) would share right-of-way, adequate shoulder width will be provided to accommodate bicyclists and pedestrians.

#### c. National Forest Land

Under either the ASDEIS IRA or the Preferred Alternative (WV), mitigation other than fair compensation for property purchased is not required. Representatives of the Monongahela National Forest and the George Washington National Forest will be updated with regard to construction scheduling and activities in a timely manner so that users are aware of construction zones and detours.

Overall construction impacts to trails under either the ASDEIS IRA or the Preferred Alternative (WV) will be mitigated through coordination with the West Virginia Scenic Trails Association, Inc. (Allegheny Trail), Monongahela National Forest (Allegheny American Discovery and Shingle Tree Trails), West Virginia Rails-to-Trails, Inc. (proposed American Discovery Trail), George Washington National Forest (Big Blue Trail) and the Potomac Appalachian Trail Club (Big Blue Trail). This should ensure the development of suitable temporary and permanent relocation routes where required, as well as the installation of trail markers so that the trails can remain open during construction.

Under the ASDEIS IRA, impacts to the Allegheny Trail at Backbone Mountain could be mitigated by relocating the trail onto relocated US 219, resulting in a minor change in distance. Impacts to the proposed American Discovery Trail near Greenland Gap could be mitigated by relocating trail onto relocated County 3/3 and 3, resulting in a minor change in distance.

Under the Preferred Alternative (WV), impacts to the Allegheny Trail where it follows FR 18 and US 219 will be mitigated by rerouting the Allegheny Trail onto new FR 18. Additionally, a pedestrian footbridge, trail access and parking will be provided at the Cheat River Valley Scenic Overlook. Impacts to the proposed American Discovery Trail between Porterwood and Parsons associated with the Preferred Alternative (WV) will be mitigated by relocating the trail to the corridor originally proposed by the West Virginia Rails to Trails group.

Under the Preferred Alternative (WV), there is no encroachment on the Big Blue Trail. The ASDEIS IRA and Line A (VA) if constructed would have some involvement with the Big Blue Trail; however, since Virginia has chosen not to proceed with either of those alternatives, no impacts to the Big Blue Trail will occur. Therefore, no mitigation measures are necessary for the Big Blue Trail.

**d. Local Parks**

Although there will be no use of local parks under either the ASDEIS IRA or the Preferred Alternative (WV) coordination with local park jurisdictions will be maintained through final design and construction.

**e. Scenic Routes**

The intersection of VA Route 55 and VA Route 600 should be designed in accordance with design standards of the Virginia Scenic Byways Program to ensure that VA 600 and VA 55 remain eligible for designation as Virginia Scenic Byways. Such efforts would require roadway design coordination between VDOT and the Virginia Department of Conservation and Recreation.

## K. VISUAL

The visual impact assessment is based on guidelines provided in FHWA's *Visual Impact Assessment for Highway Projects*. Refer to Section III, Y - Cumulative Impacts, of this FEIS regarding cumulative impacts.

### 1. METHODOLOGY

The existing visual environment was inventoried via field visits, and determinations of existing visual quality were made for resources selected for visual analysis. Visual resource impact determinations were based on comparisons of existing conditions to the proposed condition, taking into account the setting of the sensitive resources.

#### a. Identification of Sensitive Visual Resources

Visually sensitive resources are resources whose setting are either (1) integral components or the primary function of the site and the viewer's activity or experience, or (2) are contributing factors to the qualifications of a cultural resource's eligibility for, or listing on, the National Register of Historic Places (NRHP). Thirty-one resources were evaluated based on their proximity to the ASDEIS IRA, the Preferred Alternative (WV) or Line A (VA).

#### b. Viewshed Inventory

The viewshed inventory established the existing or baseline visual condition from which the impact assessment was made. Viewshed inventories were based on a 360 degree view from the resource. These inventories were used to develop information contained in Table III-32 (Vol. II).

#### c. Impact Assessment

Visual impacts were assessed for two viewer groups: those with a view from the proposed project and those with a view of the proposed project. The proposed project's visual involvement with a resource could fall into one of four categories: No Involvement; Low Degree of Change; Moderate Degree of Change; or High Degree of Change.

- NO INVOLVEMENT:

  A determination of "No Involvement" indicated that there would be no change to the existing visual environment: i.e., the No-Build Alternative would not alter the existing viewshed and either the ASDEIS IRA or the Preferred Alternative (WV) or Line A (VA) would be so far removed from the site that the resource would not be visible and there would be no concern over visual involvement.

- MINIMAL DEGREE OF CHANGE:

  A "Minimal Degree of Change" indicated that there would be little if any visual change between the resource and the proposed project or that the view of the road would be so far away that it would go almost unnoticed.

- MODERATE DEGREE OF CHANGE:

  A "Moderate Degree of Change" indicated one of the following: there were dominating visual intrusions in the viewshed from other sources, such as topography, vegetation, structures, or distance; the affected viewshed was not a contributing character to the resource's qualification for inclusion in the NRHP; the level and nature of viewer activity would not be negatively affected; or, there was a weak visual contrast between the proposed facility and the existing landscape.

- HIGH DEGREE OF CHANGE:

  A "High Degree of Change" indicated that the visibility and proximity of the project would be inconsistent with the visual expectations of the public; the visibility and proximity of the project would be in strong contrast with the existing landscape; the project would be in an area of substantial visual importance with limited other visual intrusions, or the project would visually adversely affect the setting of an NRHP eligible or listed property whose visual setting was a contributing character to the property's eligibility for inclusion in the NRHP.

## 2. EXISTING ENVIRONMENT

The existing visual environment is the baseline condition of the visual assessment and was the framework upon which impact determinations were made. The existing visual environment is a combination of the existing natural and man-made physical characteristics of the proposed project area, the principal viewers, and the resources selected for visual analysis within the proposed project area.

### a. Visual Characteristics of the Proposed Project Area

The proposed project area has a variety of visual qualities due to its mountainous terrain, vast forested areas, and rural nature. The land within the proposed project area is primarily forested, approximately 75 percent of the total land area. Twenty percent of this forest land is contained within the Monongahela and the George Washington National Forests. Within the project area, the project involves only the northern most portion of each of these Forests. Much of the land within the Forests remains natural in appearance. The existing modifications in the Forests include roadways, utility corridors, timber harvests, and pockets of residential and commercial development.

The dominant visual features of the project area are its mountainous topography and the forested areas. Occasional rock outcrops and formations and numerous streams and rivers add to the overall visual quality of the forested areas. On the West Virginia side of the project, over 70 percent of the project is in forested, mountainous terrain. This is the case for about 50 percent of the project within Virginia; the remainder being primarily agricultural.

Cropland and pasture occupy about 20 percent of the land. On the Virginia side of the project, the Shenandoah Valley is well known for its pastoral landscape. The visual quality of the Valley is a major factor in its popularity as a tourist destination, making the economic benefits of tourism in the Shenandoah Valley comparable to the area's agriculture and industry sector (Draft, *The 1994 Virginia Outdoors Plan*, December 1993.) In West Virginia, the Old Fields, Forman, and Lahmansville areas provide similar pastoral settings. However, tourism is not currently a major contributor to the economy of these areas. On the West Virginia side of the project, approximately 18 percent of the land area is in an agricultural or pastoral setting, primarily in the Old Fields, Forman, and Lahmansville areas, as well as the area between Elkins and Kerens. On the Virginia side, from Wheatfield to Strasburg, approximately 50 percent is in an agricultural or pastoral setting.

The remaining five percent of the total project area is in residential, commercial, industrial, and mining use. Within the project area, the few developed areas have maintained either rural or small town characteristics.

### b. Principal Viewers of the Proposed Project Area

Resource viewers are divided into two groups: those viewing from the proposed project (tourist, local, and through traffic) and those with a view of the proposed project (residential, recreational, community, educational, commercial, and industrial). The function and location of the resource determine the viewers affected.

### c. Sensitive Visual Resources

The 31 resources selected for visual analysis are listed on Table III-31 (Vol. II). The table also identifies the resource type (cultural, recreation, etc.), the resource importance, and the resource's overall existing visual quality.

A resource's overall visual quality is based on the combination of and dominating features within its viewshed. A resource's visual environment can be classified as either distinctive, common, or minimal. A distinctive visual environment most clearly exhibits the natural processes or characteristics of a region. A common visual environment is characteristically typical within a region. A minimal visual environment is low in visual diversity and is often characterized by intrusions such as trash and manmade alterations to the surrounding landscape.

#### (1) Cultural Resources

Of the 31 sites selected for visual analysis in the ASDEIS, 5 were cultural resources whose setting is a contributing character to their qualifications for inclusion in the NRHP. These five sites are Fort Pleasant, Buena Vista Farms, Willow Wall, The Meadows, and the P.W. Inskeep House. Although these five sites are not located close to the Preferred Alternative (WV), it was necessary to evaluate the potential for the Preferred Alternative (WV) to result in an Adverse Effect on , or use of, these properties. An additional 12 cultural resources were evaluated in the ASDEIS based solely on their proximity to either the Preferred Alternative (WV), Line A (VA) or the ASDEIS IRA; for those 12 cultural resources, setting is not a contributing factor to their qualifications for inclusion in the NHRP. All of the cultural resource properties selected for visual analysis area included in Table III-33 (Vol. II).

#### (2) Recreation Resources

Of the nine recreation resources evaluated, two are National Forests, three are trails, and four are community parks. The visual settings of the National Forests vary, but are primarily dominated by densely forested vegetation in a mountainous setting. Both the Monongahela and the George Washington

National Forests offer scenic viewing opportunities and, overall, are considered to possess common scenic qualities for the region.

Within the proposed project area, both the Allegheny Trail and the proposed American Discovery Trail are primarily located within the Monongahela National Forest. The visual setting for both trails is diverse within the mountainous and forested terrain. In part, the routes of both trails follow US, State, County, Local, and Forest roads or are located on non-trail designated right-of-way. These trails are discussed in detail in Section II-J, Recreation Resources. The visual quality of both trails is considered to be common in the areas where the trails would be involved with the proposed project.

The Big Blue Trail is located in the George Washington National Forest within the proposed project area. The visual experience along this trail primarily consists of an undisturbed, mountainous, forested setting. The trail currently crosses VA 55 at-grade, in a visual setting typical of the area. The visual quality of the trail is considered to be distinctive mostly due to the generally undisturbed setting and scenic vistas along the trail. However, its visual quality is considered to be common in the area where the trail would be involved with Line A (VA).

The four parks in the proposed project area include River City and Mill Race Parks in Parsons, Moorefield City Park in Moorefield, and the J. Allen Hawkins Community Park in Wardensville. Visually, River City Park is surrounded by development associated with Parsons. Located in a narrow floodplain, the park is bounded to the northwest by US 219 and a mix of residential and commercial development border the remaining sides of the park. Forested mountains provide the background view from the park. The visual quality of the area surrounding the park is considered to be minimal due to trash and debris surrounding the park's foreground views. The Preferred Alternative (WV) does not require the use of any property from any of these parks.

Mill Race Park is located within a large floodplain on the eastern side of Parsons. It is bounded by US 219/72 and a mix of residential and commercial development to the north and northeast, Shavers Fork and an open valley to the east and southeast, and mountains and light residential development to the west. Densely wooded mountains provide the visual backdrop for the park. The visual setting is that of a rural community park in a mountainous setting. The overall visual quality of the park is considered to be common for the region.

Located within a long valley, the Moorefield Community park is surrounded on three sides by a mix of commercial, industrial, and residential development associated with Moorefield. From the park, the remaining view to the west is that of a long and narrow valley in agricultural use. Mountains provide the visual backdrop for the park. The J. Allen Hawkins Park is situated in a small floodplain in the rural community of Wardensville. To the west, it is bounded by a few homes and the foot of Anderson Ridge. To the east, it is bounded by woods, Waites Run, and the foot of an unnamed ridge. The overall visual quality of both parks is considered to be common for their respective regions.

**(3) Unique Physical Features**

The three unique physical features of the area that are visually sensitive include Greenland Gap, a National Natural Landmark; Hanging Rock, an outcrop on privately owned land next to WV 55; and the river sinks area on the Lost River. Greenland Gap is a unique water gap formed by the cutting down of Patterson Creek Mountain by the North Fork of Patterson Creek. Visually, the Gap is flanked by sheer cliffs of Tuscarora sandstone that rise 244 meters (800 feet) above the creek. Below the sheer cliffs are talus slopes and a variety of vegetation dominating the view. The Gap was acquired by the Nature Conservancy in 1974 for the purpose of protecting its natural beauty, as well as its diverse vegetation and wildlife. The visual quality of the Gap is considered to be distinctive.

Hanging Rock is a rock outcrop located on a privately owned farm and sits approximately 42 meters (136 feet) above WV 55. The view surrounding Hanging Rock includes the narrow, winding route of WV 55 running parallel to the Lost River and a relatively undisturbed mountainous backdrop. The visual quality of Hanging Rock is considered to be distinctive in the project area.

The river sinks area is a classic example of karst topography (caverns, sinkholes, and solution cavities) in which the Lost River "disappears" into the calcareous rocks of the riverbed. Below the riverbed, the water follows solution cavities until it reappears as a surface seep approximately 76 meters (250 feet) down the riverbed. A roadside picnic area is located in the vicinity of the sinks, along the northern side of WV 55. The overall visual quality of the Sinks area is considered to be minimal.

**(4) Designated Scenic Areas**

The project has no involvement with designated scenic areas. However, the Virginia Department of Conservation and Recreation is considering designating the portion of VA 600 in Frederick County and the portion of VA 55 in Shenandoah County as State Scenic Byways. In the proposed project area, VA 600 is a two-lane, winding secondary road located at the bottom of a narrow valley, between two steep ridges. VA 600 intersects VA 55 at-grade. Within the proposed project area, this portion of VA 600 is not especially scenic: either side of the road is strewn with trash and, on the eastern side of VA 600, a small quarry is also strewn with trash and debris. For this reason, the visual quality of VA 600 at this location is considered minimal. In Shenandoah County, VA 55 is a two-lane highway that traverses the pastoral scenery of the Shenandoah Valley. The surrounding scenery along VA 55 is considered to be distinctive.

## 3. VISUAL IMPACTS

Understanding approximately how the proposed project would look and its proximity to the existing resource is important in understanding the associated visual resource impacts. Computer models simulating the proposed project's visual involvement were prepared (Exhibits III-27 through III-40 in the ASDEIS) for selected visual resources. The reporting of the degree of change is separated into two categories: the project's changes to and impact on the view from the proposed project and the project's changes to and impact on the view of the proposed project.

### a. View from the Proposed Project

In the project area, roadways are the main transportation link: they are vital to the area's economy and way of life. Roadways are also considered public places which provide an important sense of community identity. Often, the clearest and most lasting impression of a community or an area is formed by what is seen from vehicle windows. Roadway users are not limited to motorists alone: cyclists, hikers, pedestrians, and others can be expected to use and appreciate views from the road (Dutchess Roadside Council, 1989). Given the mountainous, forested and agricultural character of the area, any new roadway would offer the roadway user scenic mountain vistas and views. The following summarizes the visual resource changes and impacts associated with the Preferred Alternative (WV), Line A (VA) and the ASDEIS IRA, as seen from the proposed project.

#### (1) No-Build Alternative

The No-Build Alternative would not alter the existing roadway user's views.

#### (2) ASDEIS Improved Roadway Alternative

The ASDEIS IRA would not substantially detract from the visual experience of and from the existing roadway. The addition of truck climbing lanes, straightening of sharp curves, and widening of shoulders would have a minimal degree of impact on a viewshed that already includes a well-traveled roadway. However, in areas where the ASDEIS IRA would be on new alignment away from existing roads, such as the area between Bismarck and Forman, scenic vistas would likely be opened up where none previously existed. It is also possible that the roadway user's enjoyment of the view from the road would be improved under the ASDEIS IRA since traffic conditions would be improved. However, it is also possible that improved roadway conditions could increase traffic volumes. Depending on a resource's proximity to the ASDEIS IRA, increased traffic volumes could also lessen the resource's surrounding visual quality.

(3) Preferred Alternative (WV) and Line A (VA)

Being on new alignment, the Preferred Alternative (WV) and Line A (VA) would make available vistas and vantage points of the area that were previously unavailable by vehicle. In areas of major cuts, the Preferred Alternative (WV) would offer views of the geologic processes of the area. While the Preferred Alternative (WV) would offer expanded views of the area's character, it may not provide as intimate a visual experience as do existing roadways. In addition, the Preferred Alternative (WV) would avoid passing directly through existing communities. As a result, the feeling of local communities may not be as evident as it would be while traveling on existing roadways.

b. View of the Proposed Project

The assessment of potential visual impacts was based on three factors: (1) The visual components of the facility itself and the facility's relationship to the surrounding environment, (2) The potential change to the existing visual environment that the facility would have on the sensitive viewers of the resource, and (3) the importance of the visual setting as a contributing factor to the cultural resources determined to be eligible for, or listed on, the NRHP.

Table III-32 (Vol. II) summarizes both the resource's visual involvement with proposed alternatives and the primary viewers affected. Distance reported is the approximate distance from the closest construction limits of an alignment to a primary vantage point of the resource. The table also indicates whether or not the proposed alignment would be visible from the resource and, if visible, the approximate perspective (e.g.: the view of the alignment would be in the foreground and the proposed roadway alignment would be at-grade). Table III-33 (Vol. II) summarizes the potential degree of change associated with each alternative for each resource. Table III-34 (Vol. II) summarizes the basis for the visual impact determinations.

**(1) No-Build Alternative**

The No-Build Alternative would not impact the existing viewshed within the project area.

**(2) Improved Roadway Alternative**

Approximately 75% of the ASDEIS IRA would remain on existing alignment with minor modifications. The ASDEIS IRA between Bismarck and Forman would primarily be on new alignment, crossing the Allegheny Front and Patterson Creek Mountain. The ASDEIS IRA through this area would traverse relatively undisturbed mountainous terrain. While construction of the ASDEIS IRA through this area would alter the visual character of the immediate area, the area is so sparsely populated that the degree of visual intrusion would be considered moderate.

Of the 31 resources selected for visual analysis, most are located along or in close proximity to existing roadways that are part of the ASDEIS IRA. Therefore, the associated changes for visual resources under the ASDEIS IRA is higher than it is under the Preferred Alternative (WV). Of the 31 sites evaluated, four resources would experience a high degree of change in the visual setting and 12 resources would experience a moderate degree of change. The ASDEIS IRA would result in a high degree of change on the visual quality from the Kerens Historic District, Moorefield City Park, the P.W. Inskeep House, and the Baughman House.

Computer models depicting the ASDEIS IRA's approximate visual involvement have been developed for those sites with a high degree of change resulting from the ASDEIS IRA. While the ASDEIS IRA would only have a moderate impact on the scenic viewshed of the Allegheny Trail, a computer model has been prepared because of the interest in this resource. These models were presented in Exhibits III-27 to III-31 of the ASDEIS.

(3) **Preferred Alternative (WV) and Line A (VA)**

The introduction of a four-lane, divided highway on new alignment through mountainous, forested and agricultural areas would change the surrounding viewshed. In general, the four-lane visual intrusion of the Preferred Alternative (WV) and Line A(VA) would be greater than that of the two-lane ASDEIS IRA simply due to the size of the facility.

While the Preferred Alternative (WV) and Line A (VA) could be considered a change to the existing visual environment, the fact that it would be on new alignment makes it possible to avoid visually sensitive resources. Under the Preferred Alternative (WV), 3 sensitive resources would experience a high degree of change in their visual setting and six would experience a moderate degree of change. The sites with a high degree of change would be the Kerens Historic District, the Hawse House, and Hanging Rock. Hanging Rock is on a privately owned farm, and is not a cultural resource. Line R would also have a high degree of impact on Hanging Rock.

The Preferred Alternative (WV) in the Interchange and Forman Option Areas (Line I and Line F) would have no visual involvement with the 31 sites evaluated. Line P in the Patterson Creek Option Area would have no visual involvement with the evaluated sites. The lines within Option Areas that would be in the proximity of sensitive visual resources are identified below.

- Shavers Fork Option Area (WV): Line A and the Preferred Alternative (Line S) would alter the visual environment of the portion of the Monongahela National Forest through which it traverses. However, the visual change under either line would be moderate.

- Baker Option Area (WV): Line A and the Preferred Alternative (Line B) would alter the visual environment of the John Bott House. However, the visual change under either line would be considered moderate.

- Hanging Rock Option Area (WV): Line R would change the visual environment surrounding privately owned Hanging Rock. For those viewing Hanging Rock from the scenic pull-offs along WV 55 or from the Lost River, Line R would be a greater visual intrusion than would the Preferred Alternative (Line A). The bridge over the Lost River associated with Line R would obstruct the view of Hanging Rock. The same bridge associated with the Preferred Alternative (Line A) would be immediately behind Hanging Rock, altering the visual context of this feature.

- The viewshed of the Baughman House would be moderately changed by Line R Line R would be to the west of or behind the principal viewshed associated with the Baughman House. The Preferred Alternative (WV) would be in the immediate foreground of the site's viewshed and result in a moderate degree of change.

- Duck Run Option Area (VA): Lines D1, D2, and Line A (VA), would result in a moderate visual change to the following sites: the Big Blue Trail, VA 600, and the George Washington National Forest. There would be little visual difference between these three lines and their relative visual impact.

- Lebanon Church Option Area (VA): Line L and Line A (VA) would result in a moderate change to the viewshed of VA 55. Neither would be visible to Vesper Hall and Tenant House. Unlike Line A, Line L would not be visible from the Boehm/Coffelt House.

## 4. AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

The quality of the view from the road and of the road are important considerations for this project because the highway would serve as one of the principal means of entry into West Virginia and Virginia, and because it would serve as the gateway to the area's vast forested, rural, and natural scenic beauty. As such, an objective of the design of Corridor H would be to construct a facility that is visually compatible with the mountainous and rural environment. Possible minimization and mitigation measures are divided into three categories: general measures based on design, construction, and landscaping techniques; scenic overlooks to enhance the visual experience associated with the proposed project; and site-specific measures to mitigate the changes previously identified.

### a. General Measures

General mitigation measures could include the following:

- Bifurcate the road where possible. This provides a much more intimate driving experience; like that of driving on a two-lane roadway, only safer. Where possible, earthwork and vegetation would remain in the median between the bifurcated roadways to help block the view of the opposing roadway;

- Design the highway as a modified parkway by providing a generous right-of-way, wide medians with island plantings, rounded slopes, and heavy plantings along the highway. This design concept could result in additional right-of-way acquisition costs and displacements. However, it would be visually effective and would improve the scenic quality of the viewshed from the roadway and of the roadway by returning the landscape to a more natural looking state; it would improve the chances for faster and more successful revegetation of the right-of-way; and it would reduce the chances for slope stability and erosion problems. Strategic gaps in plantings could also be used to frame scenic views. Roadside plantings could be used to help hide views of unattractive features such as power lines (FHWA, 1990);

- Landscape the median with trees, shrubs, and flowers. Where such plantings pose safety hazards, provide guardrails to prevent vehicles from running into the plantings. Provide plantings that match the surrounding vegetation. In areas where the road traverses open valleys, provide mass plantings of wildflowers in the median. This would be effective in areas such as Forman, Lahmansville, Old Fields, and the Shenandoah Valley;

- Enhance the visual quality of the area by laying the roadside cuts back and planting them with indigenous vegetation. This would eliminate the barren, unnatural appearance of the roadside; and

- Provide pulloffs with information plaques describing geologic processes in areas where geologic features are unique or outstanding. Use native materials to construct pedestrian barriers or safety walls at these pulloffs.

**b. Scenic Overlooks**

Potential locations for scenic overlooks associated with the Preferred Alternative (WV) and Line A (VA) are provided below. Detailed locations are provided in the *Alignment and Resource Location Plans*. Coordination has been maintained with the WV Tourism Division at WVDOT.

- **Cheat River Valley Scenic Overlook (WV)**
  Northeast of Hambleton, the plan sheets indicate a possible scenic overlook of the Cheat River Valley. A nice view of the Cheat River Valley could be provided on the Preferred Alternative (WV), between stations 3855 and 3870. The overlook could use what would be the abandoned portion of Olsontown Road (FR 717). Vegetation currently blocks the view and would have to be selectively cut to open it up (It may also be necessary to cut vegetation selectively on the north side of US 219 below). This spot would seem to provide easy access for west-bound travelers to pull off and get back on.

- **Allegheny Front Scenic Overlook (WV)**
  A sweeping, scenic overlook from the Allegheny Front could be provided on the Preferred Alternative (WV), near station 5125 to 5130.

- **Clifford Hollow Bridge Scenic Overlook (WV)**
  A scenic overlook of Clifford Hollow and the bridge could be provided on the Preferred Alternative (WV), near stations 6505 to 6525. The Clifford Hollow Bridge could be a central part of the scenic pull-off. Displays showing the stages of bridge construction could be provided.

- **Hanging Rock Scenic Overlook (WV)**
  A scenic overlook of Hanging Rock, Hanging Rock Ridge, and the Lost River could be provided for either the Preferred Alternative (WV) or Line R, near station 7160. Viewers would look back across the Lost River to view the Hanging Rock formation. Displays could be provided, indicating the geologic processes at work.

- **West Virginia Welcome Center - Lost River Valley Scenic Overlook**
  A West Virginia Welcome Center and a scenic overlook of the Lost River's unique geologic formations to the north of the river could be provided on the Preferred Alternative (WV), near station 7425.

- **Great North Mountain Scenic Overlook (VA)**
  A scenic overlook on Great North Mountain across the valley to Paddy Mountain could be provided for either Line A, Line D1, or Line D2 near stations 7810 to 7820.

- **Laurel Hill Scenic Overlook (VA)**
  A scenic view from Laurel Hill into the valley below could be provided on Line A, near stations 8185 to 8190.

- **Virginia Welcome Center - Little North Mountain Scenic Overlook (VA)**
  In the vicinity of the project area, the nicest vista of the valley would come from a vantage point on top of Little North Mountain. A visitor's center could be provided at the top of Little North Mountain, providing a scenic vista of the Shenandoah Valley. An access road to such a vista would be necessary.

Construction of scenic overlooks will be further considered during final design. Factors to be considered concerning the feasibility of construction of scenic overlooks will include:

- Ability to maintain required alignment and road grade to access the proposed overlook;
- Suitability of geological subbase to support the proposed overlook;
- Ability to properly orient the overlook to accomplish its purpose of providing an attractive viewshed;
- Practicability of additional excavation or clearing of vegetation to provide for the scenic overlook;
- Assurance that access to the scenic overlook from the highway can be designed to assure adequate and safe sight distances for vehicle operators.

### c. Possible Mitigation Measures for Specific Impacts

Table III-35 (Vol. II)identifies possible measures to mitigate high degrees of visual changes.

## L. CULTURAL RESOURCES

"Cultural Resources" are the potentially significant, patterned physical remains of human activity distributed about the landscape over time. They include, for example, historically or architecturally notable structures, the locations of important events, early industrial resources, battlefields, historic roads or railroad right-of-ways, Native American archaeological sites, and so on. They may range in size and complexity from an entire district containing dozens of majestic high-style buildings to the scattered, millennia-old remnants of a prehistoric camp site.

This section summarizes those studies which have transpired to date to determine the effect of the proposed project on cultural resources. All cultural resource efforts are in compliance with the Antiquities Act of 1906; the National Historic Sites Act of 1935; Section 106 of the Historic Preservation Act of 1966, as amended; the Department of Transportation Act of 1966; the National Environmental Policy Act of 1969; Executive Order 11593: "Protection and Enhancement of the Cultural Environment" (1971); the Archaeological and Historic Preservation Act of 1974; the regulations of the Advisory Council on Historic Preservation (36 CFR 800); 36 CFR 63; the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation; West Virginia Code 29-1-6b; the Virginia Antiquities Act; Code of Virginia Title 10.1-2305; and current research guidelines provided by the West Virginia Division of Culture and History (WVDCH) and the Virginia Department of Historic Resources (VDHR).

During the drafting of the *ASDEIS*, a preliminary total of 1,154 cultural resources were identified within the selected corridor (Scheme Option D5). Of these, 891 were individually documented and filed with the WVDCH and the VDHR. The remaining 263 resources documented in the *ASDEIS* are contributing resources subsumed within three historic districts. More detailed information regarding all cultural resources identified within Scheme Option D5, including preliminary determinations of eligibility to the National Register of Historic Places based on WVSHPO review and comment (letter dated 10/25/94), and a prehistoric and historic context statement is presented in the *Alignment Selection SDEIS Appalachian Corridor H Cultural Resources Technical Report, Volumes I-III* (1995).

Following a discussion of the methodology, this section discusses the identified cultural resources and then provides an assessment of project effects and adverse effects for each alternative under consideration. All study results for the West Virginia portion of the project have been reviewed by the West Virginia Division of Culture and History (WVDCH) and their comments are reflected herein. Detailed information on the cultural resource landscape of the project area is presented in the *Cultural Resources Technical Report,* available for review at the WVDOH, VDOT, WVDCH, VDHR and the Monongahela National Forest Service office in Elkins, West Virginia.

## 1. *ASDEIS* CULTURAL RESOURCES METHODOLOGY

### a. Background Research

An examination of cultural resource maps, site forms, cultural resource reports, and other available records was conducted at the West Virginia Division of Culture and History (WVDCH) and the Virginia Department of Historic Resources (VDHR). USGS quadrangle maps and county files containing location data for archaeological sites and historic structures in or near the project area were examined and the locations and agency designations of all recorded resources were transferred to project maps. Site and structure registration forms, National Register nomination forms, and other available data were photostatically copied for all identified resources, and are attached to the cultural resource data forms prepared for this project.

Additionally, cultural resource reports and other secondary archaeological and historic studies were examined for information specific to the project area. Relevant geological, hydrological, pedological, climatological, floral, faunal, and similar environmental background information was reviewed.

### b. Development of Prehistoric and Historic Contexts

Prehistoric and historic contextual information for the project area was assembled at a level sufficient to develop determinations of significance, in accordance with *National Register Bulletin 15*, Section V (1991: 7-10), *National Register Bulletin 16*, and the Virginia Department of Historic Resources (1992). *National Register Bulletin 15* notes:

> "Historic Contexts are those patterns, themes, or trends in history by which a specific occurrence, property, or site is understood and its meaning [and ultimately its significance] within prehistory or history is made clear . . . Its core premise is that resources, properties, or happenings in history do not occur in a vacuum but rather are part of larger trends or patterns . . ." and that these patterns can be ". . . identified through consideration of the history of the surrounding area".

"Contexts" may be broad in scope (e.g., "Social development" or "Military History"), while "themes" provide a means of spatially and temporally organizing properties into coherent patterns within contexts (e.g., Military Campaigns in the Northern Shenandoah Valley -1863-1864).

**c. Field Reconnaissance**

The primary operational goal of the cultural resources study at the level of the ASDEIS was to assemble a detailed cultural resource inventory for the project area suitable for alignment planning purposes. This inventory consisted of the identification and listing on project maps of the following:

- All known archaeological resources (registered prehistoric and historic sites);
- All known or registered historic buildings, districts, structures, or objects; and
- All previously undocumented historic buildings, districts, structures, or objects with a construction date preceding ca. 1945 (or, in the case of districts, that a significant number of historically or functionally related properties evidenced a construction date preceding ca. 1945), and located within approximately 305 meters (1,000 feet) of any of the proposed alternatives or alignments.

The project field reconnaissance consisted of a vehicular and pedestrian examination of the entire preferred corridor area, approximately 183 kilometers (114 miles) long by 610 meters (2,000 feet) wide. Where proposed alignments were located near the margins of the original corridor, the reconnaissance was expanded on an *ad hoc* basis to preserve the 305 meters (1,000 feet) zone of effect to the "outside" of the proposed line.

Known prehistoric and historic resources were located and their condition and degree of preservation determined. Surficial observation of high-visibility areas such as plowed fields, road cuts, stream cuts and banks, tree falls, construction zones, etc. was undertaken. Informant interviews were conducted with local residents in an attempt to locate additional undocumented archaeological and historic resources. All historic buildings, structures, or objects within the zone of assessment which appeared to be greater than 50 years of age and which were physically and legally accessible to the crews were documented. All resources were recorded on standardized cultural resource data forms and were photo documented. Each identified resource was assigned a unique Resource Number.

No shovel probe testing or deep testing was conducted during this reconnaissance, except for that performed in association with the prehistoric settlement pattern model testing (see below).

**(1) Cultural Resources Data Forms**

In order to provide uniformity and continuity to the data collection process at the ASDEIS level, a 14-page standardized Cultural Resources Data Form was developed specifically for the Corridor H Project. This form was used throughout the reconnaissance. This form was derived from the current archaeological site and historic structure recording forms of both West Virginia and Virginia and uses all of the information categories contained within these forms. The form is divided into 13 sections including: (I) survey information; (II) recorder identification and date; (III) property location; (IV) environmental information; (V) archaeological resource data; (VI) historic building/structure data; (VII) artifact data; (VIII) informants/collections; (IX) information sources; (X) National Register status; (XI) impacts; (XII) recommendations and additional comments; and (XIII) a plan view sketch map of the resource.

**(2) Architectural References**

In order to provide continuity in the recording of building descriptions, a single reference, McAlester and McAlester (1992), was used as a guide in assigning building style categories and in organizing form and structure descriptions.

**d. Assessments of Significance**

Preliminary assessments of significance in terms of eligibility for nomination to the National Register of Historic Places (Register) have been made for all cultural properties identified during the course of the background research and field reconnaissance. These eligibility assessments are subject to change pending the receipt of additional information which may be acquired during the course of future Phase I or Phase II-level historic structure research efforts pursuant to Section 106 Programmatic Agreement for this project (Vol. II, App. B). These preliminary eligibility assessments are intended to:

- Maximize avoidance of potentially significant properties during the planning process, and
- Provide a level of information to regulatory agencies sufficient for them to recommend a preferred alternative from among the various project options, consistent with NEPA.

Although these preliminary assessments were performed in accordance with the substantive standards that are applied under Section 106 of the National Historic Preservation Act, they are not intended to complete the Section 106 review for this project. Further reviews will be performed for purposes of Section 106 pursuant t the Programmatic Agreement (Vol. II, App B.).

As per *National Register Bulletin 15*: The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- That are associated with events that have made a significant contribution to the broad patterns of our history; or
- That are associated with the lives of persons significant in our past; or
- That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- That have yielded, or may be likely to yield, information important in prehistory or history.

These four "Criteria" are normally referred to as Criteria A, B, C, and D, respectively. Based on these criteria, all documented properties have been assigned to one of six significance categories: Listed, Eligible, Potentially Eligible, Considered Eligible, Not Eligible, and Eligibility Undetermined.

- **Listed:**

  Listed Properties are those which are currently listed on the National Register or on State historic registers.

- **Eligible:**

  Eligible properties are those which have been determined by state agencies or other authority to be eligible for the National Register but have not, as yet, been nominated or listed.

- **Potentially Eligible:**

  Potentially Eligible properties are those which were determined by the consultant to be potentially eligible for nomination to the National Register based on application of the National Register criteria for the purposes of avoiding Section 4(f) properties and adverse effects to cultural resources. Historic properties (buildings, districts, structures, objects) greater than 50 years of age and possessing integrity in location, design, setting, materials, workmanship, feeling, and association, and which, normally, were associated with a defined historic context, were considered to be potentially eligible under Criterion C. All archaeological sites were considered potentially eligible under Criterion D pending additional testing. Also, various properties associated with historic events or personages (e.g., the Civil War in West Virginia and Virginia) were deemed potentially eligible under Criteria A and B. Some resources originally categorized as Potentially Eligible for planning purposes in West Virginia have now been revised to "Considered Eligible" as discussed below. Resources in Virginia would be revised accordingly upon review by VDHR.

- **Considered Eligible:**
  For some Potentially Eligible properties, WVDCH has concurred in the consultant's preliminary determination of eligibility. Those properties were redesignated as Considered Eligible.

- **Not Eligible:**
  A designation of Not Eligible was reserved for properties that, in the opinion of the investigators, could be safely removed from further consideration. Only archaeological sites consisting of "isolated finds," or those which had been tested at the Phase II level with negative results, have been so assessed. For historic properties, those structures which were determined to be clearly ineligible based on extensive major addition, alteration, deterioration, or substantial loss of feeling and context, have been assigned to this category. In West Virginia, the WVDCH has provided concurrence on properties designated as Not Eligible, and has down-graded certain other properties from Potentially Eligible to Not Eligible.

- **Eligibility Undetermined:**
  A determination of Eligibility Undetermined was employed for those sites/historic properties for which insufficient information was available to make an assessment of eligibility. This normally involved posted or gated properties or properties which were otherwise inaccessible to field crews. In West Virginia, these resources were later categorically upgraded to Considered Eligible. Undetermined properties in Virginia would be reassessed if they fall within the impact area of the selected alternative.

In addition to the above categories, for those resources located in West Virginia, equivalent West Virginia Survey Evaluation Categories have been assigned to appropriate properties. This rating system, which is used by the staff of the West Virginia Division of Culture and History, divides properties into five categories as follows:

1.___National Register listed or eligible-State Register listed or eligible;
2.___Contributing or potentially contributing structure in an historic district;
3.___Vernacular Resource - eligible as contributing structures in rural areas;
4.___Potential Resource - lacks sufficient information to determine eligibility; and
5. Unrated.

### e. Assessments of Effect

As part of the cultural resources study process during the preparation of the ASDEIS, the Criteria of Effect and Adverse Effect were applied to all properties determined as Listed, Eligible, Considered Eligible, Potentially Eligible, or Eligibility Undetermined in accordance with 36 CFR part 800.5.

The Criteria of Effect state that:

- An undertaking has an effect on a historic property when the undertaking may alter characteristics of the property for inclusion in the National Register. For the purpose of determining effect, alteration to features of a property's location, setting, or use may be relevant depending on a property's significant characteristics and should be considered.

Properties determined to be Not Eligible were not assessed for project effect or adverse effect.

The Criteria of Adverse Effect state that:

- An undertaking is considered to have an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, material, workmanship, feeling, or association. Adverse effects on historic properties include, but are not limited to:

  1. Physical destruction, damage or alteration of all or part of the property;
  2. Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register;
  3. Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
  4. Neglect of a property resulting in its deterioration or destruction; and
  5. Transfer, lease or sale of the property.

To assess effect objectively, all appropriate properties were appraised for physical, visual, auditory, and secondary/cumulative impact, based generally on the proximity of the property to the various alternative and alignment options as measured by the GIS. Each impact category was coded as: None, Minimal, Moderate, or Major, based on these considerations:

- **Physical** impact indicates that the property is within or is physically touching the mapped "cut-and-fill" limits of a proposed option, or that the property may be reasonably expected to be destroyed, damaged, or altered by project activities, or that access to the property may be restricted;

- **Visual** impact suggests that the visual atmosphere and historic feeling of a visually-sensitive property may be compromised by a proposed option. Using the GIS, the distance from a property to each option was measured. Properties within 91 meters (300 feet) of an option were assessed as potentially suffering major visual impact. Properties 91 to 83 meters (300 to 600 feet) from an option were assessed as suffering moderate visual impact. Properties 183 to 305 meters (600 to 1,000 feet) from an option were assumed to suffer only minimal impact. Finally, beyond 305 meters (1,000 feet), visual impact was normally assumed to be negligible. Normally, archaeological sites were not coded for visual impact;

- **Auditory** impact suggests that the auditory atmosphere and historic feeling of a property may be compromised by the traffic noise level generated by a project option. Properties 305 meters (1,000 feet) or further from a proposed option were generally determined to suffer minimal to no auditory impact. Properties 305-152 meters (1,000-500 feet) from a proposed option were coded moderate impact, while properties 152 meters (500 feet) or less from a proposed option were coded as potentially suffering major impact. Normally, archaeological sites were not coded for auditory impact;

- **Secondary** impacts are those impacts which, while not immediately and directly affecting a property, may occur later in time and/or further in distance from a proposed option; and

- **Cumulative** impacts are those incremental consequences which, when added together, or added to the consequences of other foreseeable projects or actions, may have a greater impact. For the purposes of this assessment, secondary and cumulative impacts have been collapsed into a single category.

All assessments of effect in West Virginia were reviewed by WVDCH whose determination generally agreed. Where the WVDCH disagreed with the initial evaluation, the impact assessment was modified to reflect the WVDCH's determination.

### f. Secondary and Cumulative Impacts

Secondary impacts are those impacts which may be expected to occur later in time and further in distance from the project area as the result of project construction or operation. Cumulative impacts are incremental consequences that added together, or added to the impacts of other projects, may negatively affect cultural resources. Development-related secondary and cumulative impacts to cultural resources have been assessed in three ways:

- Identification of any significant resources that are within 305 meters (1,000 feet) of the alternatives and falling within raw land areas predicted for residential and service-oriented development;
- Identification of resources falling within intersection areas predicted for commercial development;
- Identification of existing roads that are predicted to experience substantial increases in average daily traffic and associated noise impacts to any cultural resources; and
- Archaeological sites identified by WVDCH as potentially experiencing secondary impacts due to proximity to the construction area or that may experience other secondary or cumulative effects.

### g. Settlement Pattern Modeling

As part of the cultural resource investigations associated with the ASDEIS, a prehistoric settlement pattern model was developed and field tested for the project area. The model prioritizes the project area into differential zones of high, moderate, and low probability for the preservation of prehistoric resources. Because relatively little is known of the project area archaeology, the model is based on a variety of geographic and environmental variables derived from analog studies in contiguous or nearby environmentally similar regions.

Field testing of this model was conducted over the summer of 1994 in nine discrete Test Areas, seven in West Virginia and two in Virginia. The test program resulted in the shovel testing of 414, 50-meter square Test Units placed within the various probability zones, and the machine-assisted excavation of six deep test trenches. Ninety of the Test Units (22%) revealed the presence of prehistoric artifacts. From these positive Test Units, 38 prehistoric sites and 11 isolated find locales were identified. Statistical analysis of the test results suggest that the model is supported at a 99% confidence level in both the Allegheny Mountain Section of the Appalachian Plateaus Physiographic Province and the Appalachian Mountain Section of the Ridge and Valley Physiographic Province. The model is supported at a 90% confidence level in the Great Valley Section of the Ridge and Valley Physiographic Province. To summarize, field testing of the model has strongly confirmed its predictive ability. Accordingly, the model provides a powerful research tool for assessing the prehistoric resource sensitivity of the project area. Formal presentation of the results of the settlement pattern modeling are presented in the *ASDEIS Appalachian Corridor H Development and Field Testing of a Prehistoric Site Sensitivity Model for the Corridor H Project Area, West Virginia and Virginia* (1994).

## 2. ASDEIS CONTEXTUAL OVERVIEW

### a. Prehistoric Context

The Corridor H project area has been more-or-less continuously occupied by Native American peoples for at least 12,000 years. Previous prehistoric culture reconstructions associated with the project area (Cunningham and Barse, 1979) echo the paleo-environmental scheme and culture history sequence set forth in the mid-1970s by William M. Gardner (1984). Following more recent studies (e.g., Watts, 1979, 1983; Gardner, 1986; Anderson *et al.*, 1992), a revised culture chronology is proposed for the project area. The Prehistoric Culture History written for the project follows this scheme and the chronology has also been used in the development of the project prehistoric settlement pattern predictive model. This chronology is presented below in brief outline form.

1. Early Man and PaleoIndian Periods (15,000 - 8500 BC);
2. Early Archaic Period (8500 - 6000 BC);
3. Middle Archaic Period (6000 - 4000 BC);
4. Late Archaic Period (4000 - 2000/1900 BC);
5. Terminal Archaic Period (1800 - 1200 BC);
6. Early Woodland Period - Ridge and Valley Province (1200 - 500 BC);
7. Early Woodland Period - Appalachian Plateaus Province (1000 BC - AD 1);
8. Middle Woodland Period - Ridge and Valley Province (500 BC - AD 900);
9. Middle Woodland Period - Appalachian Plateaus Province (AD 1 - 500);
10. Late Woodland Period - Appalachian Plateaus Province (AD 500 - 1200);
11. Late Woodland Period - Ridge and Valley Province (AD 900 - 1580);
12. Late Prehistoric Period - Appalachian Plateaus Province (AD 1200 - 1580) and
13. Protohistoric Period - Ridge and Valley Province (AD 1580 - 1630).

### b. Historic Context

Beginning with the post-contact settlement of the area by native peoples, the Historic Period traces the dominant historic trends within the region, from the earliest European exploration of the interior of Virginia (including present-day West Virginia) in the seventeenth century to the present day.

Chronological, geographical, and thematic elements define the field of the historic context. Chronological themes proceed from the onset of the first Euro-American explorations in the project area, beginning about 1670, to approximately 1944, an arbitrary cut-off point defined by the 50-year age criterion prescribed for the listing of a cultural resource in the National Register. Purely chronological themes within the historical context statement therefore emphasize broader, often regional, trends and the diachronic relationships between events. They offer a temporal framework or structure for the discussion and comprehension of culture-historical themes. The text of the historic context is therefore organized first along broadly chronological lines. As the vector of historical development within the project area generally proceeds from east to west, the historic context narrative is also organized to reflect this geographic progression.

Within this chronological and geographical hierarchy, six broad culture-historical themes are interwoven that further define the major historical "boundaries" of the project area. These themes are conceptual in nature and establish reference points for evaluating the significance of specific cultural resources identified in the project. This approach facilitates evaluation of the historical significance of diverse resource types within a holistic historical framework that is directly related to the intent of the underlying legal mandates. As with the Prehistoric Context discussion, a brief outline of the historic period overview is presented below.

1. Historic Period Native Americans:
   - The major Native American language families and "tribes" who lived in or passed through the project area in the seventeenth and eighteenth centuries.
   - Native American trails in the project area.
   - Native American uses of land in the project area during the historic period and relationships between the archaeology of the Protohistoric period and the sporadic early historic record.
   - The role of trade between Native Americans and early Euro-Americans and the effects of culture contact on native health and cultural institutions.

2. Exploration and Early Settlement, 1670-1755:
   - The record of the first European explorations to and beyond the Blue Ridge, the Great Valley and the Appalachian Mountains during the seventeenth and eighteenth centuries.
   - The role of land speculation in initial settlement of the project area prior to the French and Indian War: Virginia land grants and the Fairfax proprietary in the Northern Neck of Virginia.

- Origins and motivations of the first settlers from Europe, Virginia, Pennsylvania, and elsewhere.
- Size and location or early land grants.
- Effects of settlement on the development of towns in the lower and upper Shenandoah Valley (e.g., Winchester and Staunton), in the South Branch Valley, the Patterson Creek Valley, and the Tygart Valley.

3. Socioeconomic Development:
   - Ethnic background of major population groups in the project area - Virginians, Scots-Irish, eastern Europeans, African-Americans, Pennsylvania-Germans, English, Welsh, and others.
   - Religious affiliations of early settlers and later immigrants and the effect of religion on the culture of the project area during the eighteenth, nineteenth, and twentieth centuries.
   - Educational developments in the project area: subscription schools, public schools, private academies, etc.
   - Subsistence -- the roles of farming and cattle raising and their importance to the economic development of the project area.
   - Industry and Commerce -- timbering, iron manufacturing, milling, the growth of commerce and the establishment of commercial centers and trade networks in the project area.
   - Recreation and the arts.

4. Transportation and Communication:
   - Construction of early roads in the project area and the relationship of these roads to the development of early settlements and markets.
   - Attempts to develop inland navigation.
   - Railroads and their relationship to the settlement, commercial development, and military history of the project area.

5. Political Development:
   - Chronology and course of Virginia county formation and the relationship to early settlement in the project area.
   - Establishment of county and state boundary lines.
   - The emergence of new counties in the new state of West Virginia.

6. Military History:
   - The French and Indian War, 1754-1763, and its effect on the first settlements in the project area.
   - Frontier forts in the project area.
   - Pontiac's Conspiracy, 1763-1764: continued hostility with Native Americans and its effect on further settlement.
   - Lord Dunmore's War, 1774.
   - The project area during the American Revolution, 1775-1783.
   - The post-Revolutionary resettlement of the project area and an end to Indian hostility.
   - The Civil War in the project area, 1861-1865.

### c. Summary of Identified Cultural Resources

Using the background research and field efforts a master cultural resource data base was generated. The resources identified are divided into 7 categories:

**Prehistoric archaeological sites** are the material culture remains of pre-European contact, indigenous native peoples. Since previous field investigations have rarely been conducted at a level sufficient to assess significance, the majority of Native American sites located in the project area are, pending additional testing, considered to be at least Potentially Eligible for nomination to the Register under Criterion D. Only those sites consisting of "isolated finds" or which have been tested at the Phase II level with negative results have been recorded as "Not Eligible." No prehistoric sites are currently listed on or determined to be eligible for listing in the Register within or near the boundaries of the Project Area.

**Historic Archaeological Sites** refer to those archaeological sites of post-contact, normally Euro-American origin, usually consisting of the surficial and subsurface remnants of former buildings/structures with their associated features (e.g., wells, privies, outbuildings, dependencies, etc.) and artifacts.

**Multi-component archaeological sites** are those sites which contain two or more separate cultural or temporal assemblages, for example, a site containing both prehistoric and Civil War relics.

**Single Historic Buildings**, as per *National Register Bulletin 15*, are "...created principally to shelter any form of human activity". "Building" may also be used to refer to historically and functionally related units, such as a house and barn.

**Historic Structures** are distinguished from buildings in that their function is usually for purposes other than habitation (*National Register Bulletin 15*, 1991). Bridges, tunnels, and coal tipples are examples of structures.

**Historic Districts and Multiple Resource Areas** are a related group of buildings/structures which possess a ". . . significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development" (*National Register Bulletin 15* 1991: 5). It should stressed that at this level of documentation, the boundaries illustrated for potential historic districts in the Alignment and Resource location Plans are strictly to indicate the geographic location and general cohesiveness of the resource and should not be construed as formally proposed National Register boundaries. For those resources initially identified by Commonwealth Associates, Inc. (1979) (i.e., Lebanon Church, Kerens, Scherr), Commonwealth's suggested boundaries have been used for illustration purposes without modification. A single Multiple Resource Area, the Old Fields Multiple Resource Area, was identified in West Virginia.

**Historic Cemeteries** are collections of graves that are marked by stones or other means, or are otherwise recognizable through features such as fencing or depressions, or are indicated on maps.

Two Civil War **Historic Battlefields**, Corricks Ford and Moorefield were identified in the project area. Through coordination with WVSHPO and the Keeper of the National Register of Historic Places both were included in the Considered Eligible category.

The basic information on all cultural resources identified in the project area during the course of the investigations for the ASDEIS includes the Corridor H resource number - a unique alphanumeric designation applied to each resource; the known name, if any, of the resource; the agency or other designation, if any; a description of the resource; the site type or building style; the cultural period or date(s) of the property, if known; an assessment of eligibility for nomination to the National Register of Historic Places; and locational information including county, USGS 7.5' Quadrangle map, and the map number on which the location of the resource is illustrated in the Alignment and Resource Location Plans.

Cultural resources that were identified are summarized by type, eligibility and state in Table III-36 (Vol. II).

### 3. ASDEIS EVALUATION OF IMPACTS ON CULTURAL RESOURCES

The ASDEIS evaluated the potential impacts of each alternative on cultural resources. The assessment of cultural resource impacts in the ASDEIS was conducted in accordance with the substantive standards applied under Section 106 of the National Historic Preservation Act. However, the Section 106 process itself is ongoing, pursuant to the terms of the Programmatic Agreement (Vol. II, App. B).

### a. Summary of Project Effects By Alternative

A summary of the potential Effects and Adverse Effects on Considered Eligible resources is provided in Table III-37 (Vol. II). This table indicates that Preferred Alternative (WV) would have somewhat less effect on cultural resources than the ASDEIS IRA in West Virginia and that Line A would have markedly less effect than the ASDEIS IRA in Virginia.

### b. Summary of Project Effects By Option Area

Table III-37 (Vol. II) summarizes the impacts in each Option Area for Line A and the optional lines, and summarizes the potential Effect and Adverse Effect on Considered Eligible resources.

In assessing the relative effect on cultural resources of the various alignments within the Option Areas, impacts vary slightly from area to area, producing no substantial differences except for the Lebanon Church Option Area in Virginia. In this Option Area, Line L provides some advantage from a cultural resources standpoint (Vol. II, Table III-37).

### c. Archaeological Sites

One hundred fifty-two prehistoric and historic archaeological sites have been identified in the project area during studies undertaken as part of the ASDEIS through a combination of known site assessment, informant interview, and surficial examination. No Phase I-level sub-surface testing was performed within the current project area at the ASDEIS level, except for that accomplished in connection with the testing of the prehistoric settlement pattern model (see *ASDEIS Appalachian Corridor H Development and Field Testing of a Prehistoric Site Sensitivity Model for the Corridor H Project*). During that testing, 38 additional prehistoric sites were identified during the examination of approximately 17.7 linear kilometers (11 linear miles) of project area.

These sites range in complexity from isolated finds and small, non-diagnostic lithic scatters to the multi-component Mathias Farm Site/site complex on the floodplain of the South Branch of the Potomac River. Since statistical analysis of the model has confirmed its predictive ability, it is recommended that future Phase I sub-surface testing within the selected alignment be restricted to areas of high and moderate potential, as defined by the model. Areas of predicted low probability should be traversed and assessed for the presence of historic resources or rock shelters, but not otherwise tested.

### d. Historic Buildings

Only 13 of the 266 inventoried Considered Eligible buildings and structures were initially identified as a potential Adverse Effect in the ASDEIS. Additional on-going investigations conducted since the circulation of the ASDEIS indicate that 7 of those 13 buildings and structures are not eligible for nomination to the Register.

The Preferred Alternative will not use any of the six Considered Eligible historic properties. If, after final design, it is determined that proximity impacts would result in an adverse effect finding, then, in accordance with those procedures detailed in the provisions of Section II (A-G) of the Section 106 Programmatic Agreement (FEIS, Volume II, Appendix B), a mitigation plan will be developed and implemented prior to project construction within the designed area of effect.

### e. Historic Districts

The only considered eligible historic district close to the Preferred Alternative (WV) is the Kerens Historic District. This district was determined to be eligible for listing on the NRHP during a historic resources survey conducted in 1978. That survey indicated that the areas of significance of the proposed Kerens Historic District were architectural and industrial. Since 1978, many of the 15 original buildings have deteriorated or have been destroyed by fire. The Preferred Alternative (WV) will not affect the Kerens Historic District.

### f. Capon Springs

Consideration was given to the potential adverse impacts to which the historic district of Capon Springs might be exposed through project activity. No objective evidence in the form of traffic models or other studies would suggest that the project would have a demonstrable Effect or Adverse Effect upon the Capon Springs National Register property. Factors mitigating against a finding of Effect or Adverse Effect include the lack of proximity of the property to the project area (over 3.2 kilometers), and the "buffer zone" of approximately 5,000 acres owned by Capon Springs that surround the core property. Finally, coordination with the American Council on Historic Preservation by Capon Springs resulted in an finding that the "Corridor H project is unlikely to have an appreciable effect on the Capon Springs Historic District (ACHP letter, March 6, 1996).

### g. Secondary Impacts

Eight resources (Vol. II, Table III-38) were identified that meet the constraints discussed above. Additionally, the WVDCH identified 46 resources (Vol. II, Table III-38) that may be subject to secondary impacts from construction (borrow sites or work areas) or other development. However, sufficient area exists for induced development that could avoid secondary impacts to significant cultural resources.

Investigation of substantial increases in average daily traffic showed that the ASDEIS IRA, when compared to the No-Build Alternative, resulted in differences of up to 7,000 vehicles/day (County 3/3) quadrupling the existing volumes. In most cases, the same route under the Preferred Alternative (WV) would experience a slight increase or a reduction in average daily traffic (ADT). Increases equal to or greater than 3,000 vehicles per day are presented in Table III-39 (Vol. II). Based on noise analysis investigations, six of the roads under the ASDEIS IRA (County 3/3, WV 55 Baker, WV 55 State Line, WV 93, US 219 Parsons, and US 219 Montrose) would experience noticeable increases in noise levels when compared to the No-Build Alternative. Of these, County 3/3 and WV 55 State Line would be considered moderate noise impacts. Under the Preferred Alternative (WV) or Line A (VA), there would be no noticeable noise increases, with two of the roads experiencing a noticeable decrease in decibel level from existing conditions. While all cultural resources within the 30-Minute Contour have not been identified, it can be concluded that resources along the roads noted above could experience an Effect, possibly Adverse, under the Improved Roadway Alternative.

**h. Cumulative Effect**

The additive effects of direct impacts on cultural resources have been quantified in the *Cultural Resources Technical Report*. The evaluation system used in order to make a Determination of Effect on a given resource consisted of the "addition" of physical, visual and auditory effects. Inasmuch as this system also evaluated secondary impacts, this technique has also considered the additive effects of direct and secondary impacts to cultural resources.

Relative to the cumulative impact on cultural resources based on the five foreseeable future actions, all such actions are subject to the same scrutiny as the proposed project in accordance with Section 106 of the National Historic Preservation Act. Further, the Canaan Valley Wildlife Refuge is in itself a preservation measure and would not impact cultural resources. The Stony Run Dam is located such that potentially affected resources would not constitute additional effects to those identified by the proposed action. Site identification, determinations of eligibility, and mitigation measures for potential effects on cultural resources relative to the Moorefield Floodwall Project are currently underway. Further, the results of these efforts served as background information and basis for the predictive settlement pattern model discussed in the *Cultural Resources Model Test Report*. The management plans for the Monongahela and the George Washington National Forests would primarily involve potential effects to archaeological resources on federal lands. It is not possible at this time to determine whether or not Forest Service activities would affect, in some cumulative fashion, the resources also affected by the proposed action. Refer to Section III-Y-Cumulative Effects, for further discussion of this issue.

### h. Probability Zone Distributions

Table III-40 (Vol. II) shows the distribution of prehistoric probability zones within the project area, as defined by the Corridor H prehistoric settlement pattern model. Each cell within the table indicates the total area in acres for each probability zone as measured by the GIS within the construction limits of a particular alignment. Percentage distributions are provided permitting comparisons of the impact to undocumented prehistoric sites for each of the project options.

An examination of the probability zone distributions, as shown in Table III-40 (Vol. II), suggests that the relative proportions of high, medium, and low probability zones in West Virginia for the ASDEIS IRA and the Preferred Alternative (WV) are quite similar. This might be expected since the two alternatives cross similar topographic and environmental zones. In absolute terms, the Preferred Alternative (WV) impacts approximately twice as much area as the ASDEIS IRA due to the inherent differences in these alternatives. In Virginia, the ASDEIS IRA demonstrates a somewhat higher percentage of medium probability zones (41% vs. 26%) and high probability zones (9% vs. 7%) compared to Line A, although again, in absolute terms, the ASDEIS IRA affects less acreage.

## 4. STATUS OF ONGOING CULTURAL RESOURCE INVESTIGATIONS

### a. Phase I Archaeology

Subsequent to the completion and revision, per WVDCH comment, of information presented in the *ASDEIS Cultural Resources Technical Report*, a Phase I archaeological survey work plan was formulated and implemented as part of the ongoing Section 106 process. Phase I archaeological investigations have proceeded within the Preferred Alternative (WV). Individual Phase I management reports summarizing the findings of those investigations have been prepared. Since the completion of the *ASDEIS*, the Virginia Department of Transportation has decided not to pursue either the Build or the Improved Roadway Alternatives at this time. The Virginia State Historic Preservation Officer (VASHPO) has issued a NO-EFFECT determination regarding cultural resources contained within the Virginia portion of the project study area.

Each Phase I management summary contains locational information, descriptions of fieldwork, methods employed, results of fieldwork, pertinent maps, photographs (if required), completed West Virginia Archaeological Site Forms, and recommendations and scopes of work for Phase II investigations. At the time of the completion of this FEIS, Phase I archaeological fieldwork has been conducted in all sections of the Preferred Alternative (WV), except in areas where permission for entry to properties has been denied.

Details concerning additional archaeological activities to be undertaken as part of the ongoing Section 106 process are formally presented in the *Section 106 Programmatic Agreement (FEIS, Vol. II, Appendix B).*

If Native American remains are discovered, those remains will be treated in accordance with the procedures detailed in the Section 106 Programmatic Agreement (FEIS, Volume II, Appendix A, Stipulation VII, Paragraphs 1 and 2). Stipulation VIII states in part that "FHWA will consult with ... all appropriate Native American tribes and groups regarding any decisions to avoid, preserve in place, or excavate any Native American remains...." Further, Stipulation X(E) states in part that, "Prior to construction, ....FHWA will contact the West Virginia Council on American Indian Burial Rights, Inc., as an Interested Party, regarding the discovery or excavation of any Native American remains encountered during archaeological monitoring".

**b. Historic Resources**

After the initial architectural and historic resource reconnaissance survey was completed and concurrence on potential eligibility was received by the WVDCH, a more comprehensive survey of potentially eligible standing structures and other historic resources (e.g. cemeteries, battlefields) commenced under the terms of the Section 106 Programmatic Agreement. The architectural and historic field survey of the Appalachian Corridor H Project Area was conducted for all historic properties fifty years of age or greater, which are located within approximately 1,000 ft (305 m) from the center line of the Preferred Alternative (WV). As part of this survey resources are being mapped, individually researched, and photo-documented using 35 mm black and white film for most resources and 35 mm color and slide film for others. Research of a resource consists of interviews with the property owner(s), a chain of title, a review of land tax records, and additional library research.

From the field survey and the research, each property is being assessed for significance in accordance with the National Register Criteria set out in *National Register Bulletin 15, How to Apply the National Register Criteria for Evaluation* (National Park Service n.d.) and the historic context written for the *Corridor H Cultural Resources Technical Report* (1995). Taken into special consideration in evaluating the standing structures in the Project Area are the "Architectural Overview" (Section 3.2.8) and the "Rural Landscape Patterns and Settlement Distribution" (Section 7.7) sections of the *Alignment Selection SDEIS Appalachian Corridor H Elkins to Interstate 81 Cultural Resources Technical Report - Volume I (1995)*, which includes discussion on geographic influences of folk building traditions. In evaluating the significance and eligibility of historic cemeteries, *National Register Bulletin 41, Guidelines for Evaluating and Registering Cemeteries and Burial Places* (Potter and Boland 1992) is being used.

Special consideration was also given to the research of the two Civil War battlefields within the Project Area, Corricks Ford and Moorefield. Research concentrated on primary accounts with the use of secondary sources as supporting documentation. All information uncovered during this research was summarized in *Determinations of Eligibility in the Appalachian Corridor H Project Area: The Battle of Corricks Ford* (August 1995) and *Determinations of Eligibility in the Corridor H Project Area: The Battle of Old Fields and the Battle of Moorefield* (August 1995). Both battlefields were evaluated according to *National Register Bulletin 40, Guidelines for Identifying, Evaluating, and Registering America's Historic Battlefields* (National Park Service 1992).

**(1) Corricks Ford Battlefield**

The Corricks Ford Battlefield near Parsons, WV, has been determined to meet the eligibility criteria for listing on the National Register of Historic Places. Boundaries were delineated based upon the above studies. Both the determination of eligibility and the boundary delineation were concurred with by the WV SHPO. The determination and delineation were submitted to the Keeper of the National Registry of Historic Places for review and concurrence. The Keeper concluded that the battlefield is eligible for listing in the National Register (Vol. II, Appendix F). The Keeper also found that the battlefield boundaries should include Kalars Ford (Vol. II, Appendix G). In the *ASDEIS*, Kalars Ford was identified as being bridged by the Preferred Alternative. As the result of the Keeper's finding, the Preferred Alternative's alignment has been shifted to avoid any use of Kalars Ford and any other property within the battlefield's limits (Vol. II, Appendix G).

**(2) Moorefield Battlefield**

The Keeper found that the Moorefield Battlefield is eligible for listing in the National Register and that the boundaries for the battlefield should be determined (Vol. II, Appendix F). Following the eligibility determination by the Keeper, a boundary determination was made and submitted to the Keeper, WV SHPO and other consulting parties to the Section 106 process. Furthermore, the alignment of the Preferred Alternative (WV) was shifted to avoid any use of the area of the battlefield (Vol. II, Appendix G).

**(3) Other Properties**

For those properties appearing to be eligible for inclusion in the National Register of Historic Places, preliminary National Register boundaries are being prepared in accordance with guidelines set forth in *National Register Bulletin Number 21, How to Establish Boundaries for National Register Properties* (National Park Service 1987). The architectural and historic surveys are being conducted for each preliminary design section, and the survey results are being compiled in formal Determination of Eligibility Reports.

## 5. AVOIDANCE, MINIMIZATION, AND MITIGATION

Information regarding avoidance, minimization, and mitigation strategies for cultural resources identified within the Corridor H project area is presented in the Corridor H Section 106 Programmatic Agreement (Vol. II, Appendix B of this FEIS).

## M. WATERSHED OVERVIEW

Except for a few areas of impact assessment (e.g., air quality, noise), the analysis of the environmental impacts of a proposed highway project has traditionally focused on the direct impacts on the resources lying within a relatively narrow corridor. Recently, increased emphasis has been placed on the analysis of secondary and cumulative impacts (Bank, 1992). These impacts may occur well outside of the narrow corridor. This increased emphasis on secondary and cumulative impact analysis recognizes a need to understand impacts in a broader perspective than direct impact measurement. Southerland, in his report to the EPA entitled *Evaluation of Ecological Impacts from Highway Development* (1993), recognizes the need to put impacts in a broader and more meaningful ecological context when he states, "Although in some cases the ecological impacts may be limited to the highway corridor (e.g., 300 feet in width), impacts will often extend to the watershed or ecological region."

To put the impacts of this proposed project in a broader ecological context, a watershed approach has been taken. The proposed project crosses two river systems: the Monongahela River and the Potomac River. Each river system is composed of several watersheds (Vol. II, Exhibit III-7). Within West Virginia, the proposed project crosses five of these watersheds: the Tygart Valley and Cheat Rivers in the Monongahela River system; the North and South Branches of the Potomac River, the Cacapon River and the Shenandoah River in the Potomac River system. In Virginia, the proposed project crosses the Shenandoah River watershed.

These six watersheds cover a very large geographical area in comparison to the proposed project. Because of the size disparity between the geographic coverage of the watershed and the geographic coverage of the proposed project within that watershed, utilizing the total resource base of each of these watersheds to determine ecological impacts would likely under represent the scale of magnitude or ecological importance of the project's environmental impacts. To adjust for this scale of magnitude effect and to produce a broader and more representative ecological impact analysis, each of the six major project watersheds was divided into smaller subwatersheds that are more directly related in a geographic and ecological sense to the proposed project. These subwatersheds are termed *local project watersheds*. In terms of location, these are the subwatersheds of the major watershed that "surround" the proposed project. A graphical representation of these is presented in Exhibit III-8 (Vol. II). In the following *Existing Environment and the Environmental Impacts* Sections, these local project watersheds are referenced by the major watersheds that "surround" them. For example, collectively the Stony River and Patterson Creek subwatersheds are referenced as the North Branch of the Potomac River watershed.

While the use of the total watershed area could under represent the ecological importance of certain impact types, the use of the local project watersheds could overestimate and consequently misrepresent the ecological importance of other impacts (i.e., impacts that occur beyond the boundaries of the local project watersheds). To adjust for the possible overestimate of impacts and to be certain that the ecological importance of impacts outside the local project watersheds was not missed, *regional project watersheds* were defined and utilized for the analysis of the ecological importance of secondary and cumulative effects. Regional project watersheds cover the portion of the major watershed that is bounded by the 30-Minute Contour defined for this project.

In summary, local project watersheds are utilized for the analysis of direct ecological impacts of the proposed project, while regional project watersheds are utilized for the analysis of secondary and cumulative ecological impacts presented in the *Secondary and Cumulative Impacts Technical Report,* and summarized herein.

**1. MONONGAHELA RIVER SYSTEM**

The Monongahela River System drains portions of West Virginia, Pennsylvania, and Maryland toward the Mississippi River. The West Virginia portion of the Monongahela River System stretches from Pocahontas County to the Pennsylvania state line, comprising a total area of 10,826 square kilometers (4,180 sq. miles). The river system is located in the Appalachian Mountain Section of the Appalachian Plateau Province, which is typified by mountains and high plateaus with steep slopes and long, narrow valleys and well developed dendritic drainage patterns. Near the Allegheny Front, elevations range from 900 to 1,400 meters (3,000-4,600 feet), while near Elkins, the elevations range from 500 to 750 meters (1640 to 2460 feet). This river system is part of the Mixed Mesophytic Forest Biome, which consists of a variety of hardwood and evergreen forests. During the half century between 1870 and 1920, the upland forests of West Virginia were subjected to such intensive logging that by the end of this period the original forests had been essentially eliminated (Clarkson, 1968). Extensive forest fires, fueled by large amounts of logging slash, also destroyed large areas of virgin timber. As a result of the extensive logging and frequent fires that occurred throughout the upland forest region during this period, the present day forest vegetation is mostly a mosaic of second and third-growth forest communities (Stephenson, 1993).

A wide range of wildlife is present within this river system due to the abundance and variety of upland forest, pasture and cropland, and riverine habitats. A number of game, non-game, and furbearing mammals as well as upland game birds, waterfowl, non-game birds, and raptors use these habitats for feeding and breeding. One federally listed Threatened (Cheat Mountain Salamander, *Plethodon nettingi*) and three federally listed Endangered (Virginia Northern Flying Squirrel, *Glaucomys sabrinus fuscus;* Indiana bat, *Myotis sodalis;* and the Virginia Big-eared Bat, *Plecotus townsendii virginianus*) wildlife species, as well as one federally listed Endangered plant species (Running Buffalo Clover, *Trifolium stoloniferum*) occur within the upland habitat of this river system.

Annual precipitation in this portion of the Monongahela River basin ranges from 102 to 178 cm (40 to 70 inches) per year depending upon elevation, terrain and exposure. In the high elevations, wetlands are typically bogs and fens dominated by mosses, sedges and shrubs, reflecting the higher precipitation and cooler temperatures. Along the larger rivers and streams in lower elevation valleys, man-made ponds and floodplain wetlands are the dominant wetland types. The Monongahela River System is composed of the Tygart Valley River Watershed and the Cheat River Watershed.

**a. Tygart Valley River Watershed (WV)**

The Tygart Valley River rises near Spruce, West Virginia in Pocahontas County and flows northward toward the Monongahela River. The entire watershed drains 3,564 square kilometers (1,376 sq. miles) including portions of Randolph, Upshur, Barbour, and Taylor Counties. The Tygart Valley River watershed is dominated by deciduous forest (72%) with cropland and pasture comprising 22% of the existing land use. The Tygart Valley River regional project watershed drains approximately 396 square kilometers (153 square miles) north of Elkins, West Virginia.

The proposed project lies within the drainage area of Leading Creek, which is characterized by wide stream valleys with meandering stream channels, silty substrates, and wide floodplains. The elevations and topography of this watershed are not as high or as steep as found in surrounding watersheds. Leading Creek and a number of its tributaries have been degraded by agricultural nonpoint source pollution. Within the Leading Creek subwatershed, there are no native or stocked trout streams, Nationwide Rivers Inventory listed rivers, or streams impacted by acid mine drainage.

Major municipalities in the Leading Creek watershed include Elkins and Montrose. Major employment sectors include retail trade, manufacturing, and services. This watershed has one industrial park located in Elkins (Elkins-Randolph County Park).

**b. Cheat River Watershed (WV)**

The Cheat River is formed near Parsons, West Virginia at the confluence of the Black Fork and Shavers Fork and flows north to its confluence with the Monongahela River at Point Marion, Pennsylvania. The Cheat River watershed, including all its tributaries, is comprised of parts of Pocahontas, Randolph, Tucker, Preston, and Monongahela Counties in West Virginia. The Cheat River regional project watershed drains 1,750 square kilometers (675 square miles).

Much of the Cheat River watershed is composed of undeveloped rural land. This watershed is dominated by deciduous and mixed forests (84%) with cropland and pasture comprising 12% of the existing land use. Part of the Monongahela National Forest (MNF), including the Congressionally designated Otter Creek, Laural Fork North and South, and Dolly Sods Wilderness areas, lie within the Cheat River regional project watershed. These wilderness areas are not impacted by the proposed alignments. Several areas of historic interest including the Corricks Ford Battlefield and the Douglas Coke Ovens are also present.

Historically, the Cheat River watershed has been an area dominated by coal mining, especially in the northern portion of the watershed, and particularly in the drainage area of the Black Fork and Beaver Creek. Active mines continue to operate within this watershed. As a result, many abandoned deep and surface mines in the area discharge untreated mine drainage, the major water quality problem in the watershed. In addition to acid drainage from mined areas, atmospheric deposition of acidic rain is also a serious threat to aquatic resources within this watershed. However, within portions of the watershed which have not been subjected to mining, high quality streams and rivers exist, including Shavers Fork and several trout streams.

Several restoration and reclamation projects are currently being undertaken along the Blackwater River and portions of the Black Fork, Long Run and Middle Run. WVDEP is constructing a limestone treatment station along the Blackwater River, approximately one mile upstream from Davis, above the confluence with Beaver Creek. The goal is to reduce the acidity of a five mile segment of the river sufficiently to sustain a year-round trout population. Completion of this project is anticipated for late 1994. Portions of the drainage areas of Middle Run, Long Run and the North Fork of the Blackwater River have been recently modified as part of the Albert Highwall and Douglas Highwall Reclamation projects. These projects included grading, covering and planting highwall areas and treatment of acid mine drainage.

Major municipalities in this watershed include Parsons, Hambleton, Hendricks, Thomas, and Davis, West Virginia. Major employment sectors include manufacturing, services, and mining. This watershed currently has no industrial park development.

### 2. POTOMAC RIVER SYSTEM (WV)

The Potomac River System drains 37,992 square kilometers (14,669 square miles) of portions of West Virginia, Virginia, Maryland, Pennsylvania, and the District of Columbia toward the Chesapeake Bay and the Atlantic Ocean. The Potomac River System lies in the Valley and Ridge Province which is typified by long, narrow and level valleys between steep parallel slopes and a trellised drainage pattern. Elevations range from 220 meters (725 feet) in the Shenandoah Valley to nearly 880 meters (2,900 feet) in Grant County. Within West Virginia, the Potomac River System drains 9,039 square kilometers (3,490 square miles).

This river system is part of the Oak-Chestnut Forest Biome, which consists of mixed hardwood forests. The original forests were essentially eliminated by intensive logging and extensive forest fires near the turn of the century. This has resulted in a present day vegetative community of second and third-growth forests. Large portions of the present deciduous forest (primarily oaks) have been defoliated by gypsy moth outbreaks in the eastern portion of this system, including parts of the George Washington National Forest (GWNF). By the summer of 1992, reproducing populations of gypsy moths were found on approximately half of GWNF and since the original outbreak (1986), 40% of the forest has experienced at least one defoliation (USDA, 1993). Repeated defoliations can result in severe tree mortality, thereby initiating a change in forest species composition where oaks are replaced by species less susceptible to gypsy moth damage. Currently, there is no cost-effective or environmentally acceptable way of achieving wide-spread control of gypsy moth populations in heavily infested areas.

Wetlands within this system are mostly small man-made ponds and floodplain wetlands formed along the wider river valleys. A wide range of wildlife is present within this river system due to the abundance and variety of upland forest, pasture and cropland, and riverine habitats. A number of game, non-game, and furbearing mammals as well as upland game birds, waterfowl, non-game birds, and raptors use these habitats for feeding and breeding. Five federally listed Endangered wildlife species (Virginia Northern Flying Squirrel, Indiana bat, Virginia Big-eared Bat, Peregrine Falcon, *Falco peregrinus*, Bald Eagle, *Haliaeetus leucocephalus*) occur within the upland and riverine habitats of this river system. Average annual precipitation is lower than found west of the Allegheny Front (97 cm (38 inches) per year). The watersheds which the proposed project cross include the North Branch of the Potomac River, the South Branch of the Potomac River, the Cacapon River, and the Shenandoah River.

**a. North Branch of the Potomac River Watershed (WV)**

The North Branch of the Potomac River watershed drains portions of Grant and Hampshire Counties and all of Mineral County, West Virginia. The North Branch of the Potomac River watershed is dominated by deciduous and mixed forests (79%) with cropland and pasture comprising 17% of the existing land use. The river itself runs generally northeastward along a basin between the Allegheny Front and Backbone Mountain. The North Branch of the Potomac regional project watershed drains approximately 1,200 square kilometers (460 square miles).

Suspected sources of pollution in the North Branch of the Potomac River include sediment runoff from agriculture, timbering, oil and gas exploration, and coal refuse piles. Acid mine drainage, mainly from abandoned mines, also poses a major problem, generally limited to the drainage's of Stony River and Abrams Creek.

A portion of Seneca Rocks National Recreation Area lies in the southwest portion of this watershed. Greenland Gap, located near the town of Scherr, West Virginia, is a unique topographic feature within this watershed. The gap is considered to be the least disturbed and most distinctive water gap in West Virginia, with towering sandstone cliffs that arch upward over 244 meters (800 feet) (Scott, 1991). The above two areas are not impacted by the proposed alignments. In the Patterson Creek drainage, there are native and stocked trout streams.

The major municipality in this watershed is Bayard in Grant County, West Virginia. This watershed has one industrial park near Bayard that is not yet constructed.

#### b. South Branch of the Potomac River Watershed (WV)

The South Branch of the Potomac River is the larger of the two major branches of the Potomac River. The South Branch rises in Highland County, Virginia and flows in a general northeast direction into West Virginia to its confluence with the North Branch. The South Branch of the Potomac River drains portions of Pendleton, Grant, Hardy, and Hampshire Counties. The South Branch of the Potomac River watershed is dominated by deciduous and mixed forests (72%) with cropland and pasture comprising 26% of the existing land use. The portion of this watershed within the 30-Minute Contour drains 1,338 square kilometers (510 square miles) within Grant, Hardy and Hampshire counties.

The water quality of the South Branch is considered excellent. However, some pollution associated with agriculture, poultry production, and forestry is present. The extensive stream channel work conducted as a result of the November 1985 flood has modified a number of the streams in the watershed. Within the South Branch watershed, there are no native or stocked trout streams or streams impacted by acid mine drainage, but the tributaries to Anderson Run exhibit impacts from agricultural activities. The South Branch of the Potomac River is listed on the Nationwide Rivers Inventory.

Moorefield and Petersburg, West Virginia are the major municipalities in this watershed. This watershed has two industrial parks in Moorefield, which is predicted to be a major growth center for the South Branch of the Potomac area by local and regional planners, and two industrial parks in Petersburg, which is experiencing economic growth due to the expanding poultry industry and other industrial development.

### c. Cacapon River Watershed (WV)

The Cacapon River originates in the southeastern portion of Hardy County on West Mountain. This watershed encompasses 1,792 square kilometers (692 square miles) in Hardy, Hampshire, and Morgan Counties. The Cacapon River watershed is dominated by deciduous and mixed forests (82%) with cropland and pasture comprising 17% of the existing land use. The Cacapon River regional project watershed drains approximately 1,190 square kilometers (460 square miles). The eastern end of this watershed lies within the George Washington National Forest. This watershed contains the Lost River, so-named because the upper reaches of the Cacapon River goes completely underground into cavernous limestone during periods of low flow. Approximately 6.4 kilometers (4 miles) west of Wardensville, the river cuts an underground passage in the existing limestone and remains underground for 3.2 kilometers (2 miles) until it emerges west of Wardensville. (See Section III-G, *Groundwater* for additional information on this feature.)

Water quality within the watershed is excellent, with limited pollution associated with agricultural and timber harvesting activity. There has been no substantial mining activity in this watershed. Wardensville is the major municipality in this watershed. The Wardensville Industrial Park is located on the east side of Wardensville, but has had limited development.

### d. Shenandoah River Watershed (VA)

The Shenandoah River watershed drains portions of Augusta, Rockingham, Page, Frederick, Shenandoah, Warren, and Clarke Counties in Virginia and Jefferson and Hardy Counties in West Virginia. The Hardy/Frederick County line and the axis of Great North Mountain mark the division between the Shenandoah River watershed and the Cacapon River watershed to the west. The Shenandoah River watershed existing land use is composed of deciduous and mixed forests (52%), and cropland and pasture (40%). The Shenandoah River regional project watershed drains approximately 875 square kilometers (340 square miles) in Frederick and Shenandoah Counties in Virginia.

The western portion of this watershed lies within the George Washington National Forest. This watershed includes the municipalities of Strasburg and Winchester, Virginia. Interstate 81 is a major north-south transportation corridor located within this watershed. Major employment sectors include tourism and associated retail trade, the apple industry, and manufacturing. This watershed has one industrial park located in Mt. Jackson, Virginia and three in Winchester. Because the Shenandoah Valley has played a significant role in the nation's history, historic structures and sites are prevalent within the watershed.

## N. FLOODPLAINS

The protection of floodplains and floodways is required by Executive Order 11988, *Floodplain Management*; US DOT Order 5640.2, *Floodplain Management and Protection*; 23 CFR 650. The intent of these regulations is to avoid or minimize highway encroachments within the 100 year (base) floodplains, where practicable, and to avoid supporting land use development which is incompatible with floodplains values. Where encroachment is unavoidable, the regulations require taking appropriate measures to minimize impacts.

Floodplains occur along streams and rivers, but not all floodplains represent a risk of flood damage. Officially designated floodplains are established by the Federal Emergency Management Agency (FEMA) where substantial flooding occurs near development. Floodplains are classified by FEMA based on the accuracy of the analysis used to calculate the extent of the floodplain and the regulations restricting development within the floodplain. A 100-year floodplain is the area that would be inundated by a 100-year flood (i.e. a flood which has the probability of occurring once every 100-years). The extent and elevation of the 100-year flood is determined through a detailed hydraulic study. A flood hazard zone is the area flooded during a 100-year storm; the area is determined by an engineer's professional judgment with respect to historical stream data and topography. A regulatory floodway is a portion of the 100-year floodplain within which the majority of the flood waters are carried and where flooding hazards are highest. Encroachment within a floodway could result in increased flood elevations and, possibly, additional property damages during a flood event. As a result, federal, state, and local agencies regulate development in floodways. The minimum federal standards set by FEMA limit such flood elevation increases to one foot, provided that hazardous velocities are not produced.

### 1. METHODOLOGY

The assessment methodology is based on the requirements provided in Executive Order 11988, *Floodplain Management*; 23 CFR Part 650, *Location and Hydraulic Design of Encroachments on Floodplains*, and US DOT 5650.2, *Floodplain Management and Protection*. Floodplain regulations require that a Location Hydraulics Study be performed pursuant to 23 CFR Part 650. The study evaluates the following items for each of the alternatives under consideration:

- The risk of flooding associated with the implementation of the highway facility;
- The impacts on natural and beneficial floodplain values;
- The support of development within the floodplain; and
- Measures to minimize floodplain encroachments.

Floodplain regulations also require the use of National Flood Insurance Program (NFIP) maps to identify the limits of the 100-year floodplain. The NFIP was established by FEMA and is administered and enforced through communities affected by floodplain encroachments. Under the authority of the NFIP, some communities have established permit requirements for all development within the base floodplain zone. As a result, a community's participation status in the NFIP dictates what type of mapping is available for estimating floodplain encroachments. A community's participation and status in the NFIP is based on the Regular Program and the Emergency Program.

Communities participating in NFIP's Regular Program generally have quantitative flood hydraulic studies performed on each floodway. In these communities the NFIP map is a Flood Insurance Rate Map (FIRM) and, in the majority of cases, a regulatory floodway is in effect. Communities participating in NFIP's Emergency Program generally possess qualitative flood hydraulic data for the floodway. In the Emergency Program, the community's NFIP map is a Flood Hazard Boundary Map (FHBM) showing only approximate base floodplain boundaries.

As defined by FEMA, the three types of NFIP maps include Flood Hazard Boundary Maps (FHBM), Flood Boundary and Floodway Maps (FBFM), and Flood Insurance Rate Maps (FIRM). The FHBM are usually not based on detailed hydraulic studies of a floodway and present only approximate base floodplain boundaries. According to FEMA, approximate analyses were used to study those areas having low development potential or minimal flood hazards. The FBFM accurately delineate floodplains and floodways because they are derived from detailed hydraulic studies of the floodway in question. Conversely, detailed hydraulic studies are performed on major rivers and streams, resulting in greater accuracy for estimating floodplain and floodway boundaries for such waterbodies. Boundaries for floodplain and floodway zones of smaller streams and tributaries are qualitatively estimated because no detailed hydraulic studies have been performed on them. FIRM's are usually created concurrently with the FBFM, are based on the same hydraulic analyses, detail flood rate zones, and provide elevations for base flooding. The FIRM's estimate 100 and 500 year floodplain boundaries for major rivers and streams and approximate floodplain boundaries for small streams and tributaries.

**a. Data Collection**

Flood Insurance Rate Maps (FIRM) and Flood Boundary and Floodway Maps (FBFM) were obtained for the project area to determine the limits of the 100-year floodplains and regulatory floodways within the study area.

A literature search was conducted to compile historical flooding information. This information was used to assess the flooding risks associated with the implementation of a highway facility within the study area. The primary sources of historical flooding information included the US ACOE, Pittsburgh and Baltimore Districts; the US DOI; FEMA; and the State of West Virginia, Office of Emergency Services.

Additional floodplain data were obtained by field views of each prospective stream crossing that was identified as an encroachment. For some streams, supplementary flooding history was obtained by contacting local residents.

### b. Data Analysis

The base floodplains, regulatory floodways, and the alternatives under consideration were digitized and superimposed on the GIS mapping of the project area. The area of encroachment on flood hazard zones, 100-year floodplains, and floodways was calculated within the construction limits of each alignment. Each floodplain encroachment was identified as one of the following six categories:

- 100-Year Floodplain - Longitudinal Encroachment;
- 100-Year Floodplain - Transverse Encroachment;
- 100-Year Floodplain - Complex Encroachments;
- Regulatory Floodway - Longitudinal Encroachment;
- Regulatory Floodway - Transverse Encroachment; and
- Regulatory Floodway - Complex Encroachments.

Impacts parallel to the floodplain are considered longitudinal encroachments. Impacts perpendicular to the floodplain are considered transverse encroachments. A complex encroachment would occur when there are both longitudinal and transverse encroachments or in situations where an impacted floodplain from one stream converges with an impacted floodplain from another stream.

An alternatives analysis of floodplain avoidance was conducted for a comparison of the No-Build Alternative, the ASDEIS IRA, and the Preferred Alternative (WV) and Line A (VA).

### c. HEC-2 Analyses

In situations where stream crossings would involve encroachments on designated floodways and floodplains, the US ACOE's HEC-2 Water Surface Profile Computer model was used to determine the flood elevations both before and after construction for a 100-year flood event. In cases where the initial hydraulic structure would result in an increase in the 100-year flood elevations of more than one foot, the structure was redesigned to accommodate a greater floodflow. The three types of hydraulic structures to be used for the proposed project are pipes, concrete box culverts, and bridges.

## 2. EXISTING ENVIRONMENT

Floodplains serve to moderate the flow of floods, provide water quality maintenance, act as areas for ground water recharge, and serve as habitat for plants and animals. Most floodplains in the project area lie on rural, undeveloped land and tend to be narrow because they are confined by steep valleys. Shavers Fork, Black Fork, and their tributaries flow through steep valleys resulting in relatively narrow, well defined 100-year floodplains that are restricted by adjacent valley walls. Flood flow is generally deeper and at a greater velocity in these smaller, restricted areas along the steep valley streams. Regulatory floodways associated with 100-year floodplains are most common on these streams.

Leading Creek, the South Branch of the Potomac River, and the Cacapon River have relatively wide floodplains on flat valley floors. Due to the flat, wide, and level nature of these floodplains, floodflow velocities and depth outside the main stream channel are relatively low. The most common flood areas found on these floodplains are the 100-year floodplains and flood hazard zones. Some regulatory floodways exist in more densely developed areas.

## 3. IMPACTS

The No-Build Alternative would not cause additional encroachments to flood hazard zones, 100-year floodplains, or floodways. Such encroachments would occur under the ASDEIS IRA, the Preferred Alternative (WV) and Line A (VA). Table III-41 (Vol. II) identifies the type of flood area affected, the type of encroachment (longitudinal, transverse, or complex), and the area of encroachment by watershed and stream. The stations of the floodzone areas are shown in the *Alignment and Resource Location Plans*.

Table III-42 (Vol. II) provides a summary of the flood hazard zone, 100-year floodplain, and floodway encroachments for the alternatives and the option areas. The ASDEIS IRA would result in a slightly greater total flood zone encroachment than the Preferred Alternative (WV), but the ASDEIS IRA would encroach upon less floodplain and floodway. There would be no flood zone encroachments within the Patterson Creek Option Area or the Hanging Rock Option Area. Line A would result in the least flood zone encroachments within the Interchange Option Area, the Forman Option Area, or the Baker Option Area. Within the Shavers Fork Option Area, the Line A would involve a regulatory floodway while the Preferred Alternative (Line S) would avoid encroachment into the regulatory floodway. Within the Duck Run Option Area, Line D2 would avoid flood zone encroachments. Within the Lebanon Church Option Area, Line L would avoid flood zone encroachments.

The encroachments resulting from any of the proposed alignments would not induce development incompatible with the functions and values of any flood zone. A detailed analysis of secondary (induced) development performed for this project indicates that there is sufficient land suitable for development outside of flood zones to accommodate the projected development. Details and results of this study are documented in the *Secondary and Cumulative Impact Technical Report*. Refer to Section III, Y - Cumulative Impacts, of this FEIS regarding cumulative impacts.

**a. Tygart Valley River Watershed**

In the Tygart Valley River watershed, the ASDEIS IRA would encroach upon 6.8 hectares (16.8 acres) of the 100-year floodplain and flood hazard zones of Leading Creek and five of its tributaries. Detailed hydraulic studies have shown that the transverse Leading Creek crossings and the complex encroachment at Claylick Run would not increase floodwater elevations more than one foot.

The Preferred Alternative (WV) would encroach upon 5.4 hectares (13.6 acres) of the 100-year floodplain and flood hazard zones of Leading Creek and four of its tributaries. A longitudinal encroachment would occur where the Preferred Alternative (WV) crosses a low area between two hills. Complex encroachments would occur where the Preferred Alternative (WV) would cross a tributary near its confluence with Leading Creek. Detailed hydraulic studies have shown that these encroachments would not result in flood water elevation increases of more than one foot.

Within the Interchange Option Area, the Preferred Alternative (Line I) would result more flood hazard zone encroachment than would Line A (Vol. II, Table III-41).

**b. Cheat River Watershed (WV)**

In the Cheat River watershed, the ASDEIS IRA would encroach on 2.3 hectares (5.7 acres) of 100-year floodplain and flood hazard zone. The ASDEIS IRA would encroach sporadically along a 4.9 kilometer (3 mile) length of the 100-year floodplain along Haddix Run. The ASDEIS IRA would also encroach on the Pendleton Creek flood hazard zone near its headwaters.

The Preferred Alternative (WV) would encroach upon 1.6 hectares (4.3 acres) of floodplain along Shavers Fork, the 100-year floodplain of the Black Fork near Hambleton, and the flood hazard zone encroachments at Slabcamp Run and Pendleton Creek. The encroachments along Shavers Fork and the Black Fork would not increase flood elevations more than one foot, as determined by a detailed hydraulic study.

Within the Shavers Fork Option Area, Line A would cross the Shavers Fork regulatory floodway near Porterwood on two bridges with a total encroachment of 3.4 hectares (8.5 acres). The Preferred Alternative (Line S) would avoid the regulatory floodway by remaining along the eastern side of Shavers Fork, traversing the western slopes of Fork Mountain.

c. **North Branch of the Potomac River Watershed (WV)**

Within the North Branch of the Potomac River watershed, the ASDEIS IRA would encroach upon the Patterson Creek flood hazard zone downstream of reservoirs that are used for floodwater control.

The only flood zone encroachment along the Preferred Alternative (WV) within this watershed is within the Forman Option Area. Line A would encroach upon less of the flood hazard zone of Patterson Creek than would the Preferred Alternative (Line F). There would be no flood zone encroachments within the Patterson Creek Option Area.

d. **South Branch of the Potomac River Watershed (WV)**

In the South Branch of the Potomac River watershed, the ASDEIS IRA would encroach upon 8.7 hectares (21.6 acres) of the 100-year floodplain and flood hazard zone of the South Branch of the Potomac River and the flood hazard zones of Fort Run and Anderson Run. The complex encroachment on the South Branch of the Potomac River floodplain would be due to the widening and relocation of US 220. The widening of existing roadway would not result in an elevated road surface and, therefore, would not impede flood flow.

The Preferred Alternative (WV) would transversely encroach upon the flood hazard zone of the South Branch of the Potomac River. At the location of the crossing, FEMA has not defined a 100-year floodplain. Because of the high flooding risk associated with this crossing, a detailed hydraulic study was performed to determine the appropriate bridge length. A 732 meter (2,400 foot) bridge would be required to cross the floodplain without increasing the 100-year flood elevations more than one foot. The limited encroachments would be due to the fill necessary to elevate the bridge approaches.

e. **Cacapon River Watershed (WV)**

In the Cacapon River watershed, the ASDEIS IRA would encroach upon 4.3 hectares (10.5 acres) of flood hazard zone along Baker Run, Trout Run, and Lost River. The Preferred Alternative (WV) would result in 1.7 hectares (4.1 acres) of flood hazard zone encroachments along the Lost River and Trout Run. Within the Baker Option Area, the Preferred Alternative (Line B) would result in 44 percent less encroachment than would Line A.

f. **Shenandoah River Watershed (VA)**

In the Shenandoah River watershed, the ASDEIS IRA would encroach upon 3.7 hectares (9 acres) of the flood hazard zones of Mulberry Run, Turkey Run, Duck Run, and Cedar Creek.

Line A (VA) would encroach upon 2.4 hectares (5.9 acres) of the flood hazard zones of Cedar Creek, Duck Run, and Mulberry Run. Within the Duck Run Option Area, Line A and Line D1 would encroach upon the Cedar Creek flood hazard zone, but Line D2 would avoid these encroachments.

Within the Shenandoah River watershed, Line A (VA) would result in 34 percent less flood zone encroachments than would the ASDEIS IRA. The Build Alternative, using Line D2 within the Duck Run Option Area, would result in 45 percent less flood zone encroachment than would the ASDEIS IRA.

## 4. AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Avoidance, minimization, and mitigation measures would not be necessary under the No-Build Alternative. The alignment development process for both the ASDEIS IRA, Preferred Alternative (WV) and Line A (VA) included efforts to avoid or minimize floodplain encroachments. Detailed hydraulic studies were performed for all considerable unavoidable encroachments of regulated floodways or 100-year floodplains. In all cases, the final proposed structures would result in less than a foot increase in 100-year flood elevations. Both the ASDEIS IRA and the Build Alternative have been designed to mitigate increases in flood risk. This project is in compliance with Executive Order 11988 regarding floodplain management.

In cases where the initial hydraulic structure would result in an increase in the 100-year flood elevations of more than one foot, the structure was redesigned to accommodate a greater floodflow. The following modifications were incorporated into the design of the Preferred Alternative (WV):

- Enlarged box culvert to reduce floodwater elevations;
- Replaced box culvert with bridge to reduce floodwaters elevations;
- Extended bridge over the Black Fork by 150 feet to minimize encroachments; and
- Replaced two short bridges and elevated roadway across the flood zone of the South Branch of the Potomac River with a single 732 meter (2,400 foot) bridge.

## O. VEGETATION AND WILDLIFE

The vegetation and wildlife assessment describes the methodology used to identify and evaluate habitat loss, forest fragmentation, and highway induced wildlife mortality. Avoidance, minimization, and mitigation measures related to these impacts are also discussed. Details of the assessment and a further discussion by watershed are contained in the *Vegetation and Wildlife Habitat Technical Report.*

Upland forest is the dominant vegetation type within the proposed project area. As a result of the extensive logging and frequent fires that occurred throughout the upland forest region between 1870 and 1920, the present day forest vegetation is mostly a mosaic of second and third-growth forest communities (Stephenson, 1993). The present forest vegetation community within the proposed project area west of the Allegheny Front is composed primarily of two forest types: the Northern Hardwood Forest and the Appalachian Mixed Hardwood Forest. Northern Hardwood Forests generally occur at elevations above 915 meters (3,000 feet), but can extend down slope as low as 750 meters (2,460 feet) in rich moist loamy soils (Stephenson, 1993). The three dominant tree species of this forest type are sugar maple (*Acer saccharum*), beech (*Fagus grandifolia*), and yellow birch (*Betula alleghenięnsis*). Appalachian Mixed Hardwood Forests generally occur below 750 meters (2,460 feet) and are characterized by a great diversity in species composition. Overstory composition may range from nearly pure stands of red oak (*Quercus rubra*) or yellow poplar (*Liriodendron tulipifera*) to mixtures of twenty or more commercially valuable species.

The portion of the proposed project east of the Allegheny Front lies in the Middle Section of the Ridge and Valley Province. The present forest vegetation community within this area is composed primarily of Northern and Appalachian Mixed Hardwood Forests. However, the species composition of the Northern Hardwood Forest is somewhat different due to lower precipitation levels. This area receives markedly less rainfall than the project area west of the Allegheny Front. Most major air masses move across the Allegheny Mountains from west to east, depositing most of their moisture on the higher ridges west of the Allegheny Front. The resulting tree species are those tolerant of drier conditions. Several species of oak (chestnut oak, *Quercus prinus*; red oak, and white oak, *Quercus alba*) typically occur in association with various species of pine (Virginia pine, *Pinus virginiana;* pitch pine, *P. rigida*; and Table Mountain pine, *P. pungens*).

### 1. HABITAT LOSS

#### a. Methodology

Wildlife is an important ecological, economical, and recreational resource of West Virginia. A wide range of terrestrial wildlife resources utilize the diverse upland habitat communities within the project area. These resources include reptiles and amphibians, a variety of game birds, non-game birds, raptors, and furbearing mammals. While the project area is dominated by deciduous forest, other areas of maintained agricultural/pasture land, early successional shrubland, and early regenerating forest stands provide a diverse mosaic of upland wildlife habitat. The wildlife habitat value of these communities was assessed using the U.S. Fish and Wildlife Service's (USFWS) Habitat Evaluation Procedure (HEP; USFWS, 1980). HEP is currently the only wildlife evaluation tool available that attempts to quantify the quality of wildlife habitat over a broad spectrum of habitat types for large projects. There are 119 terrestrial wildlife species models developed and tested by the USFWS that can be used for area evaluations. These models relate specific habitat characteristics to potential habitat quality. Each model generates a numeric Habitat Suitability Index (HSI) which ranges from no habitat suitability (0.00) to optimum habitat suitability (1.00).

A land use and land cover map was produced through the interpretation of 1" = 1,000' scale aerial photography and selected groundtruthing. This photography encompassed an area approximately 3.2 km (2 miles) wide and 192 km (120 miles) in length. Existing land use and land cover were classified to Anderson Level II (Anderson, *et al.*, 1976). Land cover within the construction limits of the alignments was further classified according to the USFWS Cover Type Classification System (USFWS, 1981) to accommodate data entry into the HSI computer program (USFWS, Micro-HSI Version 2.1).

**(1) Species Selection**

A "guild" approach was employed to select HEP evaluation species, based on the range of habitats within each watershed. Guilds offer a way of evaluating large groups of animals by selecting several individual indicator species. A guild is a group of species that exploit a resource in a similar fashion (Root, 1967). Thus, if the impact of environmental change is determined for one species from the guild, the remaining species should be similarly affected. The guild-indicator concept is a cost and time-effective approach: the population levels of many birds, mammals, reptiles, and amphibians can be estimated by monitoring populations of a few guild-indicator species (Block *et al.*, 1986).

The selection of evaluation species involved categorizing vertebrate species according to their feeding and reproductive habitat requirements. This information was collected through an extensive literature review on a number of terrestrial vertebrate species. DeGraaf and Rudis (1986) and individual *Habitat Suitability Index Models* provided the most comprehensive collection of information on species habitat requirements. The selection of evaluation species was predicated on several factors: the species had to be found within the watershed, either as a permanent resident or as a migratory species that potentially breeds there; the species had to represent a group of animals that exploits the same resources within particular cover types; and the species had to have an existing USFWS documented model for use with the HSI computer program.

Of the 119 wildlife species models, 19 were chosen to evaluate the wildlife habitat within the project area. Due to the time and expense involved in model development and field testing, only those wildlife models previously developed by the USFWS were considered fro this assessment. Each wildlife species was chosen to represent a group of animals that use the same habitat resources. For example, the brown thrasher model represents bird species that utilize shrubby edge habitat such as cat birds, rufous-sided towhees, indigo buntings, and northern cardinals. This approach offers a cost and time effective means of evaluating large groups of animals by selecting several individual indicator species. These species are identified on Table III-43 (Vol. II)

**(2) Data Collection**

Data collection techniques included both physical measurement and visual estimation procedures (Hays, *et al.*, 1981; Brower and Zar, 1984) to quantitatively measure the wildlife habitat variables produced by the HSI program. The wildlife habitat information was used to predict the habitat suitability of each cover type for each evaluation species. Baseline habitat suitability indices (HSI) were determined for each evaluation species. These values represent the habitat suitability for the evaluation species before project construction. The HSI values are an estimate of the habitat quality found within the proposed alignments for each evaluation species. Baseline habitat units (HUs) were calculated by multiplying the HSI values by the area of each cover type used by the evaluation species within the alignment construction limits. These numbers represent the wildlife habitat value before project construction.

**(3) Impact Assessment**

Most models chosen appeared to generate HSI values representative of the wildlife habitat within the project area. Initial HSI values ranged from highs of 1.0 and 0.97 for the black-capped chickadee and white-tailed deer respectively, to a low of 0.00 for the ruffed grouse. Further analyses of the ruffed grouse model revealed that the habitat components found in the West Virginia project area differed from those habitat components outlined in the USFWS documented model. Therefore, the resulting HSI is not representative of the actual existing grouse habitat found within the project area. After discussions with the USFWS and WVDNR, this model was removed from the 19 original species analyzed for this study. This removal did not effect any subsequent Habitat Unit calculations.

Low HSI values were also obtained for warblers. The only USFWS HEP models available to specifically evaluate warbler habitat were the pine and yellow warbler models. The USFWS pine warbler model states that optimal cover and reproductive (nesting) habitat for the pine warbler is provided by pure, dense, mature stands of pine lacking a tall deciduous understory. A forest dominated by deciduous trees is unsuitable for the pine warbler. A review of the HSI model components revealed that while the overall HSI was low (0.01), the existing evergreen forest habitat did provide suitable pine warbler habitat. However, because this forest type is a low percentage (2%) of the overall pine warbler potential habitat, the resulting HSI reflects the dominance of the deciduous forest. Similarly, the USFWS yellow warbler model states that optimal nesting habitat for the yellow warbler is provided in wet areas with dense, moderately tall stands of wetland deciduous shrubs. Upland shrub habitats on dry sites will provide only marginal suitability. A review of the HSI model components revealed that while the overall HSI was somewhat low (0.33), the scrub/shrub wetlands evaluated provided excellent yellow warbler habitat. However, because this cover type is a low percentage (4%) of all potential yellow warbler habitat, the resulting overall HSI reflects the dominance of the deciduous shrubland. Habitat suitability for other wood warblers may be inferred from HSI values of bird species that use similar forested habitat such as the black-capped chickadee and woodpecker species.

An impact assessment of wildlife habitat within each alignment's construction limits was performed using the HEP accounting program (USFWS HEP Accounting Software for Microcomputers, 1985). HUs were calculated for three target years; present or baseline conditions, during or immediately following construction, and five years after construction. It was assumed that, during or immediately following highway construction, no usable habitat would exist within the highway construction limits. Construction activities would have either removed existing vegetation or would result in disturbances sufficient to render remaining habitat unusable at this time. The HU calculation for five years after construction represents the predicted conditions of unpaved areas within the original construction limits based on standard WVDOH and VDOT right-of-way and roadside development practices. Numerous studies have shown that constructed right-of-way habitat is used by many wildlife species.

**b. Direct Impacts**

Impacts to wildlife habitat were assessed by comparing the existing habitat (baseline HUs) to the habitat that exists immediately following, and five years after construction (future HUs). As stated previously, it was assumed that, during or immediately following highway construction, activities would have either removed existing vegetation or would result in disturbances sufficient to render remaining habitat unusable by wildlife at this time.

The existing wildlife habitat area to be occupied by the ASDEIS IRA generated a total of 3,980 HUs in West Virginia and 267 HUs in Virginia. The total amount of wildlife habitat currently along the ASDEIS IRA is less than the total along the Preferred Alternative (WV) and Line A (VA) for several reasons. First, a large portion of the ASDEIS IRA follows existing roads (minimal wildlife habitat). Second, areas adjacent to the existing roads where the ASDEIS IRA would be constructed are somewhat developed, thereby providing less productive wildlife habitat. Third, the area to be occupied by the ASDEIS IRA (predominantly two lanes) would be less than the area to be occupied by the Preferred Alternative (WV) or Line A (four lanes).

The existing wildlife habitat area to be occupied by the Preferred Alternative (WV) and Line A produced a total of 8,128 HUs in West Virginia and 1,023 in Virginia, respectively. The majority of this area is deciduous forest habitat which is utilized by 70% of the HEP evaluation species.

The area to be occupied by the Preferred Alternative (WV) in the Baker Option Area has an additional 79 HUs compared with the area to be occupied by Line A. The area to be occupied by Line D1 in the Duck Run Option Area has 42 fewer HUs than the area to be occupied by Line A.

Wildlife habitat within the construction limits would be altered due to highway construction. It was assumed that, for five years after construction, no habitat units (potential wildlife habitat) would be available within the construction limits of any alignment. After five years, portions of each alignment would revegetate and recapture a portion of the wildlife habitat initially lost due to construction. It was assumed that this new habitat would be composed of 70% grassland, 10% shrub cover, and 5% tree cover.

Individual habitat variable values were estimated for the grassland habitat five years after construction. Using these values, future habitat suitability indices (HSIs) were determined for each evaluation species for each alignment. Future HUs for each evaluation species were then calculated. These numbers represent the estimated wildlife habitat value five years after project construction. Only the species that use grassland habitat such as meadowlarks and brown thrashers produced future habitat units.

Table III-44 (Vol. II) summarizes the baseline and predicted future habitat units by alternative and by option area. The No-Build Alternative would not result in construction-related impacts to wildlife habitat.

The ASDEIS IRA would result in the net loss of 3,035 HUs in West Virginia and 164 HUs in Virginia. Roadside revegetation would recapture 25 percent of the HUs initially lost to construction. A comparison of the option areas revealed the following:

- Within the Interchange Option Area, the Preferred Alternative (Line I) would result in 28 percent (20 HUs) greater loss of wildlife habitat would than Line A;
- Within the Shavers Fork Option Area, the Preferred Alternative (Line S) would result in 31 percent (66 HUs) greater loss of wildlife habitat than would Line A;
- Within the Patterson Creek Option Area, Line P would result in 13 percent (33 HUs) greater loss of wildlife habitat than would the Preferred Alternative (Line A);

- Within the Forman Option Area, Line A would result in 2 percent (3 HUs) greater loss of wildlife habitat than would the Preferred Alternative (Line F);
- Within the Line 5-D Option Area, Line A would result in 29 percent (21 HUs) greater loss of wildlife habitat than the Preferred Alternative (Line 5-D);
- Within the Baker Option Area, the Preferred Alternative (Line B) would result in 33 percent (49 HUs) greater loss of wildlife habitat than would Line A;
- Within the Hanging Rock Option Area, the Preferred Alternative (Line A) would result in 6 percent (9 HUs) greater loss of wildlife habitat than would Line R; and
- Within the Duck Run Option Area, Line D2 would result in 7 percent (32 HUs) greater loss of wildlife habitat than would Line A (VA). Line D1 would result in 14 percent (35 HUs) less loss of wildlife habitat than would Line A (VA).

Additional HEP analyses were performed to assess wildlife habitat within each of the six project watersheds. Table III-45 (Vol. II) summarizes the baseline and predicted future habitat units. The potential construction area within the ASDEIS IRA would generate the greatest loss of HU's within the North Branch of the Potomac River watershed. The potential construction area within the Preferred Alternative (WV) would generate the greatest loss of HU's within the Cheat River watershed. Please see *Vegetation and Wildlife Habitat Technical Report* for further details.

### c. Secondary Impacts

Secondary impact assessment was limited to development related activities. These impacts are defined in the *Secondary and Cumulative Impacts Technical Report*.

#### (1) Habitat Unit Loss - Improved Roadway Alternative

Development related to the ASDEIS IRA involves commercial enterprises at intersections and interchanges. The required land area for this development was presented earlier in this report. Following that calculation the total number of hectares per land cover type was multiplied by the habitat units calculated for that particular land cover type for direct highway impacts. Results of those calculations are presented in Table III-46 (Vol. II).

#### (2) Habitat Unit Loss - Preferred Alternative (WV)

Total hectares required for predicted development were calculated. Following that calculation, the total number of hectares per land cover type was multiplied by the habitat units calculated for that particular land cover type for direct highway impacts. Results of those calculations are presented in Table III-46 (Vol. II). For this calculation all development related impacts are presented in the aggregate. That is, intersection/interchange, residential and service oriented development were combined by lands cover type to determine the total number of habitat units predicted to be lost because of predicted development requirements.

### d. Cumulative Impacts

#### (1) Additive Direct Impacts

A portion of the HUs loss due to the disturbance of wildlife habitat during highway development would be regained as the highway right-of-way revegatated. These additive direct impacts to wildlife habitat (HUs lost and regained) by watershed are summarized in Table III-45 (Vol. II). The ASDEIS IRA would cumulatively result in the loss of 2,968 HUs in West Virginia and 164 HUs in Virginia. The Preferred Alternative (WV) would cumulatively result in the loss of 6,145 HUs in West Virginia. Line A would result in the loss of 809 HUs in Virginia. Habitat Units lost represent less than 2% of the HUs found within the Regional project watersheds.

#### (2) Additive Direct and Secondary Impacts

The combination of direct and secondary impacts yielded an increase in HUs lost by the evaluation species due to predicted secondary development (Vol. II, Table III-47). Predicted secondary development is an aggregate of intersection/interchange, residential and service oriented development. The Shenandoah River watershed would have the greatest cumulative loss of HUs, while the North Branch of the Potomac River watershed would have the least. This calculated loss is based on a total removal of forest and farmland habitat from wildlife use. However, residential development is based on using 2 acre lots. Many of these parcels would not be completely converted from their present land use type and would still provide some benefits for a variety of wildlife species.

#### (3) Foreseeable Future Actions

Foreseeable future projects included five Federal actions that are currently ongoing or are in the formative stages of study. These five Federal actions considered were discussed previously. Table III-48 (Vol. II) summarizes the potential wildlife habitat impacts due to the above five Federal actions. Two projects predict loss of wildlife habitat. The Moorefield floodwall project would involve impacts to approximately 21 acres of cropland and 2 acres of bottomland hardwoods. A comprehensive assessment of this wildlife habitat value was performed by the USFWS in conjunction with the US. Fish and Wildlife Coordination Act. To compensate for habitat losses, mitigation measures included the proposed acquisition and the planting of 18.8 acres of high habitat value trees and shrubs to replace 32 HUs lost (COE 1990). The Stony Run water supply dam would result in the loss of 70 acres of forested habitat. Based on an approximate value of 2.9 HUs/forested acre (based on SDEIS HEP study), this project would result in the loss of 203 HUs. However, the creation of open water habitat and the associated shoreline edge would provide food and cover resources for waterfowl, wading birds, and other species associated with aquatic environments. This could increase the overall species diversity in a region dominated by upland deciduous forest.

The proposed Canaan Valley National Wildlife Refuge would encompass nearly 11,330 hectares (28,000 acres) of relict boreal (northern) habitat with diverse flora and fauna communities. Canaan Valley's high altitude and cold, humid climate have maintained a unique relict boreal ecosystem which supports an assemblage of plant and animal life considered unusual for its latitude in the eastern United States. Nearly 288 species of mammals, birds, reptiles, amphibians, and fish are known or expected to occur here, including one threatened (Cheat Mountain salamander) and one endangered (Virginia northern flying squirrel) species. This area is nationally recognized as a breeding and fall migration concentration area for the American woodcock, and supports many other migratory species, including raptors, waterfowl, wading birds, shorebirds, and neotropical migrants.

Both National Forests have prepared Final Environmental Impact Statements that contain wildlife management plans that address the habitats needs of a variety of wildlife species. Each plan chose management indicator species to represent important game species, threatened and endangered species, species whose habitats may be influenced by management activities, and non-game species of special interest. Management plans call the monitoring of population levels of the indicator species and management of their habitats to maintain viable population numbers.

The cumulative effect of the above foreseeable actions is currently one of a positive nature for wildlife habitat. Over 30% of the land area within the 30-Minute Contour (240,000 hectares or 600,000 acres) is currently being managed to maintain species diversity and promote population levels of both game and non-game species. West Virginia Division of Natural Resources also owns and manages an additional 7,000 hectares (17,000 acres) for wildlife within Wildlife Management Areas located within the 30-Minute Contour. Refer to Section III-Y, for further discussion of cumulative impacts.

### e. Avoidance, Minimization, and Mitigation Measures

Where possible, alignments were developed to avoid known areas of unique wildlife habitat (caves, red spruce forest) where federally listed Threatened species have been documented. Alignment development also attempted to avoid impacts to wetland resources. Where avoidance was not possible, efforts were made to minimize the degree of impact.

The projected loss of habitat units for each alignment is based on the assumption that all wildlife habitat within the construction limits would be altered due to highway construction. Final design for the highway may not necessarily impact this entire area. Bifurcations in the roadway may leave portions of existing habitat intact, thereby reducing the net loss of wildlife habitat units. The proposed alignments also cross several areas of abandoned strip mines along WV 93 east of Davis, West Virginia. These areas are sparsely vegetated and presently provide little wildlife habitat. Right-of-way development, in conjunction with highway construction within these stripped sites, could provide additional habitat for wildlife use. In addition, this analysis projected future habitat variables five years after construction. Over time, the vegetative succession process would change species composition in areas that are not periodically maintained. Herbaceous species would gradually be replaced by shrub and tree species. This could provide the composition and diversity of vegetation necessary for additional use by the chosen evaluation species, and would likely result in an increase in calculated future habitat units.

## 2. FOREST FRAGMENTATION AND BIODIVERSITY

### a. Literature Review

Natural landscapes are typically composed of a mosaic of habitats differing in size, shape, and vegetative structure and composition (Verner, 1986). If undisturbed long enough, such landscapes tend to reach a stage in which units of the mosaic retain fairly stable local plant communities or climax patterns (Whittaker, 1953). However, natural disturbances in the form of fires, storms, landslides, earthquakes and erosion contribute to reduce the patch size of existing habitat units and to alter their vegetative composition, often to earlier successional stages. These activities can produce a variety of direct and indirect impacts to existing plant and animal communities. Verner suggests that because so many species of terrestrial vertebrates are adapted to breed successfully in disturbed habitats, it might be inferred that natural disturbance has been a frequent and widespread occurrence in geologic history. In addition, many plant species have evolved to pioneer disturbed landscapes, serving to begin the vegetational succession process. Therefore, it is not possible to present all fragmentation of habitat as either "good" or "bad" since it operates at varying scales on each species (USDA, 1993).

Human activities such as the construction of powerlines, residential and industrial developments, agricultural practices and roadways can produce habitat fragmentation resulting in a change to the vegetation of the successional community. Of particular concern in the central and eastern United States is the fragmentation of forest habitat and its resulting effect on biodiversity. Forest fragmentation is the process whereby large, continuous, and often homogenous areas of forest are broken into smaller often isolated tracts surrounded by a matrix of cultivated land, residential development, or other nonforest land use. Forest fragmentation is a function of several parameters:

- Patch size - the area of the resulting habitat fragments;
- Patch isolation - the characteristics of the surrounding land use;

- Total reserve area - the sum of patches and contiguous forest;
- Edge - the transition area between two or more habitat types; and
- Connectivity - the habitat linkages among patches.

Minimizing forest fragmentation promotes the natural patterns and connectivity of wildlife habitats that are key components of biodiversity (CEQ, 1993). The physical alteration of existing land use and changing land use patterns that lead to habitat simplification and fragmentation, disrupt species interactions and ecosystem processes. A regional assessment of forest fragmentation was used to determine potential effects on existing biodiversity within the 30-Minute Contour (see Section III. A: *Economic Environment Section* for definition of 30-Minute Contour).

A great deal of research has been done to evaluate the effect of forest fragmentation on the distribution and abundance of wildlife species. Due to the complex nature of the interacting parameters outlined above and the number of different wildlife species potentially involved, no consensus has been reached by the body of scientific researchers as to the overall effects of forest fragmentation on wildlife species. Most published scientific literature to date deals with avian species and their response to this phenomenon. A review of this literature was conducted to examine and summarize the major research findings on this topic.

Many researchers have studied the associated effects of forest fragmentation on avian communities. Robins *et al.* (1980) determined that gaps greater than 100 meters (330 feet.) in contiguous forest habitats produced isolation characteristics in the small habitat fragments created. Anderson (1979) showed that transmission-line corridors wider than 61 meters (200 feet) created grassland/shrub habitats within the forest. These corridors created new vegetative communities that when considered with the total bird population of the deciduous forest resulted in a greater variety and diversity of birds in the region. Rosenberg and Raphael (1986) found that bird and amphibian species richness increased significantly on more fragmented stands of Douglas-fir forests and in study plots containing more edge. A variety of species were able to utilize the more diverse vegetative component of the edge-forest ecotone.

A major topic of research has focused on the potential impact of forest fragmentation on neotropical migrant and interior forest dwelling songbirds. Neotropical migrants winter in Central America and the Caribbean, and to a lesser extent in South America, but breed in North America. A number of researchers have reported on the population decline of these species between the late 1940's and the late 1980's (see Finch, 1991). Several causes have been suggested for this decline; the loss of winter habitat in Latin America (Hall, 1984; Ambuel and Temple, 1982), brood parasitism by the brown-headed cowbird (*Molothrus ater*) (Brittingham and Temple, 1983), a low rate of colonization and a high rate of extinction in small, isolated woodlots (Whitcomb *et al.*, 1981), the lack of critical microhabitats (Lynch and Whigham,

1984) and higher rates of nest predation in small woodlots compared to large forest tracts (Robbins et al, 1980; Ambuel and Temple 1983; Wilcove, 1985). Hall suggests that some decreases in the number of neotropical species may be density dependent and result from the movement of bird species from optimal to suboptimal habitat as populations fluctuate over time.

Forest succession should be considered another potential factor influencing the changing diversity and population numbers of forest bird species. Martin (1960) reported on the changing bird populations that accompany vegetational succession. Freemark and Merriam (1986) found that habitat heterogeneity (spatial variability in habitat conditions within forest stands) was an important factor in determining bird species assemblages. Baird (1990) analyzed population changes in breeding birds in a Western New York forest from 1930 to 1980. He found the largest population decline among forest species that generally build nests less than 2 meters (6.6 feet) above the ground. He attributed this decline to the heavy browsing of white-tailed deer which has dramatically altered the understory vegetative composition. Baird observed both local increases and decreases over the past 50 years in a number of neotropical and short-distance migrants, as well as several permanent residents. Baird's study did not provide clear evidence that species which migrate to the Neotropics are declining more rapidly than short-distance migrants or permanent resident species.

Several research efforts on the effects of forest fragmentation on avian species have been conducted in the Midwest. In this area, once large expanses of contiguous forest have been replaced by small woodlots that have been extensively isolated by surrounding agricultural land. These woodland "islands" have served as study areas where the theories of island biogeography have been explored for terrestrial ecosystems. MacArthur and Wilson (1967) proposed that the number of species resident on an island is influenced primarily by area, but also by habitat diversity, age of the island, and its isolation. The Midwest's landscape mosaic has provided researchers the opportunity to study a number of fragmentation parameters such as patch size and edge effect. Temple (1986) defined the functional habitat unit for area sensitive species (core area) as the area of forest more than 100 m from an edge, instead of the total forest area observed. Further studies by Temple and Cary (1988), found significant differences in nesting success (18%, 58%, 70%) of forest interior dwelling birds within three distances from edge categories (< 100 meters, 100 to 200 meters, > 200 meters) and classified these as poor, marginal and good quality habitat respectively. They attributed these differences to nest predation, brood parasitism and competition that are associated with edge habitats. Robinson (1992) found that small isolated woodlots (< 70 hectares [170 acres]) appeared to serve as population sinks for many species of Neotropical migrants and contained several species that are considered area-sensitive elsewhere in their range, including the worm-eating warbler (*Helmitheros vermivorus)* and ovenbird (*Seiurus aurocapillus)*. However, most species suffered high nest predation and parasitism rates due to the edge-dominated forest patch configuration.

Blake and Karr (1987) studied breeding bird communities of isolated woodlots in Illinois. They found that the number and type of bird species breeding in these habitats were primarily dependent on the area of the woodlot. Differences observed among woodlot bird populations were attributed to the degree of isolation of each woodlot. Woodlots in this study were typically separated by many kilometers. They suggested that woodlots that were by themselves too small to support certain species, could do so if there were additional habitat located nearby. Lynch and Whigham (1984) studied breeding bird communities in upland forest patches of Maryland and found that vegetation characteristics, rather than patch geometry, appeared to play the dominant role in determining community composition and local abundance for the majority of bird species. Woodland patches in this study did not display the same degree of isolation as the Illinois study and were generally separated by small distances (0.1 to 1 kilometer). The complex inter-relationship between area, isolation and vegetative habitat characteristics influenced almost every bird species within the study area. Robbins (1989) found many similarities with the above study, but also some important differences. A more comprehensive sampling effort yielded data on a wider variety of habitat components and bird species. This study determined that 51% of the bird species were correlated with forest area as opposed to 26% in the Lynch and Whigham (1984) study.

Some researchers have attempted to determine the optimal forest patch size necessary to provide breeding habitat for all species of forest nesting birds. Blake and Karr (1984) found that forest interior species were not well represented in woodlots < 30 hectares (70 acres). However, species differ in many life history characteristics that influence occurrence in isolated patches of habitat and determination of optimal reserve size is dependent on species specific ecology. Robbins (1989) studied area requirements of forest birds in Maryland and adjacent counties in Pennsylvania, West Virginia, and Virginia. Twenty-six avian species showed a significant increase in probability of occurrence as forest area increased and were considered to be area-sensitive. The authors emphasize that even in forest tracts > 3000 hectares (7410 acres), species such as the northern parula warbler (*Parula americana*) and cerulean warbler (*Dendroica cerulea*) had occurrence probabilities < 0.4. They suggest that if smaller forest tracts containing streams and bottom-land habitat (preferred by these species) were preserved, these birds could likely reside there. As in other studies, proximity to other forest stands (isolation) was also found to influence the minimum breeding area for some species.

In landscapes dominated by agricultural use (cropland, pastures), much of the remaining forest is in linear tracts along streams. These forested strips provide habitat for a variety of bird species, including several area-sensitive neotropical migrants (Keller *et al.*, 1993). In addition, these areas have been found to improve water quality by reducing the sediment and nutrient content of agricultural runoff (Peterjohn and Correll, 1984; Paterson and Schnoor, 1993). Croonquist and Brooks (1993) found that naturally vegetated riparian corridors > 125 meters (410 feet) were needed to support the full complement of bird communities.

However, protecting at least a 25 meters (80 feet) wide corridor on each bank provided feeding, resting, or migrating corridors for uncommon, sensitive species including forest interior and neotropical migrants birds.

While some researchers (Whitcomb *et al.*, 1981) indicate that populations in fragmented habitats are declining at a rapid rate for reasons associated with such fragmentation (e.g., habitat island size, high predation, and frequent brood parasitism), bird population declines have also been observed in relatively undisturbed forests. Holmes *et al.* (1986) conducted studies in an unfragmented (3,075 hectares [7,600 acres]), temperate, deciduous forest (Hubbard Brooks, New Hampshire) for 16 consecutive breeding seasons. Bird community dynamics varied over time with many species (70%) declining during this period. Individual species responded to a variety of environmental factors that operated on local, regional and global scales. Five major factors were identified that influence bird numbers in the forest; food abundance, breeding season weather, successional habitat changes, interspecific aggression, and winter mortality. Hall (1984) found that both the number of species and population of neotropical migrants had declined in an undisturbed portion of the Cheat Mountains in West Virginia. The author states that a precise reason for this decline cannot be assigned, but suggests that tropical deforestation as well as local climatic and weather factors may be contributing components.

Holmes and Sherry (1988) suggest that there is little agreement on the factors that regulate songbird populations. At the unfragmented Hubbard Brooks research area, 42% of the regularly occurring species declined from 1969 to 1986, including 4 neotropical migrant species. Based on their research findings, the authors conclude that forest fragmentation is probably not a factor in the observed decline of avian species over most of New Hampshire where forests predominate and where urban development is only beginning to affect the landscape. One neotropical migrant species that declined considerably was the least flycatcher (*Empidonax minimus*). This decline was attributed to the gradual maturing of the woodlands throughout the state of New Hampshire. This species favors conditions of intermediate succession with open subcanopies beneath dense upper canopy vegetation. Population trends varied for the least flycatcher from nearby states suggesting that regional land-use patterns may be an important factor in affecting habitat suitability for this species. Other species that may have been affected by changing habitat structure were the American redstart and the wood thrush. Both species reach maximal densities in mid-successional forests. The authors suggest that it is premature to attribute observed population trends in North America songbirds to any one causal factor.

Böhning-Gaese *et al.* (1993) used the Breeding Bird Survey (BBS) data to analyze trends in breeding populations of 47 insectivorous passerines in central and eastern North America, including long distance neotropical migrants. BBS data may be useful for identifying large scale trends in bird abundance and for providing perspective about the generality of those trends. The results suggest that those species that winter in the tropics did not experience strong decreases in their populations. Long distance neotropical migrants experienced a small, non-significant decreasing trend, whereas residents and short-distance migrants increased strongly. The declines observed were attributed to breeding ground predation and not to deforestation of wintering habitat in tropical America.

Finch (1991), as part of the USDA Forest Service's role in the Neotropical Migratory Bird Conservation Program, reviewed and summarized the current information on population trends of neotropical migratory birds and the factors affecting migrant populations on the wintering and breeding grounds. The author concluded that sufficient information was lacking on the population status and causes of population changes of neotropical migrants to develop an effective management plan to conserve these species.

**b. Methodology**

Large forested tracts are important habitat for area sensitive species and species requiring large territories. These forested areas contain other microhabitats such as streams and associated riparian corridors that are utilized by a wide variety of wildlife species for feeding and/or breeding purposes. To assess the effects which disturbance or fragmentation may have on species and biological communities, indicator species were chosen to represent area sensitive and landscape dependent (sensitive to changing land use patterns) species. Forest interior neotropical migrant bird species were used to assess the potential impacts of forest fragmentation on area sensitive species. Changing land use patterns were assessed to determine the potential effects on landscape dependent species such as the wild turkey (*Meleagris gallopavo*), black bear (*Ursus americanus*), and bobcat (*Felis rufus*) (Brooks and Croonquist, 1990). This analysis was restricted to the Build and Improved Roadway Alternatives.

Breeding bird survey (BBS) data was obtained from the US. Fish and Wildlife Service's Office of Migratory Bird Management. Breeding bird population trend information was received for West Virginia and Virginia. This information was reviewed to determine the present population trends of neotropical migrant bird species within West Virginia and Virginia. As the cowbird (*Molothrus ater*) is implicated as one factor in the decline of neotropical migrants (Brittingham and Temple, 1983), population trends of this species were also reviewed.

Forest fragment size (patch size) is an important factor in determining utilization by forest-interior neotropical migrant species. Of particular concern was the creation of small forest patches that may be unusable by interior neotropical migrants for breeding purposes Impacts that would potentially create small forest patches were assessed using land use/land cover data acquired through the interpretation of 1" = 1,000' scale aerial photography and selected groundtruthing. This photography encompassed an area approximately 3.2 kilometers (2 miles) wide and 192 kilometers (120 miles) in length and provided an accurate account of the potential creation by the proposed highway of relatively small (less than 150 hectares or 370 acres) forest fragments that were entirely within the photography boundaries. Larger forest polygons (greater than 150 hectares or 370 acres) could extend beyond the limits of the photography, making an accurate assessment of their total size impractical using these data. GIS analysis determined the number of forest patches created by the potential construction of alternatives. This information was used to assess the potential impact on minimum breeding area requirements for four neotropical migrants that occur within the proposed project area. These species were chosen to represent interior forest dwelling species whose breeding area requirements span a number of forest patch sizes.

Potential changes in land use patterns were assessed using USGS 1:250,000 scale digital Anderson Level II land use/land cover data. GIS analysis determined the amount of several land use/land cover types before and after proposed highway construction within the 30-Minute Contour. The 1:250,000 scale digital data provided a broad overview of the existing land use/land cover within a large geographic area and allowed an assessment of potential changes at a "regional" scale.

Total reserve area or the total amount of forest habitat is another important component of forest fragmentation. GIS analysis determined the total acreage of forest habitat within the 30-Minute Contour before and after highway construction.

Secondary impacts due to road construction were assessed by placing a 200 meter buffer on the construction limits of the proposed highway and recalculating the number and size of forest patches within the limits of the aerial photography. This was an attempt to define the core area available for area sensitive species after secondary effects of nest predation, brood parasitism and competition (associated with edge habitats) were considered (Temple and Cary, 1988). Further discussion of cumulative impacts resulting from induced development are discussed in the *Secondary and Cumulative Impact Technical Report*.

### c. Existing Environment

Breeding bird survey (BBS) data and minimum breeding area requirements are summarized in Table III-49 (Vol. II). Within West Virginia, the population trends showed an increase for three of the four indicator species with varying minimum breeding area requirements. Virginia had two species that had declining population trends. The cowbird showed a decreasing population trend in West Virginia (-4.1%) and a slight increase in Virginia (0.2%). This may reflect the overall land use patterns within the two states and the species ability to exploit these patterns. Cowbirds are able to utilize open areas of traditional foraging habitat (agriculture/pasture) as a base from which to parasitize forest dwelling species. West Virginia is predominantly a forested state, whereas Virginia has a larger agricultural component interspersed with forest. This is reflected in the land use patterns for the 30-Minute Contour. Of the 592,642 hectares (1,464,418 acres) in West Virginia and 136,137 hectares (336,394 acres) in Virginia, forested habitat comprises 80% and

52% of West Virginia and Virginia land use respectively, while agriculture/pasture makes up 42% in Virginia and 18% in West Virginia.

**d. Impacts**

Table III-50A (Vol. II) summarizes the changes in the number of forest patches less than 150 hectares (370 acres). Based on the analysis of the 1"=1000' scale photointerpreted mapping, a total of 206 forest patches less than 150 hectares would be created if the Preferred Alternative (WV) in West Virginia and Line A (VA) were constructed. Fifty three percent (110) of these patches would be less than 1 hectares (2.5 acres) in size. Based on the indicator species minimum breeding area requirements (Vol. II, Table III-49), parcels less than 1 hectare in size would not be suitable habitat for breeding purposes. However, forest patches smaller than that required for breeding may be used as foraging or resting areas. These areas can also serve as population sinks for non-breeding individuals (Robinson, 1992). These parcels comprise less than 1% of the forest habitat within the above mapped area. Forty seven percent (96) of the created forest patches could be utilized for breeding purposes by at least one species of interior forest dwelling neotropical migrant and 13% (27) could be utilized by all four indicator species.

A total of 133 forest patches less than 150 hectares would be created due to the construction of the Improved Roadway Alternative (ASDEIS IRA). Sixty eight percent (91) of these patches would be less than 1 hectare (2.5 acres) in size and would not be suitable breeding habitat for the neotropical migrant indicator species. Thirty two percent (42) of the created forest patches could be utilized for breeding purposes by at least one species of interior forest dwelling neotropical migrant and 10% (13) could be utilized by all four indicator species.

Approximately 1,585 hectares (3,916 acres) of land would be altered due to construction of the Preferred Alternative (WV) and Line A (VA). This represents less than 1% of the total land within the 30-Minute Contour. From a regional perspective, no change in land use patterns would occur. Large forest patches (> 500 hectares or 1,235 acres) would remain to accommodate species with wide ranging territory requirements. Any effects on landscape dependent species, such as the wild turkey, black bear, and bobcat, would be minimal. The total amount of forest habitat after highway construction within the 30-Minute Contour would be 540,952 hectares (1,336,692 acres). This represents less than a 1% loss of regional forest lands.

Approximately 780 hectares (1,925 acres) of existing land would be altered due to construction of the ASDEIS IRA. This represents less than 1% of the total land within the 30-Minute Contour. From a regional perspective, no change in land use patterns would occur. The total amount of forest habitat after highway construction would be 541,757 hectares (1,335,870 acres). This represents less than a 1% loss of regional forest lands.

The 30-Minute Contour Anderson Level I land use/land cover is presented in Exhibit III-9 (Vol. II). This area is dominated by a forested landscape and is overall, relatively unfragmented. Based on the data discussed above, construction of either the alternative would not result in the development of the mosaic land cover patterns present in the Strasburg, Virginia area.

On the basis of comments by EPA, DOI and several non-agency commentors, a more refined analysis of the forest patch issue was undertaken for the FEIS. This re-analysis focused on the landscape context in which the created patches would exist.

The importance of landscape position relative to the biological value of the patch as compared to the size of the patch was investigated by Robinson *et al.* (1995). In their 4 year, 5-state (Illinois, Indiana, Minnesota, Missouri and Wisconsin) study, Robinson *et al.* tested the hypothesis that the reproductive success of nine species (acadian flycatcher, indigo bunting, Kentucky warbler, northern cardinal, ovenbird, red-eyed vireo, worm-eating warbler, wood thrush and scarlet tanager) of forest birds was related to regional forest fragmentation. The study involved over 100 researchers who "located and monitored the fates of more than 5000 nests on nine study areas from 1989 to 1993. The study areas represented the entire range of forest fragmentation available in the midwest." (Robinson *et al.*, 1995).

Following collection of nest predation (all types from all predators) and parasitism (brown-headed cowbird) data, they utilized a GIS system and USGS 1:250,000 scale digital land use and land cover data to determine the mean percentage of various land cover types within a 10 km radius of the center of each study site. The 10 km radius was chosen because it is similar in size to the maximum known travel ranges of cowbirds from feeding to breeding sites.]

They found that cowbird nest parasitism was significantly negatively correlated ($p < 0.01$) to the amount of forest cover in the landscape. They also found that nest predation across all species was significantly negatively correlated ($p < .05$) with forest cover. That is, the higher the percentage of forest cover within the 10 km radius, the lower the percentage of nest parasitism and the lower the percentage of nests predated upon.

The GIS database developed for the Corridor H project and USGS 1:250,000 scale digital land use and land cover data were utilized to determine the percentage of forest cover within approximately 10 km x 20 km square blocks centered on the Preferred Alternative (WV). This data (Vol. II, Table III-50B) was then used to compare the likely changes in rates (percentages) of nest predation and nest parasitism before and after construction of Corridor H (Vol. II, Table III-50B). Examples of forest cover change and forest fragmentation generated from the USGS 1:250,000 scale digital land use and land cover mapping were presented in the ASDEIS Exhibits III-44 and III-45.

As Table III-50B (Vol. II) indicates, the construction of Corridor H along its alignment does not change the overall percentage of forest cover within the blocks. Based on the results of the Robinson *et al.* (1995) study, the analysis conducted for Preferred Alternative (WV) suggests that nest predation and nest parasitism levels should remain relatively constant throughout the Corridor H area following highway construction. It is likely however that nest predation and nest parasitism could increase locally in those patches created in the areas of the Corridor H project where the forest has already undergone extensive fragmentation (e.g., Moorefield, WV and Shenandoah County VA).

The history of forest fragmentation in West Virginia follows the historical patterns of the entire northeastern forest. During the last portion of the 19th century and the first two decades of the 20th, West Virginia, and indeed virtually the entire northeastern United States, was deforested. By 1920, 96% of virgin forests of the northeastern states had been eliminated. For a variety of reasons, some economic, some cultural, the northeastern forest has recovered. This is evident in the Corridor H project area. Forest cover dominates the Corridor H project area; Sixty four percent (64%) of the blocks contained over 80% forest cover, 24% contained 70%-80% forest cover and 12% contained 60%-70% forest cover. Regrowth of the West Virginia forest likely accounts for the apparent declining trend in the statewide brown headed cowbird population.

### e. **Edge Effects**

Table III-51 (Vol. II) summarizes the changes in the number of forest patches less than 150 hectares (370 acres) available for area sensitive species after impacts of nest predation, brood parasitism and competition (associated with edge habitats) were considered. Additional habitat along highway construction limits was removed from adjacent forest parcels to address edge effect constraints. The number of forest patches created in each size category is less than those in Table III-50A (Vol. II). The expanded impact area, an additional 200 m perpendicular to the construction limits, "removes" many small forest patches from potential breeding use by the area sensitive indicator species due to edge effect constraints. However, these forest patches could be utilized by the breeding indicator species for foraging and resting, and could provide suitable habitat for non-breeding and immature individuals. This also does not preclude these areas from use by landscape dependent species, but it is likely that some, such as the wild turkey (Michael, 1975) would avoid this area. While the distribution of "usable" forest patch size would change slightly, large patches (> 500 hectares or 1,235 acres) would remain to accommodate species with wide ranging territory requirements. From a regional perspective, no change in land use patterns would occur.

Historically the "edge effect" was considered to be biologically "good." Leopold (1933) often considered the American founder of game management and a pioneer of the conservation movement, in his postulation of the "law of interspersion" influenced wildlife biologists views of the edge effect for over 50 years. Recently, however, studies attempting to identify reasons for the decline of neotropical migrant species have focused on the negative aspects of the edge effect. Increasing forest edge is now generally perceived as being biologically "bad." However, as Paton (1992) in a major review of edge effect studies points out, that the data are equivocal. That is, some studies have found a high degree of nest parasitism and predation of bird nests and some have not. Some have concluded that the edge effect extends up to 600 m into a woodlot while others have suggested lesser distances (25 m). After his extensive review he found that differences in data reported by the 20 separate investigations reviewed was due to:

- No consistent definition of "edge";
- No consistent consideration of surrounding land cover;
- Multiplicity of experimental approaches; and
- Use of artificial nests.

Paton concludes however, that there are sufficient data to indicate that nest predation and parasitism increase along ecotonal edges. Also based on this review, he concludes that, in terms of nest parasitism and nest predation, 50 m is likely the limits of the effect. Therefore, based on Paton's hypothesis, degradation of forest solely due to nest predation and nest parasitism would reduce the degradation of the forest acreage projection for Corridor H from the original projection of approximately 16,000 acres [based on an edge effect of 200 m, ASDEIS p. III-306] to 4000 acres. Based on the findings of Robinson *et al.* (1995), discussed above, even the 4000 acres relative to nest depredation is likely an overestimate in the context of the entire project. Edge effect on forest ecosystems is not, however, solely limited to nest depredation. Other edge effects include:

- Increase in solar radiation;
- Introduction of more generalized species within the edge;
- Elimination of shade tolerant species for some distance within the forest;
- Increasing habitat for more generalized species (e.g., staghorn sumac, black locust, blue jays, white-tailed deer);
- Destabilizing predator-prey and parasitic relationships; and
- Increase in wind damage from desiccation and windthrow.

Unfortunately, data surrounding the significance of these factors and others that occur at edges are equivocal. Saunders *et al.* (1991) in their comprehensive review of almost 175 studies conducted on the biological consequences of ecosystem fragmentation conclude in part that, "Research to date on fragmented ecosystems has provided few answers on the issues of practical importance to management." Quantification of impacts or prediction of the consequences of qualitative impact analysis of a highway project on the forest ecosystem due to the creation of additional edge habitat is problematic. Additional edge will be produced. The area and significance of those impacts can not be predicted with any certainty. The 200 m band of edge effect impacts along the highway reported in the ASDEIS (p. III-306) was generated to produce a worst-case scenario and to put that scenario into the context of the total amount of forest within the Corridor H area of influence known as the 30-minute contour.

The significance in terms of the intensity of the impacts that result from the creation of additional edge can not be determined. Also, one should not lose sight of the fact that edge environments are ecologically productive environments. Edges are naturally occurring due to blowdowns resulting from catastrophic storms (e.g., hurricanes, tornadoes) and forest fires as a result of lightning. In fact one of the results of the regrowth of the forests in the New England region has been that early successional species of birds have been declining faster than more mature forest species. This trend has stretched over the last two decades (Hagen, 1995).

Edges created by highway construction can be problematic. They can lead to the distribution of alien plant species and noxious weeds. Additionally, long grassy right-of-way corridors facilitate the distribution of non-forest animal species (e.g., meadow vole, brown-headed cowbird). Mitigation measures outlined in the *Corridor H FEIS Mitigation Document (Vol. III)* outlines control measures to minimize the spread of alien plant species and noxious weed species. That document contains commitments to rapid revegetation of area disturbed during construction with native vegetation. Additionally, WVDOH in conjunction with the natural resource agencies will attempt, where practicable, to limit the area of clearing and grubbing operations. Similarly, controlling the limits of right-of-way maintained in short grasses will limit population densities of grassland and pioneer species of fauna.

### f. Cumulative Impacts

Cumulative forest fragmentation impacts were assessed by adding the direct impacts presented in Table III-50A (Vol. II). A cumulative total of 133 forest patches less than 150 hectares would be created due to the construction of the Improved Roadway Alternative (ASDEIS IRA), which comprise less than 1% of the forest habitat within the 30-Minute Contour. For the Preferred Alternative (WV) and Line A (VA), a cumulative total of 206 forest patches less than 150 hectares would be created. This also comprises less than 1% of the forest habitat within the 30-Minute Contour.

From a landscape perspective, a cumulative total of 780 hectares (1,925 acres) of existing land would be altered due to construction of the ASDEIS IRA and 1,585 hectares (3,916 acres) of existing land would be altered due to construction of the Preferred Alternative (WV) and Line A (VA). Both represent less than 1% of the total land within the 30-Minute Contour. From a regional perspective, no change in land use patterns would occur. Large forest patches (> 500 hectares or 1,235 acres) would remain to accommodate species with wide ranging territory requirements.

The ASDEIS (p. III-289) stated that, "The calculated loss [of forest acreage] is based on a total removal of forest and farmland habitat from wildlife use. However, residential development is based on 2 acre lots. Many of these parcels would not be completely converted from their present land use type and would still provide some benefits for a variety of wildlife species". Of the acreage cited above 17,200 acres or 97% were predicted to be utilized for residential development: The area requirements for the development of predicted residential growth were developed:

- To maximize the total acreage required thus providing the worst-case secondary impact scenario by utilizing area requirements of single family dwelling units situated on 2 acre (0.8 hectare) lots; and
- To determine if sufficient raw land was available to support predicted worst-case development without directly encroaching on sensitive natural resources.

As noted above, the ASDEIS pointed out that "many of these parcels would not be completely converted from their present land use type" (ASDEIS p. III-289). Construction of homes in the Corridor H project area generally does not involve clearing large areas. Rather, single family housing units are constructed to blend into the land cover. Typical suburban housing developments are generally absent throughout the Corridor H project area occurring only around Wardensville and Elkins. This observation is supported by the population density discussions found in the CSDEIS (p. III-30).

Lack of subdivision housing developments is likely, in some part, due to the cultural heritage of the population and in large part due to the lack of public water and sewage infrastructure. Development of such infrastructure is only present in the towns of Elkins, Beverly, Parsons, Davis, Petersburg, Moorefield and Wardensville (CSDEIS, pp. III-18-III-19). Even in those areas its availability is limited. Based on the above, the statement that "secondary development will remove an additional 17,000+ acres" is not an accurate characterization of the results of the full-build out scenario discussed in the ASDEIS.

Additional housing units, no matter the number, will however add to natural resource impacts caused by development associated with or induced by the highway. Thus, it would also be inaccurate to conclude that any level of additional housing will not cause additional natural resource and social impacts. Such impacts will occur. They include:

- Additional loss of forest and farmland due to houses, outbuildings, various accouterments (e.g., gardens, horse pastures, etc.) driveways, and access roads;
- An increase of predation on nesting birds for example; Wilcove (1985) found bird nests in forest patches;
- Predation by house cats upon areas adjacent to residential housing;
- Increases in stormwater runoff and associated water quality impacts; and
- Additional pressures on various social services (e.g., school districts, emergency providers).

To some large extent the intensity of these impacts will be determined by the response of state, county and local governments. Land use controls have not been developed in most of the Corridor H project area (ASDEIS p III-47) by county or local governments and the state of west Virginia has not adopted a statewide land use control program. The state does have in place various laws and regulations regarding point source and non-point source pollution controls and water quality degradation. Additionally, for this project, the WVDOH (*Corridor H FEIS Mitigation Document (Vol. III)*) has agreed to develop a program in concert with the natural resource agencies that would provide local planners with information concerning avoidance of natural resource impacts.

Additionally, more subtle impacts on the forest ecosystem may occur as the result of the project's direct and secondary effects. One should remember when considering impacts on the forest ecosystem, that the eastern forest has a built-in resilience that has allowed it, albeit in different form, to be reborn from a number of serious man-induced insults. Deforestation as the result of the use of timber for construction and fuel, the loss of the American Chestnut as the result of an introduced fungus, and the extinction of certain faunal species (e.g., passenger pigeon) have all impacted the forest. Today, the gypsy moth, wooly adelgid, acid rain and other stressors are acting on the eastern forest. How the additional impacts caused by construction, operation and maintenance of the highway will interact with this mix of stressors and what the effects of these interactions have, is simply not predictable.

## 3. WILDLIFE MORTALITY

### a. Literature review

The most visible effect of roads on wildlife is animal mortality resulting from collisions with motor vehicles. However, data that documents impacts to populations rather than individuals of avian or mammalian wildlife species remain unclear. Generally, highway construction results in the creation of a right-of-way (ROW) and a median strip that represents an edge where contiguous vegetation once existed. Many wildlife species are able to exploit and utilize the habitat created by the ROW and its associated edge habitat. One study suggests that ROWs are a source of potential wildlife habitat that have been largely ignored by resource managers (Oetting and Frank, 1971). Highway mortality has been identified as a serious threat to the continued existence of the Florida panther (*Felis concolor coryi*), but this is a rare instance where the death of a few individuals directly impacts the survival of the entire species population. No wildlife species populations identified as occurring or potentially occurring within the study area would be impacted in this manner.

Several studies have documented the effects of highways on wildlife. Burke and Sherburne (1982) assessed the impact on the distribution, abundance and diversity of wildlife before, during and after construction of Interstate 95 in northern Maine. Data from this study suggest that the effect on the breeding-bird and small-, medium- and large-mammal populations has been limited to immediate loss of habitat and that this habitat loss is probably insignificant for those species studied. Furthermore, some wildlife species were documented exploiting and adapting to the newly created ROW habitat.

An intensive and geographically extensive investigation, funded as an FHWA research project and carried out by the USFWS, attempted to determine the effects, both positive and negative, of highways on the diversity, density and spatial distribution of a variety of wildlife species including birds, small and large mammals and amphibians and reptiles (Adams and Geis, 1982). This study was conducted along interstate highways and county roads in three geographic regions; the Southeast (the piedmont regions of Virginia, North Carolina, South Carolina), the Midwest (Illinois) and the Northwest (Oregon and northern California). No significant regional differences were observed. When the information from the three study areas was combined, the major results were:

- Seventy-six percent of the road wildlife mortality occurred on interstate highways;
- No differences were found in the distribution of the majority of bird species with respect to distance from roads;
- Small mammal community structure and abundance differed between ROW and adjacent habitats;

- No significant difference was detected in deer distribution in relation to interstate highways, but deer appeared to avoid county roads;
- Road mortality appeared to occur in a density-dependent manner, i.e. species killed in greatest numbers were those attracted to ROW habitat (meadowlark (*Sturnella magna*), indigo bunting (*Passerina cyanea*), field sparrow (*Spizella pusilla*), red-winged blackbird (*Agelaius phoeniceus*), Brewer's blackbird (*Euphagus cyanocephalus*), deer mouse (*Peromyscus maniculatus*) and several vole and rabbit species).

Michael (1975) conducted a study in Cooper's Rock State Forest in northern West Virginia to measure the impact of Interstate 68 (Corridor E) on wildlife populations. This area is dominated by deciduous upland forest with vegetative species similar to that found in the present study area. The major results of this study were:

- The majority of bird and mammal populations encountered during this study were not adversely affected as a result of highway construction;
- Game species populations were not affected by highway construction;
- Highway mortality observed appeared to be density dependent.

More detailed information is presented below on the effects of highways on individual groups of wildlife species.

**(1) Reptiles and Amphibians**

Adams and Geis (1982) reported that reptiles and amphibians made up 19% highway wildlife mortality. No salamander species were recorded during the road mortality study. The study concluded that salamanders do not readily cross interstate highways and are not attracted to ROW habitat. In the Southeast study area, the eastern box turtle (*Terrapene carolina*) was the most common species killed.

**(2) Birds**

Adams and Geis (1982) reported that birds made up the largest percentage (38%) of wildlife mortality. In the Southeast study region, 50% of the highway bird mortality was incurred by 5.5% of the species recorded in plots adjacent to highways. The high mortality for the eastern meadowlark, indigo bunting and field sparrow was the direct result of their greater abundance within habitats adjacent to the highway. These data indicate that such mortality is density-dependent. Many woodland species such as the Carolina chickadee (*Parus carolinensis*), tufted titmouse (*Parus bicolor*), wood thrush (*Catharus guttatus*), red-eyed vireo (*Vireo olivaceus*) and woodland warblers made up a significant portion (24%) of the bird community along highways but were not recorded during the road mortality survey. Statistical analyses were performed on twelve species of breeding birds (red-bellied woodpecker (*Melanerpes carolinus*), acadian flycatcher (*Empidonax virescens*), blue jay (*Cyanocitta cristata*), carolina chickadee, tufted titmouse, carolina wren (*Thryothorus ludovicianus*), wood thrush, red-eyed vireo, summer tanager (*Piranga rubra*), northern cardinal (*Cardinalis cardinalis*), indigo bunting and rufous-sided towhee (*Pipilo erythrophthalmus*)) recorded in upland forest habitat along highways. The wood thrush was more abundant away from the highways, while the remaining 11 species showed no difference in relative abundance with respect to distance from the roadway. Analyses were also conducted on wintering bird populations and produced similar results. The American kestrel (*Falco sparverius*) and red-tailed hawk (*Buteo jamaicensis*) were also observed using the ROW and median strip to hunt and capture small mammals.

Burke and Sherburne (1982) found breeding bird population densities in Maine did not vary between 0 and 400 m away from the highway either during the preconstruction or postconstruction phase of the study. Species composition appeared to change in response to the forest and ROW edge created along the highway. Several bird species, chipping sparrows (*Spizella passerina*) yellowthroats (*Geothlypis trichas*), chestnut-sided warblers (*Dendroica pensylvanica*), common crows (*Corvus brachyrhynchos*) and ravens (*Corvus corax*) exploited and utilized newly created ROW habitat. Other bird species continued to use the adjacent forest habitat and showed no adverse response to the created edge habitat. The ovenbird (*Seiurus aurocapillus*), a forest interior, neotropical migrant, was abundant in the adjacent forest habitat and appeared unaffected in relation to distance from the ROW.

Oetting and Cassel (1971) reported on the successful use of ROW habitat for nesting by a number of duck species. This study found that management of ROW habitat (adjusting the mowing maintenance schedule) can successfully enhance waterfowl reproduction. The authors also presented data from a number of studies in which game birds showed a preference for nesting along and within ROW habitats which comprised a small proportion of the total available nesting habitat.

Michael (1975) found the greatest number of individual birds, number of species and species diversity within the edge habitat separating the ROW from the upland forest. The most abundant birds within this habitat type were; European starling (*Sturnus vulgaris*), common crow, red-eyed vireo, indigo bunting, rufous-sided towhee, tufted titmouse, black-capped chickadee (*Parus atricapillus*), northern cardinal, wood thrush and red-winged blackbird. Species diversity indices increased in all three habitat types studied (ROW, edge, forest) after road construction. Several species of birds which appeared to increase in response to highway construction were the starling, indigo bunting, song sparrow (*Melospiza melodia*), killdeer (*Charadrius vociferus*) and common crow. Wild turkey (*Meleagris gallopavo*) distribution did not change in relation to the highway during and after highway construction. These birds continued to use the forested portion of the study area, but were not found using the area immediately adjacent to the highways.

**(3) Mammals**

Adams and Geis (1982) found that small mammals made up 17% of the wildlife mortality on highways, and that mortality was greatest for those species with highest densities in the ROW habitat (density dependent mortality). In the Southeast study area, the two most common species recorded in the road mortality study were the hispid cotton rat (*Sigmodon hispidus*) and the meadow vole (*Microtus pennsylvanicus*). No evidence was found to indicate that road mortality was detrimental to the populations of these two species. Adams and Geis (1982, 1983) also found that small mammal diversity and density were greater in ROW habitat than in adjacent habitat and that the highway mortality observed did not appear to be detrimental to populations of these species. They suggest that ROW habitat and its accompanying edge are attractive not only to grassland species, but to many less habitat-specific species that make use of the ROW-edge-adjacent habitat complex. One grassland species, the meadow vole, has exploited the open, grassy roadside vegetation associated with interstate highway ROWs to expand its range through forested and intensive agricultural regions (Getz *et al.*, 1978). The aggregation of large populations of small mammals (mice, moles, voles) represents a potential food resource that could be exploited by a number of avian and mammalian predators (Michael, 1975).

Available data appears to indicate that multilane highways inhibit movements of some small mammals adapted to forested habitats, while small mammals adapted to open country (meadow vole) readily venture onto the road surface (Oxley *et al.*, 1974). Adams and Geis (1982) found evidence that large roads and accompanying ROW habitat inhibited the movement of 28% of the 40 small mammal species and suggested additional research was needed in this area.

Large mammals made up 31% of the wildlife mortality along interstate highways (Adams and Geis 1982). However, species such as opossums (*Didelphis virginiana*) and skunks (*Mephitis mephitis*) persist for long periods of time and tend to inflate the actual large mammal mortality numbers. A more accurate reflection of mortality was obtained by estimating the road kill on a daily basis. When this was done, large mammals comprised 14% of the total highway mortality. White-tailed deer made up less than 1% of the total wildlife mortality in this study. The data in this study indicated that road size and traffic volume per se are not critical disturbing factors to deer. Other large mammals have shown an avoidance of highways. Brody and Pelton (1989) suggest that the behavior of bears in response to roads is probably learned and is linked to the "costs and benefits" experienced by individuals. In their North Carolina study, radio-collared bears demonstrated a pronounced avoidance of Interstate 40.

ROW and adjacent habitat use by large mammals has also been documented (Burke and Sherburne 1982, Adams and Geis 1982, Michael 1975). Cottontail rabbits (*Sylvilagus floridanus*) were more abundant in habitats adjacent to the highway than in areas farther away from the road. White-tailed deer were observed foraging within ROW habitat and red foxes (*Vulpes vulpes*) were found using ROW habitat to hunt for mice and moles.

**b. Conclusions**

The construction of the proposed highway project would convert current natural habitats (forests, agriculture, and pasture) to early successional grassy or shrubby vegetation commonly associated with highway right-of-ways. Potential highway-wildlife impacts would likely follow those observed on the Appalachian Corridor E (Interstate 68) study (Michael, 1975), which parallels other studies reviewed. These results indicate that highway construction and operation would not adversely affect the majority of birds and mammals species, including game species, that exist within the project watershed. Highway mortality would be density dependent, species killed in greatest numbers would be those attracted to right-of-way habitat with high population densities, such as edge associated birds, and small/medium sized mammals. As no endangered, threatened or special concern species are associated with highway rights-of way habitat on this project, there would be no impact to these species. Highway wildlife mortality would continue to occur on existing roadways with the No Build Alternative. Impacts would be similar to those found by Adams and Geis (1981) for county roads. Highway wildlife mortality would potentially increase with the ASDEIS IRA. In conjunction with road improvements (widening), new segments of roadway would be constructed, thereby increasing the probability of vehicle/wildlife encounters. Wildlife mortality would potentially be the greatest for the Preferred Alternative (WV). Adams and Geis (1981) found that 76 percent of road wildlife mortality occurred on four lane interstate highways.

Long term cumulative effects of wildlife mortality due to collisions with motor vehicles has not been thoroughly researched. Over time, wildlife killed in greatest numbers would be those species with high population densities that are attracted to right-of-way habitat, such as edge associated birds, and small/medium sized mammals. Because research has shown that this mortality is density dependent, individuals killed represent a population surplus and as such, no long term effect on overall wildlife populations would be expected.

## P. THREATENED AND ENDANGERED SPECIES

The Endangered Species Act (ESA) of 1973 (16 USC §1531-1543) declares the intention of Congress to protect all federally listed Threatened and Endangered species and designated Critical Habitat of such species occurring both in the United States and abroad. Section 7 of the ESA requires that federal agencies ensure that any federal action authorized, funded, or carried out is not likely to jeopardize the continued existence of any Endangered or Threatened species or result in the destruction or adverse modification of Critical Habitat. The USFWS is the primary regulatory agency responsible for ESA compliance. The USFWS maintains additional categories of species which are not legally protected, but should be considered in the planning process for any federal project. These additional categories are Proposed Threatened, Proposed Endangered, and Candidate Species. Coordination with state and federal resource agencies revealed no involvement with either Proposed or Candidate Species designated 'Category 1' or 'Category 3'. However, six 'Category 2' Candidate Species were identified within or near the project area and are discussed below.

The State of West Virginia relies upon federal legislation to protect vertebrate, invertebrate, and plant resources. The West Virginia Department of Commerce, Labor, and Environment's Natural Heritage Program (NHP), within the Division of Natural Resources (DNR), maintains a database with the known location of federally listed Threatened and Endangered species, as well as a list of Rare Species. The Natural Heritage Program places species on this list based on their population status within West Virginia. These species, which may be limited in West Virginia but more abundant and wide-spread in other states, are not afforded special legal protection as are federally listed Threatened and Endangered species. However, a review of the impacts to these species was considered in the planning process through coordination with the NHP.

In addition to federally protected species, there is state legislation that provides protection to plant and animal species deemed Threatened or Endangered within the Commonwealth of Virginia. These designations are based on population levels within Virginia and do not necessarily represent the population status of a particular species throughout its geographic range. In Virginia, both the Virginia Department of Game and Inland Fisheries (VDGIF) and the Virginia Division of Natural Heritage (VDNH) maintain databases on the presence of federal and state listed Threatened and Endangered plant and animal species. A review of the impacts to these species was considered in the planning process.

One federally listed Threatened wildlife species and one federally listed Endangered plant species are known to exist within the proposed project area, but not necessarily within the construction limits of the proposed alignments. In addition, one state listed (Virginia) Threatened species, and a number of federally listed Candidate species and Species of Special State Concern (West Virginia) potentially exist within the proposed project area. The following discussion is based primarily on direct highway impacts. A separate discussion follows that summarizes potential secondary and cumulative impacts to the above referenced species. Table III-52 (Vol. II) summarizes the occurrence of federal and state Threatened, Endangered, and

Candidate species within the proposed project area. This information is presented by watershed. Detailed information on the threatened and endangered species analysis is contained in the *Vegetation and Wildlife Habitat Technical Report*.

## 1. FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES

The Cheat Mountain salamander (*Plethodon nettingi*) was listed as a Threatened species by USFWS in September, 1989 (53 FR 188:37814-37818). Running buffalo clover (*Trifolium stoloniferum)* was listed as an Endangered species by USFWS on July 6, 1987, (50 FR 21478-21480).

### a. Methodology

Dr. Thomas Pauley of Marshall University, a recognized expert on the Cheat Mountain salamander, was retained to lead the field investigations of potential salamander habitat. USFWS provided US. Geological Survey (USGS) quadrangles with the areas of potential salamander habitat designated for field review. After consultation with Dr. Pauley, two major areas of concern were investigated based on the existence of the following conditions: elevations near 915 meters (3,000 feet); suitable vegetation composition of the landscape; and suitable cover objects (rocks, logs, leaf material). The first area was located along WV 93 between Davis and Mount Storm Lake. The second suitable area was located between Olson Road (Forest Service Road 18) and Douglas. Pedestrian and vehicular surveys were conducted along the alignments within potential salamander habitat. Based on vegetative habitat characteristics and the presence of forest floor litter, those areas deemed suitable habitat for the Cheat Mountain salamander were delineated on USGS quadrangle maps.

USFWS also expressed concern over potential impacts to a known population of running buffalo clover. The population of concern is located west of Parsons, along Shavers Fork in the Cheat River watershed. USFWS provided USGS mapping with the approximate location of this population. Mr. William Tolen of the USFWS was consulted in the formulation of a sampling protocol. As approved by USFWS, a systematic survey was conducted of all pedestrian and vehicular trails and adjacent habitat that intersect the proposed alignments. The survey included an area up to 4 kilometers (2.5 miles) from the known clover population.

### b. Existing Environment

The Cheat Mountain salamander is a small woodland salamander currently known to exist at 68 sites within an approximately 1,813 square kilometer (700 square mile) area in West Virginia (USFWS 1991). This salamander species is found near elevations of 915 meters (3,000 feet) in red spruce (*Picea rubens*), hemlock (*Tsuga canadensis*), and mixed deciduous forests dominated by yellow birch (*Betula alleghaniensis*), red maple (*Acer rubrum*), and black cherry (*Prunus serotina*) (Pauley, 1993). The presence of forest floor litter such as decayed logs, flat rocks, fallen limbs, leaf material, is an important habitat component. These materials provide foraging cover and daytime refuge. Several confirmed populations of the Cheat Mountain salamander occur along Backbone Mountain; however, none of the confirmed populations occur within the construction limits of the proposed alignments.

Running buffalo clover is a plant species that is historically associated with migration trails of large herds of bison and elk. This clover species seems restricted to areas of moist fertile soils and partial shade. It also requires some sort of moderate habitat disturbance such as mowing or trampling (Cambell, *et al.*, 1988; Cusick, 1989). This plant was once widely distributed from Kansas to West Virginia, but is currently found in only a small portion of its former range. Scientists speculate that a major reason for the decline of this species is the absence of the large migratory herbivores that once provided soil enrichment, periodic habitat disturbance, and seed dispersal apparently necessary for the proliferation of this plant (USFWS, 1991). Current populations are threatened by direct habitat destruction, excess human disturbance (such as all-terrain vehicle use), and by vegetative competitors that shade out and kill the individual plants.

**c. Impacts**

Habitat modifications that remove the forest canopy are probably the primary factors affecting the Cheat Mountain salamander. Man-made and natural events such as mining activities, utility rights-of-way, timbering, wildfires, insect infestations, and road development all contribute to canopy reduction. Highway construction would potentially impact the Cheat Mountain salamander through the direct loss of habitat and indirectly through habitat modification. Increased human activity may result in new pedestrian and vehicular trails, which could result in the removal of leaves and other forest floor litter, creating areas unsuitable for forage and shelter.

As shown on Exhibit III-10 (Vol. II), the initial salamander field investigation revealed several areas of potentially suitable habitat that would be impacted by either the ASDEIS IRA or the Preferred Alternative (WV). Dr. Pauley and a team of herpetologists conducted detailed field surveys in May and June of 1994 to search for Cheat Mountain salamander populations in these locations. No Cheat Mountain salamanders were found within the construction limits of the proposed project.

Exhibit III-11 (Vol. II) shows where the proposed alignments potentially overlap running buffalo clover habitat west of Parsons. The field investigation of this potential habitat within the impact area revealed no running buffalo clover populations. Therefore, no impacts to this species would be expected to occur under either the ASDEIS IRA or the Preferred Alternative (WV). The No-Build Alternative would not impact this species.

### d. Avoidance, Minimization, and Mitigation Measures

Through detailed field investigations, alignments were developed to avoid known populations of the Cheat Mountain salamander and running buffalo clover. Based on the field work results and the current position of the alignments, mitigation measures would not be required as these species would not be impacted. However, the known population of clover will be checked in the growing season to confirm its presence and exact location. If it still occurs at this site, WVDOH will formulate mitigation plans to protect the population.

## 2. FEDERALLY LISTED CANDIDATE SPECIES

As required by 50 CFR 402.12, species under study for Federal listing as Threatened or Endangered that potentially occur within the project area were identified.

### a. Methodology

Candidate Species that could be impacted by any of the proposed alignments were identified and evaluated. As shown on Table III-52 (Vol. II), six 'Category 2' plant and animal species have been documented within or near the project area. Category 2 species are those species for which the information now in the possession of the USFWS indicates that it is possibly appropriate to list such species as Threatened or Endangered. However, further field studies by the USFWS are required to provide conclusive data on biological vulnerability before final determinations can be made.

### b. Existing Environment and Impacts

Two plant species, Kate's mountain clover (*Trifolium virginicum*) and mountain pimpernal (*Taenidia montana*), are no longer on the listing of Threatened or Endangered species.

The rock vole (*Microtus chrotorrhinus carolinensis*) was documented by the WVNHP west of Parsons, adjacent to US 219 near Porterwood. This species is associated with rocky habitats within cool, moist forests of yellow birch, maple, and hemlock with a dense understory of herbaceous vegetation. This species would not be impacted by the No-Build or the Preferred Alternative (WV). However, the ASDEIS IRA would potentially impact this species in this area. Due to insufficient scientific information on the population status of this species, it is difficult to make an impact assessment at this time.

The New England cottontail (*Sylvilagus transitionalis*), which has been redescribed as the Appalachian Cottontail (*Sylvilagus obscurus*), is a candidate for listing as TE (Federal Register/Vol. 59, No. 219/Tuesday, November 15, 1994), was documented by WVNHP east of Davis and adjacent to WV 93. This species is associated with dense forests at higher elevations of both coniferous and deciduous canopy vegetation. This species is likely to be found (proper elevation and habitat) and potentially impacted.

During a public meeting, an occurrence of the brook floater mussel (*Alasmidonta varicosa*) was reported within the North Fork of Patterson Creek, approximately 2.3 kilometers (1.4 miles) northeast of Medley. The WVNHP has identified the location of this species and determined that it would not be impacted by the No-Build or the Preferred Alternative (WV). However, the ASDEIS IRA would cross the North Fork of Patterson Creek at this location by a simple span bridge and, as such, would impact this mussel species.

The loggerhead shrike is a medium sized bird found primarily in open country with scattered trees and shrubs. In addition to being a 'Category 2' Candidate Species, the shrike is listed as Threatened in the Commonwealth of Virginia. VDGIF documented the shrike nesting in the southeastern section of the Mountain Falls quadrangle and suggested that other nests may occur within the project area where suitable habitat conditions are present. Further discussions of the shrike are presented under the subject heading of Virginia State Listed Species.

#### c. Avoidance, Minimization, and Mitigation Measures

Where possible, alignments were developed to avoid known populations of candidate species. If warranted, further studies may be conducted to clarify any alignment impacts and design modifications made prior to the final design of the Preferred Alternative (WV). If impacts are unavoidable, coordination with the USFWS would be initiated and appropriate mitigation measures would be addressed.

### 3. VIRGINIA STATE LISTED SPECIES

The wood turtle (*Clemmys insculpta)* and loggerhead shrike (*Lanius ludovicianus*) are listed by the Commonwealth of Virginia as Threatened species (Virginia Regulation 325-01-1, § 13) and have been identified by VDNH and VDGIF as having potential involvement with the proposed alignments.

#### a. Methodology

VDNH and VDGIF were contacted to identify potential habitat of the wood turtle and loggerhead shrike that could be affected by the proposed alignments. VDNH and VDGIF expressed concern over potential impacts to the wood turtle where Duck Run and Cedar Creek parallel and intersect the proposed alignments (the ASDEIS IRA, Line A, Line D1, and Line D2). VDGIF documented the shrike nesting in the southeastern section of the Mountain Falls quadrangle and suggested that other nests may occur within the project area where suitable habitat conditions are present. A Geographic Information System (GIS) was used to identify suitable habitat within the alignments. Suitable habitat was defined as Anderson Level 21 (Cropland and Pasture) and 31 (Herbaceous Rangeland).

**b. Existing Environment**

The wood turtle is a medium sized turtle found primarily in and near clear streams in deciduous woodlands in Virginia. These turtles are omnivorous and consume a wide variety of both terrestrial and aquatic plant and animal matter. Little is known of the ecological requirements or behavior of the wood turtle in Virginia. The presence of forest floor litter (decayed logs, flat rocks, fallen limbs, leaf material) is an important habitat component, providing foraging cover and daytime refuge.

In Virginia, the shrike's typical breeding and wintering habitats consist of short grassland such as closely grazed pasture; especially in areas with scattered hedgerows and fence lines. Insects, small reptiles, amphibians, birds, and small mammals make up the majority of the shrike's diet. Prey is habitually impaled in thorn trees or on barbed wire fences.

**c. Impacts**

In Virginia, the location of all alignments (the ASDEIS IRA, Line A, Line D1, and Line D2) would potentially overlap wood turtle habitat along Duck Run and Cedar Creek in the Shenandoah River watershed. General wildlife signs and observations were recorded during the extensive stream sampling and wetlands delineation field work in this area. The wood turtle would not be impacted under the No-Build Alternative.

Coordination with VDGIF documented recent nesting records of the loggerhead shrike in the southeastern section of the Mountain Falls quadrangle. The location of the proposed alignments would not impact this known nesting area. General wildlife signs and observations were recorded during the extensive stream sampling, wetlands delineation field work, and HEP data collection along the alignments. While no loggerhead shrikes were observed during the course of these field investigations, all alignments would impact potential shrike habitat. Line A would impact 21 hectares (52 acres) of potential habitat while the ASDEIS IRA would impact 9 hectares (22 acres). These impacts represent less than 1 percent of the potential shrike habitat within the 30' contour. The loggerhead shrike would not be impacted by the No Build Alternative.

**d. Avoidance, Minimization, and Mitigation Measures**

Where possible, alignments were developed to avoid known populations of state listed species. Should either of the above species be discovered during final project design, appropriate discussions with resource agencies would be initiated regarding impact minimization and/or possible mitigation scenarios.

### 4. WEST VIRGINIA RARE SPECIES

West Virginia Rare Species are assigned ranks based on their population status within West Virginia. These species, which may be limited in the state but more abundant and wide-spread on a regional basis, are not afforded special legal protection as are federally listed Threatened and Endangered species. However, a review of potential impacts to these species was considered in the planning process.

#### a. Methodology

Coordination with WVNHP documents the potential occurrence of eleven Rare plant species within the proposed alignments. The eleven species identified are: loesel's twayblade (*Liparis loesellii*), sundial lupine (*Lupinus perennis*), hoary sedge (*Carex canescens*), northern stitchwort (*Stellaria calycantha*), thread rush (*Juncus filiformis*), shale barren bindweed (*Convolvulus purshianus*), dodder (*Cuscata indecora*), milk pea (*Galactia volubilis*), pussytoes ragwort (*Senecio antennariifolius*), shale barren evening primrose (*Oenothera argillicola*), and shale barren goldenrod (*Solidago harrisii*). The *Vegetation and Wildlife Habitat Technical Report* contains greater detail on these species.

#### b. Existing Environment and Impacts

Six of the nine Special Concern species were located during a WVNHP rare species survey northeast of Wardensville in a group of shale barrens adjacent to WV 55. This area would be potentially impacted by development of the ASDEIS IRA. Three species occur within the Davis quadrangle along WV 93. These plants are associated with wetlands and wet areas near Beaver Creek. These species would be potentially impacted by both the ASDEIS IRA and the Preferred Alternative (WV). Due to insufficient scientific information on the population status of these species, it is difficult to make a quantitative impact assessment at this time. Strausbaugh and Core (*Flora of West Virginia*, 1991) list several localities for each species, but no indication of population size is available.

#### c. Avoidance, Minimization, and Mitigation Measures

Where possible, alignments were developed to avoid known populations of species of special state concern. Three of these species are associated with wetlands and/or riparian areas. Avoidance and minimization of wetland impacts across the proposed project area would minimize any potential impacts to the these species. The remaining species are associated with shale barrens that include two 'Category 2' Candidate Species. As stated above, if the ASDEIS IRA is selected, coordination with the appropriate resource agencies would be initiated and a detailed investigation would be conducted.

## 5. SECONDARY AND CUMULATIVE IMPACTS

Secondary and cumulative impacts related to induced development would need to comply with Federal and state threatened and endangered species regulatory guidelines, including the Endangered Species Act. As such, no impact to Federal or state listed species would be expected.

Foreseeable future actions include five known Federal actions that are currently ongoing or are in the formative stages of study (see *Secondary and Cumulative Impacts Technical Report* for further discussion). Two projects predict loss of wildlife habitat, but no impacts to threatened or endangered species is anticipated. The proposed Canaan Valley National Wildlife Refuge would encompass nearly 11,330 hectares (28,000 acres) of relict boreal (northern) habitat with diverse flora and fauna communities, including one threatened (Cheat Mountain salamander) and one endangered (Virginia northern flying squirrel) species. In addition, both the Monongahela and George Washington National Forests have prepared Final Environmental Impact Statements that contain wildlife management plans that address the habitat needs of a variety of wildlife species, including threatened and endangered species. Based on the above information, no cumulative impacts to threatened or endangered species would be expected. For further analysis of cumulative impacts refer to Section III. Y-Cumulative Impacts.

## Q. WETLANDS

Presidential Executive Order 11990 (E.O. 11990) entitled, "Protection of Wetlands", establishes a national policy to "avoid to the extent possible the long-term and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative." Wetlands within the project area have been evaluated in accordance with E.O. 11990. Greater detail of the methodologies used to evaluate wetland impacts, the affected wetland environment, and the results of the wetland impact evaluations is provided in the *Wetlands Technical Report.*

### 1. METHODOLOGY

#### a. Wetland Identification, Delineation, and Classification

Wetlands are defined by the Environmental Protection Agency (EPA) and the US Army Corps of Engineers (COE) as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (EPA, 40 CFR 230.3 and COE, 33 CFR 328.3). Wetlands were initially identified for this project by producing a land use and land cover map through the interpretation of 1" = 1,000' scale aerial photography and selected groundtruthing. Aerial photography encompassed an area approximately 3.2 kilometers (2 miles) wide and 192 kilometers (120 miles) in length. Existing land use/land cover was classified to Anderson Level II in accordance with Anderson *et al.* (1976).

After the land cover mapping was complete, the methods outlined in the Corps of Engineers *Wetlands Delineation Manual* (COE Manual, January, 1987) were used to identify and delineate wetlands in the field. The field delineations were conducted by environmental scientists trained in federal wetlands identification and delineation procedures. The Routine Onsite Determination Method, as detailed in the COE Manual, was used for wetlands identification and delineation. Wetland classification was further refined from the Anderson system by using the classification system developed by the USFWS (Cowardin *et al.*, 1979). Detailed data were collected for all wetlands located near the alternatives. All wetland data, including boundaries and vegetation classification, were entered into the Geographic Information System (GIS).

#### b. Functions and Values Assessment

A functions and values evaluation of each delineated wetland was conducted using the WET 2.1 computer model. This model is based on FHWA's *Wetland Evaluation Technique* (WET) (Adamus *et al.*, 1991). The WET methodology provides an estimate (qualitative probability) of the likelihood that a function or value will occur in a wetland in terms of social significance, effectiveness, or opportunity to perform the function. The estimate of likelihood is given in three qualitative probability levels: high, moderate, or low.

It is important to remember that these ratings are qualitative values that do not measure the degree of importance of a wetland's function to its watershed.

Two levels of WET assessments were performed on each wetland based on that wetland's size: the Social Significance Evaluation - Level 1; and Effectiveness and Opportunity Evaluation - Levels 1 and 2. The Social Significance Evaluation - Level 1 was applied to all wetlands, regardless of size. The Effectiveness and Opportunity Evaluation - Levels 1 and 2 was conducted on wetlands 0.4 hectares (one acre) or larger.

In addition to the WET analysis, a Habitat Evaluation Procedures (HEP) analysis was performed to evaluate wildlife habitat of forested, scrub-shrub, and emergent wetland systems within the study area. The methodology and results for the HEP analysis are summarized in Section III-O: *Vegetation and Wildlife,* and the details can be found in the *Wildlife Technical Report.*

**c. Watershed Impact Assessment**

Wetland abiotic functions, such as floodflow alteration, sediment/nutrient retention, and toxicant removal, are important to the overall water quality of each watershed . Neither the WET assessment or a simple statement of hectares of encroachment measure watershed impact. To determine the importance to watersheds, a measure of wetland watershed loss was made. To measure this loss, it was first necessary to determine the total area of wetlands in each of the watersheds.

Total hectares of wetlands within each watershed was determined using National Wetland Inventory (NWI) mapping and the actual hectares of wetlands delineated. NWI mapping at 1"= 2000' is prepared from photointerpretation of aerial photography and smaller wetlands or those obscured by vegetation often do not appear on NWI mapping. To adjust for these "missing" wetlands, an adjustment ratio was calculated as follows. Hectares of wetlands by category (i.e., scrub shrub, emergent and forested) that were within the wetland delineated area were calculated by the GIS. The area of these wetlands was than compared by the GIS to the area of those wetlands that had been field delineated. From this comparison, a discrepancy ratio was calculated for each watershed. The ratio of discrepancy was then applied to the area of NWI wetlands in each watershed to extrapolate to the predicted number of total hectares of wetlands within the watershed. The predicted number of total hectares of wetlands is referred to below as hectares of watershed wetlands.

**d. Direct Impact Assessment**

Proposed encroachments were assessed by using the GIS to determine the wetland size, wetland classification, and the extent of encroachment (hectares). Descriptive characteristics of wetlands encroached upon were devised to aid in the evaluation of the ecological importance of the proposed encroachment. These characteristics are landscape position and adjacent land cover.

Wetland landscape position was divided into three categories:

- Isolated wetlands were defined as those that have no connection to other surface waters;
- Headwater wetlands were defined as those that are connected to other surface waters and have a drainage area of less than 13 kilometers (5 sq. miles);
- "Other" wetlands were a category defined as those that are connected to surface waters and have a drainage area of more than 13 kilometers (5 sq. miles).

Adjacent land cover was divided into three categories:

- Agricultural cover was defined as areas of crops, pastures, or plowed fields;
- Disturbed cover was defined as areas modified by man, such as power line and road right-of-way, surface mined areas, or lawns; and
- Undisturbed was defined as any natural area.

**e. Functions and Values Impact Assessment**

The predicted change in wetland functions and values caused by the proposed encroachment was assessed by conducting a hypothetical "post-construction" WET analysis for each wetland larger than 0.4 hectares (1 acre) and comparing this assessment to the wetland's "pre-construction" WET analysis. The changes in the WET qualitative probability ratings for each wetland were assigned functions and values change categories as follows:

- "No change" if none of the summary probability ratings changed;
- "Slight decrease" if one summary probability rating dropped; and
- "Decrease" if two or more of the summary probability ratings dropped.

For those wetlands smaller than 0.4 hectare (1 acre) in size, a "post-construction" WET was not prepared because the Social Significance 1 analysis is not sensitive enough to detect the changes that might occur due to highway construction. Instead, a qualitative (best professional judgment) assessment of the likely functional change was made according to the extent of areal encroachment. The categories for these small wetlands encroached upon were:

- "No change" if less than 10 percent of the wetland size would be lost;
- "Slight decrease" for encroachments ranging from to 10 to 30 percent of the wetland size;
- "Decrease" for encroachments ranging from 30 to 80 percent of the wetland size.

The wetland's functions and values were considered "lost" if over 80 percent of the wetland's area would be encroached upon.

## 2. EXISTING ENVIRONMENT

### a. General

The USFWS National Wetlands Inventory (Dahl, 1990) estimates that West Virginia contained 54,228 hectares (134,000 acres) of wetlands at the time of the European settlement and has lost approximately 24 percent of that area in the intervening 200 years (1780's to 1980's). This is an average annual loss rate of 0.12 percent for the period. The losses which occurred during that period resulted from drainage of wetlands in the floodplains of the Ohio, Kanawha, and Monongahela Rivers and their conversion to farmland and industrial uses. In Virginia, it is estimated that there were originally 748,264 hectares (1,849,000 acres) of wetlands at the time of European settlement. Virginia has lost an estimated 42 percent of that acreage in the intervening 200 years, an average annual loss of 0.21 percent.

The most current estimate of wetlands in West Virginia reports that there are 41,278 hectares (102,000 acres) of palustrine wetlands found in the state (Tiner, 1987). Approximately 14 percent of West Virginia's wetlands are concentrated in the Canaan Valley complex and the Meadow River complex, and the remaining 86 percent are scattered throughout the state. During the 23 year period from 1957 through 1980, West Virginia actually had an overall gain in wetlands of approximately 6,677 hectares (16,500 acres).

Current estimates for Virginia report that there are 422,856 hectares (1,044,900 acres) of wetlands, of which 77 percent are fresh water wetlands (Tiner, 1987). During the 23 year period from 1957 through 1980, Virginia had a net loss of approximately 8,903 hectares (22,000 acres) of wetlands.

### b. Watersheds

The proposed project is located in two major physiographic provinces which are divided by the Allegheny Front. The portion of the proposed project west of the Allegheny Front, which includes the Tygart Valley River watershed and the Cheat River watershed, is located in the Allegheny Mountain Section of the Appalachian Plateau Province. This province is part of the Mixed Mesophytic Forest Biome, which consists of a variety of hardwood and softwood forests. Wetland types found in this zone are varied, ranging from man-made ponds and floodplain wetlands along the wider stream valleys, to high elevation bogs and fens dominated by mosses, sedges, and shrubs.

The Cheat River watershed contains a higher proportion of wetlands than any of the other watersheds. This is due largely to the concentration of wetlands along Beaver Creek. Wetlands found in the Cheat River watershed differ from those to the west and the east. These wetlands are typically high elevation bogs and fens that are dominated by mosses, sedges, and shrubs such as blueberries. A large portion of the land has been subjected to surface mining activities, and numerous wetlands are affected by acid mine drainage. Several restoration and reclamation projects are underway in the region. Many of the wetlands in this area are also influenced by beaver activity. There are two wetlands with special status in this region. Big Run Bog, on the eastern slope of Backbone Mountain, is a Monongahela National Forest Research Natural Area. Elder Swamp, along Beaver Creek, is designated in the Regional Wetland Concept Plan (USFWS, 1990) as an area worthy of protection.

The portion of the proposed project east of the Allegheny Front, which includes the watersheds of the North Branch of the Potomac River, the South Branch of the Potomac River, the Cacapon River, and the Shenandoah River, is located in the Middle Section of the Ridge and Valley Province. This province is part of the Oak-Chestnut Forest Biome, which consists largely of mixed hardwood forests. Wetland types found in this area are mostly small man-made ponds and floodplain wetlands formed along the wider stream valleys. There is one wetland with special status in this area. Vance's Cove is located in the George Washington National Forest in Virginia and is designated in the Regional Wetland Concept Plan (USFWS, 1990) as an area worthy of protection. The Forest and the Virginia Department of Game and Inland Fisheries have spent a substantial amount of money in maintaining and improving this area.

### 3. WETLAND IMPACTS

Wetland encroachments by watershed are presented in Table III-53 (Vol. II). All identified wetlands are shown on the *Alignment and Resource Location Plans*. Additional information on ecological characteristics of impacted wetlands is presented in Table III-54 (Vol. II).

#### a. No-Build Alternative

The No-Build Alternative would maintain current roads with some minor improvements and ongoing maintenance activities. The No-Build Alternative would cause no direct wetland encroachments. However, secondary and cumulative impacts could occur to wetlands adjacent to the existing roadways due to routine highway operation and maintenance. Some commercial, industrial and residential development could also occur under the No-Build Alternative and could potentially result in wetland impacts.

## b. ASDEIS Improved Roadway Alternative

### (1) Impacts by Watershed

The ASDEIS IRA would directly impact 8.69 hectares (21.46 acres) of wetlands in West Virginia and Virginia, combined. Of the six watersheds, the Cheat River watershed would experience the largest total wetland area impact, while the Tygart Valley River watershed would experience the greatest percentage wetland loss compared to the total area of wetlands in the watershed. The Cacapon River watershed would experience the smallest wetland area impact as well as the smallest proportion of wetland loss.

#### (a) Tygart Valley River (WV)

In the Tygart Valley River watershed, the ASDEIS IRA would impact 16 vegetated wetlands and one pond, comprising 1.02 hectares (2.53 acres). All encroachment areas are less than 0.4 hectares (1 acre). This encroachment area accounts for approximately 0.66 percent of the total wetland area of the watershed. The majority (13) of the impacted wetlands are palustrine emergent vegetation communities and eleven (11) of the wetlands impacted are less than 0.4 hectares (1 acre) in total size.

#### (b) Cheat River (WV)

In the Cheat River watershed, the ASDEIS IRA would impact 24 vegetated wetlands and three ponds, comprising 4.88 hectares (12.06 acres). Twenty five (25) of the encroachment areas are less than 0.4 hectares (1 acre). This encroachment area accounts for approximately 0.05 percent of the predicted wetland area of the watershed. The majority (16) of impacted wetlands are palustrine emergent vegetation communities and sixteen (16) of the wetlands impacted are less than 0.4 hectares (1 acre) in total size.

#### (c) North Branch of the Potomac River (WV)

In the North Branch of the Potomac River watershed, the ASDEIS IRA would impact 10 vegetated wetlands, comprising 1.68 hectares (4.15 acres). Nine of the encroachment areas are less than 0.4 hectares (1 acre). This encroachment area accounts for approximately 0.09 percent of the predicted wetland area of the watershed. The majority (9) of impacted wetlands are palustrine emergent vegetation communities and six of the wetlands impacted are greater than 0.4 hectares (1 acre) in total size.

#### (d) South Branch of the Potomac River (WV)

In the South Branch of the Potomac River watershed, the ASDEIS IRA would impact six vegetated wetlands and two ponds, comprising 0.56 hectares (1.39 acres). All of the encroachment areas are less than 0.4 hectares (1 acre). This encroachment area accounts for approximately 0.17 percent of the predicted wetland area of the watershed. All of the impacted vegetated wetlands are palustrine emergent vegetation communities and five (5) of the wetlands impacted are less than 0.4 hectares (1 acre) in total size.

**(e) Cacapon River (WV)**

In the Cacapon River watershed, the ASDEIS IRA would impact one pond, comprising 0.08 hectares (0.19 acres). This is approximately 0.02 percent of the total wetland area of the watershed. This wetland is less than 0.4 hectares (1 acre) in size.

**(2) ASDEIS IRA in West Virginia**

The proposed ASDEIS IRA in West Virginia would directly impact a total 8.22 hectares (20.32 acres) in 63 separate wetland encroachments (Vol. II, Table III-53). The majority (60) of encroachment areas are less than 0.4 hectares (1 acre). This encroachment area accounts for approximately 0.07 percent of the predicted wetland area for the West Virginia watersheds. Most (44) of the impacted wetlands are palustrine emergent vegetation communities and thirty seven (37) of the wetlands impacted are less than 0.4 (1 acre) in total size. A summary of information on ecological characteristics of impacted wetlands in West Virginia is presented in Table III-54 (Vol. II).

**(3) ASDEIS IRA in Virginia**

The ASDEIS IRA in Virginia would directly impact 0.47 hectares (1.14 acres) of wetlands in 17 separate wetland encroachments (Vol. II, Table III-53). All of the encroachment areas are less than 0.4 hectares (1 acre). This encroachment area accounts for approximately 0.18 percent of the predicted wetland area for the Virginia watershed (Shenandoah River). Six (6) wetland impacts occur in both palustrine scrub-shrub and palustrine forested vegetation communities. The majority (16) of impacts occur in wetlands that are less than 0.4 hectares (1 acre) in total size. A summary of information on ecological characteristics of impacted wetlands in Virginia is presented in Table III-54 (Vol. II).

**c. Preferred Alternative (WV)**

The Preferred Alternative (WV) would directly impact 158 individual wetlands, comprising 14.92 hectares (36.86 acres) (Vol. II, Table III-53). The majority (154) of the encroachment areas are less than 0.4 hectares (1 acre). This encroachment area accounts for approximately 0.12 percent of the predicted wetland area of the West Virginia Watersheds. Most (107) wetland impacts occur in palustrine emergent vegetation communities and one hundred twelve (112) of the wetlands impacted are less than 0.4 hectares (1 acre) in total size. A summary of information on ecological characteristics of impacted wetlands in West Virginia is presented in Table III-54 (Vol. II).

Of the six watersheds, the Cheat River watershed would experience the largest total wetland area impact, while the Tygart Valley River watershed would experience the greatest percentage wetland loss compared to the total area of wetlands in the watershed. The South Branch of the Potomac River watershed would experience the smallest wetland area impact, while the Cheat River watershed would experience the smallest percentage wetland loss compared to the total area of wetlands in the watershed.

**(1) Tygart Valley River (WV)**

In the Tygart Valley River Watershed, the Preferred Alternative (WV) would impact 16 vegetated wetlands and one pond, comprising 2.00 hectares (4.95 acres). All encroachments are less than 0.4 hectares (1 acre). This encroachment area accounts for approximately 1.29 percent of the predicted wetland area of the watershed. The majority (14) of impacted wetlands are palustrine emergent vegetation communities and eleven (11) of the wetlands impacted are less than 0.4 hectares (1 acre) in total size.

**(2) Cheat River (WV)**

In the Cheat River Watershed, the Preferred Alternative (WV) would impact 81 vegetated wetlands and ten ponds, comprising 7.77 hectares (19.19 acres). Eighty nine (89) of the encroachment areas are less than 0.4 hectares (1 acre). This encroachment area accounts for approximately 0.09 percent of the predicted wetland area of the watershed. The majority (60) of impacted wetlands are palustrine emergent vegetation communities and sixty three (63) of the wetlands impacted are less than 0.4 hectares (1 acre) in total size.

**(3) North Branch of the Potomac River (WV)**

In the North Branch of the Potomac River Watershed, the Preferred Alternative (WV) would impact 18 vegetated wetlands and five ponds, comprising 3.38 hectares (8.35 acres). Twenty one (21) of the encroachment areas are less than 0.4 hectares (1 acre). This encroachment area accounts for approximately 0.18 percent of the predicted wetland area of the watershed. The majority (16) of impacted wetlands are palustrine emergent vegetation communities and seventeen (17) of the wetlands impacted are less than 0.4 hectares (1 acre) in total size.

**(4) South Branch of the Potomac River (WV)**

In the South Branch of the Potomac River Watershed, the Preferred Alternative (WV) would impact eight vegetated wetlands and two ponds, comprising 0.80 hectares (1.98 acres). All of the encroachment areas are less than 0.4 hectares (1 acre). This encroachment area accounts for approximately 0.24 percent of the predicted wetland area of the watershed. The majority (7) of impacted wetlands are palustrine emergent vegetation communities and seven (7) of the wetlands impacted are less than 0.4 hectares (1 acre) in total size.

(5) **Cacapon River (WV)**

In the Cacapon River Watershed, the Preferred Alternative (WV) would impact 14 vegetated wetlands and five ponds, comprising 1.08 hectares (2.66 acres). All of the encroachment areas are less than 0.4 hectares (1 acre). This encroachment area accounts for approximately 0.28 percent of the predicted wetland area of the watershed. The majority (11) of impacted wetlands are palustrine emergent vegetation communities and fourteen (14) of the wetlands impacted are less than 0.4 hectares (1 acre) in total size.

**d. Line A in Virginia**

Line A (VA) would directly impact five vegetated wetlands and two ponds, comprising 0.33 hectares (0.82 acres) in the Shenandoah River Watershed (Vol. II, Table III-53). All of the encroachment areas are less than 0.4 hectares (1 acre). This encroachment area accounts for approximately 0.13 percent of the total wetland area of the Virginia watershed. Most (4) wetland impacts occur in palustrine emergent vegetation communities and all of the wetlands impacted are less than 0.4 hectares (1 acre) in total size. A summary of information on ecological characteristics of impacted wetlands in Virginia is presented in Table III-54 (Vol. II).

**e. Alternative Comparisons**

Figures III-7 to III-12 (Vol. II) present a graphical comparison of the amount of impact within each wetland vegetative community. Figures III-13 to III-16 (Vol. II) compare wetland encroachment areas to total wetland size. A cluster of points is generally observed towards the bottom left corner of the graph. This indicated that the majority of wetland impact areas were small (less than 0.4 hectare or 1 acre) and occurred within individual wetland systems that were also small (less than 0.4 hectare or 1 acre). Both sets of figures present information by watershed.

(1) **The ASDEIS IRA and the Preferred Alternative in West Virginia**

Wetland impacts for the Preferred Alternative (WV) and ASDEIS IRA compare as follows:

- Preferred Alternative (WV) would impact more individual wetlands than the ASDEIS IRA;
- Preferred Alternative (WV) would impact more wetland area than the ASDEIS IRA;

- Preferred Alternative (WV) would impact a greater proportion of wetlands that are greater than 0.4 hectare (1 acre) in total size than the ASDEIS IRA.
- The ASDEIS IRA would impact more area of forested wetland than Preferred Alternative (WV)

**(2) The ASDEIS IRA and Line A in Virginia**

Wetland impacts for Line A (VA) and the ASDEIS IRA in Virginia compare as follows:

- Line A (VA) would impact more forested and open water wetlands than the ASDEIS IRA;
- Line A (VA) would impact a greater proportion of wetlands that are greater than 0.4 hectare (1 acre) in total size than Line A (VA);
- The ASDEIS IRA would impact more individual wetlands than Line A (VA);
- The ASDEIS IRA would impact more wetland area than Line A (VA).

**f. Option Areas**

A comparison of the wetland impacts of the various alignments within each Option Area in West Virginia and Virginia is presented in Tables III-55 and III-56 (Vol. II).

**(1) Interchange Option Area (WV)**

Within the Interchange Option Area, the Preferred Alternative (Line I) and Line A would both impact four palustrine emergent wetlands. However, Line A would impact more wetland area than the Preferred Alternative (Line I). Within both alignments, three of four wetlands impacted would be less than 0.4 hectares (1 acre ) in total size.

**(2) Shavers Fork Option Area (WV)**

Within the Shavers Fork Option Area, the Preferred Alternative (Line S) and Line A would both impact one palustrine emergent wetland. However, the Preferred Alternative (Line S) would impact slightly less wetland area than Line A. All wetlands impacted would be less than 0.4 hectares (1 acre) in total size.

**(3) Patterson Creek Option Area (WV)**

Within the proposed Patterson Creek Option Area, Line P would impact four palustrine emergent wetlands and two ponds, comprising 1.04 hectares (2.56 acres), while the Preferred Alternative (Line A) would impact two palustrine emergent wetlands and one pond, comprising 0.66 hectares (1.62 acres). All encroachment areas are less than 0.4 hectares (1 acre). Four of the wetlands impacted by Line P are over 0.4 hectare (1 acre) in total size, while two of the wetlands impacted by the Preferred Alternative (Line A) are less than 0.4 hectare (1 acre) in total size.

**(4) Forman Option Area (WV)**

Within the Forman Option Area, the Preferred Alternative (Line F) would impact nine vegetated wetlands (8 palustrine emergent, 1 palustrine forested) and two ponds, comprising 1.46 hectares (3.62 acres), while Line A would impact six vegetated wetlands (5 palustrine emergent, 1 palustrine forested) and two ponds, comprising 1.36 hectares (3.37 acres). The Preferred Alternative (Line F) would result in two encroachments areas greater than 0.4 hectare (1 acre), while Line A would create one. The Preferred Alternative (Line F) would impact more wetlands greater than 0.4 hectare (1 acre).

**(5) Line 5-D Option Area (WV)**

Within the Line 5-D Option Area, Line A would impact one palustrine emergent wetland comprising 0.07 hectare (0.18 acre), while the Preferred Alternative (Line 5-D) would not impact wetlands.

**(6) Hanging Rock Option Area (WV)**

Within the Hanging Rock Option Area, neither Line R nor the Preferred Alternative (Line A) would directly impact wetlands.

**(7) Baker Option Area (WV)**

Within the Baker Option Area, the Preferred Alternative (Line B) would impact two palustrine emergent wetlands and two ponds, comprising 0.21 hectare (0.51 acre), while Line A would impact one pond comprising 0.03 hectare (0.07 acre). The Preferred Alternative (Line B) would impact one palustrine emergent wetland greater than 0.4 hectare (1 acre) in total size.

**(8) Duck Run Option Area (VA)**

Within the Duck Run Option Area, Line D1 would impact one palustrine scrub-shrub wetland and two ponds, comprising 0.15 hectare (0.36 acre); Line D2 would impact one palustrine forested wetland, comprising 0.11 hectare (0.28 acre); while Line A would impact one palustrine forested wetland and two ponds, comprising 0.21 hectare (0.52 acre). All of the wetlands impacted are less than 0.4 hectare (1 acre) in total size.

#### (9) Lebanon Church Option Area (VA)

Within the Lebanon Church Option Area, Line L would impact three palustrine emergent wetlands and two ponds, comprising 0.35 hectare (0.87 acre), while Line A would impact three palustrine emergent wetlands, comprising 0.11 hectare (0.27 acre). Only one of the wetlands impacted (Line L) is greater than 0.4 hectare (1 acre) in total size.

### g. Secondary Impacts

#### (1) Highway-Related Impacts

The secondary impacts discussed here are defined as the effects of construction and operation of the proposed project on wetlands farther removed in distance from the construction and operation limits. These effects may be the immediate consequences of road construction, or they may be a result of the road's long-term operation. The effects of highway construction may be more likely to occur in wetlands than in uplands because wetlands are the landscape units that receive, retain, and discharge surface water and groundwater (Southerland, 1993). Secondary impacts can affect wetlands through changing the vegetation communities, erosion and sediment deposition, or altering water regimes and water quality. The majority of these impacts are temporary in nature and their severity can be mitigated through use of management practices, as discussed in *Avoidance, Minimization, and Mitigation.*

Wetland water quality could be affected by temporary erosion and sedimentation caused by earth moving activities. Shuldiner, *et al.* (1979) report that highway construction is a major source of sediment loads in surface waters, and sediment loads from highway construction during an average storm can be 10 times greater than that from cultivated land and 200 times greater than that of grassed and forest land. Construction activities within the wetland itself can cause large amounts of organic and mineral matter to be suspended in the surrounding water. Runoff from cleared lands or highway fill is also a source of inorganic matter that could enter wetlands. This could decrease overall wetland productivity by increasing water turbidity, thereby lowering the amount of light available for photosynthesis. Deposition of sediment within wetlands could raise the surface elevation of the wetland, leading to eventual drop in the water table and loss of the wetland. Excess sediment also could smother certain plant species.

Data analysis determined that 2% of the potentially impacted wetlands for the Preferred Alternatives contained submerged aquatic vegetation such as American waterwort (*Elatine americana*), white water lily (*Nymphacaea odorata*), greater duckweed (*Spirodela polyrhiza*), and long-leaved pondweed (*Potamogeton nodus*) that could be susceptible to the above impacts. Further analysis revealed that within these wetlands, the submerged vegetation was a small component of the overall wetland vegetative community. The dominant existing emergent plants that surround these submerged species, may act as a vegetative buffer to reduce potential runoff and suspended solids impacts. The employment of proper erosion and sedimentation control practices should reduce and/or minimize these potential impacts.

Changes in water levels and water flow regimes are another potential effect of highway construction and operation. Movement of groundwater could be slowed by placement of impervious fills or compression of the substrate. This effect could cause ponding of water on the upstream side of the road and drying of the downstream side of the road. Channelization of water flows in a wetland due to placement of culverts also could cause lowering of the water table. The reverse could also occur - greater water levels could occur if water is directed into a wetland from an outside source. Many wetland plant species are sensitive to the amount and level of water that occurs in the wetland. In some cases changes in water levels could cause minor alterations in the vegetation community composition, and in other cases, the changes could be dramatic.

Data analysis for the Preferred Alternative (WV) and the ASDEIS IRA determined that proposed highway construction restricted the placement of culverts to existing streams, and as such, would not impact wetland vegetation.

Alteration of flooding patterns (timing and flow volume) can impact wetland productivity and vegetative community structure. Flooding provides periodic inputs of needed nutrients into wetlands. Drier conditions accelerate decomposition of dead plant material, and these added nutrients encourage rapid growth. Thus, loss of flooding could cause reduced wetland productivity and changes in wetland community structure and composition. During wetland field investigations, an assessment was made of potential sources of wetland hydrology. Three percent (18) of the delineated wetlands were solely dependent on seasonal flooding for their hydrology. Of these, only eight wetlands were within 100 feet of the construction limits. These wetlands could be susceptible to alterations in flood patterns due to construction activity.

Wetlands often function to regulate water flows in their watersheds. Wetlands can retain water during high flow conditions, much as ponds do. During dry periods, wetlands can discharge water downstream, preventing smaller streams from drying up during drought conditions. Highway construction could either increase or decrease water flows into and out of wetlands. Although increasing stormwater storage would be beneficial to the watershed, this could cause changes in the vegetation composition and community structure. Increasing water flows from the wetland could cause faster drying of the wetland and could cause greater fluctuations in water levels downstream.

Potentially harmful and toxic materials can be associated with stormwater runoff (Dupuis and Kobriger, 1985). These materials may include nitrogen, phosphorus, metals, salts, petroleum products, and pathogenic bacteria. However, it has been found that stormwater runoff from rural highways with traffic volumes less than 30,000 vehicles per day causes minimal to no impact on the aquatic environment. Projected traffic volumes for the year 2013 for the proposed highway project ranged from 1,000 to 23,000 vehicles per day with an average volume of 9,000. At these traffic volumes, the above effects would be minimal.

**(2) Development-Related Impacts**

Only one industrial park site has not begun construction activities. All other industrial parks have been constructed or are currently under construction. This undeveloped site is located north of WV 93 and adjacent to Four Mile Run and contains a 2.3 hectare (5.5 acre) palustrine scrub-shrub wetland. Development of this site could encroach upon that wetland as well as impact Four Mile Run.

Intersection/Interchange development analysis revealed that such development could occur without encroaching upon wetland resources.

Because the definition of raw land excludes wetlands and because sufficient raw land is available to support all predicted residential and service-oriented development, it is possible that the projected development could occur without wetland impacts.

**h. Cumulative Impacts**

**(1) Additive Direct Impacts**

Additive direct impact to wetlands by watershed are summarized in Table III-57 (Vol. II). The ASDEIS IRA in West Virginia would cumulatively an encroachment area representing 0.07% of the predicted wetland area for the West Virginia Watersheds.

The ASDEIS IRA in Virginia would cumulatively an encroachment area representing 0.18% of the predicted wetland area for the Virginia Watershed. The Preferred Alternative (WV) would cumulatively an encroachment area representing 0.12% of the predicted wetland area of the West Virginia Watersheds. Line A (VA) would cumulatively impact an encroachment area representing 0.13% of the predicted wetland area of the Virginia Watershed.

Leibowitz *et al.*, (1992) presented three general categories of wetland functions that should be considered when evaluating cumulative impacts: habitat functions that provide support for wetland dependent species, including food, shelter, and breeding sites; water quality functions including water quality improvement, nutrient cycling and supply; and hydrologic functions such as flood attenuation and moderation of hydrologic flow. These functions are considered below.

Wildlife wetland habitat was assessed using the USFWS Habitat Evaluation Procedure (HEP). This procedure is discussed in detail in the *Vegetation and Wildlife Habitat Technical Report.* Overall, wetland habitat contributed less than 1% to the calculated HU total. The wetlands impacted appear to be of seasonal importance, providing limited breeding and feeding habitat during the spring and early summer. The majority of wetlands impacted for both Alternatives were relatively small palustrine emergent communities. As such, they did not provide vegetative habitat components in the quantities necessary to yield appreciable HUs for the chosen evaluation species. While small wetlands can play an important role in the population dynamics of many wetland associated small mammal, bird, amphibian, and insect species, the removal of this wetland area would not have a measurable cumulative effect on these wildlife populations within the regional project watersheds.

In addition, wetland mosaic patterns are an important feature for wetland associated species. Researchers have found that the approximate maximum migration distance for aquatic breeding amphibians, small birds, and small mammals is 1,000 m (Gibbs, 1990). Gibbs also found that small wetlands (less than 4 hectares or 10 acres) play an important role in the population dynamics of many wetland associated species by reducing inter-wetland distances, thereby increasing the probability of successful dispersal, and increasing the number of individuals dispersing among patches within the wetland mosaic. Over 90 % of the delineated wetlands met this size criteria. Alteration of the existing wetland mosaic pattern could result in wetlands becoming "isolated" (greater than 1,000 m, 3,280 ft, from the nearest wetland) which could impact the population dynamics of wetland associated species. GIS analysis examined the existing wetland mosaic pattern of the field investigated wetlands. Four percent (20) of the existing delineated wetlands were determined to be isolated based on the above definition. The average minimum distance between existing wetlands was 240 meters (790 feet).

Construction of the Preferred Alternative (WV) could potentially isolate one additional wetland by creating an inter-wetland distance greater than 1,000 meters. Overall, the average minimum distance between wetlands would increase by 20 meters to 260 meters (850 feet). This increase in average minimum distance is not considered an impediment to those species present. Construction of the ASDEIS IRA similarly would isolate one small (< 0.5 hectare) wetland. Construction of either would therefore not alter the current wetland mosaic pattern present.

A functions and values evaluation for each delineated wetland was conducted using the Wet 2.1 computer program. In summary, the WET 2.1 program assigns qualitative probability ratings to wetland functions and values including; groundwater recharge, floodflow alteration, sediment stabilization, sediment/toxicant retention, and nutrient removal/transformation. All watershed wetlands generally had high to moderate functional probability values for the above functions. Of the wetlands impacted, 25% were predicted to lose their ability to perform the above functions. These wetlands averaged approximately 0.08

hectare (0.2 acre) in total size and would likely have had limited functional capabilities. The cumulative impact of this wetland loss on watershed wetland functional values would be minimal considering the relatively small size of the impacted wetlands, and the relatively small percentage of total watershed wetlands they comprise (less than 1%).

**(2) Additive Direct and Secondary Impacts**

The combination of direct and secondary impacts yielded a slight increase in wetland impact area due to secondary industrial park development. A 2.3 hectares (5.5 acres) palustrine scrub/shrub community could potentially be impacted by the development of a new Grant County industrial park located in the North Branch of the Potomac River watershed. However, for both Alternatives, this increased wetland impact area is less than 1% of the total predicted wetland area within the North Branch of the Potomac River watershed. The loss of this wetland could impact floodflow alteration, sediment stabilization, sediment/toxicant retention, and nutrient removal/transformation functions within the immediate area. However, any development that removed this wetland would be required to replace this acreage through compliance with Federal and state wetland regulatory guidelines. Proper design of the wetland replacement site should replace and possibly enhance lost functions and values.

**(3) Foreseeable Future Actions**

Five Federal actions and potential wetlands impacts associated with these actions were identified: 1) Moorefield, WV, in cooperation with the USDA's Soil Conservation Service, is considering construction of a reservoir on Stony Run to provide sufficient raw water to accommodate future predicted demands (USDA, 1994); 2) In addition, Moorefield, in cooperation with the Corps of Engineers, is considering construction of levees along the South Fork South Branch Potomac River to provide flood protection (COE, 1990); 3) The effort to establish the Canaan Valley National Wildlife Refuge; 4) The continued multiple resource use management of the George Washington National Forest (USDA, 1993); and 5) The continued multiple resource use management of the Monongahela National Forest (USDA, 1986).

Table III-58 (Vol. II) summarizes the potential wetland impacts due to the above actions. Only the Moorefield floodwall project would involve future wetland impacts within the South Branch of the Potomac River watershed. Approximately 0.8 hectares (2 ac) of forested wetlands would be removed by the construction of this project. Proposed mitigation measures include land acquisition and planting of 0.8 ha of bottomland hardwood species to replace wetland functions and values lost (COE, 1990). The proposed Canaan Valley National Wildlife Refuge would protect the largest wetland complex in both West Virginia and the central and southern Appalachians (wetland complex over 3,400 ha in size). Both National Forests have prepared Final Environmental Impact Statements that propose no wetland impacts for the immediate future. State and Federal regulatory agencies would be consulted if proposed changes to forest management plans or objectives would impact wetlands. For further analysis of cumulative impacts refer to Section III. Y- Cumulative Impacts.

### 4. ALTERNATIVES ANALYSIS

Table III-59 (Vol. II) presents the wetland impact data that supports the selection of the Preferred Alternative. The Section 404 Permit Application and the Alternatives Analysis required by Section 404(b)(1) is included in Appendix G of the ASDEIS. Avoidance measures relative to other environmental, cultural and social issues are documented in the Alternatives Analysis.

### 5. GENERAL WETLAND MITIGATION REQUIREMENTS

Mitigation requirements for impacts of the project have been evaluated in accordance with E.O. 11990 and Technical Advisory T 6640.8A. In addition, the wetland mitigation process integrated both National Environmental Policy Act and Section 404(b)(1) Guidelines from the Clean Water Act (40 CFR 230).

The 1990 Memorandum of Agreement (MOA) between the Corps of Engineers and the Environmental Protection Agency establishes general policy approaches to mitigation. A primary feature of the policy states that mitigation should be "appropriate and practical", meaning that the mitigation measures "should be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology, and logistics in light of overall project purposes". Several topics are incorporated into this issue, including location of the mitigation site, replacement types and replacement amounts.

The MOA advises that mitigation should be undertaken in areas adjacent or contiguous to the discharge site (on-site), or if on-site mitigation is not practicable, off-site mitigation should be undertaken. It further advises that mitigation banking may be an acceptable form of mitigation.

### 6. PROJECT-SPECIFIC MITIGATION REQUIREMENTS - VIRGINIA

Mitigation strategies for wetlands in Virginia will be developed by the Virginia Department of Transportation and discussed with the Virginia agencies after the study required by Virginia's Transportation Board has been completed.

### 7. PROJECT-SPECIFIC MITIGATION REQUIREMENTS - WEST VIRGINIA

Even after all practicable measures have been taken to avoid and minimize wetland impacts, both the ASDEIS IRA and the Preferred Alternative (WV) would impact wetlands. These impacts must be mitigated based on the general mitigation policies and requirements discussed above. Wetland replacement ratios and replacement sites were the main topics of a meeting held with state and Federal resource agencies having jurisdiction or special expertise in this resource. The meeting was held on April 28, 1994 and attended by the COE, Pittsburgh District; EPA; WVDNR; WVDEP; USFWS; NRCS and the WVDOH. A consensus was reached on the need for at least two wetland replacement sites, one in each river basin, and the requirement for up-front construction of the wetlands. It was also agreed that the agencies would reconvene on the issue of replacement ratios and provide written consensus to the WVDOH. The agencies subsequently provided such correspondence with the following outcome for replacement ratios:

- Open Water, 1:1;
- Palustrine Emergent, 1:1; and
- Palustrine Scrub/Shrub and Forested, 3:1.

Other requirements for wetland mitigation include the need to monitor the created wetlands for a five year period. The plan for such monitoring would be prepared by the WVDOH and agreed to by the agencies. The agencies stated that an attempt should be made to place the Monongahela River portion of the mitigation within the Beaver Creek watershed near Davis WV. It was stated that the resource agencies reserved the right to request higher replacement ratios if the replacement sites were not created in advance of encroachments (construction).

The following discussion presents the decision-making process for site selection, provides descriptions of existing conditions at selected sites and describes a conceptual mitigation plan for each of the two selected sites.

### a. Site Selection

#### (1) Watershed Selection

A list of replacement goals was developed to compare regional project watersheds within each river basin. By comparison of these goals with existing wetland characteristics in each watershed, the most suitable regional project watershed was selected. The goals are:

- To replace wetlands in a watershed that has historically suffered wetland loss and has relatively few wetlands per area of watershed;
- To replace vegetative communities eliminated by the proposed project with similar vegetative communities (in-kind replacement);
- To replace wetland functions and values that will be lost with similar functions and values; and
- To maximize the probability of the replacement site success.

### (a) The Monongahela River Basin (WV)

The two regional project watersheds in the Monongahela River Basin that would be impacted by the proposed highway are the Tygart Valley River watershed and the Cheat River watershed. A comparison of the four replacement site goals with watershed characteristics revealed that the Tygart Valley River watershed would be more likely to allow achievement of the goals.

The Tygart Valley River watershed is characterized by wide valleys and meandering stream channels. Tiled fields and prior converted wetlands are common in this watershed. Wetland vegetation is primarily sedges and herbaceous wetland species. Based on NWI wetlands, GIS calculations show that this watershed contains approximately 0.32 hectares of wetland per square kilometer (2.0 acres per sq. mi.).

Two local project watersheds make up the Cheat River watershed; Black Fork and Shavers Fork. Wetland types in the Black Fork local project watershed are primarily high elevation bogs and fens dominated by acidophillic plants (e.g., mosses, sedges, and ericacous shrubs). Those wetlands present in the Shavers Fork local project watershed are primarily palustrine forested or scrub shrub, although some emergent wetlands are present. The ratio of NWI wetlands to total watershed area is 2.17 hectares per square kilometer (14.0 acres per sq. mi.). Based on the discussion above, a replacement site in the Tygart Valley River watershed is more likely to meet wetland replacement site goals than a replacement site in the Cheat River watershed because:

- Data suggests that the Tygart Valley River watershed has suffered a larger historic loss of wetland acreage. The Tygart Valley River watershed has a wetland to total watershed area ratio seven times less than that of the Cheat River watershed.

- No high mountain bogs or fens would be impacted by the proposed highway. Those wetlands being impacted more closely resemble the vegetative communities that occur within the Tygart Valley River watershed.

- It is generally accepted that wetland replacement sites in high mountain areas are difficult to replace successfully, thus wetland replacement site success has a lower probability in the Cheat River watershed.

- The land cover adjacent to the proposed project near Davis, West Virginia is predominately wetlands. Locating a suitable site that is not already wet was difficult based on site visits. Further, the limited soil cover in the drainages of Beaver Creek would inhibit the success of the wetland.

- The WET 2.0 analysis of impacted wetlands revealed that their functions and values were more similar to those of wetlands within the Tygart Valley River watershed than those wetlands found in the Cheat River watershed.

**(b) The Potomac River Basin (WV)**

The Preferred Alternative (WV) impacts wetlands in four watersheds within the Potomac River Basin; North Branch Potomac River, South Branch Potomac River, Cacapon River and Shenandoah River watersheds. Of those four watersheds, the South Branch of the Potomac River watershed exhibits characteristics consistent with the four replacement goals. These characteristics include:

- South Branch of the Potomac River watershed has suffered the greatest historic wetland loss. Prior converted wetlands are common on the floodplain.

- The probability of success is high due to the area's history of supporting wetlands.

- Wetland vegetative communities that are present in the South Branch of the Potomac River watershed are similar to the majority vegetative of communities that would be disrupted due to the proposed highway.

- Functions and values of wetlands capable of being supported in the South Branch of the Potomac River watershed are most similar to the wetlands that would be impacted within the other local project watersheds.

**(2) Site Selection**

Seven sites were considered for wetland mitigation, three (3) in the Tygart Valley River watershed and four (4) in the South Branch of the Potomac River watershed. Selection of one site in each was based on criteria that have been developed by others (Kusler *et al.*, 1986; Pennsylvania Department of Environmental Resources, 1992; and Horner and Raedeke, 1989) and that have been successfully employed in the selection of wetland sites for other projects. Each of the seven sites within the two river basins were rated against the criteria on a scale of 1 to 5 (Vol. II, Table III-60). The two sites with the highest totals were then selected. The site with the highest rating for the Monongahela River Basin was the Wilmoth Run site (rating of 74), and for the Potomac River Basin, the Walnut Bottom Run site (rating of 74).

### c. Mitigation Site Characteristics

Replacement areas for the appropriate wetland classes are given in Table III-61 (Vol. II). A total of approximately eighteen hectares (45 acres) of wetland are required to be replaced in the two locations that were identified above. The eighteen replacement hectares were split equally among each wetland class to provide both replacement sites with half of the total required replacement area (9 hectares (22.5 acres)). This division maximizes the total replacement area for each site therefore optimizing the individual wetland functions and values. Characteristics of each mitigation site are discussed below.

#### (1) Monongahela River Basin: Wilmoth Run Site (WV)

The Wilmoth Run Site is located within the Leading Creek local project watershed of the Tygart Valley River. This site is located adjacent to Leading Creek and Israel Church Road, approximately 1/4 mile north of Kerens, WV. Wilmoth Run, a perennial stream, flows through the southeast corner of the site into Leading Creek. This land is a prior converted wetland having been drained by a system of pipes and ditches to become agricultural land.

Hydrology for this site would be provided by Wilmoth Run and ground water. The groundwater level is expected to be near to the surface based on several soil probes taken within the site. Overbank flooding of Leading Creek and back water flooding of Wilmoth Run can also be expected. The soils on the site are listed as Philo Loam and Purdy Silt Loam. Philo Loam is described as moderately well drained and nearly level with a seasonally high water table about 0.5 to 1 meter below the surface. Purdy Silt Loam is listed as poorly drained or very poorly drained and is difficult to drain. Purdy Silt Loam comprises over 75% of the proposed site. Existing vegetation at the site primarily includes pasture species although there are limited areas of trees and shrubs along Leading Creek.

#### (2) Potomac River Basin: Walnut Bottom Run Site (WV)

The Walnut Bottom Run Site is located in the Anderson Run local project watershed of the South Branch of the Potomac River. It is located approximately 4 miles north of Moorefield along a tributary to Walnut Bottom Run. Although presently used as pasture, it is probable that this area was once farmed, and because its topography is similar to other farmland in the area, it may be a prior converted wetland. The groundwater level is expected to be near the surface, based on the existence of a perennial stream bordering the site and soil descriptions. Soils in the area are Tygart silt loam, Massanetta loam, Purdy Silt Loam, and Berks-Weikert shaly silt loams. Tygart silt loam is characterized as poorly drained with a permeability listed as slow with seasonally high water table about six to eighteen inches below the surface. Tygart silt loam constitutes approximately 30% of this site. Purdy silt loam is characterized as very poorly drained with a very slow permeability. Massanetta loam is listed as moderately well drained and constitutes approximately 30% of this site. The Berks-Weikert shaly silt loam comprises a small portion of the site and is listed as well drained with moderate to moderately rapid permeability. Existing vegetation at this site includes pasture species and small pockets of trees.

#### d. Conceptual Mitigation Plans

##### (1) Monongahela River Basin: Wilmoth Run Site (WV)

The Monongahela River Basin wetland mitigation site would be constructed to contain approximately 9 hectares (23 acres) of forested, shrub, emergent, and open water wetlands. A conceptual plan is shown in Exhibit III-12 (Vol. II). The site would contain approximately 0.4 hectares (1 acre) of open water, 6.2 hectares (15½ acres) of emergent wetland, 1.8 hectares (4½ acres) of scrub-shrub wetland, and 0.6 hectares (1½ acres) of forested wetland, surrounded by approximately 4¾ hectares (12 acres) of forested buffer. The site would be graded to the proper elevation to capture groundwater, the drainage tiles blocked, and streamflow from Wilmoth Run would be allowed to flow to a pond on the site through a diversion channel. The new shallow channel would be constructed at the downstream end of the pond, meandering through the site, until it finally re-enters Leading Creek at its natural confluence. It is anticipated that backwater flooding of Leading Creek from a 2-year return storm could also flood the site.

A forested buffer, approximately 30 meters (100 feet wide), would surround the site. The forested wetland would be placed at the eastern side of the site and would serve as a riparian corridor along the diverted stream between the forested buffer and the pond. It would also shade the pond and stream for part of the day, lowering the evaporation rates of the open water area. The scrub-shrub portion of the site could be placed between the forested buffer and emergent zone to provide a ecological and hydrological transition between the two zones. The emergent wetland and open water zones would complete the remainder of the site.

Subsequent to the publication of the ASDEIS, it was determined that acquiring the property proposed for the development of the Wilmoth Run wetland replacement site would be problematic. WVDOH identified other property on Leading Creek that would be suitable for a wetland replacement site. A field review of the property was conducted with the COE, WVDNR, and FWS. The site was approved and design plans prepared. Property acquisition procedures are currently underway.

**(2) Potomac River Basin: Walnut Bottom Run Site (WV)**

The Potomac River Basin wetland mitigation site is designed to incorporate 9 hectares (22.5 acres) of forested, shrub, emergent, and open water wetlands. The conceptual plan is shown Exhibit III-13 (Vol. II). As in the Monongahela River Basin site, the site would contain approximately 0.4 hectares (1 acre) of open water, 6.2 hectares (15½ acres) of emergent wetland, 1.8 hectares (4½ acres) of scrub-shrub wetland, and 0.6 hectares (1½ acres) of forested wetland. This site would be graded to an elevation suitable for the capture of groundwater while blocking any drainage tiles.

This wetland system would consist of two wetland ponds connected by a forested wetland area. The site hydrology would be driven primarily by streamflow from a diverted unnamed stream and groundwater. Flow from the diverted stream would enter the upper pond and meander to the first open water area. The flow would then leave the upper pond through the forested wetland into the lower pond where a second open water area is centered. Water would exit the lower wetland pond and flow back into a tributary to Walnut Bottom Run. Emergent zones will encircle the open water areas in both the upper and lower wetland ponds. A scrub-shrub area could be placed between the forested buffer zone and emergent zone in the lower pond, and in two areas along the emergent zone of the upper pond to provide ecological and hydrological transitions between different zones. A contiguous forested buffer approximately 30 meters (100 feet wide) would surround the site.

## R. STREAMS

Perennial streams support the majority of surface water functions in the project area; ranging from recreational, economic, and aesthetic uses to fishery and wildlife habitat and other functions. Intermittent streams provide a number of these functions but to a lesser degree than perennial streams. The proposed project crosses two river systems: the Monongahela River and the Potomac River. Each river system is composed of several regional project watersheds (defined in Section III-M: *Watershed Overview*). Within West Virginia, the proposed project crosses five of these major watersheds: the Tygart Valley River, the Cheat River, the North Branch and South Branch of the Potomac River, and the Cacapon River. In Virginia, the proposed project crosses the Shenandoah River regional project watershed.

This section summarizes the following: the methods used in assessing aquatic habitat, water quality and impacts as a result of the proposed project; the existing condition of streams within the project area; the environmental impacts of project implementation by alternative; and avoidance, minimization, and mitigation measures. Details of the streams assessment conducted for this project are contained in the *Streams Technical Report*.

### 1. METHODOLOGY

A systematic watershed analysis was used to analyze the direct, secondary, and cumulative impacts to surface waters that would result from construction of the proposed project.

#### a. Stream Identification and Classification

Streams within the construction limits were identified and field investigated. Streams in both West Virginia and Virginia were classified as perennial if the West Virginia regulatory definition was met (Title 46, Series 1, Section 2.5). The location and extent of intermittent and perennial streams encroached upon are shown in the *Alignment and Resource Location Plans*. Streams that were not field investigated are represented as "mapped".

Secondary information relevant to streams was collected from the West Virginia Division of Natural Resources, the Virginia Department of Environmental Quality, and the Potomac and Monongahela River Basin Plans (WVDEP, 1989; WVDEP, 1982). West Virginia High Quality Streams were identified from the fifth edition of the published list of *West Virginia High Quality Streams* (WVDNR, 1986). Streams containing trout populations were identified based on several sources, including *West Virginia High Quality Streams*, pertinent maps from the West Virginia Division of Natural Resources, a listing of stocked trout streams published by the West Virginia Division of Natural Resources (1989), trout streams as listed in Virginia Department of Environmental Quality regulations (VR 680-21-00), and public comments. Stream order, a measure of a size of a stream, was determined based on USGS topographic and photogrammetric mapping. Streams in the project area progress from small, headwater streams (i.e. first order) to large streams such as Baker Run which is a third order stream.

In Virginia, the following criteria qualify a stream as "Outstanding State Resource Waters" (VR 680-21-07.2): all designated rivers under the Virginia Scenic Rivers Act; all Class I and II trout streams; and waters containing Threatened or Endangered species. "National Resource Waters" (NRW) is the West Virginia designation for streams which are afforded the highest level of protection. The following criteria qualify a stream as a NRW: presence of Threatened or Endangered species or habitat; presence of naturally reproducing trout populations; federally-designated rivers under the National Wild and Scenic Rivers Act; and streams located within a state or Federal forest or recreation area.

**b. Stream Assessment Methodology**

Macroinvertebrate and habitat assessment was based on EPA's *Rapid Bioassessment Protocols for Use in Streams and Rivers - Benthic Macroinvertebrates, Level II* (Plafkin *et al.*, 1989). The Rapid Bioassessment Protocol, Level II (RBP II) uses basic field-collected data on ambient physical, chemical, and biological conditions. In addition, basic water quality samples were taken at the same time as the macroinvertebrate sampling.

**(1) Habitat Assessment**

Estimates regarding land use and physical stream characteristics were made at each stream crossing. As shown in Table III-62 (Vol. II), habitat parameters assessed at each stream sample station were separated into three categories; primary, secondary, and tertiary (for definitions of habitat parameters, refer to the *Streams Technical Report*). At each sampling station, numerical scores were assigned to each of the nine habitat parameter characteristics. For this project, habitat assessment scores were divided into 5 classes. A total habitat assessment score, which is the sum of the habitat assessment scores for each parameter, were divided as follows: a score of 0 to 30 indicates severely impaired habitat; a score of 31 to 60 indicates impaired habitat; a score of 61 to 90 indicates moderate habitat; a score of 91 to 120 indicates good habitat; and a score of 121 or greater indicates excellent habitat.

**(2) Benthic RBP Assessment And Data Analysis Methodology**

In addition to data collected for habitat assessment, quantitative macroinvertebrate samples were collected at each stream crossing. Aquatic invertebrates were collected from riffle/run reaches using a kick net. Organisms were identified to the family taxonomic level using standard references. Each macroinvertebrate family was assigned a pollutant tolerance value ranging from 0 for the least tolerant to 10 for the most tolerant. The use of benthic communities based on family-level identifications have been used successfully to address water quality and biotic integrity issues in several states.

Karr and Dudley (1981) define biological or biotic integrity as "the [habitat's] ability to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of natural habitat of the region." Assessment of the biotic integrity requires a method that integrates ecological concepts of the structure and dynamics of populations, communities, and ecosystems (Karr, 1987; Miller *et al.*, 1988).

To characterize the Biotic Integrity (BI) of each stream sampled, the following seven parameters were calculated: number of macroinvertebrate families (taxa); modified family biotic index; ratio of scrapers versus filtering/collector functional feeding groups; ratio of intolerant taxa to tolerant taxa; intolerant taxa index; and community similarity indices (Plafkin *et al.*, 1989).

A critical component of the RBP II is the comparison of field results to a reference site. For a given region (such as ecoregion, project, watershed, etc.), a reference site is selected that characterizes the most undisturbed existing condition within that region. A comparison of each stream station to the reference site indicates how similar the stream station is to the most undisturbed condition.

One reference site was selected to represent each stream order (first order, second order, and third order streams) from the streams sampled for this project. For each stream sampled, the seven parameters calculated were compared to the reference site parameters to determine the percent similarity of the sampled station to the reference site.

Biotic Integrity (BI) is expressed as a score (0-1) of the overall similarity between the sampled station and its reference site. The BI can be ranked from non-impaired (A) to severely impaired (D). Table III-63 <u>(Vol. II)</u> presents the attributes that make up the various Biotic Integrity rankings.

Statistical analysis of the stream data was conducted to identify trends in the data, such as differences in Habitat Assessments or Biotic Integrity between ecoregions, watersheds, and/or stream orders. The parameters tested were number of individuals, number of taxa, habitat score, Family Biotic Integrity (FBI), and Biotic Integrity (BI). Because of the length and number of analyses performed in this study, only summary results are discussed in the following sections. For a comprehensive review of all analyses performed in this study, refer to the *Streams Technical Report.*

### c. Direct Impact Assessment Methodology

Direct impacts to streams and rivers were evaluated using 200-scale engineering drawings. The following details the methodology used in assessing the impact of enclosures (i.e. culverts and pipes) and channel relocations on baseline aquatic habitat.

The size and length of structure was determined for perennial streams that would be enclosed in a box culvert or pipe. Along portions of the ASDEIS IRA, replacement of existing drainage structures was evaluated based on age and the requirement to meet current highway drainage design criteria.

For the purposes of this assessment, stream relocation is defined as any longitudinal encroachment into a perennial stream channel, diversion of a perennial stream along the construction limits, or elimination of a perennial stream channel within the construction limits of an alignment. For each perennial stream so impacted, the length of the relocation was determined using GIS.

To assess the direct impacts of the proposed project at the regional project watershed scale, the total length of enclosed streams was compared to an estimate of the total length of perennial streams within each regional project watershed. This was accomplished by calculating the total length of perennial streams from USGS 7.5 minute quadrangles for each regional project watershed.

**d. Riparian Habitat Assessment Methodology**

To determine quantitatively impacts of the proposed project to existing riparian forest buffers, the following methodology was used. GIS analysis identified where the limits of proposed highway construction would be within 23 meters (75 feet) of perennial streams for both the ASDEIS IRA, Preferred Alternative and Line A. Construction of this nature would encroach upon the existing riparian buffer. This would produce a parallel strip of land, varying in width, between the proposed construction limits and the existing perennial streams. Croonquist and Brooks (1993) suggested that protecting a forested corridor at least 25 meters (80 ft.) wide on each bank provides feeding, resting, or migrating corridors for sensitive species, including forest interior neotropical migrants birds. Riparian buffer corridors could also serve as linear wildlife corridors, allowing movement between two or more formerly contiguous habitat areas. Welsch (1991) determined that a minimum width of 23 meters (75') of forested buffer is required to protect water quality and aquatic habitats. Based on the above literature, the average width and vegetative cover type within each riparian buffer was determined to assess wildlife utilization and highway runoff impacts associated with parallel stream construction. The nearest stream sampling station to each buffer was identified to provide a quantitative assessment of stream conditions within the impact area.

**e. Cumulative Assessment Methodology**

A cumulative watershed impacts analysis was conducted in order to identify areas where watershed degradation may occur. The methodology utilized in this study included analyzing baseline stream data (Rapid Bioassessment Protocol II results), basic water quality results, review of predominant local project watershed use, and review of published information on spatial and temporal changes in community structure as a result of catastrophic events (see the *Streams Technical Report*). The goal of this analysis is to predict, with some level of confidence at both the local project watershed scale and the regional project watershed scale, the magnitude and ecological importance of cumulative impacts as a result of the construction and operation of the proposed project on surface water resources.

## 2. EXISTING ENVIRONMENT

For each regional project watershed a general discussion is provided including the land use, length of perennial streams, miles of alignment in the watershed, and number of field investigations. In addition, the existing condition of the stream habitat and biological community are summarized based on the habitat assessments and macroinvertebrate results. The basic water quality and benthic macroinvertebrate data for each of the 251 sampling stations is presented in Table III-64 (Vol. II).

### a. Tygart Valley River (WV)

The Tygart Valley River regional project watershed drains approximately 396 square kilometers (153 square miles) north of Elkins, West Virginia. Approximately 26.7 kilometers (16.6 miles) of the proposed project would traverse this regional project watershed.

The Leading Creek local project watershed drains approximately 166 square kilometers (64 square miles) and contains 168 kilometers (59 miles) of perennial streams including Pearcy Run, Wilmoth Run, Claylick Run, and Horse Run. Within the Leading Creek local project watershed, there are neither native or stocked trout streams, Nationwide Rivers Inventory listed rivers, nor streams impacted by acid mine drainage.

There were 27 field investigations conducted of streams crossed by the proposed project. Leading Creek and many of its major tributaries have wide floodplains with fine substrates (gravel, sand, and silt), in contrast to narrow floodplains and course substrates typical of streams in the other local project watersheds. Agricultural activities dominate the floodplains, which is reflected in the degraded habitat and water quality of the streams.

Leading Creek and a number of its tributaries have been moderately to severely impaired by agricultural nonpoint source pollution which is reflected in low BI ranks. The majority of the streams have moderate to low abundance of macroinvertebrates. The majority of the streams have impaired or severely impaired biotic integrity. Habitat ranges from severely impaired to good.

**b. Cheat River (WV)**

The Cheat River regional project watershed is comprised of parts of Randolph, Tucker, and Preston Counties in West Virginia. This regional project watershed drains approximately 1,750 square kilometers (675 square miles) of West Virginia. Much of the watershed is composed of undeveloped rural land dominated by deciduous and mixed forests (84%) with cropland and pasture comprising 12% of the existing land use. Part of the Monongahela National Forest (MNF), including the Congressionally-designated Otter Creek and Dolly Sods Wilderness areas, lie within the Cheat River regional project watershed. These Wilderness areas are not impacted by the proposed alignments.

There are 293 kilometers (183 miles) of perennial streams within the Cheat River local project watershed, including the major drainages of Shavers Fork and the Black Fork. Within portions of the regional project watershed which have not been subjected to mining, excellent streams and rivers, including Shavers Fork, and three trout streams (Roaring Run, Pleasant Run, and Slip Hill Mill Run) exist. Shavers Fork is listed on the Nationwide Rivers Inventory.

In total, there were 84 field investigations conducted of streams crossed by the proposed project within this watershed: 63 were in Black Fork and 21 were in Shavers Fork. Approximately 41 percent of the streams have non-impaired biotic integrity and 31 percent of the streams have good to excellent habitat. A majority of streams with good water quality and habitat are located within the MNF. Naturally acidic conditions are found in the headwaters of Big Run, Tub Run, Long Run, and Middle Run. These waters drain bog-like wetlands resulting in tannic water and naturally low pH. Big Run and Tub Run are located on Backbone Mountain within the MNF. The headwaters of Long Run and Middle Run are located in the MNF but these streams flow through strip mined areas where the water quality of the stream is affected by acid mine drainage from numerous seeps and springs. A number of streams which drain wetlands along Beaver Creek also exhibited tannic water, low pH, and low dissolved oxygen. Out of 84 streams, 16 exhibited substantial evidence of acid mine drainage. These streams included Beaver Creek and some of its tributaries, Pendleton Creek, the North Fork of the Blackwater River, and the lower portions of Long Run and Middle Run. These streams are located in either previously mined areas, are surrounded by mining spoil, or receive acidic groundwater discharges.

The Shavers Fork local project watershed drains 186 square kilometers (72 square miles) of land along the eastern slopes of Cheat Mountain and the western slopes of Shavers Mountain. There are an estimated 106 kilometers (66 miles) of perennial stream including Pleasant Run and Haddix Run. The project would cross approximately 12.6 kilometers (7.8 miles) of this local project watershed. Within this local project watershed, only Pleasant Run is reported to contain trout. None of the streams sampled within this local project watershed have been impacted by acid mine drainage. The Shavers Fork local project watershed within the vicinity of the proposed project is dominated by deciduous and mixed forests. The majority of the streams within this local project watershed had moderately impaired biotic integrity and good to excellent habitat. Out of 21 streams, only one stream had severely impaired biotic integrity and habitat.

The Black Fork local project watershed drains 396 square kilometers (153 square miles) of land along Backbone Mountain, Canaan Mountain, Canaan Valley, and Beaver Creek. There are an estimated 188 kilometers (117 miles) of perennial stream within this local project watershed, including the North Fork of the Blackwater River, Long Run, Big Run, Pendleton Creek, Blackwater River, and Beaver Creek. The proposed project would cross approximately 38.6 kilometers (24 miles) of this local project watershed. A large portion of the land has been subjected to deep and surface coal mining, including the drainage areas for Beaver Creek, the North Fork, Pendleton Creek, Long Run, and Middle Run. There are two native trout streams (Roaring Run and Slip Hill Mill Run) within the vicinity of the project. None of the streams are listed on the Nationwide Rivers Inventory. The majority of the streams within this local project watershed have moderate habitat. There are only five streams out of 64 which had non-impaired biotic integrity.

Several restoration and reclamation projects are currently being undertaken along the Blackwater River and portions of the Black Fork, Long Run, and Middle Run. WVDEP is constructing a limestone treatment station along the Blackwater River, approximately one mile upstream from Davis and above the confluence with Beaver Creek. The goal is to reduce the acidity of a five mile segment of the river sufficiently to sustain a year-round trout population. Completion of this project is anticipated for late 1994. Portions of the watersheds of Middle Run, Long Run, and the North Fork of the Blackwater River have been recently modified as part of the Albert Highwall and Douglas Highwall Reclamation projects. These projects included grading, covering, and planting highwall areas and the partial treatment of acid mine drainage.

#### c. North Branch of the Potomac River (WV)

The North Branch of the Potomac River regional project watershed covers 1,200 square kilometers (460 square miles) in Grant and Mineral Counties, West Virginia. The North Branch of the Potomac River watershed is dominated by deciduous and mixed forests (79%) with cropland and pasture comprising 17 percent of the existing land use. A portion of Seneca Rocks National Recreation Area lies in the southwest portion of this watershed. Greenland Gap, located near the town of Scherr, West Virginia, is a unique topographic feature within this watershed. The gap is considered to be the least disturbed and most distinctive water gap in West Virginia, with towering sandstone cliffs that arch upward over 244 meters (800 feet). The above two areas are not impacted by the proposed alignments.

There were 39 field investigations conducted on streams crossed by the proposed project. This project watershed can be divided into two local project watersheds: the Patterson Creek local project watershed and the Stony River local project watershed.

The Stony River drains 285 square kilometers (110 square miles) including the valley west of the Allegheny Front surrounding Mount Storm Lake. The proposed project would cross approximately 8.3 kilometers (5.2 miles) of the Stony River local project watershed. This local project watershed contains approximately 114 kilometers (71 miles) of perennial streams, as well as the Mount Storm Reservoir. Four of the eight streams sampled exhibited impacts by acid mine drainage. West of the Allegheny Front, the major streams are adversely affected by acid mine drainage, including Little Creek, Abrams Creek, and the Stony River. There are no streams listed on the Nationwide Rivers Inventory or which contain native or stocked trout. There are a number of very small, headwater streams located south of Bismarck which have high (non-impaired) biotic integrity.

The Patterson Creek local project watershed lies between Patterson Mountain on the east and the Allegheny Front to the west. The Patterson Creek local project watershed drains approximately 166 square kilometers (64 square miles) of agricultural and forested land. The project would cross approximately 24 kilometers (15 miles) of the local project watershed. This local project watershed contains approximately 55 kilometers (32 miles) of perennial streams, including one native trout stream (Elklick Run), and one stocked trout stream (North Fork of Patterson Creek). None of the streams have been impacted by acid mine drainage or are listed on the Nationwide Rivers Inventory. The small streams east of Patterson Creek are located in pasture which results in low habitat and biotic integrity. The Middle Fork and North Fork of Patterson Creek, including tributaries, have good to excellent habitat and moderately impaired to non-impaired biotic integrity. This reflects the predominately forested headwater streams.

**d. South Branch of the Potomac River (WV)**

The South Branch of the Potomac River regional project watershed is dominated by deciduous and mixed forests (72%) with cropland and pasture comprising 26 percent of the existing land use. The South Branch rises in Highland County, Virginia and flows in a general northeast direction into West Virginia to its confluence with the North Branch of the Potomac River. Within West Virginia, the South Branch of the Potomac River regional project watershed drains 1,330 square kilometers (510 square miles) within Grant, Hardy, and Hampshire Counties.

Existing land use within this regional project watershed is dominated by deciduous forests, cropland, and pasture. Although the water quality of the South Branch is considered excellent and is renowned for its small mouth bass (*Micropterus dolomieui*) fishery, a number of its tributaries are impacted by non-point source pollution associated with agriculture, cattle, swine, rabbit, poultry, and forestry production. Of growing concern is the effect of the poultry industry on ground and surface waters (USFWS, 1994; Constantz, 1992; Ritter, 1986; Ritter and Chirnside, 1987). There are no native or stocked trout streams or streams impacted by acid mine drainage, but the tributaries to Anderson Run exhibit impacts from crop and livestock production. The South Branch of the Potomac River is listed on the Nationwide Rivers Inventory.

Within the project area, the South Branch of the Potomac River Watershed contains approximately 102 kilometers (64 miles) of perennial streams and is divided into three local project watersheds: Clifford Hollow, Main Channel of the South Branch, and Anderson Run.

The Clifford Hollow local project watershed is located at the eastern edge of the South Branch watershed. This local project watershed drains approximately 31 square kilometers (12 square miles) of the western slope of South Branch Mountain. The proposed project crosses approximately 8.4 kilometers (5.2 miles) of the headwaters of Clifford Hollow local project watershed, near existing WV 55. This local project watershed contains approximately 16.7 kilometers (10.4 miles) of perennial streams.

The Main Channel local project watershed drains 106 square kilometers (41 square miles) including Williams Hollow, Fort Run and several small tributaries. The proposed project would require 10 kilometers (6.2 miles) of construction, including a crossing of the South Branch. This local project watershed contains approximately 29 kilometers (18 miles) of perennial streams.

The Anderson Run local project watershed is located west of the community of Old Fields and drains approximately 104 square kilometers (40 square miles) of predominantly agricultural land along the eastern flank of Patterson Mountain. The proposed project would cross 7.6 kilometers (4.75 miles) of the southern portion of the local project watershed and involve Walnut Bottom Run and Toombs Hollow. This local project watershed is drained by an estimated 56 kilometers (35.3 miles) of perennial streams.

There were 22 field investigations conducted on streams crossed by the proposed project. Less than half of the streams have good to excellent water quality. The majority of the streams have moderate to low abundance of macroinvertebrates. The majority of the streams had moderate habitat. The South Branch of the Potomac River has high diversity and abundance, as well as good to excellent habitat. High quality (non-impaired) streams were located in Clifford Hollow and the upper portions of Walnut Bottom Run, both of which are forested. Streams which have impaired habitat and biotic integrity are affected by surrounding agricultural land use and included Dumpling Run, Fort Run, Walnut Bottom Run, Anderson Run, and small tributaries to the South Branch and Clifford Hollow.

**e. Cacapon River (WV)**

The Cacapon River originates in the southeastern portion of Hardy County on West Mountain and flows north through Hampshire County. This watershed encompasses 1,190 square kilometers (460 square miles) in Hardy and Hampshire Counties. This regional project watershed contains two unique geologic features; the Lost River and Hanging Rock. This regional project watershed also contains several regions of karst topography. Karst topography is created by the chemical solution of carbonate rocks, more commonly know as limestone. This topography is characterized by landscape features such as sinkholes, dry valleys, springs, caves, and sinking streams (the Lost River). Subsurface features include groundwater flow through caves, or other dissolutionally enlarged cavities.

The Cacapon River's water quality varies significantly depending on location and water level (Constantz *et al.*, 1993). Both the Lost River and Middle Cacapon River sections receive non-point source pollutants and have been identified by Constantz *et al.* (1993) as being relatively more polluted than other stream reaches further downstream in the basin. Fecal coliform levels within the Lost River and Middle Cacapon River are high and, depending upon the season, exceed state water quality standards (Constantz *et al.*, 1993). Many of the non-point source pollution problems that plague the South Branch of the Potomac River were observed in the upper reaches of the Lost River basin and its tributaries. However, as a whole, the Lost/Cacapon River system is in relatively "good" health (Constantz *et al.*, 1993). The streams analysis performed for this project supports the findings of Constantz *et al.* (1993). Furthermore, this report also identifies a number of tributaries within this regional project watershed that are either severely degraded or of excellent water quality.

The Cacapon River regional project watershed contains an estimated 153 kilometers (96 miles) of perennial streams, including Baker Run, Trout Run, Waites Run, Slate Rock Run, and Skaggs Run. Approximately 35.4 kilometers (22 miles) of the proposed project crosses this watershed. The Cacapon River regional project watershed is dominated by deciduous and mixed forests (82%) with cropland and pasture comprising 17 percent of the existing land use. The eastern portion of this watershed lies within the George Washington National Forest. Water quality within the watershed is excellent, with limited nonpoint source pollution associated with agricultural and timber harvesting activity. Waites Run, Trout Run, and portions of the Lost River are stocked with trout and the Lost River is listed on the Nationwide Rivers Inventory. This watershed is divided into five local project watersheds: Skaggs Run, Baker Run, Central Cacapon River, Waites Run, and Slate Rock Run.

There were 57 field investigations conducted on streams crossed by the proposed project. The majority of the streams have good to excellent water quality and a high diversity of macroinvertebrates but moderate to low abundance of macroinvertebrates. The low abundance of organisms reflects the number of headwater streams which typically have low productivity. There are no streams affected by acid mine drainage.

Skaggs Run is located at the western edge of the Cacapon River regional project watershed. This local project watershed drains approximately 20 square kilometers (8 square miles) toward North River, a major tributary to the Cacapon River north of the project area. The proposed project crosses 4.5 kilometers (2.8 miles) of the headwaters of Skaggs Run. There are an estimated 11.3 kilometers (7 miles) of perennial streams within this local project watershed. The majority of the streams sampled in this local project watershed have moderate habitat and moderately impaired biotic integrity.

The Baker Run local project watershed drains 62 square kilometers (24 square mile) including Baker Run, Long Lick Run, Camp Branch, Parker Hollow Run, and Bears Hell Run. The proposed project crosses 9 kilometers (5.6 miles) of the local project watershed, following the general course of Baker Run from its mouth to its headwaters. There are an estimated 29.6 kilometers (18.4 miles) of perennial streams within this local project watershed. Half of the streams sampled in this local project watershed have non-impaired (high quality) biotic integrity although most have moderate habitat.

The Central Cacapon local project watershed drains 243 square kilometers (94 square miles) including the main channel of the Lost/Cacapon River from Wardensville upstream to Baker, as well as the drainage area for the major tributaries along this length including Trout Run, Sauerkraut Run, and Three Springs Run. These headwater streams are located on steep forested slopes and are naturally low in macroinvertebrate diversity and density. The proposed project crosses 15 kilometers (9.3 miles) following the general west to east orientation of the Lost River and WV 55. There are an estimated 85 kilometers (53 miles) of perennial streams within this local project watershed. Trout Run and portions of the Lost River are stocked with trout. The Lost River is listed on the Nationwide Rivers Inventory. Half of the streams sampled in this local project watershed have good to excellent habitat.

Waites Run local project watershed drains 49 square kilometers (19 square miles) of mostly forested land along the western slopes of Paddy Mountain and Great North Mountain. The proposed project crosses approximately 2.6 kilometers (1.6 miles) of this local project watershed, east of Wardensville. There are an estimated 21 kilometers (13.1 miles) of perennial streams within this local project watershed. Waites Run is a stocked trout stream. Over half of the streams sampled in this local project watershed are non-impaired with good to excellent habitat.

The proposed project crosses approximately 4.7 kilometers (2.9 miles) of the headwaters of Slate Rock Run, Harness Run, and Sine Run along the western flank of Great North Mountain. The Slate

Rock Run local project watershed drains approximately 27.6 square kilometers (10.6 square miles) of forested land. The majority of the land in this local project watershed is within the George Washington National Forest. There are an estimated 7.7 kilometers (4.8 miles) of perennial streams within this local project watershed. Over half of the streams sampled in this local project watershed are non-impaired.

**f. Shenandoah River (VA)**

The Shenandoah River regional project watershed drains approximately 875 square kilometers (340 square miles) in Frederick and Shenandoah, Counties in Virginia. The Hardy/Frederick County line and the axis of Great North Mountain mark the division between the Shenandoah River regional project watershed and the Cacapon River regional project watershed to the west. Existing land use within the Shenandoah River watershed is composed mainly of deciduous and mixed forests (52%) and cropland and pasture (40%). The western portion of this watershed lies within the George Washington National Forest.

The proposed project lies within the Cedar Creek local project watershed of the Shenandoah River regional project watershed. Cedar Creek drains approximately 414 square kilometers (160 square miles) within Frederick and Shenandoah Counties. There are approximately 209 kilometers (130 miles) of perennial streams within this local project watershed, including Duck Run, Eishelman Run, Turkey Run, Zanes Run, and Mulberry Run. Approximately 21 kilometers (13 miles) of the proposed project crosses this watershed. The headwaters of Town Run are located along the eastern end of the project. To simplify the discussions, Town Run has been included in the Cedar Creek local project watershed.

The Cedar Creek local project watershed is largely private property, predominately forest or agriculture. Cedar Creek has been stocked with trout under the state's put-and-take program. Cedar Creek is listed on the Nationwide Rivers Inventory. Duck Run, located along the eastern slope of Great North Mountain is an important native trout stream and protected as an Outstanding State Water. A headwater tributary to Paddy Run is a native trout stream. This tributary is located along the western edge of the watershed. There are no streams impacted by acid mine drainage.

There were 22 field investigations conducted of streams crossed by the proposed project. Almost half of the streams have good to excellent habitat, including Cedar Creek and Duck Run. The majority of the stream have moderately impaired biotic integrity, including Duck Run.

**g. Habitat Assessment Results**

A total of 251 habitat assessments were conducted to document the existing stream habitat. The habitat assessment scores for each stream crossing is presented in Table III-64 (Vol. II). A number of statistical tests were conducted to determine if statistically significant differences exist between the habitat assessments conducted for streams in different ecoregions, watershed or stream order.

At the ecoregion scale, no statistically significant differences in habitat assessment scores were observed. The Ridge and Valley Ecoregion (Ecoregion A) and the Central Appalachian Ecoregion (Ecoregion B) had an average habitat assessment score of 80.1, and 77.2, respectively, both indicating moderate habitat. Habitat scores in Ecoregion A ranged from 32, indicating impaired habitat, to 126, indicating excellent habitat. Habitat scores in Ecoregion B ranged from 28, indicating severely impaired habitat, to 124, indicating excellent habitat.

There were no statistically significant differences in average habitat assessment scores for regional project watersheds or local project watersheds due to the wide variation in habitat scores. All regional project watersheds were categorized as possessing moderate habitat.

Statistically significant differences were identified between average habitat assessment scores based on stream order. Third order streams had higher average habitat assessment scores than first and second order streams, while second order streams had a statistically significant higher habitat assessment score than first order streams. There were no statistically significant differences in mean total habitat assessment score between ecoregions for first and third order streams.

At the regional project watershed scale, no statistically significant differences in average habitat assessment scores were detected for first and third order streams. However, for second order streams, Ecoregion A had a statistically significant greater average habitat assessment score than Ecoregion B (Vol. II, Figure III-17).

### h. Macroinvertebrate Results

For the streams sampled for this project, a total of 93 families and 13,421 individuals were identified. Table III-64 (Vol. II) provides the number of individuals, number of families, family biotic indices and Biotic Integrity score and ranking for each stream studied.

### i. Biotic Integrity Results

The Ridge and Valley Ecoregion (BI=0.57) has statistically greater BI than the Central Appalachian Ecoregion (BI=0.44), indicating that, on average, the streams in the Ridge and Valley Ecoregion were substantially less impaired than those in the Central Appalachian Ecoregion. This may reflect the impacts of acid mine drainage in the Cheat River regional project watershed and agricultural pollution in the Tygart Valley River regional project watershed (Vol. II, Figure III-18).

A comparison of the average BI for the six regional project watersheds indicates that, on average, the streams in the Cacapon River regional project watershed are substantially less impaired than are the streams in the South Branch of the Potomac River or Tygart Valley River regional project watershed (Vol. II, Figure III-19).

At the local project watershed scale, statistically significant differences existed in mean BI ranks. The Baker Run and Waites Run local project watersheds are less impaired than the Leading Creek and the Main Channel local project watersheds. The Shavers Fork and Slate Rock Run local project watershed are less impaired than the Main Channel local project watershed (Vol. II, Figure III-20).

When streams were grouped by stream order, several statistically significant differences were detected. On average, third order streams where statistically less impaired (i.e. greater BI score) than second or first order streams. When streams were further broken down by stream order and ecoregion, Ecoregion A was less impaired (greater BI scores) than Ecoregion B for second and third order streams.

When streams were further analyzed by stream order and regional project watershed, differences were detected between several of the regional watersheds. Both the Cacapon River and the Shenandoah River regional project watersheds have less impaired streams than the Tygart Valley River regional project watershed. For third order streams, the Cacapon River regional project watershed was less impaired than that of the Cheat River regional project watershed.

### 3. IMPACT ASSESSMENT

This impact assessment summarizes the direct impacts to specific regional project watersheds for each alternative, provides a comparison of watershed impacts by alternative and option area, and provides a comparison of both secondary and cumulative impacts. In some instances, direct impacts have been determined to be "substantial". For the purposes of this assessment, a substantial impact is one that permanently alters or degrades a stream system from which incomplete ecological recovery is the result of such a disturbance (i.e., a permanent and measurable reduction in Biotic Integrity).

#### a. No-Build Alternative

The No-Build Alternative would not result in direct impacts to streams due to construction, but the streams would be subject to on-going impacts related to the operation and maintenance of existing roads. Routine highway operation and maintenance would result in impacts to streams currently crossed by existing roadways. Traffic volumes would increase under the No-Build Alternative, but not to the extent that they would under the ASDEIS IRA or the Build Alternative. Commercial, industrial, and residential development would also occur under the No-Build Alternative, adding to incremental impacts to surface water resources.

**b. ASDEIS Improved Roadway Alternative**

The direct impact of the ASDEIS IRA on perennial streams is presented in Table III-65 (Vol. II). Figure III-21 (Vol. II) clusters individual stream crossing samples by BI rank and Figure III-22 (Vol. II) clusters stream crossings by habitat assessment score for the six regional project watersheds. Table III-66 (Vol. II) provides the total length of enclosures and relocations for each regional project watershed and a comparison against the total length of perennial streams within each regional project watershed. In general, only minor and temporary direct impacts are expected in the local project watersheds as a result of the ASDEIS IRA. The following summarizes the direct impacts to surface waters for each regional and local project watershed.

**(1) Tygart Valley River Regional Project Watershed (WV)**

Within the Tygart Valley River regional project watershed, the ASDEIS IRA would require two box culverts, ten pipes, and one stream relocation. Based on the estimate of the total length of perennial streams within the Leading Creek local project watershed, the proposed stream enclosures and relocation would impact approximately 0.8 percent of the total length of perennial streams. Based on baseline conditions within this local project watershed, no substantial direct impacts to stream systems are expected.

**(2) Cheat River Regional Project Watershed (WV)**

Within the Shavers Fork local project watershed, the ASDEIS IRA would require six pipes and one stream relocation. The ASDEIS IRA may measurably impact Haddix Run based on the proximity, number, and location of cuts adjacent to Haddix Run. This impact may alter surface water hydrology, water temperature, and reduced aquatic habitat as a result of sedimentation and encroachment into the floodplain of Haddix Run.

Within the Black Fork local project watershed, the ASDEIS IRA would require three box culverts, 24 pipes, and two stream relocations. The ASDEIS IRA may impact a small tributary to Slip Hill Mill Run, thereby resulting in increased silt loads to Slip Hill Mill Run. No other stream systems within the Black Fork local project watershed are expected to experience a reduction in biotic integrity as a result of the construction of the ASDEIS IRA based on existing land use and surface water quality.

Based on the estimate of the total length of perennial streams within the Cheat River regional project watershed, the proposed stream enclosures and relocations for both the Shavers Fork and

Black Fork local project watersheds would impact approximately 0.6 percent of the total length of perennial streams within this regional project watershed.

**(3) North Branch of the Potomac River Regional Project Watershed (WV)**

Within the Stony River local project watershed, the ASDEIS IRA would require four pipes and one stream relocation. Within the Patterson Creek local project watershed, the ASDEIS IRA would require two box culverts and one pipe crossing. Proposed stream enclosures and relocations for both local project watersheds would impact approximately 0.4 percent of the total estimated length of perennial streams within this regional project watershed.

**(4) South Branch of the Potomac River Regional Project Watershed (WV)**

The ASDEIS IRA would have little impact on streams in this regional project watershed. No stream crossings are proposed within the Anderson Run local project watershed. Within the Main Channel local project watershed, the ASDEIS IRA would require one pipe and one stream relocation. The proposed stream enclosure and relocation would impact approximately 0.1 percent of the total length of perennial streams within this regional project watershed.

**(5) Cacapon River Regional Project Watershed (WV)**

Within the Skaggs Run local project watershed, the ASDEIS IRA would require four pipe crossings of streams. Within the Baker Run local project watershed, the ASDEIS IRA would require 5 pipe crossings. Within the Central Cacapon local project watershed, the ASDEIS IRA would require two box culverts and seven pipe crossings. Within the Slate Rock Run local project watershed, the ASDEIS IRA would require six pipe crossings and two stream relocations. The proposed stream enclosures and relocations for local project watersheds would impact approximately 1.2 percent of the total estimated length of perennial streams within this regional project watershed.

**(6) Shenandoah River Regional Project Watershed (VA)**

The ASDEIS IRA would require six pipe crossings and two stream relocations. Habitat degradation and alterations in water quality could also occur along Duck Run. The proposed stream enclosures and relocations would impact approximately 0.2 percent of the total estimated length of perennial streams within this regional project watershed.

**(7) Proposed Bridges: ASDEIS IRA**

Within West Virginia, the proposed ASDEIS IRA would bridge rivers listed on the Nationwide Rivers Inventory (Shavers Fork, the South Branch of the Potomac River, and Lost River). The

ASDEIS IRA would also cross six native or stocked trout streams in West Virginia. Of the six trout streams, four would be bridged by the ASDEIS IRA: the North Fork of Patterson Creek, Lost River, Waites Run, and Trout Run. The remaining two trout streams, Slip Hill Mill Run and Roaring Run, would have piped crossings. Slip Hill Mill Run would require piping since the ASDEIS IRA crosses at the extreme headwaters of the stream. The ASDEIS IRA would require a piped crossing of Roaring Run at its headwaters and a short relocation further downstream. Within Virginia, the ASDEIS IRA would bridge Cedar Creek (Nationwide Rivers Inventory, Stocked Trout). Table III-67 (Vol. II) identifies the bridges associated with the ASDEIS IRA.

**c. Preferred Alternative (WV) and Line A (VA)**

The direct impact of the Preferred Alternative (WV) and Line A (VA) on perennial streams in each local project watershed is presented in Table III-65 (Vol. II). Figure III-23 (Vol. II) clusters individual stream crossing samples by BI rank and Figure III-24 (Vol. II) clusters stream crossings by habitat assessment score for the six regional project watersheds. Table III-66 (Vol. II) provides the total length of enclosures and relocations for each regional project watershed and a comparison against the total length of perennial streams within each regional project watershed. The following summarizes the direct impacts to surface waters for each regional and local project watershed.

**(1) Tygart Valley River Regional Project Watershed (WV)**

The Preferred Alternative (WV) would require two box culverts, three pipes, and two stream relocations. The proposed stream enclosures and relocations would impact approximately 1.0 percent of the total length of perennial streams within this regional project watershed.

**(2) Cheat River Regional Project Watershed (WV)**

Within the Shavers Fork local project watershed, the Preferred Alternative (WV) would require one pipe crossing and one stream relocation. The Preferred Alternative (WV) could impact Pleasant Run, a native trout stream. Although the Preferred Alternative (WV) would impact marginal riparian areas, it would require some deforestation and cuts on a steep slope paralleling the entire length of Pleasant Run.

Within the Black Fork local project watershed, the Preferred Alternative (WV) would require ten box culverts, eighteen pipe crossings, and four stream relocations. Measurable direct impacts to Roaring Run are expected. A small tributary to Slip Hill Mill Run may be impacted, thereby resulting in increased silt loads to Slip Hill Mill Run. The proposed stream enclosures and relocations for both Shavers Fork and Black Fork local project watersheds would impact approximately 1.3 percent of the total length of perennial streams within this regional project watershed.

**(3) North Branch of the Potomac River (WV)**

Within the Stony River local project watershed, the Preferred Alternative (WV) would require two box culverts, one pipe crossing, and four stream relocations. Within the Patterson Creek local project watershed, the Preferred Alternative (WV) would require two box culverts, five pipe crossings, and four stream relocations. The proposed stream enclosures and relocations for both local project watersheds would impact approximately 1.5 percent of the total length of perennial streams within this regional project watershed.

**(4) South Branch of the Potomac River Regional Project Watershed (WV)**

One box culvert crossing is proposed within the Anderson Run local project watershed. Within the Main Channel local project watershed, the Preferred Alternative (WV) would require one stream relocation. The proposed stream enclosures and relocations for both local project watersheds would impact approximately 0.5 percent of the total length of perennial streams within this regional project watershed.

**(5) Cacapon River Regional Project Watershed (WV)**

Within the Skaggs Run local project watershed, the Preferred Alternative (WV) would require two box culverts, four pipe crossings, and two stream relocations. Within the Baker Run local project watershed, the Preferred Alternative (WV) would require two box culverts and two pipe crossings. Within the Central Cacapon local project watershed, the Preferred Alternative (WV) would require one box culvert, four pipe crossings, and one stream relocation. Within the Waites Run local project watershed, the Preferred Alternative (WV) would require one box culvert and one pipe crossing. Within the Slate Rock Run local project watershed, the Preferred Alternative (WV) would require two box culverts and four pipe crossings. The proposed stream enclosures and relocations for local project watersheds would impact approximately 2.2 percent of the total length of perennial streams within this regional project watershed.

**(6) Shenandoah River Regional Project Watershed (VA)**

Line A (VA) would require three box culverts, three pipes, and two stream relocations. Line A (including alignments within the Duck Run Option Area) would traverse a large portion of the Duck Run watershed. Line A and Lines D1 and D2 would require substantial cuts, fill, and deforestation, resulting in alterations in hydrology, increased sedimentation, and variability in surface water temperature. Line A would require a box culvert crossing of a tributary to Paddy Run, a native trout stream. No other stream systems are expected to incur direct impacts within this regional project watershed. The proposed stream enclosures and relocations for the Cedar Creek local project watershed would impact approximately 0.3 percent of the total length of perennial streams within this regional project watershed.

(7) **Proposed Bridges**

The Preferred Alternative (WV) would bridge the three rivers listed on the Nationwide Rivers Inventory: Shavers Fork, the South Branch of the Potomac River, and Lost River. It would bridge all nine native or stocked trout streams crossed in West Virginia (Pleasant Run, Roaring Run, Elklick Run, North Fork of Patterson Creek, Lost River, Waites Run, and Trout Run) and 13 of 15 West Virginia High Quality Streams. Table III-68 (Vol. II) identifies the bridges along the Preferred Alternative (WV).

Within Virginia (Shenandoah regional project watershed), Line A would bridge Cedar Creek (Nationwide Rivers Inventory, Stocked Trout) and Duck Run (Native Trout and Outstanding State Resource Water) and avoid all of Duck Run's perennial tributaries. Line A would require a box culvert crossing of a tributary to Paddy Run (Native Trout). Table III-68 (Vol. II) identifies the bridges associated with Line A.

**d. Comparison of Alternatives**

A comparison of direct impacts to streams was conducted. For the entire project, the ASDEIS IRA, and the Preferred Alternative (WV) and Line A would require a similar number of stream crossings and relocations. However, the Preferred Alternative (WV) would result in approximately twice the amount of direct stream impacts as would be expected under the ASDEIS IRA. The following summarizes the direct stream impacts of the ASDEIS IRA and the Preferred Alternative (WV) for each regional project watershed and local project watershed. Refer to Table III-4 (Vol. II) for a comparison of the direct impacts of each alternative within each regional project watershed.

(1) **Tygart Valley River Regional Project Watershed (WV)**

The Preferred Alternative (WV) would require 7 stream enclosures compared to the 13 proposed for the ASDEIS IRA, however, the length of stream impact for the Preferred Alternative (WV) would be approximately 33 percent greater than that of the ASDEIS IRA. The ASDEIS IRA would impact more streams, but the Preferred Alternative (WV) would impact a greater length of stream including a greater number and length of moderately impaired streams.

(2) **Cheat River Regional Project Watershed (WV)**

Overall, the Preferred Alternative (WV) and the ASDEIS IRA would impact similar numbers of streams within this regional project watershed, but the Preferred Alternative (WV) would impact nearly twice the length of streams as would the ASDEIS IRA.

Within the Shavers Fork local project watershed, the Preferred Alternative (WV) would require fewer stream enclosures or relocations but greater total length of stream impact than the ASDEIS

IRA. The ASDEIS IRA would impact a greater number of streams, and enclose or relocate a greater number and length of streams with greater BI than would the Preferred Alternative (WV).

Within the Black Fork local project watershed, the Preferred Alternative (WV) would have approximately 122 percent more direct stream impacts than the ASDEIS IRA. Both alternatives would directly impact a similar number of streams.

**(3) North Branch of the Potomac River Regional Project Watershed (WV)**

Within this regional project watershed, the Preferred Alternative (WV) would impact twice the number of streams and nearly four times the length of streams as would the ASDEIS IRA.

Within the Stony River local project watershed, although the ASDEIS IRA and the Preferred Alternative (WV) impact a similar number of streams, the Preferred Alternative (WV) would have twice the direct stream impacts of the ASDEIS IRA. In addition, the Preferred Alternative (WV) would impact higher quality (higher BI ranks) streams than would the ASDEIS IRA.

Within the Patterson Creek local project watershed, the Preferred Alternative (WV) would impact considerably greater number and length of stream than would the ASDEIS IRA. However, the ASDEIS IRA would impact more higher quality streams than would the Preferred Alternative (WV).

**(4) South Branch of the Potomac River Regional Project Watershed (WV)**

Within the South Branch of the Potomac River regional project watershed, the Preferred Alternative (WV) would have the same number of stream impacts but result in five times greater stream length impacts as would the ASDEIS IRA.

The ASDEIS IRA would not impact streams in the Anderson Run local whereas the Preferred Alternative (WV) would require one stream crossing. Within the Main Channel local project watershed, the Preferred Alternative (WV) would have three times the length of direct stream impacts as would the ASDEIS IRA.

**(5) Cacapon River Regional Project Watershed (WV)**

Overall, the Preferred Alternative (WV) and the ASDEIS IRA would impact similar numbers of streams within this regional project watershed, but the Preferred Alternative (WV) would impact a greater stream length than the ASDEIS IRA. The majority of the difference would be due to streams in the Skaggs Run and Central Cacapon River local project watershed. The number of higher quality streams impacted (BI rank A or B) would be similar under either alternative, but the Preferred Alternative (WV) would impact twice the length of higher quality streams.

Within the Skaggs Run local project watershed, the Preferred Alternative (WV) would impact twice the number of streams and have more than four times greater direct stream impacts than would the ASDEIS IRA. For the Baker Run local project watershed, the Preferred Alternative (WV) would have nearly the same impacts as would the ASDEIS IRA. Within the Central Cacapon local project watershed, the Preferred Alternative (WV) would impact fewer streams, but would have approximately 64 percent greater direct stream impacts than would the ASDEIS IRA. Within the Waites Run local project watershed, the Preferred Alternative (WV) would impact 213 meters (700 feet) of direct stream impacts, whereas the ASDEIS IRA would avoid all impacts. Within the Slate Rock Run local project watershed, the Preferred Alternative (WV) and the ASDEIS IRA would have approximately the same stream impacts.

**(6) Shenandoah River Regional Project Watershed (VA)**

Within the Cedar Creek local project watershed, although the ASDEIS IRA and Line A would impact the same number of streams, Line A would result in approximately twice the direct stream impacts as would the ASDEIS IRA. Line A would utilize more culverts while the ASDEIS IRA would utilize more pipes.

**e. Comparison of the Option Areas**

The stream impacts with the Options Areas in West Virginia and Virginia are presented in Table III-69 and Table III-70 (Vol. II), respectively.

Within the Interchange Option Area, Line A and the Preferred Alternative (Line I) would have similar impacts on streams. Within the Shavers Fork Option Area, the Preferred Alternative (Line S) and Line A would require no enclosures and minimal relocations of perennial streams. The Preferred Alternative (Line S) would require one crossing of Shavers Fork while Line A would require a three bridge crossings of Shavers Fork. Within the Patterson Creek Option Area, the Preferred Alternative (Line A) would minimize impacts to perennial streams, particularly the Middle Fork of Patterson Creek. Line P would require a greater number and longer enclosures and relocations of perennial streams. The Preferred Alternative (Line A) would bridge the Middle Fork of Patterson Creek while Line P would use a box culvert. Within the Forman Option Area, Line A and the Preferred Alternative (Line A) would have similar lengths of stream enclosures.

Within the 5-D Option Area, the Preferred Alternative (5-D) and Line A would have similar impacts. Within the Baker Option Area, Line A would require a bridge over the Lost River, two bridges over Baker Run, and piping of a perennial tributary to Baker Run. The Preferred Alternative (Line B) would require a bridge over Lost River but would avoid crossing Baker Run. The Preferred Alternative (Line B) also would require a 650 foot box culvert of a perennial tributary to Baker Run. Within the Baker Option Area, Line A would result in the least impacts to perennial streams. Within the Hanging Rock Option Area, both the Preferred Alternative (Line A) and Line R would bridge the Lost River and there would be minimal differences in impacts to perennial streams between the Preferred Alternative (Line A) and Line R.

There are three alignments within the Duck Run Option Area (in Virginia): Line A, Line D1, and Line D2. Line A would bridge Duck Run (native trout, Outstanding State Resource Waters) twice and require a culvert across a tributary of Paddy Run (native trout). Line D1 would require bridging Duck Run three times, but would avoid the tributary to Paddy Run and minimize construction within the George Washington National Forest. Line D2 would not cross Duck Run, but would cross the tributary to Paddy Run and require the greatest amount of construction within the George Washington National Forest.

Line A within the Lebanon Church Option Area (in Virginia) is aligned across the headwaters of Mulberry Run and Town Run. This position in the watershed results in the crossing of several tributaries to these streams. Line L, on the other hand, is located further to the north which minimizes the number of perennial streams the line crosses but increases the number of intermittent streams crossed. Within the Lebanon Church Option Area, Line L would result in the least number of impacts to perennial streams.

### f. Secondary Impacts

Secondary impacts to surface waters could include degradation of water quality and aquatic habitat as a result of: stormwater runoff carrying sediment and highway pollutants into streams; reduced light penetration resulting in lower net primary production and increased biological oxygen demand, hindered movement of aquatic organisms in streams and rivers due to enclosures; and reductions in forested riparian buffers adjacent to waterways.

#### (1) Erosion And Sedimentation

Sedimentation of streams during and after construction of the proposed project could adversely impact both aquatic invertebrates and fishes by altering the existing substrate, increasing turbidity, reducing light penetration, reducing dissolved oxygen, and increasing biological oxygen demand. When sedimentation of the stream results in the silt content of the substrate exceeding 15 percent, trout populations are reduced by 50 percent (Hunter, 1991). Sedimentation can also have acute and chronic effects on aquatic invertebrates (e.g., aquatic insects, mussels, zooplankton) and fish. Elevated suspended sediment concentrations (above 20,000 ppm) can cause mortality in adult fish by clogging the gill filaments and preventing normal water circulation and aeration of blood. However, abrasion damage to gills begins to occur at sediment concentrations as low as 200 ppm (Welsch, 1991). Additionally, low concentrations can cause behavioral changes and disrupt normal reproduction by smothering spawning areas and preventing the emergence of fry.

The effects of silt (suspended particulate matter) has also been reported to be a limiting factor in the distribution and density of invertebrate organisms such as unionids (Bartsch, 1916; Ellis, 1936; National Technical Advisory Committee, 1968; Luedtke and Brusven, 1976; Marking and Bills, 1980; Brzezinski and Holton, 1981; Gray and Ward, 1982; Buikema *et al.*, 1983; Cowie, 1985; Duncan and Brusven, 1985; Garie and McIintosh, 1986; Aldridge *et al.*, 1987; Dewalt and Olive, 1988; Wolcott and Neves, 1990; Hogg and Norris, 1991; Corkum, 1992; Layzer and Anderson, 1992; Houp, 1993). As silt settles out of the water column, the rate of accretion can be greater than the escape rate of many invertebrates that are less mobile or sedentary in nature. The modification in substrates as a result of sedimentation excludes many invertebrate species that use the interstitial zones of cobble/gravel stream beds.

**(2) Highway Pollutants**

After construction of the proposed project, major sources of pollutants include vehicles, dustfall, and precipitation (Charbeneau *et al.*, 1993). A variety of factors (e.g., traffic volume and type, local land use, and weather patterns) affect the type and amounts of pollutants. Additionally, roadway maintenance practices such as sanding, deicing, and application of herbicides on highway rights-of-way can also act as sources of pollutants. Table III-71 (Vol. II) lists the types of contaminants associated with roadway operation. From this list, deposition of pollutants from vehicles (both direct and indirect) is the largest source of pollutants during most of the year, while deicing salts (sodium chloride and calcium chloride) and abrasives are the largest source of pollutants during periods of snow and ice (Gupta *et al.*, 1981). The rate of deposition and subsequent magnitude of these pollutants in highway runoff are site-specific and affected by traffic characteristics, highway design, maintenance activities, surrounding land use, climate, and accidental spills.

Highway pollutants are removed from the highway through a number of mechanisms which include stormwater runoff, wind, vehicle turbulence, and the vehicles themselves. The effects of highway runoff on streams are variable and dependent on the length of time since the last storm event, traffic volume, natural surface winds, the quantity of stormwater runoff delivered to the stream, volume of flow in the stream, and the duration of the storm event (Charbeneau *et al.*, 1993). The most important factor contributing to the accumulation of pollutants from highway operation and maintenance is the build up of fine particulate matter. Many toxic compounds such as heavy metals and hydrocarbons adhere to fine particles and are easily transported by stormwater runoff to nearby streams. The accumulation of particulate matter on a highway is also directly proportional to the amount of traffic on the highway. However, vehicle turbulence can also remove solids and other pollutants from highway lanes and shoulders (Kerri *et al.*, 1985; and

Asplund et al., 1980) which distorts the relationship between traffic volume and pollutant concentrations in runoff.

Highway runoff may adversely affect the water quality through acute (i.e. short-term) loadings (i.e. storm events) and through chronic effects as a result of long-term accumulation and exposure. Research on rural highways similar to the proposed project indicates few substantial effects from highway runoff are apparent for highways with an average daily traffic (ADT) of less than 30,000 vehicle per day and that toxic effects are limited to urban highways with high ADTs (>50,000 ADT) (Maestri, *et al.*, 1981). Driscoll *et al.* (1990) concluded that runoff concentrations are two four times higher for highways that are subject to ADTs > 30,000. Dupuis and Kobriger (1985) reported that there were no apparent water quality impacts during storm events on benthic invertebrates. Based on the volume of traffic predicted for the proposed project (23,000 vehicles per day), it is anticipated that there would be no measurable differences in water quality on receiving streams.

**(3) Aquatic Habitat**

As described in previous sections, impacts to streams include alterations in stream hydrology, geometry, and the degradation of water quality. These impacts could impact the stream's capacity to provide habitat suitable for aquatic wildlife, including game and non-game fish, amphibians, and invertebrates.

Impacts to the aquatic environment change with time and space. Spatially, the movement of aquatic invertebrates and fish within streams is important to the colonization of portions of streams temporarily disturbed during construction and to the natural colonization of undisturbed streams (*Lancaster et al.*, 1990). During periods of low stream flow, movement of fish and aquatic invertebrates along a stream to areas of deeper water is necessary. Colonization of stream substrate by aquatic invertebrates come from four major sources: downstream drift, upstream movement, vertical movement from deep within the substrate, and aerial movements of adults (Waters, 1961,1962a, 1962b, 1965: as cited by Pearson and Kramer, 1972; Hynes, 1970; William and Hynes, 1976; Williams and Levens, 1988).

A number of macroinvertebrate species are known to move vertically into gravel and cobble substrate to depths of at least 100 centimeters. Movement vertically, horizontally, and laterally within the substrate can contribute substantially to the colonization of disturbed streams. Additionally, disturbed areas can be colonized by adult insects depositing eggs into the stream or substrate. Upstream movement of adults have been documented in Tricoptera, Plecoptera, Ephemeroptera, and Simuliidae. Some caddisflies undertake a definite upstream migration estimated at 2 to 3 kilometers (Pearson and Kramer, 1972). The importance of adult deposition of eggs for colonization varies based on the location of the stream within the watershed. Headwater streams are more dependent on adult deposition than are streams located lower in the watershed. In headwater streams, adult recruitment can lead to restoration of the trophic structure of a disturbed stream within two years. However, the taxa may differ from pre-construction conditions due to the lack of taxa with poor dispersal abilities such as some stoneflies (Wallace *et al.*, 1986).

Bridging avoids permanent impacts to aquatic habitat, but enclosures and relocations would have temporary and permanent impacts. The use of bridges to cross 39 streams avoids impacts to the aquatic habitat of those streams.

Enclosures (e.g. pipes and box culverts) would have temporary and permanent impacts on aquatic habitat. Streams would be temporary diverted or dammed while the pipe or culvert is constructed. A portion of the streams immediately adjacent to the construction of the enclosure would be disturbed during construction. However, counter sinking the enclosure below the level of the streambed would allow upstream and downstream movement of aquatic invertebrates and fish within the stream.

If proper mitigation measures are implemented, the relocation of stream channels should not detrimentally impact the movement of aquatic invertebrates or fish in areas where an acceptable ratio of pools and riffles are established.

**(4) Riparian Habitat**

The proposed project would impact the terrestrial environment immediately adjacent to stream corridors. The productivity of a stream, its water quality, and aquatic habitat, are affected by the type of riparian habitat along its banks and associated floodplain.

Overland surface runoff conveys nutrients and pollutants into streams, thereby affecting aquatic habitat and water quality. Forested riparian buffer strips adjacent to streams substantially reduce the impacts of overland surface runoff on receiving streams. Forested riparian buffer strips perform these functions through the process of filtering and transforming organic and inorganic material (Welsch, 1991; Croonquist and Brooks, 1993). The minimum width of a forested riparian buffer strip required to protect the functions that the riparian forests provides in improving water quality and aquatic and terrestrial habitats varies with soils types, slope, and permeability. According to Welsch (1991), at least 23 meters (75 feet) of riparian forest is needed to protect stream water quality and aquatic habitat.

Within the project area, most of the smaller, mountainous first order streams possess a riparian forest composed of hardwoods (oaks, yellow birch, maples, and sycamore), while steeper stream valleys with cooler and moister climates support hemlock and rhododendron. Along relatively flat second and third order stream valleys within the project area, much of the valley bottom has been converted to agricultural use, resulting in the complete loss of a forested riparian buffer strip or reduced to a narrow fringe along the stream banks. Many of the existing roadways in the study area are located along streams, thus reducing the abundance of riparian habitat.

Any construction near streams would result in some level of impact to the existing riparian habitat. The greatest potential for impact would be along streams which have well developed riparian forests. Construction along stream valleys could not be avoided but impacts to riparian forests were minimized where possible by placing the alignments a minimum of 23 meters (75 feet) up slope of the stream.

**(5) Estimated Secondary Impacts: ASDEIS IRA**

Table III-72 (Vol. II) presents a summary of the impact to riparian buffers under the ASDEIS IRA. The ASDEIS IRA would impact 59 riparian buffers paralleling 9,463 meters (31,045 feet) of perennial stream. Riparian buffers less than 23 meters (75 feet) are less capable of providing water quality and wildlife benefits. A majority of these narrower riparian buffers (88%) would contain either forest, shrub and brush, or emergent wetlands thus providing some benefits for wildlife and water quality. The ASDEIS IRA would impact almost five times the amount of riparian buffer as would the Preferred Alternative (WV) and Line A (VA).

**(6) Estimated Secondary Impacts: Preferred Alternative (WV) and Line A (VA)**

The Preferred Alternative (WV) and Line A (VA) combined would impact 19 riparian buffers paralleling 1,739 meters (5,792 feet) of perennial stream (Vol. II, Table III-73). A majority of these narrower riparian buffers (79%) would contain either forest, shrub and brush, or emergent wetlands thus providing some benefits for wildlife and water quality. Agricultural land, which comprises the remaining 21 percent, would be of limited water quality and wildlife value.

**(7) Alignment Comparison**

The ASDEIS IRA would impact 43 riparian buffers paralleling 7,899 meters (25,909 feet) of streams categorized as non-impaired or moderately impaired (BI rank A or B), while the Preferred Alternative (WV) and Line A would impact 7 riparian buffers paralleling 909 meters (3,014 feet). The water quality and aquatic communities of these streams may be more susceptible to construction induced runoff than streams with lower categorical rankings (BI rank C or D).

The Cheat River regional project watershed has the greatest number of riparian buffer impacts for both the ASDEIS IRA (28) and the Preferred Alternative (WV) (6). The greatest length of ASDEIS IRA riparian impact would also occur in this watershed (4,072 meters, 12,330 feet) while the North

Branch of the Potomac River regional project watershed contains the greatest length of riparian impact for the Preferred Alternative (WV) (457 meters, 1,384 feet).

Within both the Cacapon and Shenandoah River regional project watersheds, the ASDEIS IRA would impact a greater number and length of riparian buffer zone. Both the Cacapon and Shenandoah River regional project watersheds contain sensitive water resources such as the Lost River, Baker Run and Duck Run. The loss of forested riparian buffers could result in an increase in water temperature and a reduction of the dissolved oxygen concentration. This could negatively affect existing aquatic organism populations, including the native brook trout (*Salvelinus fontanalis*) population in Duck Run.

## g. Cumulative Impacts

### (1) Additive Direct Impacts

The additive effects of direct impacts to streams systems have been addressed in the watershed discussions. Although Roaring Run would experience substantial impacts due to the total length of enclosures (direct impacts) under the Preferred Alternative (WV), no cumulative effects of this impact are anticipated within the Cheat River watershed. The total of all enclosures in the Cheat River watershed represents 1.3% of the total length of perennial streams.

### (2) Additive Direct and Secondary Impacts

Highway-related secondary impacts would be due to riparian buffer zone encroachment and deforestation. Under the ASDEIS IRA, three stream systems would experience such impacts: Haddix Run and Roaring Run in the Cheat River watershed, and Duck Run in the Shenandoah River Watershed. Under the Preferred Alternative (WV) and Line A (VA), Pleasant Run and Roaring Run in the Cheat River watershed and Duck Run would experience secondary impacts. It is not anticipated that these impacts would measurably affect the Cheat River or the Shenandoah River watersheds, based on a study discussed in detail in the *Streams Technical Report.* This study evaluated baseline stream data and water quality, and reviewed existing surrounding land use. The overall Biotic Integrity ranking of the local project watersheds within the Cheat River and the Shenandoah watersheds was "B", moderately impaired. In view of this ranking, the impacts anticipated are not expected to reduce the BI to rank "C". Additionally, riparian buffer zone encroachments can be mitigated, along with the ability to minimize further the lengths of buffers less than 23 meters (75 feet) during final design.

Roaring Run would experience the additive effects of direct and secondary impacts under the Preferred Alternative (WV) based on total enclosures and deforestation, respectively. No stream under the ASDEIS IRA would experience measurable cumulative effects due to direct and secondary impacts.

The only identified potential development-related impact to streams is associated with the Grant County Industrial Park and Four Mile Run. This impact could be avoided during site planning efforts of the park. A study of the direct impacts in the North Branch of the Potomac River watershed indicates that cumulative effects in this watershed would be minimal. The BI of the streams studied in this regional project watershed are ranked as "C", impaired and "B", moderately impaired, for the Stony River and Patterson Creek watersheds. Existing land use and minimal predicted residential development are not expected to reduce the Biotic Integrity to "C".

Other non-quantifiable development such as new residential plans have been addressed in the watershed analysis contained in the cumulative impacts discussion of the *Streams Technical Report.*

**(2) Foreseeable Future Actions**

The Canaan Valley Wildlife Refuge is a preservation measure and as such is a positive impact to the stream systems and aquatic habitat in this portion of the Cheat River Watershed. Stony Run Dam would impact the flora and fauna of the Stony Run watershed. However, these impacts are not associated with those of direct or secondary nature due to the proposed project, and are not expected to have a combined effect on the watershed. The Moorefield floodwall project would have temporary impacts on the aquatic habitat within the South Branch channel but would have no long term effects. Therefore, no cumulative impacts of this action are anticipated. The Monongahela and the George Washington National Forests adhere to Best Management Practices in the preparation of erosion and sedimentation control plans. For further analysis of cumulative impacts refer to Section III. Y-Cumulative Impacts.

## 4. AVOIDANCE, MINIMIZATION, AND MITIGATION

The preliminary design of the proposed project included employing general avoidance and minimization measures. During the later stages of the design process, field reviews by highway engineers, environmental scientists, and regulatory agency personnel identified additional opportunities where avoidance and minimization measures could be incorporated into the design.

### a. General Avoidance and Minimization Measures

During the preliminary design process, impacts to streams were avoided, to the extent possible, by avoiding native and stocked trout streams, longitudinal impacts to streams and riparian forests, bridging streams, and minimizing culverts, relocations, and transverse crossings of perennial streams. Avoidance and minimization measures included adjustments to the location of the alignment (horizontal alignment) and the width of the construction limits (vertical alignment). The horizontal and vertical alignments were adjusted to avoid and/or minimize the number and length of stream relocations and enclosures. However, the adjustments were constrained by the presence of other sensitive resources (e.g.

adjacent streams, wetlands, known cultural resources, residences). Where practicable, the vertical alignment was modified to reduce the width of the construction limits to avoid stream encroachments. Construction limits were also narrowed by increasing the steepness of fill slopes. The changes in vertical alignment and slopes avoid 2,006 meters (6,580 feet) of stream relocations or encroachments. In three cases, retaining walls were included in the preliminary design to avoid an additional 579 meters (1,900 feet) of stream relocations. A total of 2,585 meters (8,480 feet) of stream relocations were avoided during the design process. Table III-74 (Vol. II) presents the various measures employed to avoid stream relocations. Avoidance and minimization of stream impacts is also discussed in Appendix G of the ASDEIS: *Section 404 Permit Application and Alternatives Analysis*.

**b. Specific Avoidance and Minimization Measures**

Specific avoidance and minimization measures were developed and incorporated into the preliminary alignments following stream sampling and field reviews with state and federal resource agencies. The following sections detail specific avoidance and mitigation measures that would reduce the direct and ecological impacts of the proposed project on surface waters within the immediate vicinity of the proposed project.

**(1) Bridges**

Prior to alignment field reviews with resource agencies, 35 bridge crossings had been proposed representing approximately 5,902 meters (19,385 linear feet) of construction. The 35 bridges represent a cost of approximately $217.6 million and would avoid approximately 3,889 meters (12,760 feet) of stream enclosures. Following the alignment field reviews, four additional streams were identified for bridging where box culverts were initially proposed. The four bridges would avoid an additional 1,146 meters (3,760 feet) of stream enclosures at an additional cost of approximately $27.4 million. The 39 proposed bridge crossings represent 6,945 meters (22,785 linear feet) of construction at a cost of approximately $184 million. Table III-75 (Vol. II) presents additional avoidance and minimization measures developed following field reviews.

The Preferred Alternative (WV) and Line A (VA) would bridge the four rivers listed on the Nationwide Rivers Inventory, as well as nine of the ten native or stocked trout streams (Pleasant Run, Roaring Run, Elklick Run, North Fork of Patterson Creek, Lost River, Waites Run, Trout Run, Duck Run, and Cedar Creek). Thirteen out of fifteen West Virginia designated High Quality Streams crossed by the Preferred Alternative (WV) would be bridged, as well as Duck Run along Line A, which Virginia lists as Outstanding State Resource Waters.

(2) **Enclosures**

After alignment field reviews with resource agencies, additional opportunities to minimize the length of direct impacts to surface waters were identified. This included alignment shifts and reductions in construction limits which, as a whole, reduced the length of box culverts and pipes by approximately 175 meters (575 feet).

Culverts and pipes should be countersunk, allowing substrate to fill the culverts and pipes. The natural substrate re-establishes aquatic habitat within the enclosures and aids in the movement of aquatic organisms. This design measure requires larger pipes and culverts, thus increasing the cost of construction. Other design measures which mitigate surface water impacts include low flow diversions. Low flow diversions would be used on all multiple barrel box culverts to insure stream flow during periods of low flow. This design measure allows fish and other organisms to retreat and maintains uninterrupted flow to downstream users.

Streams with non-impaired or moderately impaired biotic integrity (BI rank A or B) and good to excellent habitat (habitat assessment >90) are identified in Table III-76 (Vol. II). These streams are proposed for use of open bottom box culverts to minimize further direct impacts to stream habitat and hydrology.

(3) **Relocations**

Relocations of major streams were avoided by shifting alignments, increasing slope angles, and using retaining walls. Approximately 2,585 meters (8,480 feet) of stream relocations were avoided. Relocations were generally limited to small first order headwater streams. In many cases, a small stream was aligned perpendicular to a larger stream. The relocation of the smaller stream was often required to minimize impacts to the larger stream.

**c. Avoidance and Minimization of Secondary Impacts**

Permanent and temporary direct and secondary impacts would occur as a result of the construction of the proposed project. These impacts would be avoided or minimized by incorporation of environmentally sensitive construction techniques. WVDOH recognizes the sensitivity of many of the surface waters in the Corridor H project area. Because of this recognition, it plans to use advanced sedimentation and erosion control practices in those watersheds containing high quality, sensitive streams and has developed a resource agency involvement process that includes agency input though the final design and construction of highway sections. Additionally, habitat improvement activities associated with stream mitigation will actually increase the diversity of habitat in a number of degraded streams with project involvement. Discussions of these mitigation activities are included in the *Corridor H FEIS Mitigation Document (Vol. III)*.

WVDOH has also made commitments in the *Corridor H FEIS Mitigation Document (Vol. III)* to improve stream habitat in impacted streams or in the same watershed as those impacted streams. Stream habitat improvement will be developed to replace those stream functions that will be diminished by the encroachment. Additionally, because the impact of highway construction, operation and maintenance on streams in the Northeast has not been well documented in the literature (i.e., many impact assessments generally rests on extrapolation of studies from other geographic areas and other types of transportation facilities (such as logging roads)), WVDOH and FHWA have agreed to fund long range (5-8 year) studies of select streams that will be crossed by Corridor H. Discussion of these studies is contained in the *Corridor H FEIS Mitigation Document (Vol. III)*.

**(1) Bridges**

Bridging would avoid permanent impacts to streams but would result in temporary impacts during construction due to temporary stream crossings, bank stabilization, placement of piers for larger bridges, and clearing of riparian vegetation. General construction measures which would be employed to minimize impacts during bridge construction include: temporary construction access with nonerodible materials; stabilization of stream slopes with nonerodible materials or with vegetation where practicable; construction of all instream piers for large bridges within nonerodible cofferdams; adequate settlement and filtration of water pumped from cofferdams prior to discharge into streams; and selective removal of vegetation which interferes with the construction of the proposed bridge.

**(2) Enclosures**

General construction measures taken to avoid or minimize impacts to perennial streams during construction of enclosures would include: erosion and sedimentation controls; proper instream construction techniques, including temporary diversions; minimizing clearing adjacent to stream channels; and construction during periods of low stream flow.

**(3) Relocations**

General construction measures taken to minimize impacts to perennial streams being relocated would include: providing a natural, meandering stream channel design; design of adequate pool-riffle ratios to maximize fish habitat; and stabilizing the relocation channels "in the dry" prior to diversion of water.

### (4) Erosion and Sedimentation

For each section of highway designed, a comprehensive erosion and sedimentation control plan would be implemented to minimize impacts. The erosion and sedimentation plans would include advanced erosion and sedimentation control measures and best management practices (BMP's), as described in WVDOH's *Erosion and Sedimentation Control Manual* (1993) and *Standard Specifications Road and Bridges (1993)*. Additional advanced sedimentation and erosion control and revegetation measures are discussed in the *Corridor H FEIS Mitigation Document (Vol. III)*. In Virginia, the construction of the proposed project would adhere to Virginia's Stormwater Management Regulations (1993) and VDOT's *Road and Bridge Specification*, as well as the *Virginia Erosion and Sedimentation Control Handbook* (1992).

After construction of the facility is completed, permanent erosion control measures would be instituted. These measures would include stabilizing cut and fill slopes, shoulders, medians, and any other areas of exposed soils as well as drainage swales and ditches. Stabilization could be established with perennial vegetation or the use of non-erosive materials (i.e. riprap, geotextiles, etc.).

### (5) Highway Stormwater Runoff

Mitigation measures designed to control storms producing less than one inch of rainfall would control nonpoint pollution discharges for approximately 90 percent of the storms each year. The majority of pollutant loads from a storm are delivered by a relatively small percentage of the runoff volume during the initial stages of the storm. Mitigation measures in the final design should address the control of this "first flush" and the removal of heavy metals and other pollutants which tend to adhere to sediment particles.

Two methods have been shown to be highly effective in removing pollutant from runoff (Masestri *et al.*, 1981). The first is the use of vegetated surfaces (grass) to manage highway stormwater runoff pollution which capitalizes on the natural capability of vegetated surfaces to reduce runoff velocity, enhance sedimentation, filter suspended solids, and increase infiltration. Secondly, the use of wet detention basins which maintain a permanent pool of water capable of highly effective pollutant removal, principally through sedimentation. These methods have been found to be the most effective in removing a significant percentage of the pollutant load from stormwater runoff (Vol. II, Table III-77).

In Virginia, the project would be subject to Virginia's *Stormwater Management Regulations (1992)*. Numerous studies have shown that the greatest concentrations of highway pollutants are contained within the first "pulse" of a storm event. By requiring the detainment of the first 0.5 inches of rainfall, the water quality of receiving streams would not be subjected to this initial pulse. In West Virginia, there are no requirements for permanent management of highway stormwater quantity or quality.

In addition to control of stormwater runoff during the operation of the highway, proper application and storage of deicing chemicals, pesticides, and herbicides would minimize the introduction of these pollutant into surface waters.

**(6) Riparian Habitat**

Where possible, alignments were developed to avoid riparian buffers along perennial streams. However, some encroachment upon riparian buffers of perennial streams is unavoidable. One possible mitigation strategy would be to make design modifications during final design that would provide a minimum riparian buffer of 23 meters (75 feet). A commitment would also be made to re-vegetate areas that are disturbed during the construction process within 30 meters (100 feet) of perennial streams. Existing riparian buffers, particularly those composed of agricultural or disturbed land, could also be improved through mitigation measures designed to enhance wildlife and/or water quality functions. A riparian buffer management plan could be developed to plant tree and shrub species that would both increase sedimentation/nutrient reduction capabilities and provide more productive habitat for a variety of wildlife species.

**(7) Stream Channel Enhancement**

During construction, clearing of riparian vegetation would be limited to the minimum required to accommodate the construction of the facility. Areas not intended to be cleared would be protected from accidental intrusion by flagging or fencing. After clearing and grading, riparian areas would be revegetated to control erosion and sedimentation.

There are a number of structures that could be used to increase fish and macroinvertebrate habitat. Such structures include log dams, channel deflectors, over hanging bank cover, lunker structures, and introduced boulders. Priority should be given to the use of natural materials such as locally collected logs and boulders. The installation of 25 stream structures per mile of stream is considered ideal, but would vary depending on the quality of the existing habitat within the stream and the amount of habitat being replaced (i.e. amount of habitat lost to stream relocation).

**(8) Fencing**

In agricultural areas, many of the streams and rivers crossed by the proposed project possess minimal vegetative cover. Fencing could be used to physically block livestock from access to surface waters within 150 feet of proposed construction limits. This serves two purposes: first, it would protect stream habitat and reduce organic input from livestock; second, it would provide, in time, a vegetated riparian buffer along stream reaches.

## S. WILD AND SCENIC RIVERS

In 1968, Congress passed the National Wild and Scenic Rivers Act, Public Law 90-542, to preserve and protect wild and scenic rivers and their immediate environments. This act identifies federally administered rivers included in the National Wild and Scenic Rivers System (NWSRS), identifies additional rivers to be studied for possible inclusion in the System, and provides guidance for the management of rivers within the System.

The Virginia Scenic Rivers Act of 1970 (Title 10, Chapter 15, Section 10-167 through 10-175 of the Code of Virginia) also provides a means to identify and protect those rivers or streams with natural, scenic, historic, and/or recreational qualities that are deemed of significance in the Commonwealth of Virginia. West Virginia does not have a state level scenic rivers program.

As a result of the National Wild and Scenic Rivers Act, the National Park Service prepared and maintains the Nationwide Rivers Inventory (NRI) of significant free-flowing rivers. The rivers included in the NRI are presented in the National Park Service's *Final List of Rivers,* which includes the *Final List of Wild and Scenic Rivers* (January, 1979) and the *Final List of Recreational Rivers* (January, 1981). Segments of rivers included in the NRI have been identified as meeting the minimum requirements for further study and/or potential designation to the System. Federal agencies are requested but not mandated to minimize the adverse impacts of their projects on the NRI rivers.

From the NRI, river segments are selected for further study pursuant to Subsection 5(a) or 5(d) of the National Wild and Scenic Rivers Act (i.e., Study River) to determine if they warrant inclusion in the System. Certain federal projects that could adversely affect Study Rivers are prohibited during the river study period; such prohibited projects include dredge and fill activities associated with channel relocation or encroachment that would affect the free-flow conditions of the river. The construction of river crossings is not prohibited during the river study period, but may alter the eligibility status of a Study River.

Rivers can be studied by other federal agencies involved in land management planning. The Wild and Scenic Rivers and National Trails Memorandum (August 2, 1979) states that federal agencies administering public lands must take the rivers identified in the NRI into consideration during their ongoing land use planning and management activities and environmental review processes. As such, each agency must determine whether those rivers identified in the NRI, and which are administered by them, are suitable for inclusion in the System. This is a separate process from that which is applied to Congressionally designated Study Rivers. Suitability studies include determining if the river segment is eligible for designation and its probable classification. Federal agencies assess their land use and management plans for lands within 0.4

kilometers (0.25 miles) of each NRI listed river to determine the effect of their management plans on the eligibility of the river segment. The support of private citizens, local governments, and public agencies is also taken into account in determining the suitability of a river segment for designation.

Eligibility and probable classification determinations might be made separately or might be made as part of an overall study under Subsection 5(a) or 5(d). The three possible river segment classifications are as follows:

- **Wild:** Those rivers or river segments that are free of impoundments and generally inaccessible, except by trail, and with watersheds or shorelines essentially primitive and waters unpolluted;
- **Scenic:** Those rivers or river segments that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads; and
- **Recreational:** Those rivers or river segments that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

River crossings are not prohibited by the Act if they do not affect free-flow conditions, but they may affect the potential classification or suitability. A typical bridge replacement or new bridge crossing would not substantially alter the free-flow conditions of a stream. A bridge crossing would eliminate that segment of a river's eligibility for Wild status. However, the same crossing would not eliminate a river segment from eligibility for Scenic or Recreational status unless the crossing would destroy unique or significant river values for which the river segment was listed on the NRI.

Channel relocation or encroachments may result in the alteration of the free-flow conditions of the river that would preclude the river segment from eligibility for Wild status, but would not affect the river's eligibility for Scenic or Recreational status. Parallel construction along an NRI river segment may impact the qualities for which the river segment was nominated, thus potentially affecting the river's segment eligibility for designation as Wild, Scenic, or Recreational.

This assessment focuses on how the proposed project may affect a river's eligibility for protection under the Act, as part of the National Wild and Scenic River System (System).

## 1. METHODOLOGY

Four river segments listed in the NRI were identified which are either crossed by the proposed project or where there would be parallel construction within 0.4 kilometers (0.25 miles) of the river segment. For each river segment identified, the potential effect on its eligibility for designation as Wild, Scenic, or Recreational status was determined by evaluating the potential impacts on free-flowing conditions, as well as the potential to impact the characteristics for which the river segment was listed in the NRI.

## 2. EXISTING ENVIRONMENT

The Monongahela National Forest (MNF) is preparing a legislative environmental impact statement concerning the suitability of twelve river segments in the MNF for inclusion in the National Wild and Scenic Rivers System. Of the twelve rivers being considered, six are NRI rivers (Shavers Fork, Dry Fork, Blackwater River, Glady Fork, South Branch of the Potomac River, and the North Fork of the South Branch of the Potomac River). The remaining six rivers (Laurel Fork, Otter Creek, Williams, North Fork of the Cherry River, Red Creek, and Seneca Creek) under consideration have been proposed by environmental groups. The MNF has determined the eligibility and probable classification for the twelve rivers for potential inclusion in the System.

The proposed project would not involve the following segments under study by the MNF: Dry Fork, Glady Fork, North Fork of the Cherry, Laurel Fork, Otter Creek, Williams, Red Creek, South Branch of the Potomac, North Fork of the South Branch of the Potomac, or Seneca Creek. The alignments would cross tributaries to the segment of the Blackwater River currently under study, but would not result in a direct crossing of this river segment. Therefore, the suitability of the Blackwater River segment for Scenic or Recreational status would not be affected by the proposed project.

There are four river segments listed in the NRI that occur along the alignments: Shavers Fork, South Branch of the Potomac River (different segment than under study by MNF), Cacapon River, and Cedar Creek. None of these river segments have been designated as Wild, Scenic, or Recreational Rivers within the System or are currently Study Rivers under Subsection 5(a) of the Act. None of these river segments would qualify for Wild status due to existing development and roads.

### a. Shavers Fork

The NRI listed segment of Shavers Fork extends for 46 kilometers (29 miles) from the confluence of the Cheat River at Parsons, upstream to Faulkner, WV. The MNF study has made the preliminary determination that the 4.8 kilometer (3 mile) portion of Shavers Fork, from Jobs Run downstream to the Cheat River, is not eligible for designation due to the development associated with Porterwood and

Parsons. The 42 kilometer (26 mile) segment of Shavers Fork from Jobs Run south of Porterwood, upstream to the US 33/8 bridge, is eligible for Scenic status based on the MNF's preliminary determination.

The Monongahela National Forest Environmental Impact Statement (1995) has proposed eight alternatives recommending which of the 14 streams or portions of streams should be considered for recommendation as designated components of the National Wild and Scenic Rivers System. Under 3 of the 8 alternatives presented in the Environmental Impact Statement, this segment of Shavers Fork would be recommended for designation. As of the preparation of the Corridor H FEIS, the MNF has not selected a preferred alternative. Therefore, impact and mitigation discussions presented below concerning the Scenic status of Shavers Fork are predicated on its being recommended for designation as a component of the National Wild and Scenic Rivers System.

**b. South Branch of the Potomac River**

The NRI listed segment of the South Branch of the Potomac River extends 54 kilometers (34 miles) from its confluence with the North Branch of the Potomac River upstream to the US 220 bridge north of Moorefield. This segment is NRI listed due to a geological feature called the 'Trough', a 9.7 kilometer (6 mile) long gorge with near-wilderness qualities. The portion of the river segment between the Trough and the US 220 bridge is predominately agricultural within a wide floodplain.

**c. Cacapon River**

The 142 kilometer (89 mile) NRI listed segment of the Cacapon River begins at the dam below Great Cacapon, WV and ends at Baker. A portion of this river was a congressionally mandated Study River. A study by the Department of the Interior found the river to be eligible for classification as Scenic but unsuitable for designation due to a lack of public support. As a result, the Department of the Interior did not recommend its inclusion in the System. The George Washington National Forest and the Virginia Department of Conservation and Recreation conducted a subsequent eligibility study of streams in the Forest, but did not give further consideration to the Cacapon River due to the earlier findings of the Department of the Interior.

**d. Cedar Creek**

Cedar Creek, from its headwaters to the North Fork of the Shenandoah River, merits evaluation to determine if it qualifies for inclusion in the Virginia Scenic Rivers System. The river segment studied extends from the VA 622 bridge upstream 40 kilometers (25 miles) to the headwaters (Shenandoah and Franklin Counties, Virginia). The majority of the land along Cedar Creek is privately owned agricultural or forest land.

The GWNF and the Virginia Department of Conservation and Recreation conducted an eligibility study of this stream. The study categorized the various values for which the stream could be listed: Minimal, Common, or Distinctive. Cedar Creek was determined to have Common scenic, recreational, and geologic value. Fish and Wildlife Values were categorized as Minimal due to acid deposition in the headwaters. Historic and Cultural Values were categorized as Distinctive. Stevens Fort, an old iron furnace, and two tannery sites are located within the river corridor and have potential historical significance. In addition, Cedar Creek Battlefield and Belle Grove Mansion are in close proximity, both of which are on the National Register of Historic Places. Cedar Creek is eligible for designation under the National Wild and Scenic Rivers Act. The creek is free-flowing and has historic and cultural values. A total of 32 kilometers (20 miles) of Cedar Creek would qualify for inclusion in the System under the Scenic classification.

### 3. IMPACTS

In the proposed project area, there are no river segments currently within the National Wild and Scenic Rivers System. However, there are four NRI river segments within the proposed project area. None of the four river segments are eligible for Wild status due to existing road access. The potential impacts to the eligibility of these four river segments for Scenic or Recreational status have been assessed.

#### a. Shavers Fork

Within the section of Shavers Fork determined to be eligible for Scenic status by the MNF, the Preferred Alternative (modified Line S) would require one bridge crossing. The crossing of Shavers Fork would be south of Pleasant Run and would require a bridge 650 meters (2,100 feet) long and approximately 40 meters (120 feet) above the river. The bridge would have sufficient vertical clearance so as not to impede recreational use of the river and would avoid channel relocations and avoid encroachments into the channel and floodplains. The Preferred Alternative (modified Line S) would also parallel the river along the 3 km (2 mile) segment of Shavers Fork extending from its just south of its confluence with Pleasant Run north to its confluence with Jobs Run near Porterwood, WV. This section of Shavers Fork is at the northern end of the 29 mile segment of Shavers Fork that has been determined by the MNF Study (1995) to be eligible for Scenic status.

According to the 1995 MNF Study's *Wild and Scenic River Management Plan* (Appendix J, Scenic) "New roads could be constructed that parallel the river for short segments or bridge the river, if such construction fully protects river values (including free-flowing character) and is well-screened. Consideration will be given to the type of use for which roads are constructed and the type of use that will occur in the river corridor." Based on 1995 MNF Study, the Preferred Alternative (modified Line S) would not impact scenic status.

The portion of Shavers Fork north of Jobs Run has been determined by the MNF not to be eligible for scenic status. Therefore the ASDEIS IRA and the Preferred Alternative (WV) within this area would not impact eligibility.

**b. South Branch of the Potomac River**

The Preferred Alternative (WV) would require a crossing of the South Branch of the Potomac River approximately 6 kilometers (3.8 miles) south of the Trough, for which the segment is NRI listed. The proposed bridge on the Preferred Alternative (WV) would not impact the river segment's eligibility for Scenic or Recreational status. The ASDEIS IRA would utilize the existing US 220 bridge, approximately 7 kilometers (4.3 miles) south of the Trough. None of the alternatives would impact the river segment's eligibility for Scenic or Recreational status.

**c. Cacapon River**

Considering the determination of the Department of the Interior and the George Washington National Forest that the Cacapon River segment should not be considered for the System, the construction of the proposed project would not affect the current status of this river segment. The eligibility of the river segment for Scenic or Recreational status would not be affected by any alternative. The ASDEIS IRA would require fewer new bridge crossings and less construction on new right-of way than would the Preferred Alternative, but long stretches of the ASDEIS IRA would be located closer to the river than would the Preferred Alternative (WV).

**d. Cedar Creek**

Line A would require a crossing of Cedar Creek approximately 100 meters (300 feet) downstream of the existing VA 55 bridge. The ASDEIS IRA would use the existing WV 55 bridge, thereby eliminating the need for a new crossing of Cedar Creek. The No-Build Alternative, the ASDEIS IRA, and Line A (VA) would not impact the historical or cultural features in the vicinity of Cedar Creek; would not interfere with its designation as Scenic or Recreational; and would not interfere with its designation to the Virginia Scenic Rivers System.

**e. Summary**

The proposed project crosses three NRI river segments in West Virginia and one in Virginia. The following can be summarized about the effect of the alternatives on the Scenic or Recreational eligibility of the river segments:

- None of the river segments currently qualify for Wild status;
- Shavers Fork (West Virginia): The Preferred Alternative (Line S) and Line A within the Shavers Fork Option Area may have an effect on eligibility for Scenic status. The No-Build Alternative, and the ASDEIS IRA would have no effect on eligibility;
- South Branch of Potomac River (West Virginia): None of the alternatives would have an effect on eligibility;
- Cacapon River (West Virginia): Based on previous determinations concerning eligibility, none of the alternatives would affect eligibility; and
- Cedar Creek (Virginia): None of the alternatives would have an effect on eligibility.

## 4. AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Avoidance, minimization, and mitigation measures would not be necessary under the No-Build Alternative. The alignment development process for both the ASDEIS IRA, the Preferred Alternative (WV), and Line A (VA) included efforts to avoid or minimize impacts to NRI rivers. General measures used to minimize or mitigate impact to NRI rivers included:

- Minimizing channel relocations or encroachments;
- Minimizing parallel construction;
- Minimizing impacts to the resources for which the river segment was deemed eligible for listing;
- Ensuring that bridge structures would provide sufficient vertical clearance so as not to impede recreational boating for river segments eligible for Recreational status; and
- Minimizing the visual impacts of bridge crossings for river segments eligible for Scenic and Recreational status. Specific measures used to minimize or mitigate impact to NRI rivers are presented below.

### a. Shavers Fork

Complete avoidance of the river crossing and parallel construction is not possible within the segment of Shavers Fork that has been determined by the MNF Study (MNF, 1995) to be eligible for Scenic status. Mitigation for these impacts will include construction of the bridge to protect the free-flowing characteristics and other values of the river (e.g. no bridge piers will be placed in the river, aesthetically pleasing bridge designs and treatments, implementation of those reclamation and sedimentation control measures detailed in the *Corridor H FEIS Mitigation Document (Vol. III)*). The portion of the Preferred Alternative (modified Line S) parallel to the river is located a minimum of 190 meters (625 feet) from the east bank of the river. The river would be shielded from the Preferred Alternative (modified Line S) by a wide band of forest. An analysis of the view from the portion of the river which is eligible for scenic status indicates that the Preferred Alternative (modified Line S) would not be visible from the river. These mitigation features could protect the river's Scenic status and be in keeping with the 1995 MNF Study's *Wild and Scenic River Management Plan* (Appendix J, Scenic) statement that "New roads could be constructed that parallel the river for short segments or bridge the river, if such construction fully protects river values (including free-flowing character) and is well-screened."

The ASDEIS IRA would not impact the portion of the river determined to be eligible for Scenic status. Therefore, no mitigation would be required.

**b. South Branch of the Potomac River (WV)**

Complete avoidance of this river crossing would not be possible and there would be no impacts to its eligibility for Scenic or Recreational status. The Preferred Alternative (WV) bridge crossing at the South Branch of the Potomac River would avoid channel relocations or encroachments, parallel construction, and the Trough for which the river segment was listed in the NRI. The height of the bridge over the river would avoid interference with recreational use of the river. Recreational access to the river could be provided near the proposed bridge. No mitigation would be required for the Preferred Alternative (WV).

The ASDEIS IRA would use the existing US 220 bridge and would not require mitigation.

**c. Cacapon River (WV)**

Complete avoidance of these river crossings would not be possible and there would be no impacts to eligibility considering the previous eligibility determinations. Channel relocations or encroachments would be avoided. Although there would be construction parallel to the river, the majority of the proposed project would not be visible from the river except at bridge crossings. The three bridge crossings of the Cacapon River would not impede recreational use of the river. No mitigation would be required for the Preferred Alternative (WV).

The ASDEIS IRA would use WV 55 and thus no mitigation would be required.

**d. Cedar Creek (VA)**

Complete avoidance of this river crossing would not be possible and there would be no impacts to eligibility for Scenic or Recreational status. The Line A bridge crossing at Cedar Creek would avoid channel relocations or encroachments, parallel construction, and the cultural resources for which the river segment was listed in the NRI. Visual impacts would be minimized due to the placement of the proposed bridge adjacent to the existing VA 55 bridge. The height of the bridge over the river would avoid interference with recreational use of the river and additional recreational access to the river could be provided near the proposed bridge. No mitigation would be required for Line A.

The ASDEIS IRA would use the existing VA 55 bridge thus not changing the rivers current eligibility; no mitigation would be required.

## T. GEOLOGY, MINES, AND MINERALS

The *CSDEIS* stated that a representative of the US Department of Interior, Bureau of Mines would conduct a field investigation to determine the extent of the potential project-related mineral resource impacts along the preferred corridor,. Due to federal budget constraints and scheduling complications, the Bureau of Mines was unable to do so.

### 1. METHODOLOGY

To gain an understanding of the potential impacts to geology, mines and minerals associated with the proposed project, a literature search of state and federal sources was conducted. Sources included reports by the West Virginia Geologic and Economic Survey, the Virginia Division of Minerals and Mines, and the US Geologic Survey.

Geologic units and formations presented on geologic mapping developed by the West Virginia Geologic Survey in the 1920's and 1930's differ from the geologic map of West Virginia published by Cardwell *et al.* (1986). Nomenclature and classification changes made by Cardwell *et al.* were used to describe the geologic units. However, the older mapping was used to describe the structural features along with the orientation and extent of the geologic units.

### 2. EXISTING ENVIRONMENT

To provide a better understanding of the affected geologic environment, background information has been divided into two categories. The first category provides a general description of the proposed project area's geology by watershed. The second category provides more detailed background information on the existing coal mining conditions within the proposed project area.

#### a. Geologic Overview by Watershed

The six watersheds traversed by the proposed project lie in two distinct physiographic provinces: the Appalachian Plateau Province and the Valley and Ridge Province. A major divide known as the Allegheny Front runs northeast to southwest along the western borders of Pendleton and Grant Counties. This high ridge of the Alleghenies separates the Appalachian Plateau Province to the west from the Valley and Ridge Province to the east. Anticlines and synclines are common geologic features. Anticlines are generally convex folds in bedrock, the core of which contains stratigraphically older rocks. Synclines are generally concave folds in bedrock, the core of which contains stratigraphically younger rocks.

The Appalachian Mountain Section of the Appalachian Plateau Province includes areas of Tucker County, the northern section of Randolph County, and the westernmost edge of Grant County. These areas are drained by Shavers Fork, Dry Fork, and the Blackwater River into the basin of the Cheat and

Monongahela Rivers, which flow to the Mississippi River. Side slopes of the mountains are generally steep, except for the valleys of the Cheat River north of Parsons. Valleys are narrow with broad mountain tops. The drainage system is a well developed dendritic system which typically develops over homogeneous sedimentary rocks. Gorges are fairly common and most streams decrease in elevation rapidly.

The Valley and Ridge Province is bounded on the west by the Allegheny Front and includes Hardy County and portions of Grant County, as well as the Virginia Counties of Frederick and Shenandoah. This province consists of tight folds, wide valley bottoms, and a trellised drainage pattern. The structurally controlled trellis drainage patterns trace the shape, size, and location of the underlying bedrock. The pattern is formed by the headwaters of the Potomac River which flow to the Atlantic Ocean. Major tributaries in the study area include Patterson Creek, the North and South Branch of the Potomac River, the Cacapon River, and the Shenandoah River. Unique topographic features in this portion of the study area include the Allegheny Front, Greenland Gap, and the Lost River.

In West Virginia and Virginia, sedimentary rocks of the Paleozoic Era are found throughout the study area. These rocks were deposited during the Pennsylvanian, Mississippian, Devonian, Silurian, and Ordovician Periods. Throughout the project area, the geologic age of the sedimentary rocks becomes progressively older from the west to the east. Surficial rocks in the Appalachian Plateau Province are predominantly of Pennsylvanian, Mississippian, and Devonian age while rocks throughout the Valley and Ridge Province are of Devonian, Silurian, and Ordovician age.

The following summarizes the stratigraphy, geologic age, and relevant structural features encountered in each watershed along the ASDEIS IRA, Line A, and the Option Areas. Because all alignments are within close proximity to each other, the geologic units are the same. Unique geologic features along the ASDEIS IRA, Line A, or the Option Areas are addressed separately, where necessary.

**(1) Tygart Valley River Watershed**

The eastern boundary of the Tygart Valley River Watershed lies approximately 4.8 kilometers (3 miles) to the west of Elkins and generally parallels the western edge of the Monongahela National Forest and the crest of Cheat Mountain. The western terminus of the project is approximately 6.4 kilometers (4 miles) west of Elkins and is bounded by Laurel Mountain to the north and Rich Mountain to the south. Laurel Ridge is asymmetrical; its western slope being gentle and the eastern side being uniformly steeper with many low foot-hills toward the base. Rocks of the Pottsville Series compose the resistant rocks that form this ridge. Rich Mountain is similar in geologic structure and is located on the southern side of the Tygart Valley River. Quaternary alluvial deposits are found along the river bottom. East of Laurel Ridge, rocks are predominantly composed of olive-green sandstones and sandy or argillaceous shales of the

Devonian Chemung Series. Approaching Elkins, the alignments turn northward and generally follow US 219, encountering Quaternary alluvial deposits formed by Leading Creek. Sandy shales of the Devonian Brallier Formation can be found upslope of the river deposits. The Deer Park Anticline is the only structural feature found in the area. The axis of the anticline generally bisects the valley formed by the Tygart Valley River and Leading Creek (Reger, 1931).

**(2) Cheat River Watershed (WV)**

The eastern portion of the Cheat River Watershed coincides with the western boundary of Tucker County. Rocks are sedimentary in origin and formed during the Pennsylvanian and Mississippian Periods. Formations include the shales of the Mauch Chunk, limestones of the Greenbriar, and sandstones of the Pocono Group found along Backbone Mountain. Pennsylvanian deposits include sandstones, shales, and coal seams of the Pottsville, Allegheny, and Conemaugh Series. Relevant coal deposits include the Upper Freeport and Bakerstown coal seams. Major structural features in western Tucker County include the North Potomac Syncline (which bisects the town of Douglas) and the Blackwater Anticline, located approximately 8 kilometers (5 miles) east of Davis (Reger, 1923).

The western portion of the Cheat River Watershed primarily consists of recent Quaternary alluvial deposits found along the Cheat River and Shavers Fork, as well as sandstones of the Chemung Series (Devonian age) which form the upland areas. Major structural features include the Parsons and Deer Park Anticlines.

**(3) North Branch of the Potomac River Watershed (WV)**

This watershed is generally located within Grant County. Sedimentary rocks of the Pennsylvanian Conemaugh Series are encountered in the western portion of Grant County in the Appalachian Plateau Province. Strip mines of the Bakerstown or Upper Freeport coal seams can be found extending from the Tucker/Grant County line to slightly east of Mount Storm Lake. Major structural features include the Stony River Syncline, the Blackwater Anticline, and the Allegheny Front.

East of the Allegheny Front lie sedimentary rocks within the Valley and Ridge Province. These rocks are predominantly of Devonian and Silurian age, with the exception of Quaternary deposits found along stream channels. Major structural features include the Wills Mountain Anticline and the Bedford Syncline. The Wills Mountain Anticline (New Creek Mountain) is capped by the resistant Tuscarora Sandstone of Silurian Age. The Bedford Syncline bisects rocks of the Upper Devonian greenish-gray shales with interbedded sandstone beds of the Brallier Formation. The axis of Patterson Creek Mountain generally follows the Grant/Hardy County line.

**(4) South Branch of the Potomac River Watershed (WV)**

The South Branch extends from the Grant/Hardy County line to approximately 5.6 kilometers (3.5 miles) east of Moorefield. Patterson Creek Mountain is composed of Devonian and Silurian aged limestones with a few outcrops of the Oriskany Sandstone. To the east of the limestones, sedimentary rocks encountered are relatively flat-lying and of Devonian age. A few minor synclines and anticlines, such as the Kessel Anticline, Clearville Syncline, and Middle Mountain Syncline, can be found west of Moorefield. East of Moorefield, the Devonian rocks become extensively thicker at the surface and form the western boundary of the Cacapon River Watershed.

**(5) Cacapon River Watershed (WV)**

This watershed extends generally from 5.6 kilometers (3.5 miles) east of Moorefield to the Virginia state line. In the western portion of the watershed, Devonian aged rocks of the Portage Series, Chemung Series, and Catskill Series can be encountered. However, Short Mountain is capped by the Pennsylvanian aged Pocono Formation. East of the Lost River is the Hanging Rock Anticline. The anticline is composed of Silurian aged rocks which include the Tuscarora Sandstone, Keefer Sandstone, the Juniata Formation, and limestones of the Helderberg Formation. Ridges east of Hanging Rock are formed by the Oriskany sandstone which include Sandy Ridge and Anderson Ridge. Structural features in eastern Hardy County include the Wardensville Syncline, composed of the Marcellus Shale and Quaternary alluvial deposits, and the Meadow Branch Syncline (Tilton, 1927).

**(6) Shenandoah River Watershed (VA)**

This watershed marks the boundary between the states of West Virginia and Virginia which is also the location of the northwestern limb of Great North Mountain Anticline. The Oswego, Juniata, and Tuscarora Formations have been eroded away from the crest of the anticline to form a deep intermontane valley which occurs in the relatively soft Martinsburg Shale. Both sides of the valley have high ridges made up of resistant sandstones. The southeastern limb of the anticline is a ridge named Paddy Mountain. Immediately to the east is a valley composed of the Marcellus Shale, fine grained sandstones of the Hamilton Formation, and micaceous shales of the Brallier Group (Butts and Edmundson, 1966).

Cedar Creek is the dividing line between Frederick and Shenandoah Counties. Little North Mountain, located east of Cedar Creek, forms the western boundary of the Shenandoah Valley. The mountain is an overturned monocline with steep, southeasterly dips. It is capped by the Tuscarora sandstone and is associated with the Keefer and Rosehill Formations. The mountain is bounded on the east by the Little North Mountain Fault and on the west by a broad syncline of Devonian rocks. The Juniata, Oswego, and Martinsburg Formations can be found on the eastern flank of Little North Mountain which have been displaced by the Little North Mountain Fault.

East of Wheatfield, the alignments turn southward into the Shenandoah Valley, passing Lebanon Church and Clary to Interstate 81. Bedrock found beneath the Shenandoah Valley include Ordovician carbonates comprised of the Beekmantown and Conococheague Formations. The Cambrian Elbrook Formation is present is the vicinity of Little North Mountain (Cady, 1936).

**b. Specific Geologic Concerns**

Throughout the history of the Corridor H project, concern has been expressed over the project's involvement with and impact to previous mining activities and resources, as well as karst topography. An overview of these existing areas is provided below.

**(1) Mining**

The principal past and present mining activity in the watersheds is coal mining. The Upper Freeport and Bakerstown Coal seams of the Pennsylvanian Conemaugh Group have been extensively mined near the towns of Davis, Thomas, Douglas, and the Mount Storm Lake area. The Bakerstown Coal is located above the Freeport Coal seam. The coal beds extend from slightly west of Thomas near Long Run eastward, toward Mount Storm Lake. Typically, coal deposits are mapped by the base of the seam; therefore, elevations pertaining to the coal seams are base elevations, not top elevations. Chemically, both the Upper Freeport Coal and the Bakerstown Coal are low in sulfur and volatile matter and have a medium to high phosphorus content (Reger, 1923).

* The Bakerstown Coal ranges from 0.9 to 2.4 meters (3 to 8 feet) in thickness. It has been extensively mined near Davis and Thomas. The Bakerstown Coal outcrops northeast of Douglas, high on the hill tops, then decreases in elevation northeastward, going under drainage just above Thomas. Outcrops of the Bakerstown also extend on Pendleton Creek 2.4 kilometers (1.5 miles) northwest of Davis and northeastward, up the side of Beaver Creek, and passing across the Blackwater Anticline where it runs southward into Grant County.

The Upper Freeport Coal varies from 1.5 to 2.4 meters (5 to 8 feet) thick. Outcrops can be found in certain high summits southwest of Douglas, along the North Fork of the Blackwater River near Coketon, then extending toward Pendleton Creek where the seam goes under drainage to the east. The Upper Freeport Coal also outcrops near Long Run at an elevation of 1,006 meters (3,300 feet) and then structurally dips to the east. Strip mined areas related to the Upper Freeport Coal are found along the extent of Long Run and the North Fork of the Blackwater River.

### (2) Acid Drainage

Acid drainage is a low pH, sulfate-rich water with high amounts of acidity. The acidity is comprised of mineral acidity (iron, aluminum, manganese, and other metals depending on the geologic deposit) and also hydrogen acidity. Acid drainage results from the oxidation of metal disulfide minerals upon exposure to air and water. Acid drainage and the potential for acid drainage production as a result of construction of the Preferred Alternative (WV) is addressed in the *Corridor H FEIS Mitigation Document (Vol. III)*.

### (3) Karst Topography

Karst topography is made up of a landscape and its subsurface and is characterized by surface water flow and groundwater flow through caves or other dissolutionally enlarged cavities, and a variable suite of distinctive surface landforms and hydrologic features. These features include sinkholes, dry valleys, springs, caves, sinking streams (otherwise known as swallet), enlarged joints or bedding planes, and cutters or soil karren (soil filled joints or grooves). Most karsts are developed in carbonate rocks, but may also be found in gypsum, salt, and carbonate-cemented sandstones (Quinlan, 1992).

Sinkholes are the most commonly known karst feature. Sinkholes occur naturally or can be induced. Induced sinkholes are the result of interference with the natural hydrologic framework of karst terrain. Changes made to the surface hydrology can result in fluctuations of the groundwater table. These changes can cause a loss of support and subsequent collapse of the underlying cavities, resulting in the creation of a sinkhole. In addition, an increase in groundwater velocity can produce subsurface erosion and induced recharge.

Throughout the Valley and Ridge Province of West Virginia, limestones can be found in valleys, on the flanks of ridges formed by resistant sandstones, and as ridges. Limestones also provide recharge to the groundwater system. Generally, the limestone formations provide good cut-slope and foundation stability and serve as a good source of road material. Limestones are hard sedimentary rocks. However, limestones are subject to chemical weathering due to the presence of carbon dioxide in the groundwater system. Encountering subsurface solution channels/cavities during excavation is a possibility and the potential exists for groundwater contamination. When limestones are exposed at the surface or are the first bedrock beneath the soil, the potential for karst features exist. The lack of karst features on the surface does not necessarily mean an absence of karst in the subsurface.

### 3. IMPACTS

The ASDEIS IRA, the Preferred Alternative (WV) and Line A have the potential to impact the geologic environment by disturbing soils, geologic features, and mined lands. Disturbances of previously mined areas could result in the formation of acid mine drainage. Other environmental consequences could include impacts to the scenic geologic features of Hanging Rock and Greenland Gap.

#### a. Coal Mining

The primary geologic hazard within the proposed project area is the presence of surface and underground coal mining. Strip mining is a concern along the Preferred Alternative (WV) and the ASDEIS IRA. The strip mine reclamation process requires backfilling and grading. For contour backfilling, the edge of the highwall is removed and the spoil is graded back toward the highwall as close to the original contour as possible. Load bearing capacities of backfilled areas are generally uncertain due to a lack of compaction associated with backfilling. Compaction problems are typically caused by grading bare spoil that has been kept in storage for long periods of time and allowed to settle and harden. Construction through reclaimed areas can disturb buried wastes and/or overburden that contain sulfur bearing materials within coal or disturbed overburden. Exposure of coal waste as a result of construction activities would more than likely induce the formation of acid mine drainage (AMD).

Deep mines present the potential for subsidence and collapse if a roadway is not properly designed. Subsidence can be caused by such factors as the lack of integrity of the remaining coal pillars, shallow depth to the mine cavity and its structural integrity, as well as thin overlying bedrock. The possibility of encountering vertical mine shafts poses an additional design consideration.

##### (1) No-Build Alternative

The No-Build Alternative would not impact existing or inactive mined areas.

##### (2) ASDEIS Improved Roadway Alternative

West of Thomas, the ASDEIS IRA would not impact any active strip or underground mining operations. Inactive strip mining activities near Thomas would be impacted as the ASDEIS IRA crosses the North Fork of the Blackwater River and along Synder Run.

Along WV 93 to the north of Davis, the ASDEIS IRA would pass to the south of inactive strip and underground mining of the Bakerstown Coal. On its proposed location, the ASDEIS IRA would not impact any strip or underground mining associated with the Bakerstown or Upper Freeport Coal seams.

As the ASDEIS IRA approaches Mount Storm Lake, it would be bounded to the north by inactive strip mining of the Upper Freeport Coal. Once entering Grant County, the Upper Freeport goes under drainage and the ASDEIS IRA would pass over underground mining of the Upper Freeport Coal. The ASDEIS IRA would not impact any mining activities associated with the Bakerstown or Upper Freeport Coal to the east of Mount Storm Lake.

**(3) Preferred Alternative (WV)**

Using the coal contours provided by the West Virginia Geological and Economic Survey, underground location of the coal seams were compared to the Preferred Alternative (WV) elevations to determine potential conflicts with the coal deposits.

The Preferred Alternative (WV) crosses Long Run west of Douglas and would impact old strip mine areas of the Upper Freeport Coal. The Preferred Alternative (WV) would also impact old strip mines of the Bakerstown Coal where it crosses the North Fork of the Blackwater River. This crossing would impact old strip mines of the Bakerstown Coal and would pass directly over abandoned underground mines of the Upper Freeport Coal.

The Preferred Alternative (WV) would impact active strip mines of the Upper Freeport seam west of the intersection of WV 93 and WV 42. North and east of Davis along WV 93, the Preferred Alternative (WV) would pass to the south of Bakerstown Coal strip mines, causing no impact. The Preferred Alternative (WV) would encounter old strip mines associated with the Upper Freeport Coal, located 792 meters (2,600 feet) east of the WV 93 crossing of Beaver Creek. Underground mines of the Bakerstown Coal are located to the north of WV 93 and would not be impacted by the Preferred Alternative (WV). As WV 93 crosses Brown Mountain, strip mines of the Upper Freeport Coal are located to the north of the Preferred Alternative (WV).

The elevation of the Upper Freeport coal near the Tucker/Grant County line is approximately 1,067 meters (3,500 feet) while the proposed finished elevation for the Preferred Alternative (WV) is 1,068 meters (3,503 feet). Therefore, the Preferred Alternative (WV) would cut through the Upper Freeport Coal seam. Cutting through and exposure of the Upper Freeport Coal seam near the Tucker/Grant County line could cause acid mine drainage, depending on the groundwater table in this area.

To the east of Mount Storm Lake, the Upper Freeport Coal is located beneath the Preferred Alternative (WV). Even though the Preferred Alternative (WV) would not impact underground mines of the Upper Freeport Coal, it may impact the northernmost extent of a strip mining operation of this seam located to the southeast of Bismarck. Coal, at its highest elevation, is 884 meters (2900 feet) at Station 5045, between Abrams and Little Creek. The Preferred Alternative (WV) would be about 71 feet above the crest of the coal and would not impact the Upper Freeport Coal.

### b. Natural Gas

There are very few natural gas wells in the project area, and they are typically found penetrating ridges composed of Oriskany sandstone. No gas wells or gas fields would be impacted by any of the alternatives.

### c. Sandstone and Limestone Quarries

No quarries would be impacted by the No-Build Alternative.

On US 219, the ASDEIS IRA would pass an active sandstone quarry west of Thomas and would pass through and impact an active limestone quarry at Greenland Gap. Along VA 55, the ASDEIS IRA would pass two inactive quarries. The first is located along Cedar Creek north of VA 55 and was a sandstone and shale quarry used in the 1940s and 1950s by the Virginia Department of Transportation. The second inactive quarry is located near Short Mountain on VA 55. The ASDEIS IRA would have no impact on these inactive quarries. Additionally, high calcium Ordovician limestone mining has occurred in the Shenandoah Valley near I-81 in Virginia. These quarries or mines would not be impacted by the ASDEIS IRA.

The Preferred Alternative (WV) would pass 4.3 kilometers (2.7 miles) to the south of a limestone quarry located along Backbone Mountain and would pass 2.1 kilometers (1.3 miles) to the south of a sandstone quarry located adjacent to US 219 on Backbone Mountain. The Preferred Alternative (WV) would also pass approximately 122 meters (400 feet) to the east of a limestone quarry at Greenland Gap. The Preferred Alternative (WV) would not impact any of these active quarries. The high calcium Ordovician limestone mining in the Shenandoah Valley near I-81 would not be impacted by Line A.

### d. Unique Geologic Features

#### (1) Hanging Rock

Hanging Rock is a unique rock outcrop and is an example of the geologic process called differential weathering. Typically, differential weathering occurs when the resistant cap rock is underlain by rocks of calcareous composition which weather faster than the cap rock. The result is an undercutting of the cap rock, creating the "hanging" feature of Hanging Rock. However, previous construction of WV 55 may have accentuated the "hanging" feature of the cap rock by further undercutting the rock beneath to allow for roadway construction. Visual impacts to this area are discussed and presented in Section III-K: *Visual*.

The No-Build Alternative would not impact Hanging Rock.

The ASDEIS IRA would require a 23 meter (75 feet) cut immediately to the east of Hanging Rock where it overhangs WV 55. In order to improve the horizontal curvature of the roadway, construction activities would most likely impact the integrity of the geologic structure.

The Preferred Alternative would pass 229 meters (750 feet) to the east of Hanging Rock, thereby avoiding any direct impact to the structure. The Preferred Alternative (WV)s distance from the outcrop would minimize and likely avoid any impact to the integrity of the geologic outcrop. While directly avoiding Hanging Rock, Line R would require a cut 168 meters (550 feet) across the ridge to a depth of 30 meters (100 feet), and could create a potential impact on the integrity of the remaining geologic structure.

**(2) Greenland Gap**

Greenland Gap is located approximately 1.6 kilometers (1 mile) east of the town of Scherr along WV CR 3/3, between the towns of Falls and Scherr. The West Virginia Chapter of the Nature Conservancy owns and manages the Greenland Gap Nature Preserve, a 255 acre area which includes Greenland Gap. The most spectacular feature of the gap, a National Natural Landmark, is its towering sandstone cliffs that arch upward, over 244 meters (800 feet) high. Neither the No-Build Alternative, the ASDEIS IRA, nor the Preferred Alternative (WV) would impact Greenland Gap.

## 4. ECONOMIC IMPACT TO MINERAL RESOURCES

Significant bituminous coal deposits are located in the West Virginia Counties of Randolph, Tucker, and Grant. Randolph County has a reserve of 2,421.1 million tons, Tucker County has a reserve of 179.9 million tons, and Grant County has a reserve of 507.0 million tons. Hardy County, West Virginia and Frederick and Shenandoah Counties in Virginia do not have such deposits bituminous coal. With the exception of Randolph County, the availability of coal reserves within the project area is low compared to other counties located in the southern parts of West Virginia and Virginia.

The coal mining industry employed 288 people (2%) in Randolph County, 55 people (2%) in Tucker County, and 692 people (10%) in Grant County. In 1990, the employment in the mining industry was 554 people (5%) in Randolph County, 271 people (8%) in Tucker County, and 1,419 people (20%) in Grant County. With the exception of Grant County's coal mining activities, mineral resources have a relatively low impact on the economy of the project area.

## 5. AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Avoidance, minimization, and mitigation measures would not be necessary under the No-Build Alternative. The alignment development process for the ASDEIS IRA, Preferred Alternative (WV) and Line A (VA) included efforts to avoid or minimize impacts to mines, mineral resources, and important geologic features.

### a. Mining

The alignment development process included measures to avoid encounters with coal seams and mined-out areas. However, information on mined areas was not recorded during early periods of mining. Generally, information necessary to avoid or minimize such impacts is not obtained until geotechnical drilling investigations are conducted as part of the design phase of the Highway.

Mitigation measures taken during construction through active or reclaimed/non-reclaimed strip mined areas would include the proper treatment or removal of waste deposits and/or any acidic materials that would contribute to the formation of acid mine drainage. During final design, drainage control devices/methods would be determined on a site-specific basis. During construction, surface treatment would be implemented to minimize erosion potential and densification of the subgrade. In addition, revegetation and proper soil cover procedures would be used to minimize or eliminate the formation of acid mine drainage.

Mitigation measures concerning underground mines would be based on site-specific problems. Depending on the problems encountered, measures would include bridging, sealing, subsurface reinforcement, backfilling, or capping the deep mine area. Areas where the coal seams are relatively close to the surface would require saturation grouting with a cement/fly ash mix. Where open cavities are present, underpinning the roof overburden by grout columns would be required.

Measures to avoid exposure of coal seams would be considered in final design. The exact depth to the coal seam would be determined through the use of exploration borings into the underlying rock stratum. Adjustments to the finished grade of the proposed highway to an elevation above that of the coal seam could then be made. When avoidance is not possible, exploration borings would be used to determine the exact depth, thickness, and slope of the coal seam in relation to the local groundwater table. If the groundwater level is beneath the coal seam, then construction activities and subsequent exposure of the coal seam would not likely produce acid mine drainage. If the coal seam is located below the local groundwater table and drainage is visible from the seam, then a chemical analysis of the groundwater would be performed to determine whether the groundwater exhibits the typical chemical characteristics of acid mine drainage. If found to contain acid mine drainage, then proper diversion and treatment of the acid drainage would be executed so as not to degrade the quality of surface waters down gradient of the proposed highway cut.

**b. Unique Geologic Features**

**(1) Hanging Rock**

The No-Build Alternative would not impact Hanging Rock.

Because the ASDEIS IRA follows the existing roadway and because Hanging Rock is in close proximity to the existing roadway, measures to avoid impacts from construction will be difficult. At this time, no mitigation measures are feasible other than not improving this section of the existing roadway.

During the time of design and construction of the Preferred Alternative (WV), geologic information would be gathered to insure the integrity of the design. This data would also be used to design blasting plans to minimize any possible disturbance.

**(2) Greenland Gap**

None of the Alternatives would impact any geological features of Greenland Gap; therefore, no minimization or mitigation measures would be necessary.

## U. ENVIRONMENTAL PERMITS

Federal and state laws and regulations require that various environmental permits be acquired prior to the start of project-related construction activities; this would be the case under the ASDEIS IRA or the Preferred Alternative (WV). The No-Build Alternative would not require the acquisition of the permits discussed below.

### 1. PERMIT REQUIREMENTS

In West Virginia, the construction of the ASDEIS IRA or the Preferred Alternative (WV) would require the issuance of two federal permits, two state permits, and one state certification. WVDOH would have to obtain a Section 404 Clean Water Act Permit and a Section 10 Rivers and Harbors Act Permit from the Pittsburgh District of the US Army Corps of Engineers prior to construction activities. Issuance of the Section 404 Permit would be contingent upon obtaining from West Virginia a Section 401 Water Quality Certification. The WVDOH would also have to obtain a National Pollution Discharge Elimination System (NPDES) permit, issued through the State, and a Stream Activity Permit, issued through West Virginia's Public Land Corporation.

In Virginia, the ASDEIS IRA or Line A would require the issuance of one federal permit and four state permits. The VDOT would have to obtain a Section 404 Clean Water Act Permit from the Norfolk District of the US Army Corps of Engineers and receive a Virginia Water Protection Permit (which incorporates Section 401 Water Quality Certification) from the Commonwealth of Virginia. The State would also require the VDOT to obtain a Stormwater Permit for Construction and a Stormwater Permit for Industrial Activities. The latter permit is required for transportation projects. Finally, because of encroachment on streambeds, the VDOT would have to obtain a Subaqueous Bed Permit from the Virginia Marine Resources Commission.

### 2. STATUS OF PERMITS

The application for the Section 404 Permit for the Preferred Alternative (WV) has been prepared and submitted to the Pittsburgh District of the US Army Corps of Engineers. In accordance with Corps regulations, a Public Notice, which includes the permit application package, has been sent to all adjacent property owners. The Public Hearings on the ASDEIS were held in conjunction with the Corps Public Hearing on the Section 404 Permit. A copy of the permit package is included in Appendix G of the ASDEIS.

The Alternatives Analysis required in the Section 404(b)(1) Guidelines is included in Appendix G of the ASDEIS. Conceptual wetland mitigation plans are included in Section III-Q: *Wetlands* of this FEIS.

## V. HAZARDOUS MATERIALS

The hazardous materials analysis has been conducted in accordance with WVDOH's *Guidelines for Identifying and Dealing with Hazardous Waste on Highway Projects, 1989*, guidelines set forth in FHWA's *Technical Advisory T 6640.8A*, and FHWA's *Interim Guidance: Hazardous Waste Sites Affecting Highway Project Development, August 1988.*

Several federal regulatory programs involve the implementation of regulating hazardous waste sites. These programs include the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), including the Superfund Amendents and Reauthorization Act (SARA). These federal laws give EPA responsibility for regulating hazardous waste. In response to this directive, EPA is inventorying uncontrolled sites and has published the National Priorities List (NPL). The objective of placing sites on the NPL is their ultimate cleanup.

### 1. METHODOLOGY

Coordination with the West Virginia Division of Waste Management and the Virginia Department of Environmental Quality was undertaken to determine the location of known permitted and non-regulated hazardous waste sites within the proposed project area. Letters of inquiry were sent to the West Virginia Division of Waste Management and the Virginia Department of Environmental Quality to obtain information regarding county-wide lists of hazardous waste sites.

In addition to resource agency coordination, a background data search throughout the proposed project area was performed by Environmental Risk Information and Imaging Services (ERIIS). The following EPA databases were used for the search: National Priorities List (NPL); Comprehensive Environmental Response, Compensation, and Liability Information Systems (CERCLIS); Facility Index Systems (FINDS); Emergency Response Notification Systems (ERNS); Toxic Release Inventory System (TRIS); Resource Conservation and Recovery Information System (RCRIS); Registered Leaking Underground Storage Tanks (LUST); Registered Underground Storage Tanks (UST); Landfill List; State Hazardous Site Lists; Nuclear Power Reactors; and Open Dumps. Sites identified by ERIIS but not affected by the project were eliminated from further investigation. RCRA identifies those materials considered to be hazardous and regulates their production, transportation, and disposal. RCRA sites are either producers, transporters, or disposers of such regulated hazardous materials. CERCLA provides a system for cleaning up chemical and hazardous substances released into the groundwater, air, land, and water. CERCLA, in part, bases its definition of hazardous materials on the RCRA definitions. CERCLA sites are sites in which hazardous materials have been released and are targeted for clean-up or have been cleaned.

## 2. HAZARDOUS MATERIALS IMPACTS

The EPA database search performed by ERIIS and the county listing of hazardous waste sites identified no CERCLA sites, leaking underground storage tank sites, or landfills within the proposed construction limits of the ASDEIS IRA, the Preferred Alternative (WV) or Line A (VA).

### a. No-Build Alternative

Under the No-Build Alternative, there would be no project-related involvement with known hazardous material sites or generators.

### b. Improved Roadway Alternative

The ASDEIS IRA would not impact CERCLA sites, leaking underground storage tanks, or landfills within the proposed construction limits, nor would it directly impact RCRA sites. Four sites close to, but not affected by, the ASDEIS IRA comply with regulations stipulated under RCRA. In addition, the ASDEIS IRA would potentially impact gasoline dispensers and underground storage tanks (UST) associated with nine stores.

RCRA sites are classified according to the quantity of waste produced. The generator class descriptions are as follows:

- Class 1: Large generators producing 1,000 kg or more of hazardous waste or 1 kg of acutely hazardous waste per month.;
- Class 2: Generators producing between 100 kg to 1,000 kg of hazardous waste or up to 1 kg of acutely hazardous waste per month; and
- Class 3: Small generators producing up to 100 kg of hazardous waste or less than 1 kg of acutely hazardous waste per month. Given the relatively small quantities of hazardous waste generated by Class 3 facilities, EPA has determined that they are conditionally exempt from reporting.

Of the four RCRA sites identified, three are Class 2 waste generators and two are Class 3 waste generators; all are located in West Virginia. Roadway widening under the ASDEIS IRA would utilize additional property from both the Class 2 generator (VEPCO Mount Storm Station) and the Class 3 generators (WVDOH maintenance areas in Parsons and Moorefield) sites, but this property acquisition would not impact the above waste generators. The RCRA sites and their impact assessment related to the ASDEIS IRA are presented in Table III-78 (Vol. II).

Widening of existing roadways under the ASDEIS IRA would also require right-of-way acquisition from nine properties with gasoline dispensers and underground storage tanks. Of these nine properties, seven are located in West Virginia and two are located in Virginia. The underground storage tanks at eight of these properties would not be impacted by the ASDEIS IRA. However, one site in West Virginia would require property acquisition and the subsequent removal of the underground storage tanks. The UST sites and their involvement with the ASDEIS IRA are presented in Table III-79.

### c. Preferred Alternative (WV) and Line A

The Preferred Alternative (WV) and Line A (VA) would not involve CERCLA sites, RCRA sites, UST sites, LUST sites, or landfills.

## 3. AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

WVDOH's Hazardous Waste Guidelines state that it is the West Virginia Department of Transportation, Division of Highway's practice to avoid known waste sites. Avoidance of hazardous waste facilities is often the most practical alternative due to the potential costs of handling, sampling, treatment, storage, and transportation and disposal of these materials. Because hazardous waste sites are not located within the construction limits of the Preferred Alternative (WV), no site-specific mitigation measures would be necessary.

Geophysical investigations would be performed at UST sites that were identified to be adjacent to the construction limits of the ASDEIS IRA. These investigations would be conducted to locate accurately the lateral extent of the USTs. In cases where the USTs require relocation as a result of the ASDEIS IRA, proper planning and implementation of site-specific investigations and the subsequent removal/relocation of the UST would be necessary.

The ASDEIS IRA would require the displacement of one UST site; the BEST facility in Needmore, located along WV 55. During final design, an environmental site assessment would be performed prior to the acquisition of the property. This assessment would establish the overall risk or liability the property represents to the purchaser. The site investigations would be conducted in accordance with WVDOH's *Guidelines for Identifying and Dealing with Hazardous Waste on Highway Projects* (1989) and the guidelines set forth in FHWA's Technical Advisory T 6640.8A.

## W. ENERGY

The energy analysis is a comparison of the energy requirements of the daily energy consumption for the No-Build Alternative, Improved Roadway Alternative, Preferred Alternative (WV) and Line A (VA). Three categories of energy consumption were analyzed; construction, maintenance, and operational. Total energy consumption is also provided for a comparison of the No-Build Alternative, the ASDEIS IRA, the Preferred Alternative and Line A.

### 1. METHODOLOGY

Construction-related energy consumption is based on the construction cost of the alternatives. The energy analysis methodology, contained in *Energy and Transportation Systems* (California Department of Transportation, 1983), was developed for the FHWA by the California Transportation (CALTRANS) Laboratory. It determines the total amount of British Thermal Units (BTUs) required for the production and placement of materials (asphalt, structures, cut, fill, etc.) based on the project's construction cost. These BTU estimates are then converted to liters of gasoline. Approximately 125,000 BTU's equals approximately 3.8 liters (1 gallon) of fuel.

Maintenance and operational energy consumption were calculated using the manual, *Energy Requirements for Transportation Systems* (June, 1980), prepared by the US Department of Transportation (USDOT), FHWA, and the Office of Environmental Policy (OEP). Maintenance energy for the alternatives was based on an annual consumption factor of $1.20 \times 10^8$ BTU per 1.7 lane km (per lane mile).

Operational energy consumption is influenced by vehicle size, vehicle weight, traffic conditions, engine size, vehicle accessories, roadway design, and driving mode (highway vs. city). Vehicle Miles Traveled (VMTs) were developed for the alternatives for the year 2013. This data was combined with vehicle fuel consumption tables to develop total vehicle consumption totals for the alternatives.

Each alternative's total energy requirement equals the sum of the energy required for construction, maintenance, and operation of the proposed facility.

### 2. EXISTING ENVIRONMENT

The existing energy consumption environment is not normally analyzed. The No-Build Alternative, ASDEIS IRA, the Preferred Alternative and Line A were analyzed and compared for the design year 2013.

### 3. IMPACTS

The No-Build Alternative is predicted to consume the least amount of energy because of the lack of construction. However, the predicted consumption levels of the No-Build do not take into account the additional fuel consumed by longer traveling times and fluctuating acceleration resulting from driving the mountainous terrain. The traffic prediction model estimates speeds and travel times by links that cover a large distance of roadway section. This has a tendency to 'flatten out' speeds over long distances instead of showing slower speeds in specific areas which may need to be improved for better travel flow. This could be the case for the No-Build Alternative now or in the future, regardless of the proposed project. These potential projects would also consume energy that would need to be added to the No-Build network, thereby increasing the No-Build Alternative's actual predicted energy consumption values. Table III-80 summarizes construction, maintenance and operational energy requirements for each of the alternatives.

### 4. AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Mitigation measures for energy consumption are not normally employed, primarily due to the avoidance of environmentally sensitive areas and single family residences, as well as basic engineering laws. However, recovery of the construction energy may be calculated to predict when the benefits gained by the predicted operational consumption equal or exceed the construction energy loss.

This project is intended to attract people into this area; therefore, recovery of the construction energy that would normally result from the relief of congestion is not applicable to this project. However, as mentioned previously, energy that is not predicted to be used for this project may have to be used for other roadway improvements resulting from the non-implementation of the ASDEIS IRA or the Build Alternative.

## X. CONSTRUCTION IMPACTS

Construction activities would affect the residents of the immediate project area and those traveling in the vicinity. These impacts could include the temporary degradation of air, noise, and water quality, the temporary impedance to the maintenance and control of traffic, additional safety concerns as a result of changes in traffic flow patterns; the stockpiling and disposal of construction materials; and the use and mitigation of borrow areas.

### 1. AIR QUALITY

Construction activities could have a short-term impact on local air quality during periods of site preparation. Particulate matter, also known as fugitive dust, has the greatest impact during construction activities. This impact would occur in association with excavation and earth moving; cement, asphalt, and aggregate handling; heavy equipment operation; the use of haul roads; and wind erosion of exposed areas and material storage piles. The effect of fugitive dust would be temporary and would vary in scale depending on local weather conditions, the degree of construction activity and the nature of the construction activity.

#### a. West Virginia

Air quality effects would be minimized by requiring the contractor to adhere strictly to dust control measures as outlined in the WVDOH's Standard Specifications on page 423, "636.4 Aggregates and Dust Palliatives". Where fugitive dust is likely to be a problem, effective dust control measures could be implemented following standard roadway construction procedures. These measures may include:

- Minimizing the area of exposed erodible earth;
- Stabilizing exposed earth with grass, mulch, pavement, or other cover as early possible;
- Periodic sweeping or the application of water or stabilizing agents to the working and haulage areas;
- Covering, shielding, or stabilizing stockpiled material, as necessary, and;
- Using covered haul trucks.

All open burning would be done in accordance with all applicable laws, ordinances and regulations, and would be further subject to the applicable provisions of Office of Air Quality's West Virginia Administration Regulations, Chapter 126-20, Series IV.

**b. Virginia**

During construction, the Contractor would be required to comply with the provisions of Section 107.01 (Legal Relations And Responsibility To The Public, Laws to Be Observed) and especially with the State Air Pollution Control Law and Rules of the State Air Pollution Control Board, including notifications required therein.

Burning should be done in accordance with applicable local laws and ordinances. Burning should be performed under the constant surveillance of competent watch persons. The Contractor should not burn rubber tires, asphaltic materials, used crankcase oil, or similar materials which produce dense smoke, either to dispose of such materials or as an ignitor or promoter in the burning of other materials. Care should be exercised so that the burning of materials does not destroy or damage public or private property, or cause excessive air pollution.

## 2. NOISE

Heavy equipment operations and certain construction activities, such as pile driving and the vibratory compaction of embankments would result in temporary noise increases within the area. All such potential impacts would be limited in duration to the actual construction period and limited to the immediate vicinity of the work in progress.

**a. West Virginia**

Any anticipated noise impacts would be confined to time periods considered relatively "noise tolerant" periods generally accepted to be normal weekday working hours as well as the possible use of temporary sound barriers or any additional measures recommended and contained in WVDOH's *Standard Specifications*. To reduce the construction noise impact, WVDOH may recommend the following mitigation measures:

- The contractor would be required to use construction equipment with operable mufflers.
- The contractor would be prohibited from working on the approaches in residential areas during the hours between 10 PM and 6 AM.

The construction noise abatement measures described would be included in contract plans for the project.

**b. Virginia**

The Contractor's operations should be performed in such a manner that the exterior noise levels measured at a noise sensitive activity should not exceed 80 dB(A) during periods of such activity. Noise sensitive activity is defined as any activity for which lowered noise levels are essential if such activity is to serve its intended purpose. Noise sensitive activities include, but are not limited to, those associated with residences, hospitals, nursing homes, churches, schools, libraries, parks, and recreational areas.

VDOT reserves the right to monitor construction-related noise, as deemed necessary. In the event construction noise levels exceed the criteria herein, the Contractor should take such action as necessary to conform before proceeding with operations. The Contractor should be responsible for all costs associated with the abatement of construction noise and with the delay of operations due to non-compliance with these requirements. VDOT also reserves the right to prohibit or restrict to certain portions of the project, any work which produces objectionable noise during normal sleep hours (10 p.m. to 6 a.m), unless other hours are established by local ordinance. In such instances, the local ordinance should govern the hours of construction operation. Equipment should in no way be altered so as to result in noise levels which are greater than those produced by the original equipment. When feasible, the Contractor should establish haul routes which direct vehicles away from developed areas and ensure that noise from hauling operations is kept to a minimum.

These requirements are not applicable if the ambient noise (noise produced by sources other than the Contractor's operation) at the point of reception is greater than the noise from the Contractor's operation at the same point.

### 3. WATER QUALITY

Effects to water quality resulting from erosion and sedimentation, as well as from pollutants such as chemicals, fuels, lubricants, bitumins, raw sewage, and other harmful waste, would be strictly controlled in accordance with Sections 107 and 642 of WVDOH's *Standard Specifications,* as well as WVDOHs *Erosion and Sedimentation Control Manual* (1993) and Sections 107 and 303 of VDOT's *Specifications*. The Contractor would exercise every reasonable precaution necessary during construction to prevent pollution of rivers, streams, or impoundments. All construction discharge would be adequately filtered prior to discharge into waters and would meet the requirements of the West Virginia Administrative Regulations, State Environmental Quality Board (Chapter 22B, Article 1, Section 5 and Chapter 22, Article 11, of the Water Pollution Control Act). During spawning seasons, discharges and construction activities in spawning areas would be restricted so as not to disturb or inhibit aquatic species. In the event the contractor dumps, discharges, or spills any contaminate which may affect water quality, he/she would immediately notify all appropriate local, state, and federal agencies and would take immediate action to contain and remove the contaminate.

## 4. MAINTENANCE AND CONTROL OF TRAFFIC

Maintenance of the current flow of traffic on the existing roadway network would be planned and scheduled to minimize adverse impacts to the traveling public. Within construction areas, traffic control measures using standard practices would be used, as outlined in West Virginia's *Traffic Control for Streets and Highway Construction and Maintenance* and the Virginia's *Work Area Protection Manual.* In addition to using these standards, news releases of construction activities and schedules would be made available to the public.

Construction of the ASDEIS IRA would disrupt the daily users of the existing roadways being upgraded. Most of the ASDEIS IRA would follow existing roadways with short areas of relocation to improve vertical and horizontal curves. The primary areas where the ASDEIS IRA would be on new alignment include the area around Elkins, Roaring Run, Thomas, the area between Moorefield and Bismarck, Patterson Mountain, Moorefield, and east of Great North Mountain. Construction would be sequenced to upgrade large roadway segment to avoid disturbing an entire geographical area. However, because the ASDEIS IRA would involve upgrading much of the existing roadway, disturbances would be lengthy in terms of the area affected and the duration of construction. Therefore, traffic control patterns would require the use of temporary widening and temporary roadways. The use of detour routes would not be effective because the area is rural and the number of alternate routes is limited. Because the ASDEIS IRA would use existing roads where businesses and homes are located, extensive efforts would be made to provide accessibility. Regardless of the amount of planning, ingress and egress would be hampered by the ASDEIS IRA's construction activities.

Because the Preferred Alternative would be on new alignment, maintenance of traffic for its construction would mostly impact the existing roadway network at new crossings. Disturbances would be relatively short in terms of the length of road affected. The number of disturbances within a geographic area could be limited to protect communities or geographical areas from being inundated with construction zones. Because these disturbances are limited, most work would use flagging operations or the temporary widening of existing roads.

## 5. HEALTH AND SAFETY

During the course of construction, the Contractor would comply with all federal, state, and local laws governing safety, health, and sanitation. All reasonable safety considerations and safeguards necessary to protect the life and health of employees on the job, the safety of the public, and the protection of property in connection with roadway construction, would be taken.

## 6. POLLUTION CONTROL

Project construction would consist of roadways and bridges requiring excavation of unsuitable materials, placement of embankments, and the use of materials such as aggregates, bituminous, and portland cement concrete. The stockpiling and disposal of the construction and excavation materials may be visually displeasing to some of the residents along the construction corridor. However, this would be a temporary condition and should pose no permanent problems with the use of the required temporary erosion control features. The Contractor would be responsible for his/her methods of placing the necessary features of pollution control on haul roads, borrow and other materials pits, areas used for the disposal of waste materials, and other potential pollutants associated with the construction of the project. Temporary erosion control features would consist of berms, dikes, temporary seeding, sediment traps, fiber mats, silt fences, slope drains, mulches, crushed stone, and others, as specified in Section 642 and Section 107, respectively, of WVDOH's and VDOT's *Specifications*.

Existing conditions that would pose problems to the constructability of Corridor H, such as large cuts and fills, rockfall areas, deep-mined and strip-mined areas, stream crossings and relocations, etc., would be handled individually during preliminary and final design. The final alignment would be placed in the most practical location to avoid construction problem areas and sensitive natural resource areas. In-depth geotechnical research, reconnaissance, and core borings would be used to make sound engineering judgments to solve difficult construction problems as they arise.

## Y. CUMULATIVE IMPACTS

Cumulative impacts are those impacts on the environment which result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Cumulative impacts discussed in the *ASDEIS* were those impacts that might occur due to direct impacts of the highway project added to those impacts predicted for secondary development impacts.

Consideration of cumulative impacts from other proposed actions within the project area are discussed below. These proposed actions were identified through coordination with various federal (e.g., FWS, COE), state (e.g., WVDNR, WVDOH) and local agencies and industry representatives (e.g., county development officials, Wampler Longacre).

### 1. PROPOSED FEDERAL ACTIONS

There are seven major federal actions proposed within the project area:

- Moorefield Floodwall Project
- Establishment of the Canaan Valley National Wildlife Refuge
- Monongahela National Forest Management Plan
- George Washington National Forest Management Plan
- Blackwater River Watershed Study
- Proposed American Discovery Trail Feasibility Study
- Wild and Scenic River Study of the Monongahela National Forest

Construction of the Moorefield floodwall project would remove small additional amounts of wetlands and wildlife habitat. However, because of the small areal extent of impacts on these resources by the proposed project, the cumulative effect of this project combined with highway impacts to these resources would be very small. The proposed floodwall project would make development safer within the floodplain area. This coupled with the increased accessibility of Moorefield due to the construction of the Preferred Alternative might encourage additional development within the protected floodplain. Control of such development is the responsibility of the City of Moorefield. However, in the *Corridor H FEIS Mitigation Document (Vol. III)*, WVDOH has committed to providing local planners with information regarding natural resources within the Corridor H project area that are sensitive to development and are therefore of particular concern to the resource agencies and others.

Establishment of the Canaan Valley National Wildlife Refuge would, if established as defined in the FEIS for that project, protect approximately 80% of Canaan Valley's total of approximately 12,500 hectares (31,000 acres). Assuming that the refuge or large parts of it would be open to recreational activities associated with wildlife, construction of the Preferred Alternative would likely encourage public use. Ecotourism and utilization of national and state parks within the eastern forest has continued to increase. Providing a more efficient travel route from eastern population centers to sites such as the Canaan Valley Wildlife Refuge can be expected to increase its attractiveness as a place to visit. Should this occur, additional pressure for development around the refuge is possible. This development might include additional service oriented businesses (e.g., motels, restaurants) and the development of second homes. Such development would put additional pressure on the natural resources in the area. Projection of service oriented development is discussed in this FEIS (Section III (A)). Adverse impacts could occur to groundwater, surface waters, and wildlife and additional pressures may occur on emergency service providers. Positive impacts might include an increase in service oriented employment and local tax bases. Control of that development is the province of county and local governments. However, in the *Corridor H FEIS Mitigation Document (Vol. III)*, WVDOH has committed to providing local planners with information regarding natural resources within the Corridor H project area that are sensitive to development and are therefore of particular concern to the resource agencies and others.

Both the MNF and GWNF forest plans call for setting aside large areas of the publicly owned land for primitive and semi-primitive recreational activities. Additionally, they set aside smaller areas for timber harvesting. As with the Canaan Valley Wildlife Refuge, construction of the Preferred Alternative would provide for more efficient access to these resources by tourists. Such access might bring additional pressures to these recreational areas and might encourage development around them. Such development would put additional pressures on the natural resources within the area. Development might include second home, restaurant and other tourist related service oriented activities. Projection of "worst case" service oriented development is discussed in this FEIS (Section III (A)). Adverse impacts could occur to groundwater, surface waters, and wildlife and additional pressures may occur on emergency service providers. Positive impacts might include an increase in service oriented employment and local tax bases. Improved access might also increase logging activity, particularly on privately owned property, within the forests. An increase in logging would also put additional stress on the natural resources of the area.

The Blackwater River Watershed Study is a long term effort to study and recommend ways of improving the wetlands and general water quality of the Blackwater River Watershed particularly in the area of the Beaver Creek watershed. One of the goals of this study is to demonstrate how the watershed could be restored and improved during the Corridor H construction in a cost effective manner. WVDOH in the *Corridor H FEIS Mitigation Document (Vol. III)* has committed to working with this study. Cumulative impacts resulting from coordination with the efforts of this study and the construction of Corridor H would have positive impacts on the degraded Beaver Creek watershed.

Both the feasibility study for the proposed American Discovery Trail and the wild and scenic river study of the Monongahela National Forest have chosen preferred alternative. If the American Discovery Trail were designated as part of the National Trails System and the Preferred Alternative was constructed there would be no cumulative impacts from these actions. Similarly, designation of part of the Shavers Fork as a Scenic River and construction of the Preferred Alternative would not expect to result in any cumulative impacts. However, in the latter case, one might expect additional tourist attraction to the already heavily utilized river. Construction of the Preferred Alternative would provide more efficient access to the resource and might increase its utilization increasing pressure on its fishery.

## 2. PROPOSED STATE ACTIONS

There are two major state programs proposed within the project area. These include the:

- Watershed Management Program
- Elkins By-Pass
- Moorefield By-Pass
- Other WVDOH Projects

The watershed management program is charged with the development of a 10 year strategic plan for managing the state's watersheds. No additional or cumulative impacts to natural resources should occur as the result of the construction of the Preferred Alternative and development of the 10 year strategic plan. However, some of the information that will be developed as the result of implementation of those measures relative to water quality maintenance and highway construction and operation impacts on water quality contained in the *Corridor H FEIS Mitigation Document (Vol. III)* may be useful in the development of the 10 year strategic plan.

The proposed Elkins by-pass would correct transportation deficiencies associated with traffic congestion and roadway design deficiencies in the Elkins area. Elkins is located at the western end of the Corridor H project area. The Elkins by-pass if completed could cause additional impacts on natural resources (e.g., wetlands, farmlands and wildlife habitat).

The Moorefield By-Pass would correct existing traffic congestion and roadway design deficiencies on US 220 in Moorefield, West Virginia. The By-Pass would begin on US 220 in the vicinity of Taylor, south of Moorefield, and extend northward to US 220 north of Moorefield. The Moorefield By-Pass study has not begun. Should the project be completed there would be likely unavoidable impacts to terrestrial habitat, wetlands and floodplains. The Elkins By-Pass has not entered the location phase so no determination of impacts is possible.

Other projects found in the 1995 West Virginia Statewide Transportation Improvement Program (STIP) that are proposed for the Corridor H project area are:

- Modification of a 0.16 km (0.10 mile) curve on US 220 near Petersburg
- Installation of a left turn on Potomac Ave. for 0.4 km. (0.25 miles) in Moorefield
- Installation of a left turn lane on Spring Ave for 0.4 km (0.25 miles) in Moorefield

These three projects along with construction of the Preferred Alternative would not be expected to result in additional cumulative impacts to resources within the Corridor H project area. Their limited nature would not increase those impacts discussed for the Preferred Alternative.

### 3. PROPOSED LOCAL ACTIONS

There are two major local actions proposed within the project area. They are:

- ♦ Stony Run Watershed Water Supply Dam,
- ♦ Grant County Industrial Park.

The proposed Stony Run water supply dam would be constructed to supply additional water supply to the City of Moorefield. Construction of the dam would essentially turn the current Stony Run into a large lake. Construction would remove additional stream channel length from the South Branch of the Potomac's total stream length. It would also remove additional upland wetland habitat. The additional water supply available to the City of Moorefield and more efficient access supplied by the construction of the Preferred Alternative would not be expected increase development within Moorefield. The additional water supply is already needed by the city to supplement its current supply.

The proposed Grant County Industrial Park would occupy approximately 40 hectares (100 acres) near Mt. Storm Lake of WV 93. Currently the land cover consists of mixed forest, and scrub shrub wetlands. Additionally, a creek runs through the property. Construction of this industrial park would cause additional loss of wildlife habitat, wetlands and could add additional impacts to two intermittent tributaries to Four Mile Run. However, in the Corridor H FEIS Mitigation Document (Vol. III), WVDOH has committed to providing local planners with information regarding natural resources within the Corridor H project area that are sensitive to development and are therefore of particular concern to the resource agencies and others.

## 4. PROPOSED PRIVATE ACTIONS

Discussions were held with local and regional planners as well as with major industries in the project area indicated that no major private development has been proposed for the project area.

## Z. RELATIONSHIP OF LOCAL SHORT-TERM USES VERSUS LONG-TERM PRODUCTIVITY

The construction phase of the project would cause limited adverse effects on the environment which have been deemed to be short-term. Adverse effects have been evaluated in detail and mitigation measures identified. In addition, careful attention would be given to the problems identified during design. Proposed mitigation measures, some temporary and some permanent, would minimize adverse short-term effects and avoid any substantial long-term damage.

The proposed project would be classified as a long-term productive facility. This project, with its desirable design characteristics, would provide for safe and efficient vehicle operation for future, as well as present, traffic volumes. The benefits such as reduced operating costs, reduced travel time, reduced accidents, and general economic enhancement of the area offered by the long-term productivity of this project should more than offset the short-term inconvenience and adverse effects on the human environment.

## AA. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Implementation of the ASDEIS IRA or the Preferred Alternative would involve a commitment of a range of natural, physical, human, and fiscal resources. Land used in the construction of the proposed facility is considered an irreversible commitment during the period that the land is used for a highway facility. However, if a greater need arises for use of the land, or if the highway facility is no longer needed, the land can be converted to another use. At present, there is no reason to believe such a conversion would be necessary or desirable.

Considerable amounts of fossil fuels, labor, and highway construction materials such as cement, aggregate, and bituminous material would be expended. In addition, large amounts of labor and natural resources would be used in the fabrication and preparation of construction materials. These materials are not generally retrievable. They are not in short supply, and their use would not have an adverse effect upon continued availability of these resources. Any construction would also require a substantial one-time expenditure of both state and federal funds which are not retrievable.

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

# STATUS OF ADDITIONAL ISSUES

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# *SECTION IV: STATUS OF ADDITIONAL ISSUES*

## A. STATUS OF CORRIDOR H IN VIRGINIA

The Build Alternative which was presented in the ASDEIS consisted of a four-lane expressway-type facility extending from Elkins, WV to I-81 in Strasburg, VA. Subsequent to the ASDEIS, and following public hearings and the review of all agency and public comments received, the Virginia Commonwealth Transportation Board (VCTB) passed a resolution on the ASDEIS in February 1995 (FEIS, Vol. II, Appendix A). The decision of the VCTB, as presented in the resolution, was not to select either the Build Alternative, the No-Build Alternative or the Improved Roadway Alternative. Instead, the VCTB directed VDOT to "...study the Route 55 corridor safety aspects such as horizontal and vertical alignments, possible need for truck climbing lanes, intersection safety improvements, and other safety related features of the roadway."

Consequently, a Preferred Alternative was derived which incorporates the features of the Build Alternative within WV. Additional analyses were performed to determine what effect construction of this Preferred Alternative would have on:

1. Logical termini;
2. Project purpose and need; and
3. Safety considerations in WV and VA.

### 1. LOGICAL TERMINI

Although the Commonwealth of Virginia did not select either the Build Alternative, the No-Build Alternative or the Improved Roadway Alternative, this FEIS includes information regarding the potential impacts of all alternatives within Virginia. While the direct impacts associated with the improvements studied in Virginia will no longer occur as a part of this Preferred Alternative, they are retained in this document for information purposes. Should Virginia undertake any improvements to VA Route 55 in the future, a supplemental or separate environmental document will be prepared.

Also, the new eastern terminus developed for the Preferred Alternative as a result of the Virginia Commonwealth Transportation Board's resolution is logical, and is consistent with the objectives of 23 CFR 771.111 (f) and FHWA's 1993 memorandum entitled *Guidance on the Development of Logical Project Termini*. Specifically:

1. The eastern terminus for the Preferred Alternative is logical since the project ties into existing Route 55, a facility in Virginia which will be able to accommodate the traffic. The design year

ADT on VA 55 resulting from the Preferred Alternative is expected to be the same as the ADT predicted for the design year under the Build Alternative, affording an operational level of LOS D or better (see impact section below). The project is still 161 km (100 mi) long, which is of sufficient length to address environmental matters on a broad scope.

2. The Preferred Alternative has independent utility, even if no additional improvements are made in Virginia. The Preferred Alternative will meet the need to improve the economic condition of West Virginia citizens and will provide necessary system linkage, level of service and improved access to communities identified in Regional plans as desirable growth centers (see Purpose and Need Section below).

3. The new terminus would not restrict or preclude consideration of other reasonable foreseeable transportation improvements. The Virginia Commonwealth Transportation Board's resolution, in fact, directs VDOT to consider these on an "as needed" basis.

Therefore, the Preferred Alternative for the Appalachian Corridor H project, as presented in this FEIS, meets the three regulatory principles set forth in 23 CFR 711.111(f) governing the selection of logical termini for a highway project in a NEPA document.

**2. PURPOSE AND NEED**

Virginia's decision to not pursue any of the alternatives presented in the ASDEIS does not negate the purpose and need for the project in West Virginia. The seven elements which contribute to the project purpose and need are evaluated below in light of Virginia's resolution not to select a preferred alternative.

**a. Social Demand and Economic Development**

The data presented below and abstracted from the *Transportation Needs Study* conducted for the Corridor H project clearly demonstrate that the social demand and economic development needs are greater in West Virginia than in Virginia. Therefore, construction of the 161 km (100 mi.) long West Virginia segment of the project would satisfy the social demand and economic development needs.

Of the 49 recreational resources identified within a 30 minute drive of the Preferred Alternative (Volume II, Table III-28), 45 are situated wholly or in part in West Virginia. Of the 4 recreational resources identified in Virginia within a 30 minute drive of Line A or the option areas, three are located adjacent to VA 55 and one (Big Blue Trail) crosses VA 55 (Volume II, Table III-28). One is situated 22.5 km (14 mi.) from VA 55. Access to the West Virginia recreational resources identified in the *Transportation Needs Study* will be made more efficient with completion of the West Virginia segment of the project.

Access to the Virginia recreational resources from the west will also be made more efficient. Access to those recreational resources located in Virginia from the east (I-81) will not be changed although with increased traffic on VA 55 access might be less efficient than is currently the case. Access to these resources from the west will be made more efficient. The need to provide efficient access to the recreational resources of West Virginia will therefore be met by construction of the Preferred Alternative (WV).

Those major employers identified in the *Transportation Needs Study* as expressing a need for a more efficient highway system for transportation of their products are all located in the state of West Virginia. The movement of the products to and from these employers would be more efficient and therefore less costly with the construction of the Preferred Alternative in West Virginia. Virginia's decision to not adopt any of the alternatives presented in the ASDEIS would not seriously impede movement of goods to or from West Virginia industries. As traffic grows on VA 55 in response to construction of the Preferred Alternative (WV), some inefficiencies in transport of goods may occur but any inefficiencies encountered within the much shorter segment of VA 55 from the WV/VA state line to I-81 will be offset by those efficiencies gained from the new highway in WV. The need to provide efficient cost-saving transportation for the goods produced and used by the current industries located in West Virginia will therefore be met by the construction of the Preferred Alternative (WV) and will not be impaired by the VA decision.

Additionally, all mineral extraction industries (coal mining, limestone, gravel production) are located in West Virginia except for one limestone quarry in Virginia close to I-81. These industries primarily utilize truck transport of their product. Transportation of coal, limestone and gravel products would be more efficient and less costly with construction of the Preferred Alternative in WV. The limestone quarry located in VA is situated adjacent to I-81. Its access to the east would not be affected. However movement of product to the west would be facilitated by construction of the Preferred Alternative in WV. Additional traffic volumes on VA 55 as the result of the construction of the Preferred Alternative in WV would not seriously affect efficient transportation of product to the west. The need to provide efficient access to markets to the east will therefore be met by construction of the Preferred Alternative.

Within the project area, the average 1990 unemployment in West Virginia counties was 8% compared to a 4% average unemployment rate in the Virginia counties (Volume II, Table III-4). In addition, 19% of the population within the West Virginia portion of the study area fall below the poverty level compared to 9% of the Virginia population within the study area (Volume II, Table III-4). Finally, within the study area the average per capita income in West Virginia was approximately $4,000 below the average per capita income in Virginia (Volume II, Table III-4). Construction of the Preferred Alternative in West Virginia will facilitate efficient movement of potential employees to more distant labor markets. Construction of the Preferred Alternative therefore will meet the need to improve the economic condition of the citizens of West Virginia.

### b. Capacity and Level of Service

The *Transportation Needs Study* identified that the majority of the highway capacity problems of the current transportation system were in West Virginia. These capacity problems in West Virginia will be addressed by the construction of the Preferred Alternative thus meeting the need for a safer, more efficient access between I-79 in the west and I-81 in the east. The capacity problems include:

- Through the mountainous terrain of West Virginia, overall traffic flow is adversely affected by truck traffic.
- Most of the roads in the study region will not meet current West Virginia design standards for the forecasted traffic volumes in the design year 2013.
- The existing Elkins to the WV/VA state lines route is classified on WVDOH's Functional Classification Map as an expressway, even though the route is not designed to expressway standards.
- 1990 levels of service (LOS) were unacceptable between Parsons, WV and Davis, WV (LOS E) and by the year 2010 LOS will be unacceptable (LOS E) from Elkins to Montrose, Parsons to Davis, Moorefield to Wardensville; over 50% of the total length of the route from Elkins to the WV/VA state line.

### c. Safety

According to WVDOH data the average accident rate on expressway-type facilities in that state is 0.99 accidents per million vehicle miles traveled. The *Transportation Needs Study* identified the 1990 accident rates for the following routes within the project area:

- Elkins to Montrose - 2.90 accidents / million vehicle miles traveled.
- Montrose to Parsons - 2.43 accidents / million vehicle miles traveled.
- Parsons to Thomas - 2.82 accidents /million vehicle miles traveled.
- Thomas to Davis - 2.45 accidents /million vehicle miles traveled.
- Davis to Scheer - 2.31 accidents /million vehicle miles traveled.
- Moorefield to Wardensville - 3.44 accidents /million vehicle miles traveled.
- Wardensville to the WV/VA state line - 3.09 accidents /million vehicle miles traveled.

These accident rates all exceed the average accident rate for expressway type facilities in the State of West Virginia. Because the Preferred Alternative will be constructed to the level of an "expressway type facility" the accident rate on the new facility should be expected to be substantially lower than the accident rate on current highways in the project area. Construction of the Preferred Alternative in West Virginia would therefore address the safety need as defined in the *Transportation Needs Study*.

It was determined for the *Transportation Needs Study* that the accident rate for VA 55 between the WV/VA state line and I-81 was 1.62 accidents per one million vehicle miles traveled. This accident rate is, in most cases, substantially lower than the accident rate on West Virginia highways that "feed" traffic to VA 55. The accident rate on VA 55 could be expected to increase following construction of the Preferred Alternative due to increased traffic volumes. A discussion of accident rate increase on VA 55 is provided below (3. Impacts).

**d. Roadway Deficiencies**

Those major roadway deficiencies identified in the *Transportation Needs Study* on the existing highway system between Elkins and the WV/VA state line were all located in West Virginia, with the exception of a 1,050 m (3,500') length of 6+% grade between VA 600 and VA 628,. Examples of roadway deficiencies in West Virginia include:

- Numerous mountainous grades of 9-10% and approximately 300 curves exceeding $3^0$30' and over 150 curves exceeding $5^0$30'.
- Speed zones ranging from 15 mph - 50 mph which precludes free-flow traffic conditions.
- Roadway cross-sections were compared against the West Virginia Design Directive #6-4 and it was found that all but one of the two lane sections in West Virginia will be substandard relative to ADT by the year 2013.

Construction of the Preferred Alternative will provide a continuous route through West Virginia designed to appropriate standards with no deficiencies. The construction of the Preferred Alternative therefore meets the need to eliminate roadway deficiencies between Elkins, WV and I-81.

**e. System Linkage**

The *Transportation Needs Study* discussed the need to link the Corridor H region of West Virginia with the midwest, Mid-Atlantic and the Northeast regions. Completion of the Preferred Alternative will provide a continuous, smooth-flowing, four-lane, 97 km/hr (60 mph) facility from the WV/VA state line to I-79, approximately 240 km (150 mi.) to the west. Connection with I-79 will provide access to midwestern markets. Completion of the Preferred Alternative will also expedite connections to the Mid-Atlantic and Northeast regions even without construction of the Build Alternatives in Virginia. The Virginia section of the project represents approximately 12% of the length of the original project considered in the ASDEIS. Failure to complete this small section will have little impact on VA 55's efficiency and will allow goods and people to move efficiently between I-79 to the west and I-81 located approximately 22.5 km (14 mi.) east of the WV/VA state line. Construction of the Preferred Alternative will therefore satisfy the system linkage need currently missing in West Virginia. Because only 12% of the project is in Virginia and because WV 55 will not experience substantial traffic congestion as a result of the construction of the Preferred Alternative in West Virginia, the system linkage need will not be negated by the Virginia decision.

**f. Regional Planning Demands**

Two (Hardy and Tucker) of the three West Virginia counties through which the Preferred Alternative will pass have recognized the proposed project in their comprehensive plans as being important for enhancing development (Tucker) or for efficient transportation of its goods (Hardy). The third county, Grant, recognizes the project as a planning element.

Additionally, the Preferred Alternative would provide access to those communities identified by West Virginia Planning Regions VII and VIII as desirable growth centers. Details concerning regional planning demands are found in Volume I, Section III, B. of this FEIS. Construction of the Preferred Alternative is therefore consistent with plans in West Virginia and will provide for the need discussed or implied in those plans. In Virginia, Frederick County recognizes the project as a planning element while the project is not mentioned in the comprehensive plan for Shenandoah County. The Virginia Resolution is not inconsistent with the comprehensive plans for those Virginia Counties.

**g. Legislation**

The Corridor H project was included in the original Congressional authorization of the Appalachian Development Highway System in 1965. In Fiscal Years 1994 and 1995 a total of $110 million was included in Federal appropriations for the Corridor H project in West Virginia. Prior to these appropriations, Congress had appropriated $160.5 million for the project in West Virginia. No funds have been appropriated for Corridor H in Virginia. Funding of the Preferred Alternative in West Virginia supports the need for the project in that state (refer to Section I, E- Status of Funding). Lack of funding in Virginia is consistent with the decision of that state.

**3. IMPACTS**

This FEIS has been revised throughout to distinguish between project related impacts that can be expected to occur in West Virginia and those that can be expected to occur in Virginia. The majority of project impacts are discussed in Section III of this FEIS. Construction of the Preferred Alternative in West Virginia will result in fewer overall impacts. In light of VA's decision, additional analyses were carried out to estimate different or additional impacts that could be expected to occur with construction of the Preferred Alternative in West Virginia. These additional analyses are discussed below.

### a. West Virginia: Four-lane to Two-lane Transition

Construction of the Preferred Alternative would require a transition from the 4-lane Preferred Alternative to the 2-lane portion of WV 55 just west of the WV/VA state line that would remain in-service following construction of the Preferred Alternative. To avoid safety problems associated with this transition, special consideration will be given to designing the connection (transition) of the Preferred Alternative (4-lane) to the existing 2-lane facility.

Eastbound traffic on the Preferred Alternative will require advance notices by signing, pavement markings, and warning lights that the expressway ends and that the two eastbound lanes (and a probable climbing lane) transitions into a single eastbound lane on an undivided road with lower design characteristics and, probably, a lower posted speed limit. A logical sequence for the transition that will be employed is:

- Shift the climbing lane to the right through lane by use of a 1:50 taper to end the climbing lane and by reducing the eastbound speed limit at the beginning of the taper. Traffic moving up the long grade should be able to reduce speed easily.

- Continue two through lanes from the end of the climbing lane taper eastward for approximately 300 meters (900").

- Shift the left through lane traffic to the right through lane by ending the left lane with a 1:70 or flatter taper.

- Continue one through lane eastward for approximately 300 meters (900') while maintaining full median width.

- Taper the median down to zero width at a rate of 1:70 or flatter.

- Continue a section of two-lane, two-way traffic with full width lanes and shoulders before tapering into the existing 2-lane roadway.

There should be no difficulty in free movement of westbound traffic from existing WV 55 to the Preferred Alternative. After traveling westward through the two-lane, two-way section, that traffic would diverge into two through lanes downgrade where a reasonable operating speed could be obtained in a short distance.

### b. Virginia: VA 55 Traffic

#### (1) Traffic Analysis

It is expected that the average daily traffic (ADT) on VA 55 resulting from the construction of the Preferred Alternative (WV) will be the same as that ADT predicted for the year 2013 Build Alternative (Vol. II, Exhibit II-9). Specifically, ADT on the segment of VA 55 from the WV/VA state lines to Lebanon Church, VA will be approximately 11,000 vehicles. ADT on VA 55 from Lebanon Church, VA to I-81 will be approximately 16, 000 vehicles. Based on these volumes, VA 55 is expected generally to operate at a LOS of D or better if the Preferred Alternative is constructed from Elkins, WV to the WV/VA state line. Details concerning this analysis are presented below.

The analysis was conducted using the traffic model developed for this project and discussed in Section II, M (1)(b) above. The analysis revealed that without any improvements to VA 55, peak hour traffic in the design year (2013) could:

- Operate between 140 vehicles/hour to 800 vehicles/hour over capacity from the WV/VA state line to VA 600 depending on fluctuations in latent demand;
- Operate between 500 vehicles/hour under capacity to 140 vehicles/hour over capacity from VA 600 to VA 628 depending on fluctuations in latent demand;
- Operate between 150 vehicles/hour under capacity to 550 vehicles/hour over capacity from VA 628 to I-81, depending on fluctuations in latent demand

The worse peak hour over-capacity condition would occur if, in addition to local trips and through trips, 100% of the assumed latent demand discussed in Section II, M (1)(a) above is actually attracted to Corridor H, and travels the entire distance of VA 55 from the state line to I-81.

If 85% of the maximum latent demand is attracted to Corridor H and uses Route 55 during the peak hour, there would not be any peak hour over-capacity condition on any segment of VA 55 from the WV/VA state line to I-81.

Given the rural, generally rolling character of VA 55 for most of its 22.5 km (14 mi.) length from the state line to I-81, VA 55 could be expected to operate at LOS D or E during the peak hour. If

LOS E occurs, it is only expected to occur at the most heavily traveled portion of VA 55 near its existing interchange with I-81. At all other times of the day, VA 55 is expected to operate at LOS D or better.

**(2) Accident Rates**

Since the ADT on VA 55 (between the WV/VA state lines and I-81) is predicted to increase approximately five-fold from the current ADT, it is possible that the accident rate could increase to 4.31 accidents per million vehicle miles if no improvements are made to VA 55. Accident rates were determined by extrapolation of relationships of ADT and accidents per million vehicle miles developed by Fambro *et al.* (1981) and reported in FHWA's 1982 report entitled *Synthesis of Safety Research Related to Traffic Control and Roadway Elements, Volume I* (FHWA-TS-82-232).

The Virginia Commonwealth Transportation Board's Resolution (Vol. II, Appendix A) directs VDOT to "study the Route 55 corridor safety aspects such as horizontal and vertical alignments, possible need for truck climbing lanes, intersection safety improvements, and other safety related features of the roadway." Adoption of any recommendations from this study will mitigate those safety problems that may result from the predicted traffic increase.

## B. SECTION 4(F) AND SECTION 6(F)

In accordance with Section 4(f) of the 1966 Department of Transportation Act and Section 6(f) of the 1965 Land and Water Conservation Fund Act (LWCFA), overall evaluations were conducted for properties considered to be qualified for Section 4(f) and Section 6(f) evaluations. The evaluation included among other things, a review of the applicability of Section 4(f) to:

- Established and proposed trails that would be affected or used by the Preferred Alternative (WV) (Section III, J-Recreation Resources).
- Monongahela and George Washington National Forest Management Prescription or Management Areas through which the Preferred Alternative (WV) would pass.

Other publicly owned parks, recreation areas and wildlife and waterfowl refuges within the area of the proposed project were avoided and no use of these resources will result from the construction of the Preferred Alternative (WV).

Additionally, use of sites and properties officially eligible for inclusion in, or listed on, the National Register of Historic Places was avoided. This avoidance also includes "considered eligible" properties. The locations of these properties were used during the development of the Preferred Alternative (WV) to maximize the avoidance of adverse effects to historic and prehistoric resources.

Therefore, it was concluded that the Preferred Alternative (WV) as presented in the FEIS does not use any designated park, recreation, wildlife or waterfowl refuge areas from either the trails or the MA's/MPA's, or any historic properties.

If, during final design activities, any Section 4(f) properties not identified during the extensive Section 4(f) evaluations under taken for this project are encountered, a separate 4(f) evaluation will be completed. Such an evaluation would be consistent with FHWA regulations (23 CFR 771.135(m)) which states in part that, "Circulation of a separate 4(f) evaluation will be required when: (1) a proposed modification of the alignment or design would required the use of Section 4(f) property after the .....final EIS has been processed; (2) the Administration determines after processing.......the final EIS that Section 4(f) applies to a property."

## C. SECTION 106 PROGRAMMATIC AGREEMENT

Regulations of the Advisory Council for Historic Preservation (36 CFR Part 800) require that the effects of a project on cultural resources be "taken into account". Those regulations also allow identification, effects assessment and mitigation of adverse effects to be approached through the implementation of provisions contained in a programmatic agreement between ACHP, the project's Federal sponsoring agency and other designated parties. A programmatic agreement was developed and executed for the Preferred Alternative (WV). The Programmatic Agreement is found in Appendix B (Vol. II) of this FEIS.

## D. CORRIDOR H FEIS MITIGATION DOCUMENT (VOL. III)

Subsequent to receipt of comments from natural resource agencies and the public, a comprehensive *Corridor H FEIS Mitigation Document (Vol. III)* was prepared. This document was developed in cooperation with the natural resource agencies at two meetings in Harpers Ferry, West Virginia. A draft copy of the document was circulated to the resource agencies for their review and comment. Responses to their comments are found in Section VII of this FEIS. The document has been produced as a separate volume (Volume III) and is incorporated into this FEIS. To facilitate preparation of the mitigation document, the FHWA authorized additional detailed engineering for Section 6. This engineering was undertaken to determine possibilities of reducing the amount of excess excavation (waste) predicted at the ASDEIS stage as well as to determine the feasibility of other mitigation measures proposed in the ASDEIS and later developed for inclusion in the *Corridor H FEIS Mitigation Document (Vol. III)*.

# LIST OF PREPARERS

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# SECTION V:
# LIST OF PREPARERS

This document was prepared by the US Department of Transportation, Federal Highway Administration, and the West Virginia Department of Transportation, with assistance from Michael Baker Jr., Inc., consulting engineers and planners.

## FEDERAL HIGHWAY ADMINISTRATION (FHWA)

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## *MICHAEL BAKER JR., INC.*

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## *MICHAEL BAKER JR., INC. (Cont.)*

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| Mr. Christopher G. Gesing, P.E.<br>Graphics and GIS Manager<br>***Geographic Information Systems Manager*** | M.S. degree in Civil Engineering with 15 years experience in computer-assisted engineering, IGDS, GIS, and software development. |
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| Ms. Jennifer M. Graf<br>Environmental Scientist<br>***Wetlands*** | B.S. degree in Natural Resource Management with 7 years experience in environmental assessments and impact statements. |
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| Mr. Laurence D. Gale<br>Environmental Scientist<br>***Water Resources*** | M.S. degree in Marine Biology with 7 years experience in water resources and wetland ecology. |
| Mr. Timothy J. Smith<br>Environmental Scientist<br>***Threatened & Endangered Species, Wildlife Studies*** | M.S. degree in Wildlife Sciences with 6 years experience in threatened and endangered wildlife studies. |
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| Mr. David Bednar, Jr., P.G.<br>Geologist<br>***Geology, Hazardous Waste, and Hydrology*** | M.S. degree in Geology with 5 years experience in groundwater studies and hydrogeology. |
| Mr. Andrew P. Kuchta<br>Environmental Scientist<br>***Air, Noise, and Energy*** | B.A. degree in Geography/Community Urban and Regional Planning with 11 years experience in air quality and noise studies. |
| Mr. Kenneth R. Mobley<br>Senior Planner<br>***Socioeconomics and Land Use*** | M.S. degree in Public Policy and Management with 5 years experience in economic and development impacts. |
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| Mr. William C. Johnson, Ph. D.<br>Senior Archaeologist<br>***Prehistoric Studies*** | Ph. D. degree in Anthropology with 25 years experience in prehistoric and historic archaeological studies. |
| Ms. Denise L. Grantz<br>Archaeologist<br>***Cultural Resource Studies*** | M.A. degree in Social Sciences/Cultural Resources Management with 16 years experience in prehistoric and historic archaeological and historic studies. |

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| Mr. David T. Caudill, P.E.<br>Structural Engineer<br>***Major Drainage Structure, HEC 2 Analysis*** | B.S. degree in Civil Engineering with 9 years experience in bridge design and related computer applications. |
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## SUB-CONSULTANTS

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| Thomas K. Pauley, Ph.D.<br>Pauley Biological Consultants, Inc.<br>***Cheat Mountain Salamander Survey*** | Ph.D. degree in Ecology with 28 years of experience studying salamander ecology and 18 years of experience studying the Cheat Mountain Salamander. |
| Mr. Thomas J. Aley, P.G.<br>Ozark Underground Laboratory, Inc.<br>***Hydrogeology and Spring Studies*** | M.S. degree in Forestry with an emphasis in wildland hydrology; 27 years experience in ground water and surface water hydrology, pollution control investigation, and spring system studies with dye tracing. |

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# DISTRIBUTION OF FEIS

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# *SECTION VI: DISTRIBUTION OF FEIS*

Copies of the Final Environmental Impact Statement have been distributed to the following agencies and organizations:

**FEDERAL AGENCIES**

1. Advisory Council on Historic Preservation - Washington, D.C.
2. Environmental Protection Agency Office of Federal Activities (A-104) - Washington, D.C.
3. Environmental Protection Agency - Philadelphia, PA
4. Federal Highway Administration - Baltimore, MD
5. Federal Highway Administration - Charleston, WV
6. Federal Highway Administration - Washington, D.C.
7. Federal Railroad Administration - Washington, D.C.
8. Federal Transit Administration - Washington, D.C.
9. National Park Service - Philadelphia, PA
10. Secretary of Transportation, US Department of Transportation - Washington, D.C.
11. US Army Corps of Engineers - Norfolk, VA
12. US Army Corps of Engineers - Pittsburgh, PA
13. US Department of Agriculture, George Washington National Forest - Edinburgh, VA
14. US Department of Agriculture, Monongahela National Forest - Elkins, WV
15. US Department of Agriculture, Soil Conservation Service - Keyser, WV
16. US Department of Agriculture, Soil Conservation Service - Moorefield, WV
17. US Department of Agriculture, Soil Conservation Service - Petersburg, WV
18. US Department of Agriculture, Natural Resource Conservation Service - Romney, WV
19. US Department of Agriculture, Soil Conservation Service - Winchester, VA
20. US Department of the Interior, Office of Environmental Project Review - Washington, D.C.
21. US Department of the Interior, Fish and Wildlife Service - Elkins, WV

## STATE OF WEST VIRGINIA

1. WV Board of Education - Charleston, WV
2. WV Department of Employment Security - Charleston, WV
3. WV Department of Transportation - Charleston, WV
4. WV Department of Transportation District 5 - Burlington, WV
5. WV Department of Transportation District 8 - Elkins, WV
6. WV Department of Health & Human Services - Charleston, WV
7. WV Development Office, Community Development Division - Charleston, WV
8. WV Development Office - Charleston, WV
9. WV Division of Environmental Protection - Charleston, WV
10. WV Division of Environmental Protection - MacArthur, WV
11. WV Division of Culture & History - Charleston, WV
12. WV Division of Natural Resources Operations Center - Elkins, WV
13. WV Division of Natural Resources - Charleston, WV
14. WV Division of Tourism & Parks - Elkins, WV
15. WV Office of Emergency Services - Charleston, WV

## COMMONWEALTH OF VIRGINIA

1. VA Council on the Environment - Richmond, VA
2. VA Department of Conservation & Recreation - Richmond, VA
3. VA Department of Environmental Quality - Glen Allen, VA
4. VA Department of Game & Inland Fisheries - Richmond, VA
5. VA Department of Historic Resources - Richmond, VA
6. VA Department of Transportation - Edinburgh, VA
7. VA Department of Transportation - Richmond, VA
8. VA Department of Transportation - Staunton, VA

## STATE OF MARYLAND

1. Garrett County Clerk - Oakland, MD
2. Garrett County Development Corporation - Oakland, MD

**OTHER GOVERNMENT AGENCIES - West Virginia**

1. City Clerk - Parsons, WV
2. City Clerk - Petersburg, WV
3. City Clerk - Romney, WV
4. Executive Director Hardy County Rural Development Authority - Moorefield, WV
5. Executive Director Reg. VII Planning & Development Council - Buckhannon, WV
6. Executive Director Reg. VIII Planning & Development Council - Petersburg, WV
7. Grant County Clerk - Petersburg, WV
8. Grant County Commissioner - Burlington, WV
9. Grant County Development Authority - Petersburg, WV
10. Hampshire County Clerk - Romney, WV
11. Hampshire County Commissioner - Romney, WV
12. Hampshire County Development Authority - Romney, WV
13. Hampshire County Planning Commission - Romney, WV
14. Hardy County Clerk - Moorefield, WV
15. Hardy County Commissioner - Moorefield, WV
16. Hardy County Planner - Moorefield, WV
17. Keyser City Administrator - Keyser, WV
18. Mayor of Bayard, WV
19. Mayor of Davis, WV
20. Mayor of Elkins, WV
21. Mayor of Hambleton, WV
22. Mayor of Hendricks, WV
23. Mayor of Keyser, WV
24. Mayor of Montrose, WV
25. Mayor of Moorefield, WV
26. Mayor of Parsons, WV
27. Mayor of Petersburg, WV
28. Mayor of Romney, WV
29. Mayor of Thomas, WV
30. Mayor of Wardensville, WV
31. Mineral County Chamber of Commerce - Keyser, WV
32. Mineral County Clerk - Keyser, WV
33. Mineral County Commissioner - Keyser, WV
34. Mineral County Development Authority - Keyser, WV
35. Preston County Chamber of Commerce - Kingwood, WV
36. Preston County Commissioner - Rowlesburg, WV

37. Randolph County Chamber of Commerce - Elkins, WV
38. Randolph County Clerk - Elkins, WV
39. Randolph County Commissioner - Elkins, WV
40. Randolph County Development Authority - Elkins, WV
41. Town Recorder - Moorefield, WV
42. Town Recorder - Wardensville, WV
43. Tucker County Chamber of Commerce - Buckhannon, WV
44. Tucker County Clerk - Parsons, WV
45. Tucker County Commissioner - Parsons, WV
46. Tucker County Development Authority - St. George, WV
47. Tucker County Planning Commission, Davis, WV

**OTHER GOVERNMENT AGENCIES - Virginia**

1. 7th Planning District Commission Lord Fairfax Planning District - Front Royal, VA
2. County Office - Winchester, VA
3. Frederick County Parks & Recreation Department - Winchester, VA
4. Frederick County Chamber of Commerce - Winchester, VA
5. Frederick County Clerk - Winchester, VA
6. Frederick County Economic Development Commission - Winchester, VA
7. Frederick County Planning Commission - Winchester, VA
8. Mayor of Strasburg, VA
9. Mayor of Winchester, VA
10. Shenandoah County Parks & Recreation Department - Woodstock, VA
11. Shenandoah County Board of Supervisors - Woodstock, VA
12. Shenandoah County Chamber of Commerce - Woodstock, VA
13. Shenandoah County Clerk - Woodstock, VA
14. Shenandoah County Economic Development Council - Woodstock, VA

## UNITED STATES POST OFFICES

1. Post Master - Baker, WV
2. Post Master - Bayard, WV
3. Post Master - Capon Springs, WV
4. Post Master - Davis, WV
5. Post Master - Elkins, WV
6. Post Master - Fisher, WV
7. Post Master - Hambleton, WV
8. Post Master - Hendricks, WV
9. Post Master - Kerens, WV
10. Post Master - Keyser, WV
11. Post Master - Lahmansville, WV
12. Post Master - Maysville, WV
13. Post Master - Montrose, WV
14. Post Master - Moorefield, WV
15. Post Master - Mt. Storm, WV
16. Post Master - Old Fields, WV
17. Post Master - Parsons, WV
18. Post Master - Petersburg, WV
19. Post Master - Romney, WV
20. Post Master - Scherr, WV
21. Post Master - Star Tannery, VA
22. Post Master - Strasburg, VA
23. Post Master - Thomas, WV
24. Post Master - Wardensville, WV
25. Post Master - Winchester, VA

## LIBRARIES

1. Rivers Library - Parsons, WV
2. Allegheny Mountain Top Public Library - Mt. Storm, WV
3. Elkins - Randolph County Public Library - Elkins, WV
4. Hampshire County Public Library - Romney, WV
5. Hardy County Public Library - Moorefield, WV
6. Keyser Public Library - Keyser, WV
7. Handley Regional Library - Winchester, VA
8. Strasburg Community Library - Strasburg, VA

## HIGH SCHOOLS

1. East Hardy High School - Baker, WV
2. Elkins High School - Elkins, WV
3. Tucker County High School - Hambleton, WV
4. Keyser High School - Keyser, WV
5. Moorefield High School - Moorefield, WV
6. Union High School - Mt. Storm, WV
7. Petersburg High School - Petersburg, WV
8. Hampshire High School - Romney, WV
9. Shenandoah High School - Stephens City, VA
10. Park View High School - Sterling, VA
11. Strasburg High School - Strasburg, VA
12. James Wood High School - Winchester, VA

## INTEREST GROUPS

1. West Virginians for Corridor H - Elkins, WV
2. Sierra Club - Morgantown, WV
3. Corridor H Alternatives Central West Virginia - Kerens, WV
4. Corridor H Alternatives Eastern West Virginia - Wardensville, WV
5. Corridor H Alternatives Northern West Virginia - New Creek, WV
6. Corridor H Alternatives Virginia - Strasburg, VA
7. Virginia Advisory Committee

## SECTION 106 CONSULTING PARTIES (Not already cited above)

1. Capon Springs & Farms - Capon Springs, WV
2. Association for the Preservation of Civil War Sites
3. Virginia Citizens Advisory Committee (CAC)

# COMMENTS AND COORDINATION

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# *SECTION VII: COMMENTS AND COORDINATION*

Text that is underlined in Section VII represents instances where new text has been added to the ASDEIS based on comments received on the ASDEIS from the public and interested agencies. Comments and responses presented in this section represent those comments received from cooperating agencies and the public following circulation of the CSDEIS, the ASDEIS, the FEIS Mitigation Document (Vol. III), and the Section 404 permit application. Responses to testimony provided at public hearings is included in the section entitled, "Public Comments and Responses". Comments and responses to comments are reported below in separate sections to aid the reader. Comments and responses in each of the sections are alphabetized by the commentor name. Responses to comments followed CEQ and FHWA regulations (40 CFR 1503.4 and 23 CFR 777.111 respectively).

## A. AGENCY INVOLVEMENT: CORRIDOR SELECTION

The formal Scoping Meeting on October 30, 1990, served as a forum for explaining the project history and established a standard for future communications with the public and cooperating resource agencies. The scoping meeting is described in the document titled: *Scoping Meeting: Materials, Minutes, Comments: Appalachian Corridor H*, West Virginia Department of Transportation Division of Highways, April 1991.

Since the Scoping Meeting, numerous informal meetings, phone conversations, and written exchanges of information have taken place with various local, regional, state, and federal authorities (refer to Appendices B through H of the CSDEIS for pertinent correspondence relating to the CSDEIS).

Prior to distributing the CSDEIS, WVDOH and FHWA conducted a workshop for federal resource agencies on May 5th and 6th, 1992, in Charleston, West Virginia. The purpose of the workshop was to discuss how issues raised at the 1990 Scoping Meeting were addressed in the working draft CSDEIS, as well as to determine if sufficient information was presented or if additional data would be necessary. During this two-day meeting, representatives of WVDOH and Michael Baker Jr., Inc. provided an overall description of the workshop purpose and objectives, project status and projected schedule, and detailed discussions of issues and assessment methodologies. Agency representatives were provided an opportunity to comment at any time during the course of the workshop. (Copies of the workshop minutes are available from WVDOH. This includes a list of all agency representatives at the meeting.)

Working draft copies of the CSDEIS and the various supporting Technical Reports were distributed to the agencies in attendance. WVDOH requested comments on the working draft from the agencies. Once all agencies had provided written comments, WVDOH compiled the agency letters and distributed a complete set to all representatives attending the workshop. The CSDEIS was revised based on the agency comments received following the May 5th and 6th workshop. A follow-up resource agency workshop was held September 23rd and 24th, 1992, in Charleston, West Virginia. The purpose of this workshop was to provide an opportunity for WVDOH to discuss the changes made in the CSDEIS: i.e., to go over the comments received, how WVDOH responded to those comments and incorporated the information into the CSDEIS, and where these revisions could be found. This workshop facilitated a more comprehensive document review by the various resource agencies during the public review process.

As is consistent with CEQ Guidelines (40 CFR 1503.4), comments were responded to in one of three ways: (1) correct or revise text in the ASDEIS; (2) explain why the comment(s) did not warrant further response; and/or (3) supplement, improve, or modify analyses presented in both the CSDEIS and ASDEIS. Official agency comments on corridor selection are provided in Volume II, Appendix C of the FEIS. Summarized comments, submitted by cooperating agencies following the submission of the CSDEIS, and responses to them, are found on pages VII-9 through VII-36.

## B. AGENCY INVOLVEMENT: ALIGNMENT SELECTION

Concerned resource agencies aided in the alignment development process via field reviews, both during the identification of alignments to be eliminated or carried forward and during the alignment study efforts themselves. Appendix D (Vol. II) contains copies of the agency comments received for the alignment selection phase of this project.

As discussed previously, the formal Scoping Meeting on October 30, 1990, established a standard for future communications with the public and cooperating resource agencies. Following the selection of a preferred corridor, resource agencies and officials were given an opportunity to comment at the initiation of the alignment selection process. The purpose of the initial meetings was to discuss the project status, discuss how alternatives and alignments would be developed, and present the methodologies for assessing project-related impacts. Resource agencies were active participants throughout the alignment selection process. Table VII-1 (Vol. II) identifies the meeting dates and agencies represented at the initial alignment selection coordination meetings. The table also identifies the primary issues discussed at each of the meetings.

### 1. AGENCY FIELD REVIEWS

Participating resource agencies were invited to field reviews of proposed alignments for both the ASDEIS IRA and the Build Alternative. Their comments, concerns, and suggestions were incorporated into the design of the alignments. Table VII-2 (Vol. II) presents the dates of the field reviews by design section, as well as those agencies represented at the field reviews.

## 2. CONCURRENCE MEETING ON ALTERNATIVES CARRIED FORWARD

The culmination of the field reviews was the agency concurrence meetings in West Virginia (3/9/94) and Virginia (4/19/94). This concurrence step is an important point in the Integrated NEPA/Section 404 Process. The agency concurrence meetings were held to determine which alignments would be eliminated from further consideration and which would be carried forward for further evaluation in the ASDEIS. Table VII-1 (Vol. II) identifies the agencies in attendance at both of these meetings. Letters requesting agency concurrence on alternatives to be carried forward were distributed by WVDOH and VDOT on April 8 and June 1, respectively. Table VII-3 (Vol. II) identifies the agencies to whom the letters were sent, as well as the responses received. Copies of the agency concurrence letters are presented in Exhibits VII-1 through VII-9 (Vol. II).

Following public hearings and the review of all agency and public comments received, the Virginia Commonwealth Transportation Board passed a resolution on the ASDEIS in February 1995 (Vol. II, Appendix A). This resolution directed VDOT to conduct further study of the safety conditions of VA 55 between the West Virginia state line and I-81. These safety improvements will include evaluation of horizontal and vertical alignments, the need for truck climbing lanes, intersection safety, and other safety features.

## 3. CONCURRENCE MEETING ON WETLAND MITIGATION

Appropriate wetland mitigation measures were evaluated following agency approval of alternatives to be carried forward. As shown on Table VII-1 (Vol. II), a meeting was held on April 28, 1994, with affected resource agencies to obtain concurrence on the proposed measures in West Virginia. Those attending the meeting were in agreement with the proposed wetland mitigation plan to be submitted to the Army Corps of Engineers; the Section 404 permitting authority. At the meeting, representatives of the Corps stated they were in agreement with the plan and indicated their intention to approve the proposed mitigation strategy, barring any unforeseen circumstances. In addition to verbally approving the plan at the meeting, WVDNR, WVDEP, and EPA provided formal letters of concurrence. Copies of the agency mitigation concurrence responses are presented on Exhibits VII-10 through VII-12 (Vol. II).

### 4. AGENCY COMMENTS AND RESPONSES - ALIGNMENT SELECTION

As is consistent with CEQ Guidelines (40 CFR 1503.4), comments were responded to in one of three ways: (1) correct or revise text in the ASDEIS; (2) explain why the comment(s) did not warrant further agency response; and (3) supplement, improve, or modify analyses presented in the ASDEIS. Following submission of the ASDEIS a series of meetings were held with resource agencies with respect to issues and comments on the ASDEIS (Vol. II, Table VII-1). Official agency comments on alignment selection are provided in Appendix D (Vol. II) of the FEIS. The agency comments on alignment selection and responses, sorted by commentor's name and issue, are presented on pages VII-37 through VII-74.

## C. PUBLIC INVOLVEMENT PROCESS - CORRIDOR SELECTION

A Public Involvement Program was developed and carried out as an integral part of this project. The purpose of this program was to establish and maintain communication with the public at-large and individuals and agencies concerned with the project and its potential impacts. To ensure open communication and agency and public input, and to provide a substantial issue identification/problem solving effort, WVDOH has carried out the scoping process as required by the Council on Environmental Quality Guidelines. Detailed information on the early scoping meeting held prior to the CSDEIS is available from WVDOH. This section of the FEIS details WVDOH's program to identify fully, address, and resolve all project-related issues identified through the public involvement program.

### 1. PUBLIC MEETINGS

A number of formal and informal meetings have been sponsored by various public groups to discuss the proposed project.

#### a. Elkins Town Meeting

A town meeting was held in Elkins, West Virginia, on Thursday, February 14, 1991, at the Federal Building courtroom. The meeting was attended by over 60 area residents. Four area transportation officials served as commentators during the forum: Mike Wenger of the Appalachian Regional Commission; Roger McMahon, President of the Randolph County Development Authority; Tom Staud, District 8 Engineer for the West Virginia Department of Transportation, Division of Highways; and Jay Carter, Manager of the West Virginia Public Transit Authority. The discussions were wide-ranging and included: the history of the Appalachian Development Highway System; funding for West Virginia highway projects; the history and status of Corridor H; and economic development in West Virginia.

**b. Tucker County Meeting**

A citizens' meeting was held at Canaan Valley Resort on Tuesday, April 9, 1991, and was attended by over 100 area residents. The meeting was sponsored by the Tucker County Commission, the Development Authority, Planning Commission, Allegheny Front Regional Development Corporation, the County's Convention and Visitors Bureau, Chamber of Commerce, and Alpine Festival, Inc. The West Virginia Department of Transportation, Division of Highways was represented by Randolph Epperly. Michael Baker Jr., Inc. was represented by Phil Shucet, Ernie Aschenbach, and Bill Jeffords.

Numerous area residents expressed their reasons for believing that Corridor H should be routed via the northeast route through Tucker County. Justification for the northern route included: potential future connection with Corridor O (proposed route connecting Toronto, Canada and Elkins, West Virginia); avoidance of more populated areas impacted by the southern alignment; facilitation of tourists coming to Canaan Valley State Park; reduced environmental impact; and reduced impact to Section 4(f) properties.

**c. West Virginia Highlands Conservancy**

As part of its annual meeting at Yokum's Vacationland and Campground in Seneca Rocks, West Virginia, the Conservancy held a public forum on May 4, 1991. The meeting's topic was the possible routing of Corridor H and the potential impacts associated with its construction through sensitive and unique areas. The panelists for the forum are identified below.

Mary Wimmer, representing the West Virginia Sierra Club, discussed her role in developing the U. S. Forest Service's *Monongahela National Forest: Land and Resource Management Plan.* A brief discussion of the Committee on Corridor H recommendations, as written in their Spring 1990 position paper, ensued. There was further emphasis on the many potential environmental impacts (Bowden Fish Hatchery, unique topographic features, wilderness areas, wild and scenic rivers, national forest), along with a proposal for a parkway (like the Cranberry Glades Scenic Parkway) rather than a highway.

Norm Roush, representing the West Virginia Department of Transportation, Division of Highways, discussed the design criteria of the proposed facility, plus possible mitigation techniques (possibility of WVDOH donating right-of-way to the U. S. Forest Service), safety, and maintenance issues.

Larry Miller, Chairman of the Eastern Panhandle Coalition for Corridor H (Mr. Miller is also a member of the Hampshire County Development Authority, but he represented the Eastern Panhandle Coalition at this meeting). Mr. Miller stated for the record that the Coalition supports the northern alignment. The Coalition also officially suggested a revision to the northern alignment (following the existing northern alignment from Elkins to Romney, continuing to Martinsburg following Route 29). He further suggested that the southern route would have too many negative environmental and socioeconomic impacts. The southern route would also "make folks forget about West Virginia's Eastern Panhandle." Phil Shucet and Susan Manes-Harrison, representing Michael Baker Jr., Inc., answered questions as needed.

**d. Tucker County Rotary Club**

A meeting was held in Davis, West Virginia, on June 20, 1991. Fred VanKirk, Commissioner of the West Virginia Department of Transportation, told club members that a final decision on Corridor H would not be made until the spring of 1993. He also discussed environmental issues and potential drawbacks of the various routes.

**e. Hampshire County Chamber Of Commerce**

Approximately 100 citizens attended an open forum that was held on Tuesday, June 25, 1991, in Augusta, West Virginia, sponsored by the Hampshire County Chamber of Commerce. The discussion was moderated by Ed Bishop, a representative of the Capon Valley Ruritans Club. Panelists at the meeting were asked to discuss the Corridor H project and its potential impacts.

Ben Hark, representing the West Virginia Department of Transportation, Division of Highways-Environmental Section, discussed the project's history and status. Susan Manes-Harrison, representing Michael Baker Jr., Inc., answered questions as needed. Larry Lemon, the Northern Area Coordinator for Senator J.D. Rockefeller, IV, discussed the concept of the Appalachian Corridor System and the federal funds allocated to West Virginia for transportation projects. George Constantz, representing the Pine Run Ecological Lab, discussed the potential environmental impacts.

**2. PUBLIC COMMENTS - CORRIDOR SELECTION**

Expressions of concern were received from numerous entities. In order to facilitate response to written concerns, letters received were divided into three categories: public, other government, and special interest groups. Commentors on the CSDEIS expressed the following general concerns: potential funding sources, discussion of a Preferred Alternative (WV) in the CSDEIS, consideration of a No-Build Alternative, availability of various Technical Reports and the *Traffic and Transportation Needs Analysis* document, cost per mile, potential impact to wildlife movement, and potential impact to regional socioeconomics and culture. The *CSDEIS Decision Document* discusses general public comments on the CSDEIS in greater detail.

As is consistent with CEQ Guidelines (40 CFR 1503.4), comments were responded to in one of three ways: (1) correct or revise text in the ASDEIS; (2) explain why the comment(s) did not warrant further agency response; and (3) supplement, improve, or modify analyses presented in the ASDEIS. Summarized comments from letters received following the submission of the CSDEIS, and responses to them, are provided on pages VII-75 through VII-128of the FEIS. Summarized comments from Public Hearings held following the submission of the CSDEIS, and responses to them, are presented on pages VII-129 through VII-148 of the FEIS.

## D. PUBLIC INVOLVEMENT PROCESS - ALIGNMENT SELECTION

### 1. PUBLIC MEETINGS

An extensive public involvement effort was maintained throughout the alignment selection process. WVDOH received hundreds of letters from individuals, special interest groups, local governments, economic development authorities, and local, county and regional quasi-governmental bodies. Where appropriate, letters received individual responses from WVDOH. In addition to the written coordination efforts, numerous meetings were held to disseminate project-related information.

To facilitate public coordination and circulation of the ASDEIS, WVDOH authorized a toll-free hotline that the general public could utilize to request copies of the ASDEIS and referenced Technical Reports. In addition, the hotline provided the general public with information on how to interpret material in the ASDEIS and how to comment officially on the ASDEIS through written comment and through attendance of the public workshops/meetings.

Formal meetings included a series of Virginia Citizens Advisory Committee meetings, a series of Preliminary Alignments and Alternatives Workshops in West Virginia and Virginia, and a series of Public Information Meetings and Public Hearings on the ASDEIS.

### 2. PUBLIC COMMENTS

In general, public comments to the ASDEIS expressed a wide range of issues and general concerns. Many comments in favor of the proposed project expressed that the proposed highway would increase safety, reduce traffic, accelerate economic development, attract new companies, enhance the tourist industry, provide increased accessibility to recreational resources, and a variety of other positive economic benefits. Those groups and individuals not in favor of the proposed highway expressed that the construction of the roadway would result in severe environmental destruction to water resources, wetlands, streams, and cultural resources. In addition, those not in favor of the proposed project expressed concern that the proposed highway would act as an economic drain for the region and that the cost to build the highway was too much.

As is consistent with CEQ Guidelines (40 CFR 1503.4), comments were responded to in one of three ways: (1) correct or revise text in the ASDEIS; (2) explain why the comment(s) did not warrant further agency response; and (3) supplement, improve, or modify analyses presented in the FEIS. The comments and responses to public letters sorted by commentor's name and issue, are presented on pages VII-149 through VII-243 of the FEIS. The comments and responses to public hearing testimony, sorted by commentor's name and issue, are presented on pages VII-243 through VII-256 of the FEIS.

## E. SECTION 404 COMMENTS AND RESPONSES

As is consistent with CEQ Guidelines (40 CFR 1503.4), comments were responded to in one of three ways: (1) correct or revise text in the FEIS; (2) explain why the comment(s) did not warrant further agency response; and (3) supplement, improve, or modify analyses presented in the FEIS. The comments and responses to letters and public hearing testimony, sorted by commentor's name and issue, are presented on pages VII-257 through VII-264 of the FEIS.

## F. CORRIDOR H FEIS MITIGATION DOCUMENT COMMENTS AND RESPONSES

As is consistent with CEQ Guidelines (40 CFR 1503.4), comments were responded to in one of three ways: (1) correct or revise text in the *Corridor H FEIS Mitigation Document (Vol. III)*; (2) explain why the comment(s) did not warrant further agency response; and (3) supplement, improve, or modify analyses presented in the *Corridor H FEIS Mitigation Document*. The comments and responses to letters from EPA, WVDCH and NRCS, sorted by commentor's name and issue, are presented on pages VII-265 through VII-269 of the FEIS. The agency comment letters are found in Appendix E (Vol. II) of the FEIS.

# Corridor Selection SDEIS -

# Agency Comments and Responses

## Commentor: Deason, Mr. Jonathan P., Director Office of Environmental Affairs

**Agency - DOI**

### Issue: OTHER GOVERNMENT ACTIONS

**Subject:** Should Scheme A or D Alternative be selected, FWS is likely to recommend denial of any required Section 404 permit, based on the significant and avoidable anticipated adverse impacts to NRWs and native trout streams.

***Response:*** *A comprehensive analysis of surface water quality resources and potential impacts to them was included in the ASDEIS (pp. III-333-III-470). A mitigation strategy to address these impacts was developed in conjunction with all cooperating agencies including the EPA, DOI, COE, and SCS. That strategy is detailed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Should Scheme A or D Alternative be selected, the FWS will also recommend denial of required Section 404 for avoidable wetland impacts.

***Response:*** *A comprehensive analysis of wetland resources and potential impacts to them was included in the ASDEIS (pp. III-333-III-470). A mitigation strategy to address these impacts was developed in conjunction with all cooperating agencies including the EPA, DOI, COE, and SCS. That strategy is detailed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** We believe these schemes are environmentally unsatisfactory and would consider referring a project with the selection of any of these schemes to the Council on Environmental Quality in accord with 40 CFR 1504.

***Response:*** *The WVDOH's selection of Scheme Option D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

### Issue: ALTERNATIVES CONSIDERED

**Subject:** We are of the opinion that the improved roadway alternative should be discussed in greater detail and reevaluated and included in the final document.

***Response:*** *An IRA was developed to an appropriate level of detail and its impacts were assessed in the CSDEIS, ASDEIS and the FEIS. Details concerning the designation of the Preferred Alternative and the reasons for the dismissal of the IRA in the CSDEIS and ASDEIS are found in the FEIS (Section II).*

**Subject:** The No-Build Alternative as well as a modified improved roadway alternative should be fully considered as a means of avoiding adverse impacts to these resources.

***Response:*** *A No-Build Alternative and an Improved Roadway Alternative were included in the ASDEIS. Neither were selected as the Preferred Alternative in WV.*

## Issue: BUILD ALTERNATIVE AND CORRIDOR SCHEME OPTIONS

**Subject:** Our comments on the remaining alternatives are essentially repetitious of our draft statement comments of September 23, 1981 as they still remain valid.

***Response:*** *Comment noted.*

**Subject:** Scheme A is the most environmentally damaging Build Option and has the greatest potential for adverse impacts to Section 4(f) resources. All remaining Build Options could adversely affect listed and eligible cultural and natural Section 4(f) resources.

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** The Executive Summary should list the potential adverse impacts of Scheme A Options to the recharge zone for the U.S. Fish and Wildlife Service's (FWS) Bowden National Fish Hatchery.

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** All of the remaining practicable Scheme A Options would be situated within 200 to 2,000 linear feet of the two wilderness areas. Schemes D and E Options avoid noise impacts to these areas.

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** Schemes A and D would require the relocation/channelization of up to six miles of the Lost River (a West Virginia High Quality Stream and a National Resource Water).

***Response:*** *The WVDOH's selection of Scheme Option D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns. The Lost River will not be relocated or culverted as a result of the Preferred Alternative.*

**Subject:** We recommend the selection of Scheme El since it tends to avoid Section 4(f) resources and has the fewest impacts to the environment.

***Response:*** *The WVDOH's selection of Scheme Option D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns and documents that Scheme Option E would have resulted in potentially greater environmental impacts than Scheme Option D5.*

**Subject:** We would, at this time, object to the selection of Schemes A, B, C or D.

***Response:*** *The WVDOH's selection of Scheme Option D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns and documents that Scheme Option E would have resulted in potentially greater environmental impacts than Scheme Option D5.*

**Issue: WATER RESOURCES**

**Subject:** Discussion of impacts to aquatic resources from stream channelization/relocation have been understated and should be described in more relative terms.

***Response:*** *Quantified impact discussions are included in Section III of the ASDEIS as part of the second tier environmental document. FHWA regulations (23 CFR 777.111) with regard to tiering require that the focus of the first tier, in this case the Corridor H Corridor Selection SDEIS (CSDEIS), should be on a broad comparison of key environmental factors which may have a bearing on early decisions concerning location.*

**Subject:** Stream channelization of High Quality Streams and National Resource Waters should be avoided to the maximum extent possible.

***Response:*** *A comprehensive analysis of surface water quality resources and potential impacts to them was included in the ASDEIS (pp. III-333-III-470). A mitigation strategy to address these impacts was developed in conjunction with all cooperating agencies including the EPA, DOI, COE, and SCS. That strategy is detailed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Extensive erosion and sediment control would also need to be implemented to avoid water quality impacts during construction.

***Response:*** *A comprehensive analysis of surface water quality resources and potential impacts to them was included in the ASDEIS (pp. III-333-III-470). A mitigation strategy to address these impacts was developed in conjunction with all cooperating agencies including the EPA, DOI, COE, and SCS. That strategy is detailed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Page III-79, Bowden National Fish Hatchery - Studies proposed to determine the potential impacts of highway construction on the North Spring recharge zone should be done prior to selection of a corridor.

***Response:*** *The WVDOH's selection of Scheme Option D5 avoids any involvement with this facility.*

**Issue: WETLANDS**

**Subject:** Page III-91, Wetlands - More complete, on-the-ground mapping must take place prior to the completion of the alignment DEIS.

***Response:*** *Quantified impact discussions are included in Section III of the ASDEIS as part of the second tier environmental document. The wetland impacts analyzed in the ASDEIS were field delineated and plotted on mapping that was based on new aerial photography obtained specifically for the ASDEIS.*

**Subject:** The selected alignment should have the fewest possible number and amount of wetland impacts practicable.

***Response:*** *The Preferred Alternative was developed as a component of the integrated NEPA/404 process. Its development was facilitated by an extensive field view effort conducted by WVDOH with all of the natural resource agencies, including USDOI. The process of alternative development relative to encroachment on sensitive natural resources, including wetlands, was the accepted avoidance, minimization, and mitigation scenario. Concurrence was received from all resource agencies that wetlands had been avoided to the extent practicable, that encroachments were likewise minimized and that the replacement scenarios proposed would mitigate for those encroachments that were unavoidable. Details concerning mitigation for wetlands encroachments are found in the Corridor H FEIS Mitigation Document which is incorporated by reference into this FEIS.*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** Page III-107 Vegetation and Wildlife - The document lacks discussion on whether Scheme D Options would avoid major involvement with remote habitat in the GWNF.

***Response:*** *Remote areas in GWNF were avoided. Alignment location was coordinated closely with the GWNF through field views and interagency meetings. Details of these meetings are found in Section VII of the ASDEIS.*

**Issue: FLOODPLAINS**

**Subject:** Page III-123, Floodplains - All build alternative options would involve a considerable amount of construction in floodplains. The final design should avoid and minimize encroachment to the maximum extent practicable.

***Response:*** *Floodplain impact analyses, as required by E.O. 11988, were carried out and are discussed in the ASDEIS (pp. III-269-III-279). Final design would continue to minimize encroachments.*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** We concur with the study plans regarding endangered, threatened, and candidate species, contained under 1. METHODOLOGY, on pages III-140 and III-141.

***Response:*** *Comment noted.*

**Subject:** Biological Assessments (BA) shall be completed before any contract for construction is entered into and before construction is begun.

***Response:*** *Section 7 informal consultation, as defined in the Endangered Species Act (16 USC 1536), was carried out. Additional field surveys were undertaken during the alignment selection phase of this study. Results of consultation and field surveys were reported in the ASDEIS (pp. III-319-III-332).*

**Subject:** The identified population of clover is relatively small, when compared to several populations found to the south of the study corridor. Schemes D and E should be considered potential habitat for the clover.

***Response:*** *Section 7 informal consultation, as defined in the Endangered Species Act (16 USC 1536), was carried out. Additional field surveys were undertaken during the alignment selection phase of this study. Results of consultation and field surveys were reported in the ASDEIS (pp. III-319-III-332). The Preferred Alternative within Scheme Option D5 does not impact any known populations of the clover.*

**Subject:** There are no confirmed populations within the 2,000-foot study corridor of Schemes D and E. There is potential habitat. Two known populations are located approximately two miles south of the corridor.

***Response:*** *Section 7 informal consultation, as defined in the Endangered Species Act (16 USC 1536), was carried out. Additional field surveys were undertaken during the alignment selection phase of this study. Results of consultation and field surveys were reported in the ASDEIS (pp. III-319-III-332).*

**Subject:** Page III-147, Table III-38, Threatened and Endangered Species - The Cheat Mountain salamander is the only Federally threatened species in the study area. The remaining listed species in the table are Federally endangered.

***Response:*** *Comment noted.*

**Subject:** Page III-152, Table III-39, Federal Candidate Species, (Category 2 ), Number of Potential Involvements - The table is confusing because of the mixing of different species groups together.

***Response:*** *The table has been revised in the ASDEIS (p. III-321, Table III-52).*

**Issue: VISUAL RESOURCES**

**Subject:** Avoidance of adverse impacts to high quality visual resources is recommended.

***Response:*** *A visual impacts analysis was conducted in accordance with FHWA T.A. 6640.8A and is discussed in the ASDEIS (pp. III-177-III-230).*

**Issue: RECREATION RESOURCES**

**Subject:** Detailed discussion of the project's consistency with the GWNF Plan is absent. This section should be revised in the final document and address whether Scheme D would adversely affect these remote areas.

***Response:*** *Consistency of this project with the GWNF Plan was considered in the ASDEIS. That consideration is found in Section III, J-Recreation Resources of the ASDEIS.*

**Subject:** Page III-204, Potential Recreation Resource Involvements - This section failed to consider the adverse impacts associated with Schemes A, B, and D on the GWNF due to direct habitat loss from highway construction.

***Response:*** *An analysis of impacts to recreation resources was conducted in accordance with FHWA T.A. 6640.8A and is included in the ASDEIS (pp. III-159-III-174). Impacts to terrestrial habitat in general are addressed in the Corridor H FEIS Mitigation Document.*

**Issue: MINERAL RESOURCES**

**Subject:** In cooperation with the West Virginia Department of Transportation (WVDOT) a report on the mineral resource impacts of the alternate routes will be prepared and should be documented in the final statement with recommendations to mitigate potential impacts

***Response:*** *An analysis of potential impact to mineral resources was included in the ASDEIS (pp. III-495-III-508). Mineral resources were identified, impacts assessed and mitigation measures developed. Additional comments and responses concerning these issues are found in Section VII (Comments and Coordination) of the ASDEIS. No special report was prepared.*

**Issue: SECTION 4(f)/6(f)**

**Subject:** Coordination and consultation with the West Virginia State Historic Preservation Officer is recommended. The FEIS should include documentation of the consultation and that agency's concurrence with the project plans.

***Response:*** *A detailed comprehensive evaluation of cultural resources was undertaken in the Corridor H Alignment Selection SDEIS. Additionally, a Section 106 Programmatic Agreement has been developed to assure the consideration of all cultural resources within the project area. That Programmatic Agreement is included in the FEIS.*

**Issue: MNF MANAGEMENT PRESCRIPTION AREAS**

**Subject:** The final document should also provide discussion on the potential impacts of the project on MNF Management Prescriptions 1.1, 2.0, and 3.0 rather than simply stating their compatibility.

***Response:*** *MNF Management Prescription Areas are discussed in Section III, J - Recreation Resources of the ASDEIS.*

**Issue: MISCELLANEOUS**

**Subject:** Scope of construction impacts can only be determined by careful examination of the maps provided in the Natural Resources Technical Report.

***Response:*** *These maps have been carefully examined and were considered in the subsequent development of the mitigation plan.*

**Subject:** Future work on the Alignment draft environmental impact statement (DEIS) must utilize quantitative methods for assessing impacts.

***Response:*** *Quantified impact discussions are included in Section III of the ASDEIS as part of the second tier environmental document. FHWA regulations (23 CFR 777.111) with regard to tiering require that the focus of the first tier, in this case the Corridor H Corridor Selection SDEIS (CSDEIS), should be on a broad comparison of key environmental factors which may have a bearing on early decisions concerning location.*

**Issue: SECONDARY AND CUMULATIVE IMPACTS**

**Subject:** Discussion of secondary and cumulative impacts associated with the build alternatives is inadequate. The SDEIS provides only brief analysis of impacts to the GWNF.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Subject:** The final document should address the direct and indirect losses associated with these schemes on the GWNF.

***Response:*** *Discussion of impacts to this National Forest is included in the ASDEIS (p. III-169).*

**Issue: FOREST FRAGMENTATION**

**Subject:** Page III-119, Forest Fragmentation - We are highly concerned with impacts of forest fragmentation on neotropical migrant birds.

***Response:*** *An expanded discussion and refined data analysis based on recent (March, 1995) data reported in the journal Science on the ecological significance of forest patch creation by Corridor H has been included in the FEIS (pp. III-137-III-138).*

**Issue: GREENLAND GAP**

**Subject:** Scheme D1 could adversely impact Greenland Gap, a unique geological, biological, and water resource owned and managed by the Nature Conservancy. It is recommended that this high quality resource be avoided.

***Response:*** *The WVDOH's selection of Scheme Option D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns. Scheme Option D5 avoids Greenland Gap.*

**Issue: WATER RESOURCES**

**Subject:** Subject to the above comments and suggestions, we concur with the measures to minimize harm which should be coordinated with the appropriate state and local officials.

***Response:*** *A comprehensive analysis of surface water quality resources and potential impacts to them was included in the ASDEIS (pp. III-333-III-470). A mitigation strategy to address these impacts was developed in conjunction with all cooperating agencies including the EPA, DOI, COE, and SCS. That strategy is detailed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

### Commentor: Farrar, Mr. William G., Deputy State Historic Preservation Officer

**Agency - WVCH**

**Issue: CULTURAL RESOURCES**

**Subject:** We also requested a better contextual background statement. Upon review of the revision, this statement is still unacceptable.

***Response:*** *A detailed comprehensive evaluation of cultural resources was undertaken in the Corridor H Alignment Selection SDEIS and Cultural Resource Technical Report. Additionally, a Section 106 Programmatic Agreement has been developed to assure the consideration of all cultural resources within the project area. That Programmatic Agreement is included in the FEIS.*

**Subject:** At this time, we continue to urge the testing of the archaeological predictive model.

***Response:*** *An archaeological predictive model was developed for the ASDEIS phase of the Corridor H project. Results of this model were utilized in determining the location of the Preferred Alternative.*

**Subject:** We have discussed our preferences and believe at this time, based on existing information, that Scheme D is the least of all evils.

***Response:*** *Comment noted.*

**Subject:** We would suggest that a programmatic agreement be drafted to state specifically how the steps of the review process will be carried out regarding the chosen corridor.

***Response:*** *A detailed comprehensive evaluation of cultural resources was undertaken in the Corridor H Alignment Selection SDEIS. Additionally, a Section 106 Programmatic Agreement has been developed to assure the consideration of all cultural resources within the project area. That Programmatic Agreement is included in the FEIS.*

## Commentor: Fernald, Mr. Raymond T., Manager

**Agency - VAGIF**

### Issue: BUILD ALTERNATIVE AND CORRIDOR SCHEME OPTIONS

**Subject:** If the southern route is selected, we should be further consulted regarding the project corridor, and we recommend that the final project location should not be restricted to the currently proposed 2,000-foot-wide corridor.

***Response:*** *WVDOH committed to doing this where necessary. That commitment is found on p. 37 of the Corridor H Corridor Selection Decision Document (July, 1993).*

### Issue: AFFECTED ENVIRONMENT AND THE ENVIRONMENTAL CONSEQUENCES

**Subject:** Based on the documents submitted, considerable effort has been expended to provide alternative routes around sensitive areas in WV while comparatively little consideration has been given to protection of VA's fish and wildlife resources.

***Response:*** *Details concerning avoidance, minimization and mitigation measures in each state are discussed in the ASDEIS (Section III).*

## Commentor: Hamrick III, Mr. J. Edward, Director

**Agency - WVDNR**

### Issue: PURPOSE OF AND NEED

**Subject:** We concur with the need to complete this segment to the Virginia line. We also stated that this segment could be completed in an environmentally sound manner.

***Response:*** *Comment noted.*

### Issue: NEPA

**Subject:** We trust that the opportunity to evaluate this detailed information will be made available in the future by utilizing the NEPA process for highway alignment.

***Response:*** *The CSDEIS phase of this project had been conducted in anticipation of the Integrated NEPA/404 Process as detailed in FHWA Publication No. FHWA-RE-88-028, entitled: Applying the Section 404 Permit Process to Federal-Aid Highway Projects. As part of this process an intensive field review protocol was developed and conducted with all cooperating agencies. Details of those field reviews and other cooperating agency meetings are found on pp. VII-1-19 of the ASDEIS and Section VII of the FEIS.*

### Issue: BUILD ALTERNATIVE AND CORRIDOR SCHEME OPTIONS

**Subject:** Our evaluation indicates that a southern routing would significantly impact no less than four of our premier native, put and grow and stocked trout fisheries.

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** In general, the southern routes have the greater potential to affect more rare, threatened and endangered species and their habitats.

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** We believe that Scheme D, using a subscheme which avoids the Greenland Gap area, will best serve the environmental, recreational and transportation needs of West Virginia.

***Response:*** *The WVDOH's selection of Scheme Option D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns and avoided Greenland Gap.*

**Issue: WATER RESOURCES**

**Subject:** We are seriously concerned with the probable loss of the Bowden National Fish Hatchery already impacted by past Corridor H construction.

***Response:*** *The WVDOH's selection of Scheme Option D5 avoids any involvement with this facility.*

**Issue: MISCELLANEOUS**

**Subject:** Our agency provided comments following an extensive review of the working SDEIS in May, 1992. We believe our concerns have been addressed to the extent possible within the scope of this document.

***Response:*** *Comment noted.*

**Issue: SECONDARY AND CUMULATIVE IMPACTS**

**Subject:** We still have concerns relative to detailed qualitative and quantitative impact assessment and the cumulative and secondary impacts, none of which are addressed. Reporting at this level of detail would be difficult within a document of this scope.

***Response:*** *Quantified impact discussions are included in Section III of the ASDEIS as part of the second tier environmental document. FHWA regulations (23 CFR 777.111) with regard to tiering require that the focus of the first tier, in this case the Corridor H Corridor Selection SDEIS (CSDEIS), should be on a broad comparison of key environmental factors which may have a bearing on early decisions concerning location.*

### Commentor: Harmon, Mrs. Tracey E., Environmental Specialist Senior

**Agency - VA SWCB**

**Issue: WATER RESOURCES**

**Subject:** Once the alignments have been chosen and more detailed information is available concerning water quality impacts, we will be able to provide more site specific comments.

***Response:*** *Quantified impact discussions are included in Section III of the ASDEIS as part of the second tier environmental document. FHWA regulations (23 CFR 777.111) with regard to tiering require that the focus of the first tier, in this case the Corridor H Corridor Selection SDEIS (CSDEIS), should be on a broad comparison of key environmental factors which may have a bearing on early decisions concerning location.*

## Commentor: Hibpshman, Mr. Mark H., Supervisory Physical Scientist

**Agency - Bureau of Mines**

**Issue: MISCELLANEOUS**

**Subject:** We will not submit comments at this time; instead, our evaluation will be included in the official Department review.

***Response:*** *Comment noted.*

## Commentor: Kelley, Mr. George W., Forest Supervisor

**Agency - GWNF**

**Issue: ALTERNATIVES CONSIDERED**

**Subject:** The George Washington National Forest (GWNF) does not have an official position on whether or not Corridor H should be built.

***Response:*** *Comment noted.*

**Subject:** We do not have a preferred Scheme should the decision be made to construct the road.

***Response:*** *Comment noted.*

**Issue: SECTION 4(f)/6(f)**

**Subject:** We recommend that the 4(f) designation for the Big Blue Trail be dropped in the Final EIS. We consider the Big Blue Trail to be an important resource; we do not believe it should be listed as Section 4(f).

***Response:*** *The Preferred Alternative in West Virginia identified in the FEIS does not encroach upon the Big Blue Trail.*

## Commentor: Larson, Mr. Bruce J., Project Review Section Supervisor

**Agency - VADHR**

**Issue: CULTURAL RESOURCES**

**Subject:** We do not believe existing historic resource information, as summarized in the Technical Report, can be used for corridor selection. We do not believe a corridor should be chosen until additional, substantial identification efforts are completed.

***Response:*** *All resources were compared at a comparable level of detail in the Corridor Selection SDEIS as consistent with FHWA guidelines. At the request of the WVSHPO additional studies were conducted subsequent to the circulation of the CSDEIS and prior to the preparation of the Decision Document and the ASDEIS. Results of these studies are discussed in the FEIS (Vol. I, Section II (D)(4)(a)(3) Additional Cultural Resource Investigations).*

**Issue: MISCELLANEOUS**

**Subject:** We do not object to the concept of a "staged" approach to environmental and historic resource documentation, particularly given the scale and complexity of the project.

***Response:*** *A detailed comprehensive evaluation of cultural resources was undertaken in the Corridor H Alignment Selection SDEIS. Additionally, a Section 106 Programmatic Agreement has been developed to assure the consideration of all cultural resources within the project area. That Programmatic Agreement is included in the FEIS.*

## Commentor: Laskowski, Mr. Stanley L., Acting Regional Administrator

**Agency - EPA**

**Issue: PURPOSE OF AND NEED**

**Subject:** EPA acknowledges that the purpose and need stated in the SDEIS is sufficiently documented. However, we believe that such benefits must also be considered within the context of potential adverse environmental impacts.

***Response:*** *Comment noted.*

**Issue: ALTERNATIVES CONSIDERED**

**Subject:** EPA believes that the range of alternatives evaluated in the SDEIS is consistent with the Council on the Environmental Quality Regulations (40 CFR Parts 1500-1508).

***Response:*** *Comment noted.*

### Issue: BUILD ALTERNATIVE AND CORRIDOR SCHEME OPTIONS

**Subject:** Through the data presented in the SDEIS, EPA has determined that the northern routes present more opportunities for avoidance or reduction of significant impacts.

***Response:*** *Comment noted.*

**Subject:** The EPA has rated the northern routes (Schemes D and E) EC-2 (Environmental Concerns, Insufficient Information).

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** EPA believes that the potential adverse impacts associated with the other (corridor) alternatives due to the direct, indirect and cumulative impacts to water quality, aquatic and terrestrial resources, are environmentally unacceptable.

***Response:*** *Comment noted.*

**Subject:** We have rated Scheme A as EU-2 (Environmentally Unsatisfactory, Insufficient Information).

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** We have not provided a rating for Schemes B and C since WVDOH has eliminated these schemes from further consideration. We concur with WVDOH's decision, which is a matter of public record.

***Response:*** *Comment noted.*

**Subject:** Note, that if Schemes B and C had not been eliminated, we would have rated them EU due to their significant impacts to natural resources.

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** The basis for the assigned ratings focuses primarily on the extent and potential severity of stream related impacts.

***Response:*** *Comment noted.*

**Subject:** Scheme A potentially would have the greatest adverse effect on stream quality.

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** Scheme A would result in significant, long-term adverse impacts to the Bowden National Fish Hatchery.

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** The northern routes (Schemes D and E), will result in fewer stream involvements overall (41-47) and, in particular, will affect fewer National Resource Waters.

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** The northern routes will have no adverse impact on the Bowden National Fish Hatchery.

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** Scheme A has the greatest number of stream involvements within the fewest watersheds.

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** Believe that there may be opportunities to locate an alignment slightly outside of the corridor to achieve maximum avoidance and minimization.

***Response:*** *WVDOH committed to doing this where necessary. That commitment is found on p. 37 of the Corridor H Corridor Selection Decision Document (July, 1993).*

**Subject:** Scheme A would potentially have the greatest impact on the remote areas of the MNF including those management areas emphasizing remote wildlife habitat, semi-primitive recreation and special botanical areas.

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** Schemes D and E would not involve major impacts to remote habitat but would result in the greatest number of minor impacts (897-1309 acres).

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** We believe that these minor impacts can be avoided or reduced at the alignment level study.

***Response:*** *We agree. Additional steps were taken to avoid or minimize encroachment to sensitive habitat. Indeed, the Preferred Alternative encroaches upon no primitive or remote habitat as described by the US Forest Service. Additionally, as part of the integrated NEPA/404 process a comprehensive mitigation document was developed in concert with the natural resource agencies. This document is incorporated by reference into the FEIS.*

**Issue: DESIGN CRITERIA**

**Subject:** A summary of the basic highway design criteria that would constrain efforts to shift alignments within corridors should be provided.

***Response:*** *Details on design criteria were included in the ASDIES (pp. II-2-II-12).*

**Issue: SECONDARY AND CUMULATIVE IMPACTS**

**Subject:** Section III-44 to 45 provides a cursory description of potential secondary impacts.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Issue: SECONDARY AND CUMULATIVE IMPACTS**

**Subject:** Some studies have indicated that little or no "net" growth occurs in response to highway construction (in rural areas) and that redistributed growth is more common.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Subject:** This evaluation seems to be based on the results of the ARC's Fiscal 1993 Program, Please note, EPA's concerns with the interpretation of this report and its relevance to West Virginia.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Subject:** EPA believe that there are some general adverse impacts associated with secondary development which could have been highlighted at the corridor level.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Issue: AIR QUALITY**

**Subject:** A later version of MOBILE has subsequently been developed. This model should be utilized in the alignment SDEIS. If potential CO hotspots are identified, the appropriate model should be used.

***Response:*** *The newer version of MOBILE was used for the ASDEIS analysis.*

**Issue: NOISE**

**Subject:** EPA concurs with methodology which indicates that impact will occur if the noise exceeds the NAC limit.

***Response:*** *Comment noted.*

**Subject:** We recommend that an additional column be added in Table III-22 which identifies the number of sensitive receptors exposed in an area.

***Response:*** *Quantified impact discussions are included in Section III of the ASDEIS as part of the second tier environmental document. FHWA regulations (23 CFR 777.111) with regard to tiering require that the focus of the first tier, in this case the Corridor H Corridor Selection SDEIS (CSDEIS), should be on a broad comparison of key environmental factors which may have a bearing on early decisions concerning location.*

**Issue: WATER RESOURCES**

**Subject:** It must be shown that streams which serve as fisheries will not be negatively impacted so that the existing use is not degraded and to ensure that the construction and use of the highway does not interfere with the fishable goal of the Clean Water Act.

***Response:*** *A comprehensive analysis of surface water quality resources and potential impacts to them was included in the ASDEIS (pp. III-333-III-470). A mitigation strategy to address these impacts was developed in conjunction with all cooperating agencies including the EPA, DOI, COE, and SCS. That strategy is detailed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Beaver Creek wetlands complex has been degraded by mining activity and Beaver Creek itself is of poor water quality.

***Response:*** *Comment noted.*

**Subject:** EPA recommends that impact assessments of appropriate categories of nonpoint source environmental pollution should be included, based on long-term data from similar highway projects in WV.

***Response:*** *A detailed analysis of potential highway impacts to groundwater was included in the ASDEIS (pp. III-87-III-128).*

**Subject:** Table III-25 (page III-85) and "Potential Involvement Summary" (page III-88) should be revised to illustrate projected long-term highway use impacts in quantitative terms.

***Response:*** *Quantified impact discussions are included in Section III of the ASDEIS as part of the second tier environmental document. FHWA regulations (23 CFR 777.111) with regard to tiering require that the focus of the first tier, in this case the Corridor H Corridor Selection SDEIS (CSDEIS), should be on a broad comparison of key environmental factors which may have a bearing on early decisions concerning location.*

**Subject:** The nonpoint source controls should be designed to include practical provisions for diverting most "clean" runoff water away from road surfaces.

***Response:*** *A mitigation strategy to address these impacts was developed in conjunction with all cooperating agencies including the EPA, DOI, COE, and SCS. That strategy is detailed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Additional information should be provided which evaluates the potential impacts associated with increased access to sensitive ecological areas (i.e. Monongahela National Forest, Congressionally designated Wilderness areas, remote habitat, etc.).

***Response:*** *Under the IRA, the Preferred Alternative in West Virginia or Line A in Virginia, access to recreation resources would improve over the No-Build Alternative. As noted in the 1992 Corridor Selection SDEIS, the determination of effects resulting from access improvements to developed and undeveloped recreation resources varies, depending upon the views of the recreation user and the recreation provider. One point of view would be that improved access would result in a reduction of recreational enjoyment as resource visitation increases in volume and frequency. This would likely be the case for those individuals who travel to or relocate to the area seeking a more remote and primitive recreation experience. However, to others, improved access would be positive, providing recreation opportunities that they might otherwise not have visited. To the recreation provider, improved access might place user demands on resources which the provider may be unable to meet. On the other hand, increased visitation could provide an opportunity for growth and development of natural and developed recreation resources within the area. Predictive models utilized for the Alignment Selection SDEIS did not identify any impacts to the Laurel Fork Wilderness Areas or the Otter Creek Wilderness Area.*

**Subject:** It is imperative that the information contained in this SDEIS and subsequent NEPA documents demonstrates compliance with the Guidelines at each level of detail so that the eventual selected alternative will be in compliance with the Guidelines.

***Response:*** *The Corridor H Corridor Selection SDEIS (CSDEIS) of October 1992, Corridor H Corridor Decision Document (July, 1993), Corridor H Alignment Selection SDEIS (ASDEIS) of November 1994, and the Corridor H FEIS were prepared in accordance with the tiered EIS procedures as described by CEQ (40 CFR 1502.20) and FHWA (23 CFR 771.111) Regulations.*

**Issue: SECONDARY AND CUMULATIVE IMPACTS**

**Subject:** A comprehensive evaluation of the secondary impacts associated with induced development will be required.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Subject:** EPA also requests that WVDOH provide a comprehensive cumulative impact assessment.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Subject:** Stream impacts within a watershed will have the potential for cumulatively degrading water quality, both spatially and temporally, we expect this assessment to be successfully completed at the next stage.

***Response:*** *A comprehensive analysis of surface water quality resources and potential impacts to them was included in the ASDEIS (pp. III-333-III-470). A mitigation strategy to address these impacts was developed in conjunction with all cooperating agencies including the EPA, DOI, COE, and SCS. That strategy is detailed in the Corridor H Environmental Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Secondary impacts have been given a cursory treatment in this SDEIS.

***Response:*** *A comprehensive analysis of surface water quality resources and potential impacts to them was included in the ASDEIS (pp. III-333-III-470). A mitigation strategy to address these impacts was developed in conjunction with all cooperating agencies including the EPA, DOI, COE, and SCS. That strategy is detailed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Though we feel an opportunity has been missed in not addressing these issues at the corridor level, we need to be assured that secondary impacts will not be neglected at the next study phase.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Issue: FOREST FRAGMENTATION**

**Subject:** Construction of Corridor H will result in fragmentation of large tracts of contiguous forests.

***Response:*** *An expanded discussion and refined data analysis based on recent (March, 1995) data reported in the journal Science on the ecological significance of forest patch creation by Corridor H has been included in the FEIS (pp. III-137-III-138).*

**Issue: MITIGATION**

**Subject:** If the project goes to the alignment selection phase, we strongly recommend an interagency effort to undertake a similar but more detailed and intensive review to locate the alignment within the selected corridor to maximize avoidance and minimization.

***Response:*** *This project has been conducted in accordance with the Integrated NEPA/404 Process as detailed in FHWA Publication No. FHWA-RE-88-028, entitled: Applying the Section 404 Permit process to Federal-Aid Highway Projects. As part of this process an intensive field review process was developed and conducted with all cooperating agencies. Details of those field reviews and other cooperating agency meetings are found on pp. VII-1-19 of the ASDEIS and Section VII of the FEIS.*

**Subject:** Our position is that the preferred order of wetlands compensation is restoration, creation, and then enhancement.

***Response:*** *As agreed upon by the EPA (Exhibit VII-12, ASDEIS), wetlands will be mitigated at two separate locations. One within the Monongahela river drainage and one within the Potomac river basin. Additionally, Wetland compensation was agreed upon to be 1:1 for both Open Water and Palustrine Emergent and 3:1 for Palustrine Forested and Shrub/Scrub wetlands.*

**Subject:** Our position on mitigation ratios is: 1) Forested wetlands: replacement ratio of 3 acres created to each acre lost. 2) Scrub/Shrub Wetlands: replacement ratio of 2 to 1. 3) Emergent Wetlands: replacement ratio of 1.5 to 1.

***Response:*** *As agreed upon by the EPA (Exhibit VII-12, ASDEIS), wetlands will be mitigated at two separate locations. One within the Monongahela river drainage and one within the Potomac river basin. Additionally, wetland compensation was agreed upon to be 1:1 for both Open Water and Palustrine Emergent and 3:1 for Palustrine Forested and Shrub/Scrub wetlands.*

**Subject:** All of these ratios can be reduced to1:1 where the appropriately designed and located wetlands are mature and fully functional prior to the loss of wetlands resulting from the project.

***Response:*** *Wetland mitigation strategy and replacement ratios were developed following discussion with all cooperating agencies including the EPA. They were detailed in the ASDEIS (pp. III-375-III-378). As agreed upon by the EPA (Exhibit VII-12, ASDEIS), wetlands will be mitigated at two separate locations. One within the Monongahela river drainage and one within the Potomac river basin. Additionally, wetland compensation was agreed upon to be 1:1 for both Open Water and Palustrine Emergent and 3:1 for Palustrine Forested and Shrub/Scrub wetlands.*

**Issue: GROUNDWATER**

**Subject:** EPA recommends that delineations and potential water supply capacity for aquifers be included in the proposed alternatives analysis.

***Response:*** *Capacity impacts to known aquifers characteristics were discussed in the ASDEIS (pp. III-128).*

**Issue: AFFECTED ENVIRONMENT AND THE ENVIRONMENTAL CONSEQUENCES**

**Subject:** The very nature of the geographic area makes it impossible to lessen the impacts to a degree which would raise no environmental criticism.

***Response:*** *Comment noted.*

## Commentor: McCoy, Mr. Laidley E., Chief, Office of Water Resources

**Agency - WVDEP**

**Issue: BUILD ALTERNATIVE AND CORRIDOR SCHEME OPTIONS**

**Subject:** The Office of Water Resources recognizes that the DEIS is a corridor level study and cannot completely assess potential alignment impacts. However, Schemes A, B and C each significantly involve unique aquatic resources in the State of West Virginia

***Response:*** *The WVDOH's selection of Scheme Option D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** Consequently, Schemes A, B or C are unacceptable corridors for further consideration of alignment alternatives.

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** OWR is concerned that at the corridor level both schemes impact the greatest number of wetlands.

***Response:*** *The WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns.*

**Subject:** OWR recommends that the corridors under consideration be narrowed to Schemes D and E within which more detailed evaluation be conducted through use of the GIS database.

***Response:*** *The WVDOH's selection of Scheme Option D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) recognized these concerns. A GIS database was utilized in both assessing the baseline characteristics of the affected environment and the environmental consequences.*

**Issue: SECONDARY AND CUMULATIVE IMPACTS**

**Subject:** Secondary and cumulative impacts have not been addressed within any of the corridors.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Subject:** OWR expects a secondary and cumulative analysis of all wetland and stream impacts. Long-term impacts to aquatic systems as a result of changes in hydrology and water quality should be quantified and thoroughly evaluated.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Issue: MITIGATION**

**Subject:** Unavoidable adverse impacts should be quantified, documented, and draft plans for mitigation identified.

***Response:*** *Section III of the Corridor H Alignment Selection SDEIS (ASDEIS) discusses avoidance, minimization and mitigation measures to ecological impacts. Additionally, a comprehensive mitigation strategy (Corridor H FEIS Mitigation Document) has been developed in conjunction with all cooperating agencies including the EPA, DOI, COE, and SCS. That document is incorporated by reference into the FEIS.*

## Commentor: Page, Mr. Jim, Forest Supervisor

**Agency - MNF**

**Issue: SECTION 4(f)/6(f)**

**Subject:** We have determined four important historic sites, which fall within the Scheme (s) D & E corridors, have been omitted from the report.

***Response:*** *A detailed comprehensive evaluation of cultural resources was undertaken in the Corridor H Alignment Selection SDEIS. Additionally, a Section 106 Programmatic Agreement has been developed to assure the consideration of all cultural resources within the project area. That Programmatic Agreement is included in the FEIS.*

**Subject:** The sites omitted are located in Tucker County on U.S. Government land.

***Response:*** *The sites have been identified during the alignment selection phase of this study.*

**Subject:** Portions of this important Civil War (Corricks Ford) action are located on Forest Service lands.

***Response:*** *The boundaries of Corrick's Ford Battlefield were delineated subsequent to the circulation of the ASDEIS and submitted to WVSHPO and the Keeper of the NRHP. The Preferred Alternative (WV) selected in the FEIS avoids encroachment within the boundaries determined by the Keeper and avoids use of the Corrick's Ford Battlefield. Battlefield boundaries are indicated on mapping in Volume II, Appendix G of the FEIS.*

**Subject:** The Parsons Nursery is on Forest Service lands.

***Response:*** *The Parsons Nursery site is avoided by the Preferred Alternative selected in the FEIS.*

**Subject:** Recently the Forest Service worked with mine drainage into the Blackwater River while preserving the important parts of both the Thomas/Coketon Site and the Railroad grade.

***Response:*** *Comment noted*

**Subject:** If this alternative (D) is selected, we would like to work with your agency to plan avoidance or to mitigate adverse impacts to these historically significant Forest Service sites.

***Response:*** *The Programmatic Agreement to which the Monongahela National Forest is a party provides for the development of mitigation plans. WVDOH appreciates the cooperation of the Forest Service in these mitigation activities and will continue to utilize their expertise as the project develops.*

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# Alignment Selection SDEIS

## Agency Comments and Responses

## Commentor: Callaghan, Mr. David C., Director

**Agency - WVDEP**

### Issue: MITIGATION

**Subject:** The construction of Corridor H presents a unique opportunity to reclaim and eliminate acid producers and to make major scenic and water quality improvements.

***Response:*** *This issue is addressed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

## Commentor: Davy, Jr., Mr. John R., Planning Bureau Manager

**Agency - VA Department of Conservation and Recreation**

### Issue: IMPROVED ROADWAY ALTERNATIVE

**Subject:** The IRA design criteria should mention the incorporation of scenic roadway enhancements.

***Response:*** *The FEIS text has been modified to include scenic design considerations for the IRA.*

### Issue: SCENIC DESIGN FEATURES

**Subject:** The parkway concept is mentioned on II-20. It is not clear as to how the parkway concept relates to the truck traffic projected for Route 55.

***Response:*** *The mention of the parkway concept on p. II-20 of the ASDEIS was to characterize the roadway's design features to the reader. The narrative on that page states in part that, the scenic design features used for Corridor H would be more parkway-like in character." Additionally, Table II-2 on p. II-25 compares various scenic design features of parkways to design features for Corridor H. This table too was to characterize Corridor H's design for the readers so that they could better visualize what the road would look like*

**Subject:** No mitigation for visual impacts is identified for the IRA. It would seem appropriate that mitigation measures must be planned for the IRA as well as the Build Alternative.

***Response:*** *Mitigation for those resources that were identified as suffering a negative visual impact from either the Build Alternative or the IRA are discussed in Table III-35, p. 202 of the ASDEIS.*

**Subject:** The SDEIS does not adequately address the tourism and recreation uses which exist in VA.

***Response:*** *Recreation resources indicated in Table III-28, were identified using available mapping (numerous sources), and through coordination with Federal, State, and local governmental agencies (ASDEIS, p. III-159)*

**Issue: IMPROVED ROADWAY ALTERNATIVE**

**Subject:** DCR previously requested that a number of factors be considered to accommodate the existing scenic nature of the roadway. After reviewing the SDEIS it is evident that these factors were not incorporated into the IRA.

***Response:*** *The factors suggested in the VDCR letter (4/26/94) were originally recommended for the IRA in VA. The VA Commonwealth Transportation Board's Resolution of February 15, 1995, directed the VADOT to study the Route 55 corridor safety aspects such as horizontal and vertical alignments, possible need for truck climbing lanes, intersection improvements and other safety related features of the roadway as may be included in the Six Year Plan.*

**Issue: SECONDARY AND CUMMULATIVE IMPACTS**

**Subject:** Reference is made to the numbers of jobs created as a result of Corridor H construction. It is not clear if job growth and development relates to permanent positions or are temporary.

***Response:*** *Predicted employment numbers as part of the Economic Impact Analysis (ASDEIS, pp. III-44)) are considered to be permanent jobs. Those jobs created as the result of industrial park build-out were used to develop secondary and cumulative natural resource impact analyses. This has been clarified in the FEIS (pp. III-1-III-4).*

**Issue: WATER RESOURCES**

**Subject:** VA should ensure that private water supply sources in (karst regions) and key recharge areas are accurately mapped and characterized before selecting the route with the least overall impact.

***Response:*** *The avoidance, minimization and mitigation efforts identified on p. III-88 represent the most realistic approach which best protects owners of private water supplies. The groundwater tracing studies discussed on p. III-87 to III-102 of the ASDEIS, were conducted to map and characterize key recharge areas.*

**Issue: WATER RESOURCES**

**Subject:** Criteria used to identify private water wells within 500 feet of construction limits are not realistic in karst terrain.

***Response:*** *Private water wells within 500 feet of construction limits are the ones most likely to be impacted. As a result, these are the ones upon which monitoring is focused. Some karst area wells more than 500 feet from the construction limits may be monitored on a case by case basis if this appears appropriate.*

**Issue: WATER RESOURCES**

**Subject:** The proposal to monitor private wells along the selected alignment should include any springs and sinking streams within potential influence of the route.

***Response:*** *The FEIS discussion to monitor private wells also includes any springs and sinking streams within potential influence of the route (p. III-39).*

**Subject:** Due to the inherent variability of many karst waters, monitoring should occur prior to, during, and after construction.

***Response:*** *Page III-88 of the ASDEIS addresses this issue. Additional mitigation measures and monitoring measures have been included in the Corridor H FEIS Mitigation Document which has been incorporated by reference into the FEIS.*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** BDC documents the presence of the Potomac Sculpin, a state rare species, from Cedar Creek in the project corridor. This species may be detrimentally impacted through habitat degradation as a result of construction activities.

***Response:*** *Only temporary displacement of the species upstream and downstream is expected during construction activities. Following construction, no impact is expected to be incurred on this species.*

**Subject:** BDC records indicate the presence of the state threatened wood turtle along the unnamed tributary to Paddy Run north of Vances Cove. This species may be detrimentally impacted through habitat degradation as a result of construction activities.

***Response:*** *Comment noted. Text has been revised in the FEIS (p. III-162).*

**Subject:** DCR recommends an inventory for the wood turtle in appropriate habitat along the project corridor. DCR also recommends coordinating specific survey locations with the VDGIF.

***Response:*** *Comment noted.*

**Subject:** DCR recommends time-of-year restriction of November 1 through March 31 on instream work for streams identified as having wood turtles.

***Response:*** *Comment noted.*

**Issue: WILD AND SCENIC RIVER - CEDAR CREEK**

**Subject:** The bridge crossing and proposed development along the stream corridor (Cedar Creek) could impact the eligibility of this water body as a Virginia Scenic River.

***Response:*** *The proposed bridge crossing is adjacent to the existing VA 55 crossing. The existing crossing did not preclude Cedar Creek from eligibility for Scenic status. There would be minimal additional impacts from the proposed bridge and no secondary development is projected to occur within the vicinity of the crossing. The proposed bridge would avoid the cultural resources for which the river segment is listed.*

**Issue: SECTION 4(F) AND SECTION 6(F) RESOURCES**

**Subject:** The Big Blue Trail should have a Section 4(f) Statement prepared.

***Response:*** *The Preferred Alternative in West Virginia will not impact the Big Blue Trail. In Virginia, no preferred alternative has been selected.*

**Issue: MEETINGS AND COORDINATION**

**Subject:** DCR agrees with VCAC that the issues presented by the VA Commonwealth Transportation Board have not been fully addressed in the SDEIS.

***Response:*** *The issues presented by the Commonwealth of Virginia's Transportation Board are discussed in the FEIS (p. S-11).*

### Commentor: Dutton, Mr. David H., Director, Division of Project Review

**Virginia Department of Historic Resources**

**Issue: CULTURAL RESOURCES**

**Subject:** The Department reserves comment until it reviews the final Cultural Resources Technical Report. However, the Department has provided extensive comments on the Draft Technical report and understands that these comments helped shape the final report.

***Response:*** *Following Virginia's decision to not adopt the IRA or Line A as the Preferred Alternative as discussed in Section II of the FEIS, the VDHR withdrew as a consulting party to the Programmatic Agreement. Its letter annoucing its intention is found in the FEIS (Volume II, Appendix D).*

## Commentor: Felton, Jr., Mr. Charles B., Director

**WVDNR**

### Issue: MITIGATION

**Subject:** If the $1.8 million allocated for land purchase within Canaan Valley (Table II-12) is to be considered compensation for terrestrial habitat impacts, a detailed evaluation must be coordinated with the resource agencies.

***Response:*** *Meetings have been held with natural resource agencies including EPA, FWS, WVDNR on this issue on May 9, 22, and 25, 1995. Resolution of this issue was reached at the May 25, 1995 meeting with FWS and WVDNR. EPA was invited but did not attend this meeting. Details of the resolution reached are included in the Corridor H FEIS Mitigation Document.*

### Issue: VEGETATION AND WILDLIFE

**Subject:** DNR recommends a team to be established to review the HEP assessment, particularly with regard to applicability of regional adjustments as they relate to WV.

***Response:*** *A meeting was held on May 25, 1995 between FWS, WVDNR and WVDOH to discuss this, other HEP issues and upland habitat impact mitigation. EPA was invited to this meeting but did not attend. The meeting resulted in the elimination of that species with a zero habitat suitability rating. Most models chosen appeared to generate HSI values representative of the wildlife habitat within the project area. Initial HSI values ranged from highs of 1.0 and 0.97 for the black-capped chickadee and white-tailed deer respectively, to a low of 0.00 for the ruffed grouse. Further analysis of the ruffed grouse model revealed that the habitat components found in the West Virginia project area differed from from those outlined in the USFWS document model. Therefore the resulting HSI is not representative of the actual existing grouse habitat found within the project area. After discussions with USFWS and WVDNR personnel, this model was removed from the original species list. This removal did not effect any subsequent Habitat Unit calculations.*

### Issue: THREATENED AND ENDANGERED SPECIES

**Subject:** Page III-325, Mountain Pimpernel and Kates Mountain Clover are no longer on the listing of threatened or endangered species.

***Response:*** *Comment noted. Text has been revised in the FEIS (p. III-160).*

**Subject:** The New England cottontail (Appalachian cottontail) is a candidate for listing as TE. It is likely to be found within both roadway alignments (proper elevation and habitat).

***Response:*** *Comment noted. Text has been revised in the FEIS (pp. III-160-III-161).*

**Subject:** The population of Alasmidonta varicosa has been mapped and the DNR believes that it would be impacted by construction of the IRA.

***Response:*** *Information regarding the exact location of the brook floater was not available prior to circulation of the ASDEIS. The FEIS has been amended to include this information (p. III-161).*

**Subject:** Surveys should be conducted in appropriate habitat for the presence of the Loggerhead Shrike, a candidate for listing as TE.

***Response:*** *Populations of shrikes have not been identified along the alignment by either WVDNR, WV Natural Heritage Program, the USFWS, the Virginia Division of Natural Heritage (VDNH), or the Virginia Department of Game and Inland Fisheries (VDGIF). However, field surveys would be undertaken prior to commencement of construction in any suitable shrike nesting habitat.*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** Running Buffalo Clover is improperly mapped in the Vegetation and Wildlife Report. Population should be verified to assure it will not be impacted.

***Response:*** *Population was identified correctly but improperly mapped due to plotting error. Coordination with WVDNR and the USFWS confirmed the known location and verified that no impact would occur. Should a population be found at the location indicated, WVDOH will consult with the FWS to develop mitigation plans. Additionally, Exhibit III-11 identifies the correct location of the identified running buffalo clover population in the FEIS (see Tables, Exhibits, Figures, Appendices Document).*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** Two species have been omitted from the TR. Include Loesel's Twayblade (potential Line A and IRA impacts) and Sundial Lupine (potential IRA impacts)

***Response:*** *The two species mentioned have been included in the FEIS (p. III-163).*

**Issue: MITIGATION**

**Subject:** DNR concurs with suggested mitigation strategies (75' buffer zone and fencing) and requests that it be placed in the final mitigation plan.

***Response:*** *A stream habitat improvement strategy has been included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: WATER RESOURCES**

**Subject:** DNR suggests that DOH prepare a plan to identify and mitigate acid drainage at all potential acid producing sites. The proposed mitigation strategies should be tested on the existing acid drainage sites on the Corridor H segment from Heavener to Elkins.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the WVDNR and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: CONSTRUCTION**

**Subject:** Request that the environmental impacts and necessary mitigation measures of all waste/borrow activities disjunct from the construction limits of the roadway be evaluated and incorporated into the NEPA process.

***Response:*** *Additional authorized engineering was undertaken on certain sections of the Preferred Alternative to determine the feasibility of reducing the amount of excess waste reported in the ASDEIS. Results of the additional engineering revealed dramatic reductions in excess excavation could occur. Details of this reduction are contained in the Corridor H FEIS Mitigation Document.*

**Issue: MISCELLANEOUS**

**Subject:** Page S-8, Watershed Management Program. Replace text with text provided in the DNR letter.

***Response:*** *The text has been revised in the FEIS (p. S-7).*

## Commentor: Fernald, Mr. Raymond T., Manager, Environmental Services Section

**Virginia Department of Game and Inland Fisheries**

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** The state threatened wood turtle has been documented in Cedar Creek at the Route 55 bridge crossing and in Paddy Run. We recommend an October 15 through March 31 time-of-year restriction on instream construction activities on these identified resources.

***Response:*** *Comment noted.*

**Subject:** We recommend that wood turtle surveys be conducted immediately prior to clearing of commencement of construction activities within the approaches to any perennial stream crossings.

***Response:*** *Comment noted.*

**Issue: WATER RESOURCES**

**Subject:** We recommend an October 1 through March 31 time-of-year restriction on instream construction activities in Duck and Paddy Run.

***Response:*** *Comment noted.*

## Commentor: Harmon, Mr. Tracey E., Senior Environmental Specialist

**Virginia Department of Environmental Quality, Office of Water Resources Management**

**Issue: OPTION AREAS**

**Subject:** Stream and wetland impacts could be further reduced by selecting the Duck Run Option Area Line D1. In terms of the Lebanon Church Option Area, Line A appears to offer fewer impacts.

***Response:*** *Comment noted.*

**Issue: PERMITS**

**Subject:** Impacts from the project will require a VAPDES Stormwater Permit for construction and a VAWPP for water quality impacts due to the discharge of dredge and fill.

***Response:*** *Comment noted.*

## Commentor: Herman, Mr. Steven A., Assistant Administrator

**Agency - EPA**

**Issue: FOREST FRAGMENTATION**

**Subject:** The EPA is concerned with the potential disruption of ecological functions associated with the predominately unfragmented forest of the area.

***Response:*** *An expanded discussion and analysis of impacts to the forest ecosystem has been included in the FEIS (pp. III-137-III-146).*

**Subject:** Line A would directly impact over 3,000 acres of forest land with approximately 206 forest patches less than 370 acres with 50% of these less than 2.5 acres.

***Response:*** *An expanded discussion and refined data analysis based on recent (March, 1995) data reported in the journal Science on the ecological significance of forest patch creation by Corridor H has been included in the FEIS (pp. III-137-III-146).*

**Subject:** Additional forest acres will incur "edge" effects.

***Response:*** *An expanded discussion of the "edge effect" has been included in the FEIS (pp. III-147-III-151).*

**Issue: WATER RESOURCES**

**Subject:** Some streams will need to assimilate several alterations within a short stretch of river including pipes, stream relocation, box culverts and bridging. For instance, Patterson Creek, a state designated high quality stream, will be affected by ten stream alterations including seven enclosures (five pipes and two culverts), and three bridges.

***Response:*** *The first tier of the Corridor H study was undertaken to compare the various schemes. Data used in that study were generally derived from secondary sources. With streams, USGS quad sheets were used to enumerate the number of perennial streams in each of the study schemes. Consistent with regulations regarding tiering, the second tier of studies (ASDEIS) required more detailed information to determine the impacts of the alignments. For the ASDEIS, a regulatory definition of streams was employed that expanded the total number of streams designated as perennial. Discussion of usage of that definition and the field methodology for identification of perennial streams appears on pp-III-403-III-404 of the ASDEIS and p. 7 of the ASDEIS, Streams Technical Report. Thus, due to changes in the detail of information and the definition of perennial streams, the number of perennial streams there appeared to be increase from the CSDEIS to the ASDEIS. For example the North Fork Patterson Creek requires a number of stream crossings (not identified on USGS mapping). The crossings include low quality first-order tributaries and the main-stem. The net effect of these stream crossings on this water resource is predicted to be positive. Mitigation of aquatic habitat (riparian buffers and instream devices) will improve existing conditions considerably within the identified subwatershed. However, some streams will be impacted as a result of the roadway (e.g. Pleasant Run, Roaring Run).*

**Issue: WILD AND SCENIC RIVERS - SHAVERS FORK**

**Subject:** Shavers Fork will lose its eligibility for scenic designation due to several bridge crossings.

***Response:*** *Following publication of the Monongahela National Forest's Wild and Scenic River Study Report and FEIS Impact Statement on Twelve Rivers in the Monongahela National Forest (1995), a re-assessment of the project impact on the Scenic designation of Shavers Fork was undertaken. That re-assessment is found in Section III (S).*

**Issue: WATER RESOURCES**

**Subject:** The EPA is particularly concerned about the potential for surface water impacts which may result from the exposure to the atmosphere of coal seams and overburden containing acidic material.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: CONSTRUCTION**

**Subject:** The [A]SDEIS does not contain information describing techniques for disposal and associated adverse impacts which may result from the disposal of this overburden material.

***Response:*** *As the project moves into the subsequent design phases, excess excavation will be a central focus. Reduction and mitigation for excess excavation is discussed in the Corridor H FEIS Mitigation Document.*

**Issue: MITIGATION**

**Subject:** The [A]SDEIS does not present adequate analytical evidence to predict the potential for acid production.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Acidic drainage also needs to be addressed within the context of the Federal Antidegradation Policy required by the CWA and the water quality standards of VA and WV.

***Response:*** *Implementation of those mitigation measures described in the Corridor H FEIS Mitigation Document will assure that any water coming from areas of acid production caused by the highway will meet all Federal and state standards.*

**Issue: CONSTRUCTION IMPACTS**

**Subject:** The amount of waste (Appendix A) generated represents a significant threat to aquatic and terrestrial resources and could result in additional adverse impacts to upland, riparian, and stream habitat.

***Response:*** *As the project moves into the subsequent design phases, excess excavation will be a central focus. Reduction and mitigation of excess excavation is discussed in the Corridor H FEIS Mitigation Document.*

**Subject:** The [A]SDEIS does not disclose information on the location and feasibility of potential disposal areas, thus failing to evaluate potential impacts which may result.

***Response:*** *FHWA regulations require that there be a full description of mitigation measures in the FEIS to the extent permitted by the level of design 23 CFR 771.125 (a)(1). The level of design presented in the SDEIS allows only for an estimate of excess excavation (waste) by section. Identification of waste placement sites, analysis of impacts from that placement and development of mitigation measures for those impacts is not possible at the current level of design and would only be speculative in nature. Because of this comment and other similar comments, WVDOH undertook additional detailed engineering analyses of excess excavation reduction on selected sections. It was found that in many cases excess excavation can be dramatically reduced. Finally, a comprehensive strategy to deal with the excess excavation issue at the appropriate level of design has been developed in cooperation with EPA and other natural resource agencies. That strategy is discussed in detail in the Corridor H Mitigation Document.*

**Issue: MISCELLANEOUS**

**Subject:** EPA commends the FHWA and WVDOH for achieving full compliance with the procedural requirements of NEPA. The EPA believes that the cooperative efforts of the state and federal agencies have enabled the integrated NEPA/404 process to fulfill its aims.

***Response:*** *Comment noted.*

## Commentor: Page, Mr. Jim, Forest Supervisor

**MNF**

**Issue: MISCELLANEOUS**

**Subject:** Special bridge designs for 10 bridges will offer opportunity to bridge interesting forms of the landscape. These structures should enhance the landscape.

***Response:*** *Comment noted.*

**Issue: SCENIC DESIGN FEATURES**

**Subject:** Use of special design features will enhance the highway and assure an aesthetic driving experience.

***Response:*** *Comment noted.*

**Issue: PEDESTRIAN AND BICYCLE FACILITIES**

**Subject:** Question the need for a separate bike path. The project is a corridor highway not an interstate so bikes are allowed on the road. Suggest that highway design incorporate shoulder rumble strips at least one foot away from the driving lane.

***Response:*** *In certain areas of the facility, separate bicycle paths will be considered so that users can more enjoy the scenic character of the area. In other areas where bicycle facilities will be proposed, shared facilities will be utilized. As stated on p. II-26 of the ASDEIS, any proposed bicycle facilities, shared or separate, would be designed according to AASHTO standards for such facilities.*

**Issue: RECREATION RESOURCES**

**Subject:** Alpena Gap is a trailhead, Big Bend is a campground, not National Recreation Areas. Also, Sinks of Gandy is in private ownership. No camping is available there.

***Response:*** *Comments noted. The text and appropriate tables have been changed in the FEIS.*

**Issue: NATIONAL FOREST LANDS**

**Subject:** Agree with analysis presented in Table III-29.

***Response:*** *Comment noted.*

**Issue: VISUAL RESOURCES**

**Subject:** "Unique" as it pertains to the MNF is misleading (page III-178). We believe the forest to be not unique (one of a kind). The use of "unique" could lead the public to impart values to the scenery of the area which it does not truly possess.

***Response:*** *Comments noted. The text and appropriate tables have been changed in Section III of the FEIS (p. III-82)*

**Issue: VISUAL RESOURCES**

**Subject:** The Forest Service suggests a change in the listing of the MNF from "distinctive" to "common" (Table III-31), which in the Service's Visual Management System is the listing the Service would impose. Also the MNF should be "common" not "distinct."

***Response:*** *Comments noted. The table has been revised in the FEIS.*

**Issue: VISUAL RESOURCES**

**Subject:** The Service agrees that a major visual benefit of the project will be to open up vistas and scenic views which are not available from existing highways along the corridor.

***Response:*** *Comment noted.*

**Issue: VISUAL RESOURCES**

**Subject:** The Service agrees that Line A would not have an adverse impact on the visual resource of the MNF.

***Response:*** *Comment noted.*

**Issue: CULTURAL RESOURCES**

**Subject:** We recommend that Corricks Ford Battle Site, the Western Maryland Railroad in the Blackwater Canyon, and the Coketon area of the Davis Coal and Coke Company be avoided if possible. If not, the impacts must be mitigated as described in the EIS. Mitigation measures should be developed in consultation with the SHPO and the Forest Service.

***Response:*** *There will be no use made of the three sites by the Preferred Alternative.*

**Issue: WATER RESOURCES**

**Subject:** In general, the analysis contained in the Stream Technical Report was very well done. The data will provide useful in planning and implementing future aquatic projects.

***Response:*** *Comment Noted.*

**Issue: WATER RESOURCES**

**Subject:** The TR does not discuss modified water flow regime effect to Mill Run related to the road alignment. Increasing or decreasing water discharge in specific portions of Mill Run would have long-term adverse effects.

***Response:*** *This issue is addressed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS. It should be noted that alterations in flow regime is a concern that will be addressed during final design.*

**Issue: SECONDARY AND CUMULATIVE IMPACTS**

**Subject:** Effects on Mill Run were not discussed in the Cumulative Effects of the TR. We recommend this be reviewed and possibly revised to reflect our concern.

***Response:*** *A conceptual stream mitigation strategy has been developed for all stream impacts and is detailed in the Corridor H FEIS Mitigation Document which has been incorporated by reference into the FEIS. Additionally, this document details an agency involvement process to further develop mitigation strategies for streams. More detailed consideration of the mitigation of impacts to Mill Run will be developed at the appropriate level of design and with resource agency input.*

**Issue: WILD AND SCENIC RIVERS**

**Subject:** Page III-481. Amend sentence to include Subsection 5(d) to include study rivers without formal listing.

***Response:*** *The text has been revised in the FEIS (p. III-221).*

**Subject:** Page III-482. Amend second paragraph with suggested text.

***Response:*** *The text has been revised in the FEIS (p. III-222).*

**Issue: MISCELLANEOUS**

**Subject:** Switch "upstream" and "downstream" in the last paragraph on p. III-483.

***Response:*** *The text has been revised in the FEIS (p. III-223).*

**Issue: OPTION AREAS**

**Subject:** In the Shavers Fork Area, we prefer Line A over Line S. Line A does not have a negative effect on the view of the hill side when driving north on U.S. 219.

***Response:*** *Within Shavers Fork Option Area, Line A was adopted as the Preferred Alternative.*

**Subject:** The proposal to incorporate an overlook of the Cheat River Valley is a good idea.

***Response:*** *Comment noted.*

**Subject:** Concerned about highway design measures for handling cuts, cross drainage, and highway runoff. It is important to address this problem and describe mitigation measures in the EIS.

***Response:*** *Discussion of the mitigation for these issues found in the ASDEIS at P. III-477 and were appropriate for the level of design considered for the ASDEIS. This discussion in the ASDEIS is consistent with FHWA regulations (23 CFR 771.125 (a)(1). Additional mitigation measures will be developed at each succeeding level of design and with resource agency input at each level of design. Details concerning these measures and involvements are discussed in the Corridor H FEIS Mitigation Document which has been incorporated by reference into the FEIS.*

### Commentor: Parsons, Mr. Stephen A., Acting Forest Supervisor

**Agency - GWNF**

**Issue: PEDESTRIAN AND BICYCLING TRAILS**

**Subject:** I would like to offer an additional alternative to mitigate impacts to the BBT. The attached maps show this alternative as it relates to Line A. It appears to be a sound alternative.

***Response:*** *There will be no use of the Big Blue Trail.*

**Subject:** GWNF request that a cost analysis be conducted to objectively analyze the alternatives to mitigate impacts to the BBT.

***Response:*** *There will be no use of the Big Blue Trail.*

### Commentor: Pierce, Mrs. Susan M., Deputy State Historic Preservation Officer for Resource Protection

**SHPO**

**Issue: CULTURAL RESOURCES**

**Subject:** No objection to the development and consideration of a Programmatic Agreement as acceptable fulfillment of the Section 106 review process.

***Response:*** *Comment noted. A Programmatic Agreement was entered into between the FHWA, WVDOT, WVSHPO, ACHP, United States Department of Agriculture, Forest Service, Monongahela National Forest (Monongahela National Forest) and the George Washington National Forest (George Washington National Forest); and various consulting parties*

### Commentor: Scott, Mr. Mark A., Chief, Division of Environmental Protection, Office of Water Resources

**WV State Agency**

**Issue: PERMITS**

**Subject:** Include discussion of the Construction Stormwater NPDES permit (Page III-85, AMM measures) required for disturbances greater than 3 acres.

***Response:*** *A discussion of Construction Stormwater NPDES permit requirements has been included in the FEIS (p. III-37).*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** A population of the Brook floater (Alasmidonta varicosa) will be impacted by the IRA.

***Response:*** *Information regarding the exact location of the brook floater was not available prior to circulation of the ASDEIS. The FEIS has been amended to include this information (p. III-161).*

**Issue: MITIGATION**

**Subject:** Development of a wetland mitigation plan and approval will be a requirement of the State 401.

***Response:*** *This issue is addressed in both the Corridor H FEIS Mitigation Document and the COE 404 permit.*

**Issue: WATER RESOURCES**

**Subject:** It is unclear as to whether the SDEIS is referring to the regulatory category or to the quality of benthic diversity for Clifford Hollow.

***Response:*** *High quality includes all streams that meet the regulatory definition. Streams that were not listed as "High Quality" but possessed characteristics that would warrant such a ranking were also categorized as such.*

**Issue: SECONDARY AND CUMULATIVE IMPACTS**

**Subject:** No mention of a number of potential secondary impacts including dissolved oxygen. Additionally, unionids were not addressed regarding silt.

***Response:*** *The impacts to invertebrates, which includes unionids, is discussed on p. III-463 of the ASDEIS. Citations specific to unionids include included in the FEIS. In addition, the Secondary and Cumulative Impacts Technical Report discusses the issue of silt (p. 48 and 49). The FEIS (pp. III-209 and III-217) includes a discussion of the issues of dissolved oxygen and reduced net primary production as a result of reduced clarity and increased biological oxygen demand.*

**Issue: MITIGATION**

**Subject:** Must use acceptable methods to reduce impacts to aquatic and riparian resource for bridge construction.

***Response:*** *Where practicable, the WVDOH is committed to not disturbing terrestrial and aquatic habitat beneath bridge crossings. This issue is addressed in the Mitigation Document.*

**Issue: MITIGATION**

**Subject:** Support management of riparian zones within the ROW. Also should replace in-kind forested habitat for riparian areas. Additionally, final mitigation plans should include management that should be conducted on fenced riparian buffers.

***Response:*** *Comment noted. Discussion of mitigation strategies is included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: WILD AND SCENIC RIVERS**

**Subject:** Unclear as to the reason why mitigation would not be required for bridge crossings of Wild and Scenic River. May be a need to mitigate water quality and aquatic resources impacts.

***Response:*** *Mitigation for Line A could include improved recreational access and consideration of visual impacts of the proposed bridge crossings. Water quality and aquatic resources are part of the criteria for Wild status. Mitigation for water quality or aquatic resources impacts are addressed in the ASDEIS.*

**Issue: MITIGATION**

**Subject:** Recommends that a mitigation plan be prepared to address avoidance, minimization and mitigation of potential AMD generation.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: WATER RESOURCES**

**Subject:** Replace text, Ch. 20 Article 5 with Ch. 22, Article 11 of the Water Poll. Control Act.

***Response:*** *The text has been revised in the FEIS (p. III-251).*

**Subject:** Change State Water Resource Board to St. Env. Qual Bd. Also Water Qual - Ch 22B, Article 1, Sec. 5 replaces provisions under Ch. 20, article 5 (p. III-529).

***Response:*** *The text has been revised in the FEIS (p. III-251).*

**Issue: CONSTRUCTION**

**Subject:** There has been inadequate information provided to assess potential impacts from haul roads and borrow/disposal areas.

***Response:*** *As the project moves into the subsequent design phases, excess excavation will be a central focus. Reduction and mitigation for excess excavation is discussed in the Corridor H FEIS Mitigation Document.*

**Issue: MITIGATION**

**Subject:** OWR recommends that one mitigation document be complied to address specific plans to carry out mitigation.

***Response:*** *Based on this comment and others, a comprehensive mitigation document has been developed with cooperating agencies including WVDEP. That document is incorporated by reference into the FEIS.*

## Commentor: Stem, Mr. George L., Acting State Conservationist

**Agency - Natural Resources Conservation Service, WV**

**Issue: FARMLANDS**

**Subject:** The Natural Resources Conservation Service concurs with the finding (Section III-E of the DEIS) that minimal effect on farmland conversion will result within the project area within WV.

***Response:*** *Comment noted.*

**Issue: CONSTRUCTION**

**Subject:** The Service requests the opportunity to review the final sediment and erosion control design where sub-watersheds for PVSD flood control dam may be traversed to assure that the impoundments are adequately protected.

***Response:*** *Sedimentation and erosion control mitigation strategies and review processes are discussed in the FEIS Mitigation Document. Advanced sedimentation and erosion control strategies are detailed in the Corridor H FEIS Mitigation Document. Additionally WVDOH has devised a comprehensive resource agency involvement program which is also detailed in that document. The Natural Resources Conservation Service will be involved in the resource agency involvement program. As part of this program they will have the opportunity to review and comment on: preliminary and final contract plans for each highway section.*

## Commentor: Taylor, Mr. Willie R., Director, Office of Environmental Policy and Compliance

**Agency - DOI/USFWS**

**Issue: PURPOSE AND NEED**

**Subject:** The justification for Corridor H, based on circumstances of the 1960's, seem to be in conflict with other initiatives by the State.

***Response:*** *The purpose and need for the project was established in the Corridor Selection Transportation Needs Study (March 1992). It was included in the approved Corridor Selection SDEIS (October 21, 1992) and the Corridor Selection SDEIS Decision Document (July 26, 1993). The Purpose and Need summary discussion in the ASDEIS referenced and summarized the detailed need analyses previously conducted. Summarizing of issues discussed in previous documents in a tiered EIS is consistent with CEQ regulations 40 CFR 1508.28.*

**Subject:** Page I-2, Project Purpose and Need. The minutes from both Resource Agency Workshops are only referenced in Section VII of the 1992 Corridor Selection SDEIS. The summaries of these workshops should be given more emphasis.

***Response:*** *The formal Scoping Meeting on October 30, 1990, served as a forum for explaining the project history and established a standard for future communications with the public and cooperating resource agencies. The scoping meeting is detailed in the document entitled: Scoping Meeting: Materials, Minutes, Comments: Appalachian Corridor H, West Virginia Department of Transportation Division of Highways, April 1991. Additionally, Section VII of the CSDEIS, ASDEIS, and FEIS.*

**Subject:** It is likely that Virginia will not construct the 14 miles of the road needed to connect the West Virginia terminus with I-81, thereby defeating a primary purpose of the project.

***Response:*** *The effect of the Virginia Commonwealth Transportation Board's February, 1995, resolution on system linkage is discussed in Section IV of the FEIS.*

**Issue: IMPROVED ROADWAY ALTERNATIVE**

**Subject:** Page S-20, Comparison of the IRA and the Build Alternative. We disagree that the IRA, as proposed, remains largely on existing alignment. Rather, it would require relocation or new right of way for 62 percent of its length. The IRA failed to offer a realistic alternative to the No-build or 4-lane options. The design constraints resulted in a significant portion (62 percent) of the IRA requiring construction on new alignment or relocation.

***Response:*** *Of the IRAs approximately 206 km, approximately 38% (78 km or 49 miles) would remain unchanged or a current roadway would be widened. To maintain required design criteria approximately 38 % of the IRA would include minor roadway relocations to straighten curves and reduce grades. Construction on new alignment or major relocations would occur for approximately 24% (49 km or 31 miles) of the IRA. Additional discussion of the IRA and its design characteristics are found in Section II of the FEIS.*

**Issue: MITIGATION**

**Subject:** Table II-12 mentions the purchase of "Wildlife Refuge Property Acquisition" as a mitigation cost. The FWS prefers to see mitigation based on habitat units lost.

***Response:*** *In conjunction with the FWS and other cooperating agencies, a terrestrial mitigation plan has been developed. That plan is contained in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Purchase of habitat for mitigation may occur but mitigation ratios often run in the neighborhood of ten (purchased) to one (lost); this can be based on habitat units or acres.

***Response:*** *In conjunction with the FWS and other cooperating agencies, a terrestrial mitigation plan has been developed. That plan is contained in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Discussions during field reviews recognized the potential to enhance strip mined affected areas in Grant and Tucker Counties. Other discussions dealt with purchase of high quality wildlife habitat in Canaan Valley to offset habitat units losses.

***Response:*** *A discussion of this issue is included in the Corridor H FEIS Mitigation Document.*

**Subject:** The FWS would consider both mitigation methods provided they are habitat unit-based. The $1.8 million figure is likely low if it includes both enhancement and acquisition. This issue must be resolved prior to the selection of a preferred alignment.

***Response:*** *At a meeting held on May 25, 1995, with FWS and WVDNR, it was agreed that upland habitat impact mitigation would be habitat unit based. Details for the strategy for upland habitat impact mitigation are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Page II-95, Table II-12. The table lists $1.8 million for the acquisition of property for the Canaan Valley National Wildlife Refuge. We could not find discussion or justification for this action in the document or Technical Reports.

***Response:*** *In conjunction with the FWS and other cooperating agencies, a terrestrial mitigation plan has been developed. That plan is contained in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Mitigation of this type (acquisition of property) is inferior to enhancement or restoration of habitat, but is acceptable when the habitat to be preserved is of high wildlife value and in jeopardy of being developed.

***Response:*** *In conjunction with the FWS and other cooperating agencies, a terrestrial mitigation plan has been developed. That plan is contained in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** We support the inclusion of funding for an environmental monitor to assure all mitigative measures agreed to, during field reviews and incorporated into permits, are carried out.

***Response:*** *The concept of an environmental monitor is discussed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: ECONOMIC ENVIRONMENT**

**Subject:** Perhaps the economic benefits and cost of the project could be analyzed based on documentation and clarification of assumptions.

***Response:*** *Information presented in the ASDEIS was developed as an assessment of environmental impacts. No attempt was made to present a cost benefit analysis. Cost benefit analyses may be included in draft environmental impact statements (CEQ regulations 40 CFR 1502.23) but are not required.*

**Issue: SECONDARY AND CUMMULATIVE IMPACTS**

**Subject:** Studies by Scenic America and others indicate that four-lane roads in rural areas have no positive economic impacts but often introduce impacts on local economies and the quality of life.

***Response:*** *Because other commentors have cited the following studies by "faculty of West Virginia University" it is assumed that the DOI is citing the same studies. Those studies were Rephann and Isserman, 1994 (New Highways as Economic Tools: An Evaluation Using Quasi-Experimental Matching Methods, Research Paper 9313, Regional Research Institute, WVU) and Rephann, 1993 (A study of the Relationship Between Highways and Regional Economic Growth and Development Using Quasi-Experimental Control Group Methods, Ph.D. dissertation, WVU). Counties included in these studies only included counties that contained interstate highways. In fact, counties that contained any 4-lane highway other than an interstate highway were excluded from the studies. Corridor H will not be built to interstate highway specifications. Corridor H will be classified as and built to the design standards of a 4-lane Rural Principal Arterial Highway (Corridor SDEIS, p. II-3). Additionally, baseline data from both studies used only two WV Counties (Braxton and Marion); neither of which are within the project 30-minute drive contour. The applicability of these studies to Corridor H is therefore limited.*

**Subject:** Page III-31. We note that the Garrett County (MD) site is equidistant between I-68 and the proposed corridor, and the VA sites are located along I-81. Industrial development at these sites is likely to grow independent of the construction of Corridor H.

***Response:*** *The full build-out scenario of industrial parks located within the 30-minute contour was used to present a "worst case" scenario for the assessment of secondary impacts.*

**Subject:** Page III-41. Discussion is lacking regarding the adverse impacts to in-town businesses resulting from development of interchange development and loss of traffic.

***Response:*** *Some studies have shown a net loss of economic activity in small communities. However, other studies have shown just the opposite. For example, Buffington et al.(1992) (Buffington J.L., Crane, L.M., Clifton, B., & Speed, J. 1992. Methodology for Estimating Economic Impacts of Highway Improvements: Two Case Studies in Texas, in Transportation Research Record #1339. pp. 156-165) reviewed 34 studies each of which analyzed the economic impacts (e.g., change in gross sales, business closings vs. new business openings) of highways. For businesses that had been by-passed by a new highway traffic serving businesses, gross sales changes ranged dramatically (-65% to +39%). For other retail/service businesses, gross sales changes ranged from -15% to +55% Existing business closings and openings ranged from 13 closings of original businesses to 49 openings of new businesses. Hartgen et al. (1992) (See Literature Cited ASDEIS, Secondary and Cumulative Impacts Technical Report) in their literature review found similar confounding conclusions relative to negative and positive economic impacts on business. Finally, Widner (1990) (Widner, R.R. 1990. Appalachian Development After 25 Years: An Assessment, Economic Development Quarterly. 4:4 pp. 291-312) in his qualitative assessment of the economic effects of Appalachian Corridor B from Chillicothe, Ohio to Greenville, South Carolina found dramatic differences among communities. He concludes in part that the Appalachian development highways "have played an important part in restructuring patterns of development and settlement in parts of the region. Some town are now playing service-center roles that they could not play for surrounding areas in the past."*

## Issue: ECOMOMIC ENVIRONMENT

**Subject:** Page S-14, Table S-3. Businesses potentially relocated should include farms rendered unprofitable by roadway construction.

***Response:*** *Farmland and relocation impacts were analyzed using those requirements of FHWA's T.A. 6640.8A. No analysis of the profitability impacts on individual farms is prescribed by this T.A. Additionally, WVDOH has continuing discussions with individual farmers whose operations may be adversely impacted. During these discussions various impact minimization/mitigation measures are developed, such as minor alignment adjustments, and farm equipment underpasses. Discussions will continue into the final design and right-of-way acquisition phases of the project.*

## Issue: GROUNDWATER

**Subject:** Page III-87. This section lacks discussion of potential impacts to groundwater wells and springs from acid drainage as a result of highway construction.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: AIR QUALITY**

**Subject:** During the Alignment Selection SDEIS Technical presentation (10/94), the FWS voiced its concern for the document's failure to address NOx and other acid rain producing chemicals. The current SDEIS remains inadequate in addressing these issues.

***Response:*** *The changes in the NOx levels were calculated for all the alternatives considered and are included in Table 7 of the Air, Noise and Energy Technical Report which is incorporated by reference into the ASDEIS. Additional discussion of this issue has been included in the FEIS (pp. III-53-III-55).*

**Issue: CULTURAL RESOURCES**

**Subject:** It seems that the four-lane road would impact some Civil War sites.

***Response:*** *Discussions of impacts to Civil War sites are presented in Section III, L - Cultural Resources.*

**Issue: FLOODPLAINS**

**Subject:** Page III-276. The discussion of raising flood elevation (Tygart Valley Watershed) should specify where these are likely to occur. The SDEIS should also discuss floodplain secondary impacts with regard to Executive Order 11988.

***Response:*** *Page III-269 of the ASDEIS indicates that the floodplain analysis methodology was undertaken in accordance with E.O. 11988 and page III-278 of the ASDEIS states that "This project is in compliance with Executive Order 11988...". Table III-41 in the ASDEIS indicates that no incompatible development will occur on floodplains as a result of construction of the highway.*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** We question the omission of a sub-section discussion avoidance, minimization, and mitigation for Vegetation and Wildlife in Section III of the SDEIS.

***Response:*** *An avoidance, minimization and mitigation discussion is found on p. III-295 of the Corridor H AlSDEIS. Additional mitigation strategies for terrestrial habitat are included in the Corridor H FEIS Mitigation Document, which is incorporated by reference into the FEIS.*

**Subject:** The Fish and Wildlife Service (FWS) discussed the necessity for mitigation for impacts to terrestrial wildlife habitat at several inter-agency meetings and with the project consultant.

***Response:*** *WVDOH, in conjunction with the FWS and other cooperating agencies, has developed a terrestrial mitigation plan. That plan is contained in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Page S-16, Table S-3. Include total acres of habitat loss projected under secondary impacts.

***Response:*** *Table S-3 has been revised to include this information in the FEIS.*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** Page III-289. Direct and secondary impacts to wildlife will result in the loss of nearly 31,500 acres of habitat (Table III-46) in the project region. This figure is probably low as secondary impacts to wetlands were not expected to occur.

***Response:*** *The raw land analysis was carried out to estimate the amount of land available for development that did not contain sensitive resources such as wetlands (Corridor Selection SDEIS, p. III-37). It was found that sufficient land was available to support the estimated development without encroaching on wetlands as identified from NWI mapping. Wetland encroachments may occur as the result of permitting action by appropriate authorities or illegal encroachment activities. The point of the analysis was to determine if sufficient land was available to support development without such encroachments. The results of that analysis as shown in Table III-46 clearly indicated that more than sufficient land was available.*

**Subject:** Additional forest land (15,987 acres) could be adversely affected by the edge effects of Line A. In terms of habitat units, Line A will result in over twice the loss of habitat units when compared to the IRA.

***Response:*** *An expanded discussion of the "edge effect" has been included in the FEIS (pp. III-139-III-141).*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** The HEP process has likely underestimated the impacts associated with direct and secondary impacts, specifically, zero values for ruffed grouse and the low values for the warblers.

***Response:*** *A meeting was held on May 25, 1995 between FWS, WVDNR and WVDOH to discuss this, other HEP issues and upland habitat impact mitigation. EPA was invited to this meeting but did not attend. The meeting resulted in the elimination of that species with a zero habitat suitability rating. Most models chosen appeared to generate HSI values representative of the wildlife habitat within the project area. Initial HSI values ranged from highs of 1.0 and 0.97 for the black-capped chickadee and white-tailed deer respectively, to a low of 0.00 for the ruffed grouse. Further analysis of the ruffed grouse model revealed that the habitat components found in the West Virginia project area differed from from those outlined in the USFWS document model. Therefore the resulting HSI is not representative of the actual existing grouse habitat found within the project area. After discussions with USFWS and WVDNR personnel, this model was removed from the original species list. This removal did not effect any subsequent Habitat Unit calculations.*

**Subject:** Species that record a zero in the habitat suitability index should not be used in the HEP. This problem may have been avoided had the HEP team been made up of the action agency/consultant and the review agency member as typically occurs.

***Response:*** *A meeting was held on May 25, 1995 between FWS, WVDNR and WVDOH to discuss this, other HEP issues and upland habitat impact mitigation. EPA was invited to this meeting but did not attend. The meeting resulted in the elimination of that species with a zero habitat suitability rating.*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** Page III-292, Table III-47, Cumulative Habitat Units Lost. Include the number of hectares/acres affected for each watershed as well as totals of hectares/acres and habitat units lost for project.

***Response:*** *The number of hectares/acres affected for each watershed as well as totals of hectares/acres and habitat units lost for the project is presented in Table 12 of the ASDEIS Vegetation and Wildlife Habitat Technical Report.*

**Issue: FOREST FRAGMENTATION**

**Subject:** Page III-305, Impacts. Discussion of the secondary impacts to forest fragmentation associated with the development of nearly 31,500 acres of land, 80 percent of which is forested, should be strengthened.

***Response:*** *Of the 27,670 acres of land predicted as required to support the development projections, 97% of that acreage would be residential. The area required for the predicted residential growth was developed to: 1) maximize the predicted total acreage required for residential growth ; and 2) to determine if sufficient raw land was available to support predicted development without directly encroaching on sensitive natural resources. Residential parcels, which assumed a minimum of 2 acre lots, would still provide some benefits for a variety of wildlife species. Housing patterns in the Corridor H project area generally do not involve clearing large areas. Rather, single family housing units are constructed to blend into the surrounding environment. The lack of subdivision housing developments is likely, in some part, due to the cultural heritage of the population and in large part due to the lack of public water and sewage infrastructure. Such infrastructure is only available in limited area of the towns of Elkins, Beverly, Parsons, Davis, Petersburg, Moorfield and Wardensville (CSDEIS, pp. III-18-III-19). Additional housing units no matter the number, will however add to natural resource impacts caused by development associated with or induced by the highway. Impacts from residential development will included the following: additional loss of forest and farmland due to houses, outbuildings, various accouterments (e.g., gardens, horse pastures, etc.) driveways, and access roads;. an increase in predation on nesting birds, increases in stormwater runoff and associated water quality impacts; and additional pressures on various social services (e.g., school districts, emergency providers). To some large extent the intensity of these impacts will be determined by the response of state, county, and local governments. Land use controls have not been developed in most of the Corridor H project area (ASDEIS p. III-47) by county or local governments and the state of West Virginia has not adopted a statewide land use control program. The state does have in place various laws and regulations regarding point source and non-point source pollution controls, and water quality degradation. Additionally, WVDOH in the Corridor H FEIS Mitigation Document for this project has agreed to develop a program in concert with the natural resource agencies that would provide local planners with information concerning avoidance of natural resource impacts.*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** Page S-13, Table S-2. Include Federally-designated candidate species with Federally-listed Threatened and Endangered Species.

***Response:*** *Table S-2 has been modified to include this information in the FEIS.*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** Page III-325. The known population (buffalo clover) will be checked in the growing season to confirm its presence and exact location. If it still occurs at this site, WVDOT should formulate mitigation plans to protect the population.

***Response:*** *Should a population be found at the location indicated, WVDOH will consult with the FWS to develop mitigation plans. Additionally, Exhibit III-11 details the correct location of the identified running buffalo clover population in the FEIS.*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** Page III-319, Table III-52, and Page III-325, 2. b. Existing Environmental Impacts. Discussion and tables relating to the Trifolium virginicum, and Taenidia montana, are unnecessary.

***Response:*** *References to both these species have been removed from the FEIS.*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** Page III-326, paragraph 2. Please reference the proposed rule, (Federal Register/Vol. 59, No. 219/Tuesday, November 15, 1994) Endangered and Threatened Wildlife and Plants; Animal Candidate Review for Listing as Endangered or threatened Species.

***Response:*** *The reference has been included in the FEIS (p. III-160).*

**Subject:** Page III-326, According to the proposed Rule, the New England cottontail has been redescribed in the project area to be referred to as the Appalachian cottontail, Sylvilagus obscures.

***Response:*** *The species name has been revised in the FEIS (pp. III-160-161).*

**Subject:** Appalachian cottontail occurs throughout the higher elevations of the project area. It occurs in close proximity to the alternatives and would be directly affected by habitat destruction and road mortality.

***Response:*** *The text has been amended in the FEIS (p. III-161) to indicate that impacts to this species could occur.*

**Subject:** Surveys for the loggerhead shrike should be conducted in suitable habitat (WV and VA). Two of the reasons for the decrease in shrike populations are thought to be habitat loss and mortality caused by vehicular collisions.

***Response:*** *A detailed discussion or the reasons for the decline of the loggerhead shrike in the project area was included in the Corridor H Alignment Selection Vegetation and Wildlife Technical Report (p. 90). Populations of shrikes have not been identified along the alignment by WVDNR, WV Natural Heritage Program, the USFWS, the Virginia Division of Natural Heritage (VDNH), or the Virginia Department of Game and Inland Fisheries (VDGIF).*

**Issue: WETLANDS**

**Subject:** The majority (53%) of the wetlands to be adversely affected are less than 1 acre and 91 percent are classified as headwater or isolated. The value that these small, isolated wetlands have to the dispersal of wetland dependent wildlife is great.

***Response:*** *Isolated wetlands as defined in the ASDEIS are wetlands that have no connection to other surface waters (p. III-335). They do not necessarily represent an isolated position in the landscape. Gibbs (Importance of Small Wetlands for the Persistence of Local Populations of Wetland-Associated Animals; Wetlands, 13:1, pp. 25-31, 1993) study clearly indicates that the mosaic pattern or spatial relationship of wetlands in the landscape is important to the dispersal of wetland dependent wildlife. The analysis of potential wetland mosaic disruption by the Build Alternative was presented in the ASDEIS (p. III-373). That analysis clearly indicated that the project will have no effect on the wetland mosaic pattern and therefore the Build Alternative will have no effect on the dispersal of wetland dependent species.*

**Issue: CUMULATIVE IMPACTS**

**Subject:** To suggest that projected development could occur without adverse wetland impacts because sufficient raw land is available to support all predicated residential and industrial development ignores present day reality.

***Response:*** *The raw land analysis was carried out to estimate the amount of land available for development that did not contain sensitive resources such as wetlands (Corridor Selection SDEIS, p. III-37). It was found that sufficient land was available to support the estimated development without encroaching on wetlands as identified from NWI mapping. Wetland encroachments may occur as the result of permitting action by appropriate authorities or illegal encroachment activities. The point of the analysis was to determine if sufficient land was available to support development without such encroachments. The results of that analysis as shown in Table III-46 clearly indicated that more than sufficient land was available.*

**Issue: MITIGATION**

**Subject:** Page III-378, Mitigation Requirements-West Virginia. The first line of this paragraph should note that the IRA, as well as Line A, will impact wetlands.

***Response:*** *The paragraph has been revised to reflect this comment in the FEIS (p. III-174).*

**Subject:** The mitigation ratios proposed will only apply for the successful completion of upfront mitigation.

***Response:*** *Page III-378 of the ASDEIS acknowledges that "the resource agencies reserved the right to request higher replacement ratios if the replacement sites were not created in advance of encroachments (construction)."*

**Issue: MITIGATION**

**Subject:** Discussion of these plans is premature (failure to secure an agreement from the respective landowners for either site). The landowner of the Wilmoth run site is not a willing seller and that a viable alternative site has not been selected.

***Response:*** *A viable alternative site was found and approved by the COE, FWS, and WVDNR. A Phase I archaeological investigation was performed on the site and clearance has been obtained from WVSHPO. The wetland replacement site has been designed and property is in the final stages of acquisition by WVDOH.*

**Issue: WATER RESOURCES**

**Subject:** Page III-404. A review of the Streams Technical Report Appendices revealed that very few nitrate samples were taken. We would appreciate an explanation for the lack of data on nitrates.

***Response:*** *Generally, nitrate and ammonia samples were taken for streams located within agricultural, poultry, and cattle production areas. These samples were taken to further substantiate other observations of stream degradation, such as low habitat scores or low benthic populations.*

**Issue: WATER RESOURCES**

**Subject:** Of the 630 miles of perennial streams in the project watershed, nearly 5.3 and 2 miles of streams will be relocated or enclosed respectively. The destruction of 7.3 miles of perennial streams is considered a significant adverse impact.

***Response:*** *It is true that over 7 miles of streams will be culverted, piped or relocated (ASDEIS, Table III-65). However, the enclosed streams with proper design, can still carry out many of the primary functions of unenclosed streams. Refer to p. 63-66 of the ASDEIS-Streams Technical Report and p. II-465 to III-466 of the ASDEIS for discussions of impacts of culverts, pipes and stream relocations on biological recovery of streams following disturbance. These discussions conclude that, "Once construction is completed and the construction site stabilized, normal colonization processes would repopulate disturbed portions of the streams. Counter sinking the enclosure (where practicable) below the level of the streambed will allow upstream and downstream movement of aquatic invertebrates and fish within the stream, thus maintaining natural colonization processes. A review of Taylor and Roff's (1986) study cited by EPA revealed that benthos species did not decline following highway construction but actually increased and that there was a significant increase in fish (trout) populations at their sampling stations following construction. Taylor and Roff's state that, "Hanlon Creek may slowly return to approximately pre-construction status ...this return, if it takes place at all must certainly require many years." This statement could easily be misread and leave the impression that Hanlon Creek will take many years to "repair" itself from the negative impacts of highway construction. For Hanlon Creek to return to its pre-construction state, there would have to be an order of magnitude reduction in the numbers of fish and benthos, a 66% decreases in fish biomass and a loss of aquatic vegetation. WVDOH has also made commitments in the Corridor H FEIS Mitigation Document to improve stream habitat in impacted streams or in the same watershed as those impacted streams. Stream habitat improvement will generally be targeted to replace those stream functions that will be diminished by the encroachment. Additionally, because the impact of highway construction, operation and maintenance on streams in the Northeast has not been explored and suspected impact assessment generally rests on extrapolation of studies from other geographic areas and other types of transportation facilities (e.g., logging roads) WVDOH and FHWA have agreed to fund long range (5-8 year) studies of selected streams that will be crossed by Corridor H. Discussion of these studies is contained in the Corridor H FEIS Mitigation Document. Finally, WVDOH plans to use advanced sedimentation and erosion control practices in those watersheds containing high quality, sensitive streams and has developed a resource agency involvement process that includes agency input through design and construction of highway sections.*

**Issue: MITIGATION**

**Subject:** Page III-447, Figure III-66. The SDEIS details Best Management Practices (BMPs) as mitigation measures. The mitigative measures discussed will likely fail to prevent significant degradation to water quality and instream habitat.

***Response:*** *Additional discussion of erosion and sedimentation control measures has been included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** A detailed plan for instream enhancement measures and where they will be utilized should be developed.

***Response:*** *Discussion of a stream mitigation strategy has been included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Page III-478. BMPs should be incorporated as a construction-related cost, not as mitigation.

***Response:*** *WVDOH agrees with this comment. However BMP's are not cited as a mitigation cost in Table II-12 entitled "Right-of-Way and Mitigation Cost Estimates" nor is that implied on p. III-478.*

**Issue: MITIGATION**

**Subject:** Page III-480, Fencing. We would like to see a table listing the areas to be fenced in order to properly assess the mitigative potential of the action.

***Response:*** *A stream habitat improvement strategy has been included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: WILD AND SCENIC RIVERS - SHAVERS FORK**

**Subject:** Page III-489, Impacts. Line A will likely render the Shavers Fork ineligible for scenic status under the National Wild and Scenic Rivers Act, Public Law 90-542.

***Response:*** *Following publication of the Monongahela National Forest's "Wild and Scenic River Study Report and Environmental Impact Statement on Twelve Rivers in the Monongahela National Forest (1995)", a re-assessment of the project impact on the Scenic designation of Shavers Fork was undertaken. That re-assessment is found in Section III (S).*

**Issue: WATER RESOURCES**

**Subject:** We are also concerned with potential adverse impacts to surface and groundwater from acid drainage associated with road construction through acid-producing shales, sandstones, and clays in addition to coal bearing strata in Grant and Tucker Counties.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** The preferred route for this segment (Grant and Tucker Counties) could cause the production of acid drainage. A thorough discussion of the direct and secondary impacts of acid drainage to surface and groundwater must be incorporated into the SDEIS.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

### Issue: CONSTRUCTION

**Subject:** It may again be necessary to fill additional wetlands to avoid creating perpetual acid drainage. The FWS must have this information in order to properly assess project impacts and discuss mitigative measures.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Mitigative measures, including avoidance, for acid drainage must be proposed and approved prior to issuance of a permit for the project.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

### Issue: ENVIRONMENTAL PERMITS

**Subject:** The permit application is currently in error because the proposed purchase of mitigation land did not materialize. The FWS's concurrence on the Section 404 permit for the project will be dependent upon a new viable and adequate wetland mitigation site.

***Response:*** *The Section 404 permit will be amended to include the new site in the Monongahela River Basin. A description of that site has been included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: CONSTRUCTION**

**Subject:** There is no discussion of the potential direct, secondary, or cumulative impacts from the loss of habitat (upland, riparian, wetland, streams) resulting from the disposal of excess fill material.

***Response:*** *FHWA regulations require that there be a full description of mitigation measures in the FEIS to the extent permitted by the level of design 23 CFR 771.125 (a)(1). The level of design presented in the ASDEIS allows only for an estimate of excess excavation by section. Identification of waste placement sites, analysis of impacts from that placement and development of mitigation measures for those impacts is not possible at the current level of design and would only be speculative in nature. Because of this comment and other similar comments, WVDOH undertook additional detailed engineering analyses of excess excavation reduction on selected sections. It was found that in many cases excess excavation can be dramatically reduced. Finally, a comprehensive strategy to deal with the excess excavation issue at the appropriate level of design has been developed in cooperation with EPA and other natural resource agencies. That strategy is discussed in detail in the Corridor H Mitigation Document.*

**Issue: MISCELLANEOUS**

**Subject:** Page S-12, Beneficial Impacts, No-build Alternative. This section should elaborate on the lack of adverse impacts to the natural resources of the project area.

***Response:*** *The Summary Section of the ASDEIS was prepared in accordance with FHWA T.A. 6640.8A. Page S-12 of the ASDEIS as well as Table S-3 present a summary of the lack of adverse impacts of the Build Alternative.*

**Subject:** At this time the proposed mitigation for the unavoidable impacts is inadequate and fails to offset adverse impacts to high quality fish and wildlife resources associated with the Build Alternatives.

***Response:*** *A comprehensive mitigation strategy has been included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** The Federal Highway Administration, WVDOT and the FWS will continue to work toward an acceptable resolution of these issues. The March 13, 1995 meeting between our agencies set a framework for their potential resolution.

***Response:*** *Comment noted. Additional meetings between the WVDOH, FHWA and all cooperating agencies including the FWS have been held. The results of those meetings have resulted in the development of a comprehensive mitigation strategy which is found in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** We understand that the WVDOT intends to produce a unified mitigation document to be made part of the project FEIS.

***Response:*** *The Corridor H FEIS Mitigation Document has been completed and is incorporated by reference into the FEIS.*

### Commentor: Trilling, Donald R. Director of Office of Environment, Energy and Safety

**U.S. Department of Transportation, Office of the Secretary**

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** The Build Alternative largely avoids potential habitat for the Cheat Mountain salamander. However, the FEIS should reflect the final outcome of consultation with the U.S. Fish and Wildlife Service regarding potential impacts.

***Response:*** *Details concerning the Cheat Mountain Salamander are included in the FEIS (Section III P- Threatened and Endangered Species). Based on their comments on the ASDEIS, the U. S. Fish and Wildlife Service considers the Cheat Mountain Salamander to not longer be an issued. U. S. Fish and Wildlife Service comments are found in Volume II, Appendix D of the FEIS.*

**Subject:** Although completion of the 106 and 4(f) [processes] is not necessary before issuing a DEIS, it is useful for these processes to be at a similar stage as those for addressing other environmental resources.

***Response:*** *Since the issuance of the ASDEIS, the 106 and 4(f) evaluations have been ongoing. The results of these investigations and analyses are included in the FEIS in appropriate sections (Section III-J Recreational Resources; L-Cultural Resources). Additionally, relative to the 106 process, a Programmatic Agreement between the FHWA, WVSHPO, and the ACHP with concurrence by the WVDOH, Monongahela National Forest and the George Washington National Forest have been developed and approved. This Programmatic Agreement will assure the completion of the 106 process, as required. The Programmatic Agreement is reproduced in Appendix A of Volume II of the FEIS. On-going investigations have also determined that no Section 4(f) use will occur as the result of construction of the Preferred Alternative (WV).*

**Subject:** The [A]SDEIS noted that impacts to Hanging Rock and the Baughman House will be unavoidable. The FEIS should included a more detailed discussion as to why alternatives to avoid or mitigate these impacts are not feasible or prudent.

***Response:*** *Discussions of the impacts to Hanging Rock and the Baughman House clarifying both their status and project impacts have been included in the FEIS in Section III, K-Visual Resourcs (page III-78).*

**Subject:** The [A]SDEIS notes that a considerable number or percentage of habitat units will be lost from the Shenandoah River, Back Creek, and Operquon Creek watersheds. The FEIS should include a more specific discussion as to why these losses can not be avoided.

***Response:*** *A discussion of watersheds as defined for the purposes of impact assessment is included in Section M of the FEIS. Briefly, the habitat unit impact in these watersheds appears large because of the size of the three watersheds as defined in Section III, M-Watersheds. The area of the watershed that occurs within the project area is small and the impacts therefore appear large. Impact discussions in the FEIS relative to these three watersheds as well as other project watersheds do not include, for example, the entire Shenandoah River watershed, but only that portion of the watershed that occurs within the project limits as defined in the FEIS.*

## Commentor: Wagoner, Mr. John H., Chairman

**Agency - Potomac Valley Soil Conservation District, WV**

**Issue: BUILD ALTERNATIVE**

**Subject:** The District recommends that the proposed highway cross the valley approximately 3.5 miles to the north. By following Clifford Hollow down the west side of South Branch Mountain.

***Response:*** *Development of an alignment 3.5 miles to the north would be well outside of Scheme Option D-5 that was selected as the preferred corridor scheme in the Corridor Selection Decision Document.*

# Corridor Selection SDEIS -

# Public Comments and Responses

**Commentor: Barker, Mark E.**

**Public**

**Issue: ECONOMIC ENVIRONMENT**

**Subject:** Several studies conducted by various universities and government agencies consistently show that four-lane highways do not bring economic development to rural localities.

***Response:*** *Social and economic studies were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Additionally, a detailed socioeconomic analysis (ASDEIS Socioeconomic Technical Report) was conducted for the alignment selection phase of this tiered process (ASDEIS, pp. III-1-III-75).*

**Subject:** I didn't see an economic study or plan mentioned in the DEIS.

***Response:*** *Social and economic studies were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Additionally, a detailed socioeconomic analysis (ASDEIS Socioeconomic Technical Report) was conducted for the alignment selection phase of this tiered process (ASDEIS, pp. III-1-III-75).*

**Issue: COMMENTS AND COORDINATION**

**Subject:** The time which was given to make comments on a project of this magnitude was too short. An extension to allow additional comments should be given.

***Response:*** *The WVDOH extended the comment period to February 20, 1993. The CSDEIS was available for comment for approximately 110 days instead of the required 45 days.*

**Issue: SECONDARY AND CUMULATIVE IMPACTS**

**Subject:** Cumulative effects need to be incorporated into the EIS.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Issue: PURPOSE AND NEED**

**Subject:** The permanent inflictions upon the communities, wildlife habitats, watersheds, streams, remote areas, and National Forests by Corridor H does not justify the project's purpose and need.

***Response:*** *Comment noted.*

## Commentor: Clark, David

**Public**

**Issue: ALTERNATIVES CONSIDERED FOR ADDITIONAL STUDY**

**Subject:** I am writing to urge further consideration of this previously eliminated alternative. I feel the Improved Roadway Alternative was too quickly discarded.

***Response:*** *The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines. The CSDEIS (October 21, 1992 dismissed all Study Corridors except Corridor D5 from further consideration in the Alignment SDEIS. The alternative of improving local roads where feasible to meet design criteria for the IRA resulted in unavoidable environmental and cultural resource impacts. The IRA in the ASDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, is discussed in the Decision Document under Section E (p. 35- 36).*

**Issue: SOCIAL ENVIRONMENT**

**Subject:** Comparisons of the alternatives with respect to social and economic issues is required.

***Response:*** *The economic and social analysis for the Alignment Selection SDEIS was undertaken to assess potential direct economic impacts and indirect secondary impacts from the proposed project as required by FHWA T.A. 6640.8A.*

**Issue: MNF MANAGEMENT PRESCRIPTIONS**

**Subject:** No proposed highway scheme would avoid involvement with MNF MP 6.1 or 6.2 lands.

***Response:*** *The selection of Scheme Option D5 was partially based on its avoidance of those MP Areas within the Monongahela National Forest that are afforded protection under Section 4(f). MP 6.1 Areas are traversed by the Preferred Alternative. It has been determined that MP 6.1 areas are not afforded Section 4(f) protection. MP 6.2 areas are not traversed by the Preferred Alternative. MP areas in the Monongahela National Forest are discussed in the FEIS, Volume I, Section J.*

## Commentor: Cook, Ms. Terry, President

**Group - WVSTA**

**Issue: RECREATION RESOURCES**

**Subject:** It appears that the 2000 foot highway corridor will impact the ALT no matter what route is followed. The most obvious contact points are along the Glady Fork near Alpena or near Coketon.

***Response:*** *A detailed analysis of project-related impacts to the Allegheny Trail has been conducted in accordance with FHWA T.A. 6640.8.A. The results of the analysis are presented in the ASDEIS (pp. III-170-III-171).*

## Commentor: Czyzewski, John J., Chairman of the Board of Directors

**Group - VARP**

**Issue: MODAL INTERRELATIONSHIPS**

**Subject:** We do not believe the SDEIS gave sufficient consideration to the impacts of Corridor H on existing rail transportation networks.

***Response:*** *Intermodal alternatives were considered and dismissed as not meeting the purpose and need of the project. Discussions concerning consideration and dismissal of intermodal alternatives are detailed in the Corridor Selection Transportation Needs Study (March 1992). and the Corridor Selection SDEIS (October 21, 1992).*

## Commentor: Davenport, Tom R., Secretary

**Public**

### Issue: ECONOMIC ENVIRONMENT

**Subject:** Mountain Heritage Alliance disputes the assertion that new four lane construction will foster the economic development of the region. We also dispute the assertion that reasonable alternatives to new construction have been prudently assessed.

***Response:*** *The Mountain Heritage Alliance's comments on the development of Corridor H and specific items suggested have been noted.*

## Commentor: Downey, Daniel M.

**Public**

### Issue: WATER RESOURCES

**Subject:** My research on the headwaters of Cedar Creek and Little Stony Creek indicate that acid deposition is degrading streams. I feel that this is not addressed in the SDEIS.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy was developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

## Commentor: Erkman, Jan K.

**Public**

### Issue: WATER RESOURCES

**Subject:** I am very concerned with a draft EIS that does not adequately address ecological concerns associated with running roadways up rivers and creeks and along reservoirs.

***Response:*** *WVDOH studied many alternatives before carrying forward the schemes contained in the CSDEIS. The CSDEIS evaluated 24 different Build Alternatives along with the No-Build Alternative. All Build-Alternatives met the overall project purpose and need. The decision process (as detailed in the Corridor H Corridor Selection SDEIS Decision Document (July 26, 1993) took into account three issues: transportation need; environmental resources; and public involvement. Scheme Option D5 was identified as the preferred corridor, in part, because it avoided many of the environmentally sensitive resources within the corridor-level study area. During the alignment development process, additional efforts were made to avoid sensitive resources.*

## Commentor: Gillespie, Rick

**Public**

### Issue: ALTERNATIVES CONSIDERED FOR ADDITIONAL STUDY

**Subject:** Does time remain for slight realignment of Subscheme HR to Onego, that would skirt the northern limit of the Spruce Knob NRA?

***Response:*** *Scheme Option D5 was identified as the preferred corridor, in part, because it would avoid impacts to these resources.*

**Subject:** Additionally, does time allow for a move to the west of the portion of Scheme A and Subscheme HR that parallels SR 28 from Seneca Rocks to Jordan Run?

***Response:*** *Scheme Option D5 was identified as the preferred corridor, in part, because it avoided many of the environmentally sensitive resources within the corridor-level study area. During the alignment development process, additional efforts were made to avoid sensitive resources.*

**Subject:** I would propose that the modified Subscheme HR would depart US 33 near Onego, at or near existing Secondary Routes 5/1 and 5/2. By doing the above, the highway would not be in sight or hearing of Seneca Rocks.

***Response:*** *Scheme Option D5 was identified as the preferred corridor, in part, because it avoided many of the environmentally sensitive resources within the corridor-level study area. During the alignment development process, additional efforts were made to avoid sensitive resources.*

### Issue: BUILD ALTERNATIVE AND SCHEME OPTIONS

**Subject:** Why was the southern-most (Scheme A1) still being studied and surveyed if it was already known that the 4F Lands would stop that choice? The same question applies in regard to Schemes B and C and their impact of 4F Lands at Canaan Valley.

***Response:*** *The 1992 Corridor Selection Supplemental DEIS included all scheme options developed in the original 1981 Supplemental DEIS.*

### Commentor: Harman, Robert L., Administrator

**Public**

**Issue: SOCIAL ENVIRONMENT**

**Subject:** Notably missing from this list is the Hardy County Medical Services and the Love Memorial Clinic both located in Moorefield.

***Response:*** *Comment noted. These facilities are not impacted by the Preferred Alternative.*

**Subject:** Also missing are the following nursing homes: Pendleton County Nursing Home, Grant County Nursing Home, Heartland of Keyser, Dawn View Manor, Fort Ashby, W. Va. and Courtland Acres in Davis, WV.

***Response:*** *Comment noted. These facilities are not impacted by the Preferred Alternative.*

**Subject:** There are many facets of concern. One of those concerns has to be health care and the ability of the public to access appropriately available health care facilities.

***Response:*** *Public access, as it relates to health care facilities, is discussed in Section III (Social Environment) of the ASDEIS.*

### Commentor: Hicks, Lynn L., P.E.

**Public**

**Issue: MODAL INTERRELATIONSHIPS**

**Subject:** The SDEIS does not discuss the possible severe fog and ice problem along a 25 to 30 mile segment of Schemes D and E east of northeast of Parsons.

***Response:*** *Existing weather conditions along US 219 and WV 93 have been taken into consideration during the alignment development process.*

**Issue: ALTERNATIVES CONSIDERED AND ELIMINATED**

**Subject:** It appears as if the Transportation Needs Study's economics section has failed to take into account a number of businesses and industries to the south of the Elkins Area.

***Response:*** *Comments and concerns expressed have been taken into consideration during the alignment development process. The ASDEIS (III-3-III-44) provides a comprehensive baseline of the economic environment within the project area.*

## Commentor: Kotcon, James, Chapter Chair

**Group - Sierra Club**

### Issue: ALTERNATIVES CONSIDERED AND ELIMINATED

**Subject:** Because of the substantial environmental and economic consequences, there is a very clear and overwhelming consensus that the Southern routes must be opposed.

***Response:*** *Scheme Option D5 was identified as the preferred corridor, in part, because it would minimize impacts to environmentally sensitive resources.*

**Subject:** The Improved Roadway Alternative (page II-3) is not given adequate attention.

***Response:*** *The Improved Roadway Alternative in the Alignment Selection SDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, is discussed in the Decision Document under Section E (p.s 35 and 36).*

**Subject:** Mitigation of impacts to springs supplying the Bowden Fish Hatchery (page III-91) cannot be reliably accomplished using "additional studies" to determine recharge areas.

***Response:*** *Scheme Option D5, and the alignments developed within, would avoid the Bowden Fish Hatchery.*

### Issue: SOCIAL ENVIRONMENT

**Subject:** The section on Social Environment is strongly biased toward considering communities and ignores the strongly rural character of the local population.

***Response:*** *Comments and concerns expressed have been taken into consideration during the alignment development process. The ASDEIS (III-1-III-75) provides a comprehensive baseline of the economic and social environment within the project area.*

**Issue: PEDESTRIAN AND BICYCLES**

**Subject:** Pedestrian and bicycle involvements do not consider the impacts to hiking trails crossed (many of these trails are also used by mountain bikes).

***Response:*** *Impacts to existing bicycle and pedestrian facilities have been evaluated as part of the alignment development process. The results of the impact analyses are presented in the ASDEIS, Section III-K. Proposed bicycle facilities planned in conjunction with the proposed four-lane facility are presented in the ASDEIS, Section II-B.*

**Issue: NOISE**

**Subject:** The noise impact assessment is notable for its inadequacy. Noise impact assessment for recreational lands and Wilderness areas should consider more than just the average noise levels.

***Response:*** *A detailed noise impact analysis has been conducted as part of the ASDEIS (ASDEIS, III-137-III-158). The results of the analysis are presented in the ASDEIS (III-140-III-150) and in the Air, Noise, and Energy Technical Report prepared in conjunction with the ASDEIS.*

**Issue: WATER RESOURCES**

**Subject:** The water resources section (page III-72) is in error by apparently assuming that impacts would be limited to the corridor selected.

***Response:*** *Surface water resources were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Detailed water quality analyses have been conducted as part of the ASDEIS. Water quality impact analyses have included public water, groundwater, watersheds, streams, wild and scenic rivers, and water quality as it relates to secondary and cumulative impacts. The results of the analyses are presented in Section III (pp. III-403-III-480) of the ASDEIS and the accompanying Streams Technical Report.*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** The discussion of major versus minor impacts on remote wildlife habitat (page III-117) underestimates the impact of Corridor H on remoteness.

***Response:*** *Scheme Option D5 avoids the large acreages of remote habitat associated with the Corridor Selection SDEIS study area. Project-related impacts to forest fragmentation, biodiversity, and remote habitat have been studied in detail as part of the alignment ASDEIS. The results of these studies are presented throughout Section III of the ASDEIS and the referenced Vegetation and Wildlife Habitat Technical Report.*

**Issue: WILD AND SCENIC RIVERS**

**Subject:** The impacts on potential Wild and Scenic Rivers are more significant than implied in the SDEIS.

***Response:*** *Corridor D5 avoids and minimizes project-related impacts to Wild and Scenic Rivers and potential designation status of river segments on the Nationwide Rivers Inventory. A review of such water bodies and potential impacts to NWS rivers has been prepared as part of the alignment development process. The results of the analysis are presented in the ASDEIS (p. III-481-III-493).*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** The impacts on threatened and endangered species and especially the total number of involvements make the Southern routes unacceptable.

***Response:*** *Scheme Option D5 was identified as the preferred corridor, in part, because it avoided many of the environmentally sensitive resources within the corridor-level study area. During the alignment development process, additional efforts were made to avoid sensitive resources.*

**Issue: CULTURAL RESOURCES**

**Subject:** The assessment of Cultural and Historical sites is obviously incomplete and inadequate.

***Response:*** *All resources were compared at a comparable level of detail in the Corridor Selection SDEIS as consistent with FHWA guidelines. At the request of the WVSHPO additional studies were conducted subsequent to the circulation of the CSDEIS and prior to the preparation of the Decision Document and the ASDEIS. Results of these studies are discussed in the FEIS (Vol. I, Section II (D)(4)(a)(3) Additional Cultural Resource Investigations).*

**Issue: VISUAL RESOURCES**

**Subject:** Impacts to Visual Resources are of great importance.

***Response:*** *A detailed analysis of project-related impacts to visually sensitive resources has been conducted in accordance with FHWA T.A. 6640.8.A. The results of the analysis are presented in the ASDEIS (pp. III-177-III-230).*

**Issue: ENERGY**

**Subject:** The Energy section (page III-207) inappropriately ignores the impact of incentives to increase vehicular traffic on total energy usage.

***Response:*** *The energy analysis was done in accordance with FHWA T.A. 6640.8.A. Results of this analysis are discussed in the ASDEIS (p. III-523-III-525).*

**Issue: CONSTRUCTION**

**Subject:** The Construction impacts section (page III-208), as mentioned above for water resources, paints an overly optimistic picture.

***Response:*** *Construction impacts were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111). Construction impacts were evaluated in accordance with FHWA T.A. 6640.8.A. and are addressed in the ASDEIS (p. III-527-III-531).*

**Issue: SECTION 4(f)/6(f)**

**Subject:** We disagree with the statement that "no Scheme Option would directly involve Congressionally-designated Wilderness Areas."

***Response:*** *Comment noted. The selection of Scheme Option D5 was partially based on its avoidance of involvements with sensitive recreational resources (Corridor Selection SDEIS Decision Document, p. 26).*

**Issue: AFFECTED ENVIRONMENT AND THE ENVIRONMENTAL CONSEQUENCES**

**Subject:** A major flaw of the SDEIS is its lack of consideration of impacts outside the immediate 2000-foot-wide corridors.

***Response:*** *The purpose of the Corridor Selection SDEIS was to identify resources within the established 2,000 foot-wide corridors. Detailed analyses of resource impacts have been conducted during the alignment development process. Analyses are based on both direct and secondary and cumulative impacts and include such topics as air, noise, socioeconomics, recreation, water quality, threatened and endangered species, forest fragmentation, biodiversity, visual, and recreation resources.*

### Commentor: Marcus, Matthew

**Public**

**Issue: RECREATION RESOURCES**

**Subject:** The construction of Corridor H would negatively impact our limited recreational resources. The severity of this impact will depend on which route is chosen.

***Response:*** *A comprehensive analysis of impacts to recreational resources in Corridor D5 was included in the ASDEIS and the FEIS, Section III, J- Recreation Resources.*

**Subject:** The SDEIS does not sufficiently address the value of all of our recreation corridors.

***Response:*** *A comprehensive analysis of impacts to recreational resources in Corridor D5 was included in the ASDEIS and the FEIS, Section III, J- Recreation Resources.*

**Subject:** How can these resources be downplayed or overlooked in light of the fact that the SDEIS Summary states that "The primary social and economic reasons for the highway are to promote outdoor recreation and tourism"?

***Response:*** *A comprehensive analysis of impacts to recreational resources in Corridor D5 was included in the ASDEIS and the FEIS, Section III, J-Recreation Resources.*

### Commentor: Miller, Terry Jo, Coordinator

**Corridor H No-Build Alliance**

**Issue: PURPOSE OF AND NEED**

**Subject:** Data showing the distance from schemes D and E of the Corridor H to I-68 and thus questioning the usefulness of these schemes. (I-11)

***Response:*** *A comprehensive analysis of impacts to recreational resources in Corridor D5 was included in the ASDEIS and the FEIS, Section III, J- Recreation Resources. SDEIS, October 21, 1992, and the Corridor Selection SDEIS Decision Document of July 26, 1993.*

**Subject:** The SDEIS has failed to prove the economic purpose and need for this project.

***Response:*** *The Purpose and Need Analysis was established in the Corridor Selection Transportation Needs Study, March 1992. It was included in the approved Corridor Selection SDEIS, October 21, 1992, and the Corridor Selection SDEIS Decision Document of July 26, 1993.*

**Subject:** This section (I-3) fails to prioritize Purposes and Needs listed for Corridor H.

***Response:*** *The Purpose and Need Analysis was established in the Corridor Selection Transportation Needs Study, March 1992. It was included in the approved Corridor Selection SDEIS, October 21, 1992, and the Corridor Selection SDEIS Decision Document of July 26, 1993.*

**Subject:** The SDEIS is deficient in its failure to justify the purpose and need and the expenditure for it.

***Response:*** *The Purpose and Need Analysis was established in the Corridor Selection Transportation Needs Study, March 1992. It was included in the approved Corridor Selection SDEIS, October 21, 1992, and the Corridor Selection SDEIS Decision Document of July 26, 1993.*

**Subject:** The SDEIS has failed to adequately analyze the central question of Purpose and Need, of costs and benefits of Corridor H.

***Response:*** *The Purpose and Need Analysis was established in the Corridor Selection Transportation Needs Study, March 1992. It was included in the approved Corridor Selection SDEIS, October 21, 1992, and the Corridor Selection SDEIS Decision Document of July 26, 1993. NEPA does not require that a cost-benefit analysis be undertaken in the preparation of an SDEIS and/or FEIS.*

### Issue: CAPACITY AND LEVEL OF SERVICE

**Subject:** SDEIS fails to compare its LOS data for the study region with LOS data on other Virginia and West Virginia two-lane roads.

***Response:*** *Levels of Service are not meant to be compared on a regional basis, but serve as an indicator of traffic flow on specific highways.*

### Issue: TRANSPORATION DEMAND

**Subject:** The SDEIS data presented fails to justify the cost of building Corridor H for the purpose of improving Levels of Service.

***Response:*** *NEPA does not require that a cost-benefit analysis be undertaken in the preparation of an SDEIS and/or FEIS.*

**Subject:** When discussing road safety, we request that these secondary impacts for the entire study area be considered, before a decision is made to build Corridor H.

***Response:*** *The expressed comments and concerns have been noted and taken into consideration during the alignment development process.*

**Issue: MODAL INTERRELATIONSHIPS**

**Subject:** SDEIS's safety arguments fail to point out that building Corridor H would only improve safety on that particular road.

***Response:*** *Comment noted.*

**Subject:** SDEIS fails to consider established options for improving safety on two lane roads which are less costly in relation to volume of traffic.

***Response:*** *The 1991 to 1993 Statewide accident rates provided in the 1993 West Virginia Crash Data available from the WVDOH shows that the accident rates per hundred million vehicle miles (HMVM) for a two-lane rural primary road of width over 22' is 211. The accident rate for a four- lane rural primary road is 130 accidents /HMVM, and the accident rate for a four- lane rural primary controlled access road is 101accidents /HMVM. Site specific safety measures are factored into these averages.*

**Subject:** The SDEIS overprojects no-build fatalities and lives to be saved by Corridor H. ... The SDEIS fails to note that accidents also diminish significantly as two lane roads are wider.... SDEIS overstates the safety needs for Corridor H by overstating the number of lives that could be saved by building the new highway.

***Response:*** *The 1991 to 1993 Statewide accident rates provided in the 1993 West Virginia Crash Data available from the WVDOH shows that the accident rates per hundred million vehicle miles (HMVM) for a two-lane rural primary road of width over 22' is 211. The accident rate for a four- lane rural primary road is 130 accidents /HMVM, and the accident rate for a four- lane rural primary controlled access road is 101accidents /HMVM.*

### Issue: ALTERNATIVES CONSIDERED AND ELIMINATED

**Subject:** SDEIS does not thoroughly and adequately consider the Improved Roadway and other alternatives to building Corridor H

***Response:*** *The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines. The CSDEIS (October 21, 1992) dismissed all Study Corridors except Corridor D5 from further consideration in the Alignment SDEIS. The alternative of improving local roads where feasible to meet design criteria for the IRA resulted in unavoidable environmental and cultural resource impacts. The IRA in the ASDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, are discussed in the Decision Document under Section E (p. 35 and 36).*

**Subject:** WVDOT has failed to adequately consider road improvements as an alternative to building the corridor.

***Response:*** *The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines. The CSDEIS (October 21, 1992) dismissed all Study Corridors except Corridor D5 from further consideration in the Alignment SDEIS. The alternative of Improving local roads where feasible to meet design criteria for the IRA resulted in unavoidable environmental and cultural resource impacts. The IRA in the ASDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, are discussed in the Decision Document under Section E (p. 35 and 36).*

**Subject:** SDEIS also fails to analyze the cost of the Mass Transit alternative and fails to consider the option of improved access to rail systems.

***Response:*** *Rail facilities were discussed in the Corridor Selection Transportation Needs Analysis (March, 1992). That analysis concluded in part that, "Industries [in the project area] not located near rail system termini are unable to utilize the railroad system because roads are not designed to accommodate truck traffic to the terminal facilities."*

**Subject:** This document does not present compelling reasons for the elimination of that alternative (IRA).

***Response:*** *The Improved Roadway Alternative in the Alignment Selection SDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, is discussed in the Decision Document under Section E (p.s 35 and 36).*

**Subject:** SDEIS has failed to provide comprehensive information on how other planned road improvements could be addressing, or be designed to address, some of the purposes and needs stated for Corridor H.

***Response:*** *The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines. The Corridor Selection SDEIS (October 21, 1992 dismissed all Study Corridors except Corridor D5 from further consideration in the Alignment SDEIS. The alternative of Improving local roads where feasible to meet design criteria for the IRA resulted in unavoidable environmental and cultural resource impacts. The IRA in the ASDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, is discussed in the Decision Document under Section E (p.s 35 and 36). Consideration of remaining transportation needs in the study area are discussed in the Corridor H Corridor Selection Decision Document (Section E, p. 35-36).*

**Subject:** SDEIS fails to study routes with separate road improvements tailored to each situation.

***Response:*** *The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines. The Corridor Selection SDEIS (October 21, 1992 dismissed all Study Corridors except Corridor D5 from further consideration in the Alignment SDEIS. The alternative of Improving local roads where feasible to meet design criteria for the IRA resulted in unavoidable environmental and cultural resource impacts. The IRA in the ASDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, is discussed in the Decision Document under Section E (p.s 35 and 36).*

**Subject:** The SDEIS has failed to analyze the impacts of Corridor H on the economics of existing rail lines and has failed to analyze possible contributions of rail as an alternative.

***Response:*** *Intermodal alternatives were considered and dismissed as not meeting the purpose and need of the project. Discussions concerning consideration and dismissal of intermodal alternatives are detailed in the Corridor Selection Transportation Needs Study (p. II-14-II-16, March 1992) and the Corridor Selection SDEIS (pp. I-21-I-22 and II-2- II-3; October 21, 1992).*

**Subject:** Page II-2: MASS TRANSIT ALTERNATIVES: The SDEIS has failed to analyze costs, or even propose anything for this alternative.

***Response:*** *Intermodal alternatives were considered and dismissed as not meeting the purpose and need of the project. Discussions concerning consideration and dismissal of intermodal alternatives are detailed in the Corridor Selection Transportation Needs Study (p. II-14-II-16, March 1992) and the Corridor Selection SDEIS (pp. I-21-I-22 and II-2- II-3; October 21, 1992).*

### Issue: ALTERNATIVES CONSIDERED FOR ADDITIONAL STUDY

**Subject:** No-build and Road Improvement Alternative options were not adequately considered.

***Response:*** *As stated on p. II-1 of the ASDEIS, "the Alignment Selection process focuses on the development of the No-Build, the IRA, and the Build Alternatives. In accordance with 40 CFR 1502.14, these three alternatives have been developed to a comparable level of detail to evaluate their merits and impacts. The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines. The Corridor Selection SDEIS (October 21, 1992 dismissed all Study Corridors except Scheme Option D5 from further consideration in the Alignment SDEIS. The alternative of Improving local roads where feasible to meet design criteria for the IRA resulted in unavoidable environmental and cultural resource impacts. The IRA in the ASDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, is discussed in the Decision Document under Section E (p.s 35 and 36).*

**Subject:** The use of the word "corridor" would seem to rule out the no-build option or any type of road improvement option before the study even begins.

***Response:*** *As stated on p. II-1 of the ASDEIS, "the Alignment Selection process focuses on the development of the No-Build, the IRA, and the Build Alternatives. In accordance with 40 CFR 1502.14, these three alternatives have been developed to a comparable level of detail to evaluate their merits and impacts. The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines. The Corridor Selection SDEIS (October 21, 1992 dismissed all Study Corridors except Scheme Option D5 from further consideration in the Alignment SDEIS. The alternative of Improving local roads where feasible to meet design criteria for the IRA resulted in unavoidable environmental and cultural resource impacts. The IRA in the ASDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, is discussed in the Decision Document under Section E (p.s 35 and 36).*

**Subject:** The SDEIS did not give adequate consideration to no-build and road improvement options.

***Response:*** *As stated on p. II-1 of the ASDEIS, "the Alignment Selection process focuses on the development of the No-Build, the IRA, and the Build Alternatives. In accordance with 40 CFR 1502.14, these three alternatives have been developed to a comparable level of detail to evaluate their merits and impacts. The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines. The Corridor Selection SDEIS (October 21, 1992 dismissed all Study Corridors except Scheme Option D5 from further consideration in the Alignment SDEIS. The alternative of Improving local roads where feasible to meet design criteria for the IRA resulted in unavoidable environmental and cultural resource impacts. The IRA in the ASDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, is discussed in the Decision Document under Section E (p.s 35 and 36).*

**Subject:** The draft should be revised to address a limited number of feasible options, including no-build and various road improvement options.

***Response:*** *As stated on p. II-1 of the ASDEIS, "the Alignment Selection process focuses on the development of the No-Build, the IRA, and the Build Alternatives. In accordance with 40 CFR 1502.14, these three alternatives have been developed to a comparable level of detail to evaluate their merits and impacts. The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines. The Corridor Selection SDEIS (October 21, 1992 dismissed all Study Corridors except Scheme Option D5 from further consideration in the Alignment SDEIS. The alternative of Improving local roads where feasible to meet design criteria for the IRA resulted in unavoidable environmental and cultural resource impacts. The IRA in the ASDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, is discussed in the Decision Document under Section E (p.s 35 and 36).*

**Issue: FARMLANDS**

**Subject:** SCS has not commented officially via Form AD 1006. Again, deferred impact study.

***Response:*** *The farmland impact evaluation found in the ASDEIS was carried out in accordance with the requirements of the Farmland Policy Protection Act and FHWA T.A. 6640.8A. This issue is addressed in the ASDEIS (pp, III-30).*

**Issue: POTENTIAL DISPLACEMENTS**

**Subject:** The SDEIS has failed to analyze on community disruption, site visits with local officials and the public in each incorporated community.

***Response:*** *The ASDEIS (III-1-III-75) provides a comprehensive analysis of community disruption. The analysis was performed in accordance with FHWA T.A. 6640.8A. With respect to coordination with regional, local and community planning authorities, a number of meetings took place throughout the corridor and alignment development process (ASDEIS Table VII-1). Meetings with representatives of Grant County Development Authority, Region VIII Planning and Development Council, Lord Fairfax Planning District, Tucker County, Hardy County, and Garrett County Planning Departments, were held at various times during the alignment development process. In addition, a number of meetings were held with the Virginia Advisory Committee.*

**Subject:** Relocation options will be evaluated at the next stage of the study. Another deferred impact.

***Response:*** *The Corridor H NEPA analysis followed the CEQ (40 CFR 1508.28) and FHWA (23 CFR 777.111) regulations for tiered NEPA documents. The ASDEIS (III-1-III-75) provides a comprehensive analysis of community disruption. The analysis was performed in accordance with FHWA T.A. 6640.8A.*

**Issue: ECONOMIC ENVIRONMENT**

**Subject:** SDEIS fails to address the risk that Corridor H may not be able to deliver the manufacturing jobs promised.

***Response:*** *The socioeconomic analyses detailed in the CSDEIS and ASDEIS do not "promise" jobs. However, socioeconomic studies were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Additionally, a detailed socioeconomic analysis (ASDEIS Socioeconomic Technical Report) was conducted for the alignment selection phase of this tiered process (ASDEIS, pp. III-1-III-75).*

**Subject:** Models and projections could have been used to predict economic growth and secondary impacts on communities in Section III, but descriptive information was used instead.

***Response:*** *Social and economic studies were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Additionally, a detailed socioeconomic analysis (ASDEIS Socioeconomic Technical Report) was conducted for the alignment selection phase of this tiered process (ASDEIS, pp. III-1-III-75).*

**Subject:** The SDEIS fails to project how many people would be economically helped or harmed by this "opportunity" (land speculation).

***Response:*** *Social and economic demands were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations.*

**Subject:** The SDEIS economic analysis does not provide sufficient information on which to decide whether Corridor H fulfills its purpose and need.

***Response:*** *The Purpose and Need Analysis was established in the Corridor Selection Transportation Needs Study, March 1992. It was included in the approved Corridor Selection SDEIS, October 21, 1992, and the Corridor Selection SDEIS Decision Document of July 26, 1993. The Purpose and Need statement in the Alignment Selection SDEIS referenced the detailed Purpose and Need analysis previously conducted.*

**Issue: WATER RESOURCES**

**Subject:** WATER RESOURCES: These deferrals cause the SDEIS to have insufficient information on which to base a corridor selection decision.

***Response:*** *Surface water resources were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Detailed water quality analyses have been conducted as part of the ASDEIS. Water quality impact analyses have included public water, groundwater, watersheds, streams, wild and scenic rivers, and water quality as it relates to secondary and cumulative impacts. The results of the analyses are presented in Section III (pp. III-403-III-480) of the ASDEIS and the accompanying Streams Technical Report which has been incorporated by reference into the ASDEIS.*

**Issue: WETLANDS**

**Subject:** We questioned whether the preliminary studies provide sufficient information on which to base a corridor selection decision. A detailed wetland analysis has been deferred as has the determination of highway impact on the wetland.

***Response:*** *Wetlands were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Analysis of existing wetlands and impacts to wetlands as a result of the proposed action followed guidelines found in FHWA T.A. 6640.8A and other recognized and accepted environmental impact assessment methodologies as described in the ASDEIS (p. III-333). Detailed information on this issue is available in the ASDEIS Wetlands Technical Report.*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** No data projecting road kills, especially in the remote areas with wild habitat, is given.

***Response:*** *This issues is addressed in the Wildlife Mortality Section of the ASDEIS (pp. III-314-III-318).*

**Issue: WILD AND SCENIC RIVERS**

**Subject:** Mitigation of impacts to Wild and Scenic Rivers undermines the entire concept of river preservation and must be deleted from the SDEIS.

***Response:*** *Design characteristics of the bridge crossing of the Shavers Fork could include mitigative measures to reduce its visual impact within the viewshed. Mitigative measures could include pier placement, vertical clearance, and construction material. The requirement to consider mitigation measures for this river crossing is included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** SDEIS is extremely deficient in failing to assess endangered species before the selection of a corridor.

***Response:*** *Biological assessments for endangered species and critical habitat evaluations have been conducted as part of the ASDEIS. The results of these studies are presented in Section III (Vegetation and Wildlife, pp. III-281-III-295, and Threatened and Endangered Species, pp. III-319-III-332). Scheme Option D5 was selected, in part, because of its considerably lower potential for endangered species involvements. During the alignment development process, impacts to endangered species have been avoided.*

**Subject:** The SDEIS should have contacted the Virginia Natural Heritage office during 1992 for an update.

***Response:*** *A review of both VDGIF and VDNH databases was conducted during the corridor and alignment development phases (ASDEIS, p. III-319).*

**Subject:** SDEIS was deficient in failing to include a biological assessment, as recommended by the FWS.

***Response:*** *Biological assessments for endangered species and critical habitat evaluations have been conducted as part of the ASDEIS. The results of these studies are presented in Section III (Vegetation and Wildlife, pp. III-281-III-295, and Threatened and Endangered Species, pp. III-319-III-332). Scheme Option D5 was selected, in part, because of its considerably lower potential for endangered species involvements. Under the alignment development process, impacts to endangered species have been avoided.*

**Subject:** SDEIS is inconsistent in its designation of some endangered species habitat.

***Response:*** *Biological assessments for endangered species and critical habitat evaluations have been conducted as part of the ASDEIS. The results of these studies are presented in Section III (Vegetation and Wildlife, pp. III-281-III-295, and Threatened and Endangered Species, pp. III-319-III-332). Scheme Option D5 was selected, in part, because of its considerably lower potential for endangered species involvements. Under the alignment development process, impacts to endangered species have been avoided.*

## Issue: CULTURAL RESOURCES

**Subject:** The SDEIS is insufficiently clear on the true requirements for the cultural inventory. It is extremely deficient in both the gathering and the presentation of this information.

***Response:*** *All resources were compared at a comparable level of detail in the Corridor Selection SDEIS as consistent with FHWA guidelines. At the request of the WVSHPO additional studies were conducted subsequent to the circulation of the CSDEIS and prior to the preparation of the Decision Document and the ASDEIS. Results of these studies are discussed in the FEIS (Vol. I, Section II (D)(4)(a)(3) Additional Cultural Resource Investigations).*

**Issue: VISUAL RESOURCES**

**Subject:** The discussion in this section features seven tables and no photos. Visual subject demands a visual presentation.

***Response:*** *Computer generated graphics were included to provide the reader with additional visual "views of" perspectives. Detailed narrative discussions and analyses are included in the ASDEIS (pp. III-177-III-231). The visual analysis, prepared utilizing the FHWA's Visual Impact Assessment for Highway Projects, indicated that no scenic vistas would be destroyed (Alignment Selection SDEIS, pp. III-177-III-230). It did recognize, however, that visual impact is a highly subjective issue .*

**Issue: RECREATION RESOURCES**

**Subject:** SDEIS does not give objective data to support its claim that the tourist industry in West Virginia would suffer unless Corridor H is built.

***Response:*** *A discussion of recreational resources is included in the ASDEIS (pp. III-159-III-176) as well as the ASDEIS Socioeconomic Technical Report, which as been incorporated by reference into the ASDEIS. As stated in the Corridor Selection Transportation Needs Study (pp. III-16-III-17), the primary access routes which provide linkage from I-81 in Virginia to the recreational resources are generally substandard. Recreation demand is likely to increase, but existing highway deficiencies may deter prospective tourism. As projected traffic volumes increase on these routes, access and mobility will further deteriorate. Such a trend will likely discourage non-residents from traveling to the region. Although no research studies were found regarding this issue, interviews conducted with regional development officials and local tourist industry indicated that deficiencies in the current transportation facilities impede development of tourist.*

**Subject:** SDEIS cites no source for its assertion that the lack of a four-lane highway could cause the area to lose some of its share of the tourist market.

***Response:*** *A discussion of recreational resources is included in the ASDEIS (pp. III-159-III-176) as well as the ASDEIS Socioeconomic Technical Report, which as been incorporated by reference into the ASDEIS. As stated in the Corridor Selection Transportation Needs Study (pp. III-16-III-17), the primary access routes which provide linkage from I-81 in Virginia to the recreational resources are generally substandard. Recreation demand is likely to increase, but existing highway deficiencies may deter prospective tourism. As projected traffic volumes increase on these routes, access and mobility will further deteriorate. Such a trend will likely discourage non-residents from traveling to the region. Although no research studies were found regarding this issue, interviews conducted with regional development officials and local tourist industry indicated that deficiencies in the current transportation facilities impede development of tourist.*

**Subject:** SDEIS has failed to weigh bicycling as an economic opportunity which would be denied by the building of Corridor H.

***Response:*** *WVDOH recognize the importance of recreation resources and the role these resources play in the State's economic development. In light of the importance of these resources, the ASDEIS identified areas in which additional pedestrian and bicycle facilities could be incorporated into the proposed project (pp. II-20-II-28).*

**Subject:** SDEIS is insufficient in that it raises, but does not analyze, the question of secondary impacts of increased access to recreation resources.

***Response:*** *A comprehensive analysis of impacts to recreational resources in Corridor D5 was included in the ASDEIS and the FEIS, Section III, J- Recreation Resources.*

**Subject:** Wardensville's town park is omitted from the inventory of community parks here, and in the 4f section IV.

***Response:*** *Comment noted. There will be no use made of the J. Allen Hawkins Community Park. It is discussed in Section III, J - Recreation Resources of the ASDEIS and FEIS.*

## Issue: MINERAL RESOURCES

**Subject:** SDEIS fails to analyze environmental impacts of mining the substantial quantity of gravel or rock used in the highway.

***Response:*** *Analysis of irreversible and irretrievable commitments of resources was done in accordance with FHWA T.A. 6640.8.A. Results are discussed in the ASDEIS (p. III-135). Discussion of this issue recognized that considerable amounts of fossil fuels, labor, cement, and bituminous would be expended. However, it was concluded that improved safety, savings in time and fuel, and increased availability and quality of services outweigh the commitment of these resources.*

## Issue: CONSTRUCTION

**Subject:** The extent of construction impacts are studied for the preferred corridor selected. Another deferred impact.

***Response:*** *Construction impacts were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111). Construction impacts were evaluated in accordance with FHWA T.A. 6640.8.A. and are addressed in the ASDEIS (p. III-527-III-531).*

**Issue: SECTION 4(f)/6(f)**

**Subject:** The SDEIS defers analysis of the impact of increased access into environmentally sensitive areas until the next phase of study.

***Response:*** *Recreational resources were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. A more detailed analysis was undertaken in the ASDEIS, Section III, J - Recreation Resources.*

**Issue: MNF MANAGEMENT PRESCRIPTIONS**

**Subject:** The SDEIS insufficiently addresses long term secondary impacts to the environment of increased access and development in the area.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS. Additionally, the Preferred Alternative avoids using designated recreation resources within MNF Management Prescription 6.1 and 6.2 areas.*

**Issue: COMMENTS AND COORDINATION**

**Subject:** The SDEIS proposes to defer analyses of many impacts which can include substantial environmental and financial costs to Step 2, the Alignment Phase of the EIS process.

***Response:*** *The affected environment was analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations.*

**Subject:** Omissions and inconsistencies in facts, and failure to consult appropriate agencies result in the SDEIS being skewed in favor of building Corridor H and against no-build and road improvements alternatives.

***Response:*** *As stated on p. II-1 of the ASDEIS, "the Alignment Selection process focuses on the development of the No-Build, the IRA, and the Build Alternatives. In accordance with 40 CFR 1502.14, these three alternatives have been developed to a comparable level of detail to evaluate their merits and impacts. The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines. The Corridor Selection SDEIS (October 21, 1992 dismissed all Study Corridors except Scheme Option D5 from further consideration in the Alignment SDEIS. The alternative of Improving local roads where feasible to meet design criteria for the IRA resulted in unavoidable environmental and cultural resource impacts. The IRA in the ASDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, is discussed in the Decision Document under Section E (p.s 35 and 36).*

**Subject:** SDEIS procedure for public comment is improper because it defers all agency response to public comments until after the preparation of the final EIS on the Alignment Phase of the project.

***Response:*** *As is consistent with responding to public comments utilizing a tiering process (23 CFR 777.111), comments from both the general and site-specific environmental effects are addressed in the Final EIS.*

**Subject:** The public will have no responses to its comments of Step 1 while it is analyzing the draft EIS on Step 2. This makes it difficult for the public to understand the agency's assumptions and analysis as it moves from Step 1 to Step 2.

***Response:*** *As is consistent with responding to public comments utilizing a tiering process (23 CFR 777.111), comments from both the general and site-specific environmental effects are addressed in the Final EIS.*

**Subject:** The comment process did not give the public an adequate chance to study and comment on the SDEIS.

***Response:*** *The WVDOH extended the comment period to February 20, 1993. The CSDEIS was available for comment for approximately 110 days instead of the required 45 days.*

**Subject:** The agencies have failed to properly consult localities during the SDEIS process as FHWA and ISTEA 135(c) laws and guidelines require.

***Response:*** *The affected environment was analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. The ASDEIS (p. III-1-III-75) provides a comprehensive analysis of the economic and social environment within the project area. The analysis was performed in accordance with FHWA T.A. 6640.8A. With respect to coordination with regional, local and community planning authorities, a number of meetings took place throughout the corridor and alignment development process (ASDEIS Table VII-1). Meetings with representatives of Grant County Development Authority, Region VIII Planning and Development Council, Lord Fairfax Planning District, Tucker County, Hardy County, and Garrett County Planning Departments, were held at various times during the alignment development process. In addition, a number of meetings were held with the Virginia Advisory Committee.*

**Subject:** The SDEIS is deficient in deferring studies of many impacts to the alignment phase.

***Response:*** *The affected environment was analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations.*

**Subject:** The SDEIS fails to analyze benefit experienced by urban or rural residents, and has deferred this analysis to the Alignment phase.

***Response:*** *The affected environment was analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. The ASDEIS (III-1-III-75) provides a comprehensive analysis of the economic and social environment within the project area. The analysis was performed in accordance with FHWA T.A. 6640.8A.*

**Subject:** The SDEIS has deferred assessing each individual community, and the possible disruptive effects and their mitigations, until the Alignment phase.

***Response:*** *The affected environment was analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. The ASDEIS (III-1-III-75) provides a comprehensive analysis of the economic and social environment within the project area. The analysis was performed in accordance with FHWA T.A. 6640.8A.*

**Subject:** SDEIS acknowledges that investment, economic development and land speculation could affect property values and tax bases of local communities. It has deferred the study of these to the Alignment phase.

***Response:*** *Social and economic demands were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Additionally, a detailed socioeconomic analysis was conducted for the ASDEIS (pp. III-3-III-76).*

**Issue: MISCELLANEOUS**

**Subject:** The SDEIS misrepresents the financial costs of Corridor H. A true cost benefit analysis would show this proposal is a marginal economic proposition and an expensive boondoggle.

***Response:*** *The economic analysis section of the Alignment Selection SDEIS was undertaken to assess potential direct economic impacts and indirect secondary impacts from the proposed project as required by FHWA T.A. 6640.8A. The economic analysis was not undertaken as a cost-benefit analysis and should not be construed as such. NEPA does not require that a cost-benefit analysis be undertaken in the preparation of an SDEIS and/or FEIS.*

**Subject:** We request the opportunity to submit further comments after we review these documents.

***Response:*** *The WVDOH extended the comment period to February 20, 1993. The CSDEIS was available for comment for approximately 110 days instead of the required 45 days.*

**Subject:** Has VDOT made a study of the costs and benefits of Corridor H to Virginia?

***Response:*** *NEPA does not require that a cost-benefit analysis be undertaken in the preparation of an SDEIS or FEIS.*

**Subject:** I-22 says completion of Corridor H would improve access to existing rail and air freight facilities, but fails to designate which rail facilities would receive improved access.

***Response:*** *The expressed comments and concerns have been noted and taken into consideration during the alignment development process.*

**Issue: SECONDARY AND CUMULATIVE IMPACTS**

**Subject:** SDEIS does not adequately analyze secondary impacts of the proposed Corridor H, because it fails to consider and project the reasonably foreseeable effect of development.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Subject:** Secondary impacts not adequately addressed in SDEIS, include but not limited to the issues detailed in our letter I. (D)(1) a to l.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Subject:** In considering the "use of the environment" to be "short term," in III-210, the SDEIS flagrantly ignores all these secondary effects.

***Response:*** *The affected environment was analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. The secondary effects (p. III-210, CSDEIS) discussed in this section deal with short-term construction impacts in relation to long-term productivity. The proposed project is classified as a long-term productive facility. Issues dealing with secondary effects of the proposed action are analyzed in a comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Subject:** The SDEIS has failed to analyze or project secondary impacts of Corridor H on the natural, economic and social environment.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Subject:** SDEIS has failed to show both the benefits and costs of development by integrating economic analyses with a study on "Secondary Impacts."

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS. Additionally, the economic analysis section of the ASDEIS was undertaken to assess potential direct economic impacts and indirect secondary impacts from the proposed project as required by FHWA T.A. 6640.8A. The economic analysis was not undertaken as a cost-benefit analysis and should not be construed as such. NEPA does not require that a cost-benefit analysis be undertaken in the preparation of an SDEIS and/or FEIS.*

**Issue: GROUNDWATER**

**Subject:** SDEIS has insufficiently addressed serious threats posed to groundwater by failing to identify springs.

***Response:*** *Springs and groundwater were identified to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Identification and the potential impacts to springs are addressed in the ASDEIS (pp. III-88-III-105).*

**Subject:** The SDEIS is deficient in failing to inventory and map all groundwater sources and in deferring the designing of mitigative options.

***Response:*** *Springs and groundwater were identified to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Identification and the potential impacts to springs are addressed in the ASDEIS (pp. III-88-III-105). Additional testing and mitigation measures are described in the Corridor H FEIS Mitigation Document. Absolute mitigation measures can not be developed until final roadway design activities are undertaken.*

**Subject:** The SDEIS is deficient as a result of deferring the study of probability of damage to the Bowden hatchery water source until after a corridor is selected.

***Response:*** *Scheme Option D5 was identified as the preferred corridor. No impacts will occur to the hatchery.*

**Issue: AFFECTED ENVIRONMENT AND THE ENVIRONMENTAL CONSEQUENCES**

**Subject:** The SDEIS does not sufficiently address the environmental and economic costs of Corridor H in comparison with the relationship to the benefits.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS. NEPA does not require that a cost-benefit analysis be undertaken in the preparation of an SDEIS or FEIS.*

**Subject:** The descriptions of the affected environments are general, providing an inventory of sensitive resources within each corridor rather than separate descriptions of areas.

***Response:*** *The affected environment was analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. The purpose of the Corridor Selection SDEIS was to identify resources within the established 2,000 foot-wide corridors. Detailed analyses of resource impacts have been conducted during the alignment development process. Analyses are based on both direct and secondary and cumulative impacts and include such topics as air, noise, socioeconomics, recreation, water quality, threatened and endangered species, forest fragmentation, biodiversity, visual, and recreation resources.*

**Subject:** The SDEIS defers a complete noise level study to the Alignment Phase.

***Response:*** *Detailed studies of air quality impacts have been completed as part of the alignment selection process. Based on current, federally approved guidelines and measures, project-related impacts to air quality would be minimal. The results of the air quality analysis are presented in Section III-H of this document. A detailed noise impact analysis has been conducted as part of the alignment development process. The results of the analysis are presented in Section III-I of this document and in the Air, Noise, and Energy Technical Report prepared in conjunction with the Alignment Selection SDEIS.*

## Commentor: Mitchell, John T. & Betty G.

**Public**

**Issue: AFFECTED ENVIRONMENT AND THE ENVIRONMENTAL CONSEQUENCES**

**Subject:** Please investigate the impact the routing may have on the Preserve at New Creek before the corridor selection decision is made.

***Response:*** *The corridor identified in the 1992 SDEIS, Scheme Option D5, would avoid the New Creek/Linden Creek watershed.*

## Commentor: Morse, Larry E.

**Public**

### Issue: VISUAL RESOURCES

**Subject:** Impacts of any of the options of scenic values would be substantial, and would require careful planning to minimize.

***Response:*** *The preferred corridor, Scheme Option D5, and the subsequent alignments developed within, would avoid the visually sensitive resources located to the south. A detailed analysis of project-related impacts to visually sensitive resources has been conducted in accordance with FHWA T.A. 6640.8.A. The results of the analysis are presented in the ASDEIS (pp. III-177-III-230).*

### Issue: RECREATION RESOURCES

**Subject:** The possible effect of the highway alignment on future tourism is another consideration important to me.

***Response:*** *Comment noted.*

## Commentor: Mueller, Robert F., Ph.D.

**Group - VWAP**

### Issue: ALTERNATIVES CONSIDERED AND ELIMINATED

**Subject:** A rail alternative was not evaluated thoroughly.

***Response:*** *Rail was considered in the CSDEIS (p. I-22). It pointed out that, "existing rail lines do not provide direct access to the widespread communities and industries in the study area". Also, it states that, "While the existing rail system could be used as a means of freight distribution, use would be limited due to the limited mileage of track and the limited system termini within the region." Finally, it was pointed out in public hearings held on the ASDEIS that CSX Corporation has submitted a petition to abandon over 100 miles of track in the project area.*

### Issue: AIR QUALITY

**Subject:** In the section on air pollution only carbon monoxide is even mentioned, yet it is known that ozone may be in amounts exceeding EPA standards.

***Response:*** *Detailed studies of air quality impacts have been completed as part of the ASDEIS. Based on current, federally approved guidelines and measures, project-related impacts to air quality would be minimal. The results of the air quality analysis are presented in Section III of the ASDEIS (III-133).*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** The DEIS fails to even mention the Eastern Cougar, a federally endangered species listed in the Monongahela Forest Plan and in Virginia's Endangered Species.

***Response:*** *Scheme Option D5 does not have any involvement with any known populations of the Eastern Cougar. Biological assessments and habitat evaluations have been conducted as part of the ASDEIS. Additionally, coordination with the USFWS, MNF, and GWNF resource personnel agree that no such involvement will occur. Biological assessments for endangered species and critical habitat evaluations have been conducted as part of the ASDEIS. The results of these studies are presented in Section III (Vegetation and Wildlife, pp. III-281-III-295, and Threatened and Endangered Species, pp. III-319-III-332). Scheme Option D5 was selected, in part, because of its considerably lower potential for endangered species involvements. Under the alignment development process, impacts to endangered species have been avoided.*

**Issue: COMMENTS AND COORDINATION**

**Subject:** I protest your failure to answer my two previous letters requesting a 6 month's extension of the comment period. Finally, I protest your failure as of this date to notify Virginia residents of the schedule of Virginia hearings.

***Response:*** *The WVDOH extended the comment period to February 20, 1993. The CSDEIS was available for comment for approximately 110 days instead of the required 45 days. Additionally, VDOT notification of the public hearings was in accordance with CEQ (40 CFR 1506.6) and FHWA (23 CFR 777.111 (e), (f), and (h) Regulations.*

**Issue: AFFECTED ENVIRONMENT AND THE ENVIRONMENTAL CONSEQUENCES**

**Subject:** One of its greatest failings is that there is no attempt to evaluate the many negative effects of highways in general with respect to pollution resource depletion in external regions and the encouragement of our growing dependence on foreign oil.

***Response:*** *The affected environment was analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. All Scheme Options were analyzed to a equal level of detail.*

**Subject:** The ecological considerations regarding highways in the DEIS are pathetic. The effects of polluted run-off is dismissed in a cavalier manner by saying that the impact of 14000 vehicles per day will be "minimal" without citing any supporting data.

***Response:*** *The affected environment was analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. The purpose of the Corridor Selection SDEIS was to identify resources within the established 2,000 foot-wide corridors. Detailed analyses of resource impacts have been conducted during the alignment development process. Analyses are based on both direct and secondary and cumulative impacts and include such topics as air, noise, socioeconomics, recreation, water quality, threatened and endangered species, forest fragmentation, biodiversity, visual, and recreation resources.*

## Commentor: Parry, Susan

**Public**

**Issue: CULTURAL RESOURCES**

**Subject:** We were dismayed to find that the Historic and Archaeological Resources Report did not list our property; the report mentioned only the house one mile further west on Route 50.

***Response:*** *Route 50 (Corridor Scheme Option E) is not the preferred corridor. Further details of cultural resource assessments utilizing historic mapping and aerial photography for the purposes of corridor decision between Scheme Option D & E are detailed in Section II of the FEIS.*

## Commentor: Ragette, Bill

**Public**

**Issue: PURPOSE AND NEED**

**Subject:** My main objection is that the Purpose and Needs Section is woefully inadequate and that the No-Build alternative was not fairly considered.

***Response:*** *The Purpose and Need Analysis was established in the Corridor Selection Transportation Needs Study, March 1992. It was included in the approved Corridor Selection SDEIS, October 21, 1992, and the Corridor Selection SDEIS Decision Document of July 26, 1993. The Purpose and Need statement in the Alignment Selection SDEIS referenced the detailed Purpose and Need analysis previously conducted. As stated on p. II-1 of SDEIS, "the Alignment Selection process focuses on the development of the No-Build, the IRA, and the Build Alternatives. In accordance with 40 CFR 1502.14, these three alternatives have been developed to a comparable level of detail to evaluate their merits and impacts.*

## Commentor: Rank, Cindy, President

**Group - WV Highlands Conservancy**

### Issue: TRANSPORATION DEMAND

**Subject:** The Transportation Needs Study is totally inadequate.

***Response:*** *The Purpose and Need Analysis was established in the Corridor Selection Transportation Needs Study, March 1992. It was included in the approved Corridor Selection SDEIS, October 21, 1992, and the Corridor Selection SDEIS Decision Document of July 26, 1993. The Purpose and Need statement in the Alignment Selection SDEIS referenced the detailed Purpose and Need analysis previously conducted.*

### Issue: ALTERNATIVES CONSIDERED AND ELIMINATED

**Subject:** Information in the SDEIS supports our belief that all options along the southern corridor as well as Schemes B and C are totally unacceptable.

***Response:*** *Scheme Option D5 was identified as the preferred corridor, in part, because it avoided many of the environmentally sensitive resources within the corridor-level study area. During the alignment development process, additional efforts were made to avoid sensitive resources.*

### Issue: ALTERNATIVES CONSIDERED FOR ADDITIONAL STUDY

**Subject:** A more fundamental deficiency with the SDEIS is the express bias against the No-Build alternative. An example of this concerns visual experiences.

***Response:*** *As stated on p. II-1 of the ASDEIS, "the Alignment Selection process focuses on the development of the No-Build, the IRA, and the Build Alternatives. In accordance with 40 CFR 1502.14, these three alternatives have been developed to a comparable level of detail to evaluate their merits and impacts. The visual analysis, prepared utilizing the FHWA's Visual Impact Assessment for Highway Projects, indicated no scenic vistas would be destroyed (Alignment Selection SDEIS, pp. II-177 through 230). It did recognize however, that visual impact is highly subjective.*

**Subject:** We are also recommending that the No-Build alternative be re-examined.

***Response:*** *As stated on p. II-1 of the ASDEIS, "the Alignment Selection process focuses on the development of the No-Build, the IRA, and the Build Alternatives. In accordance with 40 CFR 1502.14, these three alternatives have been developed to a comparable level of detail to evaluate their merits and impacts.*

**Issue: VISUAL RESOURCES**

**Subject:** There is no discussion of the visual impact of billboards within each Scheme Option.

***Response:*** *An analysis of the visual impact of billboards was not conducted as part of the alignment development process. The use of billboards along the proposed roadway would be up to the local jurisdictional authorities and property owners. WVDOT has neither the authority nor the ability to prohibit or forecast the use of billboards along its facilities. Billboards may be erected along the highway but placement is subject to local, state and federal laws and regulations.*

**Issue: SECTION 4(f)/6(f)**

**Subject:** The SDEIS Section 4(f)/6(f) Inventory is inadequate.

***Response:*** *The CSDEIS Section 4(f)/6(f) Inventory was analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111). Additional Section 4(f) discussions are provided in Section III-J, and Section IV of the Corridor H FEIS.*

## Commentor: Sayers, John H., Recorder

**Agency - Local**

**Issue: GROUNDWATER**

**Subject:** Our primary concern at this time is that the highway - and the construction necessary to build it - might endanger the mountain aquifer feeding the spring which serves as the Town's (Wardensville) only water supply

***Response:*** *Dye trace studies have been conducted to test the "worst case" scenario that water could rapidly move (within a few hours or days) from the surface of Anderson Ridge into Wardensville Spring or other groundwater supplies in the area (ASDEIS, p. III-90). The dye was introduced in an area where rapid infiltration of water into the subsurface was known to occur. Furthermore, the point where the dye was introduced was in close proximity to Wardensville Spring and was within the identified wellhead protection zone for this spring. Sampling was conducted at Wardensville Spring and at numerous other stations shown in Exhibit III-13 of the ASDEIS. The Wardensville dye trace demonstrated that water from this injection site did not move rapidly from the top of Anderson Ridge into Wardensville Spring or into any other springs in the area. Sampling continued for 14 weeks without any dye recovery from the groundwater system. The ASDEIS specifically recognizes that surface waters recharging Anderson Ridge may reach the Wardensville Spring. As discussed on p. III-95 and 96 of the ASDEIS, care will be exercised during highway construction across the delineated wellhead protection zone for Wardensville Spring.*

**Subject:** The proposed route (D) will take part of the J. Allen Hawkins Community Park and come near to the site of the pump house for our entire water system.

***Response:*** *This Park and pump house will not be impacted by the Preferred Alternative (Sheet 63 of 108 of Alignment Resource Location Plans).*

## Commentor: Seme, Jr., Daniel J., President

**Public**

### Issue: ECONOMIC ENVIRONMENT

**Subject:** After reviewing the DEIS and the WVDOT materials, I am deeply concerned that the Snowshoe/Silver Creek Resort Community and our surrounding County attractions and State Parks were not included in the Corridor H study area.

***Response:*** *Social and economic demands were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. A comprehensive analysis of recreation activities and state parks was included in the ASDEIS, Section III-J.*

## Commentor: Shepherd, Thomas A., Col. USAF (RET)

**Public**

### Issue: ECONOMIC ENVIRONMENT

**Subject:** Who is determining the economic value to the counties involved in this project?

***Response:*** *Results of potential direct secondary economic values of the proposed project are contained in Sections III A and B of the ASDEIS, as well as in the Socioeconomic Technical Report and the Secondary and Cumulative Impacts Technical Report, which has been incorporated by reference into the FEIS.*

### Issue: MISCELLANEOUS

**Subject:** The cost of Corridor H must be addressed in the year dollar that construction will take place. What is this 20% in that year dollars?

***Response:*** *For comparison purposes in the ASDEIS, all construction cost estimates are based on current (1993) dollar values. These values include an additional 15 percent contingency factor, in part, to allow for inflation. To determine construction costs for the entire project based on the year constructed would be difficult because (1) the project will be broken into sections and constructed over a period of years and (2) the order in which the sections would be constructed is not known.*

**Subject:** What is the 20 % (WV contribution) in that years dollars.

***Response:*** *For the reasons noted above, construction cost estimates are based on 1993 dollars. West Virginia's responsibility would be to match 20 percent of the total costs in West Virginia, including right-of-way acquisition and mitigation costs. These costs are detailed by alternative and state in the ASDEIS (pp. II-93-II-96).*

### Commentor: Slimak, Michael W.

**Public**

#### Issue: PROJECT HISTORY AND STATUS

**Subject:** The SDEIS indicates that the project was put on hold in 1984, Why? Why was the project resumed in 1990?

***Response:*** *A primary issue in 1984 was the potential impact of the project on National Recreation Areas in addition to funding. Environmental guidelines and regulations applied to the original 1981 DEIS have undergone substantial regulatory and procedural changes. The project was resumed in 1990 based on the continued need to complete the highway.*

#### Issue: ALTERNATIVES CONSIDERED AND ELIMINATED

**Subject:** Other corridor alignments should be considered.

***Response:*** *WVDOH studied many alternatives before carrying forward the schemes contained in the CSDEIS. The CSDEIS evaluated 24 different Build Alternatives along with the No-Build Alternative. All Build-Alternatives met the overall project purpose and need. The decision process (as detailed in the Corridor H Corridor Selection SDEIS Decision Document) took into account three issues: transportation need; environmental resources; and public involvement. WVDOH chose Scheme Option D5 as the selected corridor for further analysis based on the analysis of these factors*

#### Issue: RECREATION RESOURCES

**Subject:** The construction of Corridor H through the GWNF seems to be inconsistent with the GWNF Management Plan, which has significantly changed.

***Response:*** *Construction of the Preferred Alternative though the northern end of the GWNF would not pass through any Management Areas designated as 4(f) or remote or isolated Management Areas. The impact of the Preferred Alternative is limited to the perimeter of the GWNF and is considered to be minor (ASDEIS, p. III-169).*

**Issue: SECONDARY AND CUMULATIVE IMPACTS**

**Subject:** The SDEIS is woefully inadequate in addressing the secondary impacts associated with the various alignment schemes.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

## Commentor: Stout III, Dr. Ben M.

**Public**

**Issue: LAND USE**

**Subject:** The land use information fails to consider abandoned mine lands.

***Response:*** *For the alignment development process, land use information was based on current aerial photos and current USGS digital land use files. These sources identified abandoned mine lands. Impacts to abandoned mine lands are presented in the ASDEIS (p. III-509).*

**Issue: WATER RESOURCES**

**Subject:** All streams were designated as high quality or better, when in reality many of the streams along the northern route are impacted by acid mine drainage.

***Response:*** *Detailed stream studies have been conducted as part of the alignment development process. The results of the studies are summarized in the ASDEIS (pp. III-409-III428). Additionally, the ASDEIS Streams Technical Report provides additional details for the stream analysis.*

**Subject:** I don't see the point of counting stream crossings. I am surprised at the lack of qualitative data regarding stream water quality.

***Response:*** *The stream crossing information presents valid points. This information has been taken into consideration during the stream analysis conducted for the alignment development process. All stream involvements were sampled for water quality, as well as habitat suitability. Habitat suitability methodology was based on EPA Rapid Bioassessment protocol. The results are presented in Section III-R of the ASDEIS.*

**Issue: WETLANDS**

**Subject:** Wetlands need better quantification, particularly in addressing the alignment DEIS.

***Response:*** *Wetlands were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Analysis of existing wetlands and impacts to wetlands as a result of the proposed action followed guidelines found in FHWA T.A. 6640.8A and other recognized and accepted environmental impact assessment methodologies as described in the ASDEIS at p. III-333 (wetlands). Detailed information on this issue, as required by FHWA T.A. 6640.8A, is referenced in the ASDEIS Wetlands Technical Report.*

**Subject:** The wetland banking concept, as presented, should be dropped.

***Response:*** *As agreed upon by the EPA (Exhibit VII-12, ASDEIS), wetlands will be mitigated at two separate locations. One within the Monongahela River drainage and one within the Potomac River basin. Additionally, wetland compensation was agreed upon to be 1:1 for both Open Water and Palustrine Emergent wetlands and 3:1 for Palustrine Forested and Shrub/Scrub wetlands.*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** Land use and forest fragmentation analysis were conducted on information collected sixteen years ago. Sixteen years is a long time in terms of forest succession and changing land use patterns. The forest fragmentation data and analysis are scientifically misleading.

***Response:*** *Forest fragmentation has been considered in detail in the ASDEIS, as well as the FEIS, Section III-O.*

**Issue: CONSTRUCTION**

**Subject:** While I would encourage the use of Best Management Practices, I think a project of this scale needs to go further in reducing siltation to streams and wetlands.

***Response:*** *Surface water resources were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. A more complete and site-specific discussion of erosion and sedimentation control measures has been included in the Corridor H FEIS Mitigation Document. The document identifies sensitive watersheds and the commitment of WVDOH to utilize advanced erosion and sedimentation control measures.*

**Issue: AFFECTED ENVIRONMENT AND THE ENVIRONMENTAL CONSEQUENCES**

**Subject:** Greatest weakness in the corridor SDEIS is the lack of sufficient, up-to-date natural resource data and means of data analysis.

***Response:*** *Information collected during the ASDEIS is considered up-to-date. Up-to-date aerial photos were transferred into a GIS system and used as baseline mapping. A relational database (GIS system) was then developed by relating resource information (e.g. critical habitat, field verified wetlands, cultural resources, NWI wetlands, NRWs, high quality streams, karst regions, springs, etc.), to the alignments.*

**Subject:** Many of the problems associated with natural resource involvement could be solved using advanced GIS technology and up-to-data from remote sensing and ground truthing.

***Response:*** *Up-to-date aerial photos were transferred into a GIS system and used as baseline mapping. A relational database( GIS system) was then developed by relating resource information (e.g. critical habitat, field verified wetlands, cultural resources, NWI wetlands, NRWs, High quality streams karst regions, springs, etc.), to the alignments. Information collected during the ASDEIS is considered up-to-date.*

**Subject:** Air and noise analysis are totally lacking from the document.

***Response:*** *Detailed air and noise impact analyses have been conducted; the results of which are summarized in the ASDEIS (pp. III-129-III-158) and detailed in the referenced Air and Noise Technical Report.*

## Commentor: Sullivan, Charles E., CABP, PAW

**Group - CABP**

**Issue: MISCELLANEOUS**

**Subject:** Momentous decisions made by the designers of the Corridor H project are based solely upon economic and engineering criteria, while ignoring biological and ecological imperatives.

***Response:*** *The CSDEIS evaluated 24 different Build Alternatives along with the No-Build Alternative. All Build-Alternatives met the overall project purpose and need. The decision process (as detailed in the Corridor H Corridor Selection SDEIS Decision Document (July 26, 1993) took into account three issues: transportation need; environmental resources; and public involvement. As detailed in Table S-2 (CSDEIS) and Table S-2 (ASDEIS) environmental issues were considered throughout the decision making process. The selection of Scheme Option D5 was partially based on its avoidance of involvements with sensitive recreational resources (Corridor Selection SDEIS Decision Document, p. 26).*

**Issue:** **AFFECTED ENVIRONMENT AND THE ENVIRONMENTAL CONSEQUENCES**

**Subject:** We are primarily concerned about the detrimental effects roads have upon complex ecosystems.

***Response:*** *The ASDEIS analyzed many factors of the environment at both the regional and local ecosystem level scale. These issues are discussed throughout the ASDEIS (Section III). The topic of conservation biology or biodiversity issues have been addressed as part of the alignment selection process. Dr. Pauley addressed conservation biology issues surrounding the Cheat Mountain salamander for the ASDEIS (pp. III-320-III-324). Additionally analysis of forest fragmentation, neotropical migrants, biodiversity, and wildlife mortality are discussed (ASDEIS, pp. III-278-318). Wetland isolation and landscape ecology is discussed (ASDEIS, pp. III-371-III-374). These issues are addressed in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of a FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

## Commentor: Swanson, Robert W.

**Public**

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**Issue:** **PURPOSE OF AND NEED**

**Subject:** Although improvement in transportation in the area may be an important economic element for growth, it is far from the sole factor limiting such.

***Response:*** *Comment noted.*

## Commentor: Swecker, William D.

**Public**

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**Issue:** **MODAL INTERRELATIONSHIPS**

**Subject:** The SDEIS does not acknowledge that old Route 48 or Interstate 68 exists.

***Response:*** *Both Route 48 and Interstate 68 are identified in Exhibit I-2 and Exhibit I-4 of the CSDEIS. Additionally, Interstate 68 is discussed on p. I-13 of the CSDEIS.*

**Issue: ALTERNATIVES CONSIDERED AND ELIMINATED**

**Subject:** The SDEIS does not acknowledge that a seven mile section of Scheme A is already constructed and that the Elkins By-Pass has already been funded.

***Response:*** *This issue is acknowledged in both the Corridor H Corridor Selection Transportation Needs Study (p. I-3) and the Corridor H Corridor Selection SDEIS Decision Document (July, 1993, p. 17 and 23).*

**Issue: MISCELLANEOUS**

**Subject:** Request that all construction cost estimates be honestly reviewed and modified if necessary.

***Response:*** *Construction costs are detailed in the ASDEIS (pp. II-93-II-96). Costs of right-of-way acquisition were developed in accordance with methods used by WVDOH and VDOT (ASDEIS, p. II-93). Construction costs were based on average unit prices. Table II-11 (ASDEIS) identifies preliminary construction costs and Table II-12 (ASDEIS) identifies right-of-way acquisition and mitigation costs for the alternatives considered in the ASDEIS.*

## Commentor: Torrence, Paul F., Conservation Chair Federal Issues

**Group - Sierra Club**

**Issue: CAPACITY AND LEVEL OF SERVICE**

**Subject:** This project would cause a significant increase in traffic volume either headed to destinations in the area or passing through on its way east or west.

***Response:*** *Volumes of through traffic have been projected for all alternatives including the No-Build (FEIS, Section II).*

## Issue: ALTERNATIVES CONSIDERED AND ELIMINATED

**Subject:** The SDEIS has not given adequate consideration to the "no-build" and alternatives which would upgrade existing roads. .

***Response:*** *The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines. The CSDEIS (October 21, 1992) dismissed all Study Corridors except Corridor D5 from further consideration in the Alignment SDEIS. The alternative of improving local roads where feasible to meet design criteria for the IRA resulted in unavoidable environmental and cultural resource impacts. The IRA in the ASDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, are discussed in the Decision Document under Section E (p. 35 and 36).*

## Issue: BIODIVERSITY

**Subject:** Failure of the SDEIS is the lack of appropriate expertise in areas critical for the kinds of environmental changes at stake here. Little credence can be given to this SDEIS until the project has been scrutinized by experts in conservation biology.

***Response:*** *Although conservation biology was not specifically addressed in the 1992 CSDEIS, the areas of endangered species, special botanical sites, and remote habitat were; all of which are components of conservation biology. The topic of conservation biology or biodiversity issues have been addressed as part of the alignment selection process. Dr. Pauley addressed conservation biology issues surrounding the Cheat Mountain salamander for the ASDEIS (pp. III-320-III-324). Additionally analysis of forest fragmentation, neotropical migrants, biodiversity, and wildlife mortality are discussed (ASDEIS, pp. III-278-318). Wetland isolation and landscape ecology is discussed (ASDEIS, pp. III-371-III-374). These issues are addressed in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of a FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Issue: SECONDARY AND CUMULATIVE IMPACTS**

**Subject:** Cumulative impacts have not been adequately addressed in this document.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Issue: AFFECTED ENVIRONMENT AND THE ENVIRONMENTAL CONSEQUENCES**

**Subject:** Construction of a four lane highway with partial control of access cannot proceed without an unacceptably high level of environmental damage.

***Response:*** *Comment noted.*

**Subject:** SDEIS has failed to adequately analyze long term effects of this construction on the biological and ecological health of the Central Appalachian Region.

***Response:*** *The affected environment was analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. The secondary effects (p. III-210, CSDEIS) discussed in this section deal with short-term construction impacts in relation to long-term productivity. The proposed project is classified as a long-term productive facility. Issues dealing with secondary effects of the proposed action are analyzed in a comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Subject:** Based upon a large base of ecological and conservation biology literature, negative effects will result from the further development and fragmentation of the lands in West Virginia and elsewhere.

***Response:*** *The ASDEIS analyzed many factors of the environment at both the regional and local ecosystem level scale. These issues are discussed throughout the ASDEIS. The topic of conservation biology or biodiversity issues have been addressed as part of the alignment selection process. Dr. Pauley addressed conservation biology issues surrounding the Cheat Mountain salamander for the ASDEIS (pp. III-320-III-324). Additionally, analysis of forest fragmentation, neotropical migrants, biodiversity, and wildlife mortality are discussed (ASDEIS, pp. III-278-318). Wetland isolation and landscape ecology is discussed (ASDEIS, pp. III-371-III-374). These issues are addressed in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of a FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

### Commentor: Webb, Rick, Research Scientist

**Public**

**Issue: WATER RESOURCES**

**Subject:** There is a high probability that acidic drainage will be generated from borrow and fill areas that involve rock material of the Allegheny, Pottsville, Pocono, and Milboro geologic formations.

***Response:*** *The potential for project-related acid drainage due to construction disturbance has been evaluated as part of the alignment development process. The results of the analysis are provided in the Corridor H FEIS Mitigation Document.*

### Commentor: Wimmer, Mary J., Public Lands Chair

**Group - Sierra Club**

**Issue: DESIGN ELEMENTS AND COSTS**

**Subject:** Although you point out on p.III-12 that mitigation costs are not included, you have not provided the public with some type of estimation as to which route options would require the highest mitigation costs.

***Response:*** *An estimate of these costs is provided in the ASDEIS Summary Section (p. II-93).*

**Issue: LAND USE**

**Subject:** p. III-23, Table III-9: Where do D and E directly impact a M.P. 8.0 Area? Are not these areas (Big Run Bog, Fernow) outside the corridor and generally avoidable?

***Response:*** *Impacts to both of these resources have been avoided in the alignment selection phase.*

**Subject:** Page III-24: I believe you are in error saying that Schemes D and E will encroach on any of the 6.2 Areas of the Monongahela National Forest (MNF). Do these schemes not avoid impacts here?

***Response:*** *The Preferred Alternative avoids impacts to MNF Management Prescription Areas designated as 6.2.*

**Issue: AIR QUALITY**

**Subject:** The air quality section (III-62-64) is not adequate.

***Response:*** *Detailed studies of air quality impacts have been completed as part of the ASDEIS. Based on current, federally approved guidelines and measures, project-related impacts to air quality would be minimal. The results of the air quality analysis are presented in Section III of the ASDEIS (III-133).*

**Issue: NOISE**

**Subject:** The evaluation of noise impacts (III-65-71) is wholly inadequate in view of the modern noise impact studies that exist today for impacts to wildland resources.

***Response:*** *A detailed noise impact analysis has been conducted as part of the ASDEIS (ASDEIS, III-137-III-158). The results of the analysis are presented in the ASDEIS (III-140-III-150) and in the Air, Noise, and Energy Technical Report prepared in conjunction with the ASDEIS.*

**Subject:** Your edge-of-the-pavement evaluations do not take into account the long distances noise can travel in land with the ridge and valley topography of the study area.

***Response:*** *The noise analysis performed in the ASDEIS was a worst case analysis that did not include any natural barriers which made for a conservative estimate. Areas that were found to warrant noise abatement considerations based on the conservative analysis were then reanalyzed for noise abatement in greater detail, which included the topographical features of the area. The results of the analysis are presented in the ASDEIS (III-140-III-150) and in the Air, Noise, and Energy Technical Report prepared in conjunction with the ASDEIS.*

**Subject:** Why should noise levels be allowed to change above natural background (to the FHWA level of 55 dBA) in Wilderness Areas?

***Response:*** *Otter Creek Wilderness is located more than 2 miles from the selected corridor (D5). The noise contribution from the roadway is predicted to be approximately 37 dBA without including the intervening terrain. Dolly Sods, located more than 8 miles from the selected corridor, has a predicted roadway contribution of approximately 28 dBA without the intervening terrain.*

**Subject:** We recommend that the noise impact section be totally re-done.

***Response:*** *A detailed noise impact analysis has been conducted as part of the ASDEIS (ASDEIS, III-137-III-158). The results of the analysis are presented in the ASDEIS (III-140-III-150) and in the Air, Noise, and Energy Technical Report prepared in conjunction with the ASDEIS.*

**Issue: WATER RESOURCES**

**Subject:** On p. III-203, you make it sound as though all the fishing in the project area requires fish stocking and that is certainly not true. This section must be changed and expanded to be accurate.

***Response:*** *p. III-203 of the CSDEIS does not discuss public hunting and/or fishing areas in relation to stream water quality but in regards to recreational resources within the affected environment. Surface water resources were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Detailed water quality analyses have been conducted as part of the ASDEIS. Water quality impact analyses have included public water, groundwater, watersheds, streams, wild and scenic rivers, and water quality as it relates to secondary and cumulative impacts. The results of the analyses are presented in Section III (pp. III-403-III-480) of the ASDEIS and the accompanying Streams Technical Report.*

**Subject:** We support the proposal by Dr. Ben Stout of Wheeling Jesuit College concerning the "use" of highway construction to mitigate acid mine drainage into Beaver Creek if the northern alternative is chosen.

***Response:*** *Comment noted.*

**Issue: WETLANDS**

**Subject:** III-96, Exhibit III-7: Error. "Big Bog Run" should be "Big Run Bog."

***Response:*** *This has been noted and corrected.*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** You have not thoroughly evaluated what superhighway access does to remote recreation lands, well documented in the recreation literature.

***Response:*** *The Corridor Selection SDEIS discusses involvements with the MNF on p. III-204. The selection of Scheme Option D5 was partially based on its avoidance of involvements with sensitive recreational resources (Corridor Selection SDEIS Decision Document, p. 26). There are also discussions of recreation resource use on p. III-203 of the Corridor Selection SDEIS and on p. III-162 of the ASDEIS. Additionally, predictive models utilized for the Alignment Selection SDEIS did not identify any impacts to the Laurel Fork Wilderness Areas or the Otter Creek Wilderness Area. However, as stated in the Corridor Selection Transportation Needs Study (March 1992, pp. III-16-III-17), the primary access routes which provide linkage from I-81 in Virginia to the recreational resources of the region are generally substandard. Recreational demand will likely increase, but existing highway deficiencies may deter prospective tourism. As projected traffic volumes increase on these routes, access and mobility will further deteriorate. Such a trend will likely discourage non-residents from traveling to the region.*

**Subject:** On p. III-123, your discussion of Wildlife mitigation totally ignores the proper functioning of an ecosystem.

***Response:*** *In conjunction with the WVDOH and other cooperating agencies, a terrestrial habitat mitigation plan has been developed. That plan is contained in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: WILD AND SCENIC RIVERS**

**Subject:** III-131, Section P, line 4 down: Typo. Should be "National" not "Nation" Forest.

***Response:*** *This has been corrected.*

**Subject:** The study rivers for possible Wild and Scenic River designation DO have a formal administrative status.

***Response:*** *Comment noted. Wild and Scenic Rivers and potential designation status of river segments on the Nationwide Rivers Inventory have been identified for Scheme Option D5. A review of these water bodies and potential impacts has been prepared as part of the alignment development process. The results of the analysis are presented in the ASDEIS (p. III-481-III-493).*

**Subject:** Exhibit III-10 does not show a number of the study rivers, e.g. Laurel Fork, Seneca Creek, Red Creek, Otter Creek (only shows NRI rivers).

***Response:*** *Comment noted. Exhibit III-10 of the CSDEIS has been revised in the ASDEIS (Exhibit III-56) to include this information where applicable.*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** We support the U.S. Fish and Wildlife Service and the WV DNR T&E Species personnel relative to evaluating the T&E Species Section.

***Response:*** *Comment noted.*

**Issue: RECREATION RESOURCES**

**Subject:** There should be a technical document on the Outdoor Recreation resources involved in this study.

***Response:*** *A discussion of recreational resources is included in the ASDEIS (pp. III-159-III-176) as well as the Socioeconomic Technical Report, which has been incorporated by reference into the ASDEIS.*

**Issue: SECTION 4(f)/6(f)**

**Subject:** We strongly disagree with your not designating Otter Creek and Dolly Sods Wilderness Areas as 4(f) Areas.

***Response:*** *It is stated on p. IV-19 of the CSDEIS that Management Prescription (MP) Areas 6.2 and 5 are considered 4(f) resources. Additionally, p. IV-2 of the ASDEIS also states that MP 6.2 and 5 qualify as 4(f) resources. The ASDEIS states that these resources will not be impacted by the Preferred Alternative. The CSDEIS also states that, at the corridor level stage, no impacts to these resources will occur.*

**Subject:** Table IV-1 is in error. M.P. 6.2 Areas are impacted by all the options of Subschemes A.

***Response:*** *Comment noted. The selection of Scheme Option D5 was partially based on its avoidance of involvements with sensitive recreational resources (Corridor Selection SDEIS Decision Document, p. 26).*

**Subject:** Exhibit IV-1 is in error. The Laurel Fork 6.2 Area is missing (actually, it is called 6.1). Also missing and critical to include are the Otter Creek and Dolly Sods Wilderness Areas.

***Response:*** *Comment noted. The selection of Scheme Option D5 was partially based on its avoidance of involvements with sensitive recreational resources (Corridor Selection SDEIS Decision Document, p. 26).*

**Subject:** Error, p. IV-20, top: Schemes D and E do avoid all direct impacts to M.P. 6.2 Areas. Need to add on p. IV-24 that Subscheme K severely impacts M.P. 6.2 (Canaan Mountain).

***Response:*** *Comment noted. These issues have been revised in the ASDEIS. The Preferred Alternative avoids MP 6.2 areas.*

**Issue: FOREST FRAGMENTATION**

**Subject:** The discussion of Forest Fragmentation and its subsequent use does not reflect modern forest ecosystem management.

***Response:*** *An analysis forest fragmentation is included in the ASDEIS (pp. III-295-III-313) as well as the FEIS. Additionally, the referenced Vegetation and Wildlife Habitat Technical Report provides a detailed analysis of the summarized results in the ASDEIS. This issue is also discussed in the terrestrial habitat mitigation section of the Corridor H FEIS Mitigation Document.*

**Issue: GROUNDWATER**

**Subject:** Page III-91: Need to add more on groundwater mitigation.

***Response:*** *The ASDEIS discuss this issue (pp. III-87-III-128). A more detailed discussion of impacts and mitigation measures is provided in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: AFFECTED ENVIRONMENT AND THE ENVIRONMENTAL CONSEQUENCES**

**Subject:** You have not assessed the "Affected Environment" in terms of the wildland resources.

***Response:*** *The affected environment was analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. The purpose of the Corridor Selection SDEIS was to identify resources within the established 2,000 foot-wide corridors. Detailed analyses of resource impacts have been conducted during the alignment development process. Analyses are based on both direct and secondary and cumulative impacts and include such topics as air, noise, socioeconomics, recreation, water quality, threatened and endangered species, forest fragmentation, biodiversity, visual, and recreation resources.*

**Subject:** Visual and noise impacts can not be restricted to the actual road right-of-way and may impact many more acres than even the entire 2000 foot wide corridor.

***Response:*** *The purpose of the Corridor Selection SDEIS was to identify resources within the established 2,000 foot-wide corridors. Detailed analyses of resource impacts have been conducted during the alignment development process. Analyses are based on both direct and secondary and cumulative impacts and include such topics as air, noise, socioeconomics, recreation, water quality, threatened and endangered species, forest fragmentation, biodiversity, visual, and recreation resources.*

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# Corridor Selection SDEIS -

# Public Hearing Comments and Responses

## Commentor: Bryant, Perry

**Public**

**Issue: ALTERNATIVES CONSIDERED**

**Subject:** A far more serious deficiency within the Draft EIS, I believe, was the bias toward Build.

***Response:*** *Both build and no build alternatives were developed to a comparable level of detail in both the CSDEIS and ASDEIS to evaluate their merits (CSDEIS, p. II-7) as required by CEQ Regulations (40 CFR 1502.14).*

**Issue: SOCIAL ENVIRONMENT**

**Subject:** The other major deficiency that I found is one that's been commented on already; it's a social and human impact that is not adequately considered.

***Response:*** *Social and economic studies were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Additionally, a detailed socioeconomic analysis (ASDEIS Socioeconomic Technical Report) was conducted for the alignment selection phase of this tiered process (ASDEIS, pp. III-1-III-75).*

**Issue: CULTURAL RESOURCE**

**Subject:** I'm also concerned with the impact on National Registry sites. All of these are very legitimate concerns and need to be addressed if Corridor H is to be built.

***Response:*** *Issues concerning proposed mitigation strategies for identified sites within the Corridor H Project Area, as part of the ongoing Section 106 process, are discussed in the Programmatic Agreement (FEIS, Vol. II, Appendix B).*

**Issue: MNF MANAGEMENT PRESCRIPTIONS**

**Subject:** The other area that I think needs additional attention in terms of 6.2 areas is the North Fork Mountain Hopewell 6.2 area. This is not a minor impact, as Table 4-3 would indicate.

***Response:*** *Table IV-3 of the CSDEIS identifies known or potential Section 4(f) resources (MNF MP 6.2) and potential corridor involvement. A minor impact is defined in this table as where a corridor involves MNF MP 6.2 land but is located along the perimeter of the tract (CSDEIS, p. IV-17). A major impact is where a corridor directly bisects a continuous tract of MNF 6.2 land. Selection of Scheme Option D5 avoids impacts to MNF MP 6.2 lands.*

**Subject:** Basically, what I am saying is 6.2 areas should be considered 4-f areas and road construction prohibited in both of those areas that I mentioned.

***Response:*** *It is stated on page IV-19 of the CSDEIS that Management Prescription (MP) Areas 6.2 and 5 are considered 4(f) resources. Additionally, page IV-2 of the ASDEIS also states that MP 6.2 and 5 qualify as 4(f) resources. The ASDEIS states that these resources will not be impacted by the preferred alternative. The CSDEIS also states that, at the corridor level stage, no impacts to these resources will occur.*

## Commentor: Buettner, Henry

**Public**

### Issue: COMMENTS AND COORDINATION

**Subject:** I would like to comment on the time frame that has been allowed; the ten days to make comments. I think that needs to be lengthened a little bit.

***Response:*** *The WVDOH extended the comment period to February 20, 1993. The CSDEIS was available for comment for approximately 110 days instead of the required 45 days.*

## Commentor: Coogan, Tony

**Public**

### Issue: LAND USE

**Subject:** Shenandoah County has a comprehensive plan and I attended the proposals for the plan and there is no mention at all of Corridor H in Shenandoah county's plan.

***Response:*** *Shenandoah's Comprehensive Plan is discussed in the ASDEIS (p. III-46).*

### Issue: SOCIAL ENVIRONMENT

**Subject:** Page 30 (population characteristics, densities per square mile) these figures were compiled based on the 1983 census. Why isn't the '91 census involved?

***Response:*** *There was no census in 1991. The 1990 census data was not available when the CDEIS was completed. The 1990 census was utilized in the ASDEIS.*

**Commentor: Downey, Dan**

**Public**

**Issue: WATER RESOURCES**

**Subject:** I haven't seen anything in the literature about the impact on the Lost River area, except for just a few sketchy remarks. Lost River is a very, very unique natural resource.

***Response:*** *Surface water resources were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Detailed water quality analyses have been conducted on this resource as part of the ASDEIS. Water quality impact analyses have included public water, groundwater, watersheds, streams, wild and scenic rivers, and water quality as it relates to secondary and cumulative impacts. The results of the analyses are presented in Section III (pp. III-403-III-480) of the ASDEIS and the accompanying Streams Technical Report which has been incorporated by reference into the ASDEIS.*

**Commentor: Farley, Bryant**

**Public**

**Issue: BUILD ALTERNATIVES AND CORRIDOR SCHEME OPTIONS**

**Subject:** We do believe that the KP Sub-scheme is a very viable option.

***Response:*** *The KP Sub-scheme was adopted to avoid impacts to the Town of Montrose.*

**Commentor: Gillispie, Rick**

**Public**

**Issue: ALTERNATIVES CONSIDERED AND ELIMINATED**

**Subject:** I would submit that the Southern Route would eliminate more fatalities. It covers routes that have a higher accident rate.

***Response:*** *The southern route, Scheme Options A, would also provide the most direct economical route from Elkins to I-81 at Strasburg and satisfy all transportation-related needs (Corridor Selection Decision Document, July 26, 1993; page 25). However, Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (page 37), the WVDOH intends to avoid all known Section 4(f) properties, and to minimize involvements with other environmental factors such as critical habitat for endangered species, floodplains, remote habitat, wild and scenic rivers, and National Recreation Areas.*

## Commentor: Haas, Jim

**Public**

### Issue: RECREATION RESOURCES

**Subject:** After reviewing the DEIS and the WVDOT materials, I am deeply concerned that the Snowshoe/Silver Creek Resort Community and our surrounding County attractions and State Parks were not included in the Corridor H study area.

***Response:*** *the demands on recreational resources were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations.*

## Commentor: Harman, Robert L.

**Public**

### Issue: BUILD ALTERNATIVE AND CORRIDOR SCHEME OPTIONS

**Subject:** The selection of Scheme A or the Southern Route will improve emergency response times and access to multiple health care facilities, which I just named.

***Response:*** *The southern route, Scheme Options A, would also provide the most direct economical route from Elkins to I-81 at Strasburg and satisfy all transportation-related needs (Corridor Selection Decision Document, July 26, 1993; page 25). However, Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (page 37), the WVDOH intends to avoid all known Section 4(f) properties, and to minimize involvements with other environmental factors such as critical habitat for endangered species, floodplains, remote habitat, wild and scenic rivers, and National Recreation Areas.*

### Issue: SOCIAL ENVIRONMENT

**Subject:** The SDEIS lists health care facilities and services within the study area. Missing from this list is the Love Memorial Clinic and Hardy County Medical Services, both of which are located here in Moorefield.

***Response:*** *The expressed comments and concerns on the development of Corridor H have been noted and taken into consideration during the alignment development process. These facilities have been taken into account throughout the alignment development process. These health care facilities are not impacted by the Preferred Alternative in West Virginia.*

**Subject:** Nursing homes that are located within the five counties are missing. There are a variety of concerns that need to be considered when looking at the routing of Corridor H; and one of these concerns, I feel, is the provision of health care services.

***Response:*** *The expressed comments and concerns on the development of Corridor H have been noted and taken into consideration during the alignment development process. These facilities have been taken into account throughout the alignment development process. These facilities are not impacted by the Preferred Alternative in West Virginia.*

## Commentor: Hendricks, Dennis

**Public**

### Issue: COMMENTS AND COORDINATION

**Subject:** I would like to publicly request a six month extension to the public comment period in order to study the Draft Environmental Impact Study and the supporting documents.

***Response:*** *The WVDOH extended the comment period to February 20, 1993. The CSDEIS was available for comment for approximately 110 days instead of the required 45 days.*

## Commentor: Jones, Jack

**Agency - USFWS**

### Issue: ALTERNATIVES CONSIDERED AND ELIMINATED

**Subject:** It is my belief that total avoidance of this area is the only way to fully assure the integrity of the North Spring and Hatchery's Trout Program.

***Response:*** *Scheme Option D5, and the alignments developed within, would avoid the Bowden Fish Hatchery.*

## Commentor: Kotcon, James

**Group - Sierra Club**

### Issue: ALTERNATIVES CONSIDERED AND ELIMINATED

**Subject:** The SDEIS indicates that the IRA was not given detailed consideration, and improved roadway could well achieve many of the transportation driven goals of Corridor H without the dramatic environmental and economic cost associated with the southern routes. I urge that the final Environmental Impact Statement provide detailed consideration of the improved roadway alternatives, and that in no case should southern corridors be selected for Corridor H.

***Response:*** *The Improved Roadway Alternative in the Alignment Selection SDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; page 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (page 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative in West Virginia. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, are discussed in the Decision Document under Section E (pages 35 and 36).*

### Issue: BUILD ALTERNATIVES AND CORRIDOR SCHEME OPTIONS

**Subject:** The needs section for the southern routes simply is not adequate, and it has not been adequately demonstrated in this document.

***Response:*** *The Purpose and Need Analysis was established in the Corridor Selection Transportation Needs Study, March 1992. It was included in the approved Corridor Selection SDEIS, October 21, 1992, and the Corridor Selection SDEIS Decision Document of July 26, 1993. The Purpose and Need statement in the Alignment Selection SDEIS referenced the detailed Purpose and Need analysis previously conducted. Additionally, Scheme Option D5 was identified as the preferred corridor, in part, because it would minimize impacts to environmentally sensitive resources.*

**Subject:** The environmental impacts identified along those southern corridors are simply unacceptable and are not adequately justified by the transportation system improvements identified in the document.

***Response:*** *The CSDEIS evaluated 24 different Build Alternatives along with the No-Build Alternative. All Build-Alternatives met the overall project purpose and need. The decision process (as detailed in the CSDEIS Decision Document (July 26, 1993)) took into account three issues: transportation need; environmental resources; and public involvement. As detailed in Table S-2 (CSDEIS) and Table S-2 (ASDEIS) environmental issues were considered throughout the decision making process. The selection of Scheme Option D-5 was partially based on its avoidance of involvements with sensitive recreational resources (Corridor Selection SDEIS Decision Document, p. 26).*

### Commentor: Lind, Lester

**Public**

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**Issue: ECONOMIC ENVIRONMENT**

**Subject:** The DEIS states that regional economic planning specialists agree that improving east/west access mobility to Corridor H would open markets to the East Coast and Midwest business and tourism. There was no public input on this issue found in the SDEIS.

***Response:*** *An extensive series of public meetings were held throughout the project area for both the CSDEIS and ASDEIS (Section VII of both SDEIS's). Information concerning these public meetings is included in the Section VII of both documents. The affected environment was analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. The ASDEIS (III-1-III-75) provides a comprehensive baseline economic and social environment within the project area. The analysis was performed in accordance with FHWA T.A. 6640.8A. With respect to coordination with the public, regional and local and community planning authorities, a number of meetings took place throughout the corridor and alignment development process (ASDEIS Table VII-1). Meetings with representatives of Grant County Development Authority, Region VIII Planning and Development Council, Lord Fairfax Planning District, Tucker County, Hardy County, and Garrett County Planning Departments, were held at various times during the alignment development process. In addition, a number of meetings were held with the Virginia Advisory Committee.*

## Commentor: Marcus, Matt

**Public**

### Issue: RECREATION RESOURCES

**Subject:** After reviewing the SDEIS, the construction of Corridor H would negatively impact our limited recreational resources. The severity of this impact will depend on which route is chosen.

***Response:*** *Comment noted. WVDOH's selection of Corridor D5 as detailed in the Corridor H Corridor Selection Decision Document (July, 1993) avoids impacts to many sensitive resources. Additionally, a comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

**Subject:** The SDEIS does not sufficiently address the value of all of our recreational corridors. These important corridors include the Coast-to-Coast American Discovery Trail, the Allegheny Trail and the Blackwater Cannon Railroad Gray Trail and many others.

***Response:*** *The ASDEIS discusses involvement with trails on pages III-170-III-176. General mitigation measures for impacts to existing trails are detailed in the ASDEIS (pp. III-174-III-176). As part of this mitigation strategy for trails, it is the intent of the WVDOH to maintain coordination with the National Park Service to assure replacement routes if necessary.*

## Commentor: McKeown, Bonnie

**Public**

### Issue: COMMENTS AND COORDINATION

**Subject:** Requesting a 60-day extension of the comment deadline for Corridor H. That's because they have been very late in getting these reports out to people.

***Response:*** *The WVDOH extended the comment period to February 20, 1993. The CSDEIS was available for comment for approximately 110 days instead of the required 45 days.*

**Issue: AFFECTED ENVIRONMENT AND THE ENVIRONMENTAL CONSEQUENCES**

**Subject:** Secondly, if it is a regional highway, the Highway Department should have studied regional impacts, not just those in the 2,000-foot corridor.

***Response:*** *The Corridor H NEPA analysis followed the CEQ (40 CFR 1508.28) and FHWA (23 CFR 777.111) regulations for tiered NEPA documents. In part, these regulations state that the first tier of analysis should deal with broad, general issues. In the Corridor H NEPA process, the first tier included the Corridor Selection Transportation Needs Study (March, 1992) and the CSDEIS (January, 1993). The second tier of the NEPA process, requires the consideration of narrower, alignment specific impacts to the affected environment. A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS.*

## Commentor: Orndoff-Sayers, Elizabeth W.

**Public**

**Issue: GROUNDWATER**

**Subject:** Nowhere in the report does it take into consideration the town's water. The water tower is not mentioned nor is the impact to the ground water supply. The town park is not mentioned. It is a community park.

***Response:*** *Details regarding these issues (Wardensville's water supply) are contained in the ASDEIS (pp. III-80 to III-96). Dye trace studies have been conducted to test the "worst case" scenario that water could rapidly move (within a few hours or days) from the surface of Anderson Ridge into Wardensville Spring or other groundwater supplies in the area (ASDEIS, p. III-90). The dye was introduced in an area where rapid infiltration of water into the subsurface was known to occur. Furthermore, the point where the dye was introduced was in close proximity to Wardensville Spring and was within the identified wellhead protection zone for this spring. Sampling was conducted at Wardensville Spring and at numerous other stations shown in Exhibit III-13 of the ASDEIS. The Wardensville dye trace demonstrated that water from this injection site did not move rapidly from the top of Anderson Ridge into Wardensville Spring or into any other springs in the area. Sampling continued for 14 weeks without any dye recovery from the groundwater system. The ASDEIS specifically recognizes that surface waters recharging Anderson Ridge may reach the Wardensville Spring. As discussed on p. III-95 and 96 of the ASDEIS, care will be exercised during highway construction across the delineated wellhead protection zone for Wardensville Spring. Finally, the Preferred Alternative will make no use of the J. Allen Hawkins Community Park.*

## Commentor: Pancake , David

**Public**

**Issue: ECONOMIC ENVIRONMENT**

**Subject:** The DEIS does not go into specific economic factors. Even though the SDEIS states that such determinations will be made when a preferred corridor is selected and preliminary design efforts are initiated.

***Response:*** *Social and economic studies were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Additionally, a detailed socioeconomic analysis (ASDEIS Socioeconomic Technical Report) was conducted for the alignment selection phase of this tiered process (ASDEIS, pp. III-1-III-75).*

**Subject:** They highlight Romney as being a major growth area; however, they have neglected to recognize Capon Bridge, which is a very critical area in this Scheme.

***Response:*** *In absence of standard procedures for predicting development, a good faith effort was made to research methods used in other similar parts of the United States and to develop a method for analyzing potential future growth. Public officials and planners working in the project area and familiar with the recent growth of the area were in agreement with the approach utilized for the study. Additionally, Capon Bridge was considered (Exhibit III-12; Corridor H CSDEIS).*

## Commentor: Parks, Steve

**Public**

**Issue: MISCELLANEOUS**

**Subject:** I read the SDEIS that was prepared. I found it to be a very biased document.

***Response:*** *The CSDEIS was prepared in accordance with CEQ (40 CFR 1500) and FHWA T.A. 6640.8A. regulations.*

**Commentor: Rogers, Hugh**

**Public**

**Issue: ALTERNATIVES CONSIDERED AND ELIMINATED**

**Subject:** Improvement of our existing roads. We think this option should not have been eliminated. The Improved Roadway Alternative was rejected because of "system linkage." That concept is not worth a billion dollars of construction, not to mention all the destruction.

***Response:*** *The Improved Roadway Alternative in the Alignment Selection SDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the preferred alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, are discussed in the Decision Document under Section E (p. 35 and 36).*

**Subject:** The Executive Summary says the No-Build Alternative remains a viable alternative should the impacts associated with the Build Alternative be determined to be too great. That's good, but the Improved Roadway Alternative also should remain viable.

***Response:*** *The Improved Roadway Alternative in the Alignment Selection SDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the preferred alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, are discussed in the Decision Document under Section E (p. 35 and 36).*

**Issue: SOCIAL ENVIRONMENTS**

**Subject:** Social impacts were not sufficiently considered. The need study lumps together social demands and economic development. It fails to consider adverse social impacts.

***Response:*** *Social and economic studies were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Additionally, a detailed socioeconomic analysis (ASDEIS Socioeconomic Technical Report) was conducted for the alignment selection phase of this tiered process (ASDEIS, pp. III-1-III-75).*

**Subject:** The information that you have provided focused on physical environmental impact, not social and economic impact. These issues need to be discussed and decided by all our people.

***Response:*** *Social and economic studies were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Additionally, a detailed socioeconomic analysis (ASDEIS Socioeconomic Technical Report) was conducted for the alignment selection phase of this tiered process (ASDEIS, pp. III-1-III-75).*

**Issue: ECONOMIC ENVIRONMENT**

**Subject:** It also says "additional development induced by new or improved highway access is not always desirable, especially if it adversely affects sensitive environmental resources." We would add, human resources.

***Response:*** *Comment noted.*

**Issue: COMMENTS AND COORDINATION**

**Subject:** My final comment was a request to extend the comment period beyond January 25th.

***Response:*** *The WVDOH extended the comment period to February 20, 1993. The CSDEIS was available for comment for approximately 110 days instead of the required 45 days.*

## Commentor: Schmidt, John

**Agency - USFWS**

**Issue: ALTERNATIVES CONSIDERED AND ELIMINATED**

**Subject:** The Service believes that the improved roadway alternative should be given serious consideration of a way of meeting transportation deficiencies and avoiding impact to the highly resources of the region.

***Response:*** *The Improved Roadway Alternative in the Alignment Selection SDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the preferred alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, are discussed in the Decision Document under Section E (p. 35 and 36).*

**Issue: BUILD ALTERNATIVES AND CORRIDOR SCHEME OPTIONS**

**Subject:** If one of the build options under Schemes D and E is selected, the Service will work with the West Virginia Division of Highways to mitigate wetland losses in the highway lining phase of the project.

***Response:*** *As agreed upon by the EPA (Exhibit VII-12, ASDEIS), wetlands will be mitigated at two separate locations. One within the Monongahela river drainage and one within the Potomac river basin. Additionally, wetland compensation was agreed upon to be 1:1 for both Open Water and Palustrine Emergent and 3:1 for Palustrine Forested and Shrub/Scrub wetlands.*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** Contrary to the information provided in the document however, Schemes D-1, D-2, D-3 and E-1 do not have involvement with endangered species.

***Response:*** *Comment noted.*

**Issue: AFFECTED ENVIRONMENT AND THE ENVIRONMENTAL CONSEQUENCES**

**Subject:** Concerned with short- and long-term adverse impacts from all build alternatives on the native brook, high quality streams, NRWs, wetlands, MNF (national recreational areas and 6.2 M.P areas), fish and wildlife resources, and the public's use thereof.

***Response:*** *Comment noted. Corridor D5 was identified as the preferred corridor, in part, because it would minimize impacts to environmentally sensitive resources.*

## Commentor: Schoonover, James L.

**Public**

**Issue: ECONOMIC ENVIRONMENT**

**Subject:** I refute methodology used in concluding that any scheme would be potentially better than any other because of unemployment statistics.

***Response:*** *Social and economic demands were analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. The identification of a preferred Scheme Option included a number of factors. All Build-Alternatives met the overall project purpose and need. The decision process (as detailed in the Corridor H Corridor Selection SDEIS Decision Document (July 26, 1993) took into account three issues: transportation need; environmental resources; and public involvement. Scheme Option D5 was identified as the preferred corridor, in part, because it avoided many of the environmentally sensitive resources within the corridor-level study area. During the alignment development process, additional efforts were made to avoid sensitive resources.*

**Commentor: Southerland, Daniel**

**Public**

**Issue: ALTERNATIVES CONSIDERED**

**Subject:** No alternatives to a new highway are fairly considered.

***Response:*** *Both Build and No-Build alternatives were developed to a comparable level of detail in both the CSDEIS and ASDEIS to evaluate their merits (CSDEIS, p. II-7) as required by CEQ Regulations (40 CFR 1502.14).*

**Issue: PURPOSE AND NEED**

**Subject:** First, the Project Need analysis fails to address the questions raised.

***Response:*** *The Purpose and Need Analysis was established in the Corridor Selection Transportation Needs Study, March 1992. It was included in the approved Corridor SelectionDEIS, October 21, 1992, and the Corridor Selection SDEIS Decision Document of July 26, 1993.*

**Subject:** The SDEIS must address questions regarding infrastructure to justify the need for highway improvement on a socioeconomic basis required by the Appalachian Redevelopment Act of 1965.

***Response:*** *A comprehensive secondary and cumulative impact assessment in accordance with CEQ Regulations 40 CFR 1502.16(b) and following the guidance of an FHWA position paper entitled "Secondary and Cumulative Impact Assessment in the Highway Development Process" was carried out for and included in the ASDEIS. Additionally, a technical report entitled "Secondary and Cumulative Impacts Technical Report" was prepared and incorporated by reference into the ASDEIS. Additionally, a detailed socioeconomic analysis (ASDEIS Socioeconomic Technical Report) was conducted for the alignment selection phase of this tiered process (ASDEIS, pp. III-1-III-75).*

**Issue: ALTERNATIVES CONSIDERED AND ELIMINATED**

**Subject:** The SDEIS should seriously study Route 33, 55, and Route 219 and 50, and determine what cost and other factors would be involved.

***Response:*** *The Improved Roadway Alternative in the Alignment Selection SDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, are discussed in the Decision Document under Section E (p. 35 and 36).*

**Subject:** Exhibit II-3 (Technical Report) is missing connections to Winchester, Conrail and CSX, extending west to Gore from Winchester and Weston, which is also left out.

***Response:*** *Comment noted. This issue has been taken into consideration during the alignment development process.*

**Subject:** Also omitted is the Western Maryland traffic right to the Mt. Storm plant. Martinsburg airport also ought to be on the map.

***Response:*** *Comment noted. This issue has been taken into consideration during the alignment development process.*

### Issue: ALTERNATIVES CONSIDERED

**Subject:** Under No-Build, you should consider what improvements could be made on Routes 33, 55, 219, 50 and connecting roads.

***Response:*** *As stated on page II-1 of the ASDEIS, "the Alignment Selection process focuses on the development of the No-Build, the IRA, and the Build Alternatives. In accordance with 40 CFR 1502.14, these three alternatives have been developed to a comparable level of detail to evaluate their merits and impacts. The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines. The Corridor Selection SDEIS (October 21, 1992 dismissed all Study Corridors except Scheme Option D5 from further consideration in the Alignment SDEIS. The alternative of Improving local roads where feasible to meet design criteria for the IRA resulted in unavoidable environmental and cultural resource impacts. The IRA in the ASDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; p. 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (p. 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the Preferred Alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, are discussed in the Decision Document under Section E (p. 35 and 36).*

### Issue: TRAFFIC AND TRANSPORTATION

**Subject:** Traffic and Transportation Technical Report includes no estimates of any more traffic to be induced in the region by the Corridor H highway if it is built than if the same traffic is left to struggle through the present road net.

***Response:*** *Future predictions of traffic are founded on reasonable assumptions and past trends. Traffic projections were developed using a combination of extrapolation of historic data on average daily traffic, extrapolation of census data on population growth, motorist interviews, and application of economic development models used in similar demographic and socioeconomic regions of the country. All methods utilized in the Corridor H study have been used and accepted on other four-lane highway projects.*

**Subject:** You have no showing that a new four-lane highway would bring any new traffic to the Corridor region, either tourists or trucks serving new businesses. Traffic estimates for 2010 are the same with and without the new highway, and that seems reasonable.

***Response:*** *Future predictions of traffic are founded on reasonable assumptions and past trends. Traffic projections were developed using a combination of extrapolation of historic data on average daily traffic, extrapolation of census data on population growth, motorist interviews, and application of economic development models used in similar demographic and socioeconomic regions of the country. All methods utilized in the Corridor H study have been used and accepted on other four-lane highway projects.*

**Issue: SOCIAL ENVIRONMENT**

**Subject:** Further west on Route 50, the community of Elk Garden has become labeled Allegheny Front, while the community has been located somewhere off in the north.

***Response:*** *The expressed comments and concerns on the development of Corridor H have been noted and taken into consideration during the alignment development process. The issue you raised was due to a plotting error. The proper location of Elk Garden is identified on Exhibit III-5 of the CSDEIS.*

**Issue: WATER RESOURCES**

**Subject:** Water Resources Sheet Number 18 also shows State Route 45, although this has long since been rebuilt as Route 29 North.

***Response:*** *Comment noted. This issue has been taken into consideration during the alignment development process.*

**Issue: RECREATION RESOURCES**

**Subject:** The EIS is riddled with errors. Just an example, your graph at E is rated as no involvement of community parks. Hampshire County Park in Augusta is touched by the 2,000-foot Corridor which covers its access road.

***Response:*** *Recreation resources were identified using available mapping (numerous sources), and through coordination with Federal, State, and local governmental agencies (ASDEIS, p. III-159; References include: American Hiking Society, American Hiking Society, Hardy County Planning Commission, Pocahontas County Tourism Commission, Potomac Appalachian Trail Club, Tucker County Alpine Festival, Inc., Tucker County Convention and Visitors Bureau, Final Revised Land and Resource Management Plan, George Washington National Forest, Final Environmental Impact Statement for the Land and Resource Management Plan, Monongahela National Forest, National Survey of Fishing, Hunting and Wildlife - Associated Recreation; West Virginia, Virginia Outdoors Plan; Executive Summary, West Virginia Statewide Comprehensive Outdoor Recreation, West Virginia Travel and Tourism Economic Impacts 1992. February 1993, and West Virginia Scenic Trails Association. Hiking Guide to the Allegheny Trail. The specific resource identified by the commentor is not impacted by the selected alternative identified in the ASDEIS.*

**Issue: COMMENTS AND COORDINATION**

**Subject:** I conclude that the Department should take at least another six months to review and revise the present SDEIS.

***Response:*** *The WVDOH extended the comment period to February 20, 1993. The CSDEIS was available for comment for approximately 110 days instead of the required 45 days.*

### Commentor: Sullivan, Charles

**Public**

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** The DEIS fails to mention the eastern cougar, a federally endangered species and listings of 21 federal or State of Virginia PET species.

***Response:*** *Scheme Option D5 does not have any involvement with any known populations of the Eastern Cougar. Additionally, coordination with the USFWS, MNF, and GWNF resource personnel agree that no such involvement will occur. Field assessments for endangered species have been conducted as part of the ASDEIS (Section III Vegetation and Wildlife, pp. III-281-III-295, and Threatened and Endangered Species, pp. III-319-III-332). Scheme Option D5 was selected, in part, because of its considerably lower potential for endangered species involvements. Under the alignment development process, impacts to endangered species have been avoided.*

**Issue: COMMENTS AND COORDINATION**

**Subject:** Because of the daunting size of the DEIS and its late arrival at our office, the comment period needs to be extended beyond the February 20 deadline so that a proper environmental assessment can be made.

***Response:*** *The WVDOH extended the comment period to February 20, 1993. The CSDEIS was available for comment for approximately 110 days instead of the required 45 days.*

**Issue: SECONDARY AND CUMULATIVE IMPACTS**

**Subject:** The DEIS fails to evaluate the effects of highways with respect to pollution, resource depletion, increased dependence on foreign oil, tanker spills resulting from increased use of fuel, and asphalt utilized in highway construction.

***Response:*** *The affected environment was analyzed to the level of detail required in a first tier EIS study as defined by CEQ (40 CFR 1508.28) and FHWA (23 CFR 771.111) regulations. Analysis of irreversible and irretrievable commitments of resources was done in accordance with FHWA T.A. 6640.8.A. Results are discussed in the ASDEIS (p. III-135).*

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# Alignment Selection SDEIS

# Public Comments and Responses

**Commentor: Bamford, Mr. Sherman**

**Group - P.A.W. - Southwest Virginia**

**Issue: BICYCLE FACILITIES**

**Subject:** Bicyclists will be put at risk.

***Response:*** *The issues of bicycle and bicycle paths are discussed on p. II-20 of the ASDEIS. Any constructed bicycle facility would follow those guidelines established by the American Association of State Highways and Transportation Officials (AASHTO).*

**Issue: NATURAL RESOURCES**

**Subject:** SDEIS sections on wildlife, wetlands, and recreation are inadequate and much too brief.

***Response:*** *Analysis of affected environment and environmental consequences of the proposed action followed guidelines found in FHWA T.A. 6640.8A and other recognized and accepted environmental impact assessment methodologies as described in the ASDEIS at pp. III-281, (wildlife), III-333 (wetlands), and III-159 (recreation). Detailed information on these issues is available in the Vegetation and Wildlife Habitat, Wetlands, and Socioeconomic Technical Reports.*

**Issue: ECONOMIC DEVELOPMENT**

**Subject:** Studies (National Governor's Association, 1988; USDOT, 1980) show that four-lane highways are actually an economic drain on rural area like the Corridor H study area.

***Response:*** *Some studies have shown a net loss of economic activity in small communities. However, other studies have shown just the opposite. For example, Buffington et al.(1992) (Buffington J.L., Crane, L.M., Clifton, B., & Speed, J. 1992. Methodology for Estimating Economic Impacts of Highway Improvements: Two Case Studies in Texas, in Transportation Research Record #1339. pp. 156-165) reviewed 34 studies each of which analyzed the economic impacts (e.g., change in gross sales, business closings vs. new business openings) of highways. For businesses that had been by-passed by a new highway traffic serving businesses, gross sales changes ranged dramatically (-65% to +39%). For other retail/service businesses, gross sales changes ranged from -15% to +55%. Existing business closings and openings ranged from 13 closings of original businesses to 49 openings of new businesses. Hartgen et al. (1992) (See Literature Cited ASDEIS, Secondary and Cumulative Impacts Technical Report) in their literature review found similar confounding conclusions relative to negative and positive economic impacts on business. Finally, Widner (1990) (Widner, R.R. 1990. Appalachian Development After 25 Years: An Assessment, Economic Development Quarterly. 4:4 pp. 291-312) in his qualitative assessment of the economic effects of Appalachian Corridor B from Chillicothe, Ohio to Greenville, South Carolina found dramatic differences among communities. He concludes in part that the Appalachian development highways "have played an important part in restructuring patterns of development and settlement in parts of the region. Some towns are now playing service-center roles that they could not play for surrounding areas in the past."*

**Subject:** The economic development section of the SDEIS only discusses job gains and losses by sectors.

***Response:*** *The economic development section of the SDEIS considers a variety of economic activities including industrial, interchange, and service related development. Job gains or losses in these sectors serve as an index for the measurement of economic activity associated with secondary impacts.*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** Impact on black bears and large predators is likely to be significant.

***Response:*** *Potential impacts to black bear and other large mammals is discussed on p. III-317 of the ASDEIS.*

## Commentor: Beale, Dr. Henry B.R., President & Principal Economist

**Public**

**Issue: ALTERNATIVES CONSIDERED**

**Subject:** The SDEIS contains no true IRA, instead it contains a four-lane and two-lane Build Alternative. The IRAs considered were dismissed for unsubstantiated reasons.

***Response:*** *Two Improved Roadway Alternatives (IRA) were considered during the Corridor H study process. The first IRA considered the improvement of local roads throughout the Corridor H project area. It was dismissed as a viable alternative in the CSEIS (refer to Section II). In the ASDEIS, a second IRA was developed within the selected Corridor, D5. This IRA was dismissed because it did not meet the purpose and need of the project (refer to Section II of the FEIS).*

**Issue: TRAFFIC**

**Subject:** Neither of the alternatives generally address congestion problems in the study corridor.

***Response:*** *Consideration of remaining transportation needs in the study area is discussed in the Corridor H Corridor Selection Decision Document (Section E, pp. 35-36). A transportation System Management alternative was considered and dismissed in the CSDEIS (p. II-2).*

**Issue: TRAFFIC**

**Subject:** The efficacy of Corridor H as a development highway and the through traffic projections are in question based on revisions in the projected traffic mix.

***Response:*** *A four-lane facility is justified, based on the Corridor Selection Transportation Needs Study (March 1992) and the Alignment Selection SDEIS Traffic Analysis (September 22, 1994).*

**Issue: TRAFFIC**

**Subject:** The estimate of the "latent" demand of "diverted" through traffic using Corridor H has an extremely weak and suspect to empirical basis.

***Response:*** *Latent demand was calculated to better determine maximum peak-hour traffic volumes in order to estimate a worst case analysis of environmental impacts for air and noise.*

**Subject:** The undocumented estimate of "latent" demand is a critical factor in the need for a four-lane Corridor H.

***Response:*** *Latent demand was calculated to better determine maximum peak-hour traffic volumes in order to estimate a worst case analysis of environmental impacts for air and noise.*

## Issue: TRAFFIC

**Subject:** Traffic projections are inconsistent with the conclusion that the Build Alternative will bring substantial employment benefits while the IRA will produce no net gain in employment.

***Response:*** *The ASDEIS (p. III-9) discusses employment growth as the result of the IRA. Based on a study by Lombard (1992) the ASDEIS points out that employment growth associated with the IRA would range from one-sixth to one-tenth of the employment projections for the Preferred Alternative.*

## Issue: SYSTEM LINKAGE

**Subject:** The regional system linkage rationale for Corridor H is almost entirely spurious.

***Response:*** *System linkage issues are completely discussed in Tier 1 documents, the Transportation Needs Study (pp. I-1 through I-9; March 1992), and the CSDEIS (pp. I-22 through I-25; October, 1992).*

## Issue: SAFETY CONSIDERATIONS

**Subject:** The estimate of reduction in fatalities is undocumented, lacks a time frame, and is almost certainly grossly overstated.

***Response:*** *The 1991 to 1993 Statewide accident rates provided in the 1993 West Virginia Crash Data available from the West Virginia Division of Highways shows that the accident rate per hundred million vehicle miles (HMVM) for a two-lane rural primary road with a width over 22' is 211. The accident rate for a four-lane rural primary road is 130 accidents /HMVM, and the accident rate for a four-lane rural primary controlled access road is 101accidents /HMVM.*

**Subject:** The analysis emphasizes the number of intersections per mile without regard to type of intersection or other causes of accidents.

***Response:*** *The data presented for the current roadway system relative to accident rates and intersection frequency were derived from the FHWA's publication, "Synthesis of Safety Research Related to Traffic Control and Roadway Elements, Volume I, 1982". Discussion of this is on p. II-18 of the Corridor H, Corridor Selection Transportation Needs Study (March 1992). Only a summary of that discussion is included in the ASDEIS (p. II-90). Summarizing issues that have already been decided in Tier I documents is consistent with CEQ Regulations (40 CFR 1502.20).*

**Subject:** The safety analysis is utterly devoid of any analysis of actual safety problems in the study corridor or of appropriate site-specific needs or remedies.

***Response:*** *Discussion of safety issues related to the current highway system were included in the Transportation Needs Study (pp. II-16-II-8; March 1992), and the CSDEIS (pp. I-22-I-23; October, 1992). Only a summary of that analysis is included in the ASDIES on pp. II-89-90. Summarizing issues that have already been decided in Tier I documents is consistent with CEQ Regulations (40 CFR 1502.20).*

**Subject:** Data presented in the SDEIS show little or no need for Corridor H as a safety measure in Virginia.

***Response:*** *Analysis of safety issues related to the current highway system were included in the Transportation Needs Study (pp. II-16-II-8; March 1992), and the CSDEIS (pp. I-22-I-23; October, 1992). Only a summary of that analysis is included in the ASDIES on pp. II-89-90. Summarizing issues that have already been decided in Tier I documents is consistent with CEQ Regulations (40 CFR 1502.20).*

**Issue: SECONDARY AND CUMULATIVE IMPACTS**

**Subject:** The SDEIS analysis of employment impacts is crude and biased. Most employment generation is incorrectly attributed to the Build Alternative.

***Response:*** *Employment projections were based on recognized and widely-used assumptions and models, as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out of industrial parks was undertaken so as to develop the "worst case" secondary impact scenario.*

**Issue: ECONOMIC DEVELOPMENT**

**Subject:** The SDEIS makes improper and inaccurate use of previous studies to estimate key elements of employment generation.

***Response:*** *The commentor is referring to the use of the Lombard (1992) study which analyzed economic growth in Indiana associated with two-lane and four-lane roads and a study conducted by Hartgen et al. (1992) which assessed interchange growth on I-40 in North Carolina. The commentor misunderstood the use of the Lomabard study in the ASDEIS. The (ASDEIS) study was not used to predict absolute economic growth in the project area, but was used to compare the growth analyzed in Indiana by Lombard to that of current growth trends in the project area. The ASDEIS states (p. III-41), "These figures [estimated using the Lombard study) were compared to recent growth trends and found to be lower or comparable. Therefore, no additional industrial jobs are predicted based on the construction of the IRA". Hartgen et al.'s study was used to predict "worst case" development around intersections in order to assess maximum secondary natural resource impacts. The use of their model followed the methodology described in Hartgen et al. (1992).*

**Subject:** The SDEIS ignores the availability of rail for industrial development.

***Response:*** *Rail facilities were discussed in the Corridor Selection Transportation Needs Analysis (March, 1992). That analysis concluded, in part, that, "Industries [in the project area] not located near rail system termini are unable to utilize the railroad system because roads are not designed to accommodate truck traffic to the terminal facilities."*

**Subject:** The SDEIS fails to establish that the Build Alternative will be an effective employment generator.

***Response:*** *Employment projections were based on recognized and widely-used assumptions and models, as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out and employment of industrial parks was undertaken so as to develop the "worst case" secondary impact scenario.*

**Issue: ECONOMIC DEVELOPMENT**

**Subject:** The economic literature indicates that a rural area, such as that served by Corridor H, will not enjoy economic benefits.

***Response:*** *Some studies have shown a net loss of economic activity in small communities. However, other studies have shown just the opposite. For example, Buffington et al.(1992) (Buffington J.L., Crane, L.M., Clifton, B., & Speed, J. 1992. Methodology for Estimating Economic Impacts of Highway Improvements: Two Case Studies in Texas, in Transportation Research Record #1339. pp. 156-165) reviewed 34 studies each of which analyzed the economic impacts (e.g., change in gross sales, business closings vs. new business openings) of highways. For businesses that had been by-passed by a new highway traffic serving businesses, gross sales changes ranged dramatically (-65% to +39%). For other retail/service businesses, gross sales changes ranged from -15% to +55% Existing business closings and openings ranged from 13 closings of original businesses to 49 openings of new businesses. Hartgen et al. (1992) (See Literature Cited ASDEIS, Secondary and Cumulative Impacts Technical Report) in their literature review found similar confounding conclusions relative to negative and positive economic impacts on business. Finally, Widner (1990) (Widner, R.R. 1990. Appalachian Development After 25 Years: An Assessment, Economic Development Quarterly. 4:4 pp. 291-312) in his qualitative assessment of the economic effects of Appalachian Corridor B from Chillicothe, Ohio to Greenville, South Carolina found dramatic differences among communities. He concludes in part that the Appalachian development highways "have played an important part in restructuring patterns of development and settlement in parts of the region. Some town are now playing service-center roles that they could not play for surrounding areas in the past."*

**Subject:** The SDEIS is systematically biased against the IRA, as compared with the Build Alternative.

***Response:*** *As stated on page II-1 of the ASDEIS, "the Alignment Selection process focuses on the development of the No-Build, the IRA, and the Build Alternatives. In accordance with 40 CFR 1502.14, these three alternatives have been developed to a comparable level of detail to evaluate their merits and impacts.*

**Subject:** The SDEIS baseline is inconsistent with the baseline described in the CSDEIS.

***Response:*** *The Corridor H NEPA analysis followed the CEQ (40 CFR 1508.28) and FHWA (23 CFR 777.111) regulations for tiered NEPA documents. In part, these regulations state that the first tier of analysis should deal with broad, general issues. In the Corridor H NEPA process, the first tier included the Corridor Selection Transportation Needs Study (March, 1992) and the CSDEIS (January, 1993). Prerequisites for economic development at the first tier dealt with general area-wide prerequisites. The second tier of the NEPA process requires the consideration of narrower, alignment specific economic development prerequisites. Alignment specific prerequisites are discussed in the ASDEIS (p. II-32).*

**Commentor: Beale, Dr. Henry B.R., President & Principal Economist - Microeconomic Application, Inc.**

**Public**

**Issue: PURPOSE AND NEED**

**Subject:** The Needs study analysis of economic development benefits is too vague to justify the Build Alternative or the current IRA.

***Response:*** *The details of the Purpose and Need Analysis was included in the Corridor Selection Transportation Needs Study, March 1992. It was included in the CSDEIS, October 21, 1992, and the CSDEIS Decision Document of July 26, 1993. The Purpose and Need statement in the ASDEIS referenced the detailed Purpose and Need analysis previously conducted.*

**Commentor: Beale, Dr. Henry B.R., President & Principal Economist - Microeconomic Applications Inc.**

**Public**

**Issue: PURPOSE AND NEED**

**Subject:** The SDEIS incorporates the assumption that a four-lane highway is needed.

***Response:*** *Alternatives other than a four-lane highway as well as the No-Build were considered and discussed in the CSDEIS. The CSDEIS concluded that a four-lane facility was required to meet the Purpose and Need of this project.*

**Commentor: Cain, Mr. Thomas M., President and Treasurer**

**Group - Allegheny Front Regional Development Corporation**

**Issue: DESIGN CONSIDERATIONS**

**Subject:** We question whether the at-grade intersections design standards chosen for the Appalachian Corridor system thirty years ago, ought to be built.

***Response:*** *AASHTO's policy on Geometric Design of Highways and Streets (1990) was utilized in determining all preliminary engineering design criteria. At-grade intersections meet those criteria.*

## Commentor: Cain, Mr. Thomas M., Vise-President and Treasurer

**Group - Allegheny Front Regional Development Corporation**

### Issue: ACCESS

**Subject:** Without access controls or development controls property development could produce unsafe conditions and disruptions.

***Response:*** *Design criteria for Appalachian Development Highways call for partially controlled intersection but allow for interchanges where traffic volume is predicted to be heavy. Corridor H must follow those design standards. As to property development, land use controls in West Virginia are vested in the local and County governments. It is their prerogative to develop or not to develop such controls.*

**Subject:** Urge that at-grade intersections not be provided except in areas where roadside development is impossible and interchanges would be unnecessarily disruptive.

***Response:*** *Design criteria including at-grade intersections are defined for Appalachian Highways. These criteria prescribe at grade intersections be partially controlled consisting of no more than two at-grade intersections per mile. Providing access to isolated areas is one of the functions of the Appalachian Highway System as described in the enabling legislation.*

### Issue: MISCELLANEOUS

**Subject:** We are concerned that there is no mention of the potential development of U.S. 219 in any of the planning documents for Corridor H. This oversight would lead to incorrect future traffic volumes and lesser design standards.

***Response:*** *The Preliminary Purpose and Need report for the U.S. Route 219 International Highway Corridor Study was not completed until January, 1995. The proposed Route 219 Highway Corridor would extend from Toronto, Ontario in the north to Miami, Florida in the south. According to the Allegheny Front Regional Development Corporation, approximately 40 miles of the Route 219 Corridor overlaps Corridor H. The Purpose and Need Report for the Rt. 219 Corridor recognizes the importance of the Corridor H east-west tie-in to the proposed International Highway.*

## Commentor: Cole, Mr. Matthew B.

**Public**

### Issue: SAFETY CONSIDERATIONS

**Subject:** The larger volume of traffic will lead to more accidents and a higher demand on the services of volunteer firemen and emergency medical personnel.

***Response:*** *Traffic safety issues were one part of the project Purpose and Need study. A discussion of that analysis can be found on p. II-16 of the Corridor Selection Transportation Needs Study (March 1992), and on p. I-22 of the CSDEIS. The design criteria for Corridor H take into consideration increased traffic volumes.*

### Issue: ECONOMIC DEVELOPMENT

**Subject:** The methodologies employed to calculate economic benefit as a result of highway construction is overly optimistic.

***Response:*** *Employment projections were based on recognized and widely-used assumptions and models, as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out and employment of industrial parks was undertaken so as to develop the "worst case" secondary impact scenario.*

### Issue: WARDENSVILLE SPRING

**Subject:** The SDEIS glosses over mitigation measures for the Wardensville Wellhead Protection Area.

***Response:*** *Additional testing and mitigation measures are described in the Corridor H FEIS Mitigation Document. Final mitigation measures can not be developed until final roadway design activities are undertaken.*

### Issue: RECREATION RESOURCES

**Subject:** Inadequate study of major impacts to trails and MNF. Also no discussion of major impacts to Otter Creek Wilderness Area.

***Response:*** *The Otter Creek Wilderness Area at its closest point is 2.5 miles from the proposed highway. Predictive models utilized for the Alignment Selection SDEIS did not identify any impacts to the Otter Creek Wilderness Area or the MNF (ASDEIS p. III-26-III-40, Secondary and Cumulative Impacts Technical Report). However, this resource will be more accessible to the public as a result of construction of the Preferred Alternative. The likely result of this improved access will be increased public utilization, enjoyment, awareness, and appreciation of nature trails and wilderness areas.*

**Issue: FOREST FRAGMENTATION AND BIODIVERSITY**

**Subject:** The Shavers Fork west of Parsons is a major crossing area for wildlife, no discussion in the SDEIS regarding severing of a major crossing area between mountain highlands and farmland areas.

***Response:*** *Data presented in the ASDEIS on pp. III-314-III-318 indicates that a new highway will not impact wildlife movement for those species of wildlife present within the study area.*

**Issue: PUBLIC INVOLVEMENT MEETINGS AND COORDINATION**

**Subject:** I question the adequacy of public comment for the Transportation Needs Study.

***Response:*** *A record of public meetings and public hearings as well as comment periods is included in Section VII of the FEIS. Public meetings, hearings, and comment periods were carried out in accordance with FHWA Regulations (23 CFR Part 771), FHWA Guidance Document T.A. 6640.8A and CEQ Regulations (40 CFR Part 1500).*

**Issue: MISCELLANEOUS**

**Subject:** The SDEIS was written with a pre-determined outcome to construct the Line A Build Alternative.

***Response:*** *The SDEIS clearly states that the three alternatives (No-Build, IRA, and Build Alternatives) have, in accordance with 40 CFR 1502.14, been developed to a comparable level of detail to evaluate their merits and impacts (SDEIS, p. II-1).*

## Commentor: Constantz, Dr. George

**Public**

**Issue: WATER RESOURCES**

**Subject:** On p. III-424 please change text "It is assumed"...to read "Fecal coliform levels within the Lost River and Middle Cacapon River".....

***Response:*** *The text has been revised in the FEIS (p. III-197).*

**Issue: MISCELLANEOUS**

**Subject:** p. III-541 give complete citation for reference # 10.

***Response:*** *The text has been revised in the Reference Section of the FEIS (p. III-269).*

**Subject:** Give complete citation for reference # 11, p.III-541. Constanz, G. 1992. What will happen to all the chicken manure? Cacapon 4(4):1.

***Response:*** *The text has been revised in the Reference Section of the FEIS (p. III-269).*

## Commentor: Cussins, Mr. R. Donald, President

**Company**

### Issue: SAFETY CONSIDERATIONS

**Subject:** It appears that the proposed Corridor H would intersect Buffalo's bonded roadway just north of the current Route 93 crossing. This crossing constitutes a severe safety problem for the public and employees of this company.

***Response:*** *This crossing will be investigated prior to final highway design in this Section.*

## Commentor: Dipretoro, Mr. Richard S., Geologist

**Group - Corridor H Alternatives**

### Issue: WATER RESOURCES

**Subject:** The SDEIS fails to provide adequate baseline information and monitoring plans. The method chosen (Biotic Integrity).

***Response:*** *The SDEIS explains that the stream assessment is only a "snap shot" and that natural variation in both time and space occurs. Use of BI for the streams subject to acid discharge is a valid analysis because macroinvertebrates are highly sensitive to acid discharge. Macroinvertebrates in AMD-prone areas exhibited low diversity and density. Additional discussion on stream quality and mitigation is provided in the Corridor H FEIS Mitigation Document, which is incorporated by reference into the FEIS.*

**Subject:** Discharge of additional acid still represents an adverse impact because it extends the acid conditions further downstream.

***Response:*** *Potential acid discharge is addressed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** The SDEIS fails to provide documentation of cumulative effects of the increase in acid and metal loading as a result of construction of the highway.

***Response:*** *Potential acid discharge is addressed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: GEOLOGY, MINES, AND MINERALS**

**Subject:** The SDEIS makes no attempt to quantify the amount of additional acid or metals, or alkalinity, that the corridor will generate.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategies are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** The SDEIS gives incomplete, inaccurate, and inconsistent, and contradictory account of the likely effects of Line A in terms of acid drainage.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategies are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** The definition of AMD, given in the Glossary, is non-standard and incorrect.

***Response:*** *The definition has been revised in the FEIS Glossary.*

**Subject:** The SDEIS dilute concerns regarding acid generation with concerns about coal-related engineering problems (highway construction and non-interference with coal mining operations).

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** No chemistry data was provided on groundwater. There is no baseline against which to measure impacts where the biota are weak or absent.

***Response:*** *Sufficient information was collected on ambient conditions of streams, other surface water bodies, and groundwater. The ASDEIS identifies the location of sensitive groundwater resources. A comprehensive dye study was undertaken for sensitive groundwater resources including wellhead protection areas consistent with FHWA 6640.8.A Guidelines. Additionally, investigation, avoidance of impacts, and development of any required mitigation measures to groundwater and water supplies will be an ongoing process. Commitments to that process are contained in the Corridor H FEIS Mitigation Document. Specific measures can not be developed until final designs are completed and are not part of the FEIS.*

**Issue: GEOLOGY, MINES, AND MINERALS**

**Subject:** The SDEIS fails to identify the extent of acid potential, including characterizing acid-producing materials and quantifying acid and metal loading.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: GEOLOGY, MINES, AND MINERALS**

**Subject:** The SDEIS does not adequately address the potential for AMD loading in the Cheat and Potomac drainages.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** The prediction of the amount and duration of acid generation can be calculated using the National Mine Land Reclamation Center (UWV) spread sheet. The SDEIS should use this technique.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Disturbance of other strata, some of which do not contain coal, can also generate acid drainage. They do not require previous mining to present potential problems.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Strata above the water table can also generate acid.

***Response:*** *Concern relative to deep cuts and steep water table gradients are only relevant if the road cuts intersect the water table; most road cuts do not do that. Road cuts are mapped. Areas with steep water table gradients indicate low permeability; this would decrease the lateral distance over which highway construction might impact nearby wells.*

**Issue: GEOLOGY, MINES, AND MINERALS**

**Subject:** The SDEIS fails to identify effective mitigation measures for acid-producing materials and metal loading.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Acid drainage can take up to two or more years to develop. Therefore, limiting attention to drainage from the seam ignores much of the potential for acid drainage.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** The SDEIS fails to suggest what "proper treatment or removal" constitutes or where and how acid waste will be disposed of.

***Response:*** *WVDOH in conjunction with the FWS and other cooperating agencies, has developed a waste mitigation strategy. Details of that strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS. As the project moves into the subsequent design phases, waste reduction will be a central focus. Waste reduction and mitigation for excess waste is discussed in the Corridor H FEIS Mitigation Document.*

**Subject:** The SDEIS fails to address mitigation measures dealing with encountering underground mines (release of AMD).

***Response:*** *Possible acid drainage production relative to coal seams and coal mines (strip benches, deep mines, abandoned mines) was discussed in detail in the ASDEIS (pp. III-505-III-506).*

**Subject:** The SDEIS fails to identify specific areas where mitigative techniques e.g., (created wetlands or anoxic drains).

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** No plans to monitor groundwater or receiving streams during and after construction to verify the predictions of the SDEIS.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** There is no evidence that revegetation and soil covering prevents acid drainage on full-scale mine sites.

***Response:*** *Potential mitigation measures are addressed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: MISCELLANEOUS**

**Subject:** We can safely say that Line A will disturb at least 600 acres (700-800) in the potentially acid-producing coal-bearing areas of Tucker and Grant Counties.

***Response:*** *Comment noted.*

## Commentor: Elkins, Mr. Benjamin F., President

**Group - Hampshire County Development Authority**

**Issue: ALIGNMENTS CONSIDERED BUT ELIMINATED**

**Subject:** Don't think it was fair to hold the public meetings in the locations chosen. Feel that Scheme E was not considered fully.

***Response:*** *Public meetings, workshops, and public hearings were held at a wide range of locations within the Corridor H project area. Additionally, the time period as well as the length of each of the meetings was purposely scheduled to allow travel time from the edges of the project area. A table of meeting dates, locations, and meeting times is listed in the FEIS in Section VII. Scheme E was considered in the CSDEIS, and eliminated in the Corridor Selection Decision Document.*

## Commentor: Fansler, Mr. Paul

**Public**

### Issue: ACCESS

**Subject:** You should consider putting a crossing in at Station 3675.

***Response:*** *The WVDOH has taken your suggestion into consideration. If the Preferred Alternative is selected for construction, this matter will be investigated further during preliminary and final engineering.*

## Commentor: Ferster, Ms. Andrea C. and Mr. Thomas R. Michael, Esquires

**Group - Corridor H Alternatives**

### Issue: PURPOSE AND NEED

**Subject:** The scheduled March 1, 1995 Agency Concurrence in the Preferred Alternative for the Final EIS is premature.

***Response:*** *The meeting was canceled.*

**Subject:** VA's decision not to support a Build Alternative creates a fundamental change and conflict in the project.

***Response:*** *System linkage, in terms of connecting I-79 and I-81, is one of many needs factors that the Build Alternative of Corridor H would address. Virginia will be studying the necessary improvements to the VA 55 corridor under various scenarios. The resulting improvements, in whatever form, should accommodate future traffic, and thereby meet the system linkage needs requirements. An additional discussion of the linkage and traffic issues relative to the Commonwealth of Virginia have been included in the FEIS.*

**Subject:** Strongly question whether the Build Alternative will provide the desired economic development goals any better than the IRA.

***Response:*** *The Purpose and Need Analysis as detailed in the Corridor Selection Transportation Needs Study, March 1992, and outlined in the CSDEIS of October 21, 1992, determined that only a four-lane facility would satisfy the purpose and need of the project.*

**Subject:** A new highway is not necessary to provide east/west or regional linkages to the Interstate system.

***Response:*** *The Purpose and Need Analysis as detailed in the Corridor Selection Transportation Needs Study, March 1992, and outlined in the CSDEIS of October 21, 1992, determined that only a four-lane facility would satisfy the purpose and need of the project.*

**Issue: PROJECT STATUS**

**Subject:** Core drilling activities along the "Preferred Alignment" is premature.

***Response:*** *Core borings have been conducted within one section of the Preferred Alternative to field verify the accuracy of certain geologic information contained in the geographic information system (GIS) developed for the project. The verification of geologic information is important in the development of certain mitigation strategies, including those for acid drainage, wetland replacement, and the relocation of stream encroachments.*

**Issue: ALTERNATIVES CONSIDERED**

**Subject:** The alignment SDEIS is tainted by premature Selection of a Corridor, in violation of Federal Law.

***Response:*** *The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines. The CSDEIS (October 21, 1992) dismissed all Study Corridors except Corridor D5 from further consideration in the Alignment SDEIS.*

**Issue: IMPROVED ROADWAY ALTERNATIVE**

**Subject:** The SDEIS fails to adequately consider a properly designed IRA or Intermodal Alternatives.

***Response:*** *Intermodal alternatives were considered and dismissed as not meeting the purpose and need of the project. Discussions concerning consideration and dismissal of intermodal alternatives are detailed in the Corridor Selection Transportation Needs Study (pp. II-14-II-16, March 1992) and the CSDEIS (pp. I-21-I-22 and II-2- II-3; October 21, 1992).*

**Subject:** The IRA presented in the SDEIS results in numerous relocations and impacts on environmental and historical resources that could easily be avoided.

***Response:*** *Improving local roads where feasible to meet design criteria for the IRA resulted in unavoidable environmental and cultural resource impacts.*

**Subject:** The IRA presented in the SDEIS continues to avoid design solutions that would address spot capacity problems by adding a third lane.

***Response:*** *Consideration of design solutions that would address spot capacity problems were considered as part of the Transportation Systems Management (TSM) Alternative in the CSDEIS(Section II, p.II-2). The TSM alternative was dismissed as not meeting the project purpose and need.*

**Issue: TRAFFIC**

**Subject:** A four-lane highway is not needed to meet traffic levels for local development by the year 2013.

***Response:*** *A four-lane facility is justified, based on the Corridor Selection Transportation Needs Study (March 1992) and the Alignment Selection SDEIS Traffic Analysis (September 22, 1994).*

**Subject:** The SDEIS contains no explanation for the significant change in the vehicle mix between the Corridor SDEIS and this DEIS.

***Response:*** *Traffic projections used in the CSDEIS were analyzed at a more general level of detail, consistent with the tiered process adopted for the Corridor H study. As such, the traffic projections were based only on extrapolation of average daily traffic data, extrapolation of census data on population growth and motorist interviews. WVDOT conducted new traffic counts since the preparation of the CSDEIS making the information used for the Alignment Selection SDEIS more recent.*

**Issue: SAFETY CONSIDERATIONS**

**Subject:** No support of the SDEIS conclusion that a four-lane highway would significantly reduce accident rates more than properly designed improvements to existing two-lane highways.

***Response:*** *The 1991 to 1993 Statewide accident rates provided in the 1993 West Virginia Crash Data available from the West Virginia division of highways shows that the accident rate per hundred vehicle miles (HMVM) for a two-lane rural primary road of width over 22' is 211. The IRA would be considered a rural primary road with a width of over 22'. The accident rate for a four- lane rural primary road is 130 accidents /HMVM, and the accident rate for a four- lane rural primary controlled access road is 101 accidents /HMVM. The Build Alternative is considered to be a limited access controlled rural primary and would be expected to have a lower rate of accidents than the IRA.*

**Subject:** In VA, the SDEIS data indicates that Route 55 has a very low accident rate which would be harmed by increased traffic volume brought by Corridor H.

***Response:*** *It is possible that increased traffic volumes on VA 55 could lead to an increase in the accident rate. Virginia's Commonwealth Transportation Board resolution directs VDOT to monitor traffic and traffic related conditions on VA 55 and to study the VA 55 corridor to determine what safety improvements may be needed.*

**Subject:** Attachment 7 (CHA) suggest that some accidents on main east-west routes around Moorefield are caused by greasy leakage from trucks not as a result of deficient roads. Based on the premise that greasy leakage from poultry trucks is a major source of accidents, a four-lane highway, with increased speeds, would exacerbate rather than remedy accident problems.

***Response:*** *Attachment 7 does not offer any evidence to suggest that accidents on main east-west routes around Moorefield are caused by greasy leakage from trucks and not as a result of deficient roads.*

**Subject:** Legitimate safety and capacity concerns can be addressed through improvements to existing roads.

***Response:*** *The Purpose and Need Analysis as detailed in the Corridor Selection Transportation Needs Study, March 1992, and outlined in the CSDEIS of October 21, 1992, determined that only a four-lane facility would satisfy the requirements, as outlined in that statement.*

**Subject:** At-grade intersections, especially at bottom of hills with high-speed, higher volume, and heavier loads of four-lane traffic, have the potential for safety hazards. These hazards are not discussed in the SDEIS.

***Response:*** *All connections proposed for the Build Alternative meet the requirements for distance between intersections, sight distance and geometry for the design speed of Corridor H.*

**Subject:** The SDEIS does not analyze accidents within the corridor with respect to their nature, location, or cause.

***Response:*** *The data presented for the current roadway system relative to accident rates and intersection frequency were derived from the FHWA's publication, Synthesis of Safety Research Related to Traffic Control and Roadway Elements, Volume I, 1982. Discussion of this is on p. II-18 of the Corridor H, Corridor Selection Transportation Needs Study (March 1992). Only a summary of that discussion is included in the ASDEIS (p. II-90). Summarizing issues that have already been decided in Tier I documents is consistent with CEQ Regulations (40 CFR 1502.20).*

**Issue: MITIGATION**

**Subject:** Mitigation measures are discussed as actions which may be taken. FHWA regulations provide that necessary mitigation measures are to be incorporated into the action. Requirements have not been met in SDEIS.

***Response:*** *All relevant and reasonable mitigation measures are discussed and assessed in the Corridor H FEIS Mitigation Document. The mitigation document is incorporated by reference into the FEIS and the Record of Decision.*

**Issue: ECONOMIC DEVELOPMENT**

**Subject:** The conclusion that the Build Alternative will generate jobs is unsupported.

***Response:*** *Employment projections were based on recognized and widely-used assumptions and models, as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out and employment of industrial parks was undertaken so as to develop the "worst case" secondary impact scenario.*

**Subject:** The SDEIS ignores the availability of rail for industrial development.

***Response:*** *Comment noted. However, rail, relative to industrial development, was discussed in the Corridor Selection Transportation Needs Study (March, 1992). That analysis concluded that, "Industires [in the project area] not located near rail system termini are unable to utilize the railroad system because roads are not designed to accomodate truck traffic to the terminal facilities." Finally, testimony was presented at the public hearings on the ASDEIS that CSX is petitioning to abandon over 100 miles of rail in the project area.*

**Issue: FARMLAND**

**Subject:** The SDEIS fails to acknowledge the true impact of conversion of farmland as a result of Corridor H.

***Response:*** *A farmland impact assessment was carried out in accordance with FHWA guidance (T.A. 6640.8A) and the Farmland Protection Policy Act of 1984(ASDEIS pp. III-77-III-83). As part of the required farmland impact assessment, coordination was carried out with appropriate officials of the USDA's Natural Resources Conservation Service (formerly the Soil Conservation Service) a cooperating agency on the Corridor H project. Copies of correspondence with that agency are found in the FEIS (Appendix D).*

**Subject:** The SDEIS states that 543 acres of farmland will be converted due to the Build Alternative, yet 10,000 acres will be developed (Secondary and Cumulative TR).

***Response:*** *The confusion on this issue arises from two "definitions" of farmland that appear in the ASDEIS. Farmlands discussed in the Land Use (pp.III-45-III-47) and Vegetation and Wildlife (pp. III-281-III-318) Chapters of the ASDEIS and the Secondary and Cumulative Impacts and Vegetation and Wildlife Technical Reports are farmlands as defined in the Anderson Land Use/Land Cover Classification System. This system includes all land cover/land use types associated with farming (e.g., pasture land, cropland, orchards). It is this definition that relates to the 10,000 acres cited by the commentator. The second definition of the term farmland used in the Farmlands Chapter of the ASDEIS (pp. III-77-III-83) applies to those soil types (also known as soil units) identified by the USDA's Natural Resources Conservation Service as prime, or unique, or statewide, or locally important. These soil types are the "farmlands" that fall under the protection of the Farmland Policy Protection Act (FPPA) of 1984 and are the farmlands discussed in the Farmlands Chapter of the ASDEIS. The project impact to these "farmlands" is predicted to be 543 acres.*

## Issue: AIR QUALITY

**Subject:** The SDEIS fails to consider the cumulative effect of increased emissions from the proposed highway on the Shenandoah National Park.

***Response:*** *Normally, ozone emissions are not considered in air quality attainment areas such as the project area. However, because of a special request by EPA and the FWS, the daily changes in VOC and NOx for each alternative were calculated and included in the ASDEIS. The very small emissions of sulfur and the increased VOC and NOx from additional traffic will contribute to the air pollution load currently present. The importance or significance of that contribution, however, can not be quantified but would be expected to be insignificant. To put this in some perspective, the Shenandoah National Park in 1991 recorded their highest number of vehicles entering the park as over 148,000 during one month. For that year, it was calculated that 70 tons of NOx was emitted from all of the vehicles entering the park. The study compared this amount against the 10,000 tons of NOx per year that would be emitted from just one proposed stationary source. Even in the design year of 2013, traffic on Corridor H is not predicted to exceed 48,000 vehicles per month.*

## Issue: RECREATION RESOURCES

**Subject:** The SDEIS fails to recognize that destroying the scenic vistas and encouraging sprawl-type development, Corridor H will be destroying the region's true economic base.

***Response:*** *The visual analysis prepared utilizing the FHWA's Visual Impact Assessment for Highway Projects did not indicate that any scenic vistas would be destroyed (Alignment Selection SDEIS, pp. II-177-II-230). It did recognize, however, that visual impact is highly individual based (SDEIS, p. III-196).*

**Issue: VISUAL RESOURCES**

**Subject:** In general, the identification of visual impacts to significant cultural resources is poor.

***Response:*** *The visual analysis prepared utilizing the FHWA's Visual Impact Assessment for Highway Projects did not indicate that any scenic vistas would be destroyed (ASDEIS, pp. III-177-III-230). It did recognize, however, that visual impact is highly individual based (SDEIS, p. III-196).*

**Issue: VISUAL RESOURCES**

**Subject:** The entire seven miles of scenery between Wardensville and Baker should be considered "distinctive" and must be evaluated for possible environmental impacts.

***Response:*** *The visual analysis prepared utilizing the FHWA's Visual Impact Assessment for Highway Projects did not indicate that any scenic vistas would be destroyed (ASDEIS, pp. III-177-III-230). It did recognize, however, that visual impact is highly individual based (SDEIS, p. III-196).*

**Issue: CULTURAL RESOURCES**

**Subject:** Neither the WV or the VA SHPO have concurred in the identification of historic resources within the area of potential affects.

***Response:*** *Studies and investigations required under Section 106 of the Historic Preservation Act of 1966 as amended have been undertaken with the concurrence of the West Virginia State Historic Preservation Officer and the Advisory Council for Historic Preservation. Additional studies, investigations and concurrences that are required to assure compliance with Section 106 are detailed in the Programmatic Agreement (FEIS, Appendix B).*

**Issue: VISUAL RESOURCES**

**Subject:** The criteria used for assessing visual impacts as major, moderate, and negligible fails to take into account topography of the area.

***Response:*** *The visual analysis prepared utilizing the FHWA's Visual Impact Assessment for Highway Projects did not indicate that any scenic vistas would be destroyed (ASDEIS, pp. III-177-III-230). It did recognize, however, that visual impact is highly individual based (SDEIS, p. III-196).*

**Issue: CULTURAL RESOURCES**

**Subject:** Many historic homesteads show only building locations, the surrounding landscape frequently provides context that contributes to their historic significance.

***Response:*** *Issues addressing architectural overviews, rural landscape patterns, and settlement distribution are provided in the referenced ASDEIS Cultural Resources Technical Report (pp. 347-351, 519-526). Formal boundary delineation of historic-period resources will be provided in final Determination of Eligibility reports as part of the ongoing Section 106 process (see Appendix B of the FEIS). Additional discussion of this issue is included in Volume I of the FEIS (Section III(L)).*

**Issue: CULTURAL RESOURCES**

**Subject:** The predictive techniques employed in the evaluation do not provide the accuracy of actual field work or measurement of effects.

***Response:*** *The model testing effort was, in effect, a way to bridge the gap between the field work and model development. The predictive model testing was field verified. Results of the field verification of the predictive model were used to upgrade the probability area distributions according to field conditions (e.g. fine scale variation). The model testing effort was not meant to measure or determine project effect.*

**Issue: FOREST FRAGMENTATION AND BIODIVERSITY**

**Subject:** The SDEIS merely states an unsupported conclusion that it is "unlikely" that genetic diversity would decline.

***Response:*** *All of the studies but one cited in the ASDEIS(p. III-314-III-318) indicate that highways do not act as barriers to the movement patterns of vertebrate species common to the project area. Additionally, bridges and culverts serve to facilitate gene flow between populations thus mitigating any assumed "barrier effect" of a highway and its associated right-of-way.*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** The SDEIS admits an adverse impact on wood turtle habitat, in reality it is a population of wood turtles which is at risk.

***Response:*** *The wood turtle population is located in the Commonwealth of Virginia and would not be impacted by the Preferred Alternative (WV).*

**Issue: WATER RESOURCES**

**Subject:** The SDEIS does not discuss that treatment of stormwater runoff will probably be required. The statement that such pollution should be minimized is not a rational analysis of the impact.

***Response:*** *Stormwater runoff, based on projected traffic volumes (ADT) for the Preferred Alternative, will have minimal impact on receiving streams. Stormwater runoff will be treated as required by state and Federal regulations.*

**Subject:** No discussion in the SDEIS on the effect on streams and aquatic wildlife during bridge construction.

***Response:*** *Where practicable, the WVDOH is committed to not disturbing terrestrial and aquatic habitat beneath bridge crossings. This issue is addressed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: WILD AND SCENIC RIVERS**

**Subject:** A suitability study under the Wild and Scenic Rivers Act is required.

***Response:*** *Suitability studies are the responsibility of the overseeing agency. To date, only the Cacapon has been evaluated for suitability for inclusion into the system. However, the DOI determined that the Cacapon is not suitable for listing due to lack of public support. The section of the South Branch of the Potomac River listed in the NRI as eligible for Scenic status is not crossed by this project.*

**Issue: GEOLOGY, MINES, AND MINERALS**

**Subject:** If acidic seeps are created, each one would be a point source and require an NPDES permit.

***Response:*** *NPDES permits will be applied for and secured for each construction segment. This issue is addressed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: WATER RESOURCES**

**Subject:** The adverse effects of stormwater run-off should be mitigated in WV by using VA's standards.

***Response:*** *Stormwater control measures will be those required by WV state regulations.*

### Issue: RELATIONSHIP OF LOCAL SHORT-TERM USES VERSUS LONG-TERM PRODUCTIVITY

**Subject:** Discussions of short vs. long-term productivity and irreversible and irretrievable commitments of resources and of Secondary and Cumulative Impacts are lacking in detail.

***Response:*** *Discussion of these topics follow those guidelines found in CEQ (23 CFR 1502.16) Regulations and FHWA's T.A. 6640.8A, which states in part that: "The EIS should discuss in general terms the proposed action's relationship of local short-term impacts and use of resources and the maintenance and enhancement of long-term productivity"; and, "The EIS should discuss in general terms the proposed action's irreversible and irretrievable commitment of resources".*

**Subject:** The discussion of these topics in the SDEIS occupies a total of one page whereas NEPA requires a "detailed" statement of the relationship between short term usage and long term productivity.

***Response:*** *Discussion of these topics follow those guidelines found in CEQ (23 CFR 1502.16) Regulations and FHWA's T.A. 6640.8A, which states in part that: "The EIS should discuss in general terms the proposed action's relationship of local short-term impacts and use of resources and the maintenance and enhancement of long-term productivity"; and, "The EIS should discuss in general terms the proposed action's irreversible and irretrievable commitment of resources".*

### Issue: SECTION 4(F) AND SECTION 6(F) RESOURCES

**Subject:** Corridor H will use Section 4(f) - Protected Resources.

***Response:*** *The Preferred Alternative (WV) does not use any 4(f) resources (see FEIS, Vol. I, Section IV).*

**Subject:** The following resources are 4(f) -Big Blue Trail, proposed ADT, the Allegheny Trail, Johnnies Knob Management area, and Fernow Experimental Forest.

***Response:*** *With Virginia's decision not to pursue the project, there will be no impacts to the Big Blue Trail. The 4(f) status for the proposed American Discovery Trail and the Allegheny Trail is discussed in the FEIS (Section III, J-Recreation Resources). The Preferred Alternative does not use either the Johnnies Knob Management Area or the Fernow Experimental Forest.*

**Issue: MISCELLANEOUS**

**Subject:** A new SDEIS is required to correct the SDEIS' analytical, substantive, and procedural deficiencies.

***Response:*** *The ASDEIS is in full compliance with the procedural requirements of NEPA. The methodologies utilized in the Alignment Selection DEIS were developed jointly and agreed upon by the WVDOH and cooperating agencies.*

### Commentor: Foch, Dr. James

**Public**

**Issue: NOISE**

**Subject:** The SDEIS ignores the extreme variation in noise levels generated by heavy trucks descending and ascending steep grades.

***Response:*** *The effects of grades upon the sound emission levels were incorporated using the NCHRP Report 117 Method which provided a table used to account for these effects. Based on the table, a positive adjustment was made to the truck levels (cars are not included) for those only going uphill. A negative adjustment was not made for downhill traffic as per the recommendation of the report. Also note that the decibel levels in the SDEIS do not take into account for shielding because it was the analyst's intention to "capture" the greatest number of possible impacts resulting from the proposed roadway. Shielding and other factors were taken into account for noise mitigation in the final analysis.*

**Issue: NOISE**

**Subject:** The SDEIS makes the erroneous claim that wilderness areas will be protected based on FHWA noise criteria.

***Response:*** *The ASDEIS makes no claim that wilderness areas will be "protected" from noise based on FHWA noise criteria. The noise analysis was performed according to the guidelines established by 23 CFR Part 772. The criteria included as part of this regulation exists for the protection of people and not property. Otter Creek Wilderness is located approximately 2.5 miles from the proposed roadway at its nearest point. The noise contribution from the roadway is predicted to be approximately 37 dBA without including the intervening terrain. Dolly Sods, located approximately 8.75 miles from the proposed roadway, has a predicted roadway contribution of approximately 28 dBA without the intervening terrain.*

**Subject:** Choice of a noise criterion (55dBA) should not be based on what is economically feasible.

***Response:*** *The use of this noise criterion was not used in the ASDEIS noise analysis.*

**Subject:** Use of any arbitrary sound level (such as 55dBA) as a noise criterion for pristine areas in the MNF is inappropriate.

***Response:*** *The use of this noise criterion was not used in the ASDEIS noise analysis.*

**Subject:** The proper measure of noise impact in pristine areas is audibility or acoustic detectability.

***Response:*** *The noise analysis was performed according to FHWA guidelines 23 CFR part 772. The descriptors that may be used for highway sound level analysis are either Leq (the equivalent sound energy level) or L10 (the sound energy level exceeded 10 percent of the time), but not both, according to the 23 CFR Part 772 guidelines. In addition, the Class I area in the Mon National Forest is located more than 2 miles away from the proposed roadway. The "noise swaths" mentioned in the formal comment that may increase sound levels only identify "swaths" 1 and 2 miles away.*

**Issue: NOISE**

**Subject:** Noise prediction, based on the FHWA noise model, ignores the phenomenon of temperature inversion.

***Response:*** *Temperature inversions occur during the night and early morning hours, which are not concurrent with peak traffic noise periods of the day. They occur in late summer and early fall and then only under the correct series of atmospheric conditions. The small amount of collected data on the subject indicates that sound levels may be affected at greater heights and not those sound levels near the earth's plane. Also, noise propagation waves still decrease with distance because of geometric spreading and lose sound level energies as they are absorbed, reflected or refracted.*

**Subject:** The SDEIS erroneously identifies as the maximum limit of area (1000 feet) affected by highway noise.

***Response:*** *The ASDEIS does not delineate any expected maximum impact area. The noise analysis takes into account the effects of noise impacts according to 23 CFR Part 772 guidelines, regardless of the distance from the proposed roadway.*

## Commentor: Frye, Mr. Dennis E., President

**Group - APCWS**

### Issue: CULTURAL RESOURCES

**Subject:** The proposed four-lane highway will impact Civil War battlefields at Corrick's Ford and Moorefield.

***Response:*** *Corricks Ford Battlefield and Moorefield Battlefield are discussed in the FEIS (Section III, L -Cultural Resources). There will be no use of these sites by the proposed project.*

## Commentor: Funk, Mr. Arlie

**Public**

### Issue: ALIGNMENT MODIFICATION

**Subject:** Could you reconsider the alignment location along Luxemburg Road. Its proposed location has serious impacts on my property.

***Response:*** *We examined the alignment in the vicinity of your property along Luxemburg Road and considered a line that would turn south and pass west of your property. We would be able to place an alignment behind your house and stay within our design criteria; however this shift would result in an extensive relocation of Luxemberg Road and result in the taking of an additional home. Also two perennial streams located parallel to Luxemburg Road would be impacted. For these reasons, the proposed alignment of Corridor H will not be changed in this area.*

## Commentor: George, Mr. Larry W., Attorney-at-Law

**Group - Capon Springs & Farms, Inc.**

### Issue: CAPON SPRINGS

**Subject:** Ask that all reasonable and necessary measures to protect the springs be expressly set forth in the FEIS and the Corridor H record of decision.

***Response:*** *Investigation, avoidance of impacts, and development of any required mitigation measures will be an ongoing process. Commitments to that process are contained in the Corridor H FEIS Mitigation Document. Specific measures can not be developed until final designs are completed and are not part of the FEIS.*

**Commentor: Gillies, Mr. Nell**

**Group - Corridor H Alternatives**

**Issue: IMPROVED ROADWAY ALTERNATIVE**

**Subject:** The IRA alternative was not addressed. Additionally, the design is intended to be a "red herring".

***Response:*** *As required by CEQ and FHWA, each alternative was developed to the same level of detail to facilitate comparisions. Two Improved Roadway Alternatives (IRA) were considered during the Corridor H study process. The first IRA considered the improvement of local roads throughout the Corridor H project area. It was dismissed as a viable alternative in the CSEIS (refer to Section II). In the ASDEIS, a second IRA was developed within the selected Corridor, D5. This IRA was dismissed because it did not meet the purpose and need of the project (refer to Section II of the FEIS)*

**Issue: ECONOMIC DEVELOPMENT**

**Subject:** A 100% build-out seems very excessive.

***Response:*** *Employment projections were based on recognized and widely-used assumptions and models, as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out and employment of industrial parks was undertaken so as to develop the "worst case" secondary impact scenario.*

## Commentor: Good, Mr. Gregory A., Director, Monongahela Trails Project

**Group - WV Chapter of the Sierra Club**

### Issue: RECREATION RESOURCES

**Subject:** Within the 30-minute commuting corridor addressed by the DEIS, a surprising number of explicitly recreational areas exist that weren't evaluated.

***Response:*** *Recreation resources indicated in Table III-28, were identified using available mapping (numerous sources), and through coordination with Federal, State, and local governmental agencies (ASDEIS, p. III-159; References include: American Hiking Society, American Hiking Society, Hardy County Planning Commission, Pocahontas County Tourism Commission, Potomac Appalachian Trail Club, Tucker County Alpine Festival, Inc., Tucker County Convention and Visitors Bureau, Final Revised Land and Resource Management Plan, George Washington National Forest, Final Environmental Impact Statement for the Land and Resource Management Plan, Monongahela National Forest, National Survey of Fishing, Hunting and Wildlife - Associated Recreation; West Virginia, Virginia Outdoors Plan; Executive Summary, West Virginia Statewide Comprehensive Outdoor Recreation, West Virginia Travel and Tourism Economic Impacts 1992, February 1993, and West Virginia Scenic Trails Association Hiking Guide to the Allegheny Trail.*

**Subject:** Otter Creek Wilderness Area , Laurel Fork North and South Wilderness Areas were not discussed in the SDEIS.

***Response:*** *The Otter Creek Wilderness Area, at its closest point, is 2.5 miles from the proposed highway. Likewise, Laurel Fork North and South are 14.5 and 16.0 miles from the project, respectively. Predictive models utilized for the Alignment Selection SDEIS did not identify any impacts to the Laurel Fork Wilderness Areas or the MNF (ASDEIS p. III-26-III-40, Secondary and Cumulative Impacts Technical Report). However, these resources will be more accessible to the public as a result of construction of the preferred alternative. The likely result of this increased accessibility to these public resources will include increased public utilization, enjoyment, awareness, and appreciation of wilderness areas.*

### Issue: NATIONAL FOREST LANDS

**Subject:** The evaluation team was completely unaware of the existence of MNF lands designated Management Prescription 6.2. A number of MP 6.2 areas within the 30-minute contour were missed.

***Response:*** *An extensive discussion of MNF Forest Management Prescription (MP) Areas was included in the CSDEIS pp. IV-11-20. The CSDEIS (p. IV-18) analysis revealed that Scheme Option D5 would not impact MP 6.2 Areas.*

**Subject:** The DEIS for Corridor H is extremely deficient in its analysis of its effect on recreation on the MNF. The increase in recreational loading that must be expected if the projected traffic increase occurs makes this deficiency troubling. Increased use of MNF recreational resources due to Corridor H could only lead to irretrievable loss of resources.

***Response:*** *The CSDEIS discusses involvements with the MNF on p. III-204. The selection of Scheme Option D5 was partially based on its avoidance of involvements with sensitive recreational resources (Corridor Selection SDEIS Decision Document, p. 26). There are also discussions of recreation resource use on p. III-203 of the CSDEIS and on p. III-162 of the ASDEIS. Predictive models utilized for the Alignment Selection SDEIS did not identify any impacts to the Laurel Fork Wilderness Areas or the Otter Creek Wilderness Area. However, as stated in the Corridor Selection Transportation Needs Study (March 1992, pp. III-16-III-17), the primary access routes which provide linkage from I-81 in Virginia to the recreational resources of the region are generally substandard. Recreational demand will likely increase, but existing highway deficiencies may deter prospective tourism. As projected traffic volumes increase on these routes, access and mobility will further deteriorate. Such a trend will likely discourage non-residents from traveling to the region.*

**Issue: SECTION 4(F) AND SECTION 6(F) RESOURCES**

**Subject:** MNF MPs 6.1 and 8.0 are not counted as 4(f) resources. No provisions are discussed in the SDEIS for mitigation of increased recreational use of these sensitive areas.

***Response:*** *A discussion of the 4(f) status of MP 6.1 and 8.0 areas is included in the FEIS (Section III, L-Cultural Resources).*

### Commentor: Graf, Mr. Charles A., President

**Group - Potomac Appalachian Trail Club**

**Issue: IMPROVED ROADWAY ALTERNATIVE**

**Subject:** It seems that the IRA is merely a slightly narrower version of the Build Alternative.

***Response:*** *Two Improved Roadway Alternatives (IRA) were considered during the Corridor H study process. The first IRA considered the improvement of local roads throughout the Corridor H project area. It was dismissed as a viable alternative in the CSEIS (refer to Section II). In the ASDEIS, a second IRA was developed within the selected Corridor, D5. This IRA was dismissed because it did not meet the purpose and need of the project (refer to Section II of the FEIS).*

**Issue: TRAFFIC**

**Subject:** The estimates given for traffic along the affected corridor do not appear to result from more than speculation.

***Response:*** *A detailed description of the methodologies employed to estimate traffic volumes was included in Section II of the ASDEIS, as well as the FEIS.*

**Issue: ECONOMIC DEVELOPMENT**

**Subject:** Figures for economic development used in the Alignment Selection SDEIS also appear to be based more on conjecture and hope than on fact.

***Response:*** *Employment projections were based on recognized and widely-used assumptions and models, as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out and employment of industrial parks was undertaken so as to develop the "worst case" secondary impact scenario.*

**Issue: PEDESTRIAN AND BICYCLING TRAILS**

**Subject:** PATC rejects the statement that "all possible planning to minimize harm" was taken with respect to the Big Blue Trail/VA Route 55 crossing. The plans do not take into account a number of issues. There will be no public accommodation and access will be denied to trail users when the new road is built. See extended comment in PATC's letter. PATC believes that the relocation will take up to 2 years to complete due to the terrain and steepness of the relocation.

***Response:*** *With Virginia's decision to not pursue the four-lane Build Alternative or the IRA in Virginia and a redesign of the Preferred Alternative's transition into WV 55, a relocation of the the Big Blue Trail will not be required.*

**Subject:** The design of the proposed relocation will not allow concurrent work on the Big Blue Trail while road construction occurs. After construction of the roadway, the closest point to access the BBT is 10 miles away. PATC stands by its comments contained in the February 12, 1993 letter, regarding the mitigation required to support the BBT. PATC strongly urges the WVDOT and the FHWA to provide for safe public access and parking on either side of the highway constructed, and that they provide a safe pedestrian footbridge to cross the highway (including horses and bicyclists).

***Response:*** *With Virginia's decision to not pursue the four lane Build Alternative or the IRA in Virginia and a redesign of the Preferred Alternative's transition into WV 55, a relocation of the the Big Blue Trail will not be required.*

**Issue: COMMENTS PRIOR TO THE ALIGNMENT SELECTION SDEIS**

**Subject:** The SDEIS does not include the comments and recommendations that this group provided in response to the Corridor Selection DEIS.

***Response:*** *As is consistent with responding to public comments utilizing a tiering process (23 CFR 777.111), comments from both the general and site-specific environmental effects are addressed in the FEIS. Coordination with the GWNF, WVDOH and PATC has been on-going throughout the tiering process.*

## Commentor: Graziani, Jr., Mr. Philip J., City Clerk

**City Government**

**Issue: LINE I: INTERCHANGE OPTION AREA**

**Subject:** The design of the ramp at Aggregates is of concern. The plan for the exchange ramp on the Parsons road is undesirable. Council supports the Laurel Mountain, Line I Option.

***Response:*** *The Preferred Alternative follows Line I within the Interchange Option Area.*

## Commentor: Harrison, Jr., Mr. Roger, Executive Director

**Group - WV Rivers Coalition**

**Issue: WATER RESOURCES**

**Subject:** You must consider reducing the number of stream involvements and relocations so as to preserve the biological integrity of these waters.

***Response:*** *Stream avoidance during the preliminary engineering phase is discussed in the ASDEIS on pp. III-472-474. Additional discussion of avoidance and minimization measures are discussed in the 404 (b)(1) alternatives analysis found in the ASDEIS Appendices. Finally, additional avoidance and minimization measures will be investigated during the final design phase.*

**Issue: WILD AND SCENIC RIVERS**

**Subject:** The negative impact on the Scenic status of the Shavers Fork, with the downgrading to Recreational or elimination from eligibility entirely is unacceptable in light of the on-going study of the river.

***Response:*** *Following publication of the Monongahela National Forest's Wild and Scenic River Study Report and Environmental Impact Statement on Twelve Rivers in the Monongahela National Forest (1995), a re-assessment of the project impact on the Scenic designation of Shavers Fork was undertaken. That re-assessment is found in Section III (S).*

**Subject:** We believe that you must re-examine/examine the values of the South Branch, the Cacapon, and Cedar Creek to determine their eligibility for inclusion into the WSR system.

***Response:*** *Eligibility studies of the identified rivers have been conducted by the responsible agencies (MNF, GWNF, VADCR). Cedar Creek and the Cacapon River segments were determined to be eligible for Scenic status. However, the DOI determined that the Cacapon is not suitable for listing due to lack of public support. The section of the South Branch of the Potomac River listed in the NRI as eligible for Scenic status is not crossed by this project. The proposed bridge crossing of Cedar Creek is adjacent to the existing VA 55 crossing. The existing crossing did not preclude Cedar Creek from eligibility for Scenic status. There would be minimal additional impacts from the proposed bridge and no secondary development is projected to occur within the vicinity of the crossing. The proposed bridge would avoid the cultural resources for which the river segment is listed.*

**Issue: GEOLOGY, MINES, AND MINERALS**

**Subject:** The SDEIS does not give adequate consideration to the issue of AMD due to exposure of pyritic materials.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: MISCELLANEOUS**

**Subject:** The SDEIS notes an excess of 60.3 million cubic yards of waste material. There is no mention of how this material is to be dealt with.

***Response:*** *The potential volume of excess material generated is a gross estimate. It is anticipated that the amount of excess material generated will be reduced by 50% or more during final design of the Preferred Alternative. As detailed in the Corridor H FEIS Mitigation Document, the disposal of waste material will not be placed in "sensitive" resources (perennial streams, wetlands, floodplains, cultural resources, etc.).*

## Commentor: Kotcon, Mr. Jim, State Government Programs Chair, and Helen Ries, Corridor H Coordinator.

**Group - WV Chapter of the Sierra Club**

**Issue: PURPOSE AND NEED**

**Subject:** The purpose and need for Corridor H is not valid because VA Commonwealth Transportation Board objects to construction within VA.

***Response:*** *The effects of the project as a result of the Commonwealth of Virginia's decision are discussed in Section IV of the FEIS.*

**Issue: BICYCLE FACILITY TYPES**

**Subject:** The discussion of bicycle facilities is misleading and implies that these facilities could mitigate for scenic impacts of the Build Alternative.

***Response:*** *The term "visual" has been removed to avoid further confusion (II., B., p. II-20).*

**Subject:** The statement that such bike facilities could be provided gives no assurances that these facilities will be constructed.

***Response:*** *The DEIS states that WVDOT is committed to investigating the feasibility of bikeways (p. II-26) and that actual locations of such facilities would be determined during final design of the facility.*

**Subject:** The SDEIS is very misleading, trying to imply benefits and mitigation that are not assured and purely speculative.

***Response:*** *Final mitigation commitments are discussed in the FEIS and the Corridor H FEIS Mitigation Document.*

**Issue: TRAFFIC**

**Subject:** The SDEIS must explain why the projected traffic volume increased 2- to 4- fold between the Corridor SDEIS and the Alternative SDEIS.

***Response:*** *Traffic projections used in the CSDEIS were analyzed at a more general level of detail, consistent with the tiered process adopted for the Corridor H study. As such, the traffic projections were based only on extrapolation of average daily traffic data. WVDOT conducted new traffic counts since the preparation of the CSDEIS making the information used for the Alignment Selection SDEIS more recent.*

**Issue: FUTURE ROADWAY IMPROVEMENTS**

**Subject:** The SDEIS states that no additional traffic lanes for intersecting roads would be required under the Build Alternative. Therefore, there will be no increase in economic activity.

***Response:*** *The recommendations made in the SDEIS are based on the analyses conducted for the study. No data has been generated by this study to support the comment given.*

**Subject:** The SDEIS states that no additional traffic lanes for intersecting roads would be required under the Build Alternative. It is contended that Corridor H will aggravate some areas and require additional lanes at some intersections.

***Response:*** *The recommendations made in the SDEIS are based on the analyses conducted for the study. No data has been generated by this study to support the comment given. However, should the traffic growth be greater than projected in certain areas, these would be evaluated by the WVDOH as part of their normal transportation planning process.*

**Issue: ECONOMIC ENVIRONMENT**

**Subject:** SDEIS does not calculate the economic impact of traffic loss on I-79 and I-64. Analysis is needed to evaluate the true impact of Corridor H.

***Response:*** *Secondary economic impacts were determined within the project's Area of Influence as discussed in the SDEIS (p. III-26). Interstate 79 and Interstate 64 lie outside of the defined Area of Influence and were not considered further.*

**Issue: ECONOMIC DEVELOPMENT**

**Subject:** Estimates of economic activity are incorrect because "studies" have shown a net loss of economic activity in small rural communities.

***Response:*** *Some studies have shown a net loss of economic activity in small communities. However, other studies have shown just the opposite. For example, Buffington et al. (Buffington J.L., Crane, L.M., Clifton, B., & Speed, J. 1992. Methodology for Estimating Economic Impacts of Highway Improvements: Two Case Studies in Texas, in Transportation Research Record #1339. pp. 156-165) reviewed 34 studies each of which analyzed the economic impacts (e.g., change in gross sales, business closings vs. new business openings) of highways. For businesses that had been by-passed by a new highway traffic serving businesses, gross sales changes ranged dramatically (-65% to +39%). For other retail/service businesses, gross sales changes ranged from -15% to +55%. Existing business closings and openings ranged from 13 closings of original businesses to 49 openings of new businesses. Hartgen et al. (1992) (See Literature Cited ASDEIS, Secondary and Cumulative Impacts Technical Report) in their literature review found similar confounding conclusions relative to negative and positive economic impacts on business. Finally, Widner (1990) (Widner, R.R. 1990. Appalachian Development After 25 Years: An Assessment, Economic Development Quarterly. 4:4 pp. 291-312) in his qualitative assessment of the economic effects of Appalachian Corridor B from Chillicothe, Ohio to Greenville, South Carolina found dramatic differences among communities. He concludes in part that the Appalachian development highways "have played an important part in restructuring patterns of development and settlement in parts of the region. Some town are now playing service-center roles that they could not play for surrounding areas in the past."*

**Issue: GROUNDWATER**

**Subject:** The assumption that groundwater impacts from construction would be limited to 500 feet of the construction limits is not valid in Karst topography.

***Response:*** *The ASDEIS did not assume that the impacts would be limited to 500 feet. Recognition that impacts could extend to more distance points, particularly in the case of springs, was the fundamental reason for the groundwater tracing studies conducted during the ASDEIS.*

**Subject:** The assumption that groundwater impacts to wells from construction would be limited to 500 feet of construction is incorrect where deep cuts occur or where steep water table gradients occur.

***Response:*** *The ASDEIS did not assume that the impacts would be limited to 500 feet. Recognition that impacts could extend to more distance points, particularly in the case of springs, was the fundamental reason for the groundwater tracing studies conducted during the ASDEIS.*

**Subject:** Areas where deep cuts or steep water table gradients occur should be mapped and provisions for monitoring stated in the SDEIS.

***Response:*** *Concern relative to deep cuts and steep water table gradients are only relevant if the road cuts intersect the water table; most road cuts do not do that. Road cuts are mapped. Areas with steep water table gradients indicate low permeability; this would decrease the lateral distance over which highway construction might impact nearby wells.*

**Subject:** The SDEIS should state that "mitigation measures SHALL be used...", not "could be used" to avoid or compensate for impacts.

***Response:*** *All relevant and reasonable mitigation measures are discussed and assessed in the Corridor H FEIS Mitigation Document. The mitigation document is incorporated by reference into the FEIS and the Record of Decision.*

**Issue: GROUNDWATER**

**Subject:** The use of sand-peat filters to protect sinkholes is dubious and unproven in this region.

***Response:*** *Sand-peat filters are being used to protect karst groundwater in the Edward Aquifer of Texas. They are also being used and assessed by the Indiana Department of Transportation along State Road 37 in Lawrence County, Indiana which is a karst area with numerous sinkholes. Their performance is unlikely to be region-specific. Peat-sand filters are reviewed in Galli (Peat-sand filters: a proposed stormwater management practice for urbanized areas. Dept. of Env. Programs, Metropolitan Washington Council of Governments, Washington, D.C., Publ 91702, 45p.).*

**Subject:** Amend sentence to state that increased truck traffic and secondary development associated with the IRA and Build Alternative would increase the likelihood of groundwater contamination.

***Response:*** *The text has been revised in the FEIS (pp. III-49-III-50).*

**Issue: GROUNDWATER**

**Subject:** The designation of sensitivity zones in Karst/sandstone recharge units is misleading for it implies that an area of low sensitivity is defined as having fewer drinking water supplies.

***Response:*** *Zones of sensitivity were arbitrarily defined to more "finely" identify potential impacts to groundwater. This issue is further discussed in the FEIS (p. III-49)*

**Subject:** This classification is scientifically indefensible. The number of users is not relevant to the hydrogeologic sensitivity of an area.

***Response:*** *Zones of sensitivity were arbitrarily defined to more "finely" identify potential impacts to groundwater. They are not intended to indicate any degree of importance. This issue is further discussed in the FEIS (p. III-49)*

**Subject:** No mitigation or assessment of groundwater quality impacts from secondary development is discussed in this section.

***Response:*** *Potential secondary impacts to groundwater related to development are discussed on p. III-128 of the ASDEIS.*

**Subject:** The assumption of no cumulative impacts is dubious and a basis for this assumption should be presented, an accurate conclusion should be included.

***Response:*** *The ASDEIS states that there are no anticipated cumulative impacts to groundwater resources (pp. III-128).*

**Issue: AIR QUALITY**

**Subject:** The SDEIS and TR fail to consider standards for visibility for Class I air quality areas.

***Response:*** *Particulate matter, which is generally thrown into the air as a result of logging and/or mining operations, is also addressed in the ASDEIS as a result of roadway construction. Contractors are required to control fugitive dust palliatives with water, track pads or whatever is allowed by law.*

**Subject:** Air quality impact of the Build Alternative should be assessed in terms of Class I areas (i.e. Otter Creek, Dolly Sods Wilderness).

***Response:*** *These areas are too far away for localized CO impacts from the proposed highway. Ozone is a long range transport pollutant, for which stationary and area sources account for approximately 73% (VOC) to 94% (NOx) in the Charleston area and 77% (VOC) to 85% (NOx) in the Parkersburg area. If biogenic sources are included, the percentages are even greater. Note: there is no statewide breakdown for these pollutants. Information only exists in the non-attainment areas.*

**Subject:** The failure to consider Otter Creek is a major flaw in the SDEIS. Class I area increments may already be consumed by existing sources of air emissions and should be documented in the SDEIS.

***Response:*** *The allowable increments of Class I areas are in addition to existing sources. Therefore, the baseline is what is already there. Mon National Forest personnel are responsible for the review of permissible significant deterioration by new and expanding stationary sources within 80.5 km of the two Class I Wilderness Areas. The concentration levels are identified in the ASDEIS as well as their possible exceedances. These are inclusive of the existing sources of emissions.*

**Subject:** The SDEIS does not consider any cumulative impacts associated with sulfur and nitrous oxide emissions and their conversion to acid deposition.

***Response:*** *Sulfur is not a pollutant studied for highway analyses because sulfur emissions from vehicles is small. Sulfur is associated with stationary sources. Normally ozone emissions are not considered in air quality attainment areas such as the project area. However, because of a special request by EPA and the FWS, the daily changes in VOC and NOx for each alternative were calculated and included in the ASDEIS. The very small emissions of sulfur and the increased VOC and NOx from additional traffic will contribute to the air pollution load currently present. The importance or significance of that contribution, however, can not be quantified but would be expected to be insignificant. To put this in some perspective, the Shenandoah National Park in 1991 recorded their highest number of vehicles entering the park as over 148,000 during one month. For that year, it was calculated that 70 tons of NOx was emitted from all of the vehicles entering the park. The study compared this amount against the 10,000 tons of NOx per year that would be emitted from just one proposed stationary source. Even in the design year of 2013, traffic on Corridor H is not predicted to exceed 48,000 vehicles per month.*

**Subject:** The SDEIS should assess acidic deposition as a result of traffic emissions and assess cumulative impacts of the increased emissions associated with the Build Alternative.

***Response:*** *Sulfur is not a pollutant studied for highway analyses as it is primarily a stationary source pollutant.*

**Issue: AIR QUALITY**

**Subject:** The FHWA requirement for a carbon monoxide analysis is inadequate for an assessment of air pollution impacts for this project.

***Response:*** *As discussed on p. III-129 of the ASDEIS the air quality assessment "was performed following the guidelines and recommendations received from the West Virginia Department of Transportation, West Virginia Division of Environmental Protection, Virginia Department of Environmental Quality - Division of Air Quality, Virginia Department of Transportation and the Environmental Protection Agency - Region 3 in Philadelphia". Additional air quality analysis is not required for transportation project. However, at the request of the EPA, "a mesoscale analysis was performed to analyze the proposed projects effect on the precursors of ozone, volatile organic compounds (VOC's) and Nitrogen Oxides (NOx)" ASDEIS p. III-134).*

**Subject:** The CO analysis should be redone using more conservative mixing heights because temperature inversions in mountainous areas can trap CO at ground level. Note: Table 2 of the TR indicates mixing height = 100 meters. Fix.

***Response:*** *The receptor with the highest concentration for the Build Alternative (5.5 ppm for receptor B in the year 2013) was remodeled with lower mixing heights. For the example, it was remodeled with both 50 meter and 30 meter mixing heights and had a surface roughness representing forested land, similar to the forested mountain areas. Our original analysis had a surface roughness representing grass (0.75 cm), which creates little turbulence typically associated with upward and downwash wind action and is more of a worst case scenario than the currently existing area that may have trees or buildings in the vicinity. The results showed that: for 23,000 vehicles per day during the year 2013, with a mixing height of 50 meters and a surface roughness of 283 centimeters for forested land, the CO concentrations for Build Alternative Line A are predicted to be 4.3 ppm, including the background concentration for a 30 meter mixing.*

**Issue: AIR QUALITY**

**Subject:** The microscale analysis incorrectly implies that air quality is most improved by the Build Alternative. While CO emissions decrease with increasing speeds, nitrous oxide increases.

***Response:*** *There is no implication that in the report that air quality will be improved as a result of the Build Alternative. CO increases and decreases with traffic volume changes and VOC and NOx will increase as shown in the ASDEIS.*

**Issue: AIR QUALITY**

**Subject:** The SDEIS is incomplete because it fails to assess ozone increases in the mesoscale analysis.

***Response:*** *Carbon monoxide emissions were already analyzed. Normally, project level ozone emissions are not analyzed in air quality attainment areas nor are they normally analyzed if the project comes from an approved and conforming Transportation Improvement Program. In a special request by EPA prior to the completion of the ASDEIS, the daily changes in VOC and NOx for each alternative were calculated and included in the report. In addition, the Shenandoah National Park also has an air quality fact sheet (7/93) that discusses air pollution concerns in the park. However, the report only mentions off-site stationary sources and vehicle traffic in the park as pollution contributors in their study. The mesoscale analysis found that under the Build Alternative VOC and NOx will increase by 15.5% and 17.4%, respectively, over the No-Build condition. However, no method exists to translate these percentage increases into ozone increases.*

**Issue: NOISE**

**Subject:** The noise analysis is seriously flawed, based on the premise that only those noises that are subject to mitigation have an impact on the environment.

***Response:*** *The noise analysis was performed according to guidelines for human health and welfare as indicated. In addition, the descriptors that may be used for highway sound level analysis are either Leq (the equivalent sound energy level ) or L10 (the sound energy level exceeded 10 percent of the time), but not both, according to the 23 CFR Part 772 guidelines and in accordance with the Federal Aid Highway Program Manual.*

**Subject:** Similar comments were provided for the CSDEIS. The failure to address prior comments represents a fundamental error in the development of the Alignment SDEIS.

***Response:*** *A detailed noise impact analysis has been conducted as part of the alignment development process. The results of the analysis are presented in Section III-I of the ASDEIS and in the Air, Noise, and Energy Technical Report. Regarding the adequacy of the noise analysis and potential impacts on remote recreational lands and Wilderness Areas: Otter Creek Wilderness is located, at its closest point, approximately 2.5 miles from the proposed roadway. The noise contribution from the roadway is predicted to be approximately 37 dBA without including the intervening terrain. Dolly Sods, located approximately 8.75 miles from the proposed roadway, has a predicted roadway contribution of approximately 28 dBA without the intervening terrain.*

**Subject:** If the SDEIS is not amended to reflect hilly terrain, then it should state that the assessment of noise impacts represent substantial underestimates.

***Response:*** *The effects of grades upon the sound emission levels were incorporated using the NCHRP Report 117 Method which provided a table used to account for these effects. Based on the table, a positive adjustment was made to the truck levels (cars are not included) for those only going uphill. A negative adjustment was not made for downhill traffic as per the recommendation of the report. Please also note that the decibel levels in the SDEIS do not take into account for shielding because it was the analyst's intention to "capture" the greatest number of possible impacts resulting from the proposed roadway. Shielding and other factors were taken into account for noise mitigation in the final analysis. Finally, sound levels from grade adjustments do not represent "substantial underestimates" as the comment claims. According to the Report, six percent grades have an adjustment of 3 dBA to the truck traffic going uphill. When this is combined with all the other vehicles, the adjustment amounted to a 2 dBA increase overall because of the logarithmic way that sound levels are added.*

**Issue: NOISE**

**Subject:** The use of average sound level is inappropriate and misleading as a measure of noise impacts. Audibility is the appropriate measure of noise impact.

***Response:*** *The descriptors that may be used for highway sound level analysis are either Leq (the equivalent sound energy level ) or L10 (the sound energy level exceeded 10 percent of the time), but not both, according to the 23 CFR Part 772 guidelines.*

**Subject:** The noise analysis should be repeated and the SDEIS should include a discussion of the true noise impact as measured by peak noise levels.

***Response:*** *The descriptors that may be used for highway sound level analysis are either Leq (the equivalent sound energy level ) or L10 (the sound energy level exceeded 10 percent of the time), but not both, according to the 23 CFR Part 772 guidelines.*

**Subject:** The error associated with use of average sound levels is compounded by use of Category B (substantial increase criterion 15 dBA). Should use Category A and audibility (5 to 10 dBA below background).

***Response:*** *The descriptors that may be used for highway sound level analysis are either Leq (the equivalent sound energy level ) or L10 (the sound energy level exceeded 10 percent of the time), but not both, according to the 23 CFR Part 772 guidelines.*

**Subject:** The noise model does not account for the increased peak noises of heavy trucks in hilly terrain (increased engine and brake noises).

***Response:*** *The effects of grades upon the sound emission levels were incorporated using the NCHRP Report 117 Method which provided a table used to account for these effects. Based on the table, a positive adjustment was made to the truck levels (cars are not included) for those only going uphill. A negative adjustment was not made for downhill traffic as per the recommendation of the report. Please also note that the decibel levels in the SDEIS do not take into account for shielding because it was the analyst's intention to "capture" the greatest number of possible impacts resulting from the proposed roadway. Shielding and other factors were taken into account for noise mitigation in the final analysis.*

**Subject:** Additional receptors likely to be affected in currently remote areas (i.e., Otter Creek) should be assessed in terms of penetration of audible, human-induced noises, not health-based noise criteria.

***Response:*** *Otter Creek Wilderness is located approximately 2.5 miles from the proposed roadway at its nearest point. The noise contribution from the roadway is predicted to be approximately 37 dBA without including the intervening terrain. Dolly Sods, located approximately 8.75 miles from the proposed roadway, has a predicted roadway contribution of approximately 28 dBA without the intervening terrain. The result is that one would not notice the slight increase in noise.*

**Issue: NOISE**

**Subject:** Activity interference should be amended to include the impact of human-induced noise as a disturbance to recreationists in wilderness and remote recreation areas.

***Response:*** *The activity interference section does not need to be amended because highway vehicle sounds are being studied for this analysis and not human-induced noise as the comment states. Sound levels generated by pedestrian activity, hunting, boating, wildlife, wind, water and on-site vehicle usage are part of the background levels at a number of facilities and are not modeled. The comment also identifies Otter Creek Wilderness as potentially being disturbed as a result of the proposed highway. Otter Creek Wilderness is located approximately 2.5 miles from the proposed roadway at its nearest point. The noise contribution from the roadway is predicted to be approximately 37 dBA without including any intervening terrain.*

**Issue: NOISE**

**Subject:** Inclusion of open areas and wooded areas as land uses less sensitive to noise is erroneous, at least in the context for recreational lands.

***Response:*** *Open and wooded areas (non-recreational) are considered less sensitive to sound impacts because the regulations of 23 CFR Part 772 are designed to protect people and not property. In addition, sound level impacts would have to be assessed where the human -activity is within the park at not just at the boundary line. Otter Creek Wilderness and Dolly Sods are usually mentioned as being impacted by this proposed highway. The boundary of Otter Creek Wilderness is located approximately 2.5 miles from the proposed roadway at its nearest point. The noise contribution from the roadway is predicted to be approximately 37 dBA without including the intervening terrain. Dolly Sods, located approximately 8.75 miles from the proposed roadway, has a predicted roadway contribution of approximately 28 dBA without the intervening terrain.*

**Issue: NOISE**

**Subject:** The conditions under which noise measurements were collected are inadequately described in both the SDEIS and TR.

***Response:*** *Information relevant to the sound level study was presented in both the SDEIS and TR. The overlap time frame was identified and changed to reflect correct date and time in the FEIS. Places where traffic was labeled "n/a" represent areas where traffic was not visible, e.g., from inside the Mon Forest, or places where there was no traffic passing by during the measurement, e.g., the Hawse House. Meteorological conditions were within the parameters established by FHWA guide guidelines.*

**Subject:** The SDEIS and TR should include an explanation of a number of factors (meteorological, background noise) so that outside parties can adequately review these data.

***Response:*** *Information relevant to the sound level study was presented in both the SDEIS and TR. The overlap time frame was identified and changed to reflect correct date and time in the FEIS. Places where traffic was labeled "n/a" represent areas where traffic was not visible, e.g., from inside the Mon Forest, or places where there was no traffic passing by during the measurement, e.g., the Hawse House. Meteorological conditions were within the parameters established by FHWA guide guidelines.*

**Issue: NOISE**

**Subject:** Noise impacts to Otter Creek Wilderness should be addressed. If mitigation is infeasible, the loss of high quality wilderness experiences needs to be addressed.

***Response:*** *Otter Creek Wilderness is located approximately 2.5 miles from the proposed roadway at its nearest point. The noise contribution from the roadway is predicted to be approximately 37 dBA without including the intervening terrain. Dolly Sods, located approximately 8.75 miles from the proposed roadway, has a predicted roadway contribution of approximately 28 dBA without the intervening terrain. No mitigation is required.*

**Issue: NOISE**

**Subject:** Observations of the audibility of human-induced noises are needed for more distant locations in remote recreation, wilderness, and National Forest lands.

***Response:*** *The activity interference section does not need to be amended because highway vehicle sounds are being studied for this analysis and not human-induced noise as the comment states. Sound levels generated by pedestrian activity, hunting, boating, wildlife, wind, water and on-site vehicle usage are part of the background levels at a number of facilities and are not modeled. The comment also identifies Otter Creek Wilderness as potentially being disturbed as a result of the proposed highway. Otter Creek Wilderness is located approximately 2.5 miles from the proposed roadway at its nearest point. The noise contribution from the roadway is predicted to be approximately 37 dBA without including any intervening terrain.*

**Subject:** Otter Creek Wilderness, in addition to other public lands managed for remote recreation or disturbance-intolerant wildlife, should be added to this section.

***Response:*** *Noise impacts were modeled for representative natural areas of concern including Big Run Bog, Great North Mountain, and Greenland Gap. Results of that modeling are presented and discussed on pp. III-148-III-150 of the ASDEIS.*

**Subject:** Discussion of noise at the Nature Conservancy site is misleading for it implies that no additional noise impacts will occur when there will be additional noise from either of the Build Alternatives.

***Response:*** *When the sound level contribution from the traffic in Greenland Gap is added to the sound level contribution from the proposed roadway, the overall sound level stays the same. Sound is added logarithmically and when these two sounds are added, the sound from the proposed roadway does not add to the total sound level environment because it is too far below the predicted sound levels within Greenland Gap. The proposed Build Alternative is approximately 1000 feet away from the boundary and the proposed IRA alternative is approximately 1500 feet away.*

**Issue: NOISE**

**Subject:** AMM Section contains no definitive statement that ANY noise abatement would be implemented. The SDEIS is misleading in that mitigation is implied but may never be delivered.

***Response:*** *Final noise mitigation measures are presented in the FEIS (pp. III-69-III-70).*

**Issue: RECREATION RESOURCES**

**Subject:** Otter Creek Wilderness should be included in this section and should receive a negative impact assessment for the Build Alternative.

***Response:*** *The Otter Creek Wilderness Area, at its closest point, is 2.5 miles from the proposed highway. Predictive models utilized for the ASDEIS identified no impacts to this resource or the MNF (ASDEIS p. III-26-III-40, Secondary and Cumulative Impacts Technical Report). However, this resource will be more accessible to the public as a result of construction of the Preferred Alternative. The likely result of this increased accessibility will include increased public utilization, enjoyment, awareness, and appreciation of wilderness areas.*

**Subject:** Laural Fork Wilderness Areas and several Monongahela National Forest areas designated for remote recreation uses have been omitted from Table III-28.

***Response:*** *Table III-28 has been revised (see Tables, Exhibits, Figures, and Appendicies Document) to include the distances of identified Wilderness Areas from the proposed highway.*

**Subject:** Secondary development to Laural Fork Wilderness Areas and the identified Monongahela National Forest areas should be evaluated.

***Response:*** *These areas are not directly impacted by the proposed highway. The Laural Fork North and South are 14.5 and 16.0 miles respectively from the proposed Preferred Alternative. Predictive models utilized for the Alignment Selection SDEIS did not identify any impacts to the Laurel Fork Wilderness Areas or the MNF (ASDEIS p. III-26-III-40, Secondary and Cumulative Impacts Technical Report). However, these resource will be more accessible to the public as a result of construction of the preferred alternative. The likely result of this increased accessibility to these public resources will include increased public utilization, enjoyment, awareness, and appreciation of wilderness areas.*

**Subject:** Though impacts to these areas (Wilderness Areas) may initially be slight, cumulative impacts could be great as a result of secondary development.

***Response:*** *These areas are not directly impacted by the proposed highway. The Otter Creek Wilderness Area at its closest point is 2.5 miles from the proposed highway. Likewise, Laural Fork North and South are 14.5 and 16.0 miles respectively. Predictive models utilized for the Alignment Selection SDEIS did not identify any impacts to the Laurel Fork Wilderness Areas or the MNF (ASDEIS p. III-26-III-40, Secondary and Cumulative Impacts Technical Report). However, these resource will be more accessible to the public as a result of construction of the preferred alternative. The likely result of this increased accessibility to these public resources will include increased public utilization, enjoyment, awareness, and appreciation of wilderness areas.*

**Subject:** Table III-28 contains numerous omissions of recreation activities at various locations.

***Response:*** *Recreation resources indicated in Table III-28, were identified using available mapping (numerous sources), and through coordination with Federal, State, and local governmental agencies (ASDEIS, p. III-159; References include: American Hiking Society, American Hiking Society, Hardy County Planning Commission, Pocahontas County Tourism Commission, Potomac Appalachian Trail Club, Tucker County Alpine Festival, Inc., Tucker County Convention and Visitors Bureau, Final Revised Land and Resource Management Plan, George Washington National Forest, Final Environmental Impact Statement for the Land and Resource Management Plan, Monongahela National Forest, National Survey of Fishing, Hunting and Wildlife - Associated Recreation; West Virginia, Virginia Outdoors Plan; Executive Summary, West Virginia Statewide Comprehensive Outdoor Recreation, West Virginia Travel and Tourism Economic Impacts 1992, February 1993, and West Virginia Scenic Trails Association Hiking Guide to the Allegheny Trail.*

## Issue: VISUAL RESOURCES

**Subject:** Table III-31 is misleading because it undervalues the importance of visual resources associated with MNF and GWNF.

***Response:*** *The U.S. Forest Service has requested that the visual characterization of the MNF be changed from "distinctive" to "common" and that the description of its scenery not be described as "unique." These changes have been made in the FEIS.*

**Subject:** The National forests represent a huge area of distinctive visual quality.

***Response:*** *The U.S. Forest Service has requested that the visual characterization of the MNF be changed from "distinctive" to "common" and that the description of its scenery not be described as "unique." These changes have been made in the FEIS.*

**Issue: VISUAL RESOURCES**

**Subject:** It is erroneous to say that because the area is sparsely populated that no negative visual impact will occur.

***Response:*** *The visual analysis prepared utilizing the FHWA's Visual Impact Assessment for Highway Projects did not indicate that any scenic vistas would be destroyed (ASDEIS, pp. III-177-III-230). It did recognize, however, that visual impact is highly individual based (SDEIS, p. III-196).*

**Subject:** Table III-34 incorrectly states that the Build Alternatives would not have an adverse visual impact on the MNF or GWNF's.

***Response:*** *The visual analysis prepared utilizing the FHWA's Visual Impact Assessment for Highway Projects did not indicate that any scenic vistas would be destroyed (ASDEIS, pp. III-177-III-230). It did recognize, however, that visual impact is highly individual based (SDEIS, p. III-196).*

**Subject:** The use of computer model generated photos underestimates the visual impact of the Build Alternatives. The impacts would be substantially greater than is shown in the photos.

***Response:*** *Computer generated graphics were included to provide the reader with additional visual "views of" perspectives. Detailed narrative discussions and analyses are included in the ASDEIS (pp. III-177-III-231). The visual analysis, prepared utilizing the FHWA's Visual Impact Assessment for Highway Projects, did not indicate that any scenic vistas would be destroyed (Alignment Selection SDEIS, pp. III-177-III-230). It did recognize however, that visual impact is highly individual based (SDEIS, p. III-196).*

**Subject:** The statement that the visual impact of the Build Alternative is greater than that of the IRA should be revised to reflect a more accurate description.

***Response:*** *The statement referred to is an introductory statement made within the context of a comprehensive visual analysis with numerous tables and exhibit as part of the ASDEIS (Section III, K - Visual Resources).*

**Subject:** Visual impacts of the Shavers Fork option area should be considered negative and the statement (III-197) should be corrected to so indicate.

***Response:*** *The visual analysis prepared utilizing the FHWA's Visual Impact Assessment for Highway Projects did not indicate that any scenic vistas would be destroyed (ASDEIS, pp. III-177-III-230). It did recognize, however, that visual impact is highly individual based (SDEIS, p. III-196).*

**Issue: AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES**

**Subject:** Discussion of mitigation does not include definitive statements of what will be done, only vague allusions to what could be done.

***Response:*** *A more complete discussion is included in the Corridor H FEIS Mitigation Document.*

**Issue: RECREATIONAL RESOURCES**

**Subject:** The statement that Otter Creek and Dolly Sods Wilderness Areas would not be impacted by the project is incorrect.

***Response:*** *The Otter Creek Wilderness Area, at its closest point, is 2.5 miles from the proposed highway. The Dolly Sods is located approximately 8.75 miles from the proposed highway. Predictive models utilized for the ASDEIS identified no impacts to the to these resources or the MNF (ASDEIS p. III-26-III-40, Secondary and Cumulative Impacts Technical Report). However, this resource will be more accessible to the public as a result of construction of the Preferred Alternative. The likely result of this increased accessibility will include increased public utilization, enjoyment, awareness, and appreciation of wilderness areas. .*

**Subject:** Disruption and fragmentation of habitat and water pollution impacts would affect migration of terrestrial and aquatic wildlife through Otter Creek and Dolly Sods Wilderness Areas.

***Response:*** *Since the Preferred Alternative avoids direct impacts to Otter Creek and Dolly Sods, there would be no habitat fragmentation in the wilderness areas. Other than bird species, there are no long-distance migratory terrestrial or aquatic wildlife species in the project area.*

**Subject:** The discussion of water quality (Cheat River Watershed) implies that AMD is the only serious water quality problem, disregarding impacts of sedimentation and atmospheric deposition.

***Response:*** *AMD has been identified as the primary threat to aquatic resources in this watershed. The threat or impact of acidic rain is dependent on the underlying geology and soil type in addition to the inherent buffering capacity of the waterbody in question. Logging and other earth disturbance activities do pose a threat to aquatic resources in all watersheds investigated in this study. Additionally, the streams investigated in this regional project watershed were affected by acid drainage as a result of mining. No conclusion or hypotheses were formulated with respect to atmospheric deposition due to the limited temporal sampling protocol required for this study. The effect of acid rain needs to be studied on a historical basis.*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** Methods for selection of guild indicator species in the HEP is incomplete. A more complete discussion of the uncertainties and data gaps associated with the methodology is needed for the DEIS.

***Response:*** *Habitat types associated with each species were dictated by existing USFWS documented models. The species chosen to evaluate the existing habitat types of the project area were approved by the USFWS.*

**Subject:** Emphasis on HUs and hectares lost is misleading for it overlooks the importance of fragmentation and loss of connectivity associated with a line disturbance such as a new highway.

***Response:*** *Discussion of this issue begins on page 93 of the Vegetation and Wildlife Habitat Technical Report. An expanded discussion of forest fragmentation, edge effects and habitat loss are included in this section of the FEIS.*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** Discussions and conclusions for wildlife impacts ignore connectivity of habitat for migratory terrestrial wildlife (bear and large predators).

***Response:*** *Bear and other large predators, such as bobcats and coyotes, are not migratory.*

**Subject:** Lack of mitigation proposed for this section is a serious weakness that should be repaired.

***Response:*** *In conjunction with the FWS and other cooperating agencies, a terrestrial mitigation plan has been developed. That plan is contained in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** The SDEIS fails to discuss the impacts to the federally listed Endangered Virginia Northern Flying Squirrel.

***Response:*** *No populations of, or potential habitat for the Virginia Northern Flying Squirrel were identified by state or federal resource agencies as being potentially impacted by the alternatives developed. In fact, Scheme Option D5 was chosen, in part, to avoid encroachment on known habitat of this species.*

### Issue: GEOLOGY, MINES, AND MINERALS

**Subject:** The DEIS does not consider acid drainage whenever pyritic minerals are disturbed by construction and excavation. Discussion of acid drainage impacts should be added.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** The DEIS erroneously implies that only the exposure of coal waste from mining activities produces acid drainage.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

### Issue: GEOLOGY, MINES, AND MINERALS

**Subject:** The section erroneously implies that revegetation and soil cover eliminates acid formation. There is no known method to prevent acid drainage formation except complete avoidance.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** The SDEIS erroneously implies that avoiding coal seams would prevent acid drainage. Pyritic overburden is a much larger source of acid than coal seams penetrated.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Appropriate test borings, testing of geologic strata for acid base accounting should be conducted. The procedure outlined in the SDEIS would fail to identify acid producing strata.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Proper diversion and treatment of acid drainage is not defined in the SDEIS.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Active treatment for acid drainage includes neutralization and removal of toxic metals, the cost required for a project of this magnitude needs to be addressed.

***Response:*** *Comment noted.*

### Commentor: Landenberger, Mr. Rick

**Public**

**Issue: PURPOSE AND NEED**

**Subject:** Fundamental inadequacies in the Traffic Analysis undermine the Purpose and Need for Corridor H.

***Response:*** *Future predictions of traffic are founded on reasonable assumptions and past trends. Traffic projections were developed using a combination of extrapolation of historic data on average daily traffic, extrapolation of census data on population growth, motorist interviews, and application of economic development models used in similar demographic and socioeconomic regions of the country. All methods utilized in the Corridor H study have been used and accepted on other four-lane highway projects.*

**Subject:** Purpose and Need is based on inadequate analysis of the seven factors to establish project need.

***Response:*** *The Purpose and Need Analysis was established in the Corridor Selection Transportation Needs Study, March 1992. It was included in the approved Corridor Selection SDEIS, October 21, 1992, and the CSDEIS Decision Document of July 26, 1993. The Purpose and Need statement in the Alignment Selection SDEIS referenced the detailed Purpose and Need analysis previously conducted.*

**Subject:** State of VA's rejection of the build and IRA alternatives makes the underlying purpose of connecting I-79 to I-81 impossible.

***Response:*** *System linkage, in terms of connecting I-79 in WV and I-81 in VA is one of many need factors that the Build Alternative of Corridor H would address. The VA Commonwealth Transportation Board's Resolution of February 15, 1995, directed the VADOT to study the Route 55 corridor safety aspects such as horizontal and vertical alignments, possible need for truck climbing lanes, intersection improvements and other safety related features of the roadway as may be included in the Six Year Plan.*

**Issue: TRAFFIC**

**Subject:** System linkage assessment does not adequately address the relationships between I-64, I-68 and Corridor H.

***Response:*** *System linkage issues were addressed in the Corridor Selection Transportation Needs Study (II-1) March 1992, and the CSDEIS October 21, 1992 .*

**Issue: TRAFFIC**

**Subject:** Roadway deficiencies assessment disregards the interrelated nature of the existing road systems. The SDEIS requires a more thorough evaluation of existing roadway deficiencies.

***Response:*** *Roadway deficiencies and system linkage were investigated and thoroughly discussed in the Transportation Needs Study (pp. II-1 through II-7; March 1992). Additionally, traffic analyses were conducted by a registered traffic engineer using those methods commonly utilized and accepted by the profession. The ASDEIS (pp. II-68 and II-69) presents a detailed account of the traffic modeling that was done using the QRSII Traffic Model.*

**Issue: ECONOMIC DEVELOPMENT**

**Subject:** Industrial development is assumed to take place at existing industrial parks or those that are planned is an invalid statement.

***Response:*** *The rationale for industrial development occurring in established industrial parks is detailed in the Alignment Selection SDEIS and the Secondary and Cumulative Impacts Technical Report (p.8).*

**Issue: RECREATION RESOURCES**

**Subject:** Request that the Otter Creek Wilderness be analyzed for both direct and indirect environmental impacts.

***Response:*** *The Otter Creek Wilderness Area at its closest point is 2.5 miles from the proposed highway. Predictive models utilized for the Alignment Selection SDEIS did not identify any impacts to this resource or the MNF (SDEIS p. III-26-III-40, Secondary and Cumulative Impacts Technical Report). However, this resource will be more accessible to the public as a result of construction of the preferred alternative. The likely result of this increased accessibility to this resource will include increased public utilization, enjoyment, awareness, and appreciation of wilderness areas.*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** USDOT and Southerland citations are missing.

***Response:*** *Proper citations have been included in the FEIS Reference Section.*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** Habitat quality is a crude estimate and not assessed using a non-dimensional index. Habitat types not broken down far enough, oversimplified guild-based indicator species models and habitat generates meaningless data.

***Response:*** *HEP was developed by the USFWS to rate the quality and quantity of wildlife habitat. The described HEP methodology, the use of guild based indicator species, and the classification of forested habitat types using the Anderson land cover and land use classification system, are accepted procedures by both state and federal resource agencies to address potential highway impacts to wildlife habitat.*

**Subject:** Believes that the methodology section of the TR is flawed and inadequate due to extreme oversimplification. Recommends reevaluating by forest community.

***Response:*** *See page 3 of technical report. HEP was developed by the USFWS to rate the quality and quantity of wildlife habitat. The described HEP methodology, the use of guild based indicator species, and the classification of forested habitat types using the Anderson land cover and land use classification system, are accepted procedures by both state and federal resource agencies to address potential highway impacts to wildlife habitat.*

**Subject:** Can't divide study area into homogeneous subareas based on existing vegetative cover type. Homogenizing cover types using mean habitat variables inaccurately and imprecisely estimates the true nature of the native forest.

***Response:*** *See page 3 of technical report. HEP was developed by the USFWS to rate the quality and quantity of wildlife habitat. The described HEP methodology, the use of guild based indicator species, and the classification of forested habitat types using the Anderson land cover and land use classification system, are accepted procedures by both state and federal resource agencies to address potential highway impacts to wildlife habitat.*

**Subject:** 77145 HU's lost is inaccurate and unacceptable. Assumption that habitat quality adjacent to ROW is equal to the true forest interior habitat is wrong.

***Response:*** *See page 43 of the Vegetation and Wildlife Habitat Technical Report for the number of HU's lost for each alternative.*

**Subject:** Should include noise, humidity changes, wind speed/direction, indirect effect for analyzing true impacts. The document has reduced most complex forest ecosystem to a listing of inaccurate numbers based on a few variables

***Response:*** *An analysis of these factors is not required by resource agencies to evaluate potential effects on wildlife resources. The number of variables assessed was based on output from the USFWS HSI program which was driven by the individual species requirements as defined in existing USFWS documented models.*

### Issue: FOREST FRAGMENTATION AND BIODIVERSITY

**Subject:** Literature review is incredibly biased. It is an accepted fact that interior forest dwelling birds are declining across the east; this is documented.

***Response:*** *The over two dozen references to scientific literature cited in the discussion of forest fragmentation (SDEIS, pp. III-295-III-300) support the consensus conclusion in the SDEIS.*

**Issue: FOREST FRAGMENTATION AND BIODIVERSITY**

**Subject:** Methodology section should have focused on environmental effects of fragmentation not the regional scale of land use/land cover.

***Response:*** *It is appropriate to look at forest fragmentation from a regional perspective. Forest fragmentation is the process whereby large, continuous, and often homogenous areas of forest are broken into smaller often isolated tracts surrounded by a matrix of cultivated land, residential development, or other nonforest land use. An additional regional analysis of forest fragmentation data was conducted for the FEIS. Results of that analysis are included in the Vegetation and Wildlife Section of the FEIS.*

**Subject:** Assessment oversimplifies the effects of fragmentation because only patch size and not habitat quality within patches were assessed.

***Response:*** *The analysis assumed that any created patches below certain size criteria would not be used for breeding purposes by the evaluation species. Robbins et al., (1989) suggest that small forest tracts containing certain favorable habitat characteristics could be used by species that are found in larger tracts. An individual habitat assessment of created forest patches would likely show some of these suitable for use by neotropical migrants and would lower the number of "unusable" patches reported. An additional regional analysis of forest fragmentation data was conducted for the FEIS. Results of that analysis are included in the Vegetation and Wildlife Section of the FEIS.*

## Commentor: LaRusso, Ms. Dorothy K.

**Public**

**Issue: MISCELANOUS**

**Subject:** No cost-benefit analysis is provided in the SDEIS.

***Response:*** *NEPA does not require that a cost-benefit analysis be undertaken in the preparation of an SDEIS and/or FEIS.*

**Issue: ECONOMIC DEVELOPMENT**

**Subject:** The economic benefits are highly speculative and lack realistic justification.

***Response:*** *Employment projections were based on recognized and widely-used assumptions and models, as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out and employment of industrial parks was undertaken so as to develop the "worst case" secondary impact scenario.*

**Issue: WARDENSVILLE SPRING**

**Subject:** The validity of the statement, that there will be no impact on Wardensville Spring or its associated wellhead protection area, is without foundation.

***Response:*** *The actual statement is found on p. III-95 of the ASDIES; it states that neither the No-Build Alternative nor the IRA would impact the Wardensville Spring or its associated wellhead protection area. The statement is correct; neither the existing road nor the IRA cross, or would cross, the delineated wellhead protection area for Wardensville Spring. Additional studies will be conducted on the Wardensville Spring WPA to better ascertain the recharge area for the spring. These and possible mitigation measures are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Subject:** Questions the adequacy of proposed measures to prevent contamination of the water supply during construction and operation of the highway.

***Response:*** *Mitigation measures discussed in the ASDEIS were developed to a level of detail allowed by the level of engineering performed for NEPA highway documents. This is consistent with FHWA regulations (23 CFR 771.125). Additional measures are included in the Corridor H FEIS Mitigation Document, which is incorporated by reference into the FEIS.*

**Subject:** The SDEIS does not include inspection procedures to ensure that mitigation measures are operating successfully.

***Response:*** *The inspection and monitoring procedures are identified on pp. III-95 and 96 of the ASDEIS.*

## Commentor: Little, Ms. Elizabeth, President

**Group - West Virginia Environmental Council**

**Issue: ECONOMIC DEVELOPMENT**

**Subject:** Cannot accept the assumptions on which the highway's economic benefits are founded.

***Response:*** *The economic analysis section of the Alignment Selection SDEIS was undertaken to assess potential direct economic impacts and indirect secondary impacts from the proposed project as required by FHWA T.A. 6640.8A.*

**Issue: ECONOMIC DEVELOPMENT**

**Subject:** Supposed benefits (8000 permanent jobs) in WV pale beside the billion-dollar cost and extensive damage to the environment.

***Response:*** *The economic analysis section of the Alignment Selection SDEIS was undertaken to assess potential direct economic impacts and indirect secondary impacts from the proposed project as required by FHWA T.A. 6640.8A. The economic analysis was not undertaken as a cost-benefit analysis and should not be construed as such. NEPA does not require that a cost-benefit analysis be undertaken in the preparation of an SDEIS and/or FEIS.*

## Commentor: Lukei, Jr., Mr. Reese F.

**Group - American Hiking Society**

**Issue: PEDESTRIAN AND BICYCLING TRAILS**

**Subject:** There is one major disruption of the planned ADT[American Discovery Trail] route that would require a replacement route for both the IRA and Line A. If the replacement route is not provided for, the American Hiking Society will oppose either alternative.

***Response:*** *A detailed discussion of the impacts of the Preferred Alternative (WV) on the American Discovery Trail is included in the FEIS (Section III, J-Recreation Resources).*

## Commentor: McFerrin, Mr. John, President

**WV Highlands Conservancy**

**Issue: PURPOSE AND NEED**

**Subject:** Question Need due to VA's refusal to build Corridor H. Without VA's participation the project cannot accomplish its purpose.

***Response:*** *The Preferred Alternative (WV) meets the purpose and need and logical termini as discussed in Section IV of the FEIS.*

### Issue: ALTERNATIVES CONSIDERED

**Subject:** The SDEIS is biased towards a four-lane alternative. The IRA is really a two-lane Build Alternative. The alternative of improving existing roads is not considered. See letter for specific issues regarding these biases.

***Response:*** *As required by CEQ and FHWA, each alternative was developed to the same level of detail to facilitate comparisions. Two Improved Roadway Alternatives (IRA) were considered during the Corridor H study process. The first IRA considered the improvement of local roads throughout the Corridor H project area. It was dismissed as a viable alternative in the CSEIS (refer to Section II). In the ASDEIS, a second IRA was developed within the selected Corridor, D5. This IRA was dismissed because it did not meet the purpose and need of the project (refer to Section II of the FEIS).*

### Issue: PURPOSE AND NEED

**Subject:** If the project is weighed on the basis of the SDEIS, the supposed economic advantages are so reduced that the cost of construction overwhelms the benefits or the project.

***Response:*** *The economic analysis section of the Alignment Selection SDEIS was undertaken to assess potential direct economic impacts and indirect secondary impacts from the proposed project as required by FHWA T.A. 6640.8A. The economic analysis was not undertaken as a cost-benefit analysis and should not be construed as such. NEPA does not require that a cost-benefit analysis be undertaken in the preparation of an SDEIS and/or FEIS.*

### Issue: ECONOMIC DEVELOPMENT

**Subject:** The list of prerequisites for economic development are different between the needs study and the two cited studies. The SDEIS should examine the factors they considered important.

***Response:*** *The Corridor H NEPA analysis followed the CEQ (40 CFR 1508.28) and FHWA (23 CFR 777.111) regulations for tiered NEPA documents. In part, these regulations state that the first tier of analysis should deal with broad, general issues. In the Corridor H NEPA process, the first tier included the Corridor Selection Transportation Needs Study (March, 1992) and the CSDEIS (January, 1993). Prerequisites for economic development at the first tier dealt with general area-wide prerequisites. The second tier of the NEPA process, requires the consideration of narrower, alignment specific economic development prerequisites. Alignment specific prerequisites are discussed in the ASDEIS (p. II-32).*

**Subject:** The SDEIS does not consider more relevant studies done in WV and the Appalachian region because the conclusions do not support the document's bias. Fix citation for Regional Research Institute.

***Response:*** *The SDEIS considered several studies in order to develop a methodology for induced development, including Terrence Rephann's work. Rephann's study evaluated growth along interstates, rather than a four-lane divided highway with partial control of access. A transportation facility's ability to access communities, rather than bypass them, is an important factor in induced development. Because other commentors have cited the following studies by "faculty of West Virginia University", it is assumed that the Mr. McFerrin is citing the same studies. Those studies were Rephann and Isserman, 1994 (New Highways as Economic Tools: An Evaluation Using Quasi-Experimental Matching Methods, Research Paper 9313, Regional Research Institute, WVU) and Rephann, 1993 (A study of the Relationship Between Highways and Regional Economic Growth and Development Using Quasi-Experimental Control Group Methods, Ph.D. dissertation, WVU). Counties included in these studies only included counties that contained interstate highways. In fact, counties that contained any four-lane highway other than an interstate highway were excluded from the studies. Corridor H will not be built to interstate highway specifications. Corridor H will be classified as and built to the design standards of a four-lane Rural Principal Arterial Highway (Corridor SDEIS, p. II-3). Additionally, baseline data from both studies used only two WV Counties (Braxton and Marion); neither of which are within the project 30-minute drive contour. The applicability of these studies to Corridor H is therefore problematic.*

## Issue: ECONOMIC DEVELOPMENT

**Subject:** The SDEIS ignores rail lines for stimulating growth at industrial parks. Currently, 12 of the 13 industrial parks identified in the study are served by rail.

***Response:*** *Rail was considered in the Corridor H Transportation Needs Study (March, 1992). Further consideration in the ASDEIS was not required under the tiered process by which this project was conducted. This is consistent with CEQ (40 CFR 1508.28) and FHWA (23 CFR 777.111) regulations for tiered NEPA documents.*

**Subject:** The SDEIS ignores opinions of planners that rail is important. Region VII officials cite a new Weyerhaeuser plant that has direct access to rail service (The Inter-Mountain, Elkins, WV, Feb. 9, 1995).

***Response:*** *Rail was considered in the CSDEIS (p. I-22). It pointed out that, "existing rail lines do not provide direct access to the widespread communities and industries in the study area". Also, it states that, "While the existing rail system could be used as a means of freight distribution, use would be limited due to the limited mileage of track and the limited system termini within the region." Finally, it was pointed out in public hearings held on the ASDEIS that CSX Corporation has submitted a petition to abandon over 100 miles of track in the project area.*

**Subject:** Employment predictions are grossly exaggerated.

***Response:*** *Employment projections were based on recognized and widely-used assumptions and models, as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out of industrial parks was undertaken so as to develop the "worst case" secondary impact scenario.*

### Issue: CHANGES IN NEIGHBORHOODS AND COMMUNITY COHESION

**Subject:** DOH promised to evaluate alignment between Thomas and Davis, at a minimum the SDEIS should recognize the Build Alternative's negative impacts on Thomas and Davis.

***Response:*** *Development of the suggested alignment would be outside of Scheme Option D5 which was selected as the preferred corridor scheme in the Corridor Selection Decision Document of July 26, 1993.*

### Issue: RECREATION RESOURCES

**Subject:** Object to the summary of impacts on recreation resources (Table III-29).

***Response:*** *Table III-29 was developed to enable readers to have a summary of impacts to the various recreational areas defined in the project area. It does not compare impacts among recreation areas.*

**Subject:** Impacts to the Otter Creek Wilderness Area are a serious omission. The group adopts the comments of the Sierra Club West Virginia Chapter in toto. Otter Creek is not considered in the sections on noise, recreation, and air quality.

***Response:*** *The Otter Creek Wilderness Area at its closest point is 2.5 miles from the proposed highway. Predictive models utilized for the Alignment Selection SDEIS did not identify any impacts to the Otter Creek Wilderness Area or the MNF (ASDEIS p. III-26-III-40, Secondary and Cumulative Impacts Technical Report). However, this resource will be more accessible to the public as a result of construction ~~on~~ of the preferred alternative. The likely result of this increased public utilization, enjoyment, awareness, and appreciation of nature trails and wilderness areas. Noise impacts were modeled for representative natural areas of concern including Big Run Bog, Great North Mountain, and Greenland Gap. Results of that modeling are presented and discussed on pp. III-148-III-150 of the ASDEIS. Additionally, the noise contribution from the roadway is predicted to be approximately 37 dBA without including the intervening terrain. Otter Creek Wilderness area is too far away for localized CO impacts from the proposed highway. Ozone is a long range transport pollutant, for which stationary and area sources account for approximately 73% (VOC) to 94% (NOx) in the Charleston area and 77% (VOC) to 85% (NOx) in the Parkersburg area. If biogenic sources are included, the percentages are even greater. Note: there is no statewide breakdown for these pollutants. Information only exists in the non-attainment areas.*

**Issue: CULTURAL RESOURCES**

**Subject:** Corridor H would have a devastating impact on the Corricks Ford battlefield, which is not discussed in the SDEIS.

***Response:*** *Corricks Ford Battlefield and Moorefield Battlefield are discussed in the FEIS (Section III, L -Cultural Resources). There will be no use of these sites by the proposed project.*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** The route would impact confirmed populations of two E&T species, the Cheat Mountain Salamander and running buffalo clover. Also adopt the comments of Donna Mitchell regarding federal candidate species.

***Response:*** *The Alternative Selection SDEIS clearly indicates that the project would not impact populations of the Cheat Mountain Salamander (p. III-322) or Running Buffalo Clover (p. III-325), based on field surveys and coordination with the FWS.*

**Issue: WILD AND SCENIC RIVERS**

**Subject:** Impacts to the Shavers Fork and the Cacapon/Lost River are too great. Corridor H would make designations to the NWS and/or recreation status impossible.

***Response:*** *Following publication of the Monongahela National Forest's Wild and Scenic River Study Report and Environmental Impact Statement on Twelve Rivers in the Monongahela National Forest (1995), a re-assessment of the project impact on the Scenic designation of Shavers Fork was undertaken. That re-assessment is found in the FEIS (Section III-S Wild and Scenic Rivers).*

**Issue: GREENLAND GAP**

**Subject:** The highway would have negative visual, noise, traffic, and vibration impacts to Greenland Gap.

***Response:*** *FHWA's Visual Impact Assessment for Highway Projects did not indicate that any scenic vistas would be destroyed (ASDEIS, pp. III-177 -III-230). It did recognize, however, that visual impact is highly individual based (SDEIS, p. III-196). When the sound level contribution from the traffic in Greenland Gap is added to the sound level contribution from the proposed roadway, the overall sound level stays the same. Sound is added logarithmically and when these two sounds are added, the sound from the proposed roadway does not add to the total sound level environment because it is too far below the predicted sound levels within Greenland Gap. The proposed Build Alternative is approximately 1,000 feet away from the Greenland Gap boundary, no vibration impacts are expected to occur.*

**Issue: MISCELLANEOUS**

**Subject:** The process of selecting an alternative from the corridor selection to the alignment selection showed a disregard for public input.

***Response:*** *As the Lead Agency, FHWA has worked diligently with the cooperating agencies, concerned citizens and organizations, and state and local agencies to achieve full compliance with the procedural requirements of NEPA. Additionally, as is consistent with responding to public comments utilizing a tiering process (23 CFR 777.111), comments from both the general and site-specific environmental effects are addressed in the FEIS.*

### Commentor: Merritt, Mr. Charles H.

**Public**

**Issue: PURPOSE AND NEED**

**Subject:** Purpose and Need should be negated as a result of VA's refusal to allow any construction of a four or two-lane Build Alternative.

***Response:*** *The Preferred Alternative (WV) meets the purpose and need and logical termini as discussed in Section IV of the FEIS.*

**Issue: BUILD ALTERNATIVE**

**Subject:** Protest the proposed moving of the Elkins Interchange. This will result in more wetland impacts, and worsen flooding and water quality.

***Response:*** *Careful design of the interchange pipe and bridge system will provide adequate drainage of Claylick Run. Drainage investigations and studies will be conducted during preliminary and final design for Claylick Run, Leading Creek, and the Tygart Valley River.*

**Issue: RECREATION RESOURCES**

**Subject:** Otter Creek Wilderness Area will incur both direct and indirect impacts.

***Response:*** *The Otter Creek Wilderness Area at its closest point is 2.5 miles from the proposed highway. Predictive models utilized for the Alignment Selection SDEIS did not identify any impacts to this resource or the MNF (ASDEIS p. III-26-III-40, Secondary and Cumulative Impacts Technical Report). However, this resource will be more accessible to the public as a result of construction of the preferred alternative. The likely result of this increased accessibility to this resource will include increased public utilization, enjoyment, awareness, and appreciation of wilderness areas.*

**Issue: WETLANDS**

**Subject:** Impact to Big Run Bog are considered direct due to the forced relocation of Forest Service Roads 717 &18 into the headwaters of the RNA.

***Response:*** *Relocation and abandonment for forest roads has been coordinated with the Forest Service. Relocations discussed in the ASDEIS are subject to additional refinement as the project moves into more detailed design stages. The proposed relocation of Forest Service Roads is located approximately 600 m (1800 ft.) north of Big Run Bog. Based on field views and project mapping, no tributaries to this bog will be crossed. However, advanced sedimentation and erosion controls, as described in the Corridor H FEIS Mitigation Document, will be employed during construction to control sedimentation.*

**Issue: WATER RESOURCES**

**Subject:** Water quality and quantity of the Pleasant Run drainage is currently at and exceeding its sediment load. Construction and operation of the Build Alternative will excessively damage this stream.

***Response:*** *The water quality and benthic diversity of Pleasant Run was assessed as high quality. The stream was not observed to have excessively high sediment loads or sediment deposits. However, the stream is still recovering from catastrophic flood events. It is known that this particular stream was severely impacted by this flood event in 1986. . Issues regarding sedimentation and flooding are discussed in the Alignment Selection SDEIS Streams Technical Report (p. 71). The use of the term "at or exceeding its sediment load" is confusing. Current loading of sediment, known for this watershed, is a result of natural runoff from forested areas, existing roadways, logging activities, and other surface altering activities. The effect of the catastrophic flooding resulted not in excessive sedimentation but in extreme scouring of the stream channel and instability of the stream banks. The catastrophic flood also modified the hydrology of the stream system. Lastly, Pleasant Run will be targeted for stream habitat improvements.*

**Issue: WILD AND SCENIC RIVERS**

**Subject:** The impacts of the two proposed bridges (Shavers Fork), retaining walls, and stream relocations cannot be mitigated or justified. Additionally, the potential downgrading of the Shavers Fork from its eligibility for Scenic status to Recreational or ineligible may result from construction of the four-lane highway.

***Response:*** *Following publication of the Monongahela National Forest's Wild and Scenic River Study Report and Environmental Impact Statement on Twelve Rivers in the Monongahela National Forest (1995), a re-assessment of the project impact on the Scenic designation of Shavers Fork was undertaken. That re-assessment is found in Section III (S).*

**Issue: MISCELLANEOUS**

**Subject:** The lack of cut and fill lines at certain intersections and on & off ramps, etc...is inadequate.

***Response:*** *These areas were field investigated for the ASDEIS. Potential impacts to resources within these areas have been identified. Excess excavation issues are addressed in the Corridor H FEIS Mitigation Document, which is incorporated by reference into the FEIS.*

### Commentor: Merritt, Ms Pamela C.

**Public**

**Issue: PURPOSE AND NEED**

**Subject:** Questions purpose and need.

***Response:*** *The Purpose and Need Analysis was established in the Corridor Selection Transportation Needs Study, March 1992. It was included in the approved Corridor Selection SDEIS, October 21, 1992, and the CSDEIS Decision Document of July 26, 1993. The Purpose and Need statement in the Alignment Selection SDEIS referenced the detailed Purpose and Need analysis previously conducted.*

**Subject:** Upcoming March 1 inter-agency meeting could result in a premature decision.

***Response:*** *The meeting was canceled*

**Issue: VISUAL RESOURCES**

**Subject:** There are many sites along this project that will suffer significant impact from the road proximity. Note examples of such impacts provided in letter.

***Response:*** *The visual analysis prepared utilizing the FHWA's Visual Impact Assessment for Highway Projects did not indicate that any scenic vistas would be destroyed (ASDEIS, pp. III-177-III-230). It did recognize, however, that visual impact is highly individual based (SDEIS, p. III-196).*

**Issue: VISUAL RESOURCES**

**Subject:** Visual effects/impacts of 300-500-1,000 feet, 300 ft could be on the other side of the mountain while 1,000 ft could still be in the view scape. This seems to be an unreasonable and arbitrary standard.

***Response:*** *The visual analysis prepared utilizing the FHWA's Visual Impact Assessment for Highway Projects did not indicate that any scenic vistas would be destroyed (ASDEIS, pp. III-177-III-230). It did recognize, however, that visual impact is highly individual based (SDEIS, p. III-196).*

**Issue: CULTURAL RESOURCES**

**Subject:** Section 106 process continues beyond Feb. 23 NEPA closure. The Cultural resources portion of the FEIS must be entered into the record.

***Response:*** *A Programmatic Agreement entered into between the FHWA, WVDOT, WVSHPO, VASHPO, ACHP, United States Department of Agriculture, Forest Service, Monongahela National Forest and the George Washington National Forest and other consulting parties. The Programmatic Agreement is contained in the FEIS (Voll II, Appendix B).*

**Subject:** Confusing language from page III-231-256 regarding when an alternative is selected when in fact an alternative has been selected.

***Response:*** *No Preferred Alternative was identified in the ASDEIS.*

**Issue: CULTURAL RESOURCES**

**Subject:** Two sites have been omitted from the inventory: (1) Old railroad grade and (2) Olsen Fire Tower.

***Response:*** *The old railroad grade of the Western Maryland Railroad was included in the cultural resources inventory (Cultural Resources Technical Report, Volume I, January, 1995). The Olsen Fire Tower will not be used by the Preferred Alternative.*

**Subject:** Many boundaries have not been established on numerous properties

***Response:*** *The two primary purposes of the cultural resources study of historic properties was to: (1) identify those resources within the area of potential impacts; (2) provide a preliminary assessment as to project impact and effect for the purposes of assisting in the selection of a proposed alternative and possible alignments within the study corridor. Formal boundary delineations of eligible and "considered" eligible properties are being addressed as part of the ongoing Section 106 process, as detailed in the Programmatic Agreement (FEIS, Appendix B).*

## Issue: CULTURAL RESOURCES

**Subject:** How were the probability areas defined?

***Response:*** *Five criteria were utilized to define probability areas: 1) relative distance from water; 2) topographic situation; 3) drainage order; 4) lithic sources; and 5) soils/geology.*

**Subject:** It is not explained exactly what criteria they are using to set locations/boundaries of these zones.

***Response:*** *Locations/boundaries of zones were defined by the following: (1) high probability zones were associated with - a. nearness to water, b. arable soils, c. high-level terrace, d. high-order streams, e. bluffs overlooking high-order streams, f. areas near high quality lithic resources, and g. spring heads; (2) moderate probability zones were associated with - a. upland hilltops, b. low-order terraces (T1, T0), c. near to low-order streams, and d. saddles; (3) low probability zones were associated with - a. hillysides/slopes, b. areas far from permanent water sources, c. upland swamps, and d. ridgetops.*

**Subject:** Baker's model is similar to the one used for the MNF. Why was no reference or comparison to MNF, or grid to randomly test model.

***Response:*** *Since the predictive model was intuitively based, there was no quantitative means for comparing the two models. Thus, only a qualitative comparison could be utilized. The MNF model is primarily based on data from the Allegheny Mountain Section. However, the Baker model includes data from the Great Valley Section of the Ridge and Valley Province in addition to the Allegheny Mountain Section.*

**Subject:** When testing the predictive model how did throwing out of certain test units occur.

***Response:*** *Details of probability area definition are included in the Cultural Resources Model Test Report. It was assumed that areas delimited as high, moderate, and low probability zones were: (1) internally consistent; (2) categorically consistent; and (3) cross-categorically impotent. Sample sizes for statistical analyses were determined based on a 95% confidence level. Based on the assumptions that all areas within each probability zone were internally consistent, it was not important which 50x50 meter test units were utilized in the statistical comparison, only that they be fully investigated and disturbed areas rejected in favor of undisturbed test units. No exclusions were permitted (such as testing hillsides). If a 50x50 meter unit was part of a sample it was tested in its entirety.*

**Subject:** What statistical tests were used for the model.

***Response:*** *Details of probability area definition are included in the Cultural Resources Model Test Report. Chi-square tests were utilized. This nonparametric significance test is most appropriate for nominal data (i.e. nominal categories and positive/negative responses or variables).*

**Subject:** Baker implied that there existed no valuable data to go by regarding their predictive model. Also no reference to what does exist in WV.

***Response:*** *While information is available on the prehistory of this portion of West Virginia, it is not provided in a format that was useful for developing an unbiased, chronologically sensitive, predictive model (Johnson et al., 1994). Also, the amount of data available was not statistically significant to allow WVDOH to compare physiographic provinces, and/or topographic/hydrologic within, and between them.*

**Subject:** Given data reported regarding settlement pattern modeling, results indicate an average of 3.5 prehistoric sites per mile. Feel that this is fairly high density, and that some could be significant enough to warrant preservation.

***Response:*** *An average of 3.5 prehistoric sites per mile is not an accurate protrayal of the settlement patterns in the region. Settlement density varies by portion of the project and cannot simply be characterized by an average value. Nevertheless, some areas do indeed have fairly high site densities, and are very likely to contain potentially significant sites. The field survey strategies implemented during the Phase I archaeological survey take into consideration the variations in site density and the methodology is altered accordingly. Site significance is then determined in the context of the field methodology and the variance in site densitites. Proposed migitation strategies will be tailored to each site and will also reflect the nature of its significance. The end result is that the field methodology, the determinations of National Register of Historic Places eligibilty, and the development of mitigation strategies are intricately linked to the calculations of site density patterns. This is reflected in the Programmatic Agreement (FEIS, Vol. II, Appendix B)*

**Issue: WETLANDS**

**Subject:** Believes that negative impact will occur to Big Run Bog research Natural Area as a result of ground disturbance. Additionally, relocated roads do not show cut/fill limits.

***Response:*** *Relocation and abandonment for forest roads has been coordinated with the Forest Service. Relocations discussed in the ASDEIS are subject to additional refinement as the project moves into more detailed design stages. The proposed relocation of Forest Service Roads is located approximately 600 m (1800 ft.) north of Big Run Bog. based on to field views and project mapping, no tributaries to this bog will be crossed. However, advanced sedimentation and erosion controls, as described in the Corridor H FEIS Mitigation Document, will be employed during construction which will protect the bog from sedimentation.*

**Issue: WATER RESOURCES**

**Subject:** Few streams were tested for nitrates or ammonia. Lack of consistency, sparse testing, and not doing as reported needs to be addressed.

***Response:*** *Nitrate and ammonia samples were taken for streams located within agricultural, poultry, and cattle production areas. A number of the streams sampled possessed elevated concentrations of these two constituents at the time of sampling. Additionally, a relationship was found between these elevated parameters and low Biotic Integrity. Habitat values (i.e. low habitat score) were also found to demonstrate a similar relationship with elevated concentrations of these two parameters. For this study it was assumed that all streams subject to poultry and cattle production within the project area would also exhibit a similar relationship between the discussed parameters. Because the objective of the stream sampling protocol was to determine the quality of sampled streams, it was decided that additional water samples for these constituents were not needed because a relationship between elevated concentrations of nitrate/ammonia and reduced Biotic Integrity was established.*

**Issue: WATER RESOURCES**

**Subject:** Need to address stream impacts, secondary and cumulative impacts of multiple crossings, more thoroughly.

***Response:*** *Streams identified in the SDEIS as potentially being impacted include multiple crossings. Streams of poor water quality are not expected to incur secondary and cumulative impacts. This is because the impact of temporary construction in degraded stream systems would not be measurable, either biotically, or chemically.*

**Issue: WATER RESOURCES**

**Subject:** Mill run is so sediment laden that all timbering and potential timbering projects have been halted. Mill run is already at a critical situation being on the threshold for sediment deposition.

***Response:*** *The current physical and ecological state of Slip Hill Mill Run is the result of the high erosion potential of soil types within this watershed. Siltation, as a result of forest harvesting has been identified as a threat to this stream and its tributaries. The proposed roadway will have a minimal impact on this stream and its watershed based on the location of the proposed alignment. The alignment does not cross this stream and is located "above" existing US 219. Thus, minimal or immeasurable impacts to the stream's hydrology, BOD, DO PIM, POM, DIM, and DOM concentrations are expected. Additionally, "sensitive" watersheds have been identified and advance sedimentation and erosion control measures identified and coordination with resource agencies will be undertaken during final design. These issues are detailed in the Corridor H FEIS Mitigation Document.*

**Subject:** Sedimentation needs to be addressed further in the FEIS.

***Response:*** *The control of erosion and sedimentation on receiving streams are further addressed in the Corridor H FEIS Mitigation Document.*

**Issue: WILD AND SCENIC RIVERS**

**Subject:** Full consideration must be given to the impact of the proposed road to the current eligibility status of the Shavers Fork.

***Response:*** *Following publication of the Monongahela National Forest's Wild and Scenic River Study Report and Environmental Impact Statement on Twelve Rivers in the Monongahela National Forest (1995), a re-assessment of the project impact on the Scenic designation of Shavers Fork was undertaken. That re-assessment is found in Section III (S).*

**Subject:** Request that a study be done to examine or reexamine the values of the identified rivers to determine their eligibility.

***Response:*** *Eligibility studies of the identified rivers have been conducted by the responsible agencies (MNF, GWNF, VADCR). Cedar Creek and the Cacapon River segments were determined to be eligible for Scenic status. The DOI determined that the Cacapon is not suitable for listing due to lack of public support. The section of the South Branch of the Potomac River listed in the NRI as eligible for Scenic status is not crossed by this project.*

**Issue: SECTION 4(F) AND SECTION 6(F) RESOURCES**

**Subject:** Section 4(f) evaluation must be done when a project uses land protected by Section 4(f). Was one done? If not, why not?

***Response:*** *The Preferred Alternative in West Virignia does not use any 4(f) resources, thus, a Section 4(f) evaluation is not required.*

**Subject:** The Big Blue Trail has been considered 4(f) within the GWNF. Representative of GWNF had a recent change in position in the status of the Big Blue. Merritt challenges this new decision.

***Response:*** *The Big Blue Trail is not considered to be a 4(f) resource. However, with Virginia's decision not to pursue either the build or IRA alternatives, no use will be made of the Big Blue Trail by the Preferred Alternative, thus Section 4(f) would not apply.*

**Subject:** Other 4(f) considerations include the Allegheny Trail, the American Discovery Trail, Otter Creek Wilderness, and the Shavers Fork River. These must be addressed before selection and final approval of the alignment.

***Response:*** *Neither the Allegheny Trail or the proposed American Discovery Trail are 4(f) resources (refer to FEIS). The closest point of the Otter Creek Wilderness to the Preferred Alternative is approximately 4 km (2.5 miles) and therefore no use of the Otter Creek Wilderness will occur. Shavers Fork is not a Section 4(f) resource.*

**Issue: MISCELLANEOUS**

**Subject:** How is the fill material to be disposed of and will the excess waste be toxic (i.e. contain coal or an acid producing shale)?

***Response:*** *As detailed in the Corridor H FEIS Mitigation Document, the disposal of excess excavation material will not be placed in "sensitive" resources (perennial streams, wetlands, floodplains, cultural resources, etc.). Excess excavation material that is known to potentially produce acid drainage has been identified. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: MISCELLANEOUS**

**Subject:** How close is the proposed road to the Tucker County Landfill near Davis. Will it impede operation?

***Response:*** *The proposed highway off-ramp is approximately 0.67 km (0.42 mi) from the entrance of the Tucker County Landfill. The proposed project will not impede operations of this landfill.*

**Subject:** No cut and fill lines at intersections and road relocations, also absent is areas of waste, borrow, and staging areas.

***Response:*** *These areas were field investigated for the ASDEIS. Potential impacts to resources within these areas have been identified. Excess excavation/borrow issues are addressed in the Corridor H FEIS Mitigation Document, which is incorporated by reference into the FEIS.*

## Commentor: Meyer, Ms. Debbie

**Group - WMG**

**Issue: MISCELLANEOUS**

**Subject:** In the event that a build option is selected, we would want to document any caves that would be affected by construction.

***Response:*** *Comment noted.*

## Commentor: Miller, Jr., Mr. John V., Superintendent

**Local Agency - Hardy County Schools**

**Issue: LINE B: BAKER OPTION AREA**

**Subject:** Line A will negatively impact the East Hardy School property. We recommend building Line B. We also question the similar cost between the Line A and Line B.

***Response:*** *Due to this and other considerations, the Preferred Alternative follows Line B within the Baker Option Area.*

### Commentor: Mitchell, Ms. Donna, Biologist

**Public**

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** There is no mention of shale barrens as being a distinct habitat type within the alignment. There is mention of a shale barren near Wardensville. This shale barren will be affected by the IRA. Are there more shale barrens east of the Allegheny Frount?

***Response:*** *This shale barren was identified by the WV Natural Heritage Program. No additional shale barrens were identified. Shale barrens were discussed in the CSDEIS (pp. III-112-III-114). Shale barrens are located within Scheme Option D5 bu the alignment was purposely developed to aviod them.*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** It is mentioned that there will be no impacts to the Appalachian Cottontail, this seems unlikely since there would be at the least, mortality from road traffic.

***Response:*** *Road mortality could occur; however, other serious threats to this species in this area would appear to be the continued strip mining operations and recreational hunting activity. Highway mortality of wildlife is density dependant. The impacts to wildlife populations due to this mortality area discussed in the FEIS (Section III, O-Vegetation and Wildlife).*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** Running Buffalo Clover is mapped on the wrong side of the river. It appears as though Line A will impact this population. There seems to be a significant impact not "no Impact" as stated in the TR.

***Response:*** *Population was identified correctly but improperly mapped due to plotting error. Coordination with WVDNR and the USFWS confirmed the known location and verified that no impact would occur. Should a population be found at the location indicated, WVDOH will consult with the FWS to develop mitigation plans. Additionally, Exhibit III-47 has been revised to indicate the correct location of the identified running buffalo clover population in the FEIS (see Tables, Exhibits, Figures, Appendices Document).*

**Subject:** Call into question, based on the wrong mapping of Running Buffalo Clover, the survey that was conducted by Baker Personnel. It is assumed that the known site was never located.

***Response:*** *Population was identified correctly but improperly mapped due to plotting error. Coordination with WVDNR and the USFWS confirmed the known location and verified that no impact would occur. Should a population be found at the location indicated, WVDOH will consult with the FWS to develop mitigation plans. Additionally, Exhibit III-47 has been revised to indicate the correct location of the identified running buffalo clover population in the FEIS (see Tables, Exhibits, Figures, Appendices Document).*

**Issue: FEDERALLY LISTED CANDIDATE SPECIES**

**Subject:** The statement that there would be minimal impact on mussel species seems to be false with respect to the brook floater.

***Response:*** *Information regarding the exact location of the brook floater was not available prior to circulation of the ASDEIS. The FEIS has been amended to include this information (p. III-161) and the fact that the IRA could impact this population if it were constructed.*

**Subject:** There are no known nesting sites of this federally listed candidate species along the alignment. However, one theory of the decline of this species is from road kills. This is not mentioned in the TR.

***Response:*** *Mortality from collisions with motor vehicles is one factor associated with the decline of the shrike. However, since populations of shrikes have not been identified along the alignment by either WVDNR, WV Natural Heritage Program, the USFWS, the Virginia Division of Natural Heritage (VDNH), or the Virginia Department of Game and Inland Fisheries (VDGIF) this potential impact would be minimal.*

## Commentor: Park, Mr. Max E.

**Public**

**Issue: ALIGNMENT MODIFICATION**

**Subject:** The Preferred Alternative as shown in the plans would remove my chicken houses. Could the line be changed to avoid them.

***Response:*** *We believe that we can successfully avoid taking your chicken houses within the construction limits. However, there will have to be a variance made for the right of way limits. Engineering of this line will be completed after the ROD.*

### Commentor: Polinski, Mr. Adam

**Public**

**Issue: IMPROVED ROADWAY ALTERNATIVE**

**Subject:** The IRA is faulty because it is based on a mandatory design speed of 50 m.p.h.

***Response:*** *The IRA was designed to meet the requirements for a two-lane, Rural Principal Arterial Highway, in accordance with AASHTO Design Guidelines (1994) and WV Design Directive 601.*

**Issue: RECREATION RESOURCES**

**Subject:** I believe many more people than the number that visit now, who think of Wilderness Areas as merely outdoor playgrounds, will visit Otter Creek if a four-lane makes access to it convenient.

***Response:*** *Comment noted. Corridor H will provide the general public a safe and efficient route to enjoy this public resource.*

**Subject:** Table 23 (Socioeconomic Technical Report) is ridden with errors, at least 44 errors and discrepancies.

***Response:*** *Recreation resources indicated in Table 23 were identified using available mapping (numerous sources), and through coordination with Federal, State, and local governmental agencies (ASDEIS, p. III-159; References include: American Hiking Society, American Hiking Society, Hardy County Planning Commission, Pocahontas County Tourism Commission, Potomac Appalachian Trail Club, Tucker County Alpine Festival, Inc., Tucker County Convention and Visitors Bureau, Final Revised Land and Resource Management Plan, George Washington National Forest, Final Environmental Impact Statement for the Land and Resource Management Plan, Monongahela National Forest, National Survey of Fishing, Hunting and Wildlife - Associated Recreation; West Virginia, Virginia Outdoors Plan; Executive Summary, West Virginia Statewide Comprehensive Outdoor Recreation, West Virginia Travel and Tourism Economic Impacts 1992. February 1993, and West Virginia Scenic Trails Association. Hiking Guide to the Allegheny Trail.*

**Issue: NOISE**

**Subject:** Sonic and visual disruption will occur with the construction of an Interstate Highway in close proximity to some areas of the northern Monongahela Forest.

***Response:*** *Investigations of sound level increases in (Alignment Selection DEIS, p. III-150) and visual impacts (Alignment Selection DEIS, p. III-90) to the MNF revealed that no adverse impacts will occur to that resource.*

**Commentor: Rosier, Mr. George L., Trail Coordinator**

**Group - WVSTA**

**Issue: PEDESTRIAN AND BICYCLING TRAILS**

**Subject:** Suggest that an overpass or underpass be built for the Allegheny Trail in areas where its disrupted. Also, loss of use of the trail during construction is unacceptable.

***Response:*** *A pedestrian overpass will be constructed for the Allegheny Trail just west of its US 219/FR18 location. Access will be maintained during construction.*

**Commentor: Southern, Mr. James M.**

**Public**

**Issue: ACCESS**

**Subject:** Expressed concern about access to pastureland and landlocking families from thier property.

***Response:*** *Access will be maintained to any properties potentially landlocked by the proposed project. Additionally, during the final design, a farm underpass will be considered to provide for farm animal access to the pasture land.*

**Commentor: Spadaro, Mr. Jack**

**Public**

**Issue: WATER RESOURCES**

**Subject:** E&S control plans using BMPs have proven inadequate for storm runoff exceeding the one-year storm frequency. The SDEIS fails in addressing this problem. The No Build Alternative is the only acceptable means of preventing stream damage.

***Response:*** *Discussion of erosion and sedimentation control measures has been included in the Corridor H FEIS Mitigation Document.*

**Issue: WATER RESOURCES**

**Subject:** The SDEIS offers only minimal mitigation efforts for highway sediment control during construction, and no control of slopes and ditch generated sediment after construction.

***Response:*** *A discussion of advanced erosion and sedimentation control measures is included in the Corridor H FEIS Mitigation Document which is incorporated by reference into the FEIS.*

**Issue: WATER RESOURCES**

**Subject:** Sediment barriers (i.e., straw bales and silt fencing, Streams TR, P. 61), are ineffective in controlling sediment by storm exceeding the one-year storm frequency.

***Response:*** *Investigation, avoidance of impacts, and development of any required mitigation measures will be an ongoing process. Commitments to that process are contained in the Corridor H FEIS Mitigation Document. Specific measures can not be developed until final designs are completed and are not part of the FEIS. Additionally, "sensitive" watersheds have been identified and advance sedimentation and erosion control measures identified and coordination with resource agencies will be undertaken during final design. These issues are detailed in the Corridor H FEIS Mitigation Document.*

**Subject:** There is no geotechnical engineering addressing the problem of rock and land slides. Road cuts along the mountain sides will encounter deep colluvial soils that are unstable and that will cause serious and massive landslides in the future.

***Response:*** *The level of detail to identify problem areas was not available at the SDEIS level of engineering detail. Advanced geotechnical investigations are done during the next level of engineering design. Designs will follow WVDOH specifications regarding avoidance and minimization of rock and landslides.*

**Issue: WATER RESOURCES**

**Subject:** The SDEIS does not adequately address slope instability and sedimentation problems.

***Response:*** *Slope instability will be determined at the appropriate level of engineering detail. Advanced sedimentation and erosion control methods which will be utilized during construction are detailed in the Corridor H FEIS Mitigation Document which is incorporated by reference into the FEIS.*

**Subject:** Total daily sediment loads into streams generated by construction of Corridor H during rainfalls exceeding the one-year frequency storm could be in excess of 1 million tons of sediment per day.

***Response:*** *Sediment load calculations based on preliminary design drawings that the commentor performed are erroneous due to the error associated with the scale and preliminary estimate of cut and fill limits.*

## Commentor: Tazewel, Mr. Shaloml, Chair, Wildlife Committee

**Group - WV Chapter of the Sierra Club**

### Issue: VEGETATION AND WILDLIFE

**Subject:** Species which occupy edge habitat are different from those which occupy deciduous forest. Equating the two is deceptive and is not an adequate substitute to top of the food chain animals.

***Response:*** *The ASDEIS does not equate edge habitat to the deciduous forest.*

### Issue: FOREST FRAGMENTATION AND BIODIVERSITY

**Subject:** The literature review used to justify the statement "no consensus has been reached on the effects of forest fragmentation on wildlife species" is one-sided. No mention of supporting citations.

***Response:*** *The over two dozen references to scientific literature cited in the discussion of forest fragmentation (ASDEIS, pp. III-295-III-300) support the consensus conclusion in the SDEIS.*

### Issue: FOREST FRAGMENTATION AND BIODIVERSITY

**Subject:** The EIS cites studies which conclude that salamanders do not readily cross interstates. However, a tunnel was constructed to accommodate salamanders that were being crushed by cars in Amherst, MA.

***Response:*** *The study cited, Adams and Geis, 1992, reported the results of their multi-state study of wildlife mortality on various classes of roadway. The authors concluded from their results that salamanders do not readily cross interstate highways and are not attracted to right-of-way habitat (SDEIS, p. III-315). The salamander tunnel referred to is located in an area of rapid urbanization and very heavy urban traffic. That situation does not exist in this project area.*

## Commentor: Thorn, Jr., Mr. Donald E.

**Public**

### Issue: RELOCATIONS

**Subject:** Based on the placement of the Build Alternative, Corridor H leaves no allowance for farming access on my property.

***Response:*** *Comment noted. Your expressed concern will be addressed at the time of preliminary engineering.*

### Commentor: Trianosky, Mr. Paul, State Director

**Group - The Nature Conservancy of West Virginia**

**Issue: ALTERNATIVES CONSIDERED**

**Subject:** The Conservancy feels strongly that the WVDOH has not adequately stated or reviewed all realistic alternatives. The absence of a true IRA calls into question the completeness and credibility of the SDEIS.

***Response:*** *As required by CEQ and FHWA, each alternative was developed to the same level of detail to facilitate comparisions. Two Improved Roadway Alternatives (IRA) were considered during the Corridor H study process. The first IRA considered the improvement of local roads throughout the Corridor H project area. It was dismissed as a viable alternative in the CSEIS (refer to Section II). In the ASDEIS, a second IRA was developed within the selected Corridor, D5. This IRA was dismissed because it did not meet the purpose and need of the project (refer to Section II of the FEIS).*

**Issue: VISUAL RESOURCES**

**Subject:** While the Build Alternative does not cross into Greenland Gap, the proposed road would be extremely visible to visitors to this historic, scenic, and significant preserve.

***Response:*** *The visual analysis prepared utilizing the FHWA's Visual Impact Assessment for Highway Projects did not indicate that any scenic vistas would be destroyed (ASDEIS, pp. III-177-III-230). It did recognize, however, that visual impact is highly individual based (SDEIS, p. III-196).*

**Subject:** It is the Conservancy's judgment significant that visual impacts will occur as a result of the Build Alternative. Greenland Gap features an extensive trail system, the trails provide the only visual access of the view of this water gap.

***Response:*** *The visual analysis prepared utilizing the FHWA's Visual Impact Assessment for Highway Projects did not indicate that any scenic vistas would be destroyed (ASDEIS, pp. III-177-III-230). It did recognize, however, that visual impact is highly individual based (SDEIS, p. III-196).*

**Issue: GREENLAND GAP**

**Subject:** Placement of the interchange at Greenland Gap is also untenable for reasons of increased traffic and resulting impact to the natural features of the preserve.

***Response:*** *No interchange is planned at Greenland Gap. A connection at an improved at-grade intersection is provided for access to the existing County 1 Road (also known as Greenland Gap Road).*

**Commentor: Vanevender, Messrs. Ralph and Gregg**

**Public**

**Issue: ALIGNMENT MODIFICATION**

**Subject:** Please consider the alignment shift as proposed in the attached sketch plan.

***Response:*** *The alignment shift that you proposed was examined. WVDOH has decided against your proposed shift based on the following. Because the same elevation changes would occur along the proposed shift a significant reduction of earth movement is not expected. WVDOH was also concerned that your proposed shift would require the relocation of Wilmoth Run and possibly County Road 3 in Randolph County and a relocation of County Road 47 in Tucker County. A retaining wall would be required to protect Pleasant Run (Pheasant Run) from the fill required by the proposed fill. Pleasant Run may also have to be relocated in a number of areas. Pleasant Run is classified as a stocked trout fishery and is still recoverying from catastrophic flood events. For these reasons, physical involvement with Pleasant Run is being limited.*

**Commentor: Veach, Mr. Doug**

**Public**

**Issue: ALIGNMENT MODIFICATION**

**Subject:** Suggest that you review and consider a change in the proposed alignment of Corridor H starting near the Grant/Hardy County Line and taking a more southerly route as shown on the enclosed sketch. This new route would have many advantages including: less bedrock to remove thus lowering costs; would more closely follow property lines having less impact on me and my neighbor; has only a small elevation difference from the proposed route and avoid a spring on Toombs Hollow.

***Response:*** *We examined your proposed alignment shift. We found that just east of the Grant/Hardy County Line, the elevation of the Preferred Alternative at station #5920 is 1,834 feet and the existing elevation is 1,820 feet. At the east end of your proposed shift (Station # 6020) the Preferred Alternative elevation is 1,475 feet and the existing elevation is 1,480 feet. This results in an elevation difference of 359 feet. In order to achieve the elevation differrenial, the grades for the Preferred Alternative would approach the maximum allowed for this project, varying from 2.5% to 5.83%. Using similar grades for your proposed shift would result in significant additional earthwork with additional depth of cuts up to 300 feet. Further, the Preferred Alternative will pass through 4 parcels and involve 4 landowners including yourself, whereas your proposed shift would pass through 6 parcels and involve 5 landowners. After carefull consideration of your proposed shift, it was decided to remain with the original alignment.*

**Issue: ALIGNMENTS CONSIDERED AND ELIMINATED**

**Subject:** Please consider the attached proposed line shift for the reasons outlined in this letter.

***Response:*** *Final right-of-way acquisition requirements are not determined until the final design stage. During final design, all appropriate measures are taken to minimize the impacts of right-of-way takes. Compensation for necessary right-of-way acquisitions will be in accordance with all applicable state and federal regulations.*

**Issue: GROUND WATER**

**Subject:** I have identified on Map sheet 43 of 108 a spring that I believe will be impacted as a result of construction of Line A. The water supply is important for a variety of reasons.

***Response:*** *A monitoring program to determine the impacts to springs that serve as water supply sources has been included in the Corridor H FEIS Mitigation Document which is incorporated by reference into the FEIS. In the event that the water supply would be lost due to highway construction that water supply would be replaced.*

### Commentor: Webb, Mr. Rick, Research Scientist

**Group - Corridor H Alternatives**

**Issue: GEOLOGY, MINES, AND MINERALS**

**Subject:** The Corridor SDEIS - there is a high probability that acid drainage will be generated from rock material of the Allegheny, Pottsville, Pocono, and Milboro geologic formations.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Commentor: Werner, Dr. Eberhard**

**Group - Corridor H Alternatives**

**Issue: WARDENSVILLE SPRING**

**Subject:** The dye trace (Wardensville Spring) has not demonstrated anything, other than that it was done using inappropriate injection and sampling sites.

***Response:*** *The dye trace study was designed and conducted under the supervision of a nationally recognized expert in groundwater within karst terrain (Mr. Thomas Aley, P.G. -Ozark Underground Laboratory). The trace was designed to test the "worst case" scenario that water could rapidly move (within a few hours or days) from the surface of Anderson Ridge into Wardensville Spring or other groundwater supplies in the area; this is specifically stated on p. III-90. The dye was introduced in an area where rapid infiltration of water into the subsurface was known to occur. Furthermore, the point where the dye was introduced was in close proximity to Wardensville Spring and was within the identified wellhead protection zone for this spring. Sampling at Wardensville Spring and at numerous other stations shown in Exhibit III-13 of the ASDEIS, was clearly appropriate. The Wardensville dye trace demonstrated that water from this injection site did not move rapidly from the top of Anderson Ridge into Wardensville Spring or into any other springs in the area. Sampling continued for 14 weeks without any dye recovery from the groundwater system. The ASDEIS specifically recognizes that surface waters recharging Anderson Ridge may reach the Wardensville Spring. As discussed on p. III-95 and 96 of the ASDEIS, care will be exercised during highway construction across the delineated wellhead protection zone for Wardensville Spring.*

**Subject:** Negative results from dye traces do not provide any information regarding hydrologic connections unless all the dye is accounted for.

***Response:*** *Negative results demonstrate that no detectable amounts of dye-tagged water moved from the point of dye introduction to the sampling point during the duration of the sampling. Decomposition of the dye, adsorption, and other processes always result in some dye losses. As a result, all dye cannot be accounted for by knowing dye concentrations and flow volumes at dye recovery sites. All three dye traces shown on Exhibit III-13 (Wardensville/Lost River/Cacapon Springs traces) of the ASDEIS, were designed to assess whether dyed water would move relatively rapidly through the groundwater system from a particular point of dye injection to springs of particular significance. Negative results demonstrate an absence of such evidence, and the results have been used in that manner.*

**Subject:** The test (Wardensville dye trace) needs to be done again with more extensive monitoring, and one or more different injection sites somewhere near the proposed road alignment.

***Response:*** *Additional tracing has been proposed along the alignment corridor once a final alignment has been selected. This dye tracing would involve different injection sites (which are located further from Wardensville Spring than the site previously used). It is anticipated that the proposed tracing would produce results similar to the previous trace, specifically, that waters sinking on Anderson Ridge do not move rapidly into Wardensville Spring.*

**Subject:** Results from a second trace conducted by injecting eosin dye at the sinking point of the Lost River are similarly inconclusive.

***Response:*** *Dye from the sinking point of Lost River discharged from downstream springs as explained on p. III-95 of the ASDEIS. No dye from this injection was recovered at Big Spring or at any sampling stations on Trout Run. Also, no dye from this injection was recovered at Wardensville Spring.*

**Subject:** Data shown by Hobba, for the area in general indicate there is better-than-even probability that the saturated zone will be intersected at that depth (154-foot-deep cut).

***Response:*** *The Hobba study was of a large region and therefore has limited site-specific utility. Water levels in existing wells on Anderson Ridge indicate that the proposed cut will not intersect the saturated zone of the groundwater system.*

## Commentor: Wilfong, Mr. Bryan

**Public**

**Issue: PURPOSE AND NEED**

**Subject:** The SDEIS claims that the primary need for building Corridor H is for economic development. The SDEIS fails to explain how Corridor H would bring this development.

***Response:*** *The text has been revised in the FEIS (pp. III-3-III-5) to reflect the fact that economic development is one of seven established needs for the project. Additionally, the Corridor Selection Transportation Needs Study (March, 1992, pp. III-1-III-17) discusses in detail the current transportation deficiencies and their relationship to economic development growth. A summary of the findings from this study has been included in the FEIS in Section I - Purpose and Need for the Action.*

**Issue: ECONOMIC DEVELOPMENT**

**Subject:** The SDEIS's discussion concerning industrial development and its predictions concerning industrial parks is inadequate.

***Response:*** *Employment projections were based on recognized and widely-used assumptions and models, as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out and employment of industrial parks was undertaken so as to develop the "worst case" secondary impact scenario.*

**Subject:** Residential and service-oriented development that is predicted in the SDEIS as a spin off of job growth in the industrial sector is not a legitimate prediction.

***Response:*** *Employment projections were based on recognized and widely-used assumptions and models, as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out and employment of industrial parks was undertaken so as to develop the "worst case" secondary impact scenario.*

**Issue: GROUND WATER**

**Subject:** No specific mitigation, minimization, or avoidance plans are presented to counter the potential impacts upon Knobbly Road Spring.

***Response:*** *Knobbly Road Spring was discussed in the ASDEIS (p. III-103). Mitigation measures and additional investigations of springs are included in the Corridor H FEIS Mitigation Document.*

**Issue: GROUNDWATER**

**Subject:** No specific mitigation, minimization, or avoidance measures are presented to counter the potential impacts upon Cold Spring.

***Response:*** *Cold Spring was discussed in the ASDEIS (p. III-103). Mitigation measures and additional investigations of springs are included in the Corridor H FEIS Mitigation Document.*

**Issue: GROUNDWATER**

**Subject:** No specific mitigation, minimization, or avoidance measures are presented to counter the potential impacts upon other springs potentially impacted.

***Response:*** *Investigation, avoidance of impacts, and development of any required mitigation measures to groundwater and water supplies will be an ongoing process. Commitments to that process are contained in the Corridor H FEIS Mitigation Document. Specific measures can not be developed until final designs are completed and are not part of the FEIS.*

**Issue: AIR QUALITY**

**Subject:** There are no refueling emissions included in any of the scenarios modeled. Refueling emissions are an important source of air pollution.

***Response:*** *West Virginia models refueling emissions as part of their stationary and area source inventories.*

**Issue: PEDESTRIAN AND BICYCLING TRAILS**

**Subject:** No mitigation measures are provided for damage to trails.

***Response:*** *Mitigation for impacts to trails is discussed in the FEIS (Section III, (J)). The WVDOH has made a commitment to maintain trail acess during construction. Additionally, a pedestrian overpass will be provided following construction for the Allegheny Trail at US 219 and FR18 on Backbone Mountain. Any trail relocations will be coordinated with the Forest Service and various trail user groups.*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** No mitigation is provided for habitat loss or the habitat fragmentation that would occur if the Build Alternative were to be selected.

***Response:*** *Mitigation relative to forest habitat is discussed in the Corridor H FEIS Mitigation Document.*

**Issue: THREATENED AND ENDANGERED SPECIES**

**Subject:** The SDEIS does not recognize the impact on Cheat Mountain salamander habitat as a significant direct impact.

***Response:*** *As required by Section 7 of the Endangered Species Act, Section 7 consultation has occurred with USFWS concerning the Cheat Mountain Salamander. Additionally, the alignment of the Preferred Alternative was purposefully selected to avoid preferred habitat of the Cheat Mountain Salamander. A complete discussion of the potential impact to the Cheat Mountain Salamander is found on p. III-332 of the ASDEIS.*

**Subject:** The SDEIS does not recognize the impact on running buffalo clover habitat as a significant direct impact.

***Response:*** *A discussion of Running Buffalo clover is found on p. III-322 of the SDEIS.*

**Issue: FEDERALLY LISTED CANDIDATE SPECIES**

**Subject:** The SDEIS does not adequately address federally listed candidate species.

***Response:*** *Assessment of potential impacts to candidate species were carried out in accordance with FHWA T.A. 6640 8A and following consultation with the USFWS. A discussion of candidate species is found on pp. III-325 and III-326 of the SDEIS.*

**Issue: WATER RESOURCES**

**Subject:** The stream section does not deal with the degradation that would result from acid drainage caused by construction of the Build Alternative.

***Response:*** *This issue is addressed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: WATER RESOURCES**

**Subject:** The SDEIS fails to discuss specific mitigation plans for streams.

***Response:*** *Specific mitigation measures are addressed in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: GEOLOGY, MINES, AND MINERALS**

**Subject:** The whole section fails to address the acid mine drainage problems as should be done in a SDEIS.

***Response:*** *Possible acid drainage production relative to coal seams and coal mines (strip benches, deep mines, abandoned mines) was discussed in detail in the ASDEIS (pp. III-505-III-506). Additional studies have been performed as the result of public hearing and comment letters that address the problems of possible acid drainage production from other geologic formations. Discussion of these studies and mitigation that will be employed when acid producing formations are encountered are included in the Corridor H FEIS Mitigation Document.*

**Issue: GEOLOGY, MINES, AND MINERALS**

**Subject:** The groundwater section fails to address the acidic drainage that will be caused by the Build Alternative.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: GEOLOGY, MINES, AND MINERALS**

**Subject:** The SDEIS fails to address the problems that can be caused when old mines are disturbed. Specific mitigation plans are not described.

***Response:*** *Possible acid drainage production relative to coal seams and coal mines (strip benches, deep mines, abandoned mines) was discussed in detail in the ASDEIS (pp. III-505-III-506). FHWA regulations require that there be a full description of mitigation measures in the FEIS to the extent permitted by the level of design 23 CFR 771.125 (a) (1). The level of design presented in the ASDEIS allows only for a discussion of mines as included in the ASDEIS. Before more detailed engineering designs are completed additional geotechnical investigations will be completed to identify any abandoned mines or mine voids.*

**Issue: GROUNDWATER**

**Subject:** No substantive plans are provided for the possible groundwater contamination of Greenland Gap as a result of construction of Line A.

***Response:*** *Investigation, avoidance of impacts, and development of any required mitigation measures will be an ongoing process. Commitments to that process are contained in the Corridor H FEIS Mitigation Document. Specific measures can not be developed until final designs are completed and are not part of the FEIS.*

**Subject:** How well will the peat-sand filters work?

***Response:*** *Sand-peat filters are being used to protect karst groundwater in the Edward Aquifer of Texas. They are also being used and assessed by the Indiana Department of Transportation along State Road 37 in Lawrence County, Indiana; this is a karst area with numerous sinkholes. Their performance is unlikely to be region-specific. Peat-sand filters are reviewed in Galli (Peat-sand filters: a proposed stormwater management practice for urbanized areas. Dept. of Env. Programs, Metropolitan Washington Council of Governments, Washington, D.C., Publ 91702, 45p.).*

**Issue: MISCELLANEOUS**

**Subject:** Mitigation measures are not adequately addressed for acid drainage.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

## Commentor: Wood, Mr. Doug, President WVSTA

**Group - WVSTA**

**Issue: PEDESTRIAN AND BICYCLING TRAILS**

**Subject:** There is no mention in the DEIS of the Allegheny Trail in the vicinity of the junction of Forest Road 18 and U.S. Rt. 219.

***Response:*** *Page III-170 of the Alignment Selection SDEIS identifies impacts for the IRA occurring at FR 18/US 219. Additionally, the Build Alternative also identifies potential impacts to the Allegheny Trail within this vicinity (ASDEIS, p. III-171).*

**Subject:** Suggest that an overpass or underpass be built for the Allegheny Trail in areas where its disrupted. Also suggests that the trail not be blocked during construction and that trailhead parking be included as mitigation.

***Response:*** *A pedestrian overpass will be constructed for the Allegheny Trail just west of its US 219/FR18 location. Access will be maintained during construction.*

**Subject:** The intersection of US 219 and FR 18 is used by hikers for trailhead parking. If this is impacted, mitigation should be required.

***Response:*** *General mitigation measures for impacts to existing trails is detailed in the FEIS (Section III, J-Recreation Resources). As part of this mitigation strategy for trails, it is the intent of the WVDOT to maintain coordination with the US Forest Service to assure a replacement route.*

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# Alignment Selection SDEIS -

# Public Hearing Comments and Responses

## Commentor: Birmingham, Kathy

**Public**

**Issue: SECONDARY AND CUMULATIVE IMPACTS**

**Subject:** I question the assumption that we'll have a lot of new jobs in this area.

***Response:*** *Employment projections were based on assumptions and recognized and widely used models as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out and employment of industrial parks was undertaken so as to develop the "worst case" secondary impact scenario.*

## Commentor: Elbon, Julia

**Public**

**Issue: ALIGNMENTS CONSIDERED BUT ELIMINATED**

**Subject:** I would like to ask if consideration could be given to another west-end exit, perhaps in the same location where the Corridor H bypass might be someday.

***Response:*** *Comment noted. Location of the proposed Elkins by-pass has not yet been determined. It would therefore be premature to address this issue. However, consideration to this issue will be given as the design of the Elkins By-Pass progresses.*

## Commentor: Evans, Ave

**Public**

**Issue: GREENLAND GAP**

**Subject:** The potential exists for a disaster with the numerous sinkholes that we have along our route of approximately one mile along County Route 1.

***Response:*** *Potential impacts to karst regions, sinkholes and groundwater and mitigation measures for these impacts were discussed in detail in the ASDEIS pp. III-87-III-128. Additional discussions of impacts to karst regions, sinkholes, and groundwater are included in this FEIS (Section III) and the Corridor H FEIS Mitigation Document.*

**Commentor: Funkhouser, Dan**

**Public**

**Issue: EXISTING ENVIRONMENT AND IMPACTS**

**Subject:** The way the road is currently situated, it is going to go right through the middle of this farm and for all practical purposes ends the viability of that property as a working farm which it is today.

***Response:*** *Final right-of-way acquisition requirements are not determined until the final design stage. During final design, all appropriate measures are taken to minimize the impacts of right-of-way takes. Compensation for necessary right-of-way acquisitions will be in accordance with all applicable state and federal regulations.*

**Issue: RELOCATIONS**

**Subject:** We propose that the road be relocated not off of our property but to a different section of the property where it does not take the viability of the farm away.

***Response:*** *Final right-of-way acquisition requirements are not determined until the final design stage. During final design, all appropriate measures are taken to minimize the impacts of right-of-way takes. Compensation for necessary right-of-way acquisitions will be in accordance with all applicable state and federal regulations.*

**Issue: RELOCATIONS**

**Subject:** The pipeline, as it is currently shown, is incorrect.

***Response:*** *Preliminary utility locations are based on the location of lines on USGS (1:2000) mapping. During the subsequent design phases, utility companies will be asked to accurately locate utility lines on current mapping.*

**Commentor: Good, Greg**

**Public**

**Issue: NATIONAL FOREST LANDS**

**Subject:** It seems surprising that of the six areas known as semiprimitive recreation areas within the National Forest that are within a 30 minutes' drive of the proposed corridor, not one is mentioned in the Draft EIS.

***Response:*** *An extensive discussion of MNF Forest Management Prescription (MP) Areas was included in the Corridor Selection SDEIS pp. IV-11-20. The Corridor Selection SDEIS (p. IV-18) analysis revealed that Scheme Option D5 would not impact MP 6.2 Areas. Recreation resources indicated in ASDEIS were identified using available mapping (numerous sources), and through coordination with Federal, State, and local governmental agencies (ASDEIS, p. III-159).*

**Subject:** I am concerned that there is no mention of the increase in recreational use of the National Forest that will come with this four lane highway.

***Response:*** *The Corridor Selection SDEIS discusses involvements with the MNF on p. III-204. The selection of Corridor D-5 was partially based on its avoidance of involvements with sensitive recreational resources (Corridor Selection SDEIS Decision Document, p. 26). There are also discussions of recreation resource use on p. III-203 of the Corridor Selection SDEIS and on p. III-162 of the ASDEIS.*

**Commentor: Kotcon, James**

**Group - Sierra Club**

**Issue: PROJECT PURPOSE AND NEED**

**Subject:** The Sierra Club has expressed concern about the need for Corridor H.

***Response:*** *The Purpose and Need Analysis was established in the Corridor Selection Transportation Needs Study, March 1992. It was included in the approved Corridor Selection SDEIS, October 21, 1992, and the Corridor Selection SDEIS Decision Document of July 26, 1993. The Purpose and Need statement in the Alignment Selection SDEIS referenced the detailed Purpose and Need analysis previously conducted.*

**Subject:** One of the issues and one of the primary issues to be documented is the purpose and need, and the major purpose is economic development.

***Response:*** *The Corridor Selection Transportation Needs Study (March, 1992) and the CSDEIS concluded that only a 4-lane facility would meet the project purpose and need. As stated on p. II-1 of the ASDEIS, "Originally, the Improved Roadway Alternative (IRA) was eliminated from further consideration because it did not meet the project purpose and need. However, interest in the improvement of two-lane local roads prompted WVDOT to determine that the IRA would be equally developed and evaluated throughout the Alignment Selection process, even though it does not meet the project purpose and need." In addition, the Virginia Commonwealth Transportation Board resolution requires the consideration of the IRA in the Alignment Selection process.*

**Issue: NATIONAL FOREST LANDS**

**Subject:** I am particularly concerned that there is virtually no mention of Otter Creek Wilderness Area anywhere within this document.

***Response:*** *The Otter Creek Wilderness Area at its closest point is 2.5 miles from the proposed highway. Predictive models utilized for the Alignment Selection SDEIS did not identify any impacts to the Otter Creek Wilderness Area or the MNF (ASDEIS p. III-26- III-40, Secondary and Cumulative Impacts Technical Report). However, this resource will be more accessible to the public as a result of construction of the Preferred Alternative.*

### Commentor: Leatherman, George

**Public**

**Issue: LINE B: BAKER OPTION AREA**

**Subject:** Of particular concern is in the Baker area where there are two alternatives, Line A and Line B. Line B seems a lot more logical.

***Response:*** *Line B was selected as the Preferred Alternative within the Baker Option Area.*

### Commentor: Leyzorek, John

**Public**

**Issue: VISUAL**

**Subject:** Part of the scenery that these tourists are going to love seeing, long, long, long stretches of it are going to be obliterated by sound barrier walls that average 20 feet in height.

***Response:*** *Final noise mitigation measures are presented in the FEIS (pp. III-64-III-66). In short, the phase 2 noise analysis conducted for the FEIS found that only one noise wall is currently justified for the project.*

**Issue: VEGETATION AND WILDLIFE**

**Subject:** No mention in the SDEIS of other turtles and other amphibians except for Cheat Mountain salamanders and a few other salamanders, no frogs, no toads, nothing are mentioned in this.

***Response:*** *Impacts to amphibians and reptiles are included in the wetland mosaic impact analysis (p. III-337 of the ASDEIS) and the wildlife mortality discussion (p. III-314 of the ASDEIS). More detailed discussions of specific species (e.g. Cheat Mountain salamander) were required by FHWA and FWS regulations.*

**Issue: PUBLIC INVOLVEMENT MEETINGS AND COORDINATION**

**Subject:** We do need this public comment period extended for at least 30 days so everyone has time to read.

***Response:*** *The Public comment period was extended to March 23 for a total public review period of 135 days. The required comment period is 45 days.*

## Commentor: Lind, Lester

**Public**

**Issue: DESCRIPTION OF THE NO-BUILD ALTERNATIVE**

**Subject:** The No-Build Alternative was included in the study to appease persons like myself who are against the four-lane road and are asking for an alternative.

***Response:*** *Consideration of the No-Build Alternative as a baseline against which to measure alternatives is required by CEQ (40 CFR 1502.14(d)) and FHWA (T.A. 6640.8A) regulations. The No-Build Alternative was developed to a comparable level of detail as the other alternatives as explained on p. II-1 of the ASDEIS.*

## Commentor: Marcus, Matt

**Public**

### Issue: RECREATION

**Subject:** The Alignment Selection SDEIS has numerous errors that indicate that the recreational resources have not been studied or identified sufficiently.

***Response:*** *Recreation resources indicated in ASDEIS were identified using available mapping (numerous sources), and through coordination with Federal, State, and local governmental agencies (ASDEIS, p. III-159; References include: American Hiking Society, American Hiking Society, Hardy County Planning Commission, Pocahontas County Tourism Commission, Potomac Appalachian Trail Club, Tucker County Alpine Festival, Inc., Tucker County Convention and Visitors Bureau, Final Revised Land and Resource Management Plan, George Washington National Forest, Final Environmental Impact Statement for the Land and Resource Management Plan, Monongahela National Forest, National Survey of Fishing, Hunting and Wildlife - Associated Recreation; West Virginia, Virginia Outdoors Plan; Executive Summary, West Virginia Statewide Comprehensive Outdoor Recreation, West Virginia Travel and Tourism Economic Impacts 1992. February 1993, and West Virginia Scenic Trails Association. Hiking Guide to the Allegheny Trail.)*

### Issue: PUBLIC INVOLVEMENT MEETINGS AND COORDINATION

**Subject:** I believe an extension to this comment period is needed.

***Response:*** *The Public comment period was extended to March 23 for a total public review period of 135 days. The required comment period is 45 days.*

## Commentor: Merritt, Chuck

**Public**

### Issue: PUBLIC INVOLVEMENT MEETINGS AND COORDINATION

**Subject:** First thing I would like to do is ask for an additional 45 days extension to the public comment period past the January 23rd date.

***Response:*** *The Public comment period was extended to March 23 for a total public review period of 135 days. The required comment period is 45 days.*

**Commentor: Merritt, Pam**

**Public**

**Issue: AIR QUALITY**

**Subject:** The SDEIS needs to look at other air quality issues beyond carbon monoxide, specifically, the nitrogen oxides, ozone and sulfur dioxide. Ozone needs to be looked into.

***Response:*** *The changes in the NOx levels was calculated for all the alternatives considered and are included in Table 7 of the Air, Noise and Energy Technical Report which is incorporated by reference into the ASDEIS. Sulfur is not a pollutant studied for highway analyses as it is primarily a stationary source pollutant. Carbon monoxide emissions were already analyzed. Normally, project level ozone emissions are not analyzed in air quality attainment areas nor are they normally analyzed if the project comes from an approved and conforming Transportation Improvement Program. In a special request by EPA prior to the completion of the SDEIS, the daily changes in VOC and NOx for each alternative were calculated and included in the report. In addition, the Shenandoah National Park also has an air quality fact sheet (7/93) that discusses air pollution concerns in the park. However, the report only mentions off-site stationary sources and vehicle traffic in the park as pollution contributors in their study. An expanded discussion of ozone precursors and ozone has been included in the FEIS (pp. III-53-III-55)*

**Issue: AIR QUALITY**

**Subject:** Otter Creek is listed as a Class 1 Wilderness Area and has other federal guidelines which it needs to meet in regards to the Clean Air Act.

***Response:*** *Carbon monoxide emissions were already analyzed. Normally, project level ozone emissions are not analyzed in air quality attainment areas nor are they normally analyzed if the project comes from an approved and conforming Transportation Improvement Program. In a special request by EPA prior to the completion of the SDEIS, the daily changes in VOC and NOx for each alternative were calculated and included in the report. In addition, the Shenandoah National Park also has an air quality fact sheet (7/93) that discusses air pollution concerns in the park. However, the report only mentions off-site stationary sources and vehicle traffic in the park as pollution contributors in their study.*

**Issue: WETLANDS**

**Subject:** One of my concerns is that cut and fill lines seem to go onto the watershed site that would bring sedimentation into the Big Run Bog research area.

***Response:*** *According to field views and project mapping, no tributaries to this bog will be crossed. However, advanced sedimentation and erosion controls as described in the Corridor H FEIS Mitigation Document will be employed during construction. Use of these will preclude indirect impacts from increased sediment load to the bog.*

**Issue: EXISTING ENVIRONMENT**

**Subject:** I would like to see the U.S. Geological Survey Study that is being done on the South Branch of the Potomac right now included in the FEIS.

***Response:*** *Results of the study are not yet available.*

**Issue: WATER RESOURCES**

**Subject:** In regards to water quality, some of the things I think that were skipped or need to be paid more attention to are acid mine drainage issues.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

## Commentor: Miller, Terry

**Public**

**Issue: IMPROVED ROADWAY ALTERNATIVE**

**Subject:** The proposed IRA just stuck to Scheme D. The Improved Roadway Alternative is neither improving existing roadways nor a suitable solution.

***Response:*** *Two Improved Roadway Alternatives (IRA) were considered during the Corridor H study process. The first IRA considered the improvement of local roads throughout the Corridor H project area. It was dismissed as a viable alternative in the CSEIS (refer to Section II). In the ASDEIS, a second IRA was developed within the selected Corridor, D5. This IRA was dismissed because it did not meet the purpose and need of the project (refer to Section II of the FEIS).*

## Commentor: Newlon, Dora

**Public**

**Issue: RELOCATIONS**

**Subject:** This proposed highway that is going to be built is going to come directly through our farm which will affect our water source.

***Response:*** *Final right-of-way acquisition requirements are not determined until the final design stage. During final design, all appropriate measures are taken to minimize the impacts of right-of-way takes. Compensation for necessary right-of-way acquisitions will be in accordance with all applicable state and federal regulations. Additionally, any private water supplies that are removed will be replaced.*

## Commentor: Newlon, Mitch

**Public**

**Issue: RELOCATIONS**

**Subject:** I am against the route going through our farm. Maps I have seen show our pond being destroyed but does not show where the one will be built to replace it.

***Response:*** *Final right-of-way acquisition requirements are not determined until the final design stage. During final design, all appropriate measures are taken to minimize the impacts of right-of-way takes. Compensation for necessary right-of-way acquisitions will be in accordance with all applicable state and federal regulations.*

## Commentor: Polinski, Adam

**Public**

**Issue: IMPROVED ROADWAY ALTERNATIVE**

**Subject:** I also feel the IRA road improvement should not have a mandatory 50-mile-an-hour design speed.

***Response:*** *The IRA was designed to meet the requirements for a 2-lane, Rural Principal Arterial Highway, in accordance with AASHTO Design Guidelines (1994) and WV Design Directive 601.*

**Issue:** NATIONAL FOREST LANDS

**Subject:** Construction close to wild areas under the 6.2 prescription, will affect these areas.

***Response:*** *An extensive discussion of MNF Forest Management Prescription (MP) Areas was included in the CSDEIS (pp. IV-11-20). The Corridor Selection SDEIS (p. IV-18) analysis revealed that Scheme Option D5 would not impact MP 6.2 Areas. The Otter Creek Wilderness Area at its closest point is 2.5 miles from the proposed highway. Predictive models utilized for the Alignment Selection SDEIS did not identify any impacts to the Otter Creek Wilderness Area or the MNF (ASDEIS p. III-26-III-40, Secondary and Cumulative Impacts Technical Report). However, this resource will be more accessible to the public as a result of construction of the Preferred Alternative, resulting in increased public utilization, enjoyment, awareness, and appreciation of nature trails and wilderness areas.*

**Issue:** PUBLIC INVOLVEMENT MEETINGS AND COORDINATION

**Subject:** I hope you extend the comment period because of the holiday season.

***Response:*** *The Public comment period was extended to March 23 for a total public review period of 135 days. The required comment period is 45 days.*

## Commentor: Rogers, Hugh

**Public**

**Issue:** PUBLIC INVOLVEMENT MEETINGS AND COORDINATION

**Subject:** I join with the other people who have asked for an extension of the comment period.

***Response:*** *The Public comment period was extended to March 23 for a total public review period of 135 days. The required comment period is 45 days.*

## Commentor: Schoonover, James

**Public**

**Issue:** RELOCATIONS

**Subject:** Near Station 505, we would like to have some consideration in using Line I as it approaches that building as opposed to Line A so that the building would not be taken as part of the right-of-way.

***Response:*** *Final right-of-way acquisition requirements are not determined until the final design stage. During final design, all appropriate measures are taken to minimize the impacts of right-of-way takes. Compensation for necessary right-of-way acquisitions will be in accordance with all applicable state and federal regulations.*

## Commentor: Similak, Michael W.

**Public**

### Issue: ECONOMIC ENVIRONMENT

**Subject:** The economic and social benefits described in the ASDEIS associated with the Build Alternative are grossly overstated.

***Response:*** *Employment projections were based on assumptions and recognized and widely used models as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out and employment of industrial parks was undertaken so as to develop the "worst case" secondary impact scenario.*

### Issue: MISCELLANEOUS

**Subject:** The ASDEIS is fundamentally flawed and violates the basic principles of NEPA.

***Response:*** *The ASDEIS is in full compliance with the procedural requirements of NEPA. The methodologies utilized in the Alignment Selection DEIS were developed jointly and agreed upon by the WVDOH and Cooperating Agencies.*

**Subject:** The ASDEIS is biased in favor of the Build Alternative.

***Response:*** *As stated on page II-1 of SDEIS, "the Alignment Selection process focuses on the development of the No-Build, the IRA, and the Build Alternatives." In accordance with 40 CFR 1502.14, these three alternatives have been developed to a comparable level of detail to evaluate their merits and impacts.*

## Commentor: Spadaro, Laura

**Public**

### Issue: SECONDARY AND CUMULATIVE IMPACTS

**Subject:** I think that the Draft EIS is a little bit misleading in the amount of jobs that it predicts.

***Response:*** *Employment projections were based on assumptions and recognized and widely used models as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out and employment of industrial parks was undertaken so as to develop the "worst case" secondary impact scenario.*

## Commentor: Sturdivant, Donald R.

**Public**

### Issue: OPTION AREAS IN WEST VIRGINIA

**Subject:** I would like to recommend if I could, and that would be Interchange Option A over Interchange Option I. This would get the interchange up above the flood plain and make it a lot easier access to the city of Elkins

***Response:*** *Line I within Interchange Option Area was selected as a component of the Preferred Alternative within West Virginia. Details concerning that decision are discussed in the Section II of the FEIS.*

## Commentor: Sutherland, David

**Public**

### Issue: DESCRIPTION OF THE NO-BUILD ALTERNATIVE

**Subject:** Your No-Build Alternative is unrealistic. It assumes no construction of any kind in the affected counties except the minimum maintenance as I read it.

***Response:*** *Consideration of the No-Build Alternative as a baseline against which to measure alternatives is required by CEQ (40 CFR 1502.14(d)) and FHWA (T.A. 6640.8A) regulations. The No-Build Alternative was developed to a comparable level of detail as the other alternatives as explained on p. II-1 of the ASDEIS.*

### Issue: PUBLIC INVOLVEMENT MEETINGS AND COORDINATION

**Subject:** I need at least 45 extra days to digest and comment on your new Alignment.

***Response:*** *The Public comment period was extended to March 23 for a total public review period of 135 days. The required comment period is 45 days.*

**Subject:** The Corridor Selection Decision Document failed to adequately consider an alignment along US 50. In a matter this complex, it's impossible for a member of the public to seriously address the issues in five minutes.

***Response:*** *The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines and included a corridor option following US Rt. 50. The Corridor Selection SDEIS (October 21, 1992) dismissed all Study Corridors except Corridor D5 from further consideration in the Alignment SDEIS. An expanded discussion of latent demand analysis has been included in the FEIS (p. II-26). The Public comment period was extended to March 23 for a total public review period of 135 days. The required comment period is 45 days.*

## Commentor: Winfree, Charlie

**Public**

### Issue: SECONDARY AND CUMULATIVE IMPACTS

**Subject:** Using a study from another four-lane road in North Carolina, the Department of Highways predicts that 9.8 commercial jobs per mile will be created in West Virginia: gas station, restaurant and motel jobs.

***Response:*** *Employment projections were based on assumptions and widely used models as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out and employment of industrial parks was predicted so as to develop the "worst case" secondary impact scenario.*

### Issue: SECONDARY AND CUMULATIVE IMPACTS

**Subject:** Industrial jobs are only assumed because they feel all industrial capacity will automatically fill to 100 percent of Corridor H; no proof, no study, no evidence from similar roads, just an assumption.

***Response:*** *Employment projections were based on assumptions and recognized and widely used models as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out and employment of industrial parks was predicted so as to develop the "worst case" secondary impact scenario.*

### Issue: PUBLIC INVOLVEMENT MEETINGS AND COORDINATION

**Subject:** I would like to ask the Highway Department to extend the comment period.

***Response:*** *The Public comment period was extended to March 23 for a total public review period of 135 days. The required comment period is 45 days.*

# Section 404 Permit

## Comments and Responses

# Section 404 - Comments and Responses

## Commentor: Bean, Mr. Oscar M., Attorney

**Group - Church**

### Issue: RELOCATIONS

**Subject:** Walnut Grove Church objects to the relocation of County Route 15 south of the Walnut Grove Church of the Brethren worship house.

***Response:*** *The relocation has been modified to the satisfaction of the Church.*

## Commentor: D'Angelo, Ms. Barbara Z., Chief, Wetlands Protection Section

**Agency - EPA**

### Issue: WATER RESOURCES

**Subject:** Some streams will need to assimilate several alterations within a short stretch of river including pipes, stream relocation, box culverts and bridging.

***Response:*** *Comment noted. However, it should be noted that many streams which will incur multiple crossings have been found to be impaired. In many cases, such as in the Patterson Creek area, streams that will be crossed are severly impacted by cattle production. Mitigative measures in these instances will provide a net gain in aquatic habitat and water quality through riparian habitat restoration, and in-stream habitat enhancement.*

### Issue: WILD AND SCENIC RIVERS

**Subject:** Shavers Fork will lose its eligibility for scenic designation due to several bridge crossings.

***Response:*** *Following publication of the Monongahela National Forest's "Wild and Scenic River Study Report and Environmental Impact Statement on Twelve Rivers in the Monongahela National Forest (1995)", a re-assessment of the project impact on the Scenic designation of Shavers Fork was undertaken. ~~That~~ re-assessment is found in Section III (S) of this FEIS. Based on the river report, Shavers Fork would not lose its eligibility for Scenic status.*

### Issue: AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

**Subject:** The ASDEIS does not contain information describing techniques for disposal and associated adverse impacts which may result from the disposal of this overburden material.

***Response:*** *As the project moves into the subsequent design phases, waste reduction will be a central focus. Waste reduction and mitigation for excess waste is discussed in the Corridor H FEIS Mitigation Document.*

### Issue: SECONDARY AND CUMULATIVE IMPACTS

**Subject:** The ASDEIS does not disclose information on the location and feasibility of potential disposal areas, thus failing to evaluate potential impacts which may result.

***Response:*** *As the project moves into the subsequent design phases, waste reduction will be a central focus. Waste reduction and mitigation for excess waste is discussed in the Corridor H FEIS Mitigation Document.*

### Issue: MITIGATION

**Subject:** The success of this project is dependent upon the development and implementation of corrective measures as part of a strong commitment to a comprehensive mitigation strategy which should include short- and long-term aquatic mitigation measures.

***Response:*** *The Corridor H FEIS Mitigation Document addresses a wide range of mitigation for aquatic habitats.*

**Subject:** The EPA wants the currently recommended wetland sites to be expanded to provide several upland inclusions within the wetland complex to form a wetland mosaic.

***Response:*** *As agreed upon by the EPA (Exhibit VII-12, ASDEIS), wetlands will be mitigated at two separate locations. One within the Monongahela river drainage and one within the Potomac river basin. Additionally, wetland compensation was agreed upon to be 1:1 for both Open Water and Palustrine Emergent and 3:1 for Palustrine Forested and Shrub/Scrub wetlands.*

**Subject:** EPA recommends that the applicant convene a series of interagency meetings throughout the remaining planning process.

***Response:*** *Interagency meetings with representatives from the FHWA, WVDOH, EPA, COE, WVDNR, WVDEP, USFWS, GWNF, and MNF have taken place (May 9, 10, 22, and 23, 1995) to discuss relevant issues of the Cooperating Agencies. As the project moves into the subsequent design phases, additional meetings with appropriate resource agencies will occur.*

### Commentor: Michael, Mr. Thomas R., Attorney

**Group - Corridor H Alternatives**

**Issue: PROJECT PURPOSE AND NEED**

**Subject:** The stated purpose for Corridor H is to link I-79 and I-81. Because VA Commonwealth Transportation Board rejected construction within VA the goal is unachievable.

***Response:*** *System linkage, in terms of connecting I-79 in WV and I-81 in VA is one of many need factors that the Build Alternative of Corridor H would address. The VA Commonwealth Transportation Board's Resolution of February 15, 1995, directed the VADOT to study the Route 55 corridor safety aspects such as horizontal and vertical alignments, possible need for truck climbing lanes, intersection improvements and other safety related features of the roadway as may be included in the Six Year Plan.*

**Issue: SAFETY CONSIDERATIONS**

**Subject:** The State of WV will create another impact (traffic and safety problems) which was not considered in the SDEIS. That is the construction of a four lane highway in WV which terminates at the VA border.

***Response:*** *The VA Commonwealth Transportation Board's Resolution of February 15, 1995, directed the VADOT to study the Route 55 corridor safety aspects such as horizontal and vertical alignments, possible need for truck climbing lanes, intersection improvements and other safety related features of the roadway as may be included in the Six Year Plan. The resulting improvements, in whatever form, would accommodate future traffic.*

**Issue: WILD AND SCENIC RIVERS**

**Subject:** In sum, the SDEIS does not fulfill the obligation to give continuing consideration to the eligibility and suitability of these rivers under the Act. Complete and comprehensive, up-to-date studies are required.

***Response:*** *Following publication of the Monongahela National Forest's "Wild and Scenic River Study Report and Environmental Impact Statement on Twelve Rivers in the Monongahela National Forest (1995)", a re-assessment of the project impact on the Scenic designation of Shavers Fork was undertaken. That re-assessment is found in Section III (S) of this FEIS. Based on the river report, Shavers Fork would not lose its eligibility for Scenic status. Cedar Creek and the Cacapon River segments were determined to be eligible for Scenic status. The DOI determined that the Cacapon is not suitable for listing due to lack of public support. The section of the South Branch of the Potomac River listed in the NRI as eligible for Scenic status is not crossed by this project.*

**Issue: ENVIRONMENTAL PERMITS**

**Subject:** The pending permit application does not meet the Section 404 (b) (1) Guidelines (40 CFR § 230.10). The practicable alternative is the improvement of the existing network of roads.

***Response:*** *The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines. The Corridor Selection SDEIS (October 21, 1992) dismissed all Study Corridors except Corridor D5 from further consideration in the Alignment SDEIS. The alternative of Improving local roads where feasible to meet design criteria for the IRA resulted in unavoidable environmental and cultural resource impacts.*

**Subject:** CFR § 230.10. (a). The NEPA documents do not consider the alternatives required by the Guidelines and must be supplemented before consideration can be given to issuing a permit.

***Response:*** *The Corridor H Project followed the CEQ (40 CFR 1502.20) and FHWA (6640.8A) guidelines. The Corridor Selection SDEIS (October 21, 1992) dismissed all Study Corridors except Corridor D5 from further consideration in the Alignment SDEIS. The alternative of improving local roads where feasible to meet design criteria for the IRA resulted in unavoidable environmental and cultural resource impacts. The IRA in the ASDEIS meets the requirements specified in the Corridor Selection Decision Document (July 26, 1993; page 20). An IRA located within the applicable southern Corridor Selection Scheme A Options would require unavoidable 4(f) impacts in the Spruce Knob-Seneca Rocks National Recreation Area. As stated in the Decision Document (page 37), the WVDOH intends to avoid all known Section 4(f) property. An IRA located within the northern Corridor Selection Scheme E Options would require a 6-fold increase in the number of residential and commercial displacements required by the preferred alternative. Other remaining transportation needs, particularly on US 33, US 50, and WV 55, is discussed in the Decision Document under Section E (pages 35 and 36).*

**Issue: MISCELLANEOUS**

**Subject:** The SDEIS is deficient in terms of NEPA standards. As such the SDEIS cannot be adopted by the Corps. A Supplemental DEIS is required.

***Response:*** *The ASDEIS is in full compliance with the procedural requirements of NEPA. The methodologies utilized in the Alignment Selection DEIS were developed jointly and agreed upon by the WVDOH and Cooperating Agencies.*

**Subject:** There are serious unanswered questions concerning the impacts of the proposed permit on streams and wetlands. These include acidic drainage, waste, springs, karst terrain, groundwater, and mitigation of wild and scenic rivers.

***Response:*** *These issues have been addressed in the Corridor H FEIS Mitigation Document.*

**Subject:** New information provided by CHA's comments is significant and relevant such that a new Supplemental DEIS is required.

***Response:*** *The CSDEIS and ASDEIS analyze alternatives to an appropriate level of detail. The FEIS contains responses to both DEIS's as required. A supplemental EIS is not required.*

## Commentor: Schmidt, Mr. John E. and Jean L.

**Individual**

### Issue: PROJECT PURPOSE AND NEED

**Subject:** The projected economic benefits do not support the financial and natural resource costs of this project.

***Response:*** *Information presented in the ASDEIS was developed as an assessment of environmental impacts. No attempt was made to present a cost benefit analysis. Cost benefit analyses may be included in draft environmental impact statements (CEQ regulations 40 CFR 1502.23) but are not required.*

### Issue: DEVELOPMENT PREDICTIONS

**Subject:** The projected economic benefits to the region are suspect. Most of the jobs will be located in VA which is served by two Interstates. Traffic projections appear to be largely influenced by local conditions rather than to projected increased commerce.

***Response:*** *Employment projections were based on assumptions and recognized and widely used models as discussed in the Secondary and Cumulative Impacts Technical Report (pp. 3-18). Additionally, full build-out and employment of industrial parks were undertaken so as to develop the "worst case" secondary impact scenario.*

### Issue: WATER QUALITY

**Subject:** Although the amount of excess waste is likely to decrease, the document should identify potential impacts to waters of the U.S. and measures to mitigate the impacts.

***Response:*** *As detailed in the Corridor H FEIS Mitigation Document, the disposal of waste material will not be placed in "sensitive" resouces (perennial streams, wetlands, floodplains, cultural resources, etc.). Waste material that is known to potentially produce acid drainage has been identified. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

**Issue: WATER RESOURCES**

**Subject:** We believe direct project impacts to wetlands and streams have been adequately addressed and mitigation, while incomplete, will be successful.

***Response:*** *Comment noted.*

**Subject:** We do not believe that secondary impacts to waters of the United States from development (especially wetlands), sedimentation and acid drainage have been adequately addressed or mitigated.

***Response:*** *WVDOH has conducted additional investigations of the acid drainage issue. Areas of potential acid drainage have been identified and a mitigation strategy developed in conjunction with the FWS and other cooperating agencies. Details of the methodology for identification of acid draining areas and ensuing mitigation strategy are included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS. The raw land analysis was carried out to estimate the amount of land available for development that did not contain sensitive resources such as wetlands (Corridor Selection SDEIS, p. III-37). It was found that sufficient land was available to support the estimated development without encroaching on wetlands as identified from NWI mapping. Wetland encroachments may occur as the result of permitting action by appropriate authorities or illegal encroachment activities. The point of the analysis was to determine if sufficient land was available to support development without such encroachments. The results of that analysis as shown in Table III-46 (ASDEIS) clearly indicated that more than sufficient land was available. Additional discussion of erosion and sedimentation control measures has been included in the Corridor H FEIS Mitigation Document, which has been incorporated by reference into the FEIS.*

## Commentor: Tolstead, Dr. W.L., Professor Emeritus

**Individual**

**Issue: RELOCATIONS**

**Subject:** The proposed alignment will go directly through my horticultural laboratory. These plants are named and registered with a number yet to be processed.

***Response:*** *Final right-of-way acquisition requirements are not determined until the final design stage. During final design, all appropriate measures are taken to minimize the impacts of right-of-way takes. Compensation for necessary right-of-way acquisitions will be in accordance with all applicable state and federal regulations.*

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# Corridor H FEIS Mitigation Document

## Comment and Responses

## Commentor: Keesecker, Mr. Edward

**District Conservationist, Natural Resources Conservation Service**

**Subject:** We concur with the intent of the proposed mitigation strategy and the contents of the document presented.

***Response:*** *Comment noted.*

## Commentor: McDowell, Ms. Susan

**Acting Chief, Environmental Planning and Assessment Section, US EPA**

**Subject:** EPA requests that WVDOH provide a commitment to the mitigation sequence of avoidance, minimization, and compensation for all future design work and request that this commitment be reflected in the document. We would also recommend that the document state that commitments made by WVDOH will be included in the ROD over the FHWA's signature.

***Response:*** *Commitment to that sequence has been followed throughout the developement of this project. Continued agency coordination commitments as detailed in the Corridor H FEIS Mitigation Document will assure that sequencing continues to be implemented. The Corridor H FEIS Mitigation Document is incorporated by reference into the FEIS and will be incorporated into the ROD.*

**Subject:** Provide clarity for the justification of a WVDOH employee as the environmental monitor, a brief description of the role of the monitor would be helpful.

***Response:*** *No decision has yet been made concerning the affiliation of the environmental monitor. That decision will be made during further discussions with the resource agencies. A discussion of the role of the monitor was included in the document (Section C). Additional roles for the monitor will be developed as the process evolves through cooperative and collaborative activities undertaken between WVDOH and the resource agencies. A commitment to that process is made in the introductory statement in the document.*

**Subject:** In Part I, Section D, please indicate that construction monitoring will occur throughout and downstream of the project area and will begin prior to the onset of construction.

***Response:*** *That Section states that "The methods used to collect data, perform analyses, and report the resulting data will be developed in concert with the agencies." It is the intention of WVDOH in cooperation with the agencies to develop reasonable and scientifically valid monitoring procedures. Monitoring throughout the project area and downstream will certainly occur before construction in order to develop baseline information, as well as during and after construction activities.*

**Subject:** A corrective action plan should be included which states that corrective action should be taken based on both visual assessments and monitoring results.

***Response:*** *Corrective action plans will be developed on a case by case basis, should permit violations or effectiveness of proposed erosion and sedimentation control measures be found to be compromised or not functioning properly.*

**Subject:** We recommend that the WVDOH work with affected counties and communities to address development issues and/or provide the resources for conservation planning assistance.

***Response:*** *Section E of the document states that, "WVDOH will develop a program, in concert with the agencies to inform local and regional planners about sensitive resources in their respective regions that could be potentially harmed by development."*

**Subject:** EPA believes that a habitat based assessment would be a better measure to use to develop stream mitigation plans than the linear foot approach for mitigation of stream impacts.

***Response:*** *The goal of the stream habitat improvement program is to mitigate for stream length loss, not to replicate the habitat lost In many cases the habitat lost was determined to be fair to poor condition. The goal is to increase habitat values of the same or other streams to the maximum extent practicable, which would be better than the habitat that is being lost. Length of stream improvements will be the starting point for the determination of mitigation. This measure will be used in concert with those data collected during the intensive stream habitat assessments performed for the project. Like all mitigation strategies, stream improvement plans will be developed in concert with the agencies.*

**Subject:** Is crown vetch needed in the seed mixture?

***Response:*** *Crown vetch is included in seed mixture D (WVDOH specification 642.5.3.2) which is generally used to re-seed cut and fill slopes. However, the document points out that "Contract plans will include alternative seed mixtures which will make greater use of native or naturalized species..."*

**Subject:** We would like to see a commitment that clearing will be prohibited beyond the limits of construction.

***Response:*** *Clearing will be so prohibited except for that required for staging areas and other construction related activities. Even this clearing will be subject to agency review and environmental monitoring.*

**Subject:** Temporary and final reclamation should result in 80% cover. The 50% standard is insufficient and can be increased by mulching the areas.

***Response:*** *The document has been modified to reflect this suggestion.*

**Subject:** Ground level photomonitoring points should be supplemented with remotely sensed photography.

***Response:*** *WVDOH believes that ground level photomonitoring coupled with on-site and downstream investigations by the environmental monitor is sufficient. Ground level photomonitoring proposed is for the purposes of maintaining a record of reclaimation success.*

**Subject:** Areas unsuitable should include both perennial and intermittent streams and associated riparian areas, intact/high quality wildlife habitat including hardwoods in particular mast producing species.

***Response:*** *Unsuitable areas will include perennial and intermittent streams and associated riparian areas. Attempts will be made to avoid or minimize impact due to the placement of excess excavation on valuable upland habitats.*

**Subject:** We recommend rewording of paragraph to state: Contractors will submit to WVDOH all areas proposed by contractors for borrowing and excess excavation disposal for review and approval. WVDOH will investigate these submittals for the presence of any areas deemed unacceptable.

***Response:*** *Paragraph has been modified to reflect that language.*

**Subject:** Will some form of monitoring be conducted for the success of mitigation for the excavation and borrow sites?

***Response:*** *Reclamation monitoring will occur for these sites as for the construction sites as detailed in the document.*

**Subject:** EPA would like to see documented commitments by WVDOH to a) clearly delineate contractor limits on all design drawings, b) require that contractors submit plans for construction offices, parking areas, temporary access roads, laydown/storage areas, etc. for review and approval prior to construction.

***Response:*** *The document states that, "Where practicable clearing limits will be established independent of the right-of-way edge so as to preserve existing wildlife habitat within the right-of-way". These limits would appear on appropriate plans and would be subject to agency review as depicted in Figure 1 of the document Contractors plans including those structures/areas cited above which are provided to WVDOH prior to commencing construction activities. They too would be subject to agency review and comment as depicted in Figure 1.*

**Subject:** Terrestrial mitigation should incorporate the results of the HEP analysis by developing a strategy which serves to mitigate impacts using the most ecologically relevant approach. Recovery of habitat units represents just one component of a comprehensive mitigation plan.

***Response:*** *It was decided by WVDOH, WVDNR and FWS to use habitat unit recovery as an unbiased, objective measure of terrestrial mitigation requirements. Terrestrial mitigation plans will be developed in conjunction with WVDNR, FWS and EPA to assure ecological relevance.*

**Subject:** EPA would like to see efforts to seek out areas to protect/purchase which contribute to the extent and/or integrity of high quality ecosystems/wilderness areas which will further enhance or protect those ecosystem functions and values.

***Response:*** *Identification and HEP analysis of the unique habitat to be purchased for the preservation will be carried out by a team of wildlife biologists assembled from WVDOH, FWS and WVDNR. EPA's concerns will be considered by that team during their deliberations.*

**Subject:** Part I, Section A, goal 4: Please add to the end of the sentance "...and provide a means to track the implementation and success of mitigation activities".

***Response:*** *Phrase has been added.*

## Commentor: Pierce, Ms. Susan

**Deputy State Historic Preservation Officer for Recourse Presevation; West Virginia Division of Culture and History**

**Subject:** Document does not reflect the steps requried in the Section 106 review process.

***Response:*** *The 106 review process for this project will be carried out as outlined in the Section 106 Programmatic Agreement found in Volume II, Appendix B of this FEIS. Inclusion of WVDCH in this Corridor H FEIS Mitigation Document was done so as to include WVDCH in agency review meetings as spelled out in the Corridor H FEIS Mitigation Document.*

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# REFERENCES

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# SECTION VIII: REFERENCES


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