Final Environmental Impact Statement

Illinois 29 (FAP 318) from IL6 to I-180

Peoria, Marshall, Putnam and Bureau Counties, Illinois

Illinois Department of Transportation

April 2009

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FEDERAL AID PRIMARY ROUTE 318
ILLINOIS ROUTE 29 FROM ILLINOIS 6 TO I-180
PEORIA, MARSHALL, PUTNAM AND BUREAU COUNTIES

FINAL ENVIRONMENTAL IMPACT STATEMENT AND SECTION 4(F) EVALUATION

Submitted Pursuant to 42 USC 4332(2)(c)
and 49 USC 303 by the

U.S. Department of Transportation, Federal Highway Administration

and the

Illinois Department of Transportation

Cooperating Agencies

U.S. Environmental Protection Agency
Illinois Department of Agriculture
Illinois Department of Natural Resources
U.S. Fish and Wildlife Service
U.S. Army Corps of Engineers

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For IDOT

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For FHWA

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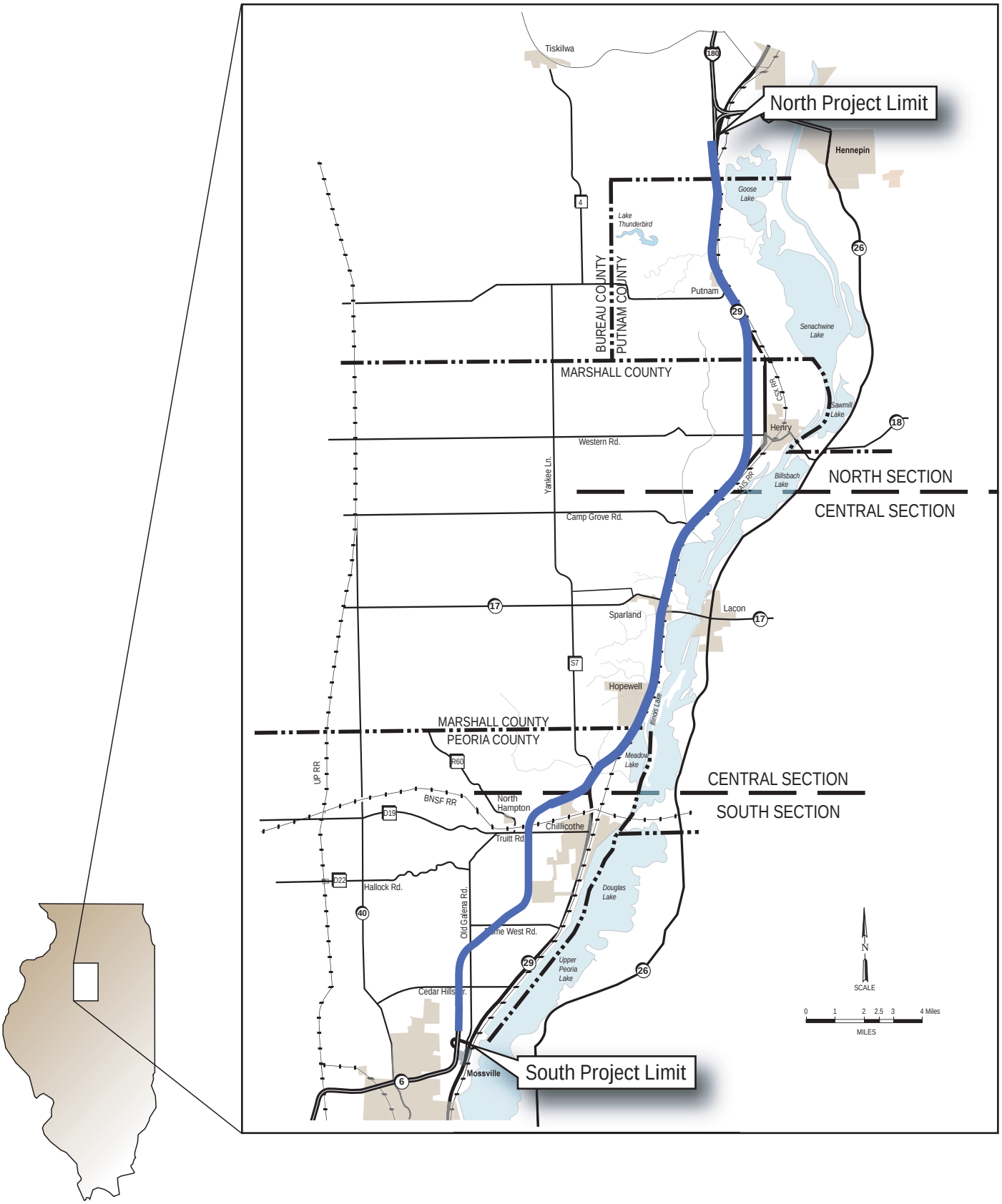
Abstract: The Illinois Department of Transportation (IDOT), in consultation with the Federal Highway Administration (FHWA), studied alternatives to enhance continuity and to improve the safety and travel efficiency in the Illinois Route 29 (IL 29) corridor from IL 6 near Mossville in Peoria County to the Interstate 180 (I-180) interchange north of Kentville Road in Bureau County. The project is located in Peoria, Marshall, Putnam and Bureau counties. Alternatives considered in the Draft EIS include the No-Build Alternative and the Build Alternative. IDOT and FHWA have identified the Build Alternative as the Preferred Alternative based on review of impacts presented in the Draft EIS and comments received as a result of the public hearing and availability of the Draft EIS for agency and public review. The Build Alternative will improve north-south highway access west of the Illinois River between IL 6 and I-180, improve travel efficiency, and enhance economic stability and development in the region. It will affect 20 acres of wetlands, 122 acres of forested land, and 1,027 acres of cropland, and will displace 44 residences and 4 businesses.

Location Map

IL 29 Corridor Study

IL 6 to I-180

Peoria, Marshall, Putnam, Bureau Counties



Executive Summary

Introduction

This Final Environmental Impact Statement (EIS) for the Illinois Route 29 (IL 29) corridor from IL 6 near Mossville in Peoria County to Interstate 180 (I-180) north of Kentville Road in Bureau County, Illinois has been prepared to identify the potential environmental affects associated with the proposed action in accordance with the National Environmental Policy Act (NEPA), the 1978 Council on Environmental Quality (CEQ) regulations, and the Federal Highway Administration and Illinois Department of Transportation guidelines.

The Notice of Intent to prepare an EIS for the project appeared in the *Federal Register* on July 24, 2002. A Draft EIS for the IL 29 corridor was approved by the Federal Highway Administration (FHWA) and the Illinois Department of Transportation (IDOT) on May 6, 2006, for distribution to state and federal review agencies and public availability. The Draft EIS discussed social/economic and environmental resource impacts for a range of alternative improvements. The IDOT held a public hearing on June 14 and 15, 2006. The alternatives under consideration included both the Build and No-Build Alternatives. The Build Alternative is shown on the Location Map and is generally described along with the No-Build Alternative as follows:

- The Build Alternative begins at the IL 6 interchange and extends north to I-180 north of the Kentville Road intersection. Along the approximately 10-mile stretch from IL 6 to a point north of Chillicothe where the alignment rejoins existing IL 29, the type of highway design being considered for construction is a freeway on new alignment. From the proposed North Chillicothe interchange to the north project terminus, the type of highway design being considered for construction is a 4-lane divided expressway, generally following existing IL 29 except in Henry, where the proposed design is on new alignment west of the community. Within the freeway section, access would only be allowed at grade-separated interchanges. With the expressway typical section at-grade intersections would be permitted at crossroads and access would be permitted from residential and agricultural properties.

- No-Build Alternative is defined as no new major construction. The No-Build Alternative would be limited to short-term restoration activities (maintenance improvements) needed to ensure the continued use of IL 29 between IL 6 and I-180. No capacity improvements would be made. The design of the existing roadway, including location, geometric features, and current capacity limitations, would remain unchanged. Generally, there would be no need for any additional right-of-way for the No-Build Alternative. The No-Build Alternative would not address existing deficiencies along IL 29 and therefore would not meet the project's purpose and need.

Information About This Final EIS

This Final EIS includes information presented in the Draft EIS. It also responds to comments on the Draft EIS, summarizes input received as a result of the public hearing and availability of the Draft EIS for review, and identifies the IDOT's and FHWA's Preferred Alternative and the basis for its selection.

Following is an overview of the changes between the Draft and Final EIS, and revisions or additions based on Draft EIS comments or public hearing input.

- Summary—Updated the section to include the identification of the Preferred Alternative and updated the impact summary table to reflect design changes since distribution of the Draft EIS.
- Section 1—Purpose and Need for the Proposed Action. Minor changes in response to agency comments.
- Section 2—Alternatives/Preferred Alternative. Identified the Preferred Alternative and described design changes since distribution of the Draft EIS.
- Section 3—Affected Environment, Environmental Consequences, and Measures to Minimize Harm. Updated the environmental consequences and measures to minimize harm as appropriate to reflect design changes since distribution of the Draft EIS and identification of the Preferred Alternative.
- Section 4—List of Agencies, Organizations and Persons Receiving a Copy of this Statement. New Final EIS section.
- Section 5—Agency Coordination and Public Involvement. Updated the section to include a description of the Public Hearing and input received during the comment period, as well as information related to agency coordination and agency input on the Draft EIS.
- Section 6—References. No changes.
- Section 7—List of Preparers. Updated to reflect preparers of the EIS.

Location

The proposed IL 29 improvement extends about 35 miles from the IL 6 interchange near Mossville north to I-180 in Bureau County (see Figure 1-1). The project study area involves four counties—Peoria, Marshall, Putnam and Bureau—and encompasses a number of communities. The four principal communities in the study area are Chillicothe, Sparland, Henry and Putnam. Other communities in the study area include Mossville, Rome, Hopewell, and Lacon.

Proposed Action

The proposed action will provide a modern high-type highway between IL 6 near Mossville in Peoria County and I-180 in Bureau County, Illinois. The proposed highway facility will

provide improved transportation continuity, facilitate modal interrelationships, improve travel efficiency, and enhance economic stability within the IL 29 corridor between IL 6 to I-180. The proposed facility would provide a safe and efficient highway to serve existing and future travel demand for both regional and local travelers while minimizing disturbance to the natural and built environment.

Preferred Alternative

The IDOT and FHWA selected the Build Alternative as the Preferred Alternative after evaluating the public and agency comments received at the June 2006 public hearing and during the public comment period. Table 1 summarizes the impacts of the Preferred Alternative. The IDOT received more than 175 written and oral comments from citizens, businesses and local governments during the Draft EIS comment period. Nine agencies also provided comments:

- Illinois Department of Agriculture—Division of Natural Resources, Bureau of Land and Water Resources
- Illinois Department of Natural Resources—Division of Environment and Ecosystems
- Illinois Environmental Protection Agency
- U.S. Army Corps of Engineers—Rock Island District
- U.S. Army Corps of Engineers—Planning, Programs and Project Management Division
- U.S. Department of Commerce—National Oceanic and Atmospheric Administration
- U.S. Public Health Service, Department of Health and Human Services—Center for Environmental Health
- U.S. Department of Interior—Office of Environmental Policy and Compliance
- U.S. Environmental Protection Agency

Throughout the study process, regular opportunities were provided for project area residents and local government officials to learn about and provide input to the IL 29 project. Two sets of public information meetings were held (June 11 and 12, 2003, and July 14 and 15, 2004): one in Chillicothe and one in Henry. Small group meetings were held with residents and officials of local communities, the Senachwine Township, Henry Fire Protection District, Peoria Park District, area railroad companies, and area watershed committee representatives.

Three newsletters were produced and distributed throughout the study area. The third newsletter, which was sent out just before the Public Hearings, was sent to more than 1,100 names on the mailing list. Return-mail comment forms were included in each newsletter and were available at public meetings. Approximately 600 written comments have been received and considered throughout the course of the study. A fourth newsletter will be sent out summarizing the conclusions of the NEPA process.

TABLE 1
Impact Summary

Resource (Unit of Measurement)	No-Build Alternative	Preferred Alternative
New Right of Way Needed to Construct the Roadway	0 acres	1,038 acres
Landlocked/Environmental Mitigation Parcels	0 acres	746 acres
Total New Right of Way	0 acres	1,784 acres[a]
Existing Right of Way Used	637 acres	668 acres
Farms Affected	0	90
Farmland	0 acres	1,202 acres[b]
Cropland	0 acres	1,027 acres[c]
Forest	0 acres	122 acres
Wetland	0 acres	20 acres
Stream Crossings	NA	12
Floodplain	0 acres	214 acres
Threatened and Endangered Species	NA	2
IDNR Properties	0 acres	9.5 acres
Natural Areas	0 acres	1.2 acres[d]
Residential Displacements	0	44
Commercial Displacements	0	4
Outbuilding Displacements	0	86
Noise Receptors Affected	NA	4
Historic Structures	0	Barrville Bridge
Special Waste Sites	0	5

[a]Does not include 111 acres of farmland south of Cedar Hills Drive owned and leased by IDOT

[b]Includes wetlands, forested areas, 111 acres of farmland owned by IDOT and farmland on landlocked parcels.

[c]Includes cropland, pasture, hayland, orchards and vineyards. Also includes cropland on landlocked parcels and 111 acres leased from IDOT for farmland

[d]Includes 1.1 acres of natural area within the IDOT right of way.

Public Hearings were held in Chillicothe and Henry on June 14 and 15, 2006, respectively. Approximately 425 persons attended the two hearings combined. More than 175 written and oral comments received during the course of, and following, the hearings. Comments focused on such topics as impacts to farmland and other environmental impacts, project cost, and effects on rural lifestyle and property values. See Section 5.3.2.3 for more details on comments received at the Public Hearings.

Environmental Impacts

The proposed project was developed to provide safe and efficient travel within and through the project area through the construction of a continuous north-south route. Beneficial impacts resulting from the project would be transportation continuity, enhanced economic

stability, and improved safety and travel efficiency. These and other natural resource and social/economic impacts are discussed in detail in Section 3—Affected Environment, Environmental Consequences, and Measures to Minimize Harm. Table 1 summarizes the potential environmental impacts of the Preferred Alternative.

Time Period for Proposed Action

The project's design engineering phase will begin for the segment of the project corridor between IL 6 and Cedar Hills Drive following the completion of the Final EIS and Record of Decision, but no timetable for real estate acquisition or construction has been established. Neither has a timetable for the completion of roadway design plans, real estate acquisition, or construction for the rest of the project corridor been established.

Other Activities Required

Regulatory permits required for the build alternative would include the following:

- Section 404 of the Clean Water Act from the USACE
- Section 401 of the Clean Water Act Water Quality Certification from the IEPA
- Section 402 National Pollutant Discharge Elimination System (NPDES) Construction Permit from the IEPA
- Construction in Floodways of Rivers, Lakes, and Streams from IDNR, Office of Water Resources
- Notification of Demolition and Renovation permit from IEPA
- UST Permit from the Office of the State Fire Marshall

Limitation on Claims Notice, 23 USC §139(1)

A federal agency may publish a notice in the *Federal Register,* pursuant to 23 USC §139(l), indicating that one or more federal agencies have taken final action on permits, licenses, or approvals for a transportation project. If such notice is published, claims seeking judicial review of those federal agency actions will be barred unless such claims are filed within 180 days after the date of publication of the notice, or within such shorter time period as specified in the federal laws pursuant to which judicial review of the federal agency action is allowed. If no notice is published, then the periods of time that otherwise are provided by the federal laws governing such claims will apply.

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Acronyms and Abbreviations

AASTHO	American Association of State Highway and Transportation Officials
ADT	average daily traffic
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
COSIM	carbon monoxide screen for intersection modeling
dBA	A-weighted decibel unit
DEIS	draft environmental impact statement
EIS	environmental impact statement
F	Fahrenheit
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FQI	Floristic Quality Index
GIS	geographic information system
IDNR	Illinois Department of Natural Resources
IDOA	Illinois Department of Agriculture
IDOT	Illinois Department of Transportation
IEPA	Illinois Environmental Protection Agency
IHPA	Illinois Historic Preservation Agency
INAI	Illinois Natural Areas Inventory
INHS	Illinois Natural History Survey
INPC	Illinois Nature Preserve Commission
ISGS	Illinois State Geological Survey
LESA	Land Evaluation and Site Assessment
LOS	level of service
LUST	leaking underground storage tanks
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NWI	National Wetland Inventory
PESA	Preliminary Environmental Site Assessment
TNM	Traffic Noise Model
URA	Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOI	U.S. Department of the Interior
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

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Section 1
Purpose of and Need for Action

SECTION 1

Purpose of and Need for Action

Section 1 describes the purpose of and need for the improvements being considered to the IL 29 corridor. Purpose and need factors encompass improvements intended to correct not only existing problems but also those that may occur later during the 27-year planning period.

1.1 Proposed Action

The Illinois Department of Transportation (IDOT), in consultation with the Federal Highway Administration (FHWA), is studying alternatives to enhance continuity and to improve the safety and travel efficiency in the Illinois Route 29 (IL 29) corridor from IL 6 near Mossville in Peoria County to the Interstate 180 (I-180) interchange north of Kentville Road in Bureau County. From IL 6 to Hart Lane north of Chillicothe, proposed improvements would either follow existing IL 29 or proceed on a new alignment bypassing Chillicothe on the west. North of Chillicothe, the proposed improvements generally would follow existing IL 29. To minimize community impacts and impacts to natural areas, Department of Natural Resources property, and Section 4(f) resources, alternatives on new alignment will be evaluated west of Chillicothe, Hopewell, Sparland, and Henry, and east of Putnam. The 35-mile-long study area includes parts of Peoria, Marshall, Putnam, and Bureau counties (Exhibit 1-1). The principal communities in the study area are Chillicothe, Sparland, Lacon, and Henry. Smaller communities include Mossville, Rome, Hopewell, and Putnam.

IL 6 at the south end of the project and I-180 at the north end are the logical termini for the IL 29 study. Both highways are 4-lane access-controlled facilities. The termini are of sufficient length to address environmental matters, provide a section of study that has independent utility (that is, would be a reasonable expenditure even if no additional transportation improvements were made in the area), and do not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

1.2 Purpose and Need

The purpose of the proposed action is to improve transportation continuity, facilitate modal interrelationships, improve travel efficiency, and enhance economic stability within the IL 29 corridor from IL 6 in Peoria County to I-180 in Bureau County. The proposed facility will provide an efficient highway that will serve existing and future travel demand for both regional and local travelers while minimizing disturbance to the natural and built environment. The need for the proposed action is based on a combination of factors related to:

- Project history
- System linkage, facility continuity, and route importance
- Modal interrelationships

- Travel efficiency, which includes existing and future traffic, highway operations, and existing highway characteristics
- Economic stability

The remainder of this section discusses these factors.

1.2.1 Project History

The need to provide the Peoria metropolitan area and the west side of the Illinois River with efficient north-south access to IL 6/I-74 and I-180 is long standing. After completion of the initial interstate system, IDOT and the state recognized the need for additional east-west and north-south access throughout the state. In 1968, IDOT sent a request to the Federal Bureau of Public Roads (now the FHWA) for three interstate routes in the state. One of the requested routes was a section of interstate highway extending from I-74 in Peoria to I-180 at Hennepin.

In 1969, the General Assembly passed legislation making possible major highway improvements statewide. An important part of that legislation was the Supplemental Freeway System. One of the freeways included in the enabling legislation, Supplemental Freeway F-5 (later known as FA 405), extended west of the Illinois River from Peoria to Hennepin (Exhibit 1-2).

After the legislation was passed, IDOT prepared a Corridor Study for FA 405. Public hearings were held in early 1970, and the final Corridor Report was approved in June 1972. Of the three freeway corridors considered in the report, one generally followed IL 29 (Exhibit 1-3). Following completion of the Corridor Report, IDOT prepared Draft and Final Environmental Impact Statements (EISs) for the section of FA 405 between I-74 and Cedar Hills Drive (County Highway 25) near Mossville. The Draft and Final EISs were completed by August 1976. IDOT then began design studies for the section between I-74 and Mossville, which was constructed in 1986.

In late 1974, IDOT began a Draft EIS for the remainder of FA 405 between Cedar Hills Drive and Hennepin. The EIS process was not completed, and in 1976 the study was suspended.

In 1986, IDOT's Special Studies Unit evaluated the feasibility of constructing a 4-lane bypass west of Chillicothe and upgrading IL 29 north of Chillicothe to a 4-lane highway. All the alignments north of Chillicothe generally followed existing IL 29. Because of the bluffs on the west and the railroad on the east, the width of the median varied along the study area. No additional lanes were proposed north of Henry.

In 1995, IDOT concluded the Heart of Illinois Highway Feasibility Study. The 2-year study investigated the feasibility of constructing a new highway that would provide a direct link between Peoria and Chicago. It examined a number of broad highway corridors to determine whether a new highway would be physically, environmentally, and economically feasible. At the conclusion of the study, the IDOT announced three feasible Heart of Illinois Highway corridors. One corridor extended between IL 6 and I-180 and was located along the bluff west of IL 29. Alternatives were developed within this corridor as part of the Heart of Illinois Phase I Study in 2000.

Although the Heart of Illinois Highway Phase I Study provided some base data for the current study, the two studies have different purposes. The purpose of the Heart of Illinois

Highway study was to provide a high-type highway connection between Peoria and Chicago to enhance the efficiency of trips between metropolitan areas. The purpose of the IL 29 study, as noted previously, is to enhance continuity and improve the safety and travel efficiency along IL 29 from IL 6 to the I-180 interchange. This study also seeks to maximize multimodal opportunities in the IL 29 corridor and to maintain existing development. While the current study and the Heart of Illinois Highway Phase I Study may have some common elements, the IL 29 improvement will not necessarily meet the purpose of and need for the Heart of Illinois Highway Phase I Study.

The current IL 29 study is the latest effort in 35 years to improve north-south access between I-74 and I-180 west of the Illinois River. The rationale behind the original vision of providing improved east-west and north-south access throughout the state to augment the interstate system remains valid. In that respect, the IL 29 study shares similarities with the other supplemental highways (Exhibit 1-2) that have been constructed: FA Highway 412 (I-39), FA Highway 406 (I-155), FA Highway 408 (I-72), FA Highway 407 (IL 336 partially constructed), and FA Highway 413 (U.S. 67 partially constructed).

1.2.2 System Linkage, Facility Continuity, and Route Importance

System linkage and continuity are major considerations in determining the need for the proposed improvement. IL 29 is an important connecting link in the regional transportation system. Since the construction of I-180 and IL 6, IL 29 has functioned as the only direct connection between them. It has, however, served as an inadequate replacement for the state's original vision of a "supplemental four-lane highway" connecting I-74 and I-180. The 2-lane IL 29 connection fails to meet the level of travel reliability and safety of IL 6 and I-180, and interrupts or interferes with the continuity of travel between those points. Closing the gap in the high-type highway network between IL 6 and I-180 would have systemwide benefits, including improving route continuity and reducing travel times for those traveling to and from the study area.

Further evidence of the importance of IL 29 in the regional transportation system is reflected in the designation the route has been given by the state and FHWA. The state and FHWA included IL 29 between IL 6 and I-180 in Illinois's part of the National Highway System (Exhibits 1-4 and 1-5). The National Highway System (NHS) was created by The National Highway System Designation Act of 1995. That legislation designated 161,000 miles of roads throughout the country as the NHS. The NHS includes the interstate system as well as rural and urban principal arterial highways serving major population centers, international border crossings, intermodal transportation facilities, and major travel destinations. The principal arterial highways (like IL 29) in the NHS account for 57 percent of the system's total miles.

In September 2005, the U.S. Secretary of Transportation designated parts of IL 29 a National Scenic Byway, called the Illinois River Road: Route of the Voyagers Scenic Byway. The scenic byway unifies and connects a number of different geological regions, natural areas, plant communities, and wildlife habitats unique to the Illinois River Valley.

Although the NHS includes only 4 percent of the nation's roads, it carries more than 40 percent of all highway traffic, 75 percent of heavy truck traffic, and 90 percent of tourist traffic. The lack of a 4-lane connection along IL 29 hinders travel and transport opportunities for study area communities, thereby interfering with the ability of IL 29 to fully meet the purposes of a principal arterial and NHS route.

IL 29 is the only 2-lane NHS route in the study area. Using IL 6 and I-180, it is the only noninterstate NHS connection between I-74 and I-80, which confirms the importance of the connection it provides between IL 6 and I-180.

1.2.3 Modal Interrelationships

Industrial and agricultural interests in the study corridor ship and receive products using the highway network, rail network (Lincoln & Southern Railroad and CSX), and barge terminal (Illinois River Waterway terminals). IL 29 serves barge terminals in Chillicothe, Lacon (in conjunction with IL 17 and IL 26), Henry, and Hennepin. The reach of the Illinois River in the study area is part of the Illinois River Waterway that extends 350 miles from Lake Michigan to the upper Mississippi River. Peoria docks are the northernmost regional docks that remain open the entire year. According to the U.S. Army Corps of Engineers (USACE), the 109 million tons shipped to, from, and within Illinois on barges in 1999 had a value of more than $16.5 billion.

IL 29 also serves industries in Henry's industrial park that have direct connections to the Lincoln & Southern Railroad and CSX. The Iowa Interstate Railroad operates more than 500 miles of railroad between Omaha, Nebraska and Chicago, with a 43-mile branch line from Bureau Junction to Peoria on the Lincoln & Southern tracks within the study area. Between Henry and Chicago, the Iowa Interstate has trackage rights on the CSX's Rock Subdivision. The Iowa Interstate Railroad primarily transports grain, agricultural products, steel, scrap, appliances, intermodal containers and trailers, chemicals, and forest products.

The following connections between IL 29 and barge and rail service exist within the study area:

- United Suppliers, located in Henry's industrial park, is a storage and distribution facility for anhydrous ammonia. The plant receives all its anhydrous ammonia and nitrogen solution by barge, and ships its entire product out by semi trailer (about 3,000 trips annually). About 80 percent of the outbound trips travel northbound on IL 29 and 15 percent travel southbound on IL 29. United Suppliers provides same-day deliveries to customers generally within a 70-mile radius of the plant.
- The International Steel Group (ISG), which purchased the former LTV steel plant in Hennepin, has 70 percent of its unfinished steel coil barged to Hennepin and then trucked to the plant. The remaining 30 percent comes by rail. Ninety percent of the plant's finished steel is trucked out, with a number of trips bound for industries in the Peoria area on IL 29.
- A large percentage of the corn grown between IL 29 and the Kewanee area is shipped by truck to barge terminals in Hennepin, Henry, Lacon, or Chillicothe, requiring trips of various lengths on IL 29. Farmers would also use IL 29 to reach the grain elevator in Putnam, which does not have a barge terminal. Proposed improvements to IL 29 that would reduce travel inefficiencies (such as traveling through communities within the project area) could improve the economics for shippers by allowing them to make one additional trip to barge terminals or grain elevators per day.
- Gravel, sand, and bulk salt are barged to and from the project area requiring use of IL 29.
- A fertilizer producer in the Henry industrial park receives raw materials by truck and the Iowa Interstate Railroad. It ships its finished product by truck throughout the U.S. and Canada and uses IL 29 to access I-180 and the interstate system.

In addition, two potential projects in and near Henry's industrial park—a sand quarry and an ethanol plant—would increase truck traffic on IL 29.

Improvements along IL 29 would provide a safer, more efficient facility that would maximize the benefits of existing intermodal connectivity in the project area and provide greater options for the project area's industrial employers, agri-industries, and their suppliers.

1.2.4 Travel Efficiency

Improvements to IL 29 would result in more efficient and reliable transportation service. Increasing travel efficiency and reliability on IL 29 would reduce transportation costs for commuters, commercial trips, and other trips through the study area, and improve traffic flow. Reliable travel along IL 29 is impeded by a combination of factors discussed below.

1.2.4.1 Existing and Future Traffic

Traffic volumes are expressed as average daily traffic (ADT). The ADT volumes reflect average travel conditions on a particular highway rather than daily or seasonal variations. Forecast volumes are based on historic counts and associated growth trends, and demographic data such as changes in population and employment.

Existing traffic and forecast traffic for 2032 under the No-Build Alternative show that traffic is expected to increase over time. Exhibit 1-6 and Table 1-1 summarize existing traffic and forecast traffic for the design year, which represents the end of the planning period within which traffic forecasts can reasonably be made.

The highest existing and forecast traffic volumes (under the No-Build Alternative) are for the section between IL 6 and IL 17 in Sparland (Table 1-1). Forecast traffic between Sparland and Henry is lower than forecast volumes within the communities themselves. Forecast volumes in Henry are similar to those in Sparland. North of Henry, traffic volumes increase by more than 80 percent between 2001 and 2032, but in terms of ADT remain the lowest in the study corridor.

IDOT's roadway design guidelines specify 8,000 to 10,000 ADT as the threshold volume that can be handled at an acceptable service level on a 2-lane rural highway. In the study area, that threshold is already exceeded in the 16-mile section between the south project terminus and the south side of Sparland (Exhibit 1-7). North of Sparland the 8,000 to 10,000 ADT threshold would not be exceeded until after 2032 with the exception of Henry. Traffic volumes in Henry would meet the 4-lane threshold in 2019. It should be noted that while traffic volumes decline north of Sparland and north of Henry those areas also have the highest percentage of trucks in the traffic stream (Table 1-2).

1.2.4.2 Truck Traffic

The number of heavy trucks in the traffic stream affects traffic operations and safety and contributes to the level of congestion. Heavy trucks are slower, occupy more roadway space, require more turning room, and consequently have a greater effect on the roadway than passenger vehicles. The overall effect of one truck on traffic operation is equivalent to 2 to 5 passenger cars. Thus, the larger the proportion of trucks in the traffic stream, the greater the traffic load and highway capacity required (Transportation Research Board 2000). Table 1-2 summarizes truck traffic in the study area.

TABLE 1-1
Existing and Design Year Traffic Comparison

IL 29 Section	Existing ADT (2001)	Design Year ADT (2032) (No-Build Alt.)	% Increase (No-Build Alt.)	Expected Year 4-Lane Threshold Would Be Met
Peoria County				
Chillicothe: IL 6 to Truitt Avenue	16,900	26,400	56	Already met
Chillicothe: Truitt Avenue to Wood Street	10,600	14,700	39	Already met
Chillicothe: Wood Street to Yankee Lane	8,700	12,100	39	Already met
Marshall County				
Yankee Lane to Oak Street (Sparland)	8,100	12,900	59	Already met
Oak Street to IL 17 South (Sparland)	7,500	11,900	59	2019
IL 17 South to IL 17 North (Sparland)	5,600	10,300	84	2019
Between Sparland and Henry	3,650–4,000	6,700–7,400	68–102	Beyond 2032
Henry: Spruce Street to IL 18	4,400	8,100	84	2031
Henry: IL 18 to Old Indian Town Road	5,600	10,300	84	2019
Old Indian Town Rd. to Marshall Co. line	3,650	6,700	84	Beyond 2032
Putnam County				
Marshall Co. line to Putnam	3,100	5,700	84	Beyond 2032
Putnam and Bureau Counties				
Putnam to I-180 Interchange	3,050	5,600	84	Beyond 2032

TABLE 1-2
Truck Percentages in IL 29 Traffic Stream

Section	Percentage of Trucks in ADT[a]
Truitt Avenue to IL 17	7 to 10
IL 17 to TR 13	11 to 14
TR 13 to Kentville Road	16 to 20

[a]Based on year 2001 ADT

Trucks on IL 29 account for 7 to 20 percent of the total ADT in the study corridor. The high percentage of trucks using IL 29 confirms its importance as a major commercial route and important connection in the regional transportation system. On an average weekday, truck traffic varies from about 600 per day at the north end of the corridor to 900 per day at the south end. In 2032, truck volumes would be expected to increase to 1,100 trucks per day at the north end of the corridor (an 83 percent increase) and 1,300 per day at the south end (a 45 percent increase). Given that trucks are the equivalent of 2 to 5 passenger cars on a 2-lane highway, the substantial predicted increase in truck traffic would increase the number of potential conflicts between trucks and other vehicles throughout the corridor.

The predicted increase in traffic volumes by 2032 would reduce travel reliability by causing slower travel speeds and further interference with local commercial and residential activity. The increase would make it more difficult to enter the highway from driveways and side roads and reduce safe passing opportunities, thereby increasing the potential for crashes.

1.2.4.3 Highway Operations

Level of service (LOS) is a qualitative measure of operational conditions within a traffic stream as perceived by motorists. A designated LOS is described in terms of average travel speed, density, traffic interruptions, comfort, convenience, and safety.

Because drivers will accept different driving operational conditions, including lower travel speeds on different facilities, it is not practical to establish one LOS for application to every type of highway. Therefore, IDOT has established several levels for the various classes and types of highway. The values of speed and design hourly volume used in each case to identify an LOS are the lowest acceptable speed and the highest obtainable volume for that specific level.

TABLE 1-3
Level of Service Design Guidelines (Roadway Mainline)

Highway Type	Applicable Design Level of Service	
	Rural	Suburban/Urban
Freeway/Expressway	B	C
Principal Arterial	B	C
Minor Arterial	C	C
Collector	C	D

LOS A—Free flow with low volumes and high speeds.
LOS B—Reasonably free flow, but speeds beginning to be restricted by traffic conditions.
LOS C—In stable flow zone, but speed selection is restricted.
LOS D—Approaching unstable flow; driver freedom to maneuver is restricted.
LOS E—Unstable flow, short stoppages (represents maximum capacity).
LOS F—Breakdown flow, gridlock.

Source: IDOT, Division of Highways, January 2000. *Bureau of Design and Environment Manual*, Part V.

LOS designations range from "A" to "F," with "A" representing free-flow traffic and "F" gridlock conditions. Table 1-3 summarizes IDOT level of service design guidelines for various types of highways. IL 29 is a rural principal arterial highway in the study corridor, except for short sections in Chillicothe, Sparland, and Henry that may be considered suburban/urban conditions. As indicated, LOS B is the appropriate guideline for the rural parts of the highway and LOS C that for the suburban/urban areas.

Exhibit 1-8 summarizes the existing LOS, and Table 1-4 summarizes the existing and future LOSs along IL 29 for the existing number of travel lanes (or "No-Build" Alternative) compared to IDOT's guidelines. As shown in Table 1-4, peak traffic conditions along some segments of IL 29 already exceed applicable IDOT LOS guidelines. Two segments, one in Sparland and one north of Henry, currently operate at LOS E, which represents maximum capacity. Under 2032 peak traffic conditions, there would be a further decline so that 4 of the 11 sections of IL 29 would be LOS E, and the intersection at IL 18 would exceed capacity (LOS F). For roadways approaching or at maximum capacity, traffic flow is unstable, minor disruptions may cause traffic backups and freedom to maneuver safely is compromised.

TABLE 1-4
Comparison of Existing and Future Level of Service on IL 29

Applicable LOS Guidelines	Existing LOS (2001)	Future LOS (2032)
Chillicothe: IL 6 to South of Cloverdale Road (Suburban/Urban; LOS C)	NA[a]	NA[a]
Chillicothe: South of Cloverdale to Moffit Street[b] (Suburban/Urban; LOS C)	LOS A	LOS B
Cloverdale Intersection	LOS B	LOS C
Walnut Intersection	LOS B	LOS C
Truitt Intersection	LOS B	LOS C
Moffit Street to Yankee Lane (Rural; LOS B)	LOS D	LOS D
Yankee Lane to Oak Street (Sparland) (Rural; LOS B)	LOS D	LOS E
Oak Street to IL 17 South (Sparland) (Suburban/Urban; LOS C)	LOS C	LOS D
IL 17 South Intersection[c]	LOS B	LOS D
IL 17 South to IL 17 North (Sparland) (Suburban/Urban; LOS C)	LOS E	LOS E
Between Sparland and Henry (Rural; LOS B)	LOS B	LOS C
Spruce Street to IL 18 (Henry) (Suburban/Urban; LOS C)	LOS D	LOS E
IL 18 Intersection[d]	LOS B	LOS F
IL 18 to Old Indian Town Road (Henry) (Suburban/Urban; LOS C)	LOS B	LOS C
Old Indian Town Road to Marshall County line (Rural; LOS B)	LOS E	LOS E
Marshall County line to Putnam (Rural; LOS B)	LOS B	LOS C
Putnam to I-180 Interchange (Rural; LOS B)[e]	LOS B	LOS C

Note: Results are based on IL 29 being a Class I Highway. Assumed free flow speeds determined from HI-STAR automatic traffic recorder data furnished by IDOT. The LOS data are based on peak hour traffic volumes for existing (2001) and future (2032) conditions under the No-Build Alternative. LOS was calculated using McTrans Highway Capacity Software (HCS) version 4.1f.

[a]Chillicothe: IL 6 to Truitt Avenue was not analyzed because it is an existing urban divided 4-lane arterial while other sections are 2- to 4-lane undivided arterials.

[b]South of Cloverdale Road to Moffit Street is an existing urban 4-lane undivided section. It was analyzed using Synchro to account for LOS at intersections as well as along the segment.

[c]IL 17 in Sparland is an existing all-way stop that was analyzed as an isolated intersection.

[d]IL 18 in Henry is an existing all-way stop that was analyzed as an isolated intersection.

[e]Putnam has several intersections, but IL 29 does not stop; therefore, it was not analyzed as an isolated intersection, but may have a slower speed than the rest of the segment.

1.2.4.4 Existing Highway Characteristics

Existing conditions along IL 29 were examined to identify deficiencies and to provide a basis for defining future roadway requirements capable of meeting the future transportation demand in the corridor.

- There are numerous access points (local roads and driveways) in Chillicothe and Henry and to a lesser extent in Sparland and Putnam. Turning movements to and from access points conflict with the highway's function as a principal rural arterial. The increased

traffic volume expected on IL 29 would make access to and from the highway more difficult for both local and through traffic in the future.

- The posted speed limit along IL 29 outside the communities is generally 55 mph, while within communities the speed limit is typically lowered to 30 to 45 mph. The five traffic signals between the IL 6/IL 29 intersection and the north side of Chillicothe and the four-way stop in Sparland (at Ferry Street) and Henry (at IL 18) also contribute to less efficient travel in the study area and higher vehicle operating costs caused by speed change cycles.
- The width of IL 29 forces slow-moving farm equipment, particularly in the Henry to Putnam part of the study area, to use the travel lane, causing conflicts with and slowing the faster moving through traffic. This poses a safety hazard to both farmers and passing motorists. A 4-lane facility would provide better travel service by reducing or eliminating potential conflicts with agricultural equipment.
- Crash information for the study area from IDOT's Division of Traffic Safety for 2001 through 2003 is shown on Tables 1-5 and 1-6. A total of 75 crashes were single vehicle crashes, 170 crashes involved more than one vehicle, and 242 crashes involved deer occurred during this period. There were 28 (6 percent) crashes that involved severe personal injury (Type A), but no fatalities during the period studied.

TABLE 1-5
Crash Summary, 2001 Through 2003

County	Single Vehicle Involving Animals	Single Vehicle Involving Other	Multiple Vehicle Involving Animal	Multiple Vehicle Involving Other	Total Crashes
Peoria	53	47	0	144	**244**
Marshall	119	14	1	21	**155**
Putnam	55	9	0	2	**66**
Bureau	14	5	0	2	**21**
Total	**241 (50%)**	**75 (15%)**	**1 (0%)**	**169 (35%)**	**486 (100%)**

TABLE 1-6
Crash Severity Summary, 2001 Through 2003

County	Fatalities	Severe Injury (Type A)	Other Injury (Types B &C)	Property Damage Only	Total Crashes
Peoria	0	20	45	178	**244**
Marshall	0	5	15	135	**155**
Putnam	0	2	3	61	**66**
Bureau	0	1	3	17	**21**
Total	**0 (0%)**	**28 (6%)**	**66 (14%)**	**391 (80%)**	**486 (100%)**

- Of the 28 severe crashes, 20 occurred in Peoria County between IL 6 and Peoria/Marshall County line and 8 crashes occurred along the corridor at other locations. Of the 20 crashes in Peoria County, 4 crashes occurred between Cloverdale Road and Three Sisters Park, 4 between Francis Street and Truitt Avenue, 5 between Caldwell Street and Yankee Lane, and the remaining 7 between IL 6 and Washington Street.
- Of the 28 severe injury crashes, 32 percent involved a fixed object, 21 percent resulted in an overturned vehicle, 18 percent were rear end crashes, 18 percent were turning or angle crashes, and 11 percent were another crash type like pedestrian, animal, or sideswipe crash.
- The statewide average crash rate (excluding deer) for 2-lane rural highways is 0.65 crash per million vehicle miles (MVM). The only segments of Illinois Route 29 where crash rates (excluding deer) were approximately equal to the statewide average were between the Peoria/Marshall County Line and Illinois Route 17 (0.65) and between Camp Grove Road and Illinois 18 (0.63). None of the 2-lane urban, 4-lane urban, or 4-lane rural sections approached the statewide average.
- Based on national research,[1] a 30.9 percent rate of collision with animals would be anticipated on rural 2-lane highways. In contrast, the 4-county average rate of collision with animals on Illinois Rout 29 is 50 percent (Table 1-5). That percentage is higher within Marshall, Putnam, and Bureau counties.
- Two intersections in the Illinois Route 29 study area have been identified as high accident locations. These are the intersections of Illinois Route 29 and Walnut Street in Chillicothe and Illinois Route 6 and Old Galena Road/State Street/CH 59 in Peoria County.
- Although safety is not identified as a major component of the need of the proposed action, the alternatives being evaluated address safety issues by providing better access control, a contributing factor for reducing congestion, improving sight distance and improving traffic flow. The alternatives developed provide better roadside clearance to mitigate or reduce fixed object crashes and to lessen the severity of run-off-road incidents.

1.3 Economic Stability

Two major goals of the state's transportation system are to enhance the state's economic advantage and to retain existing economic bases (including the viability of the agricultural sector) and employment in rural areas. Ensuring economic stability in the project corridor and improving IL 29 are closely linked. Commercial and industrial uses in Chillicothe, Sparland, Lacon, Henry, and Hennepin stimulate transportation demand by increasing the number of workers commuting to and from work, the customers traveling to and from services areas, and the products being shipped between producers and consumers.

[1] D. W. Harwood et al. 2000. *Prediction of the Expected Safety Performance of Rural Two-Lane Highways.*

In today's competitive economy, agricultural and industrial products and parts produced in the study area must move quickly and safely throughout the state, the country, and the world. Businesses and agricultural interests in the study area depend on an efficient highway system with connections to rail and barge facilities to meet their shipping needs. The transport of raw materials and finished products is a large part of the business costs borne by manufacturers and agricultural interests. Expanding IL 29 from 2 to 4 lanes would benefit agricultural interests and existing commercial and industrial development in the study area by decreasing transportation costs and making transportation more reliable. By eliminating the deficiencies of IL 29 and maximizing existing intermodal connections, commercial and industrial development and area farmers can transport raw and finished products at less cost. As a result of reduced transportation costs, businesses in the study area could experience greater profitability or increased market share.

Residents could benefit when travel becomes more efficient and transportation costs are lowered. Besides the inherent value of increased mobility associated with improvements to IL 29, study area residents would benefit from the increased efficiency in commuting to employment outside their county of residence or increased employment options as their range of feasible commuting is expanded. Table 1-7 indicates the high percentage of study area residents that commute outside their county of residence. According to the 2000 Census, more than one-half of the workers in Marshall and Putnam counties worked outside their county of residence. Between 1990 and 2000 the number of workers in all study area counties had increased, as did the number of workers working outside their county of residence. While the 2000 Census does not indicate where, exactly, the workers are commuting to, given the amount of employment offered in Peoria, Mossville, Chillicothe, Lacon, Henry, and Hennepin, it is reasonable to assume that most are bound for employment centers in those areas by way of IL 29.

TABLE 1-7
Employee Travel Characteristics for 1990 and 2000

	Number of Workers		Worked Outside County		Percent of Total	
County	**1990**	**2000**	**1990**	**2000**	**1990**	**2000**
Bureau	16,015	17,184	4,868	6,337	30.4	36.9
Marshall	5,765	6,492	2,502	3,292	43.4	50.7
Peoria	80,525	84,003	11,542	12,492	14.3	14.9
Putnam	2,599	2,777	1,351	1,662	52.0	59.8

Source: 1990 and 2000 Censuses.

The supply of labor to study area employers could increase as more potential employees fall within their commuting range. With a high quality labor force and competitive labor costs already in place, the elimination of transportation inadequacies is critical to enhancing economic stability.

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SECTION 2

Alternatives / Preferred Alternative

This section describes the range of alternatives developed to address the purpose and need factors identified in Section 1. It presents the initial broad range of alternatives considered, the screening process for reducing that range of alternatives, the reasonable alternatives retained for detailed study, and the reasons other alternatives were eliminated from further consideration. The discussion consists of four major parts. The first describes the reasonable alternatives selected for detailed evaluation; the second describes the alternatives development and screening decisions made during the alignment studies between 2002 and 2005; the third contains a detailed description of the Preferred Alternative, and the fourth describes other alternatives considered. The chapter concludes with a description of the project's operationally independent phases of work.

2.1 Alternatives Selected for Detailed Study

2.1.1 No-Build Alternative

The No-Build Alternative consists of doing nothing to IL 29 other than continued routine maintenance. No capacity improvements would be made. Improvements would be limited to short-term restoration activities (maintenance improvements) needed to ensure continued use of IL 29 between IL 6 and I-180. The design of the existing roadway, including location, geometric features, and capacity limitations, would remain unchanged, but minor changes that would improve safety may be anticipated at high volume intersections. Generally, the No-Build Alternative would not require new right of way and would avoid impacts to the natural environment and to agricultural, residential, and commercial properties. The No-Build Alternative would not address the deficiencies along IL 29 identified in Section 1 and, therefore, would not meet the project's purpose and need. Although the No-Build Alternative is not considered a reasonable course of action, it is retained for detailed evaluation as a basis of comparison to the Build Alternative.

2.1.2 Build Alternative

One build alternative remains under consideration (Exhibit 2-1). Between the IL 6 interchange at the south end of the corridor and the point about 10 miles north in Chillicothe where the alignment rejoins IL 29, it would be a freeway section on new alignment. From the IL 6 interchange, the Build Alternative would proceed north, passing west of the Caterpillar Tech Center on Cedar Hills Drive (west of Old Galena Road). A diamond interchange with one loop is proposed at Cedar Hills Drive. North of Cedar Hills Drive the alignment curves to the northeast and crosses Old Galena Road. The alignment continues northeast crossing Wayne Road, near the intersection with Rome West Road where a diamond interchange is proposed. The alignment continues northeast to a point west of Three Sisters Park where a diamond interchange would be constructed when it is warranted by development and traffic volumes. If development does not occur in the area of the interchange, the interchange will not be constructed. The extension of McGrath Street

from its current terminus just west of IL 29 to the proposed interchange, which is part of the interchange concept, would be a locally funded project. North of the McGrath interchange, the alignment runs north-south (2 miles west of existing IL 29) to Truitt Road. IL 29 passes over Cloverdale Road and Sycamore Street. A diamond interchange with one loop is proposed at Truitt Road. North of Truitt Road, the alignment crosses over the Burlington Northern and Santa Fe (BNSF) railroad and Senachwine Creek (South) and curves to the east after crossing Senachwine Creek. Continuing to the east, the alignment runs beneath Benedict Street and rejoins IL 29 with a proposed trumpet interchange north of Chillicothe.

Within Chillicothe, existing IL 29 would be improved to a 4-lane undivided arterial between the proposed interchange north of Chillicothe and the railroad viaduct. Between the viaduct and Truitt Road, IL 29 would be a 5-lane section with a 2-way left-turn median to match the typical section south of Truitt Road. The south viaduct structure would be removed and replaced, and the north viaduct crossing would be eliminated.

From the proposed north Chillicothe interchange to the north project terminus, IL 29 would be a 4-lane divided expressway. The expressway was selected to accommodate the local road connections to IL 29 and other access points. Use of a freeway section north of Chillicothe would require constructing long segments of frontage roads to provide access to local roads and driveways and would increase the impacts to the natural and built environment.

From north of Chillicothe to north of Sparland, widened IL 29 would use existing travel lanes for the northbound roadway and widen to the west side of IL 29 for the southbound roadway (into the bluff). The median would narrow from 50 to 22 feet to minimize impacts to the bluff. Through the Sparland interchange area, IL 29 would be relocated to the east by crossing over the Iowa Interstate railroad tracks and IL 17 with a bridge. The bridge would be wide enough to accommodate the existing railroad tracks as well as a future track. North of Sparland, IL 29 would be widened to the west through the Camp Grove Road intersection and continue north of 1300E, where the alignment would curve north on a bypass west of Henry. The Build Alternative would have an interchange at Western Avenue 0.5 mile west of existing IL 29 and a grade separation under Old Indian Town Road. Intersections are proposed at Whitefield Road and the Marshall County/Putnam County line. The alignment would rejoin IL 29 north of the county line. Widening would occur west of IL 29 through Putnam, to the intersection of Log Cabin Road. North of Log Cabin Road, the alignment would shift to the east to avoid the Miller-Anderson Woods Nature Preserve. The improvements would shift back to the existing IL 29 centerline near Kentville Road. The improvements north of Kentville Road would terminate 0.5 mile south of the I-180 interchange ramps.

By providing a 4-lane divided connection between IL 6 and I-180, the Build Alternative would meet the project's purpose and need. The proposed improvements to IL 29 would improve the system linkage/route continuity between IL 6 and I-180 and provide more reliable transportation service between the south and north ends of the project area. As a 4-lane divided facility, the Build Alternative would provide a more efficient facility than existing IL 29. It would maximize the benefits of existing intermodal connectivity in the project area and provide greater options for the project area's industrial employers, agri-industries, and their suppliers. Increasing travel efficiency and reliability on IL 29 would likely reduce transportation costs for commuters, commercial trips, and other trips through the study area. The potential reductions in transportation costs and the increased efficiency of IL 29 will help foster economic stability in the study area.

Information about the basic features of the Build Alternative is found below. A more detailed description of the Build Alternative is addressed under subsection 2.3.

2.1.3 Basic Features of the Build Alternative

The roadway types considered included a full access-controlled freeway and a 4-lane partial access-controlled expressway. Access to a freeway is allowed only at grade-separated interchanges. Along the freeway, interchanges would be located to provide access to be consistent with existing travel patterns.

For expressway sections, interchanges would be provided at all U.S.- and state-marked routes where justified by the cross traffic volume, and at all major crossroads where traffic signals would otherwise be warranted within 9 years of initial construction. Direct access is permitted along an expressway for residences and farms but not for commercial uses. Crossroads at all interchanges would be access-controlled for a distance of 600 feet from the ramp terminal intersections.

The freeway was selected as the preferred roadway type from IL 6 to north of Chillicothe because most of the project area is within the area that the Peoria/Pekin Urbanized Area Transportation Study (PPUATS) expects will be urbanized in the next 20 to 25 years. PPUATS serves as the transportation advisory board to the Tri-County Regional Planning Commission, the Metropolitan Planning Organization for the Peoria/Pekin Urbanized Area. IDOT policy [BDE Chapter 45 Section 2.06(b)3.] recommends that where a rural expressway is extended into an urbanized area and where a bypass is feasible, the roadway be designed with full control of access. The freeway's full access control eliminates cross traffic conflicts, stopping through traffic due to traffic signals, lower running speeds, and the potential for rear-end and right angle crashes. Because the Build Alternative would be on new alignment between IL 6 and north of Chillicothe, it is possible to construct the new facility with limited effect on the local road network and local travel patterns.

The typical freeway section includes two 12-foot travel lanes in each direction separated by a 56-foot grass median. The median would consist of paved shoulders and grassed areas (Exhibit 2-2). The typical paved shoulder width would be 10 feet for the right shoulder and 4 feet for the left (with an additional 2 feet unpaved). Roadside ditches and median inlets would be provided for drainage as appropriate.

IL 29 would be constructed as an expressway from the interchange north of Chillicothe to the north project terminus. At-grade intersections would be permitted at crossroads (that is, at township, county, and state highways), and access would be permitted from residential and agricultural properties with a specified minimum distance of 500 feet (for rural areas) between access locations. At interchanges, the expressway would be access-controlled for a distance of about 1,500 feet from the ramp tapers on either side of each interchange. The roadway section would be the same as the freeway section, except that the median would vary in width from 22 feet in areas with constraints on both sides of the road to 50 feet in other areas. The 22-foot median requires a concrete median barrier because adequate clear zone would not be provided between opposing lanes of traffic (Exhibit 2-2). For constrained areas, retaining walls or guardrail may be used and closed drainage systems would be provided where necessary.

Because of unstable bluff soil and rock on the west side of proposed IL 29, a split profile would be used for part of the constrained section from north of Chillicothe to south of Camp

Grove Road. In select locations south of Sparland, a split profile would be required to eliminate impacts to the environmentally sensitive areas. The typical section for the split profile section includes a retaining wall between the northbound and southbound roadways and a concrete median type barrier on the west side of the southbound roadway next to the bluff (Exhibit 2-3). The treatment on the west side of the road may vary between retaining wall and concrete barrier depending on the height required. This would minimize cuts into the unstable bluff soil.

2.2 Build Alternative Development

The Build Alternative described in this chapter evolved from alignment studies conducted between 2002 and 2005. The objective of the studies was to evaluate a wide range of alternatives to address the transportation deficiencies described in Section 1. To facilitate the development and comparison of alignments in the 35-mile-long study corridor, the project was divided into three sections:

- **South:** IL 6 interchange to a point east of Benedict Street, north of Chillicothe (Aerial Exhibit, Sheets 1 to 6)
- **Central:** A point east of Benedict Street (north of Chillicothe) to a point north of Camp Grove Road (to Crow Creek) (Aerial Exhibit, Sheets 7 to 12)
- **North:** North of Camp Grove Road to I-180 (Aerial Exhibit, Sheets 13 to 18)

The sections were subdivided for further refinement. Because of the length of the project area and the numerous possible alignments within each section, the project team focused on developing and screening alignments within sections and subsections instead of on single alternatives that extended from IL 6 to I-180.

Alternative alignments were studied within the South, Central, and North sections. Initially alignment names were developed by combining letters and numbers representing each section, subsection (1, 2, or 3), number within the subsection, and relative location (east or west; Exhibits 2-4 through 2-6). As alignments were evaluated and eliminated, the remaining alignments were renamed using a simplified naming convention, developed in July 2003 and based on section, alignment number, and subsection letter where necessary. The discussion below uses the original and simplified naming convention for screening decisions prior to June 2003. After June 2003, only the simplified naming convention was used.

The screening process described below involved input from the project's Technical Advisory Committee and the public. A wide range of environmental and socioeconomic resources and engineering issues was considered during the screening process. The goal of the screening process was to develop alternatives that would minimize impacts while addressing the transportation deficiencies identified by the project's purpose and need. A posted speed of 65 mph was a requirement for all mainline segments of the roadway.

The process the project team used to arrive at the Build Alternative is described below, chronologically and by section.

2.2.1 2002 (Project Start) to June 2003

Between early 2002 and spring 2003, the project team developed and evaluated the initial range of project alignments listed in Table 2-1 and shown in Exhibits 2-4 (South Section), 2-5 (Central Section), and 2-6 (North Section).

TABLE 2-1
Screening of Preliminary Alignments: 2002 to June 2003

Project Section	Alignments Eliminated from Consideration	Reasons for Eliminating Alignments	Alignments Carried Forward
South	S-1 (S-01-W1W)	Potential proximity impacts to Singing Woods Nature Preserve; public opposition from Heart of Illinois study; poor access to Chillicothe.	S-4A/B (S-01-W4W/S-01-W4E) S-5A/B (S-01-W5W/S-01-W5E)
South	S-2 (S-01-W2W)	Greatest floodplain impacts (137 acres); most stream crossings (6); highest cost ($129 million)	
South	S-3/3A (S-01-W3W/S-01-W3E)	Most residential displacements (9)	
South	S-01-E	See text below.	
Central	C-1/1A (C-01W-N, C-02-W, C-03W-D, C-03W-ND)	Poor access to Hopewell and Sparland; highest farmland impacts (191 acres); most new right of way (221 acres).	C-2/2A/2B (C-01W-N, C-01E-NS, C-01E-N, C-01W-S, C-01E-NS, C-02-E, C-03E-ND, C-03E-D) C-3/3A (C-01-WC, C-02-WC, C-02-WC (RR), C-03-WC)
Central	C-2C (C-01E-S)	Residential displacements (4), greatest forest impacts (31 acres)	
North	H-1 (N-01-FW)	Poor access to Henry, farmland impacts (191 acres)	H-3 (N-01-C)
North	H-2/2A (N-01-WA, N-01-W)	Poor access to Henry, farmland impacts (195 acres)	H-4 (N-01-EC)
North	H-5/5A (N-01-E) (Henry through-town)	See text below.	N-2/2A (N-02A-WCN, N-02-WCN, N-02A-WCN (RR), N-02-WCN (RR), N-02-A, N-02-WNN)
North	N-02A-WNN, N-02B-WNN, N-02A-Oneway2, N-02B-Oneway2, N-03-EN	Potential impact to Indian burial grounds, two grade-separated railroad crossings with ramps to access IL 29.	N-4 (N-02A-E1, N-02B-E1, N-02A-E2, N-02B-E2, N-02A-Oneway1, N-02B-Oneway1, N-03-WC, N-03-WN (RR), N-03-EC, N-03-Oneway)
Chillicothe		Through-town (see text below).	See text below.

Six alignments were evaluated in the South Section, five of them on relocated alignments ranging from 1 mile to 4 miles west of IL 29. With the exception of the westernmost alignment, which runs along the edge of the bluff, the other alignments use some part of Wayne Road or Krause Road along their length (Exhibit 2-4). Three alignments had two subsections each that crossed Senachwine Creek (South) at various locations. Improving existing IL 29 from the IL 6 intersection through Chillicothe was also considered.

Three basic alignments were reviewed in the Central Section: one along IL 29 and two along bypasses located 2 and 2.5 miles west of IL 29 (Exhibit 2-5). The alignment along IL 29 contained two options through Sparland, with and without railroad relocation. After crossing Senachwine Creek (South), there were three possible connections to the two bluff alignments. Similarly, at the north end of the bluff alignments, there were different routes coming off the bluff, but all tied into IL 29 at the Camp Grove Road intersection.

In the North Section, four bypass alternatives west of Henry were developed, as well as improvement of existing IL 29 through Henry (Exhibit 2-6). The bypass alignments ranged from 0.5 mile to 2 miles west of IL 29. North of Henry and the Marshall-Putnam county line, one alignment along existing IL 29 and three alignments off existing IL 29 were studied. Subsections within the alignments also were considered.

Because of various engineering and environmental impacts, many preliminary alignments were eliminated from further consideration (Table 2-1). In the South Section, the Chillicothe through-town alignment was eliminated because accommodating a 65-mph facility between IL 6 and Truitt Road would have displaced many businesses and residences and created a barrier in the heart of the community's commercial district. A Henry through-town alignment was evaluated and eliminated for similar reasons. Improving IL 29 to freeway standards would have resulted in numerous commercial displacements south and north of Western Avenue and impacts to the fairgrounds and the high school. Elimination of the through-town alignments left only a "bypass" alignment as a feasible option in either community.

Table 2-1 also lists the alignments retained for study. Alignments that were eliminated from consideration or carried forward were presented to the Technical Advisory Committee in November 2002 and to state and federal review agencies during the first NEPA/Section 404 merger meeting in April 2003. Participants in the Technical Advisory Committee meeting and the NEPA/Section 404 merger meeting concurred with IDOT's screening decisions. The alignments carried forward for study were displayed at the first set of public information meetings on June 11 and 12, 2003 (Exhibit 2-7).

2.2.2 July 2003 to January 2004

IDOT used the input from the June 2003 public information meetings, the development of preliminary engineering plans, and the additional environmental data gathered during field surveys to continue screening alignments between July 2003 and January 2004. Exhibit 2-7 shows the alignments under consideration at the start of the screening period. The screening decisions are discussed by project section below.

2.2.2.1 South Section

Following the June 2003 public meeting, Alignment S-6 was added to the South Section alignments array. From IL 6 to a point south of Cedar Hills Drive, Alignment S-6 is the same as Alignment S-4. From Cedar Hills Drive to about Rome West Road, Alignments S-6 and S-4 are distinctly different. Alignment S-6 bypasses the Caterpillar Tech Center on its west side and crosses Old Galena Road just south of the Audubon Wildlife Center before heading east toward Rome West Road. Alignment S-4 crosses Cedar Hills Drive east of Alignment S-6 passing between Caterpillar's two plants and remains east of Alignment S-6 to a point north of Rome West Road where Alignment S-6 joins Alignment S-4. IDOT eliminated the part of Alignment S-4 from south of Cedar Hills Drive to Rome West Road and retained Alignment S-6.

Because Alignment S-6 runs north-south, it allows for a better interchange configuration at Cedar Hills Drive by providing ramp terminal intersections with Cedar Hills at a 90-degree angle. Further, the alignment and interchange would be less disruptive to Caterpillar plant operations than Alignment S-4 because they would be on the periphery of the campus rather than bisecting it. Between Rome West Road and Truitt Road, IDOT also eliminated Alignment S-5 west of Chillicothe, and retained Alignment S-4 (Exhibit 2-7). Alignment S-4 was retained because the Village of Chillicothe indicated that it would be more compatible with the Village's land use plan than Alignment S-5. Alignment S-4 would also cross the narrow north tip of the Galena Road Gravel Quarry avoiding the constructability issues posed by Alignment S-5, which would cross a deeper and wider area of the quarry east of S-4.

North of Truitt Road, Alignment S-5B, the connection between Alignment S-5 and the Central Section alignments, was eliminated and Alignment S-4B was retained. Alignment S-5B was eliminated because its proposed alignment south of Senachwine Creek (South) would likely have three stream crossings rather than the single crossing with Alignment S-4B. It is expected that Alignment S-5B would cross the stream twice where it bends south between stations 3185 and 3195, and again between stations 3215 and 3225, before tying into Alignment S-4B (see Exhibit 2-4 and Aerial Exhibit, sheet 6). An additional reason for eliminating Alignment S-5B is that it would be centered in Senachwine Creek's 100-year floodplain rather than at its edge like Alignment S-4B. Following the June 2003 public information meeting, Alignment S-4B was realigned to the west to improve the angle at which the roadway would cross Senachwine Creek (South) and to move the alignment to the north edge of the creek's 100-year floodplain.

2.2.2.2 Central Section

Alignment C-2, west of C-2A in Peoria County, was eliminated because it would require an interchange north of Chillicothe to be constructed in the bluffs northwest of Chillicothe. The cuts and fills required to construct an interchange in the bluffs would create much more complicated constructability issues than a north Chillicothe interchange along Alignment C-2A. The Alignment C-2 interchange on the north side of Chillicothe would be connected to existing IL 29 by Hart Lane. To accommodate the volume of truck and auto traffic that would want to access Chillicothe at this location, Hart Lane would have to be improved. Widening Hart Lane would affect residential properties along Hart Lane. Alignment C-2A was retained because the proposed interchange would be constructed in the relatively flat area between Hart Lane and Senachwine Creek (South) and it would allow a direct connection to Chillicothe north of the viaduct.

In Sparland, IDOT eliminated Alignment C-3, the through-town option, and retained alignment C-3A because it had fewer potential displacements (11 versus 30) and allowed better traffic circulation in Sparland. Because future traffic volumes on IL 29 and IL 17 would be too high to be accommodated efficiently at the existing at-grade intersection, five interchange alternatives were developed in Sparland to connect the two highways (Exhibit 2-8). The object in developing the five alternatives was to minimize impacts to the community, minimize impacts to IDNR property, minimize impacts to wetlands and floodplains, and provide a standard interchange design.

2.2.2.3 North Section

Following the June 2003 public information meeting, Alignment H-3 was dropped and H-4 retained. H-4 is closer to Henry than H-3 and is preferred by Henry officials. Alignment H-4 would affect less cropland (211 acres versus 257) and require less new right of way than H-3 (249 acres versus 275).

Three access options were developed for the Putnam area. Mainline location and design is the same for all options. They differed in access allowed at intersections with Bradford, Douglas, Courtland, Main, and High streets (Table 2-2). Crossroad geometry varies among them as well. Option 1 closes the Main Street/Senachwine Lake Road intersection creating 2,400 feet of spacing between the Bradford Street and High Street intersections with IL 29. IDOT recommends approximately 2,600 feet of intersection spacing on expressways like IL 29. Options 2 and 3 keep the Main Street intersection open and are only able to achieve 1,500 feet of spacing between the Bradford Road and Main Street intersections.

TABLE 2-2
Access Options for the Putnam Area

Street	Option 1	Option 2	Option 3
Bradford	Full intersection, extends east of IL 29	Full intersection, no extension east	Full intersection, no extension east
Douglas	Closed at IL 29	Closed at IL 29	Closed at IL 29
Courtland	Closed at IL 29	Closed at IL 29	Closed at IL 29
Main (west) / Senachwine Lake (east)	Closed at IL 29	Full intersection at better angle	Full intersection at same angle
High	Full “T” intersection	Right in/right out	Cul-de-sac

Alignment N-4, east of Putnam and the railroad, was eliminated because it would have:

- 49 to 87 more acres of impact to agricultural land than N-2 and N-2A
- 9 to 15 more acres of impact to wetlands than N-2 and N-2A
- 40 more acres of impact to floodplains than N-2 and N-2A

In addition, Alignment N-4 was eliminated because it would be located in the Miller-Anderson Woods Natural Area (east of IL 29) and potentially impact two protected species, the bald eagle and the decurrent false aster. The two alignments through the Miller-Anderson Woods Nature Preserve that remained then were N-2 and N-2A. These two alignments, located along existing IL 29, were expanded to the following five alignments:

- **N-2A:** 50-foot-wide median, no retaining walls, Iowa Interstate railroad relocation 100 feet east of the existing tracks
- **N-2B:** 50-foot-wide median, retaining wall on the east side of IL 29, Iowa Interstate railroad relocation 44 feet east of existing tracks
- **N-2C:** 50-foot-wide median, retaining walls on the east and west sides of IL 29, Iowa Interstate railroad relocation 28 feet east of existing tracks
- **N-2D:** 47-foot-wide median, retaining walls on the east and west sides of IL 29, no railroad relocation

- **N-2E:** 22-foot-wide median, retaining walls east and west of IL 29, no railroad relocation

The screening and new alignment decisions were presented to the Technical Advisory Committee on January 20, 2004. Meeting participants concurred with IDOT's alternatives recommendations.

2.2.3 February to July 2004

Within the period February to July 2004, preliminary plans were submitted to IDOT for the South Section (June 2004), Central Section (April 2004), and the North Section (April 2004). The additional engineering information gathered from the plan development and additional environmental data were used to screen the alignments in the three project sections. Exhibit 2-9 shows the alignments under consideration at the start of the screening period. The screening decisions are described below by project section.

2.2.3.1 South Section

The only alignment change in the South Section during the period was to refine the design of Alignment S-6 east of Old Galena Road to create Alignments S-6B and S-6C (Exhibit 2-10). IDOT created the two alignments to investigate whether farm severances could be reduced.

Two interchanges were evaluated at Cedar Hills Drive: a diamond and diamond with a loop in the southwest quadrant. The diamond with a loop in the southwest quadrant would maximize use of IDOT's right of way south of Cedar Hills Drive.

Interchanges were developed for Rome West Road and McGrath Road for Alignments S-6B and S-6C. A standard diamond interchange was developed at McGrath Road. A new connection would be developed between the interchange and Krause Road to the west. A connection also is planned along the north side of Three Sisters Park between the interchange and existing IL 29. It was decided that the McGrath Road interchange would not be constructed as part of the Build Alternative. Construction would be delayed until development in the McGrath Road area warranted an interchange. At that time, IDOT would construct the interchange and the connection to Krause Road, but the east connection to existing IL 29 would have to be funded by others. The impacts of the interchange and its connections to Krause Road and McGrath Road are included in this document.

At the proposed Truitt Road interchange, the diamond interchange with a loop ramp in the southeastern quadrant was selected over the traditional diamond interchange because it would not acquire new right of way from the Galena Gravel Quarry operation in areas of deep quarry excavation.

2.2.3.2 Central Section

Three interchange configurations were developed and evaluated at the north Chillicothe interchange: Alternative 1 (trumpet interchange), Alternative 2 (diamond interchange with Hart Lane), and Alternative 3 (diamond interchange with Yankee Lane; see Exhibit 2-11).

In Sparland, interchange Alternatives 1 (diamond with railroad relocation) and 5 (high-type intersection, see Exhibit 2-8) were eliminated from further consideration. Alternative 1 was eliminated because it had higher overall impacts than the other alternatives and Alternative 5 had tight loop ramps with a low design speed (Table 2-3). Alternatives 2 (diamond without

railroad relocation), 3 (split diamond), and 4 (standard diamond east of IL 29) were retained. Table 2-3 presents a comparison of the five interchanges in Sparland.

2.2.3.3 North Section

In Putnam, Options 2 and 3 were eliminated because they keep the Main Street intersection open and are only able to achieve 1,500 feet of spacing between the Bradford Road and Main Street intersections. IDOT recommends 2,600 feet of intersection spacing on expressways like IL 29. Option 1 was carried forward because it closes the Main Street/Senachwine Lake Road intersection creating 2,400 feet of spacing between the Bradford Street and High Street intersections with IL 29. Greater intersection spacing is proposed because of the numerous truck movements generated by the grain elevator business. Greater distance allows for longer acceleration and deceleration lanes for trucks and improved intersection geometry. Option 1 will also improve intersection geometry, and improve access to grain elevator business (with the extension of Bradford Road east of IL 29).

Near the Miller-Anderson Woods Nature Preserve, Alignments N-2A, N-2B, and N-2C, each of which would relocate the railroad to the east, were eliminated from consideration because of their higher overall impacts, particularly on wetlands, floodplain and the Miller-Anderson Woods Natural Area (Table 2-4). Alignment N-2D, which did not relocate the railroad but maintained a 47-foot median, was dropped from consideration because it required a costly and complex drain system in the narrowed right of way between the highway and railroad.

TABLE 2-4
Miller Anderson Woods Alternatives Comparison

	New Right of Way[a] (ac)	Wetland Impacts (ac)	Floodplains IL River (ac)	Natural Area[b] (ac)
N-2A: 100 ft RR relocation	92.0	11.6	62.8	18.6
N-2B: 44 ft RR relocation	75.7	5.9	47.8	14.5
N-2C: 28 ft RR relocation	72.6	4.4	44.8	13.4
N-2D: No RR relocation, 47 ft median	67.5	3.3	28.9	6.9
N-2E: No RR relocation, 22 ft median	67.5	3.3	26.4	5.7

[a]136.7 acres of existing roadway right of way is used. 27.9 to 1.2 acres of existing railroad right of way is used.
[b]Later in the study (2005) the size of the natural area was reduced when IDNR eliminated part of the area previously designated as natural area.

Alignment N-2E, which did not relocate the railroad and had a 22-foot median was carried forward. Further refinements to N-2E included moving it 8 feet to the east to eliminate the need for a retaining wall on the west side of IL 29.

The screening decisions listed above were presented to the project's Technical Advisory Committee on June 9, 2004, and concurred with by meeting participants. The alignments eliminated subsequent to the June 2003 public information meeting and the remaining alignments were presented to the public at the second set of public information meetings on July 13 and 14, 2004. Exhibit 2-10 shows the alignments on display at the July 2004 meetings. Interchange alternatives proposed throughout the project area were also displayed.

TABLE 2-3
Sparland Interchange Alternatives Comparison

Configuration	Alternative 1 Diamond (Relocated) (Eliminated)	Alternative 2 Compressed Diamond (on Existing IL 29) (Carried Forward)	Alternative 3 Split Diamond (Relocated) (Carried Forward)	Alternative 4 Diamond (Relocated) (Carried Forward)	Alternative 5 Modified Intersection Type (Eliminated)
Wetland, acres	16	9	8	11	4
Floodplain, acres	84	50	44	65	34
Forest Area, acres	12	12	19	16	12
Natural Area (not IDNR), acres	0	0	0	0	0
IDNR, acres	19	12	7	13	7
Potential Displacements					
Commercial	7	6	1	1	2
Residential	21	34	11	12	35
Outbuildings Impacts	34	46	14	18	46
U.S. Post Office and Sparland Village Hall Relocated	Yes	No	No	No	No
Fellowship Baptist Church Relocated	No	Yes	No	No	Yes
Potentially Historic Property, Building at Whiffle Tree Place	Yes, property	No	Yes, property	Yes, property and building	No
Right of Way Impacts (Additional Right of Way), acres	66	57	55	69	43
Visual Impact to Residences	High	High	Low	Medium	Medium
Farmland, acres	30	20	36	43	14

2.2.4 August 2004 to March 2005

IDOT used input from the July 2004 public information meeting and engineering and environmental data gathered as part of developing preliminary plans to make the final series of alignment screening decisions. Exhibit 2-10 shows the alignments under consideration at the start of the period. The screening decisions are listed below by project section.

2.2.4.1 South Section

Alignment S-6B was carried forward because it was perceived by the public as less disruptive to Galena Knolls subdivision on Rome West Road. Alignment S-6C was eliminated.

Cedar Hills Drive Interchange. The diamond interchange with the loop ramp in the southwest quadrant was selected to maximize use of existing IDOT right of way south of Cedar Hills Drive. The standard diamond interchange was eliminated from further consideration because it would require 10 more acres of right of way from private property than the diamond interchange with a loop ramp.

Rome West Road and McGrath Road Interchanges. Following the July public information meeting, IDOT determined that proper interchange spacing could be maintained if interchanges were constructed at both Rome West Road and McGrath Road. The standard diamond interchange was maintained at McGrath Road. Six interchange types were evaluated at Rome West Road. Four interchanges were eliminated because IL 29 was grade separated over Rome West Road. These alternatives would result in higher initial construction costs and greater maintenance costs. The fifth alternative was eliminated because it would align Rome West Road to the north. IDOT selected a standard diamond interchange with Rome West Road over IL 29 because it would better meet driver expectation and have lower construction and maintenance costs. Rome West Road would tie into the proposed Knox Street extension. The extension would be on new alignment north of the residential properties on North 6th Street and tie into the existing Knox Street/IL 29 intersection.

2.2.4.2 Central Section (Bluff Alignment)

The Bluff Alignment (C-2) was developed at the start of the study to avoid what were expected to be impacts to IDNR property (a likely Section 4(f) resource) and privately owned natural areas. To a lesser extent, the Bluff Alignment was viewed as a means of minimizing wetland and woodland impacts associated with improving existing IL 29.

As part of the study, the project team evaluated the amount of traffic that would be carried by either an improved IL 29 or by the Bluff Alignment in the design year 2032. The analysis found that between 7,300 and 15,600 vehicles per day would use a widened facility along IL 29 in the Central Section. The Bluff Alignment was predicted to carry 2,850 to 3,800 vehicles daily, leaving 5,700 to 12,600 vehicles per day on the existing 2-lane IL 29.

Marshall County residents living east of the Illinois River use the IL 17 bridge to access the west side of the river. For residents west of the Illinois River, IL 17 provides a direct connection to I-39. Alternate river crossings are located 7 miles north on IL 18 or 25 miles south on US 24/US 150. Frequent or recurring travelers from east of the Illinois River

working, visiting or doing business in Sparland, Chillicothe, or Peoria will use the route most reasonable to them, either existing IL 29 or widened IL 29.

If the Bluff Alignment were constructed, the route of choice for most travelers would still be existing IL 29. Failure of the Bluff Alignment to attract travelers and alleviate future congestion on IL 29 would mean that it had not fulfilled the object of providing a safe and efficient highway to serve existing and future travel demands for both regional and local travelers. The recommendation to drop the Bluff Alignment was presented to agencies at the second NEPA meeting on March 1, 2005. The agencies postponed a decision on the Bluff Alignment until the project team provided more information about how future traffic volumes on existing IL 29 and the Bluff Alignment were developed. IDOT sent the agencies a memorandum with additional traffic information, and the agencies concurred with elimination of the Bluff Alignment (see Appendix A, State and Federal Agency Coordination, NEPA/404 Merger Process, pp. A-15 to A-27).

2.2.4.3 Central Section (Existing Alignment)

The three north Chillicothe interchanges (Alternative 1, trumpet; Alternative 2, diamond with Hart Lane; Alternative 3, diamond with Yankee Lane) had similar impacts and costs, but Alternative 1 was retained because the trumpet interchange would provide a free-flow movement for vehicles traveling between Chillicothe and Sparland, the predominant movement through the interchange. The diamond interchanges in Alternatives 2 and 3 required traffic to stop and make turns at the ramp terminals before entering or exiting IL 29 between Chillicothe and Sparland.

IDOT considered two alternatives for widening IL 29 between IDOT's rest area (north of the north Chillicothe interchange) and IDNR's Land and Water Reserve south of Sparland: widening west while maintaining the same elevation between northbound and southbound lanes, or widening west with a split profile (the southbound lanes would be at a higher elevation than the northbound). Widening west at the same elevation was eliminated because it would require a strip of new right of way 30 to 50 feet wider than the split level alternative for most of the distance between Chillicothe and north of Sparland. The split elevation (Exhibit 2-3) was selected because it requires less new right of way from the west side of IL 29, thereby reducing impacts on privately owned natural areas and IDNR property. It also reduces the amount of excavation into the unstable bluff soils. The split profile is also used from north of the proposed Sparland interchange to a point just south of the IL 29/1100E intersection.

Interchange Alternative 3 (split diamond) in Sparland was carried forward because it minimized impacts to a greater degree than the other interchange alternatives (Table 2-5).

Alternative 2 (diamond interchange west of the railroad tracks) and Alternative 4 (diamond interchange east of the railroad tracks) were eliminated from consideration because they require more right of way than Alternative 3 and would result in greater environmental and socioeconomic impacts. Further, they would have a greater impact on traffic maintenance during construction.

Based on recommendations from the Federal Emergency Management Agency (FEMA) to avoid flood buyout properties in Sparland, interchange Alternative 3a was developed and compared to Alternative 3. Flood buyout properties are those that have been damaged by Gimlet Creek and the Illinois River flooding in the past that have been purchased to reduce

TABLE 2-5
Sparland Interchange Comparison (August 2004 to March 2005)

Impact	Alternative 2 Diamond without RR Relocation	Alternative 3 Split Diamond	Alternative 4 Diamond East of RR
Right of Way			
Existing Roadway Acres	83	69	69
Existing Railroad Acres	4	4	4
New Acres	110	108	122
Total Acres	197	181	195
Wetlands			
Hits	7	6	7
Acres	18	17	20
Floodplain Acres			
Illinois River	39	43	64
Gimlet Creek	6	0.4	0
Thenius Creek	6	1	1
Crow Creek	16	16	16
IDNR Properties			
Acres	12	7	13
Displacements			
Residential	42	19	20
Commercial	7	2	2
Historic Properties	0	1	1
Landlocked			
Number of Properties	1	1	2
Acres	7	8	8
Farmland			
Acres	47	19	25

future risk for property damage. The flood buyout properties owned by the Village of Sparland and IDNR are shown in Exhibit 3-23. An explanation of the flood buyout program is provided in Section 3.10.1.4. Alternative 3a is located east of existing IL 29 and east of the developed properties along IL 17. Although Alternative 3a acquired 1 more acre of right of way than Alternative 3 and created a 4-acre parcel (as opposed to a 1-acre parcel with Alternative 3) west of IL 29 that would be isolated from the remainder of IDNR's Marshall State Fish and Wildlife Area (Sparland Unit) property, it was retained because it avoided the flood buyout properties. Alternative 3 was eliminated from consideration.

2.2.4.4 North Section

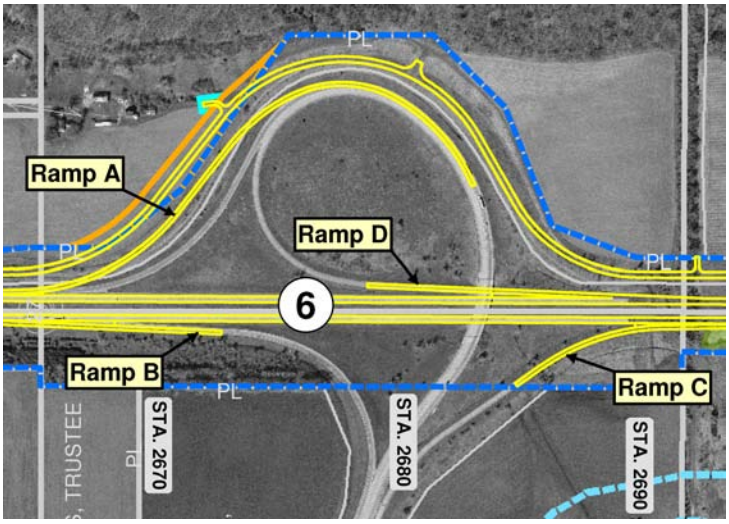
Different options were evaluated in the Crow Creek area to minimize impacts to floodplain and wetlands west of IL 29. The standard typical section with a 50-foot median and a ditch on the west side of IL 29 would affect 28 acres of floodplain and 13 acres of wetland. Constructing a retaining wall on the west side of IL 29 would reduce floodplain impacts to 15 acres and wetland impacts to 5 acres. It was decided to use a guardrail on the west side of IL 29 with 2:1 side slopes as a compromise solution (Exhibit 2-12). The guardrail would cover two areas with a total length of 5,200 feet. This option would affect 25 acres of floodplain, 11 acres of wetland and cost $24 million. The feasibility of using steeper than 2:1 side slopes with reinforced earth foreslopes will be investigated in a future design phase.

After the June 2006 Public Hearings, IDOT, in coordination with USEPA, determined it best to construct retaining walls along parts of Crow Creek. See Section 2.3.3 for additional information.

2.3 Detailed Description of the Preferred Alternative

The Build Alternative was identified as the Preferred Alternative. Its identification was based on the analysis of environmental impacts, engineering, traffic service considerations, public comments and agency comments, and concurred upon by the interagency resource group comprising USEPA, USACE, USFWS, IDNR, and IDOA (see Section 5.2.1). Following is a detailed description of the Preferred Alternative, including changes made since publication of the DEIS.

2.3.1 South Section



The general location of the Preferred Alternative in the South Section is shown on the following page. The more detailed view is found in Aerial Exhibit sheets 1 through 6. The Preferred Alternative begins at the IL 6 interchange with the focus of the work there being ramp related. The geometry of Ramp A would be improved, and Ramps B, C, and D will be completed (see photograph). The new IL 29 mainline would begin north of the existing IL 6 terminus. The 4-lane divided freeway section would extend within the existing right of way to Cedar Hills Drive. Dickison Lane and Boy Scout Road would be closed east of the proposed alignment. Access to properties west of the alignment would be gained from a 2-lane frontage road extending from Mossville Road to Cedar Hills Drive. The proposed bridge over Dickison Run would be designed to accommodate a wildlife crossing for large mammals.

At Cedar Hills Drive an interchange would be constructed with a loop ramp in the southwest quadrant. The interchange would be located mainly south of Cedar Hills Drive

within existing IDOT right of way. The 2-lane frontage road would intersect Cedar Hills Drive at Ivy Lake Road, which would be shifted slightly west of its current alignment. IL 29 would pass under Cedar Hills Drive. Cedar Hills Drive would be expanded to a 4-lane undivided roadway between the west side of the interchange and Old Galena Road to match the typical section on Cedar Hills Drive east of Old Galena Road.

North of Cedar Hills Drive the Preferred Alternative would be on new alignment west of Caterpillar's Tech Center. North of the Tech Center, IL 29 would curve northeast and pass over Old Galena Road immediately south of the undeveloped Audubon Wildlife Area.

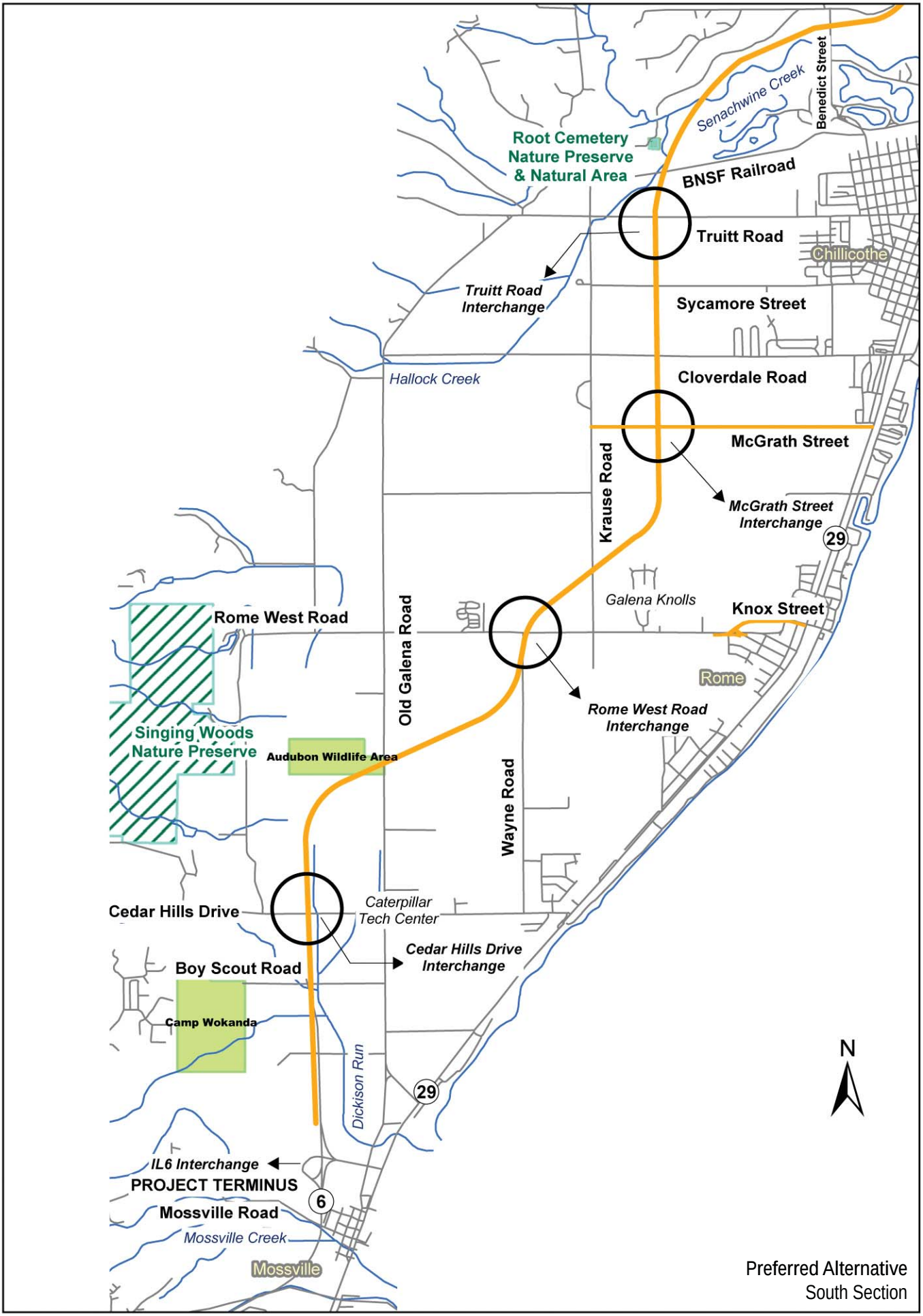
North of Old Galena Road, IL 29 would continue northeast and cross Wayne Road south of the existing intersection with Rome West Road. A diamond interchange is proposed at Rome West Road. Rome West Road would pass over IL 29 and a new frontage road connecting Wayne Road (at Rome West Road) to Krause Road east of the interchange is proposed. The interchange would displace one residence. West of the interchange, the Wayne Road/Rome West Road T-intersection would be moved west to create the 500 feet of spacing IDOT requires between the proposed interchange ramp and the nearest intersection (Aerial Exhibit, sheet 3). A service road would be created on the north side of Rome West Road opposite the new T-intersection, and two residential driveways that currently access Rome West Road would be moved to the service road. Two other driveways on Rome West Road would be realigned slightly to the west to create the proper spacing from the relocated Rome West Road/Wayne Road intersection (Aerial Exhibit, sheet 3). East of the interchange, near the Rome West Road/North 7th Street intersection, Rome West Road would tie into the proposed Knox Street extension. The extension would be on new alignment north of the residential properties on North 6th Street and tie into Knox Street just west of the existing Knox Street/IL 29 intersection. A short section of Knox Street east of IL 29 would be reconstructed to complete the upgrade of the IL 29/Knox Street intersection.

Continuing northeast, interchanges would be provided at McGrath Street and Truitt Road. The Preferred Alternative would cross over Old Galena and Wayne Roads, and beneath Krause Road, Cloverdale Road, Sycamore Street, and Benedict Street. All crossings would be bridges except Wayne Road, which would be on fill with realignment of Wayne Road to connect to Rome West Road at Krause Road.

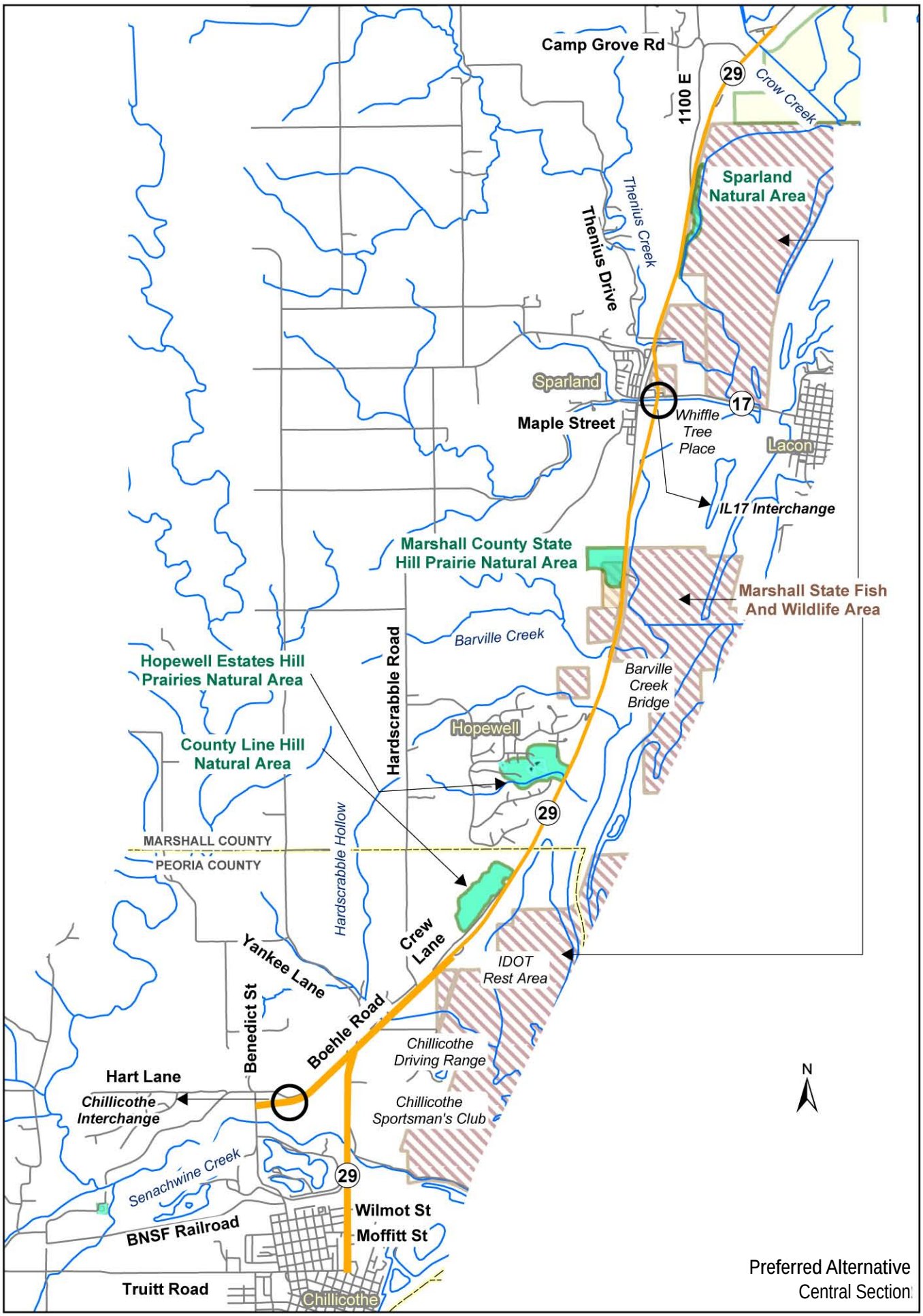
North of Truitt Road, IL 29 would cross over the BNSF railroad and continue north and east, crossing Senachwine Creek (South). The Senachwine Creek bridge would be lengthened to provide a wildlife crossing. North of the creek crossing, IL 29 would bend east, aligned parallel to and over part of Ratliff Road. Two additional culverts east of Senachwine Creek would accommodate wildlife crossings. Continuing east, the Preferred Alternative in the South Section would end east of the relocated Benedict Street bridge.

2.3.2 Central Section

The general location of the proposed alignment for the Central Section is shown on the following page. A more detailed view is found in Aerial Exhibit sheets 7 through 12. In the Central Section, the Preferred Alternative would begin east of the relocated Benedict Street bridge from which the expressway type facility would continue a short distance before entering the proposed north Chillicothe interchange area. A trumpet interchange is planned for the area between Hart Lane and IL 29. The interchange would allow free-flow movement for



Preferred Alternative
South Section



Preferred Alternative
Central Section

travel between Chillicothe and Sparland, which constitutes most of the traffic in the area. Southbound traffic leaving Sparland would enter Chillicothe using the ramp adjacent to the loop ramp. Northbound traffic from the bypass would enter Chillicothe from an exit ramp (Exhibit 2-11).

Improvements to IL 29 within Chillicothe are planned between Truitt Road and the north Chillicothe interchange. South of Truitt Road, IL 29 has 2 lanes in each direction plus a center 2-way left-turn lane and sidewalks on either side. North of the Truitt Road intersection to Wilmot Street, IL 29 has 2 lanes in each direction with a 5-foot flush median. The 5-foot median would be widened to 12 feet to accommodate left turning vehicles, and sidewalks would be provided on both sides of the road. North of Wilmot Street, where the cross section narrows to 2 lanes (under the existing viaduct), IL 29 would be widened to the west and have 2 lanes in each direction with an 18-foot raised median to the north Chillicothe interchange. The east leg of Moffit Street would be moved to the north to align with the west leg of Moffit Street along the IL 29 connector into Chillicothe. A strip of new right of way would be acquired from residences in Chillicothe between Truitt Road and the viaduct. Five residences (and two garages) west of IL 29 would be displaced. The strip of new right of way would create a continuous sidewalk between Truitt Road and just north of the railroad viaduct (for access to the Chillicothe Recreational Area). The outside lane of the 4-lane section of IL 29 from Truitt Road to a point south of the viaduct would be widened to 14 feet to provide a shared use lane on both sides of the roadway. The proposed sidewalk under the viaduct would accommodate both pedestrians and bicycles on the west side of IL 29 (10 feet wide) and bicycles only on the east side (8 feet wide). North of the Chillicothe Recreational Area and along proposed IL 29, bicycles would be accommodated on the 10-foot-wide outside paved shoulder on both sides of the roadway.

The south railroad viaduct would be reconstructed to accommodate two lanes of traffic in each direction with a center bridge pier (within an 18-foot raised median). A guardrail would be installed adjacent to the outside travel lanes (under the viaduct) separating the traffic from the sidewalks on the east and west side of IL 29 (Exhibit 2-13). Continuing north, the north viaduct would be demolished requiring realignment of the BNSF yard track and maintenance road over the reconstructed south viaduct (Exhibit 2-14). The realignment would allow all existing through tracks to use the reconstructed south viaduct and accommodate an additional main track in the future.

South of the reconstructed south viaduct, IL 29 would be expanded to a 4-lane divided facility and continue north of Senachwine Creek to the proposed East Service Road with an 18-foot raised median. North of the East Service Road, the roadway would transition to a 2-lane divided roadway with a 22-foot median as it approaches the trumpet interchange. North of the interchange, Hart Lane would be extended on new alignment west of IL 29 and tied into realigned Boehle Road. Realigned Boehle Road would partially follow existing IL 29, then continue north along existing alignment to Hardscrabble Road. This design would create a new connection from Hart Lane to Hardscrabble Road. A new intersection connecting Hart Lane and Boehle and Hardscrabble roads to IL 29 is proposed 1,500 feet north of the Yankee Lane/Hart Lane intersection with IL 29. On the east side of proposed IL 29, Yankee Lane would be realigned to tie into a frontage road serving the Chillicothe Driving Range property. Yankee Lane and frontage road traffic would access IL 29 at the intersection serving Hart Lane and Boehle and Hardscrabble roads.

Several wildlife crossings would be included in the design of box culverts and bridges from Benedict Street to Crow Creek on the north end of the Central Section. See Section 3.12 for more detail on proposed wildlife crossings.

The Preferred Alternative would widen IL 29 to the east across the Chillicothe Sportsman property, the Chillicothe Driving Range and IDOT's rest area. North of the rest area, the IL 29 median would transition from a 50-foot grass median to a 22-foot concrete barrier median and widen to the west to minimize impacts to natural areas and IDNR property on both sides of IL 29 south of Sparland. The IDOT rest area would be improved to allow for a weigh scale and truck maneuvering. The rest area intersection would have service drives north and south of the rest area to provide access to one property to the north and three properties to the south, including IDNR property. On the west side of IL 29 opposite the IDOT rest area, a small section of Crew Lane would be reconstructed and the south and north intersections of Crew Lane and IL 29 closed. A new intersection would be constructed at the north driveway of IDOT's rest area as would a new connection to Crew Lane. The Preferred Alternative would displace four residences located between IL 29 and Crew Lane.

A split profile typical section (southbound lanes at a higher elevation than the northbound lanes) would begin just north of the existing intersection with Crew Lane and continue north 0.5 mile to reduce impacts to County Line Hill Prairie Natural Area. The split profile typical section would have a 2- to 3-foot retaining wall in the median and a retaining wall that would vary from up to 7 feet along the west side of IL 29. There would also be a split profile typical section from 1,100 feet south of the Hopewell Estates Hill Prairies Natural Area to 800 feet south of the Hopewell entrance. The typical split profile would have a 3- to 10-foot retaining wall in the median and a retaining wall on the west side of IL 29 that would be up to 14 feet high. The entrance drive to the Village of Hopewell would be realigned to improve stopping sight distance along IL 29. A median opening would be constructed at the entrance to Hopewell to provide access for northbound and southbound travel.

A split profile and retaining wall would be proposed between 1,300 feet north of the Barrville Drive entrance and the north limits of the Marshall County State Hill Prairie Natural Area. The split profile section would be 3,400 feet long with a 3- to 10-foot retaining wall in the median and a retaining wall varying up to 11 feet along the west side of IL 29. The widening to the west would displace the historic Barrville bridge and one residence near the IL 29/Barrville Drive intersection. North of Barrville Drive, widening would continue on the west side. The existing entrance to the Marshall State Fish and Wildlife Area west of IL 29 would be widened and extended for 900 feet south of the existing entrance. The driveway for the wildlife area east of IL 29 would be relocated to the south to improve safety at the railroad crossing in that area. The railroad tracks would be relocated east to provide a 90-degree crossing from IL 29 to the east side of the railroad. Because the Marshall County State Hill Prairie Natural Area extends into the IL 29 right of way on the west side, a minor impact (less than 1 acre) would occur at the property.

North of the Marshall County State Hill Prairie Natural Area, the split profile typical section ends as the Preferred Alternative enters the proposed Sparland interchange (see Exhibit 2-15). A split diamond interchange separating the northbound exit and southbound entrance ramps from northbound entrance and southbound exit ramps is proposed. The Preferred Alternative would bend west of existing IL 29 starting about 2,500 feet south of the Sparland corporate limits. It would then proceed east and cross over existing IL 29 and the Iowa Interstate

Railroad tracks on a bridge. East of the railroad tracks, the Preferred Alternative would cross the agricultural field on the south side of Sparland on approximately 30 to 35 feet of fill. The Preferred Alternative would cross over Gimlet Creek and IL 17 east of the Whiffle Tree House and continue north passing approximately 100 feet west of Sparland's treatment ponds. The Preferred Alternative would cross over Thenius Creek and the Iowa Interstate Railroad for the second time.

The northbound entrance ramp and the southbound exit ramp would be located north of Thenius Street, providing access to Sparland (see photograph). The southbound exit ramp at the north end of the interchange includes a flyover ramp over Thenius Street before merging with existing IL 29. A 16-foot-high wall between the ramp and the bluff on the west is required. The mainline through the interchange will have a 65 mph design speed instead of the 70 mph design speed used elsewhere. This is necessary because in certain areas, the median barrier walls will restrict the line of site of a driver traveling 70 mph. In order for a design speed of 70 mph to be achieved, the shoulders would need to be widened excessively. Widening the shoulder to increase the sight distance might lead the driver to think the shoulder is an additional lane. Therefore in the interest of safety, on the mainline through the interchange, a design speed of 65 mph will be used. Within the Sparland Interchange, bicycles will be diverted to existing IL 29 using the exit ramps. Bicyclists can either travel east on IL 17 or return to proposed IL 29 using the northbound entrance ramp.

In Sparland, IL 17 and IL 29 would be reconstructed at their existing elevations (see photograph), except at the proposed roundabout. Along existing IL 29 between the south and north legs of IL 17, access would remain the same but would be modified south of the existing intersection. The intersections of Oak and Maple Streets and existing IL 29 would be closed and Willow Street would remain open. Existing IL 29 on the south side of Sparland would be terminated south of Willow Street to provide for the entrance and exit ramps to and from proposed IL 29. The alley between Willow Street and Maple Street and Maple Street to Oak Street would be improved to provide internal circulation. Retaining walls on the west side of existing IL 29

between Willow Street and the Gimlet Creek bridge would be included to allow Elm Street to remain open via Willow Street. The Railroad Street/Willow Street and Willow Street/Elm Street Extended intersections would be improved to accommodate single-unit trucks. Water Street would be extended to provide access to the Ducks Unlimited property east of the realigned IL 29. A signal would be installed at the existing IL 29/IL 17 intersection (south leg). Two left-turn lanes would be provided on IL 17 (south leg), which requires the addition of a southbound lane on IL 29 south of the intersection. The Gimlet Creek bridge would need to be widened to accommodate the additional southbound lane, resulting in the displacement of the residence in the southwest corner of Ferry Street and existing IL 29. Access to businesses and residences along IL 17 would remain. However, for safety reasons, left turns would be prohibited at Center Street off of IL 17 east of the railroad tracks so that vehicle queues do not extend over the railroad tracks. Left turns would be permitted at Lacon Street, which would be improved. Vine Street would also be improved to provide connection back to Center Street where the post office and city hall are located. The intersection of existing IL 29 and IL 17 (north leg) would be reconfigured as a roundabout (see photograph). The roundabout would allow southbound exit ramp traffic also to make a U-turn for access to Thenius Street. Access from existing IL 29 to the properties on the west side of existing IL 29 between the roundabout and Thenius Creek would be replaced with access from Marshall Street. North of Sparland, nine residences along the ramp west of IL 29 would be displaced by the Preferred Alternative (Exhibit 2-15).

North of the Sparland interchange, to minimize cuts into the bluff, a split profile commences and continues to the existing intersection of 1100E. Also north of Sparland, widening would resume on the west side of existing IL 29, and the 22-foot concrete median with barrier wall would be used. The retaining wall on the west side of IL 29 would be up to 15 feet high while the median wall would be up to 18 feet high. The south intersection of Road 1100E with IL 29 would be closed. A new intersection would be constructed 3,100 feet north of the intersection to be closed. Three residences along the west side of IL 29 north of the proposed intersection would be displaced. Access to properties north and south of the proposed 1100E would be along a service road and driveway rather than IL 29. The proposed intersection would also provide access to properties east of IL 29. The median width would transition from 22 feet about 2,500 feet south of the intersection to 50 feet about 700 feet north of the intersection. The concrete median would convert to a grass median about 2,000 south of the intersections. The Preferred Alternative would continue widening to the west through the Camp Grove Road intersection displacing a residence and two commercial storage buildings at the Camp Grove Road intersection.

A new bridge would be constructed at the Crow Creek crossing. The bridge would be lengthened to provide for a wildlife crossing.

2.3.3 North Section

The general location of the proposed alignment for the North Section is shown on the following page. The more detailed view is found in Aerial Exhibit sheets 13 through 18. The North Section begins just north of the proposed Crow Creek bridge.

North of the new Crow Creek bridge, two residences west of IL 29 would be displaced. The elevation of IL 29 would be increased approximately 10 feet to raise the travel lanes above the 50-year design water elevation. The existing culvert at the north Crow Creek crossing would be extended west to accommodate widening IL 29 on the west side. The culvert would continue to drain to another culvert under the railroad tracks. Because of the proximity of the north Crow Creek crossing and the retaining wall, two small animal wildlife crossings would be provided at the north crossing of Crow Creek.

To limit wetland and floodplain impacts west of IL 29, retaining walls, a guardrail, and steeper side slopes would be used in the Crow Creek area near the north crossing. The retaining walls would be constructed adjacent to W-52 and W-53 on the west side of IL 29. One wall, about 5,000 feet north of Camp Grove Road, would be 2,040 feet long with an average height of 18 feet. The other wall, about 700 feet south of Old IL 29 (1150N), would be 900 feet long with an average height of 25 feet.

North of the north Crow Creek crossing, widening continues on the west side of IL 29 through the IL 29/Old IL 29 (1150 N) intersection displacing a residence south of the intersection. That intersection would be realigned to the south to improve sight distance at the intersection. The realignment would change the access to the lumber warehouse located in the northwest quadrant of the intersection with the Preferred Alternative.

North of the Old IL 29 intersection, widening would continue to the west, and the Preferred Alternative would realign the IL 29/1300E intersection to the north to improve sight distance. The west and east connections would be realigned to connect to the new intersection. The west widening would cross the AgView FS Co-op property, displacing the warehouse, office and storage tanks. To the north, the Preferred Alternative would displace a farm residence before leaving the IL 29 alignment and veering northward across farm land (at the south end of the Henry bypass). At this point bicycles would be directed off the mainline and onto existing IL 29 through Henry until existing IL 29 rejoins the Preferred Alternative. This would provide a shorter route for cyclists to goods and services in Henry. The Preferred Alternative would proceed north on new alignment through farm fields toward Western Avenue (County Highway 6). A diamond interchange is planned at Western Avenue, about 0.5 mile west of Henry. The Preferred Alternative would be carried over Western Avenue on structure. On the south side of Western Avenue, the proposed interchange would displace three residences and landlock a property in the southwestern quadrant. One residence would be displaced on the north side of Western Avenue, a property would be landlocked in the northeast quadrant, and a service road would be developed in the northwest quadrant to provide access to a commercial property, a farm entrance and a residential property. A driveway on Western Avenue would be realigned slightly to the west to create the proper spacing from the service

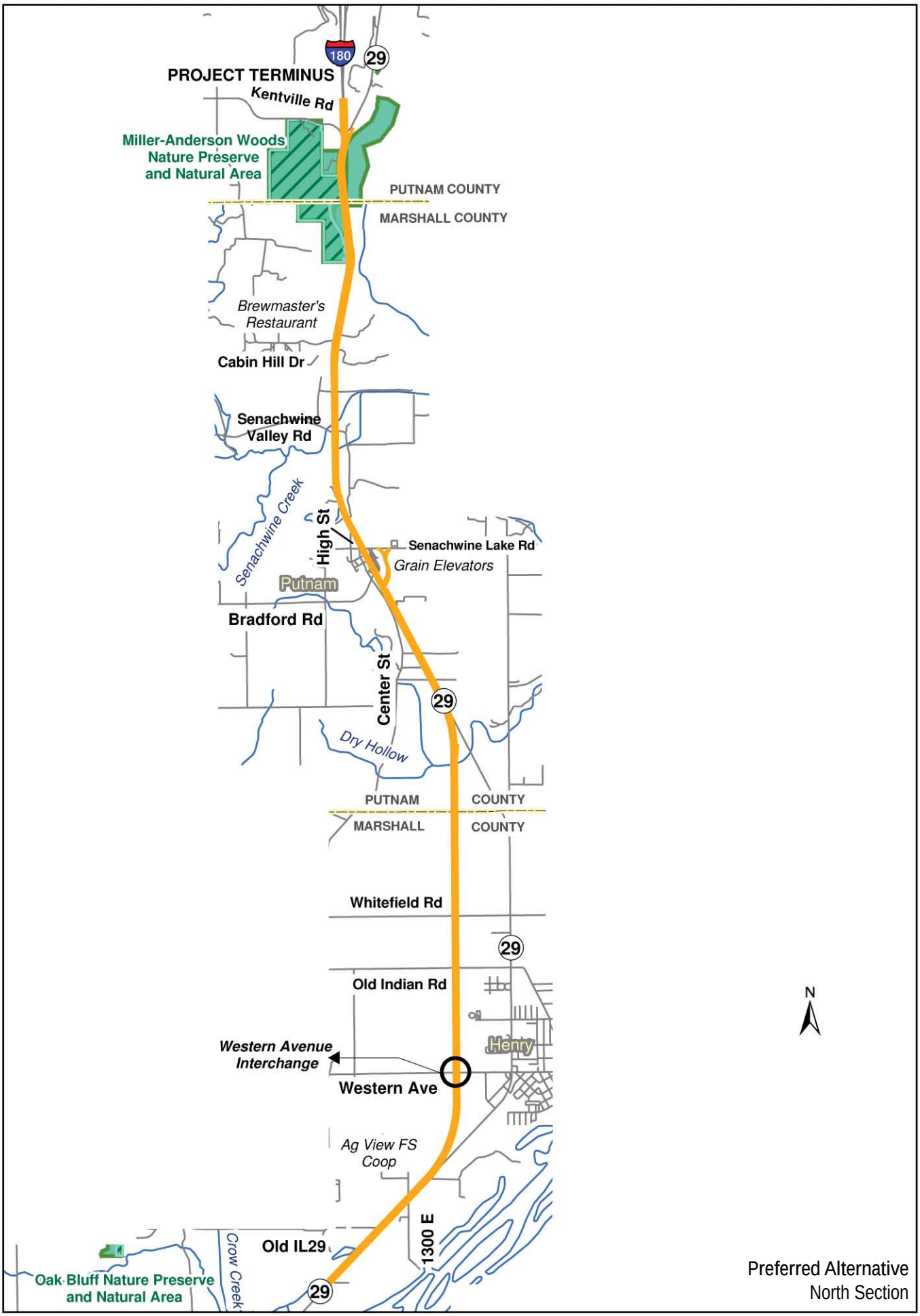
road. Another service road would be developed in the southeast quadrant to provide access to four residential properties.

North of the proposed Western Avenue interchange, the Preferred Alternative would remain on new alignment crossing through farm fields. Two large outbuildings would be displaced. A cattle pass would be provided under IL 29 on the property just north of the interchange to minimize the adverse travel that would be necessary to reach the severed field west of IL 29. The Preferred Alternative would cross under Old Indian Road and intersect Whitefield Road at grade. North of the Whitefield Road intersection, the Preferred Alternative would remain on new alignment before crossing the Marshall/Putnam county line road at-grade and rejoining existing IL 29 about 1,600 feet north of Dry Hollow Creek. Bicycles would travel from existing IL 29 to the outside paved shoulder of the Preferred Alternative at that location. The proposed bridge at Dry Hollow Creek would be lengthened to provide a wildlife crossing.

After rejoining the IL 29 alignment, widening would continue on the west side of the highway as it approaches Putnam. A new connection between IL 29 and Center Street is proposed south of Bradford Road. Within Putnam, the 50-foot median would generally be maintained, and widening to the west would displace five residences and one business. Based on coordination with Senachwine Township, the median would be widened to 64 feet at IL 29 and Bradford Road because of the large number of trucks. The IL 29/Bradford Road intersection would be realigned slightly to the south. Bradford Road would be extended east of IL 29 and aligned east of the grain elevator and residential area and tie into Senachwine Lake Road (County Highway 13). Senachwine Lake Road would be reconstructed between the Bradford Road intersection and Condit Street. Senachwine Lake Road between IL 29 and Condit Street would be closed to through-traffic but would remain open for grain elevator truck traffic operations. The existing road would be maintained by others. The Bradford Road extension would provide access to the Putnam grain elevator property and its scales. Direct access to IL 29 at Senachwine Lake Road would not be permitted. Douglas and Cortland streets would both be turned into cul-de-sacs. Main Street would end at the west side of IL 29 at Center Street. Access to Putnam from IL 29 would remain at Bradford Road and High Street, which would be realigned slightly to the south to improve sight distance at the intersection (see Exhibit 2-16).

North of Putnam, widening would continue west of existing IL 29 through the Senachwine Valley Road intersection, which would be realigned slightly to the north. Widening would continue on the west through the Log Cabin Road intersection to a restaurant and residences north of Log Cabin Road. There the median would change from a 50-foot-wide open, grass median to a 22-foot concrete barrier median to minimize impacts in the Miller-Anderson Woods Nature Preserve. A service road is proposed to provide access to the restaurant and adjacent residential properties. Impact to the wetland west of existing IL 29 would be minimized by the use of a 1,000-foot-long retaining wall on the west side of IL 29 beginning north of Log Cabin Road.

North of the restaurant, the Preferred Alternative would shift to the east side of IL 29 close to the Iowa Interstate Railroad to avoid the nature preserve. To avoid changes to the slope and ditch along the west side of IL 29 adjacent to the preserve, a guardrail would be located on the west side of the road. A 5- to 18-foot retaining wall would be constructed on the east to limit



Preferred Alternative
North Section

the amount of right of way needed from the railroad. Up to 28 feet of railroad right of way would be used to accommodate the shift to the east.

The mainline profile begins to rise, from a point 1,300 feet south of Kentville Road to I-180, to improve the intersection sight distance and the existing profile grade. The intersection of Kentville Road would be 15 feet higher than the existing intersection, and the intersection angle with IL 29 would be improved to increase the stopping sight distance and safety of turning movements. The raise in profile would require some earthwork that affects bluffs north of the existing intersection. Retaining walls would be added on the east side of the proposed improvements to minimize impacts to the bluff north of the proposed intersection where existing benching would remain in place.

2.3.4 Accommodating Bicycles

No bicycles would be allowed on the freeway portion of IL 29 from the IL 6 interchange to the interchange north of Chillicothe, a distance of about 11 miles. Between Truitt Avenue and the viaduct on the north side of Chillicothe, the outside lanes in both directions would be widened to allow approximately 3 feet between the curb and the travel lanes for bicycles. From Gail Street just south of the viaduct to the Chillicothe Recreation Area, the proposed 10-foot-wide west sidewalk would accommodate pedestrians and bicycles; only bicycles would be allowed on the 8-foot-wide east sidewalk.

North of the Chillicothe Recreation Area to the the Chillicothe interchange, bicyclists would use the 10-foot-wide outside paved shoulders on both sides of IL 29. Within the interchange, bicyclists would use the 8-foot-wide paved shoulders on interchange entrance and exit ramps. Between the Chillicothe and Sparland interchanges, bicyclists would use the 10-foot-wide outside paved shoulders on both sides of the highway. Before entering the relocated portion of IL 29 in Sparland, bicyclists from the north or south would be directed off of IL 29 and on to Railroad Street (existing IL 29). Bicyclists would travel through Sparland on Railroad Street using either the shoulder or the outside travel lane. Bicyclists would rejoin the improved IL 29 using the 8-foot-wide paved shoulder of an entrance ramp. From north of Sparland to south of Henry, bicyclists would use the 10-foot-wide outside paved shoulders in both directions.

Bicyclists would not be allowed to use the Henry Bypass. On the north and south sides of the bypass, bicyclists would use proposed intersections to exit and enter the improved IL 29. Bicyclists would access the intersections by using existing IL 29 though Henry. Between the north side of Henry and the IL 29/Kentville Road intersection, bicyclists would use the 10-foot-wide outside paved shoulders on both sides of the highway. At the proposed IL 29/Kentville Road intersection, bicyclists would have to turn onto either Kentville Road or IL 29 rather than proceeding north on what becomes I-180.

2.4 Other Alternatives Considered

2.4.1 Transportation Control Measures

Transportation control measures attempt to reduce the number of auto trips and to increase transit use (primarily bus ridership) or carpooling. Transit service is unavailable in the project area, and there are no known plans to begin such service. The rural nature of the

project area makes it unlikely that there ever will be sufficient ridership to warrant or support a transit service. Transportation control measures are not considered feasible for improving transportation continuity, facilitating modal interrelationships, or improving travel efficiency between IL 6 and I-180.

2.4.2 Transportation System Management

Transportation System Management (TSM) employs measures to maximize the efficiency and use of the highway to help alleviate or postpone the need to increase capacity. Such measures include engineering design features to improve traffic flow and safety, such as intersection capacity improvements, adding traffic signals, eliminating or consolidating driveways, adding passing lanes at critical locations, widening shoulders, and flattening slopes, among others. Although the transportation system management alternative might partially address some transportation deficiencies in the project area, it is not a feasible standalone solution for addressing future traffic demand, improving transportation continuity, or improving travel efficiency between IL 6 and I-180.

Pertinent aspects of the Build Alternative will contribute to an increased efficiency of the local and regional transportation system in the study area. Consequently, TSM improvements are being proposed as components of the preferred alternative. Those TSM elements included in the preferred alternative include turning lanes, improved access, eliminating or consolidating driveways, and widening shoulders.

2.5 Operationally Independent Phases of Work

Section 1904 of the *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (SAFETEA-LU) amended 23 U.S. C. 106 and made several significant changes to the requirements for major projects. Major projects have a total estimated cost of $500 million or more and receive financial assistance from the federal government. In compliance with the major project requirements, FHWA has identified operationally independent phases of work for the IL 29 study that could be built and function as feasible transportation facilities, even if the rest of the work described in the Final EIS is never built. The sections are described in detail in the Operational Independence Justification Report accepted by FHWA.

FHWA identified four operationally independent project sections for the IL 29 study:

- Section 1—IL 6 to Cedar Hills Drive (construction cost $53 million)
- Section 2—Cedar Hills Drive to existing IL 29 north of Chillicothe (construction cost $180 million)
- Section 3—Existing IL 29 north of Chillicothe to IL 17 in Sparland (construction cost $380 million)
- Section 4—IL 17 in Sparland to I-180 (construction cost $210 million)

Environmental commitments described in this Final EIS will be implemented as part of each operationally independent phase of work that is built. The four operationally independent project sections were identified to address existing problems and future needs identified in

the Purpose and Need statement for the study. Each operationally independent project section will provide immediate travel related benefits. Those benefits will compound as additional operationally independent project sections are completed. There are no additional environmental impacts associated with the implementation and construction of the project in operationally independent phases of work.

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SECTION 3

Affected Environment, Environmental Consequences, and Measures to Minimize Harm

This section describes the socioeconomic and natural resources in the project area. It also identifies the effects the Preferred Alternative may have on those resources and measures to minimize adverse effects. The discussion of existing conditions/characteristics and impacts is arranged by the following 17 topics. Applicable project alternatives are addressed within each topic.

- Social/Economic Setting
- Agriculture
- Culture
- Air Quality
- Noise
- Geology and Soils
- Surface Water Resources/Quality
- Wetlands
- Floodplains
- Upland Plant Communities
- Wildlife Resources
- Threatened and Endangered Species
- Designated Lands
- Special Wastes
- Permits and Certifications
- Visual Resources
- Section 4(f)

Each subsection provides an analysis of direct impacts associated with the Preferred Alternative. This section also considers the indirect (secondary) effects of the project as well as cumulative effects that might occur because of other actions or projects within the general project area.

The indirect and cumulative analyses were prepared in accordance with the requirements of NEPA (National Environmental Policy Act) and guidance from the Council on Environmental Quality, *Considering Cumulative Effects under the National Environmental Policy Act.* The Council on Environmental Quality defines direct, indirect, and cumulative impacts as:

- **Direct impacts** are caused by the action and occur at the same time and place (Title 40, *Code of Federal Regulations,* 1508.8).

- **Indirect impacts** "are caused by an action and are later in time or further removed in distance but are still reasonably foreseeable" (Title 40, *Code of Federal Regulations*, 1508.8). They may include growth-inducing effects related to changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems. Indirect impacts associated with highway improvements are those that affect the natural or built environment beyond the immediate "footprint" of the highway improvements. An example of an indirect impact is the loss of agricultural land at an interchange to the development of service stations, restaurants, and motels after it is constructed.

- **Cumulative impacts** "result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions regardless of what agency

(federal or non-federal) or person undertakes such other actions" (Title 40, *Code of Federal Regulations*, 1508.7). They can result from individually minor but collectively significant actions taking place over a period of time. For example, degradation of a stream's water quality by several developments that taken individually would have minimal effects but collectively would cause a measurable negative impact is considered a cumulative effect. The cumulative effects of an action may be undetectable when viewed in the individual context of direct and even indirect impacts, but nonetheless can add to other disturbances and eventually lead to a measurable environmental change.

The assessment of indirect and cumulative impacts focuses on the area of potential traffic movement and development influence of the proposed alternatives (Exhibit 3-1), under topical areas as appropriate. In June 2004, the indirect and cumulative impacts analysis area shown in Exhibit 3-1 was sent to review agencies for comment. Past trends in development and natural resource use in the study area were identified. Reasonably foreseeable development within the area was described and used to determine a probable future environment. The project design year (2032) was used to analyze indirect and cumulative impacts. Indirect and cumulative effects are discussed for the following topics:

- Agriculture
- Surface Water Resources/Quality
- Wetlands
- Upland Plant Communities
- Wildlife Resources
- Designated Lands

3.1 Geographic Setting

The IL 29 project area spans parts of Peoria, Marshall, Putnam, and Bureau counties in central Illinois (Exhibit 3-2). It passes through 10 townships and encompasses 8 communities: Chillicothe, Mossville, Rome, Hopewell, Sparland, Lacon, Henry, and Putnam. The project area, which extends approximately 35 miles from the IL 6 interchange north of Peoria to a point on I-180 0.5 mile north of the IL 29/Kentville Road intersection, generally is bounded by the bluff and farmlands on the west and the Illinois River on the east. The topography from Chillicothe to Camp Grove Road along IL 29 and east to the Illinois River generally slopes downward toward the river. In the south and north section, the topography on the east and west side is flat to gentle, rolling farmland. The bluffs rise in many locations along the corridor almost immediately west of the highway. Elevations range from 700 feet (National Geodetic Vertical Datum) at the top of the bluffs to 445 feet at the southern terminus by the Illinois River. This part of Illinois marks the farthest reach of the Wisconsinan glaciers that originated north and east of the state. As the ice walls melted, rock rubble piled up along its edges creating the moraines (bluffs) found in the study area.[1]

[1]IDNR, Office of Realty and Environmental Planning. 1998.*The Illinois River Bluffs, An Inventory of the Region's Resources*.

3.2 Social / Economic Setting

3.2.1 Affected Environment

3.2.1.1 Demographics

Population. The population of the 4-county area declined slightly (-2.6 percent) between 1960 and 2000. In contrast, the state of Illinois experienced a 23.2-percent increase in population during the same period (Table 3-1). Looking at county data over the 40-year period, Putnam is the only county in which the 2000 population was greater than the 1960 population. The population of Putnam County increased by 33.2 percent between 1960 and 2000, but Putnam County is the least populated of the 4 counties.

TABLE 3-1
County Population Trends

						Percent Population Change				
County	**1960**	**1970**	**1980**	**1990**	**2000**	1960–70	1970–80	1980–90	1990–2000	1960–2000
Peoria	189,044	195,318	200,466	182,827	183,433	3.3	2.6	-8.8	0.3	-3.0
Marshall	13,334	13,302	14,479	12,846	13,180	-0.2	8.8	-11.3	2.6	-1.2
Putnam	4,570	5,007	6,085	5,730	6,086	9.6	21.5	-5.8	6.2	33.2
Bureau	37,594	38,541	39,114	35,688	35,503	2.5	1.5	-8.8	-0.5	-5.6
Total	244,542	252,168	260,144	237,091	238,202	3.1	3.2	-8.9	0.5	-2.6
Illinois	10,081,158	11,110,285	11,427,409	11,430,602	12,419,293	10.2	2.9	0.03	8.6	23.2

Source: U.S. Bureau of the Census, Census of Population and Housing 1960, 1970, 1980, 1990, 2000.

Between 1960 and 1980, population in Peoria, Putnam, and Bureau counties steadily increased. Marshall County experienced a slight population decline between 1960 and 1970. During the recession of the early 1980s, all 4 counties combined lost more than 23,000 residents, or 9 percent of their population. Between 1990 and 2000, the population of the four-county area increased by 0.5 percent, from 237,091 to 238,202. The 2000 population in the four-county area is still less than what it was in 1960 (Table 3-1).

Table 3-2 summarizes projected county population through 2020. Population is forecast to increase in Marshall and Peoria counties, and moderate population declines are forecast for Bureau and Putnam counties.

The six[2] incorporated communities within the project area had a combined 2000 population of 13,191 (Table 3-3). The largest community in the project area is Chillicothe (with a population of nearly 6,000), followed by Henry, Lacon, and Rome (with populations ranging from 1,776 to 2,540). Sparland and Hopewell have fewer than 1,000 residents each. Between 1990 and 2000, Sparland, Chillicothe, and Hopewell increased in population, whereas Lacon, Henry, and Rome declined slightly.

[2]The Town of Rome is not formally incorporated; however, the U.S. Census Bureau has identified the Town of Rome as a "census designated place," the equivalent of a legally incorporated village or city.

TABLE 3-2
Study Area Projected Population (2000–2020)

County	2000 Population	2005 Projection	2010 Projection	2015 Projection	2020 Projection	% Change 2000–2020
Peoria	183,433	187,738	188,473	189,447	189,271	3.2
Marshall	13,180	13,182	13,199	13,401	13,852	5.1
Putnam	6,086	5,802	5,817	5,847	5,886	-3.3
Bureau	35,503	35,453	35,002	34,673	34,388	-3.1
State of Illinois	12,419,293	12,382,632	12,689,367	13,011,264	13,295,586	7.1

Source: Office of Policy, Development, Planning and Research; Illinois Department of Commerce and Economic Opportunity Web site (http://www.illinoisbiz.biz/bus/research/econ/population_index.html).

TABLE 3-3
Population Trends for Project Area Townships and Incorporated Communities

	Township		City or Village		% Population Change 1990–2000
	1990	2000	1990	2000	
Peoria County					
Chillicothe Township	8,241	8,233			-0.1
City of Chillicothe		5,959		5,996	0.6
Rome		1,902		1,776	-6.6
Hallock Township	1,499	1,532			2.2
Medina Township	6,140	6,388			4.0
Mossville	NA		NA		
Marshall County					
Henry Township	2,884	2,865			-0.7
City of Henry			2,591	2,540	-2.0
Steuben Township	1,204	1,328			10.3
Village of Hopewell			343	396	15.5
City of Sparland			412	504	22.3
Whitefield Township	372	376			1.1
Lacon Township	2,478	2,492			0.6
City of Lacon			1,986	1,979	-0.4
Putnam County					
Senachwine Township	527	685			30.0
Putnam	NA		NA		
Bureau County					
Arispie Township	854	835			-2.2
Leepertown Township	384	408			6.3
Total				13,191	

Source: U.S. Bureau of the Census 1990 and 2000.
NA = unincorporated community; data unavailable.

In 2000, 3.5 percent of Bureau County's residents were located in the 2 townships within the project area; 53.6 percent of Marshall County's residents were located in the 4 townships within the project area; 8.8 percent of Peoria County's residents were located in the 3 townships within the project area; and 11.3 percent of Putnam County's residents were located in the 1 township within the project area (Exhibit 3-3).

Households. The number of households increased and the average household size decreased in all four counties, as well as in each project-area township and incorporated community between 1990 and 2000. This mirrors the state trend.

Age Distribution. In 2000, 25 percent of the 4-county population was under the age of 18; 60 percent was between the ages of 18 and 64; and 15 percent was over the age of 65. In most of the project-area townships and incorporated communities, the median age is higher than the statewide median age.

The median age in Sparland is lower than that in any other project-area township or incorporated community, as well as slightly lower than the statewide median age (34.4 versus 34.7). Sparland also has a greater percent of residents under 18 than other townships and incorporated communities in the study area. Lacon has the highest median age of the incorporated communities in the study area, as well as the smallest percentage of residents under 18. Hopewell has the smallest percentage of residents 65 years or older (6.1 percent).

Housing Units. Residential areas are concentrated primarily in the communities, with rural residences (farmsteads) scattered throughout the project area. Residential areas are, for the most part, older single-family residences and mobile homes. There are, however, newer residences (homes built within the last 25 years) in the project area, including those on the west side of the City of Chillicothe and subdivisions west of Chillicothe, in the Village of Hopewell and on the northwest side of Henry.

Communities within the project area have a limited inventory of multifamily residences. The City of Henry has Country View Apartments (just west IL 29 on the south edge of town), two quadplexes south of Western Avenue and west of IL 29 and senior citizen apartments (Indian Town Homes) east of IL 29 and north of Henry High School. There is no multifamily housing in Chillicothe near the Preferred Alternative.

Home ownership rates in Bureau, Marshall, and Putnam counties are greater than the statewide average, whereas the rate in Peoria County is comparable (Table 3-4). The 2000 median value of owner-occupied housing units ranged from $75,900 in Marshall County to $89,100 in Putnam County (Table 3-4). The median value of owner-occupied units in all four counties is less than the state median value of $130,800.

Racial and Ethnic Characteristics. In Bureau, Marshall, and Putnam counties, more than 97 percent of residents are white. Peoria County is more diverse, with approximately 80 percent of the residents white and 20 percent minority residents. Within the four-county area, there are 5,892 people of Hispanic origin, representing 2.5 percent of the population. Almost two-thirds of the residents of Hispanic origin are located in Peoria County, but Bureau County has a higher percentage of persons (relative to total population) of Hispanic origin than the other counties in the project area (Table 3-5). In 9 of the project area's 10 census tracts, the white population ranges from 95.2 to 99.1 percent (Table 3-6). Exhibit 3-3 illustrates the census tracts in the project area.

TABLE 3-4
County Housing Characteristics

County	Housing Units	Homeownership Rate	% of Homes Built before 1960
Peoria County	78,204	67.7	50.8
Chillicothe Township	3,473	77.5	51.1
City of Chillicothe	2,544	74.7	53.9
Rome	746	85.1	45.4
Hallock Township	554	92.6	32.2
Mossville	NA	NA	NA
Medina Township	2,521	86.6	22.7
Marshall County	5,914	80.1	56.5
Henry Township	1,286	78.0	59.7
City of Henry	1,085	78.1	64.0
Steuben Township	528	85.8	38.1
Village of Hopewell	142	99.3	0.0
Village of Sparland	204	78.9	63.7
Whitefield Township	156	78.1	67.1
Lacon Township	1,068	80.4	60.2
City of Lacon	852	77.2	70.6
Putnam County	2,888	82.6	42.9
Senachwine Township	553	87.5	17.2
Putnam	NA	NA	NA
Bureau County	15,331	76.0	64.4
Araspie Township	360	78.6	58.8
Leepertown Township	179	78.1	72.4
State of Illinois	4,885,615	67.3	47.0

Source: U.S. Bureau of the Census 2000.

TABLE 3-5
Population by Race

	Total Population	White[a]		Black or African-American		American Indian and Alaska Native Persons[a]		Asian or Pacific Islander[a]		Some Other Race		Hispanic or Latino[b]	
		Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Peoria County[c]	181,676	145,646	80.2	29,533	16.3	367	0.2	3,118	1.7	4,769	2.6	3,852	2.1
Chillicothe Township	8,233	8,034	97.6	19	0.2	17	0.2	20	0.2	143	1.7	235	2.9
City of Chillicothe	5,996	5,840	97.4	13	0.2	10	0.2	12	0.2	121	2.0	210	3.5
Rome	1,776	1,744	98.2	5	0.3	0	0.0	8	0.5	19	1.1	22	1.2
Hallock Township	1,532	1,497	97.7	5	0.3	6	0.4	17	1.1	7	0.5	15	1.0
Medina Township	6,388	6,182	96.8	51	0.8	14	0.2	86	1.3	55	0.9	38	0.6
Marshall County	13,180	12,941	98.2	46	0.3	29	0.2	34	0.3	130	1.0	138	1.0
Henry Township	2,865	2,795	97.6	17	0.6	6	0.2	8	0.3	39	1.4	17	0.6
City of Henry	2,540	2,481	97.7	13	0.5	5	0.2	5	0.2	36	1.4	16	0.6
Steuben Township	1,328	1,310	98.6	8	0.6	1	0.1	1	0.1	8	0.6	17	1.3
Village of Hopewell	396	391	98.7	3	0.8	0	0.0	1	0.3	1	0.3	4	1.0
Village of Sparland	504	499	99.0	0	0.0	0	0.0	0	0.0	5	1.0	8	1.5
Whitefield Township	376	374	99.5	0	0.0	1	0.3	0	0.0	1	0.3	4	1.1
Lacon Township	2,492	2,473	99.2	2	0.1	2	0.1	4	0.2	11	0.4	23	0.9
City of Lacon	1,979	1,961	99.1	2	0.1	2	0.1	4	0.2	10	0.5	18	0.9
Putnam County[d]	6,124	5,940	97.0	37	0.6	18	0.3	18	0.3	67	1.1	170	2.8
Senachwine Township	685	662	96.6	3	0.4	0	0.0	1	0.1	19	2.8	22	3.2
Bureau County	35,503	34,365	96.8	116	0.3	61	0.2	192	0.5	769	2.2	1,732	4.9
Araspie Township	835	813	97.4	1	0.1	4	0.5	7	0.8	10	1.2	14	1.7
Leepertown Township	408	398	97.5	0	0.0	5	1.2	0	0.0	5	1.2	39	9.6
State of Illinois	12,482,301	9,128,180	73.1	1,875,313	15.0	24,839	0.2	422,256	3.4	720,319	5.8	1,527,573	12.2

Source: U.S. Bureau of the Census 2000.

[a]Includes persons reporting only one race.
[b]Hispanics may be of any race, so also are included in applicable race categories.
[c]Mossville: unavailable.
[d]Putnam: unavailable.

TABLE 3-6
Racial Characteristics by Census Tract

Census Tract	% White	% Minority	% Hispanic Origin (may be any race)
Bureau County			
9650	89.7	10.2	24.3
9655	98.1	1.9	0.6
Marshall County			
9612	97.6	2.4	0.6
9613	98.0	2.0	1.3
9614	99.1	1.0	0.8
Peoria County			
0034.02	95.2	4.9	1.0
0036.01	98.4	1.6	1.4
0036.02	97.3	2.7	3.5
0037	98.4	1.7	0.6
Putnam County			
9546	97.2	2.7	1.8

Source: U.S. Bureau of the Census 2000.

Note: Percentages may exceed 100% as the Census allowed individuals to report more than one race.

TABLE 3-7
Income Characteristics by Census Tract

Census Tract	Median Family Income	% Families below Poverty Level
Bureau County		
9650	$42,140	8.0
9655	$49,226	6.1
Marshall County		
9612	$49,306	6.2
9613	$51,354	2.3
9614	$48,846	2.2
Peoria County		
0034.02	$90,036	1.3
0036.01	$49,250	2.6
0036.02	$51,067	5.6
0037	$68,750	0.0
Putnam County		
9546	$51,273	3.7

Source: U.S. Bureau of the Census 2000.

Census Tract 9650 in Bureau County (at the northern terminus of the project) has a minority population of 12 percent. The census category "Hispanic or Latino" is not regarded as a racial classification, only an indicator of origin. It should be noted that there are no residents living along IL 29 in the part of Bureau County within the project area.

Income Characteristics. Tables 3-7 and 3-8 summarize the median incomes in the study area. The only incorporated community in the study area in which the median family income exceeds the state median family income is Hopewell, where the median family income is $71,250. Sparland has the lowest median family income ($36,759). The percent of families living below poverty level for the state is 7.8 percent. The 2000 Census poverty level for a family of four is $17,029. The 2008 Health and Human Services Poverty Guideline for a family of four is $21,200. Most counties, townships, and incorporated communities in the project area have a lower percentage of families living below the poverty level than the state. Exceptions are Peoria County (where 10 percent of families are below poverty level) and Sparland (where 9.2 percent of families are below poverty level).

Median family income is greater than the state median family income of $55,545 in 2 of the 10 census tracts in the project area (Table 3-7). In the rest of the project area, median family income is slightly lower than the state median. In only one census tract (9650 in Bureau County), the percent of families below poverty level is slightly higher than that of the state (8.0 versus 7.8).

TABLE 3-8
Income Characteristics by Township and Community

	Median Family Income	% Families below Poverty Level
Peoria County[a]	$50,592	10.0
Chillicothe Township	$50,302	4.7
City of Chillicothe	$50,981	5.1
Rome	$46,250	3.7
Hallock Township	$78,201	0.0
Medina Township	$68,943	2.3
Marshall County	$48,061	3.8
Henry Township	$50,242	5.8
City of Henry	$50,375	5.7
Steuben Township	$55,500	3.4
Village of Hopewell	$71,250	0.0
Village of Sparland	$36,750	9.2
Whitefield Township	$63,281	0.0
Lacon Township	$48,301	2.7
City of Lacon	$47,670	3.6
Putnam County[b]	$50,708	4.2
Senachwine Township	$49,393	4.7
Bureau County	$48,488	5.4
Araspie Township	$48,295	5.2
Leepertown Township	$45,357	1.9
State of Illinois	$55,545	7.8

Source: U.S. Bureau of the Census 2000.
[a]Mossville: unavailable.
[b]Putnam: unavailable.

3.2.1.2 Economic

Employment Status. The job market in the study area has improved steadily during the last two decades, mirroring the statewide trend.

According to the Illinois Department of Employment Security (IDES), in 2000 the total labor force[3] in the four-county area was 128,076. Peoria County represented 73 percent of the labor

[3]IDES methodology defines the labor force as all civilian, noninstitutionalized, working age individuals (age 16+) who were employed or who were without employment but available and actively looking for work. The employed include those workers who worked at least 1 hour for pay or profit, were temporarily away from work due to reasons such as labor disputes, vacation, or illnesses, or worked at least 15 unpaid hours in a family business. No distinction is made among those who work full-time or part-time, are self-employed, or receive government assistance while working. The unemployed include those who lost their jobs involuntarily, quit their jobs, entered the labor market for the first time or reentered the labor market after a period of absence, or had been laid off but are expected to be recalled. Those not counted as either employed or unemployed are considered not to be in the labor force. This category includes people who want a job and those who do not.

force, followed by Bureau County with 15 percent. Marshall and Putnam counties had smaller labor forces, each accounting for approximately 5 percent of the 4-county workforce. Within the four-county area labor force, 122,402 were employed, translating to a 4.4 percent unemployment rate. This matched the state's average unemployment rate (Table 3-9).

Looking at 2000 data for each county, Peoria and Marshall counties had unemployment rates below the statewide rate of 4.4 percent, whereas Bureau and Putnam counties had unemployment rates that were slightly higher than the statewide unemployment rate. Overall, the unemployment rates for all four counties and the state have been steadily declining since the 1980s.

Employment by Industry. In 2000, total employment (jobs)[4] in the four-county area was 154,125 (Table 3-10). Peoria County accounted for the majority (82 percent) in the four-county area, followed by Bureau County (12 percent), Marshall County (4 percent), and Putnam County (2 percent).

Peoria County has a greater percentage of its workforce in services and retail trade than Marshall, Putnam, and Bureau counties. Those counties have higher percentages of employment devoted to the farm and manufacturing sectors.

Between 1980 and 2000, Peoria County's economy saw a shift from manufacturing to a service and retail trade economy. From 1980 to 2000, Peoria County's total employment grew by 11.3 percent. Over that 20-year period, losses occurred in the mining, manufacturing, farm employment, and wholesale trade sectors. The services sector saw a large increase in terms of both employment and total employment. (In absolute numbers, this sector saw an 80 percent increase over the 20-year period and also an increase from 25 to 40 percent of total county employment.)

Marshall County experienced the largest increase in total employment between 1980 and 2000 (21.3 percent). Most of its growth occurred in the services and construction sectors. Over the same period, farm employment was the only sector to decline in total employment.

Bureau County's total employment grew by 12.7 percent between 1980 and 2000. Farm employment and manufacturing sectors lost employment, whereas all others gained. In 1980, farm employment accounted for 15.6 percent of all employment, but by 2000 it accounted for 11.1 percent. Similarly, manufacturing declined from 18.6 percent in 1980 to 13.6 percent in 2000.

Putnam County's total employment increased by 17.7 percent between 1980 and 2000. Manufacturing employment experienced only a small decline during the 20-year period, and remains the largest employment sector in the county, followed by farm employment, which increased about 30 percent in employment over the 20-year period.

Although quarrying is a visible and prominent land use along the project corridor and there are plans to expand several existing quarries, the mining sector employs less than 1 percent in the project-area counties.[5]

[4]Bureau of Economic Analysis (BEA) employment estimates measure the number of jobs in a county, instead of the number of workers who perform the jobs. County employment estimates are estimated on a full-time and part-time basis because of the limitations of the available source data. Therefore BEA employment data differ from IDES employment data.

[5]Data are for 1990, the last year for which data are available for the entire project area.

TABLE 3-9
Employment Status by County

	1980			1990			2000			% Change in Labor Force		
	Labor Force	**Number Employed**	**Unempl. Rate**	**Labor Force**	**Number Employed**	**Unempl. Rate**	**Labor Force**	**Number Employed**	**Unempl. Rate**	**1980–1990**	**1990–2000**	**1980–2000**
Peoria County	97,478	89,304	8.4	89,233	84,097	5.8	98,026	93,851	4.3	-8.5	9.9	0.6
Marshall County	7,670	7,130	7.0	6,159	5,866	4.8	6,893	6,622	3.9	-19.7	11.9	-10.1
Putnam County	2,696	2,404	10.8	2,833	2,617	7.6	3,428	3,256	5.0	5.1	21.0	27.2
Bureau County	17,091	15,453	9.6	17,028	16,013	6.0	19,729	18,673	5.4	-0.4	15.9	15.4
Illinois	5,552,000	5,093,000	8.3	5,916,000	5,547,000	6.2	6,419,300	6,139,900	4.4	6.6	8.5	15.6

Source: Illinois Department of Employment Security 2003.

TABLE 3-10
Total Employment by County

County	1980	1990	2000	Percent Change 1980–1990	1990–2000	1980–2000
Peoria	113,859	114,394	126,693	0.5	10.8	11.3
Marshall	4,713	5,137	5,715	9.0	11.3	21.3
Putnam	2,667	3,124	3,139	17.1	0.5	17.7
Bureau	16,487	17,064	18,578	3.5	8.9	12.7
Total	137,726	139,719	154,125	1.4	10.3	10.3

Source: U.S. Department of Commerce, Bureau of Economic Analysis, October 2003.

Location of Employment. Between 1990 and 2000, the number of workers in all study area counties increased, as did the number of workers working outside their county of residence (Table 3-11). According to census data, in 2000, more than half of the workers in Marshall and Putnam counties worked outside their county of residence, and 37 percent of workers in Bureau County worked outside theirs. In contrast, most of residents in Peoria County (85 percent) were employed inside the county in 2000.

TABLE 3-11
Employee Travel Characteristics for 1990 and 2000

County	Number of Workers 1990	Number of Workers 2000	Worked Outside County 1990	Worked Outside County 2000	Percent of Total 1990	Percent of Total 2000
Peoria	80,525	84,003	11,542	12,492	14.3	14.9
Marshall	5,765	6,492	2,502	3,292	43.4	50.7
Putnam	2,599	2,777	1,351	1,662	52.0	59.8
Bureau	16,015	17,184	4,868	6,337	30.4	36.9

Source: U.S. Bureau of the Census 1990 and 2000.

Employers. Employment concentrations occur along the corridor near each community. Between communities, the areas along the corridor are either farmed or state-owned lands (conservation and recreation areas). Various businesses are found throughout the corridor, including industrial, commercial, and private recreation facilities. Businesses near to the Preferred Alternative are discussed in the following paragraphs. Exhibit 3-4 indicates the locations of major area employers.

The Mossville Caterpillar Plant, which manufactures heavy earthmoving equipment, is the largest employer in the project area, with an estimated 5,000 people engaged in marketing, research, design, and manufacturing at the company's Design Center and Tech Center at the intersection of Cedar Hills Drive and Old Galena Road. The 7-acre Mossville Industrial Park is located on Old Galena Road north of the Caterpillar plant. Inventory Technology Inc., a contract packager that ships a wide variety of parts worldwide, is the park's principle tenant. Roanoke Concrete Products is also located there. Buckeye Terminal, which provides bulk storage services and throughput services for refined petroleum products, is located just north of the industrial park.

There is a wide variety of commercial activity in Chillicothe that is not near the Preferred Alternative. Much of the land north of Chillicothe contains active and former gravel mines. Riverside Materials gravel mining and processing company is located on the east side of IL 29, and Galena Road Gravel is located on Truitt Road west of IL 29 and Chillicothe. Crushed stone and ground limestone is mined for use in producing cement, agricultural lime, ballast and construction aggregates. Located just north of the Burlington North Santa Fe (BNSF) railroad tracks is the Chillicothe Recreation Area, a former gravel mine area (owned by Galena Road Gravel) that was converted to a private recreation area. Facilities include camp sites and swimming, scuba, and boating opportunities. Chilli Paintball Pits, another private recreation facility, is also located near the former and current gravel mining locations. It is accessed from IL 29 just north of the BNSF railroad viaduct. Chillicothe Driving Range and Baseball Field (private recreation facility) is located on the east side of IL 29, just north of Yankee Lane. Neighborhood Camp House, a nature camp for school age children, is located on the west side of IL 29 off of Yankee Lane.

Sparland's small commercial area is located on the east side of IL 29. Businesses in this area include the post office, an ATM machine, a candle store, a woodworking shop, and a bar.

In Henry, there are numerous businesses along IL 29 including M&D Printing (one of the larger employers in the study area), two car dealerships, an auto wrecker service, truck rental facility, Read Brothers (farm implements), AgView Coop FS, Illini Hardwood Lumber Company, two gas stations (Casey's and Fast Stop Gas Station), a pharmacy, a dollar store, a bowling alley, mini-storage facilities, an insurance agency, and a fast food restaurant. Henry's downtown is located east of the project area.

The 219-acre Henry Industrial Park or "City Farm," located on the Illinois River east of IL 29 in Henry, contains Noveon (producer of advanced specialty chemicals, polymer-based formulations, and chemical additives for a consumer and industrial applications), PolyOne (polymer services company, including polymer, elastomer, colorant, and additive products), Henry Wastewater Treatment Plant, United Suppliers, and Koch Nitrogen. An ethanol plant may locate in the industrial park. There is also potential for a sand quarry near the industrial park. A new harbor may be developed in the industrial park with either of the proposed projects.

Businesses in Putnam (all on IL 29) include Rumhold and Huhn Grain Elevator, an upholstery shop, and Brewmaster's Supper Club.

Condit's Ranch, located on Log Cabin Hill Road west of IL 29, is a private campground facility. It has RV sites, primitive camping sites, lakes, and other recreational activities.

A commercial area is located on the east side of IL 29 and the Illinois River in Lacon. Commercial businesses front IL 17, as well as along the arterial streets adjacent to IL 17 in the downtown area. Businesses include a mix of commercial and retail shops such as a bakery, restaurants, doctors' offices, and specialty and antique shops.

Table 3-12 lists major employers in the study area by community. Three are located in or near the project corridor: Caterpillar's Mossville Facility (5,000 employees), M&D Printing (88 employees), and Read Brothers (36 employees).

TABLE 3-12
Major Employers, IL 29 Study Area

Location	Employer	Product/Service	No. of Employees
Mossville	Caterpillar	Equipment manufacturer	5,000
Chillicothe	Butler Technical Group	Engineering, support	250–500
	Mediacom	Cable company	234
	J. T. Fenell	Steel fabrication	100
	Allied Welding Co.	Steel fabrication	65
	Chillicothe Metal	Custom metal cabinetry	45
Lacon	Meta-Tec	Machining, production	120
	St. Joseph's Home	Extended Care	95
Henry	Poly One	Chemicals	105
	Noveon	Chemicals	91
	M&D Printing	Printing, publishing	88
	Read Bros.	Hardware, implements	36

Source: Illinois Department of Commerce and Economic Opportunity Community Profiles for Chillicothe, Henry, and Lacon; 2003; Economic Development Council for Central Illinois.

3.2.1.3 Neighborhoods

Concentrations of residential development are found throughout the project corridor, for the most part within the 8 communities along IL 29. In the southern section of the project area, residential subdivisions have developed outside (west of) the project area communities. Because IL 29 parallels the Illinois River, most of the residential development on the west side of the Illinois River is also west of IL 29. This subsection discusses the residential development of each community and in unincorporated areas near the Preferred Alternative. It addresses developments related to the proposed alignment, the size of the development, and current access to IL 29. The locations of residential concentrations in the project corridor are depicted on the Aerial Exhibit.

Mossville, Rome, and Chillicothe are located at the south end of the project area. The residential community of Mossville is located predominantly on the east side of the project's southern terminus at IL 6. Residents access IL 29 from several streets, including Mossville Road. The residential community of Rome is predominantly west of IL 29, about 1 mile east of the proposed Wayne Road extension. Rome has a frontage road on each side of IL 29. Residents access IL 29 from several streets, including Knox Street and Cambron Road. Chillicothe's residential concentration nearest the Preferred Alternative is located between Cloverdale Road and Sycamore Street. On the north side of Cloverdale Road, residential neighborhoods extend from IL 29 to about 1,490 feet from the proposed Cloverdale Road overpass. On the south side of Sycamore Street about 0.5 mile from the proposed Sycamore Street overpass, a new subdivision, Sycamore Trail, is under construction. When complete, the subdivision will consist of 50 single-family homes.

Other prominent residential concentrations near the Preferred Alternative in the south section include five subdivisions. Farthest south is Hidden Valley (20 homes), a single-

family subdivision southwest of Rome about 3,000 feet from the proposed mainline alignment. Residents access IL 29 from Wayne Road. Pinewood Estates (204 homes) is a high-density mobile home community located west of Rome, 2,196 feet west of the proposed Rome West Road interchange. Residents access IL 29 using Rome West Road. Galena Knolls Subdivision (84 homes) is also west of Rome off of Rome West Road. The entrance to Galena Knolls is 1,785 feet east of the proposed Wayne Road extension. Timberwalk Subdivision (19 homes) is a low-density single-family home subdivision located west of Chillicothe, about 900 feet north of the proposed McGrath Street interchange. Residents of the subdivision access IL 29 from Krause Road or Cloverdale Road to its north. North of the Galena Road gravel quarry on Hart Lane is Fawn Hills (50 homes), a low-density subdivision of single-family homes 1,583 feet from the proposed mainline alignment. Residents access IL 29 from Ratliff Road.

The village of Hopewell is located west of IL 29. Residents access IL 29 from Hopewell Drive to the east and Hardscrabble Road to the south. IL 29 bisects the city of Sparland. Most residents live on the west side of the community and access IL 29 from several roads, including Willow Road, Elm Street, North Street, and IL 17. Approximately 1.5 miles east of Sparland and across the Illinois River is Lacon. Lacon's residential community surrounds its downtown, which is located along IL 17. Residents access IL 29 by crossing the river on IL 17.

In Henry the Preferred Alternative is on new alignment approximately 0.5 mile west of IL 29. Henry's residential community is predominantly east of IL 29. Residents can access IL 29 from several roads including Western Avenue/County Highway 6, Old Indian Road/1400N, and Whitefield Road/1450N.

Putnam is the northernmost community in the project area. Its residential community is predominantly on the west side of IL 29 and residents access IL 29 from High Street, Main Street, Courtland Street, Douglas Street, and Bradford Street. A small cluster of residences is located east of IL 29 and the grain elevator.

A residential development, Valley View Ridge, is proposed north of Putnam and south of Senachwine Valley Road (west of IL 29). When completed, it would consist of nine single-family residences on medium-sized lots. No timeline for completion has been established.

3.2.1.4 Public Facilities / Services

This subsection identifies the public facilities and services that serve the residents of the project area. Services include health care facilities, fire and police departments, rescue units, churches, cemeteries, and others.

Health Care. There are no hospitals within the project area, but five hospitals in the region serve area residents. Three hospitals in Peoria—Proctor, Methodist, and St. Francis—serve Peoria and Marshall counties. Illinois Valley Community Hospital and St. Margaret's Hospital in Spring Valley serve Putnam and Bureau counties. Three medical centers and skilled nursing facilities also serve the area. The Parkhill Medical Complex in south Chillicothe is a skilled nursing facility. Chillicothe is also served by the Chillicothe Valley Medical Center, a family practice located in south Chillicothe on the east side of IL 29.

Heartland Health Care Center is located on the north side of Henry east of IL 29. It is an assisted retirement and skilled nursing center. No other hospitals, medical centers, or skilled nursing facilities are located near the Preferred Alternative.

Emergency Services. The Chillicothe Fire Department, Chillicothe Community Fire Department Inc., and Rescue 33 Ltd. provide fire protection and rescue services to the southern half of the project area, including Mossville, Rome, Chillicothe, and Hopewell. The rest of the study area is served by the Lacon-Sparland Fire Department, Lacon-Sparland Rescue Unit 52, Henry Fire Protection District, Princeton Fire and Rescue Department, and Tiskilwa Fire Protection District.

The Putnam Unit of the Henry Fire Protection District and the Chillicothe Community Fire Department's Station 5 in Mossville and Station 4 in Rome are near the Preferred Alternative.

Six law enforcement agencies serve residents of the project area. The Peoria County Sheriff serves the towns of Chillicothe, Rome, and Mossville. Chillicothe also is served by the Chillicothe Police Department. The Marshall County Sheriff serves Lacon, Sparland, Hopewell, and Henry. In addition, Lacon is served by the Lacon Police Department and Henry by the Henry Police Department. The Putnam County Sheriff provides services to the residents of Putnam. None of the facilities is near the Preferred Alternative.

Schools. There are 4 school districts and 12 school facilities within the project corridor. The Mossville Grade School, Illinois Valley High School, Sparland Elementary School/Midland Middle School, and Henry Senachwine High School are near the project corridor (Aerial Exhibit).

Churches and Cemeteries. There are 14 churches within the project corridor: Mossville Methodist Church, Calvary Baptist Church, Chillicothe Bible Church, Chillicothe Christian Church, Plymouth Congregational Church, Vineyard Community Church, St. Francis Episcopal Church, Jehovah's Witnesses, Richland Seventh Day Adventist, First Baptist Church, Fellowship Baptist Church, Good Shepherd Baptist, Henry Apostolic Tabernacle, and Putnam Christian Church.

There are 12 cemeteries within the project corridor: St. Joseph Cemetery, La Salle Cemetery, Chillicothe Cemetery, Root Cemetery, Hammett Cemetery, Sparland Cemetery, Bonham Cemetery, Calvary Cemetery, St. Patrick Cemetery, Henry Cemetery, Hoyt Cemetery, and Putnam Cemetery (Aerial Exhibit).

Other Public Facilities. Governmental and public facilities within the project area include the Village Hall and Post Office in Sparland, the Marshall-Putnam Fairgrounds in Henry, Senachwine Township Hall and Garage, Condit House Memorial Library, and the Post Office in Putnam.

3.2.1.5 Land Use and Zoning

Existing Land Use. Land use in the project corridor is influenced primarily by the Illinois River and the area's suitability for agriculture. Agriculture, followed by other development concentrations and environmentally sensitive areas, dominate land use on both sides of IL 29.

The communities of Mossville, Rome, and Chillicothe at the south end of the project area undergo changes in land use as agricultural lands at the edges of the communities convert

to urban land use (industrial, commercial, and residential subdivisions). Land use in the area generally consists of open space and recreational uses such as Camp Wokanda and Singing Woods Nature Preserve in the wooded bluff to the west; older residential and commercial developments along existing IL 29 paralleling the Illinois River to the east; and the area in between that is predominantly farmland, with some industrial development along Old Galena Road. The industrial developments along Old Galena Road on the north side of Mossville include Caterpillar's manufacturing and research complex, the Mossville Industrial Park, and Buckeye Terminal's petroleum throughput and storage facility. Just north of the industrial sites on Old Galena Road is the Audubon Wildlife Area, currently farmed land. In Rome, most commercial and residential development is clustered along IL 29. Some residential development is locating west of IL 29.

Chillicothe's primary business areas are located along IL 29 and Truitt Road. Quarry operations, such as Galena Road Gravel and Riverside Materials, are located north of town on both sides of IL 29. Major recreational land uses are found on the south side of town at Three Sisters Park and on the north side of town at the Chillicothe Recreation Area. Three Sisters Park is a privately owned 400-acre site operated as a living historic farm for educational, recreational, and conservation purposes. The Chillicothe Recreation Center is located on former gravel pits and offers opportunities for camping and paintball. Established residential neighborhoods ring the business core, and newer residential development is occurring on Chillicothe's west side and beyond the city limits. Exhibit 3-5 illustrates Chillicothe's existing land use, which is described in its comprehensive plan as consisting of several zoning districts.

In the central part of the corridor, land use includes a mix of agriculture, designated lands, and residential development. The designated lands, which include parcels in both public and private ownership, include Marshall State Fish and Wildlife Area, County Line Hill Prairie, Hopewell Estates Hill Prairies Natural Area, Marshall County Conservation Hill Prairies, and Marshall County State Land and Water Reserve. (See Section 3.14, Designated Lands, for more information.) The designated lands are largely associated with the bluffs, which rise just west of IL 29 and are designed to protect the bluffs. West of the bluffs land use is dominated by agriculture. East of IL 29 to the Illinois River and its associated lakes there is a relatively thin strip of land, generally dominated by floodplain forests, including the Sparland Unit of the Marshall State Fish and Wildlife Area and Cameron-Billsbach Division of the Chautauqua National Wildlife Refuge north of Sparland.

Hopewell is entirely residential. Sparland is predominantly residential except for a few commercial properties along IL 29 and IL 17. Most of the residences in Sparland are located west of IL 29, outside the Illinois River floodplain. Sparland has a number of flood buyout properties, most of them located east of IL 29, that will remain as open space. Lacon, across the Illinois River from Sparland on IL 17, has a vibrant commercial district on IL 17 and residential areas north and south of IL 17. The Marshall County airport is located on the east side of Lacon, south of IL 17. Industrial land uses are predominantly found across the street from the airport on the north side of IL 17.

North of Crow Creek, agricultural land use is interrupted by the communities of Henry and Putnam and the Miller-Anderson Woods Nature Preserve at the project's north terminus. Residential development in Henry is located predominantly east of IL 29 and the project corridor, surrounding the communities' central business district. Along existing IL 29, land

use includes a mix of commercial, residential, and institutional uses such as the Marshall-Putnam County Fair Grounds and Henry Senachwine High School. A large industrial park is located on the city's north side east of IL 29. Exhibit 3-6 shows the land use plan for Henry. Putnam, the northernmost community in the project corridor, is predominantly residential. Most of Putnam's residential development is located west of IL 29. A large grain elevator is located in Putnam immediately east of IL 29. North of Putnam land use is predominantly agricultural, including the Shady Bluffs Farm designated lands, Miller-Anderson Woods Natural Area and Nature Preserves, and a restaurant (Brewmaster's Supper Club) surrounded by a few residences.

Zoning. Peoria, Marshall, Putnam, and Bureau counties have zoning departments with authority for lands within the project corridor, except in Chillicothe in Peoria County and Henry in Marshall County. Peoria County has zoned most of its land within the project corridor as agricultural. The Caterpillar campus is in an area zoned industrial, and residential centers are in areas zoned low or medium density residential. Chillicothe has its own zoning jurisdiction. Close to half of Chillicothe is zoned residential, most of which is zoned single-family. This is followed by recreational land (25 percent)[6] and vacant land (10 percent). Seven percent of the land is zoned industrial, nearly half of which is represented by industrial use on the northwest side of the city, and 4 percent is zoned commercial, most of it represented by the service sector district. Western Chillicothe nearest the Preferred Alternative is zoned single-family residential until northwest Chillicothe, where it is zoned industrial, and north Chillicothe, where the area is zoned recreational.

Marshall County has zoned most of the land in its jurisdiction as agricultural, except for the communities of Sparland and Hopewell, which are zoned residential. Henry has its own zoning jurisdiction. Henry has zoned the land at the edge of the town agricultural. The area south and northeast of Henry has largely been zoned industrial; residential and commercial zones are largely to the east of IL 29.

Putnam County has zoned all the area within the project corridor as agricultural, except that around the Brewmaster's Supper Club (north of Cabin Hill Road) and the grain elevators in Putnam, which the county has zoned as industrial/commercial. Bureau County has zoned all the area within the project corridor as agriculture except for part of the land to the north of where I-180 and IL 29 meet, which it has zoned residential.

County Level Planning Documents. Peoria County's Land Use Plan (1992) is intended to prevent land use conflicts, ensure that future needs are met, and encourage a land use configuration that creates a balance between development and the environment. The land use plan identifies the county's vision for future land use and the steps to realize that vision by first identifying goals and objectives of target areas (for example, housing, transportation) and then describing the policies or strategies for implementing the plan.

Peoria County has developed Small Area Plans to tailor recommendation from the general plan to the local land use issues. The plan that covers the part of Peoria County within the project corridor (Mossville, Rome, Chillicothe, and the surrounding unincorporated rural area) is the Chillicothe-River Small Area Plan. The Small Area Advisory Group (SAAG) was formed to complete the plan in 1994. The plan, which was adopted later that year, focuses

[6] Includes recreational, public park and private park land use designations.

on an array of social, environmental, and economic issues related to projected development in the area. The overarching goal is to locate residential, commercial, and industrial development where it already exists and where utility infrastructure is in place. The plan cites Chillicothe as the foremost location for new development because it has designated areas for future development inside and around its corporate limits. It also is the only community in the Chillicothe River Small Area Plan that has municipal sewer and water systems. New development in Rome and Mossville is recommended when municipal water and sewer systems are developed in the communities. The small area plan recommends that new businesses and industrial facilities be developed in redevelopment areas or where similar development exists. The advisory group recommended preserving farmland and natural areas that have remained undisturbed by urbanization.

In 1979, Bureau, Marshall, and Putnam counties teamed with LaSalle and Stark counties to form one redevelopment district: the North Central Illinois Council of Governments. The organization developed a Comprehensive Economic Development Strategy for the region, the most recent edition of which was submitted in February 2001 and updated in February 2004. This document grew out of several needs identified by the contributing counties: job creation, broader and more established economies, improved lifestyles, and organization of various interest groups focused on economic development. The document describes not only the region's needs and goals to address the needs but also the avenues by which those needs should be met and measures to evaluate how well the needs were addressed.

Common areas of concern for the five counties include industrial development, small business and retail development, basic and advanced infrastructure, housing and associated quality of life amenities, and tourism. The following goals were identified to address the areas of concern:

- Diversify retail sectors and continue to supply local communities with various basic goods and services.
- Expand the industrial sector by diversifying and improving employment opportunities.
- Maintain and expand infrastructure and facilities to promote the influx of development and business opportunities.
- Improve the quality of life for residents by increasing housing units, improving public safety, and raising awareness of the available public healthcare services.
- Centralize and publicize information relating to resources and attractions in the district.

Steps taken by Marshall County toward realizing the goals set in the Comprehensive Economic Development Strategy include Henry constructing a senior citizens residential community with assistance from the Department of Housing and Urban Development, and promoting commercial development along existing IL 29. Bureau and Putnam counties' accomplishments to date are outside the project corridor.

Municipal Planning Documents.

Chillicothe. Chillicothe's 2002 Comprehensive Plan was completed with assistance from the Tri-County Regional Planning Agency. Community parameters that were assessed in the plan include community history, demographic information, sewer and water infrastructure capacity, transportation, community amenities, economic development, land use, and

natural resources. The dominant land use in Chillicothe is residential housing, with recreational lands the next largest land use. Chillicothe also has smaller amounts of land dedicated to commercial, industrial, and park property.

Chillicothe's Comprehensive Plan includes two future land use scenarios: one with existing IL 29 remaining in place and one with a relocated IL 29 bypassing Chillicothe to the west (Exhibits 3-7 and 3-8). The future land use plans include a 1.5-mile buffer around the city's corporate limits. In both cases, it was determined that the best location for residential areas would be on the western edge of town because schools and a new library are located there. The plans diverge regarding residential development in that the IL 29 bypass plan proposes general highway-related commercial development at the McGrath Street interchange, whereas the plan without the bypass proposes single-family residential development. Also, the IL 29 bypass plan identifies an area west of the bypass as long-term residential, whereas the plan without the bypass has no future land use identified west of the bypass. Chillicothe plans for industrial facilities to be located west of the bypass in order to use the new roadway as a buffer between industry and the community. In both plans, the primary focus of commercial development is on rejuvenating the economic centers on 4th and 2nd streets. However, with the proposal of the bypass, the city identified the area off the proposed McGrath Street extension as an area of future industrial growth.

Chillicothe's objectives for the future are to expand the city's economic opportunities, to revitalize the downtown area by beautifying the streetscapes and preserving the historical nature of the downtown, to determine the feasibility of expanding sewer and water facilities to accommodate future growth, to improve the transportation network, and to identify commercial opportunities to locate adjacent to new transportation facilities. Conversations with local officials confirmed the objectives outlined in the plans. Officials also commented that the downtown is now dominated by specialty shops. The zoning ordinance does not allow services to locate downtown without a special use permit. Most of the city's services and "big box" uses are located along IL 29. City officials noted that McDonalds, Hardees, and Subway may be affected by the proposed Chillicothe bypass, although other uses along IL 29 are destinations and would not be affected by the bypass.

Henry. The City of Henry published a Comprehensive Plan in 1989, the third since 1967. The purpose of the plan was to evaluate existing land use, transportation, business and industrial development, community facilities, housing, and neighborhoods, and to guide future development so that it is compatible with current uses.

The plan includes areas within the municipal boundaries as well as areas within 1.5 miles of its corporate limits. The western limit of the Henry land use plan extends approximately to the east side of the proposed Henry bypass. With regard to housing, the plan recommends that additional single-family housing be located west of IL 29 and on the north side of the city, where open land exists, single-family housing currently dominates, and services are already easily accessible (Exhibit 3-9). As for commercial properties, the planning board recommends bolstering two economic centers already in existence—downtown and along existing IL 29—with an emphasis on commercial growth along IL 29.

Other future land development possibilities were identified after the Comprehensive Plan was developed. An ethanol plant has expressed interest in locating in Henry's industrial park located north of Henry along B.F. Goodrich Road, east of existing IL 29. A barge

terminal is also proposed in conjunction with the plant. No construction has been undertaken as yet. B.F. Goodrich Drive is proposed as the future entrance to the plant. A sand quarry is also proposed near the industrial park. Information from city officials indicates that a harbor on the Illinois River would be developed with the sand quarry.

Conversation with Henry officials about the proposed project indicated that they envision city services on both sides of the proposed Henry bypass. They do not see the bypass as a logical growth boundary, as new development in Henry tends to move west. Development is limited to the south by the large Material Gravel holdings and to the north by the industrial park.

Concerning general development trends caused by the proposed Henry bypass, it was noted that some local businesses may locate away from IL 29 toward the bypass to set themselves up for the future roadway. Officials indicated that they do not see any new development south of Western Avenue as a result of the bypass.

Sparland. Sparland does not have a land use plan or zoning ordinance to guide the location of development. Conversations with local officials indicate that new development would be welcomed anywhere on the west side of IL 29. Development is not possible east of IL 29 because of the Illinois River floodplain. Sparland's corporate limits were expanded in the past to meet the requirements of an enterprise zone.[7] An enterprise zone would allow future developers to receive financial assistance from the North Central Illinois Regional Council of Governments. Sparland representatives do not expect changes to the village's corporate limits.

Concerning past development and possible future development associated with improvements to IL 29, Sparland officials indicated that there has been no recent development in Sparland and none is envisioned within the proposed project. The south end of the village and the west side near the middle school were identified as the most likely locations for development, but again no development is envisioned. Sparland officials did not think that removing through traffic from IL 29 and reconstructing the roadway would result in new development along IL 29. It was noted that Sparland has been without a service station since 1991. The representatives also noted that the Bunge Corporation property south of IL 17 had recently been sold to Ducks Unlimited. The property, which is currently farmed, will likely undergo changes (such as the restoration of wetlands) to make it more attractive for waterfowl.

Other Planning Documents. Plans have been developed for water resources in the corridor. The Tri-County Planning Commission conducts planning work in Peoria County, and it has developed the Mossville Bluffs Watershed Plan covering the extreme south end of the study area. Committees have also formed to protect and enhance the Illinois River, Crow Creek, and Senachwine Creek watersheds. All four counties have placed restrictions on development in the unincorporated areas within floodplains and floodways. The only incorporated communities with floodplain in the project corridor are Chillicothe and Sparland, and they have their own policies on developing within floodplain. The watershed plans and floodplain policies for these communities are discussed below.

Mossville Bluffs Watershed Plan. The Mossville Bluffs watershed has experienced an escalating rate of degradation over the years. The Illinois Department of Natural Resources

[7]An enterprise zone is a specific geographic area targeted for economic revitalization.

(IDNR) has identified it as a strategic subwatershed. IDNR identified strategic watersheds to facilitate the Conservation 2000 program (C2000). Strategic watersheds are areas where the maximum benefits can be derived from watershed protection and restoration. The C2000 program is designed to take a holistic, long-term approach to protecting and managing Illinois natural resources. As such, the Tri-County Regional Planning Commission oversaw the development of a watershed plan for the Mossville Bluffs subbasin. The goal of the Mossville Bluffs Watershed Plan was to:

- Identify actions that may reduce sedimentation
- Propose tools for preventing sedimentation in future development projects
- Uncover the primary factors that cause the Mossville Bluffs Watershed to contribute sediment to Peoria Lake

The plan identified practices that could enhance erosion control and stormwater control efforts.

Illinois Rivers 2020. The Illinois Rivers 2020 project is a multibillion dollar effort to reduce sedimentation and soil erosion and to improve water quality and wildlife habitat within the Illinois River Basin. The project, which is governed by the Illinois River Coordinating Council and chaired by Lieutenant Governor Pat Quinn, is a cooperative effort between federal and state governmental entities, including the Governor's and Lieutenant Governor's offices, IDNR, IDOA, IEPA, USACE, and several nongovernmental entities. Building on the success of the Illinois River Conservation Reserve Enhancement Program (CREP), the idea of the Illinois Rivers 2020 program is that it would use only existing legal structures, including the Farm Bill, the Water Resources Development Act, and the Clean Water Act. Contribution is voluntary and incentive-based.

The project identified river channel management, backwater and side stream sedimentation, destabilized tributaries, and water level fluctuations as the main sources of the increase in sediment in the waterways within the basin. The solutions for the Illinois River restoration project include reintroducing natural riparian habitat and floodplains to the riverside, reducing sedimentation in the Illinois River, and modifying the river depths and fluctuations. No projects are under way or proposed within the IL 29 project corridor.

Crow Creek West Watershed Plan. The Crow Creek West Watershed Plan was implemented because of the need to reduce sedimentation and its effects in the Crow Creek West Watershed. Specific issues cited in the plan include soil and gully erosion, streambank erosion and downcutting, flooding, livestock in streams, nutrient management, water quality, and transportation safety issues. Stakeholders range from environmental interests to the farming community. The committee's approach is broad-based and ranges from micromanagement of the water flow to proactive land management techniques. Its intent is to reduce sedimentation transported to and retained in Crow Creek, provide flood management, prevent soil erosion, and reduce the susceptibility of cropland to erosion. The recommended plan includes alternatives to reduce sediment, construction of numerous small dams, installation of in-stream grade control structures, streambank stabilization in the middle and upper reaches of the watershed, and selective removal of log jams. Because the watershed plan remains in the draft stage, no improvement projects have taken place in the watershed.

Senachwine Creek Watershed Nonpoint Source Control Project. In response to a noted decrease in the water quality of the Senachwine Creek (South) and ultimately the Illinois

River, an interagency team called the Illinois River Soil Conservation Task Force prepared a watershed plan that would use funds from Section 319 of the Clean Water Act to decrease nonpoint source pollution in the Senachwine Creek, Peoria Lakes, and the Illinois River. The nonpoint source control projects implemented as a result of the plan were done in two phases. The first phase installed 53 projects from 1993 to 1997 and the second 107 projects between 2000 and 2003. The project focuses on reducing soil erosion upstream, improving water quality and introducing best management practices to the farming community within the watershed. Types of practices include installing water and sediment control basins, planting grass along waterways, and enrolling in the Conservation Reserve Enhancement Program. Actions in the project area include:

- Constructing rock veins (also known as stream barbs) in the Senachwine Creek bed to divert stream flow away from the stream bank. Bank armoring and a rock riffle were also included to further prevent erosion of the streambed.
- Building water and sediment control basins between Hart Lane and IL 29 to focus water flow underground and to stop ephemeral erosion caused by concentrated water flow.
- Installing bendway weirs and longitudinal peak stone toe protection near Benedict Road to minimize streambank erosion.
- Enrolling two properties (one west of Benedict Road, one east of IL 29) in the CREP.

Floodplain and Floodway Policies.

County Policies. All four counties instituted restrictions on developing flood levels and protecting structures and environmental features that would be affected adversely by an increase in flood levels. Regulations prohibit development in a floodplain (and flood fringe in the case of Peoria County) unless a permit is acquired from the Floodplain Officer (Marshall County), Zoning Administrator (Peoria and Putnam County) or Enforcement Officer (Bureau County) or the activity is exempt or covered under an alternative permit. Variances can be requested when the applicant can demonstrate that the development project cannot be placed outside the floodplain, development within the floodplain would not threaten public health and safety, and the policies' purposes would not be compromised. Regarding floodways, Peoria County's regulations also state that no new construction, fill, or substantial improvements can occur in a floodway, but variances can be applied to floodways in areas of longitudinal encroachment only if construction does not result in an elevation rise of the 100-year flood discharge 0.1 foot in urban areas and 0.5 foot in rural areas.

Municipal Policies. Chillicothe's floodplain policy states that development in excess of $500 within the floodplain district is prohibited unless a special use permit has been issued by the city council only after reviewing the policies of the IDOT, the IDNR's Division of Water Resources, and the USACE. The floodplain district is defined as the floodway and flood fringe delineated by FEMA.

3.2.2 Environmental Consequences

The No-Build Alternative would have no additional impacts to socioeconomic resources in the project area.

3.2.2.1 Community Changes / Cohesion

Roadway improvements can have beneficial results, such as supporting local planning policies and accommodating future growth and development. But roadway improvements sometimes have undesirable effects and may become a barrier within a community. The subsections below discuss the potential effects of the Preferred Alternative on community cohesion. Communities along or near the proposed alignment include Mossville, Rome, Chillicothe, Hopewell, Sparland, Henry, and Putnam. The No-Build Alternative would not affect community cohesion, but it would not accommodate future growth and development. This information is reported in Tables 3-5, 3-6, 3-7, and 3-8.

Mossville. Near Mossville, the Preferred Alternative begins at the IL 6 interchange. A proposed interchange at Cedar Hills Drive would provide improved access to the Caterpillar Mossville Plant and the Mossville industrial area. Under the proposed improvements, Boy Scout Road, which connects Camp Wokanda to Old Galena Road, would be closed. Access to Camp Wokanda would be provided by a proposed frontage road running from Mossville Road to Cedar Hills Drive (Aerial Exhibit sheet 1). The frontage road would provide more options to access the camp than exist today. Mossville residents would gain access to the frontage road from either Mossville or Cedar Hills roads, and the relocated IL 29 from Cedar Hills Road. The alignment would not bisect any residential neighborhoods or separate community facilities from the population center. As the proposed alignment would be grade-separated at Old Galena Road, access to Audubon Park would not be changed. Generally, the Preferred Alternative would improve access to Mossville and the industrial area without adverse impact to Peoria County's existing or future land use plans, which include additional industrial development (Wall 2005).

Rome. The Preferred Alternative would be located slightly more than 1 mile west of Rome. The proposed alignment would not separate residents from community facilities or services, impose barriers among existing neighborhoods, or adversely affect vehicular or pedestrian patterns within the community. The bypass would remove some through traffic along existing IL 29, which may make it safer for local vehicular and pedestrian traffic movement. An interchange would be provided at Rome West Road, providing access to development along existing IL 29 (Knox Road extended) and subdivisions such as Hidden Valley, Pinewood Estates, and Galena Knolls.

Chillicothe. In Chillicothe, the proposed alignment would be about 2 miles west of existing IL 29 and 1 mile west of the western edge of the community. The McGrath Road interchange and Truitt Road interchange would provide community access including nearby unincorporated subdivisions (for example, Timberwalk) off Krause Road to the new facility. The proposed alignment would not separate residents from community facilities or services, nor impose barriers among existing neighborhoods. Residents north of Chillicothe, including residents of the Fawn Hills (near Ratliff Road), would access the proposed improvements from the realigned Hart Lane/Boehle Road north of existing connection to IL 29. The proposed bypass is consistent with the community's future land use plan, which identifies the proposed transportation corridor as part of its long-range plan. Accordingly, Chillicothe's land use plan proposes continued westward development of the community beyond the proposed facility (Exhibit 3-8). The plan identifies future industrial development near the proposed interchange at McGrath Road, and residential development between Cloverdale

and Truitt roads. Therefore, the proposed alignment is consistent with, and promotes, the community's long-range development plans.

Hopewell. In Hopewell, the proposed IL 29 alignment would remain on existing IL 29 alignment and would avoid direct impacts to the village, which is located on top of the bluff. The Preferred Alternative would not affect community cohesion. Community access would remain the same, resulting in no change in travel patterns for residents.

Sparland. In Sparland, the proposed alignment would be shifted east of existing IL 29 and the existing development in that part of the community. A split-diamond interchange would be provided at both the north and south ends of the community to provide access. Existing IL 29 would remain as a local access road. The interchange would displace two outbuildings in Sparland, six homes, and six mobile homes. Most residential development in Sparland is located west of IL 29, and so the Preferred Alternative is not expected to be a barrier (see Table 3-11). A review of homes for sale in the area[8] indicated there are four homes for sale in Sparland, one home for sale just west of Sparland, and two homes for sale north of Sparland to which the residents of three displaced homes could relocate. There is open space on the west side of Sparland, so it would be possible for the residents of the four manufactured (mobile) homes that would be displaced by the IL 29 improvements to relocate their homes to that area. Village officials indicated that future development would be permitted on the west side of IL 29 but acknowledged that development is not possible east of IL 29 because of the Illinois River floodplain. They further noted that there has not been any development in Sparland, nor is any envisioned as a result of improvements to IL 29. Given the availability of existing replacement housing and open space to accommodate displaced residences, the Preferred Alternative is not expected to impact community cohesion.

Henry. In Henry, the alignment would bypass the community to the west, and existing IL 29 would continue to be a local road through town. An interchange at Western Avenue would provide access to Henry. Old Indian Road would be grade separated, allowing school bus and rural residents to gain access to Henry as they do today. Whitefield Road, which turns into B.F. Goodrich Road and serves the industrial park, would be an at-grade intersection, allowing convenient access to the industrial park and the north side of Henry. The City's future land use plan stops at the east side of the proposed IL 29 alignment location. In a meeting on November 18, 2004, City officials indicated support for the proposed bypass location and that they would not view the proposed location as a growth boundary but would allow the community to grow farther to the west, if needed (Appendix A, Local Officials/Other Coordination). The bypass would not impose barriers among neighborhoods, separate residents from community facilities or services, or adversely affect vehicular or pedestrian patterns within the community. By removing through traffic from existing IL 29, the bypass may improve safety for pedestrian, bicycle, and local vehicular trips on IL 29. The bypass would not affect travel patterns between rural areas and Henry. No change in the level of community cohesion between the rural areas and Henry is expected. The bypass would provide opportunities for undeveloped properties to fill the area between the proposed alignment and existing IL 29.

[8] www.realtor.com March 7, 2005.

Putnam. In Putnam, the proposed alternative would remain on existing alignment. Nearly all of Putnam is located west of IL 29, with the exception of the grain elevator on the east side of IL 29 and a small residential area east of the grain elevator and railroad tracks. The proposed improvements would widen the roadway, consolidate local access, and displace five residences and one business adjacent to IL 29. Most residential development in Putnam is west of IL 29, and so the Preferred Alternative is not expected to be a barrier. A review of homes for sale in the area[9] indicated one home is for sale in Putnam. There is also open space west of IL 29 in Putnam available for future development, as well as more than 20 homes for sale in Senachwine Township just west of Putnam surrounding Thunderbird Lake and the planned Valley View Ridge subdivision north of town (9 homes) to which displaced residents could relocate. Given the availability of open space in Putnam and existing housing in the township the Preferred Alternative is not expected to affect community cohesion.

3.2.2.2 Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898 on Environmental Justice. The Order requires all federal agencies to address the effects of their programs with respect to environmental justice. It states that, to the extent practicable and permitted by law, neither minority nor low-income populations may receive disproportionately high or adverse impacts as a result of a proposed project. It also requires that representatives from low-income or minority populations that could be affected by the project be provided the opportunity to be included in the impact assessment and public involvement process.

An environmental justice analysis was completed to determine whether the proposed project would affect minority or low-income populations and to assess if such impacts would be disproportionately high as compared to the total population ratio. If the project's potential impacts are found to be borne disproportionately by low-income and minority populations, an analysis must examine mitigation measures, offsetting benefits, and impacts of other system elements in accordance with FHWA Order 6640.23, Actions to Address Environmental Justice in Minority Populations and Low-income Populations (USDOT, FHWA 1998).

A stepwise process was followed to identify an appropriate study area, gather appropriate census statistics, and identify locations of minority and low-income populations.

Identify Study Area. For the purpose of the environmental justice evaluation, 2000 census data were gathered at the township and census tract level for areas potentially affected by the proposed project. The study area reflects the geographic area most likely to experience the direct impacts and indirect community, human health, and environmental impacts of the temporary construction and permanent operational impacts of IL 29 improvements.

Ensuring environmental justice calls for assessing whether the direct and indirect adverse impacts of the IL 29 improvements would fall disproportionately upon low-income and minority populations. For comparison purposes, the demographic composition of the study area was compared and benchmarked against the county and state of Illinois data.

Compile Characteristics. Population and income characteristics from the 2000 U.S. Census of Population and Housing were analyzed to identify populations of concern for environmental justice. The following information was collected for the project area:

[9] www.realtor.com March 7, 2005.

- **Racial and Ethnic Characteristics—**Population was characterized using the racial categories White, Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and Other.
- **Percentage of Minority Population—**Population was characterized using the categories White, Minority, or Hispanic origin. In response to census questions, persons of Hispanic origin can be White, Black or African-American, American Indian, and Alaska Native.
- **Low-Income Population—**Median family income was used to characterize income levels. The percentage of persons living below the poverty level, as defined in the 2000 census, was the second measure used to determine the low-income population. Also, the 2005 Health and Human Services Poverty Guideline for a family of four has been reported.

Identify Locations of Minority and Low-Income Persons and Public Outreach. Based on the discussion in subsections Racial and Ethnic Characteristics and Income Characteristics, although there are minority and low-income persons in the project area, no specific locations or groups were identified that would be affected by the project. That notwithstanding, the project's public involvement program has afforded the opportunity for potentially affected communities, including minority and low-income populations, interested in the project to learn about and provide input to the project. See Section 5.3, Community Involvement, for a discussion of the public involvement opportunities offered to all area residents.

Determine Disproportionately High and Adverse Effects on Populations of Concern. The 44 residential displacements and 4 business displacements caused by the proposed IL 29 improvements occur in 4 of the 10 census tracts in the project area. The City of Chillicothe (5) and the Village of Sparland (12) are the only incorporated communities within the 4 census tracts that would have displacements. The remaining 27 displacements are located in project-area townships. In the 4 census tracts, the white population ranges from 97.2 to 98.4 percent. Among the townships, City of Chillicothe and Village of Sparland that would experience displacements, the percentage of families below the poverty level ranges from 3.2 percent in Medina Township (south end of the project) to 9.2 percent in Sparland. Because Census data is collected and reported for relatively large geographic areas, it is not possible to know the racial and economic characteristics of individual households displaced by the project. However, based on the demographic information for the affected block groups and contacts with the public at the public information meetings and other meetings discussed in Section 4, the project team has concluded that the proposed action does not have the potential to exert high or disproportionate adverse impacts on minority or low-income populations. While some impacts may be borne by minority and low-income residents, the level of impact would not be disproportionately high and, therefore, would not be considered specifically as an environmental justice impact. Nonetheless, the impacts would be mitigated to the extent practicable and allowable by law, rule, and code.

The Preferred Alternative is in compliance with Executive Order 12898 and FHWA Order 6640.23. The project's public involvement process did not exclude any individuals because of income, race, color, religion, national origin, sex, age, or handicap. Meeting locations were selected to limit the distance project-area residents had to travel to attend the meetings and to accommodate people with disabilities.

3.2.2.3 Residential and Business Relocations

The Preferred Alternative would displace 44 residences and 4 businesses, as denoted on the Aerial Exhibit. Table 3-13 lists the general locations of residential displacements. A review of homes for sale[10] indicated that displaced rural residents (those living in unincorporated areas) could relocate to similar housing in the area.

There is no Section 8 housing or other public subsidized housing affected by the Preferred Alternative. Of the 44 displaced residences, 12 are farm residences. Assuming an average household size of 2.47 persons (derived from the 2000 Census data for Peoria, Marshall, Putnam and Bureau counties), the Preferred Alternative would displace approximately 109 persons. The No-Build Alternative would not affect residences or businesses.

TABLE 3-13
General Location of Residential Displacements

Location	Number of Displacements
West of Rome	1
Northwest of Chillicothe	2
North side of Chillicothe	5
Chillicothe Interchange	1
North of Chillicothe (Crew Lane)	4
Barrville Creek	1
Sparland	12
North of Sparland	3
Crow Creek	4
South of Henry	2
West of Henry	4
Putnam	5
Total	**44**

The Preferred Alternative would displace two roofing storage buildings, an auto repair shop, an agriculture cooperative, and an upholstery shop. The roofing storage buildings and the auto repair shop could be relocated on their existing properties. There is undeveloped property in the immediate area that the agriculture cooperative business could purchase to reestablish the business, as well as undeveloped property in Putnam that could accommodate the upholstery shop to keep the businesses in the area. Table 3-14 lists the number of employees of the displaced businesses.

IDOT would offer relocation assistance, in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (URA), as amended, and IDOT's *Land Acquisition Procedures Manual*, to all occupants of buildings they would purchase and remove. Those policies provide for relocation assistance services for both homeowners and renters. Participation under the state and federal policies is without discrimination. IDOT would pay property owners fair market value for all private property purchased. Adequate replacement housing is available near the proposed alignment.

TABLE 3-14
Displaced Businesses

Business	Number of Employees	Location
Hosler Roofing	NA[a]	Camp Grove Road
PPG Collision	1 full-time	North of Camp Grove Road
AgView FS Inc.	5 full-time, 4 part-time	IL 29 south of Henry
Country Corner Upholstery	1 full-time	IL 29 Putnam

[a]Property contains two storage sheds, no business office.

[10] www.realtor.com March 7, 2005.

3.2.2.4 Businesses to Remain

Businesses that would not be relocated could be affected by either having part of their property transferred to IDOT right of way or having access to and from IL 29 changed as a result of the Preferred Alternative. In most cases this would be a strip of land of varying width near the edge of the parcel or a realignment or relocation of a driveway entrance to improve safety. These actions would also be covered under the URA. Businesses that would lose property include Caterpillar, Buckeye Terminal, Galena Road Gravel, Riverside Materials, Chillicothe Sportsman's Club, Chillicothe Driving Range, Illini Hardwood Lumber, Stunkel Tree Service, and Brewmaster's Supper Club. Rumhold and Huhn Elevator would lose a residential unit it owns on the west side of IL 29 in Putnam, but that building is not integral to the business. All businesses are expected to remain viable despite the impacts. Following is a summary of the right of way acquisition and access changes at the affected businesses.

Property Impacts and Access Changes.

Caterpillar Mossville Plant. The Preferred Alternative is located west of the Caterpillar Technical Center, passing though agricultural lands owned by Caterpillar. Access to the Caterpillar Technical Center would not change, but access to the farmed parcels owned by Caterpillar adjacent to the Technical Center would. The improvements would bisect the parcel starting at Cedar Hill Drive extending north and then northeast to Old Galena Road, which would affect the cropping patterns on the property. East and south of the improvements, access to the parcel would remain the same, but to the west and north access would be provided from Ivy Lake Road. See Aerial Exhibit sheet 2.

Buckeye Terminal. The Preferred Alternative would clip the northwestern corner of Buckeye Terminal's property, north of the existing driveway. The driveway would be improved for a section to be shared with an agricultural parcel to its north. From the shared part of the driveway, a new driveway segment would extend northeasterly across Buckeye Terminal's property, paralleling the IL 29 right of way, to provide access to the farmed parcel. Access to Buckeye Terminal would not change. See Aerial Exhibit sheet 2.

Galena Road Gravel. The Preferred Alternative would cross the western side of Galena Road Gravel's property starting at Truitt Road and extending past a utility corridor just north of the property. The BNSF railroad tracks bisect the Galena Road Gravel property. North of the railroad tracks, access to a 15-acre parcel between Senachwine Creek (South) and the railroad right of way effectively would be eliminated. South of the railroad, access would be provided by a service road from Truitt Road that also provides access to an adjacent utility corridor. See Aerial Exhibit sheet 6.

Riverside Material. The Preferred Alternative would pass through the western part of the Riverside Material property, running northeasterly from existing IL 29 past Yankee Lane. The driveway off IL 29 would be removed, and an access road would be built east of the proposed north Chillicothe interchange and relocated IL 29 to provide safe access to the facility. The access road would tie into IL 29 south of the proposed north Chillicothe interchange. See Aerial Exhibit sheet 8.

Chillicothe Sportsman Club. The Preferred Alternative would cross the Chillicothe Sportsman's Club property in a northeasterly direction, taking part of the property on its

western side. The entrance to the property at the Yankee Lane/IL 29 intersection would be closed. The part of the property north of Coon Creek would access the proposed IL 29 from a frontage road that would extend from the Chillicothe Driving Range property to a proposed intersection with IL 29 that would also serve Boehle Road (west of IL 29). The part of the property south of Coon Creek would continue to use Yankee Lane, which would tie into the frontage road serving the Chillicothe Driving Range. The part of the property south of Coon Creek and west of the proposed mainline would be accessed from a new driveway off the relocated Hart Lane. See Aerial Exhibit sheet 8.

Chillicothe Driving Range. The Preferred Alternative would take a strip of land along the western part of the property, including the parking lot, which would need to be relocated east of the Preferred Alternative. A new parking area can be constructed on the remaining 4.5-acre property without affecting the driving range, thus allowing the business to remain in its present location. The driveway to IL 29 would be closed, and a frontage road east of the proposed improvements would provide access to the property. See Aerial Exhibit sheet 8.

Illini Hardwood Lumber. The Preferred Alternative would take a strip of land along the eastern side of Illini Hardwood Lumber's property. Old Route 29 1150 N would be realigned adjacent to Illini Hardwood Lumber. Because the driveway would be within the proposed right of way, a new driveway entrance would be provided along the realigned Old Route 29 1150N west of the existing driveway. See Aerial Exhibit sheet 13.

Stunkel Tree Service. The northwestern quadrant of the proposed Western Avenue interchange would take the eastern and southern portion of the agricultural land on the Stunkel property, however, it would not affect the storage building for the Stunkel Tree Service that is located at the north end of the property. No impacts to Stunkel Tree Service, which has its office at another location in Henry, are anticipated from the loss of the agricultural land. A new driveway from Western Avenue would be provided west of and adjacent to the proposed interchange. See Aerial Exhibit sheet 14.

Rumbold and Kuhn Putnam Elevator. The Preferred Alternative would pass to the west of the Rumbold and Kuhn Putnam Elevator operations. Access to Rumbold and Kuhn Putnam Elevator from the north would be provided by an east extension of Bradford Road south of the property. See Aerial Exhibit sheet 16.

Brewmaster's Supper Club. The Preferred Alternative would be east of the Brewmaster's Supper Club (See Exhibit 3-15). The proposed right of way line would be located 20 feet west of the existing right-of-way line and acquire a strip of the restaurant's parking lot. The current driveway would be closed and access would be provided by a frontage road located at the south end of the existing parking lot. Parking lot capacity would remain unchanged because the strip acquisition is from the driveways rather than the body of the parking lot. See Aerial Exhibit sheet 17.

Bypass Issues. The Preferred Alternative would bypass Mossville, Rome, Chillicothe, and Henry. Through traffic would be diverted to the proposed new alignment that would have passed by and perhaps stopped at businesses along existing IL 29. Review of the businesses immediately adjacent to IL 29 indicated there are about 13 highway service businesses in Chillicothe, 1 in Mossville, 1 in Rome, and 7 in Henry whose sales in part depend on through traffic. The businesses are primarily gas stations, motels, and fast food restaurants.

Approximately 83 other businesses immediately adjacent to IL 29 in these communities are not or are minimally dependent on impulse stops by passing traffic. They are primarily medical, financial, and other professional services, government services, car repair, and retail businesses such as grocery and building supply stores. They are destination businesses—a customer drives to the business to purchase a specific service or product.

There are several interchanges along the proposed bypasses (for example, McGrath Street and Truitt Road in Chillicothe; Western Avenue in Henry) that could experience highway-related commercial development depending on local ordinances and land use planning. Highway service businesses, such as gas stations and fast food restaurants that might develop at the proposed interchanges, may draw through-trip customers from highway dependent businesses in Chillicothe and Henry. Though possible, it is less likely that Henry or Chillicothe residents would travel to highway service businesses at the proposed interchanges when similar businesses along existing IL 29 would be closer to them. Thus the proposed highway should not have a large influence on the business community from the perspective of travel pattern changes.

Existing IL 29 would remain open in Mossville, Rome, Chillicothe, and Henry. Businesses that are traffic-dependent would have reduced exposure to potential customers if the proposed improvements are built. Although traffic volumes through these communities would be less in the design year than with the No-Build Alternative, traffic would be greater than it is today. It is expected that most highway dependent businesses will remain viable.

3.2.2.5 Public Facilities and Services

The Preferred Alternative would not displace any public facility or service. Right of way would be required from two facilities, and other public buildings and services would be affected indirectly by changes in travel patterns.

The proposed Sparland interchange would acquire 3.6 acres from the property owned by Sparland's wastewater treatment facility. The proposed interchange would not affect the treatment ponds or interfere with the operations of the treatment facility.

In Putnam, the Preferred Alternative would acquire a strip of land from two contiguous publicly owned parcels west of IL 29 between Courtland Street and Main Street. Approximately 0.2 acre would be acquired from the east edge of the property, the location of an open-air picnic shelter. More information about the impacts to this publicly owned property is found in Section 3.15. Approximately 1.9 acres would be acquired from the east edge of the property on which the volunteer fire department garages are located. The acquisition would not affect the garages.

The Preferred Alternative would acquire 0.1 acre from the property where the Senachwine Township hall and public works garage are located. The Preferred Alternative also would acquire some undeveloped land from the former ballfield immediately north of the Senachwine Township Hall. Impacts to the ballfield are discussed in subsections 3.15 and 3.18. Access to the property from High Street would not change.

Henry and Putnam are the only communities in which facilities and services would be affected indirectly by changes in travel patterns.

The Preferred Alternative would not provide direct access to Henry's public facilities such as the Marshall-Putnam County Fairgrounds and Henry-Senachwine High School. Those facilities would continue to be served by existing IL 29. Traffic on the Henry bypass could access public facilities and services in Henry from the proposed Western Avenue interchange or at-grade intersections along the bypass. The Preferred Alternative does not provide a direct connection between existing IL 29 south of Western Avenue and the bypass. Access to public facilities and services from the south would be provided by the Western Avenue from its interchange with the new alignment.

In Putnam, access to the fire department, U.S. Post Office, Condit Memorial Library, and the Senachwine Township offices would remain unchanged for residents west of IL 29. With the Preferred Alternative, Putnam residents living east of IL 29 or traffic on IL 29 would access the facilities from Bradford Street and High Street (access to IL 29 from Douglas Street and Courtland Street would be closed).

School bus routes may need to be altered during and after construction of the Preferred Alternative, but that already is done before each school year to adjust for changes in student addresses. The Preferred Alternative would not prevent school buses from accessing residences along the corridor.

Emergency service routes may need to be adjusted as a result of the changes in access points to and from IL 29 along the existing facility, as well as use of the parts on new alignment where appropriate. However, emergency services to project area residents would not be affected adversely by the Preferred Alternative. The access-controlled facility in the southern part of the project area would improve the connection between Chillicothe and Mossville, and a new interchange in Sparland would maintain the connection between IL 17 and IL 29. On the south side of Henry, existing IL 29 would become a cul-de-sac. With the Preferred Alternative, emergency responders in Henry would be rerouted along the new alignment to access points south of the city limits, but emergency response officials agreed that the improvements would not affect their operations adversely (subsection 5.3.1.3). With the Preferred Alternative, emergency services would benefit from the increase in travel speeds, additional capacity and improved safety conditions.

3.2.2.6 Land Use Changes

Right of Way Required. The proposed alternative would require 1,038 acres of right of way.

Land Use Changes. Table 3-15 lists land uses converted to transportation uses.

TABLE 3-15
Land Use Impacts

Land Use	Acreage Converted	% of Total Land Use Converted
Urban and Built-up	50	5
Agriculture	978	94
Park/Open Space	10	1

Note: Table describes land uses, not cover types. Added to this number is 111 acres of farmland south of Cedar Hills Drive currently owned and leased by IDOT.

Consistency of the Proposed Action with Land Use Plans. As discussed in subsection 3.2.1.7, Planning Documents, future land use along the project corridor is addressed by various local agencies at the municipal and county level. There are four land use planning documents that address land use along parts of the Preferred Alternative: the Peoria County Land Use Plan, the City of Chillicothe Comprehensive Plan, and the Henry

Comprehensive Plan. Peoria County developed the Chillicothe River Area Land Use Plan to tailor recommendations from the general County Plan to the specific needs and issues unique to a small area that includes parts of the project area. The communities outside these jurisdictions do not have a formal plan directing land development in their communities.

The primary impetus of the Peoria County Land Use Plan is to guide development toward a compact, centralized form of urban growth. Recognizing the importance of this concept, the Chillicothe-River Area Land Use Plan has focused new development where it can be best served by sewer and water. Although the Preferred Alternative is consistent with the desire to have new development occur near existing development, the land use plan makes no reference to an improved highway facility that would bypass the community growth area of Chillicothe. The land use plan has identified IL 29 as one of three state highways of significance in the planning area, with a strategy to coordinate future right of way needs with the design of new development (for example, building setbacks) to accommodate future road widenings. The Preferred Alternative would convert some lands identified in the plan as agricultural, environmental corridors, industrial/office warehouse, and community growth areas to transportation uses.

The Chillicothe Comprehensive Plan contains two land use scenarios: one with improvements to IL 29 as a bypass and one with improvements to existing IL 29. The Preferred Alternative is consistent with the city's land use plan with an IL 29 bypass. The primary difference between the city's two land use scenarios is the identification of additional residential land use to the west of the proposed bypass and additional commercial and industrial land use adjacent to the Preferred Alternative in the southern part of the community. The Preferred Alternative (on new alignment in Chillicothe) would be compatible with growth and intended development of the community.

The Henry Comprehensive Plan recognized an improvement to IL 29 between I-180 and Chillicothe, as part of IDOT's long-range transportation goals. At the time the plan was written (1989) Henry officials noted the improvement was not funded or programmed as part of IDOT's 5-year program. The plan expected that lane additions on IL 29 would be similar to the 4 lanes from Chillicothe to Peoria and that access would be provided by intersections rather than controlled access. The Preferred Alternative would be immediately adjacent to the western boundary of the city's future land use plan. Generally, the Preferred Alternative would cause some agricultural lands to be converted to nonagricultural use. Local officials said that the proposed project would not necessarily create a growth boundary for the community as new development in Henry tends to move west. The project (on new alignment in Henry) is not inconsistent with known plans for future growth in the community, but community officials have acknowledged it would not interfere with the growth of Henry to the west.

For other lands in the project area, the Preferred Alternative generally would convert land uses adjacent to existing IL 29 to transportation use. In Sparland, the land use conversion would be greater than in other areas because of construction of an interchange with IL 17.

3.2.2.7 Property Values

When roads are expanded or new roads constructed, the market value of adjacent properties may be affected. Local units of government base their residential property

assessments (property value) on sale prices (market prices). With this approach, it is difficult to speculate on property value impacts, since property must be sold to determine its market value and then a comparison made to recent sales prices for similar properties. There is no evidence to suggest that 4-lane roads result in diminished residential property values.

Proximity of a road to a residence is a factor buyers would consider in purchasing a residence, but the importance of "road setback" varies considerably among study area residents and prospective home buyers. There are examples of newer and older residences throughout the study corridor with a wide range of setbacks from IL 29.

Improvements to IL 29 may be expected to have a positive effect on property values over the long term in areas where the improvements stimulate new development. While property values of individual parcels may decline, the cumulative impact of property value changes is expected to be positive for the communities and for the region. It is also likely that this positive effect will be greater in larger project area communities such as Chillicothe and Henry than in the smaller predominantly residential communities such as Sparland and Putnam, where the communities have not undergone much development recently.

3.2.2.8 Employment

As noted in Section 1, a major goal of the state's transportation system and a "need factor" for this study is to retain existing economic bases and employment in rural areas. Maintaining the economic viability of agriculture, businesses, and industries in the project area and improving IL 29 are closely linked. Commercial and industrial uses in Chillicothe, Lacon, and Henry stimulate transportation demand by increasing the number of workers commuting to and from work, customers traveling to and from service areas, and products being shipped between producers and consumers.

Businesses and agricultural interests in the study area depend on an efficient highway system with connections to rail and barge facilities to meet their shipping needs. The transport of raw materials and finished products is a part of the business costs borne by manufacturers and agricultural interests. The Preferred Alternative would benefit agricultural interests and commercial and industrial development by decreasing transportation costs and making transportation more reliable. Decreasing transportation costs and maximizing intermodal connections would allow commercial and industrial development and area farmers to transport raw and finished products at less cost. As a result of reduced transportation costs, businesses in the study area could experience greater profitability or increased market share.

It is not clear whether lowering transportation costs for farms, businesses, and industries would increase the labor force in the project area. That could happen, but low transportation cost is only one of many factors that businesses consider in deciding whether to expand and add employees.

Construction of the Preferred Alternative would create temporary construction-related jobs. Table 3-16 reflects the potential temporary labor force increases that could result from the creation of construction jobs related to the Preferred Alternative.

TABLE 3-16
Construction-Related Employment and Generated Income

	Cost of Construction (Millions)	Multiplier	Total
Direct Employment	$474	7.1 (Low, 1985) 9.75 (High, 1985)	3,365 Jobs 4,622 Jobs
Indirect Employment	$474	9.25 (Low, 1985) 12.7 (High, 1985)	4,385 Jobs 6,020 Jobs
Induced Employment	$474	10.5	4,977 Jobs
Direct, Indirect, and Induced Income	$474	1.94	$920 Million

Source: Robert Gorman, FHWA. 1985. *Analysis of Employment Statistics: Field Survey to Determine Employment Impacts of the Surface Transportation Act of 1982, Final Report*; FHWA. 1995. *FHWA Direct Employment Impacts: A Quantitative Analysis*.

Construction of the Preferred Alternative is estimated to create between 3,365 and 4,622 direct onsite construction jobs, between 4,385 and 6,020 offsite manufacture and preparation of supplies and equipment jobs, and 4,977 induced jobs (employment generated to fulfill demand for goods and services to newly employed households). In total it will employ an estimated 12,727 to 15,619 people. Income generated by the Preferred Alternative is estimated at $920 million. Economic impacts would not be experienced solely in the project area. The impact would depend on availability of local labor and materials. Also, some of the jobs "created" represent existing jobs that would remain filled because of the road construction project rather than new jobs. Jobs created include both temporary and full-time jobs. The methodology does not distinguish between such jobs, nor can it determine the duration of a worker's employment. Not all job creation would occur in the project area. Table 3-16 reflects the potential temporary labor force increases that could result from the creation of construction jobs related to the proposed highway.

3.2.2.9 Tax Revenues

A short-term tax revenue loss in the region will result from converting taxable land into a nontaxable transportation use. To evaluate the tax losses, information was obtained from the County Tax Assessors' offices for Peoria, Marshall, Putnam, and Bureau counties. All taxing districts, including schools, fire protection, sanitary districts, and individual communities, were delineated. The results of this analysis are summarized in Table 3-17, with detail of impact to each taxing body. The tax loss analysis shows that total annual property tax losses are estimated to be $113,209 along the alignment. This potential loss represents 0.14 percent of the total annual taxes collected by the taxing entities in the four counties.

Of the $113,209 annual tax revenue loss that will occur due to the project, $8,968 of it is attributable to tax loss from landlocked parcels and parcels that will be purchased to mitigate the project's environmental impacts in Peoria County (149 acres) and Marshall County (597 acres). Table 3-17 details tax loss by each taxing district.

TABLE 3-17
Tax Revenue Loss Analysis

District	Additional Right of Way (acres)[a]	EAV of Land[b] ($)	Market Value of Structures[c] ($)	Tax Rates for 2003[d]	Revenue Loss[e] ($)	2003 Total Assessed Taxes[f] ($)	Percent of Tax Loss[g]
Peoria County							
Peoria County	766	$83,494	$1,001,000	0.8604	$3,586	$20,954,700.15	0.02
Fire Protection District (ID#62)	0	$0	$0	NA	NA	not levied	NA
Junior College District 514	766	$83,494	$1,001,000	0.4771	$1,989	$11,639,779.98	0.02
Chillicothe	88	$9,592	$385,000	0.5084	$701	$351,262.09	0.20
Medina Township	199	$21,691	$77,000	0.1732	$82	$347,127.11	0.02
Hallock Township	69	$7,521	$0	0.2206	$17	$64,246.53	0.03
Chillicothe Township	498	$54,282	$924,000	0.1010	$366	$89,193.52	0.41
Medina Township Rd & Br	199	$21,691	$77,000	0.3304	$156	$619,309.75	0.03
Hallock Township Rd & Br	69	$7,521	$0	0.2610	$20	$76,012.33	0.03
Chillicothe Township Rd & Br	498	$54,282	$924,000	0.1580	$603	$99,553.34	0.61
Chillicothe Public Library District	766	$83,494	$1,001,000	0.3402	$1,418	$554,840.93	0.26
Pleasure Driveway Park District	46	$5,014	$0	0.6944	$35	$11,011,356.40	0.00
Chillicothe Township Park District	651	$70,959	$1,001,000	0.1441	$583	$247,260.84	0.24
Peoria County TB Sanitarium District	0	$0	$0	NA	NA	not levied	NA
Chillicothe Sanitary District	24	$2,616	$385,000	0.0882	$115	$55,129.28	0.21
School Unit 321	766	$83,494	$1,001,000	4.5219	$18,849	$8,969,492.11	0.21
Marshall County							
Marshall County Airport Authority	905	$152,040	$2,302,000	0.0608	$559	$104,816.86	0.53
Marshall County	905	$152,040	$2,302,000	1.0913	$10,025	$1,869,323.21	0.54
Henry Fire Protection District	227	$38,136	$716,000	0.6537	$1,808	$292,264.23	0.62
Lacon-Sparland Fire Protection District	554	$93,072	$1,586,000	0.4317	$2,682	$150,345.77	1.78

TABLE 3-17
Tax Revenue Loss Analysis

District	Additional Right of Way (acres)[a]	EAV of Land[b] ($)	Market Value of Structures[c] ($)	Tax Rates for 2003[d]	Revenue Loss[e] ($)	2003 Total Assessed Taxes[f] ($)	Percent of Tax Loss[g]
Junior College District 514	905	$152,040	$2,302,000	0.4823	$4,430	$572,267.20	0.77
(Hopewell)	0	$0	$0	0.5085	$0	$28,145.66	0.00
Sparland	41	$6,088	$77,000	0.7360	$239	$17,504.94	01.37
(Henry)	0	$0	$0	0.9882	$0	$236,420.32	0.00
Steuben Township	648	$108,864	$1,078,000	0.4817	$2,254	$64,527.03	3.49
Whitefield Township	37	$6,216	$508,000	0.5179	$908	$35,816.74	2.54
Henry Township	220	$36,960	$716,000	0.0639	$176	$21,304.94	0.83
Steuben Township Rd & Br	648	$108,864	$1,078,000	0.5350	$2,503	$71,672.02	3.49
Whitefield Township Rd & Br	37	$6,216	$508,000	0.4150	$728	$28,700.83	2.54
Henry Township Rd & Br	220	$36,960	$716,000	0.1574	$433	$52,474.19	0.83
Marshall-Putnam River Conservation District	905	$152,040	$2,302,000	0.0041	$38	$4,315.80	0.87
Marshall-Putnam Soil and Water Conservation District	905	$152,040	$2,302,000	0.0025	$23	$7,064.97	0.32
School Unit 5	220	$36,960	$716,000	4.7200	$12,998	$2,349,831.44	0.55
School Unit 7	685	$115,080	$1,586,000	4.8717	$31,336	$3,356,513.47	0.93
Putnam County							
Putnam County	112	$19,488	$485,000	0.7899	$1,430	$938,948.15	0.15
Henry Fire Protection District	112	$19,488	$485,000	0.6461	$1,169	$83,408.38	1.40
Junior College District 513	112	$19,488	$485,000	0.4161	$753	$494,614.92	0.15
Senachwine Township	112	$19,488	$485,000	0.7704	$1,394	$203,186.31	0.69
Putnam County Public Library District	112	$19,488	$485,000	0.1886	$341	$224,187.39	0.15
Marshall-Putnam River Conservation District/SWCD	112	$19,488	$485,000	0.0065	$12	$7,726.50	0.15
School Unit 5	112	$19,488	$485,000	4.6696	$8,452	$1,224,372.30	0.69

TABLE 3-17
Tax Revenue Loss Analysis

District	Additional Right of Way (acres)[a]	EAV of Land[b] ($)	Market Value of Structures[c] ($)	Tax Rates for 2003[d]	Revenue Loss[e] ($)	2003 Total Assessed Taxes[f] ($)	Percent of Tax Loss[g]
Bureau County							
Bureau County	0	0	0	0.85187	0	$4,112,868.30	0
Tiskilwa Fire Protection District	0	0	0	0.31178	0	$73,666.41	0
Grade School (E 115)	0	0	0	2.51048	0	$4,876,385.82	0
High School (H 500)	0	0	0	2.12475	0	$4,389,414.17	0
Junior College District 513	0	0	0	0.45528	0	$1,876,417.65	0
Arispie Township	0	0	0	1.21626	0	$135,610.81	0
Multitownship Assessment	0	0	0	0.02234	0	$7,353.26	0
Total					$113,209		

[a]New right of way required for construction.
[b]EAV (equalized assessed valuation) = Additional right of way multiplied by $109/acre for Peoria County, $168/acre for Marshall County, $110/acre for Putnam County, and $102/acre for Bureau County.
[c]Equalized assessed value (EAV) of structures within ROW to be acquired: $77,000 per residence and $100,000 per commercial building. (Note: these values reflect estimates made by CH2M HILL and in no way predict the actual purchase price to be offered to individual owners of properties and/or structures. The fair market value of any portion of a land owner's property needed for the proposed highway improvement will be determined by qualified real estate appraisers.
[d]Dollars per $100 of assessed valuation.
[e][EAV of land + (market value of structures × 0.333) / 100] × tax rate.
[f]Total assessed property tax (source: County Assessor's offices for Peoria, Marshall, Putnam, and Bureau counties).
[g]Percent of revenue lost from highway construction.

3.3 Agriculture

3.3.1 Affected Environment

Farming is a major land use in the four-county area and a vital part of its economy. Based on the 2003 Illinois Agricultural Statistics and the 2002 Census of Agriculture, the most current statistics, the combined agricultural lands account for 77 percent of the four-county land area. This translates to 1,020,048 acres of land devoted to farming (Table 3-18). The four counties represent about 10 percent of the state's entire amount of farmland.

TABLE 3-18
Agricultural Lands

	County				Four-County Total or Average	Illinois
	Peoria	Bureau	Marshall	Putnam		
Total Land Area of County (acres)	402,600	559,110	254,880	110,080	1,326,670	35,557,556
Total Land in Farms (acres)	266,280	491,180	191,323	71,265	1,020,048	27,310,833
Percent of Total Land Area Devoted to Farming	66	88	75	65	77	77
Percent Designated Prime Farmland	56	76	75	63	68	NA
Number of Farms	892	1,091	454	175	2,612	73,027
Average Farm Size (acres)	299	450	421	407	394	374
Average Farm Value	$863,792	$1,241,444	$1,195,983	$1,159,919	$1,115,285	$913,251

Source: 2003 Illinois Agricultural Statistics Annual Summary; Census of Agriculture 2002; Soil Surveys of Bureau, Marshall, Peoria, and Putnam counties.

NA = not available

Nearly 70 percent of lands in the four-county area are prime or important soils. As defined in the U.S. Department of Agriculture (USDA) publication *Prime Farmlands, Important Farmlands,* prime farmland is land best suited to food, feed, forage, fiber, and oilseed crops. Prime farmland produces the highest yields with minimal expenditure of energy or economic resources, and farming it results in the least damage to the environment (USDA 1991).

Table 3-19 shows farm data and trends between 1997 and 2002. All counties in the study area experienced a decrease in the number of farms, the largest in Marshall County (8 percent) and the smallest in Peoria County (3.5 percent). Three of the four counties saw increases in average farm size (Bureau, Peoria, and Putnam). Only Bureau County saw an increase in the amount of land in farms; all others saw a decrease in land devoted to farming operations.

TABLE 3-19
Agricultural Resources

County	1997			2002			Percent Change		
	Farmland (acres)	Number of Farms	Avg Size (acres)	Farmland (acres)	Number of Farms	Avg Size (acres)	Farmland Acreage	Number of Farms	Avg Size
Bureau	483,993	1,155	419	491,180	1,091	450	2	-6	7
Marshall	227,521	494	461	191,323	454	421	-16	-8	-9
Peoria	267,283	924	289	266,280	892	299	0	-4	-4
Putnam	76,950	190	405	71,265	175	407	-7	-8	1

Source: USDA. 1997 and 2002 Census of Agriculture.

The three main crops produced in Illinois are corn, soybeans, and wheat. Illinois ranks number two in the U.S. in both corn and soybean production. The four-county area produces about 5 percent of the state's corn and soybeans. In 2003, Bureau County was among the top 10 counties in the state for both corn and wheat production. Throughout the corridor, specialty crops include sweet corn, pumpkins, and green beans. These crops generally are grown in locations where there are sandy soils and the land is irrigated. There are three general areas where center-pivot irrigation[11] systems are used:

- West of Rome (south of Rome West Road)
- West of Chillicothe (approximately from Cloverdale Road to Sycamore Street)
- West of Henry (generally, all farmland west of the community in Marshall County)

Table 3-20 presents a breakdown of the cash receipts for the four project-area counties.

TABLE 3-20
Cash Crop Receipts, 2003 (thousand dollars)

	Bureau County	Marshall County	Peoria County	Putnam County	Illinois
Corn	$84,741	$30,343	$39,480	$11,108	$3,258,853
Soybeans	$46,146	$20,179	$24,115	$7,371	$2,557,704
Wheat	$830	$302	$615	[a]	$157,356
Other Crops	$3,435	$2,825	$5,777	[a]	$516,193
Total Crop	$135,160	$53,649	$69,987	$18,955	$6,490,106
Livestock	$28,630	$5,729	$18,297	$3,067	$1,799,851
Total Receipts	**$163,790**	**$59,378**	**$88,284**	**$22,022**	**$8,289,957**

Source: Illinois Agricultural Statistics Annual Summary. 2003.

[a]Counties with less than 1,000 acres harvested for grain not published.

The production of crops and other agricultural commodities plays an important role in the study area's economy. According to the 2000 U.S. Department of Commerce Bureau of Economic Analysis, 5,959 people in Bureau, Marshall, Peoria, and Putnam counties were employed in farming and agricultural services, which represents nearly 4 percent of the work force. Agribusinesses in the project area include grain elevators (both rail and river

[11]A method of agricultural irrigation using a long, wheeled arm with many nozzles that pivots about the center of a circle. Center-pivot irrigation systems can be used to apply both water and fertilizer to the soil.

terminals), fertilizer companies (both wholesale and retail), and other agricultural related businesses. Refer to subsection 3.2.1.2, Economic, for more information.

The proximity of the Illinois River makes the area an agribusiness transportation center. Water freight transport of bulk commodities is an important part of the transportation system in the project area. There are several barge terminals along this stretch of the Illinois River, including ones in Hennepin, Henry, Chillicothe, and Lacon. For the 37-year period 1965 to 2002, commercial traffic has increased an average annual rate of 1 percent for the entire Illinois Waterway, including the Illinois River.[12] About 45 percent of the commodities transported on the Illinois Waterway are related to agriculture (Table 3-21).

TABLE 3-21
Commodities Transported on the Illinois Waterway in 2000

Commodity	Percent
Corn	28
Petroleum Products	15
Construction Materials	13
Soybeans	10
Iron and Steel	9
Industrial Chemicals	7
Coal and Coke	5
Fertilizers	3
Prepared Animal Feed	3
Wheat	1
Other	6

Source: Waterborne Commerce Statistics Center 2000.

The USACE forecasts that barge traffic will continue to increase over the next 40 to 50 years along the Upper Mississippi River and the Illinois Waterway under all scenarios except under the most unfavorable trade conditions.[13]

There are three agricultural-related businesses located along IL 29 corridor, all near Henry and Putnam. In the Henry area are several agricultural-related businesses:

- Morrissey Produce Stand: east side of IL 29, south of 300 N north of Henry
- Read Brothers (farm implements): southeast quadrant of Western Avenue and IL 29 in Henry
- AgView Coop FS: west side of IL 29, south of Henry
- Two fertilizer businesses: east of IL 29 in the Henry Industrial Park

3.3.1.1 Agricultural Lands

The Conservation Reserve Program (CRP) is available to agricultural producers to take highly erodible or environmentally sensitive lands out of agricultural production for contract periods of 10 to 15 years. The program encourages farmers to voluntarily plant permanent areas of vegetative cover such as native grasses, wildlife plantings, trees, filter

[12]USACE April 2004. *Draft Integrated Feasibility Report and Environmental Impact Statement for the UMR-IWW System Navigation Study*.

[13]The USACE developed a number of different export scenarios based on trade policies to develop forecasts for future commercial/barge traffic along the Upper Mississippi River and Illinois River. The range of exports across all scenarios by the year 2050 is projected to be as high as 161.4 million metric ton under the Most Favorable Trade Scenario to as low as 36.8 million metric ton under the Least Favorable Trade Scenario. (USACE, *Draft Integrated Feasibility Report and Environmental Impact Statement for the UMR-IWW System Navigation Study*, April 2004)

strips, or riparian buffers to improve water quality or provide food and habitat for wildlife. In return, farmers receive annual rental payments, incentive payments for certain activities and cost-share assistance to establish the protective vegetation.

The CREP is an offshoot of the CRP that is focused on protecting and improving water quality in the Illinois River. Like CRP it establishes contracts with farm operators to plant specific kinds of vegetation near streams and rivers. The goals of the CREP are to reduce total sediment loading in the Illinois River by 20 percent; reduce phosphorous and nitrogen loading in the Illinois River by 10 percent; increase waterfowl, shorebirds and state- and federal-listed species by 15 percent; and increase native fish and mussel stocks by 10 percent in the lower reaches of the Illinois River.

Approximately 367 acres of land on 19 properties within the project corridor are part of the CRP or CREP. Four properties are located in Peoria County, 11 in Marshall County, 1 in Putnam County, and 3 in Bureau County.

The Agricultural Areas Conservation and Protection Act (P.A. 81-1173) provides a means by which agricultural land may be protected and enhanced as a viable segment of the state's economy and as an economic and environmental resource of major importance. These "ag areas" must consist of 350 contiguous acres or more of land. They are organized among local landowners and county government, then registered as an Agricultural Protection Area with the Illinois Department of Agriculture (IDOA) for the purpose of designating blocks of land committed to production of agricultural commodities. Within the four counties of the project area, there are 13 ag areas covering 19,220 acres. Putnam County has the greatest amount of land in the program with 7,328 acres, followed by Marshall County with 5,412 acres. There are no ag areas near the project area in Bureau or Peoria counties. In Putnam County, there is one ag area that is bisected by existing IL 29. In Marshall County, two ag areas are near the project area (Aerial Exhibit sheets 8 and 17).

There are six centennial farms in the project area: two each in Marshall, Peoria, and Putnam counties. Centennial farms are farms that have been owned by a straight or collateral line of descendants of the original owner for more than 100 years.

3.3.1.2 Soils

The soils and topography throughout most of the corridor range from good to ideal for an agricultural environment. The best soils are typically found along IL 29 and in the areas of flatter topography. In contrast to the bluff areas, the flatter areas generally contain fewer highly erodible soils, and are blacker in color (Edwards 2003). Most of the area's natural drainage is toward to the Illinois River, with the low-lying areas subject to frequent brief flooding.

As stated in *Prime Farmlands, Important Farmlands*, published by the USDA, Soil Conservation Service, agricultural lands are divided into two principal categories: prime farmland and additional farmland of statewide importance (important farmland). Prime farmland is defined as land with the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. The land must have the soil quality, growing season, and moisture supply needed to produce economically sustained high yields when treated and managed according to acceptable farming methods.

Prime farmland is found throughout the project area. Prime farmland generally is used for crops, mainly corn and soybeans, which account for most of the local agricultural income each year. The amount of prime farmland, by county, is as follows:

- In Peoria County, about 227,000 acres, or more than 56 percent of the total acreage
- In Marshall County, about 190,000 acres, or more than 75 percent of the total acreage
- In Putnam County, about 69,000 acres, or more than 63 percent of the total acreage
- In Bureau County, about 423,000 acres, or more than 76 percent of the total acreage

Important farmland is of statewide importance for the production of food, feed, fiber, forage, and oil seed crops. Farmlands of statewide importance include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. The amount of important farmlands by county is as follows:

- In Peoria County, 78,215 acres, or more than 19 percent of the total acreage
- In Marshall County, about 31,985 acres, or more than 12 percent of the total acreage
- In Putnam County, about 16,740 acres, or more than 15 percent of the total acreage
- In Bureau County, 15,305 acres, or just less than 3 percent of the total acreage

3.3.2 Environmental Consequences

This section describes the Preferred Alternative's impacts to farm operations. A farm operation is defined as one or more parcels of land farmed as a single unit. Although farmed under single management, a farm operation may be under multiple ownership. The USDA/Farm Service Agencies in the four counties provided information on farm boundaries and owners/operators of individual farm units in the project corridor.

The Federal Farmland Protection Policy Act, enacted by Congress in 1984, established criteria for identifying and considering the effects of federal programs (such as the construction of the proposed improvements to IL 29) on the conversion of farmland to nonagricultural uses. Form AD-1006 of the National Resource Conservation Service (NRCS) is used for this purpose (Appendix B). The fundamental purpose of the Act is to minimize the extent of farmland conversion and impacts and to "assure that federal programs are administered in a manner that, to the extent practicable, will be compatible with state, unit of local government, and private programs and policies to protect farmland." The Preferred Alternative described in Section 2 was developed to limit severances and overall agricultural impacts to the extent practicable.

The agricultural impacts discussed in this section include loss of farmland, farmland severances with the associated changes in cropping patterns, irrigation practices and field access and displacement of farm residences and outbuildings. For the purpose of this discussion, farmland is defined as cropland and other cover types (wetlands, forest, etc.) found on farms. Cropland includes cropped fields, pasture and hay land, vineyards, and orchards.

The No-Build Alternative would not acquire land from farm operations in the project area. However, as traffic volumes increase travel efficiency and possibly safety for farm vehicles using IL 29 would be expected to decline.

Table 3-22 summarizes the Preferred Alternative's key agricultural impacts. Exhibit 3-10 provides an illustration of the terms used in this subsection. Agricultural impacts are discussed in the subsections below.

TABLE 3-22
Summary of Key Agricultural Impacts

	No-Build Alternative	Preferred Alternative
Number of Farms Affected	0	90
Farmland Required to Construct the Facility (acres)	0	978
Farmland Affected by Landlocked and Environmental Mitigation Parcels (acres)	0	113
Total Farmland Affected (acres)[a]	0	1,202
Cropland Affected (acres)[b]	0	1,027
Number of Farm Severances	0	33
Displaced Agricultural Residences	0	12

[a]Of the total farmland and cropland acres affected, 111 acres south of Cedar Hills Drive are currently owned and leased by IDOT.

[b]There are 6,878 acres of cropland in the project area.

3.3.2.1 Agricultural Acres Required

Total Farmland Converted. As shown in Table 3-22, 978 acres of farmland will be purchased as right-of-way to construct the Preferred Alignment and therefore will be removed from agricultural use. This total includes 814 acres of cropland and 164 acres of other cover types on farm properties. The affected cropland acreage includes 803 acres of row crops, 7 acres of pastureland, 4 acres of orchard/vineyard, 111 acres of affected cropland on lease by IDOT, and 102 acres of cropland on landlocked/environmental mitigation properties.

Another 113 acres of farmland located on landlocked properties and environmental mitigation properties will be removed from agricultural use. These properties will be used as sites to mitigate wetland, woodland and threatened and endangered plant impacts. The use of these parcels for mitigation sites would eliminate or reduce the need to remove additional agricultural lands from production for mitigation purposes. Also cropland located on the landlocked parcels will be investigated for use as borrow.

The land that would be purchased from farm operations for the Preferred Alternative represents well under one percent of the 1,020,048 acres of farms in the four-county area.

Of the 1,202 acres of farmland affected, 730 acres are located in the off-alignment portion between the IL 6 interchange and the north Chillicothe interchange and 246 acres along the Henry bypass. The remaining 226 acres affected are from farms along IL 29.

Conservation Reserve Program Lands. A total of 18 acres of CRP land will be acquired from 5 farms. Most of the affected CRP land is located in the off-alignment section between IL 6 and north of Chillicothe and the rest is along the existing alignment. Standard CRP contracts can be 10 to 15 years in duration. Converting CRP land to highway right of way will violate the terms of the contract with NRCS and will require IDOT to coordinate with NRCS to determine if there will be financial consequences of acquiring CRP land.

Centennial Farms. The Preferred Alternative would affect land from three centennial farms in the project corridor. The extension of McGrath Road west to Krause Road would affect about 2 acres from the Linden centennial farm near the proposed McGrath interchange (west of Chillicothe). The expansion of IL 29 to the west north of Cabin Hill Road would acquire a 4-acre strip of cropland from the Condit centennial farm and a 7-acre strip from the Shady Bluff Farm.

3.3.2.2 Soils/Land Capability Groupings

Prime and Important Soils. Approximately 83 percent, or 954 acres of the total soils that would be converted by the project from agricultural use is classified as prime farmland (Table 3-23). Another 9 percent, or 100 acres, of farmland that would be converted is classified as important farmland.

TABLE 3-23
Conversion of Prime and Important Farmlands

Category	Acres Affected		Total in Four-County Area (acres)
	Acres	% of Total Affected	
Prime	954	83	909,000
Important	100	9	142,245
Other	95	8	275,425
Total	**1,149**	**100**	**1,326,670**

Note: The total includes area required for construction of proposed highway and 111 acres south of Cedar Hills Drive currently owned and leased by IDOT. The total does not include farmland on land-locked parcels. The acres of impacted soils is more than agricultural lands impacted because soil impacts constitutes all area within the proposed right of way where agricultural impacts omit urban and built-up land and IDNR land within proposed right of way.

Land Capability Classes. There are 73 soil types along the proposed alignment alternative. By overlaying the proposed right of way limits on the soil survey maps, 56 soil types affected by the Preferred Alternative were identified. Existing right of way was excluded from the overall effects, because existing right of way already has been converted to nonagricultural uses. Generally, Classes I and II are considered prime soils. Table 3-24 summarizes affected lands. by soil class for the Preferred Alternative.

TABLE 3-24
Impacts by Soil Capability

Soil Grouping[a]	Acres
Class I	61
Class II	914
Class III	43
Class IV	51
Class V	10
Class VI	18
Class VII	27
Total[b]	**1,124**

[a]The remaining 25 acres of soil is not classified for soil capability.

[b]The total includes area required for construction of proposed highway and 111 acres south of Cedar Hills Drive currently owned and leased by IDOT. The total does not include farmland on land-locked parcels.

Displacements. The Preferred Alternative would displace 12 farm residences and 49 outbuildings.[14] Of the 12 farm residences displaced, three are between IL 6 and the north Chillicothe interchange, one is within the north Chillicothe interchange, four are between the north Chillicothe interchange and Crow Creek, two are between Crow Creek and the Henry Bypass, and two are along the Henry Bypass. Given the small lot size of some of the displaced properties, it is expected that seven of the farm residences would not relocate elsewhere on the property but that the other five would. The "Uniform Relocation Assistance and Real

[14] The Farm Service Agency has identified the 12 residences as owned by farmers. The farmland worked by the owner may not be contiguous to the residence.

TABLE 3-25
Impacts to Farm Operations

Impact Type	Acres	Number
Farm Operations	NA	90
Displaced Agricultural Residences	NA	12
Displaced Agricultural Outbuildings	NA	49
Landlocked Parcels	54	5
Environmental Mitigation Parcels	56	4
Uneconomical Remnants	18	13
Farms Severed	NA	25
Severance Management Zones	178	208

Property Acquisition Act of 1970, as amended" applies to all federal or federal-assisted activities that involve the acquisition of real property or the displacement of residences or businesses. IDOT would provide just compensation for each property acquired by new right of way. Just compensation is a monetary payment equivalent to the fair market value of the property. Fair market value is the highest estimated price the property would bring if sold on the open market, with a reasonable time allowed to find a buyer, and buying with the knowledge of all the uses to which it is adapted, and for which it is capable of being used. Mitigation of relocation impacts or displaced structures would be in the form of financial remuneration or compensation for property loss and relocation expenses, as outlined in the Uniform Relocation and Real Property Acquisition Act of 1970, as amended. See subsection 3.2.2.3 for more information about the compensation for displaced farm residences and other residences. Table 3-25 identifies displaced agricultural residences and outbuildings as well as other impacts to farm operations.

Severances. Severances occur when a contiguously farmed parcel is divided either laterally or diagonally by the proposed improvements. Twenty-five farms would be severed by the project. As would be expected, severances are found only on new alignment. Most severances are between IL 6 and north of the Chillicothe interchange and along the Henry bypass. Other severances occur within the proposed Sparland interchange and improved access to Senachwine Lake Road in Putnam.

The effects of property severances include changes in cropping patterns and field access because of parcel splits. Direct access to farm fields would not be allowed from IL 29 between IL 6 and the north Chillicothe interchange. North of Chillicothe, access to farm fields from IL 29 would be permitted. As a result of farm severances, some project-area farmers would experience changes in the way they work, irrigate, and move between their fields.

The inability to cross the freeway between IL 6 and the north Chillicothe interchange would affect farmers who have land on both sides of the proposed freeway. A severed farm requires farmers to travel on local roads with farm machinery to reach the nearest interchange that provides access to the severed parcel. Not only does the increased travel time for farmers reduce profits, it also increases the potential for conflicts on local roads between farm machinery and other vehicles. Farmers whose wells would be separated from their irrigation equipment would seek compensation from IDOT for the cost of developing a new well because IDOT will not permit irrigation piping to be located under the Preferred Alternative.

Remnants. Severed parts of a farm that are 3 acres or less and still accessible may be uneconomical to farm. Thirteen remnants less than 3 acres in size totaling 18 acres would be created as a result of the Preferred Alternative. In general these areas are located at interchanges or in locations where the proposed alignment is not parallel to property lines.

During the land acquisition process, the acquiring agency would determine if any remainder are uneconomic remnants (i.e., of little value or use to the owner). If any remainders are determined to be uneconomic remnants, the acquiring agency will offer owners the option of acquiring those remnants.

Landlocked Parcels. A landlocked parcel is an area of a property that is isolated by IDOT's right of way, thereby rendering it inaccessible by public road or easement. Landlocked parcels on agricultural land would be created by the proposed Henry interchange and difficulty in providing access to properties adjacent to the proposed freeway between the IL 6 interchange and the north Chillicothe interchange. Approximately 54 acres of farmland will be landlocked by the proposed IL 29 improvements. The landlocked agricultural parcels will be used for mitigation sites thereby eliminating or reducing the need to remove additional agricultural lands from production for mitigation purposes. Cropland located on the landlocked parcels will also be investigated for use as borrow.

Environmental Mitigation Areas. Environmental mitigation areas are properties located east of IL 29 and the railroad between Chillicothe and Sparland that IDOT will purchase and turn over to IDNR for future management. These properties, which total approximately 657 acres will be used to mitigate the project's environmental impacts. Of the 657 total acres, there are approximately 56 acres of cropland that would be taken out of production. The remainder of the mitigation parcels are floodplain forest or water.

Adverse Travel. Adverse travel would be caused by improvements to IL 29 (or a proposed interchange) crossing a farm dividing one part of the property from another. The increased distance a farmer must travel between the severed pieces to avoid crossing IL 29 is considered adverse travel. The amount of adverse travel each farmer experiences is calculated by subtracting the round trip distance the farmer travels today between one side of a field and the other or one field and another without the project from the round trip distance after the Preferred Alternative is constructed. Six farm operations would be affected by adverse travel. The amount of adverse travel would range from 1 mile to 6 miles.

3.3.2.3 Income

The Preferred Alternative would result in an annual agricultural income loss of $368,436,[15] representing reduced farm production from crops. The reduction in income generated by crops could be recovered by renting farmland. The Marshall/Putnam Farm Services Agency Office indicated that cropland in the project corridor is renting for about $200/acre. It noted, however, that very little land is available for rent. For farmers who continue to work severed properties, there would be an increase in transportation costs associated with out-of-distance travel. The transportation cost increase would vary by farmer depending on the amount of out-of-distance travel.

Offsetting the lost income from crops to some degree would be the possible savings in transportation costs associated with the proposed IL 29 improvements. The costs associated with trips to and from grain elevators or beyond the study area could be reduced by the increased efficiency and safety of the improved IL 29.

[15] The estimate of $358.75/acre for corn was used to estimate agricultural income loss for the new right of way. Personal communication with Kent Mason of the Marshall/Putnam Farm Service Agency Office on February 24, 2005.

3.3.2.4 Irrigation and Subsurface Drainage Maintenance

Twelve center-pivot operations would be affected to varying degrees by the Preferred Alternative: eight in the section between IL 6 and the north Chillicothe interchange and four along the Henry bypass. Of the 12 operations that would be affected, the Preferred Alternative would separate one well from an irrigation system and remove one other well. Farmers whose wells would be separated from their irrigation equipment would seek compensation from IDOT for the cost to develop a new well because IDOT will not permit irrigation piping to be located under the Preferred Alternative. In addition, irrigation systems affected by IL 29 would need to be modified to properly cover the reduced irrigated area. Finally, changes to irrigation patterns caused by the Preferred Alternative would likely create corners and edges that would be not be irrigated and likely unavailable for crop production.

The Preferred Alternative would be constructed at least 3 feet above the 50-year flood condition. Existing drainage patterns and ditch flowline elevations were taken into consideration when the proposed profile grade was selected. Detention facilities will be constructed to improve water quality of drainage from the proposed highway. See Section 3.8, Surface Waters Resources and Quality.

3.3.2.5 Farmland Conversion Impact Rating

In order to comply with state and federal agriculture protection regulations (the Farmland Preservation Act and Farmland Protection Policy Act, respectively), the NRCS developed the Land Evaluation and Site Assessment (LESA) system. It is a tool for evaluating the relative effect development projects would have on farmland. NRCS uses it to evaluate the productivity of the soils affected by a project (the Land Evaluation section). IDOA also uses it to assess the impact a project may have on the viability of farmed land in that project's corridor (the Site Assessment section). The following are examples of the factors that contribute to a Preferred Alternative's Site Assessment rating:

- Amount of agricultural land required
- Creation of severed farm parcels, uneconomical remnants, landlocked parcels, and adverse travel
- Relocations of rural residences and farm buildings
- Use of minimum design standards

Each factor is given points, which are tallied to reach an overall rating and included on Farmland Conversion Impact Rating Form AD-1006 (Appendix B). For corridor projects, the Land Evaluation section can receive as high as 100 points, whereas the Site Assessment section can receive 150 points. The higher the rating, the better suited the location is for agriculture and is encouraged to be retained for agricultural uses. LESA scores of 226 and above are in the high protection bracket, a rating between 176 and 225 indicates a moderate need for protection, and a rating below 175 indicates low protection status. The LESA score for the IL 29 project is 219 points.

3.3.3 Measures to Minimize Harm

The following management and design practices were and will continue to be incorporated into the proposed alignment to help minimize disruptions to agricultural activities and limit adverse impacts to designated soils:

- Design alignment to parallel property lines, where feasible, to keep farm severances, severance management zones and uneconomical remnants to a minimum.
- Where practical, construct field access roads to maintain access to farm fields.
- Maintain existing surface and subsurface drainage.
- Locate field tiles draining to, or intersected by, the proposed highway's right of way by trenching to ensure that proper field drainage is maintained during construction.
- Investigate areas of cropland and nonnative grasses on landlocked parcels for use as borrow areas. If suitable, they would be given priority as sources of borrow, thereby reducing additional impacts to agricultural lands.
- Implement sedimentation and erosion control measures to minimize loss of topsoil into streams and roadside ditches. (See subsection 3.8.3, Surface Water Resource and Quality, for more information.)
- Lessen agricultural impacts by using landlocked parcels for mitigation purposes.

3.3.4 Indirect Impacts

3.3.4.1 Background Information

Because agriculture is the first "resource" topic that includes an analysis of indirect impacts, an explanation is provided here about the general philosophy that guided the thought process on this topic. The background text below describes the indirect development potential in the project area based, in part, on the information local governments provided to the project team about reasonably foreseeable indirect development. The concept of "reasonably foreseeable development" used in this document follows the guidance in *Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process*. That is, reasonably foreseeable actions are those "likely to occur or probable rather than those that are merely possible." For the purpose of this document, reasonably foreseeable actions were generally limited to developments identified by local officials.

In addition to agriculture, indirect and cumulative evaluations are included for Surface Water Resources/Quality, Wetlands, Upland Plant Communities, and Designated Lands. Following this general discussion will be an evaluation of the project's indirect impacts on agriculture.

The analysis of indirect impacts began by examining the project area's potential for growth beyond the proposed IL 29 right of way. The general contention is that an area that is not already developing (or showing evidence of a development trend) is unlikely to experience indirect development simply because an existing highway is improved. Residential and commercial development decisions generally are based on such factors as labor force quality, housing prices, tax structure, quality of schools, proximity to employment, and

others largely unrelated to proposed highway improvements. Efficient transportation facilities are a factor in development decisions, but without most or all the other factors mentioned, transportation improvements alone are not enough to change an area's attractiveness for development.

Thus, it seems very unlikely that reasonably foreseeable development attributable to the IL 29 improvements will occur outside project communities and interchanges adjacent to them. There is no current evidence in the project area of widespread development (or a movement in that direction) that would be stimulated by the proposed IL 29 improvements. The limited existing growth in the corridor is found primarily in the larger Chillicothe area and, to a lesser extent, in Henry. Chillicothe and the surrounding area is experiencing some growth because of its proximity to employment in Peoria, its school system, and the fact that it has a large enough nucleus of people to support new development. Henry, with its industrial park and other commercial opportunities, has the best employment opportunities in the north project area; it has a high school and other facilities, such as the fair grounds, that make it a destination for the surrounding rural areas.

The 2.6 percent population decline in the four-county area between 1960 and 2000 speaks to the limited historic development potential in the study area. In addition, population projections for the four-county area through 2020 (a 5 percent increase in Marshall County, a 3 percent increase in Peoria County, and a 3 percent decline in Putnam and Bureau counties) support the contention of limited future growth potential in the study area.

In addition, it is reasonable to expect that the features along IL 29 that have posed challenges for widening along the existing alignment will limit the potential for indirect development. From the north side of Chillicothe to Henry, the Illinois River floodplain and its associated lakes and wetlands and publicly owned land (IDNR and FWS) along long stretches of the east side of IL 29 will preclude future development. Within that same general area, the bluff along the west side of IL 29 and IDNR property south of Sparland also impose constraints on indirect development. At the north end of the study area, Goose Lake and wetlands east of IL 29 and the Miller-Anderson Woods Nature Preserve on the west side also limit the potential for indirect development.

In discussions with Chillicothe and Peoria County, there was no mention of reasonably foreseeable indirect development south of Chillicothe. The freeway typical section, IDOT-owned right of way, and property owned by Caterpillar reduce the likelihood of development outside the right of way between IL 6 and the proposed Cedar Hills Drive interchange. The frontage road between Mossville Road and Cedar Hills Drive presents an opportunity for indirect development, although Peoria County mentioned no specific proposals. Additional constraints on indirect development are imposed by Camp Wokanda, Singing Woods Nature Preserve, and Audubon Wildlife Area. Although no information about reasonably foreseeable development associated with the proposed Rome West Road interchange was offered by Chillicothe, the definition of "reasonably foreseeable" could be expanded to assume that some development would occur in all four quadrants of the interchange. The acreage lost would be entirely agricultural land.

Chillicothe is one of two communities in the corridor with a land use plan. In cooperation with the Tri-County Regional Planning Commission, Chillicothe developed land use scenarios with and without the bypass. In the area near the proposed IL 29 bypass, its land

use plan covers an area approximately from the proposed McGrath interchange on the south to the interchange north of Chillicothe. Indirect development would be any reasonably foreseeable development above and beyond Chillicothe's planned development with the bypass. In a meeting with Chillicothe's mayor, there was no indication of indirect development beyond the future land use plan.

If indirect development were to occur between Chillicothe and Henry, it likely would be in or near Sparland because of the modest level of existing development and its location at the crossroads of IL 29 and IL 17. With the split diamond interchange proposed in Sparland, indirect development could occur at or near the entrance and exit ramps on the west side of IL 29, outside the Illinois River floodplain. Sparland officials indicated that no new development would occur east of IL 29 because it is within the Illinois River floodplain. The flood buyout properties east of IL 29 are evidence of the development constraint posed by the Illinois River floodplain.

North of Sparland, the east side of IL 29 is dominated by publicly owned land, the Illinois River floodplain, Wightman Lake, and wetlands. The potential for indirect development on the west side of IL 29 is diminished by landlocked properties near Thenius Drive, IDOT's property north of Sparland, and the bluff. It is assumed that expanding IL 29 would not increase the likelihood of reasonably foreseeable development on the bluff west of Sparland. The distance between IL 29 and the top of the bluff and the few connections between the top of the bluff and IL 29 would not make the bluff any more attractive for indirect development than it is today.

The greatest potential for indirect development in the Henry area and to the north is in and around Henry. The project team met with Henry officials in November 2004 to discuss development issues. During the meeting, projects were discussed that have been proposed in Henry (the sand quarry and the ethanol plant, both of which would require a new harbor on the Illinois River). Henry officials did not know whether or when those projects would begin, but they did note that the decision to proceed with the projects is not related to the proposed IL 29 improvements. Other possible development mentioned by the Henry officials were a 40-acre subdivision and a hotel, but they could not give a time for beginning either development. Henry officials could not identify any reasonably foreseeable indirect development beyond their Comprehensive Plan limits. They acknowledged that Henry's growth would not be constrained by the proposed bypass west of Henry.

Because Henry's Comprehensive Plan extends to the east side of the bypass, it would be reasonable to include the proposed Western Avenue interchange on the west side of the proposed IL 29 as land that could undergo indirect development. It is likely, however, that in the update of Henry's land use plan, the western half of the interchange (and some land west of the bypass) will have a land use designation.

No information has been obtained about any reasonably foreseeable development induced by the highway north of Henry. The lack of commercial development in Putnam aside from the grain elevator and of any new residential development suggests that Putnam would not be expected to experience indirect development pressure as a result of the Preferred Alternative. A new subdivision is planned in a wooded area north of Putnam. This type of unplanned residential development may occur in the future, but there is no indication that it is in response to improvements to IL 29. North of Putnam, the potential for indirect

development is diminished by Goose Lake and associated wetlands on the east side of IL 29 and Miller-Anderson Woods Nature Preserve on the west side of IL 29.

3.3.4.2 Agricultural Indirect Impacts

The focus of the indirect agricultural impacts discussion is on land removed from agricultural use. Local officials identified no reasonably foreseeable indirect development that would affect agriculture.

Between the IL 6 and proposed Cedar Hills Drive interchanges indirect development may be possible along the west side frontage that could affect the cropped land between the Preferred Alternative and the wooded bluff. Residential development of just the cropped land seems unlikely given the proximity of the freeway and a general preference for wooded building sites. Residential development that incorporated the cropped land and the wooded bluff to the west is possible on any one of the four properties south of the IDOT property south of Cedar Hills Drive. Given that no development is reasonably foreseeable, no estimates will be made to the potential impacts on cropland. The cropland along the frontage road could be developed for commercial/industrial uses. However, given the amount of available land for such development along Old Galena Road and in established locations such as the Mossville Industrial Park (that will have equally convenient access to the IL 6 and Cedar Hills Drive interchanges), there is no reason to expect that there will be a strong demand for commercial/industrial development there.

No indirect development of cropland is expected along Cedar Hills Drive because most of the land in the interchange area is owned by Caterpillar and IDOT. The combined Wayne/Krause frontage road presents an opportunity for indirect development at the proposed Rome West Road interchange. Residential development similar to the Galena Knolls subdivision just east of the proposed interchange seems unlikely. In an area with an abundance of undeveloped land, it is difficult to imagine the attraction of a new residential development immediately adjacent to a freeway. Highway services (fast food restaurants, service stations) along the frontage road (relocated Wayne Road to Krause Road) or Rome West Road (outside IDOT's access-restricted area) are possible. This type of development is more likely to acquire small parcels along the frontage road or Rome West Road than multiple acres of land.

IDOT's position on the proposed McGrath interchange is that it would be constructed when development and traffic volumes warrant, rather than as part of the Preferred Alternative. Given that existing development will drive the need for the project, no indirect impacts are expected at this location. In the Truitt Road interchange area, no indirect development is expected at Cloverdale Road and Sycamore Street because they will not have access to the Preferred Alternative. Indirect development along the north side of Truitt Road will be precluded by the gravel quarry. Although new residential growth is occurring west along Truitt Road, it is reasonable to assume that part of the attraction is larger lot development in a quiet setting. The freeway and interchange are thought to be a deterrent to residential development that could affect cropland rather than an attraction. Highway services development along the south side of Truitt Road (outside the access restriction area) could acquire small parcels of agricultural land.

Chillicothe officials did not identify any indirect development at the proposed north Chillicothe interchange. Planned development in Chillicothe is shown in Exhibit 3-8. Two areas may cause indirect impacts to agricultural land: the extended driveway serving the Riverside Materials property, and the proposed frontage road serving the Chillicothe Driving Range. In both cases it seems that only commercial/industrial uses would be attracted to those areas. Given that Chillicothe did not envision any indirect development there, no estimates will be made on potential impact to agricultural land.

The only agricultural property in the Sparland interchange area has recently been purchased by Ducks Unlimited, and, therefore, no indirect impacts are expected at that location.

Henry's future land use plan shows that planned development extends approximately to the east edge of the Preferred Alternative (Exhibit 3-9). Henry officials acknowledged that new development likely would locate west of existing IL 29, but they did not identify any reasonably foreseeable indirect development in the interchange area. Because Henry's future land use plan calls for commercial and residential development of the agricultural land between existing IL 29 and the proposed bypass, the Preferred Alternative would not contribute to "new" indirect agricultural impacts in the southeast and northeast quadrants of the interchange; rather, it may change only the timing of the development and the type of land use that ultimately develops on the agricultural land. The proposed Western Avenue interchange could create more commercial land use than identified in Henry's future plan, but the impact to agricultural land would be no different. Indirect development that would affect agricultural land is possible in the proposed interchange's southwest and northwest quadrants. The three agricultural properties in the northwest quadrant served by the proposed frontage road and the property immediately west of southbound entrance ramp would be the most likely locations for indirect development. Although Henry's existing future land use plan does not cover the west side of the proposed Henry bypass, Henry officials indicated that they did not view the east side of the proposed Henry bypass as a logical growth boundary. They indicated that they could foresee providing sewer and water to both sides of the bypass, and if growth pressure required expanding west of the bypass, they would amend the land use plan to allow such growth. It is reasonable to expect that to control the type and intensity of development immediately adjacent to future plan land use limits, Henry officials will amend their land use plan to include the west side of the bypass before the bypass is constructed. From the standpoint of indirect impacts, this would create a condition similar to that east of the bypass, where the land use plan calls for the conversion of agricultural land. The Preferred Alternative may affect only the timing of development and the mix of land uses that convert the agricultural land.

North of Henry, no interchanges are proposed and no reasonably foreseeable indirect impacts to agriculture are expected.

3.3.5 Cumulative Impacts

This section evaluates potential cumulative impacts on agriculture in the study area. As noted, cumulative impacts "result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (Title 40, *Code of Federal Regulations*, 1508.7). They can result from individually minor but collectively significant actions taking place over a period of time.

Several projects identified during the course of the study could contribute to the loss of agricultural acres in the project area in addition to the Preferred Alternative. Planned development has contributed and will continue to contribute to the loss of agricultural land. An examination of Henry's and Chillicothe's future land use plans clearly shows that the projected growth areas in both communities are dominated by agricultural land. Within those communities, 1,851 acres of agricultural land would be converted to other uses. The timing of the development of agricultural land in both communities is unknown. Development of agricultural land in parts of the project area that do not have future land use plans also would affect agricultural land.

In the Henry area, a sand quarry may affect existing agricultural land. Although not normally considered "new development," the effect of sand or gravel mining in the project area on agricultural land is the same as residential or commercial development. A sand quarry could affect 400 to 600 acres of existing agricultural land. Expansion of the Galena Gravel Quarry north of Truitt Avenue and the Riverside Materials quarry east of IL 29 (north of Chillicothe) also would remove agricultural land from production.

In addition to agricultural land lost to new development, USDA programs such as the Conservation Reserve Program, the Conservation Reserve Enhancement Project, and the Wetland Reserve Program remove thousands of acres of agricultural land from production in the general project area. Agricultural land enrolled in these programs is not permanently converted in every instance as it would be with new development, but it could be out of production for at least 10 to 15 years, the normal length of a CRP contract. It should be noted that there are permanent conversions of agricultural land participating in these programs, the most notable local example being the Hennepin and Hopper Lake Restoration Project on the east side of Illinois River, which converted 2,600 acres of farmland to mix of open water, wetland, and upland habitat. That restoration project was funded, in part, by CREP.

An example of private purchase of agricultural land with the intention of converting part of it to waterfowl habitat is the recent Ducks Unlimited purchase of the 378-acre agricultural property south of IL 17 in Sparland. It is expected that part of the property will be converted to wetlands or open water habitat for waterfowl habitat.

3.4 Cultural Resources

3.4.1 Affected Environment

Cultural resources in the project area have been investigated pursuant to the National Historic Preservation Act of 1966, as amended. The studies, carried out with the cooperation of the Illinois State Historic Preservation Officer, were designed to identify the types of cultural resources present in the project area and to produce data which will allow a determination of eligibility in terms of National Register of Historic Places criteria and to aid in the formulation of mitigation measures, if and when appropriate.

3.4.1.1 Historic Resources

Buildings and standing structures more than 50 years old along the proposed project were photographed and evaluated for a preliminary determination of historical status. A review of published historic site files and maps was conducted. A historic bridge over Barrville Creek

(SN 062-0011) was identified from the IDOT's Historic Bridge Survey Listing as being in the National Register of Historic Places. Six other structures were evaluated in terms of the criteria for eligibility for the National Register of Historic Places. Four of the properties—a school building, two houses, and a farmstead—do not meet the criteria for listing on the National Register. The fifth and sixth properties— the Bazyn House on Western Avenue west of Henry and the Whiffle Tree Place in Sparland—retain their architectural integrity and are considered eligible under Criterion C. Appendix A (State and Federal Agency Coordination) contains coordination letters with Illinois Historic Preservation Agency (IHPA). Aerial Exhibit sheets 10, 11, and 14 show the locations of the Barville Creek bridge and the two residences. There are no historic districts in the project area.

3.4.1.2 Archaeological Resources

Archaeological surveys have been conducted within the 36-mile long corridor by University of Illinois survey crews working for the Illinois Transportation Archaeological Research Program under contract to IDOT. Areas with good ground surface visibility, such as cultivated fields, were subjected to systematic pedestrian surveys conducted at 10- to 16-foot intervals. Testing in wooded areas and pastures has been, and continues to be, carried out by shovel probing and augering. An intensive records search and on-ground survey were conducted of areas, such as bluff-tops, for prehistoric mounds and cemeteries. State, county, and township records were reviewed for evidence of historic period cemeteries.

The program of systematic archaeological survey resulted in the discovery and recording of 208 sites, including relocation of 15 known sites. Three prehistoric mound groups were found within the study area, and their precise boundaries were calculated and forwarded to highway planners. The 208 sites were found on five general landforms: uplands (36 percent), floodplains (25 percent), stream terraces (16 percent), blufftops (12 percent), and bluffbases (11 percent). These sites have yielded diagnostic artifacts (stone tools, pottery fragments and so on) that span all periods of the prehistoric sequence for the area, from the end of the Wisconsin glaciation 12,000 years ago, to an era equivalent to the Medieval period in Europe (circa 1,000 to 1,400 C.E.). Historic period sites dating to the European expansion into the Old Northwest after the 1804 Louisiana Purchase also have been recorded in the corridor. These latter sites are most commonly the remains of small farmsteads.

Data from the 208 archaeological sites in the project corridor were analyzed to provide a ranking of each site's potential for eligibility on the National Register of Historic Places. Such factors as the presence of diagnostic artifacts and the potential for intact buried components at prehistoric loci were used in the process. For historic properties, which in this area of the state generally date to the nineteenth century, potential significance was based upon site age (that is, pre–Civil War era), site function (farmstead, blacksmith shop, tavern), and integrity of subsurface deposits.

This evaluation, conducted by professional archaeologists, resulted in the determination that 117 sites (56 percent) have moderate or high research potential. As of now, about half those sites fall within the Preferred Alignment and should be subjected to subsurface evaluations (test excavations). No further archaeological work is recommended for the 89 low potential sites or for the sites located outside the potential construction zones.

The Peoria Tribe of Indians of Oklahoma is unaware of any Indian religious sites within the corridor. If any items covered by the Native American Grave Protection and Repatriation Act are encountered while the proposed project is being built, construction should stop, and the should be notified and consulted further (see Appendix A, Correspondence and Meeting Materials).

3.4.2 Environmental Consequences

3.4.2.1 Historic

Bridge SN 062-0011 is on the National Register of Historic Places, and the Bazyn House west of Henry and the Whiffle Tree House in Sparland are eligible to be placed on the National Register. The No-Build Alternative would not affect these historic resources. The Preferred Alternative, however, would directly affect the historic bridge and require its removal. Alternatives that would avoid impacts to the bridge were considered but found to be infeasible (see Section 3.18). The footprint of the proposed new bridge structure over Barrville Creek would displace the historic bridge. The proposed alignment would not affect the Bazyn House or the Whiffle Tree House. The boundaries of these two properties are the main building foundations, since it is the structures' architectural merit that makes them eligible. The closest distance from the Whiffle Tree House to the proposed retaining wall is approximately 84 feet. Appendix A (Correspondence and Meeting Materials, State and Federal Agency Coordination) contains a letter with IHPA concurrence that the Whiffle Tree House is eligible and will not be affected by the proposed improvements. Appendix A also contains a letter with IHPA concurrence that the Bazyn House will not be affected by the proposed project.

3.4.2.2 Archaeological

All mounds and cemeteries will be avoided by the selected alignment. All sites that merit further evaluation have potential National Register significance because of the data they may contain concerning prehistoric life-ways in this region of Illinois (Criterion D). No archaeological sites historically associated with federal-recognized native American tribes were found within the project corridor. No archaeological sites that merit preservation in place will be affected by the selected alignment.

The results of subsurface investigations of archaeological sites, and any others found subsequently, will be evaluated for a determination of eligibility for the National Register of Historic Places. A formal determination of eligibility will be submitted to the Illinois State Historic Preservation Officer for review and concurrence. Should any properties be determined eligible, and if the Build Alternative will result in an adverse effect, a Memorandum of Agreement will be executed.

This project is in a portion of Illinois that was once a part of Peoria Tribal territory, and therefore FHWA contacted them by letter on November 22, 2006. They responded on December 13, 2006, with no objection to the proposed project, but they would like to be notified if human remains or any objects falling under the Native American Graves Protection and Repatriation Act are uncovered during construction.

3.4.3 Measures to Minimize Harm and Mitigation

Several alternative alignments were considered to avoid impacts to the historic bridge, but no feasible and prudent alternative was found. The project will require the removal of structure SN 062-0011 from the Illinois Historic Bridge Survey.

Under the stipulations of a Programmatic Agreement for Historic Bridges ratified by IHPA and FHWA in 2004, a Memorandum of Agreement was formulated and signed by IHPA, FHWA, and IDOT in November of 2005 which specifies mitigation measures for the adverse effects of the removal of SN 062-0011 (see Appendix A, Other Agency Coordination).

IDOT will also ensure that a bridge in Illinois analogous to the Barrville bridge will be sought and, if found, will be substituted for the adversely affected bridge on the Illinois Historic Bridge Survey.

A retaining wall has been proposed along the west side of proposed IL 29 east of the Whiffle Tree House property to avoid affecting the Whiffle Tree House.

3.5 Air Quality

3.5.1 Affected Environment

The National Ambient Air Quality Standards (NAAQS), established by the USEPA, set maximum allowable concentration limits for six criteria air pollutants. Areas in which air pollution levels persistently exceed the NAAQS may be designated as "nonattainment." Areas that were previously designated as non-attainment areas but have now met the standard—with USEPA approval of a suitable air quality plan—are called "maintenance" areas. States in which nonattainment areas are located must develop and implement a State Implementation Plan containing policies and regulations that will bring about attainment of the NAAQS. All areas of Illinois are in attainment of the standards for four of the six pollutants: carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead.

For the 1-hour ozone standard, Chicago is a severe nonattainment area and Jersey, Madison, Monroe, and St. Clair counties are maintenance areas. The Chicago nonattainment area includes Cook, DuPage, Kane, Lake, McHenry, and Will counties, Aux Sable and Goose Lake townships in Grundy County, and Oswego Township in Kendall County. For the 8-hour ozone standard, Cook, DuPage, Kane, Lake, McHenry, and Will counties and Aux Sable, Goose Lake, and Oswego townships are moderate nonattainment areas. Jersey, Madison, Monroe, and St. Clair counties in the St. Louis area are moderate nonattainment areas for the 8-hour ozone standard.

The Lake Calumet area and Lyons Township in Cook County are nonattainment areas for the particulate matter (PM_{10}) standard. Oglesby and several adjacent townships in LaSalle County, and Granite City Township and Nameoki Township in Madison County, are maintenance areas for PM_{10}. In addition, Cook, DuPage, Grundy (Goose Lake and Aux Sable Townships), Kendall (Oswego Township), Kane, Lake, Madison, McHenry, Monroe, Randolph (Baldwin Township), St. Clair, and Will Counties are in nonattainment for $PM_{2.5}$ standard. All other areas of Illinois are in attainment for the ozone and PM standards.

No part of the project lies within a designated nonattainment area or maintenance area.

3.5.2 Environmental Consequences

3.5.2.1 Microscale Analysis

The COSIM (carbon monoxide screen for intersection modeling) air quality analysis was conducted in Sparland at the intersection of existing IL 29 and the IL 17 south leg, which connects to Lacon on the east (Exhibit 3-11).

A prescreen analysis was completed for the proposed project. The results for the proposed roadway improvement indicate that a COSIM air quality analysis is not required, as the results for the worst-case receptor are below the 8-hour average NAAQS for carbon monoxide of 9.0 parts per million, which is necessary to protect the public health and welfare.

3.5.2.2 Conformity Statement

No part of the project is within a designated nonattainment area for any of the air pollutants for which the USEPA has established standards. Accordingly, a conformity determination under 40 Code of Federal Regulations (CFR) Part 93 ("Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded or Approved Under Title 23 USC of the Federal Transit Act") is not required.

3.5.2.3 Construction Related Particulate Matter

Demolition and construction work can result in short-term increases in fugitive dust and equipment-related particulate emissions in and around the project area. (Equipment-related particulate emissions usually are minor when equipment is well maintained.) The potential air quality impacts will be short-term, occurring only while demolition and construction work is in progress and local conditions are appropriate.

The potential for fugitive dust emissions typically is associated with building demolition, ground clearing, site preparation, grading, stockpiling of materials, onsite movement of equipment, and transportation of materials. The potential is greatest during dry periods, high wind conditions, and periods of intense construction work.

IDOT's Standard Specifications for Road and Bridge Construction include provisions for dust control. Under those provisions, dust and airborne dirt generated by construction will be managed through dust control procedures or a specific dust control plan, when warranted. The contractor and IDOT will meet to review the nature and extent of dust-generating activities and will cooperatively develop specific types of control techniques appropriate to the specific situation. Techniques that may warrant consideration include measures such as minimizing track-out of soils onto nearly publicly traveled roads, reducing speed on unpaved roads, covering haul vehicles, and applying chemical dust suppressants or water to exposed surfaces, particularly those on which construction vehicles travel. With the application of appropriate measures to limit dust emissions during construction, this project will not cause any notable, short-term particulate matter air quality impacts.

3.5.2.4 Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, the USEPA also regulates air toxics. Most air toxics originate from human sources, including on-road mobile

sources, non-road mobile sources (such as airplanes), area sources (such as dry cleaners), and stationary sources (such as factories or refineries).

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and nonroad equipment. Some toxic compounds are present in fuel and are emitted to the air when fuel evaporates or passes uncombusted through the engine. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The USEPA is the lead federal agency for administering the Clean Air Act and has certain responsibilities regarding the health effects of MSATs. The USEPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources (66 *Federal Register* [March 29, 2001]: 17229). The rule was issued under the authority in Section 202 of the Clean Air Act. In its rule, the USEPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline program, its national low emission vehicle standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards on-highway diesel fuel sulfur control requirements. FHWA projects that even with a 64 percent increase in VMT between 2000 and 2020, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 to 65 percent, and will reduce on-highway diesel particulate matter emissions by 87 percent.

As a result, the USEPA concluded that no further motor vehicle emissions standards or fuel standards are necessary to further control MSATs. The agency is preparing another rule under authority of CAA Section 202(l) that will address these issues and could make adjustments to the full 21 and the primary six MSATs.

This final EIS includes a basic analysis of the likely MSAT emission impacts of the project. However, the technical tools that are available do not enable us to predict the project-specific health impacts of emission changes associated with the alternatives carried forward in the final EIS. Thus, the following discussion is included in accordance with CEQ regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information.

Evaluating the environmental and health impacts of MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling to estimate ambient concentrations resulting from the estimated emissions, exposure modeling to estimate human exposure to the estimated concentrations, and final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more thorough determination of the MSAT health impacts of the project.

1. Emissions. The USEPA's tools for estimating MSAT emissions from motor vehicles are not sensitive to key variables determining emissions of MSATs in the context of highway projects. MOBILE6.2 is used to predict emissions at a regional level but has limited applicability at the project level. MOBILE6.2 is a trip-based model: emission factors are projected based on a typical trip of 7.5 miles and on average speeds for the typical trip. This means that MOBILE6.2 cannot predict emission factors for a specific vehicle operating condition at a specific location at a specific time. Because of this limitation, MOBILE6.2 can only approximate the operating

speeds and levels of congestion likely to be present on the largest-scale projects and cannot adequately capture emissions effects of smaller projects. For particulate matter, the model results are not sensitive to average trip speed, although the other MSAT emission rates do change with changes in trip speed. Also, the emissions rates used in MOBILE6.2 for both particulate matter and MSATs are based on a limited number of tests of mostly older-technology vehicles. Lastly, in its discussions of particulate matter under the conformity rule, the USEPA has identified problems with MOBILE6.2 as an obstacle to quantitative analysis.

These deficiencies compromise the capability of MOBILE6.2 to estimate MSAT emissions. MOBILE6.2 is an adequate tool for projecting emissions trends, and performing relative analyses among alternatives for very large projects, but it is not sensitive enough to capture the effects of travel changes tied to smaller projects or to predict emissions near specific roadside locations.

2. Dispersion. Tools for predicting how MSATs disperse are also limited. The USEPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS. The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at some time at some location within a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk. The National Cooperative Highway Research Program is conducting research on best practices in applying models and other technical methods in the analysis of MSATs. The work will focus on identifying appropriate methods of documenting and communicating MSAT impacts in the NEPA process and to the general public. Along with these general limitations of dispersion models, FHWA is also faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

3. Exposure Levels and Health Effects. Finally, even if emission levels and concentrations of MSATs could be predicted accurately, shortcomings in current techniques for exposure assessment and risk analysis preclude us from reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roadways, and to determine the period that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because insupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. Considerable uncertainty is associated with the existing estimates of toxicity of the various MSATs because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts among alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decisionmakers, who would need to weigh such information against other project impacts that are better suited for quantitative analysis.

Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies that show either that some are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels

found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of several USEPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or State level.

The USEPA is in the process of assessing the risks of various kinds of exposures to these pollutants. Its Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database Weight of Evidence Characterization summaries. The information is taken verbatim from USEPA's IRIS database and represents the agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- Benzene is characterized as a known human carcinogen.
- The potential carcinogenicity of acrolein cannot be determined because existing data are inadequate for an assessment of human carcinogenic potential for the oral and inhalation routes of exposure.
- Formaldehyde is a probable human carcinogen, as indicated by limited evidence in humans and sufficient evidence in animals. 1,3-butadiene is characterized as carcinogenic to humans by inhalation.
- Acetaldehyde is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- Diesel exhaust is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust, as reviewed in this document, is the combination of diesel particulate matter and diesel exhaust organic gases.
- Diesel exhaust also represents chronic respiratory effects, possibly the primary noncancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

Other studies have addressed MSAT health impacts in proximity to roadways. The Health Effects Institute, a nonprofit organization funded by the USEPA, FHWA, and industry, has undertaken a major series of studies to research near-roadway MSAT hotspots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes—particularly respiratory problems.[16] Much of this research is not specific to

[16] South Coast Air Quality Management District, Multiple Air Toxic Exposure Study-II (2000); Highway Health Hazards, The Sierra Club (2004) summarizing 24 studies on the relationship between health and air quality); NEPA's Uncertainty in the

MSATs; rather, it surveys the full spectrum of both criteria and other pollutants. The FHWA cannot evaluate the validity of these studies, but more important, it does not provide information that would be useful to alleviate the uncertainties listed above and enable us to perform a more comprehensive evaluation of health impacts specific to this project.

Because of the uncertainties outlined above, the effects of air toxic emissions on human health cannot be assessed quantitatively at the project level. Available tools allow us to reasonably predict relative emissions changes between alternatives for larger projects, but the amount of MSAT emissions from each project alternative and MSAT concentrations or exposures created by each project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. (As noted, the emissions model cannot serve as a meaningful emissions analysis tool for smaller projects.) Therefore, the relevance of the unavailable or incomplete information is that it is not possible to determine whether any of the alternatives carried forward would have "significant adverse impacts on the human environment."

As noted, technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of this project. However, even though reliable methods do not exist for accurately estimating the health impacts of MSATs at the project level, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative analysis cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions between the No-Build Alternative and the Preferred Alternative. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* (www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm).

For the Preferred Alternative, the amount of MSATs emitted would be proportional to vehicle miles traveled, or VMT. The VMT for the Preferred Alternative is slightly higher for the Preferred Alternative than for the No-Build Alternative, because the additional capacity increases the efficiency of the roadway. The increase in VMT would lead to higher MSAT emissions for the Preferred Alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates because of increased speeds; according to the USEPA's MOBILE6 emissions model, emissions of all priority MSATs except diesel particulate matter decrease as speed increases. The extent to which these speed-related emission decreases will offset VMT-related emission increases cannot be reliably projected because of the inherent deficiencies of technical models.

With the implementation of the Preferred Alternative, emissions will likely be lower than present levels in the design year as a result of the USEPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent between 2000 and 2020. Local conditions may differ from these national projects in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the USEPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the project area are likely to be lower in the future in nearly all cases.

Federal Legal Scheme Controlling Air Pollution from Motor Vehicles, Environmental Law Institute, 35 ELR 10273 (2005) with health studies cited therein.

The additional travel lanes of the Preferred Alternative will have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, there may be localized areas where ambient concentrations of MSATs could be higher with the Preferred Alternative than the No-Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections in areas where the Preferred Alternative follows the existing alignment. However, as discussed above, the magnitude and the duration of these potential increases compared to the No-Build alternative cannot be quantified accurately because of the inherent deficiencies of current models.

In summary, when a highway is widened and, as a result, becomes closer to receptors, the localized levels of MSAT emissions for the Preferred Alternative could be higher relative to the No-Build Alternative, but this could be offset by increased speeds and reductions in congestion (which are associated with lower MSAT emissions.) Also, MSATs will be lower in other locations when the roadway shifts away from them. However, the USEPA's vehicle and fuel regulations, coupled with fleet turnover, over time will cause substantial reductions that, in almost all cases, will cause regionwide MSAT levels to be significantly lower than those of today.

In this document, FHWA has provided a qualitative analysis of MSAT emissions relative to the various alternatives carried forward and has acknowledged that the Preferred Alternative may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain. Because of this uncertainty, the health effects from these emissions cannot be estimated.

3.6 Noise

3.6.1 Environmental Consequences

Traffic on the proposed alignment would affect noise levels at adjacent noise-sensitive areas, such as homes and recreational areas. This section describes noise levels in those areas and the likely future increase in noise levels. The noise analysis contrasted existing conditions and predicted design year (2032) noise levels with the Federal Highway Administration's Noise Abatement Criteria (NAC) to determine whether noise abatement measures should be considered. A noise abatement analysis was conducted at sensitive receptors to determine the effectiveness and reasonableness of sound walls and other abatement measures. The analysis was conducted in accordance with the methodology established in Title 23 CFR, Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise, and the guidance in Chapter 26 of IDOT's *Bureau of Design and Environment Manual* (December 2002).

3.6.1.1 Noise Abatement Criteria

The criteria used in this report to evaluate noise impacts are contained in Title 23 CFR Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise, and the IDOT Bureau of Design and Environment Procedure Memorandum, Procedures for Highway Project Noise Analysis. The Category B criterion in these documents applies to residences, churches, schools, recreation areas, and similar establishments and is an hourly sound level that approaches or exceeds 67 decibels (dBA) L_{eq}. Other developed land, such as commercial or industrial areas, is included in Category C, for which an hourly sound level

criterion that approaches or exceeds 72 dBA L_{eq} has been established. The criterion sound levels are determined at the exteriors of structures under peak hour noise conditions.

Table 3-26 shows the FHWA Design Level/Activity Relationship used for determining the NAC for specific land uses. FHWA and IDOT consider a traffic noise impact to occur if predicted peak-hour traffic noise levels approach or exceed the noise abatement criteria. IDOT defines "approach" as noise levels within 1 dBA of noise abatement criterion. For Activity Category B, which applies to the noise-sensitive sites evaluated for this study, this is equal to 66 dBA.

TABLE 3-26
Federal Highway Administration Noise Abatement Criteria

Activity Category[a]	Noise Abatement Criteria L_{eq} Hourly (dBA)	Description of Land Use Activity Category
A	57 (exterior)	Tracts of land where serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is important if they are to continue to serve their intended purpose. Such areas could include amphitheaters, particular parks or parts of parks, open spaces, or historic districts dedicated to or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B	67 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, and parks that are not included in category A, and residences, motels, hotels, public meeting rooms, schools, churches, libraries, and hospitals.
C	72 (exterior)	Developed lands, properties, or activities not included in Categories A and B above.
D	—	Undeveloped lands.
E	52 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: Title 23 CFR Part 772–Procedures for Abatement of Highway Traffic Noise and Construction Noise. Federal Highway Administration. April 1992.

[a]Parks of Categories A and B include all such lands (public or private) used as parks, as well as public lands officially set aside or designated by a governmental agency as parks on the date of public knowledge of the proposed highway project.

In addition to the criterion sound levels described above, the FHWA and IDOT consider a traffic noise impact to occur if predicted sound levels are substantially higher than existing noise levels. The IDOT memorandum defines "substantially higher" as an increase of 14 dBA over existing noise level conditions. Consequently, noise abatement must be considered if predicted design year noise levels result in an increase of more than 14 decibels over existing ambient noise levels. The NAC are noise impact thresholds for determining when consideration of noise abatement measures could be warranted. The NAC are not design criteria or targets.

3.6.1.2 Methodology

Existing and future (2032) traffic noise levels were evaluated using FHWA's Traffic Noise Model (TNM) version 2.5, in conjunction with existing onsite traffic noise level measurements. TNM is the latest analytical method developed for highway traffic noise

prediction. The model is based upon reference energy emission levels for automobiles, medium trucks (two axles), heavy trucks (three or more axles), buses and motorcycles, with

consideration given to vehicle volume, speed, roadway configuration, distance to the receptor, atmospheric conditions, and the acoustical characteristics of the site. The model uses traffic noise emission curves, which the FHWA recommends for accurately calculating noise levels generated by highway traffic. Table 3-27 summarizes TNM parameters used to predict traffic noise conditions.

TABLE 3-27
TNM Model Parameters

Parameter	Value	Comments
Temperature	68°F	Default value in TNM model.
Relative Humidity	50%	Default value in TNM model.
Pavement Type	Average	FHWA recommends using the "average" pavement type for predicting traffic noise levels.
Ground Type	Lawn	The default lawn ground type was used.

Current tools do not offer analysis capabilities for the effects of other factors, such as wind and atmospheric inversions. Therefore, a no-wind condition was assumed for the noise analysis. IDOT developed the traffic data used in the noise model.

In areas where noise abatement is warranted, the TNM model is used to determine the noise level reduction provided by various noise barrier heights. The program calculates barrier insertion loss by accounting for variables such as distance from source to barrier, distance from barrier to receptor, source and receptor elevations, and barrier height. Based on the outcome of the noise barrier calculations and FHWA and IDOT requirements for minimum noise level reduction from barriers, the required locations, lengths, and heights of barriers are determined.

3.6.1.3 Ambient Measurements

Twenty-eight representative receptor locations (Table 3-28) were used to determine noise levels within the project area.

Field measurements were conducted according to procedures described in *Measurements of Highway-Related Noise* (Report No. FHWA-PD-96-046, May 1996). Noise level measurements and concurrent traffic counts were conducted at the exterior areas of representative residential locations along the proposed project on June 15 and 16, 2004. Measurement equipment consisted of a Larson Davis model 820 sound level meter equipped with a Larson Davis 2551 ½-inch microphone. A B&K Type 4230 acoustical calibrator was used to calibrate the sound level meter. The equipment complies with the requirements of the American National Standards Institute (ANSI) and the International Electrotechnical Commission (IEC) for precision sound level measurement instrumentation. Weather conditions during the measurements consisted of mostly clear skies and winds less than 10 miles per hour. Temperature was about 75°F during the measurements.

Noise level measurements were conducted at representative locations throughout the project area. The noise monitoring locations were selected based on their representativeness

of noise-sensitive areas within the project limits. Field measurements were not taken at all the receptor locations listed in Table 3-28. A receptor was not identified at the south end of Mossville Road, since noise sensitive receptors there were examined as part of the IL 6/IL 29 interchange improvements. All receptors lie north of IL 6.

TABLE 3-28
Receptor Descriptions

Receptor Number	Aerial Sheet Location	Distance from Existing Roadway (ft)	Distance from Proposed Improvements (ft)	Surrounding Land Use	# of Sensitive Receptors Represented	Receptor Type
R1	3	6,523	986	Rural	1	Residential
R2	3	6,690	848	Rural	1	Residential
R3	3	8,669	979	Rural	3	Residential
R4	3	9,626	1,975	Rural	3	Residential
R5	3	5,239	2,687	Rural	15	Residential
R6	3, 4	7,218	871	Rural	4	Residential
R7	3	8,671	664	Rural	2	Residential
R8	4	8,658	257	Rural	4	Residential
R9	6	10,700	1,106	Rural	1	Residential
R10	6, 7	3,410	505	Rural	7	Residential
R11	7	168	168	Urban	8	Residential
R12	7	77	77	Urban	25	Residential
R13	7	176	158	Urban	12	Residential
R14	7	546	528	Rural	6	Campground
R15	7	276	778	Rural	4	Residential
R16	8, 9	498	477	Rural	9	Residential
R17	9	314	294	Rural	2	Residential
R18	9	351	337	Rural	2	Residential
R19	9	352	374	Rural	2	Residential
R20	10	827	131	Urban	1	Residential
R21	10	143	905	Urban	18	Residential
R22	10	296	683	Urban	3	Residential
R23	11	207	156	Rural	5	Residential
R24	14	1,815	991	Rural	5	Residential
R25	14, 15	1,557	1,266	Rural	3	Residential
R26	16	419	368	Rural	3	Institutional
R27	16	391	335	Rural	5	Church
R28	17	88	88	Rural	4	Residential/Commercial

The purpose of the noise level measurements was to validate the use of TNM in predicting traffic noise exposure within the study area. The project area was closely inspected in order to model accurately the roadway and receiver locations. During the field inspection, site-specific features that may affect the acoustical condition at each location, such as terrain features, building structures, intervening ground types, and roadway and receiver elevations, were noted. The number of vehicles counted during the noise measurement periods also was input into the noise model. Noise measurement data obtained at the exterior locations of residential areas were then compared to the noise levels calculated using TNM. This evaluation served to calibrate the model.

3.6.1.4 Existing Noise Levels

Using year 2001 traffic data, existing condition noise levels were predicted at noise sensitive areas within the project area. The predicted noise levels under existing conditions range from 43 to 65 dBA. Table 3-29 presents existing and predicted condition noise levels. The receptor locations are indicated on the Aerial Exhibit. More recent traffic data do not vary from 2001 and therefore will not increase traffic noise levels.

3.6.1.5 Design Year Noise Levels

In 2032, the predicted levels under the No-Build condition range from 50 to 65 dBA (see Table 3-29). The projected increases in traffic volume along IL 29 account for the increases in noise levels above existing conditions under the No-Build Alternative.

FHWA regulations indicate that noise abatement should be considered when future predicted traffic noise levels "approach" or exceed the NAC or when predicted traffic noise levels "substantially" exceed existing noise levels. "Approach" is defined to mean within 1 dBA of the NAC. For all the noise sensitive residential sites evaluated for the project, this is equal to 66 dBA. A "substantial" increase is defined to be more than 14 dBA above existing noise levels. Peak hour noise levels under the build condition are predicted to approach or exceed the NAC at four representative receptor locations. Noise levels range from 49 to 73 dBA under the build condition. The difference in noise levels between no-build and build conditions is a result of numerous factors such as shifts in the alignment from the existing to the proposed facility (that is, a shift to one side or another of the bypass alignment), changes in traffic volumes, shifts in the roadway elevation, and differences in topography from one receptor to the next. For example, the realignment of the IL 29/IL 17 interchange east of existing IL 29 and the traffic it will remove from existing IL 29 account for the reduction in noise at R21. Correspondingly, noise levels are expected to increase at R20 because the relocated IL 29/IL 17 interchange would pass within 84 feet of R20. (Note that expected noise levels are well below the NAC at R20.) Similarly noise levels are expected to decrease at R15, because realigned IL 29 would be southeast of the receptor and existing IL 29 would become a local road, Hart Lane.

Under project build conditions, future peak-hour noise levels at noise-sensitive areas adjacent to the Preferred Alternative would not exceed the existing noise levels by 14 dBA.

TABLE 3-29
Predicted Peak Hour Traffic Noise Levels (dBA)

Receptor Location	Noise Abatement Criteria (NAC)	Existing Condition Leq(h)	Future 2032 No-Build Leq(h)	Future 2032 Build Leq(h)	Future 2032 Build Change from Existing
R1	67	49 [a b]	— [a]	49	0
R2	67	49 [a b]	— [a]	50	+1
R3	67	54	54	55	+1
R4	67	56	56	56	0
R5	67	54	55	58	+4
R6	67	43 [a b]	— [a]	50	+7
R7	67	40	41	53	+13
R8	67	53	53	59	+6
R9	67	61	61	64	+3
R10	67	57 [a b]	— [a]	57	0
R11	67	58	59	60	+2
R12	67	63	65	**67**	+4
R13	67	59	61	63	+4
R14	67	50	52	52	+2
R15	67	61	62	60	-1
R16	67	50	55	59	+9
R17	67	58	63	**67**	+9
R18	67	56	58	61	+5
R19	67	55	57	59	+4
R20	67	51	51	58	+7
R21	67	60	63	64	+4
R22	67	62	62	65	+3
R23	67	57	59	**66**	+9
R24	67	53	54	62	+9
R25	67	50	52	55	+5
R26	67	50	51	58	+8
R27	67	51	53	61	+10
R28	67	65	65	**73**	+8
No. of Affected Noise Sensitive Areas		**0**	**0**	**4**	

[a]These receptors are located in areas where proposed IL 29 would be on new alignment and located at a distance from existing IL 29. IL 29 does not extend through these areas, nor would it extend through them under the future no-build scenario. As a result, these locations were not modeled in TNM for no-build conditions because the ambient noise there is the result of local roadways and other secondary sources.

[b]Field monitoring data were used at these locations to approximate existing noise levels in the absence of actual data.

3.6.1.6 Evaluation of Abatement Measures

FHWA regulations indicate that noise abatement should be considered when future predicted traffic noise levels approach or exceed the NAC, or when predicted traffic noise levels substantially exceed the existing condition noise levels. None of the sites evaluated is expected to experience substantial increases in noise levels. However, four representative receptor sites are expected to experience noise levels of 66 dBA or higher. The feasibility and reasonableness of abatement measures were evaluated for those locations. As outlined in FHWA's guidelines, such measures may include noise barriers, transportation system management measures, alignment modifications, property acquisitions, and land use controls. When noise abatement is proposed, it is recommended that an attempt be made to achieve the greatest reduction possible. IDOT's noise policy requires that noise barriers reduce traffic noise levels generated by the proposed project by at least 8 dBA. It also requires that the total cost of a noise barrier not exceed $24, 000 per benefited residence. A benefited residence is one that experiences a reduction of at least 5 dBA in the level of traffic noise as a result of the noise barrier.

Of the noise abatement measures mentioned, the noise barrier is the most practical, reasonable, and effective. In this case, transportation management measures, modification of speed limits, and restriction of trucks would not be congruent with the project purpose. Alignment modifications generally involve orientating or siting the roadway at sufficient distances from noise-sensitive areas to minimize noise impacts. As discussed in Section 2, the project team evaluated numerous location alternatives. The location of the Preferred Alternative offers the most reasonable tradeoff between social and natural resources. Because of high cost, a property acquisition program to create noise buffer zones is infeasible. Local government and planning agencies with land use control authority should consider land use controls to minimize impacts to future developments, but this would not affect existing land developments.

Abatement studies found that available options for reducing noise levels at the four impacted receptor locations are neither reasonable nor feasible because they do not substantially reduce traffic noise levels by 8 dBA, nor are they cost-effective to construct (less than $24,000 per benefited receptor). At those locations, abatement is neither reasonable nor feasible because of the distance of the affected residences from the proposed highway or the barriers are not economically reasonable.

3.6.1.7 Noise Barrier Analysis

Noise barriers, including earth berms, reduce noise levels by blocking the sound path between a roadway and noise sensitive site. To be effective in reducing traffic noise impacts, a noise barrier must have certain characteristics. The barrier must be long (theoretically about four times the distance from the receptor to the source), continuous (with no intermittent openings), and high enough to provide the necessary reduction in noise levels. According to IDOT's noise policy, for a barrier to be considered feasible and economically reasonable, it must meet the following minimum criteria:

- It must provide a minimum insertion loss (noise reduction) of 8 dBA.
- The cost to construct the barrier should not exceed $24,000 per benefited residence unless a higher level of expenditure can be justified by special circumstances. For the

purposes of this determination, benefited residences are those that would experience a reduction of 5 dBA or more in the level of traffic noise as a result of the noise barrier.

The TNM was used to determine the noise level reduction provided by various barrier heights along the proposed project. The program calculates barrier insertion loss by accounting for such variables as distance from source to barrier, distance from barrier to receptor, source and receptor elevations, and barrier height. Per standard assumptions, effective acoustical heights of automobiles, medium trucks and heavy trucks are at roadway surface, 2 and 8 feet above the road, respectively. Receptor height is assumed to be about 5 feet above the ground.

Noise barriers were analyzed at the four noise sensitive locations that exceeded the noise abatement criteria in Table 3-29 (Receptors 12, 17, 23, and 28). The analysis found that barriers would not be a reasonable expense in any of the areas evaluated. The evaluation of each barrier was conducted using the noise prediction model. The barrier analysis found:

- **IL 29 (east side) north of Truitt Rd (Receptor 12, Barrier Exhibit 3-12, Barrier 1a)—** Analysts evaluated the placement of a 223-foot barrier for homes on the east side of IL 29 north of Truitt Road along the right of way line. The barrier heights modeled varied from 8 to 10 feet. The barrier would be effective in reducing noise levels by 8 dBA. The cost to construct the barrier would be more than $50,000 and would benefit two residences. The cost per benefited residence would be greater than $25,000, exceeding the $24,000 cost criterion. Thus, the barrier would not be economically reasonable.
- **IL 29 (east side) north of Hilda Court (Receptor 12, Barrier Exhibit 3-12, Barrier 1b)—** Analysts evaluated the placement of a 415-foot barrier for homes on the east side of IL 29 north of Hilda Court along the right of way line, including a short distance along Hilda Court. The barrier heights modeled extended up to 20 feet. An 8-dBA reduction in noise levels could not be achieved by a barrier at that location. Thus, the barrier would not meet the feasibility criteria and was not considered further.
- **IL 29 (west side) opposite the intersection of McDowell Street to a point opposite the intersection of Moffitt Street (Receptor 12, Barrier Exhibit 3-12, Barrier 1c)—** Analysts evaluated the placement of a 1,040-foot barrier for the homes on the west side of IL 29 between Hilda Court and Moffit streets along the right of way line. The barrier heights modeled extended up to 20 feet. An 8-dBA reduction in noise levels could not be achieved by a barrier at that location. Thus, the barrier would not meet the feasibility criteria and was not considered further.
- **IL 29 (east side) north of McDowell Street to south of Moffit Street (Receptor 12, Barrier Exhibit 3-12, Barrier 1d)—** Analysts evaluated the placement of a 390-foot barrier for the homes on the east side of IL 29 between McDowell and Moffit streets along the right of way line. The barrier heights modeled varied from 14 to 16 feet. The barrier would be effective in reducing noise levels by the 8-dBA criterion at 5 residences. The cost to construct the barrier would be nearly $130,000 or nearly $26,000 benefited residence, exceeding the $24,000 cost criterion. Thus, the barrier would not be economically reasonable.
- **IL 29 (west side) entrance to Hopewell (Receptor 17, Barrier Exhibit 3-13, Barrier 2)—** Analysts evaluated the placement of a 2,319-foot barrier for homes on the west side of IL 29 in Hopewell along the right of way line. The barrier heights modeled extended up

to 20 feet. An 8-dBA reduction in noise levels could not be achieved by a barrier at that location. Thus, the barrier would not meet the feasibility criteria and was not considered further.

- **IL 29 (west side) north of 1100 E (Receptor 23, Barrier Exhibit 3-14, Barrier 3)—** Analysts evaluated the placement of a 1,475-foot barrier for homes on the west side of IL 29 north of 1100E along the right of way line. The barrier heights modeled varied from 6 to 16 feet. The barrier would be effective in reducing noise levels by the 8-dBA criterion at 5 residences. The total cost to construct the barrier would be nearly $390,000, or more than $77,900 per benefited residence, far exceeding the $24,000 cost criterion. Thus, the barrier would not be economically reasonable.
- **IL 29 (west side) south of Miller-Anderson Woods Nature Preserve and Natural Area (Receptor 28, Barrier Exhibit 3-15, Barrier 4)—** Analysts evaluated the placement of a 1,402-foot barrier for homes on the west side of IL 29 south of the Miller-Anderson Woods Natural Area along the right of way line. The barrier heights modeled extended up to 20 feet. An 8-dBA reduction in noise levels could not be achieved by a barrier at that location. Thus, the barrier would not meet the feasibility criteria and was not considered further.

3.6.2 Measures to Minimize Harm

Abatement studies found that options for reducing noise levels at affected locations are neither reasonable nor feasible because they either do not substantially reduce traffic noise levels by 8 dBA, or they are not cost-effective to construct (more than $24,000 per benefited receptor). Local government and planning agencies with land use control authority should consider land use controls to minimize impacts to future developments.

Construction equipment could generate short-term impacts during construction of the Preferred Alternative. To reduce the potential for such impacts, IDOT would require contractors to adhere to the latest edition of the *Standard Specifications for Road and Bridge Construction*. The specifications include guidelines for screening stationary equipment, exhaust noise, noise from loose equipment parts, and excessive tailgate banging.

3.7 Geology and Soils

3.7.1 Affected Environment

The project area includes the area generally bounded by the Illinois River on the east, by relatively uneroded uplands above the Illinois River valley wall to the west, by IL 6 to the south, and by I-180 to the north. IL 29 follows the base of the eroded bluffs of the Illinois River valley wall in various locations within the project area. Parts of the bluff slopes continually erode and have marginal slope stability. This section summarizes the geologic and geotechnical conditions within the project area.

Part of the information presented is compiled from previous studies by ISGS and IDOT (Willman 1973, Willman et al. 1975, Goodfield 1971, and others). ISGS has prepared a detailed three-dimensional model of subsurface conditions within the project study area (ISGS 2002a). The model is based on an extensive database of soil boring and well logs compiled by ISGS. Using the model, ISGS has generated maps and geographical

information system (GIS) data layers that represent bedrock topography, thickness of unconsolidated deposits, surficial geology, and soil parent materials in the project study area. The maps form the basis for much of the information in this report, and they have been adapted as exhibits in this document.

Geotechnical data will be obtained during Phase II design to verify existing conditions. Design may need to be reconsidered in light of that data.

3.7.1.1 Bedrock Geology

Surficial bedrock in the study area belongs to the Carbondale and Modesto formations of the Pennsylvanian bedrock system. Bedrock units deposited between Pennsylvanian and Pleistocene time have been eroded and are not present in the project area (Willman 1973).

The Pennsylvanian formations are characterized by cyclotherms of shale, sandstone, coal, clay, and limestone. Bedding is practically flat in the study area, but the bedrock surface has been eroded by glaciation to form a variable bedrock topography. Most notable of the bedrock topographic features is the ancient Mississippi River valley, which generally corresponds with the location of the Illinois River in the study area. Bedrock elevation ranges from a low of about 360 feet above mean sea level at the valley center, to more than 640 feet in the upland areas about 2 miles west of the valley. Bedrock outcrops are present within the walls of the Illinois River valley. Bedrock surface elevations in the project study area are presented in Appendix C, Exhibit C-1 for the southern, central, and northern parts of the project area. The exhibits represent the bedrock surface as modeled by ISGS (ISGS 2002a).

3.7.1.2 Surficial Geology

The study area lies within the western edge of the Bloomington Ridged Plain Physiographic Division of the Till Plaines Section of the Central Lowlands Province. Surface geology in this division is characterized by end and ground moraines deposited during Wisconsinan glaciations. Exhibit 3-16 shows the major physiographic divisions in Illinois.

Unconsolidated deposits present above bedrock in the project study area were deposited during the Pleistocene age. The oldest of these materials present in the project study area were deposited during the Kansan Stage. The Sankoty sand of the Banner Formation is present only within the walls of the ancient Mississippi River valley. The Sankoty sand is predominantly a stratified sand with some gravel, which has a distinctive pink color. Later Kansan glacial till deposits of the Banner Formation may also be present in the uplands within the project study area, and some paleosols that developed later in the top of the Banner Formation during the Yarmouthian Stage may be present locally. All Kansan stage deposits, where present, are overlain by younger glacial and alluvial deposits.

Illinoian and Wisconsinan stage deposits are present near IL 29. Of the Illinoian stage deposits, the Hulick and Radnor Till members of the Glasford Formation, both well-graded silty diamictons, are present in the upland areas and may be exposed at bluffs and slope cuts along IL 29. Wisconsinan stage glacial tills of the Wedron Formation (including the Delevan, Tiskilwa, and Batestown members) are present in the uplands and bluff slopes near IL 29. The Wisconsinan stage Peoria and Richland loess soils are present in the uplands and on the surface slopes west of IL 29, typically over the Wisconsinan glacial tills.

Within the terrace areas near Chillicothe and Henry, meltwater outwash and stream deposits are common. The Henry Formation was created as meltwater outwash during the Wedron glaciations and is present as surficial fluvial sediment in the Illinois River valley. During the late Wisconsinan stage, wind action formed the Parkland sand dunes in the terrace areas.

Modern erosion and deposition processes continue to modify the surficial geology of the project area. Modern stream deposits of the Cahokia Formation continue to be deposited along tributaries and the floodplain of the Illinois River. These typically consist of stratified silt, clay, sand, and gravel placed as channel deposits and alluvial fans. Modern, unstratified, well-graded slopewash colluvium of the Peyton Formation continues to be deposited along the bluffs of the Illinois River valley wall west of IL 29. Modern topsoil is present above the surficial deposits, except over bedrock outcrops present in the Illinois River valley wall and over areas of recent slope disturbance.

Exhibit C-2 in Appendix C shows the surface topography within southern, central, and northern parts of the project area. The exhibit was generated from the ISGS three-dimensional model of stratigraphy within the project area (ISGS 2002a).

3.7.1.3 Topography

The topography in the project corridor includes level to gently rolling uplands, deeply dissected uplands closer to the Illinois River bluff, steep bluff areas adjacent to the river valley, and the level, wide floodplain of the Illinois River. Elevations range from more than 700 feet above sea level in the uplands west of the Illinois River valley wall to about 420 feet at the Illinois River. Tributary streams throughout the project area are deeply incised and have steep valley walls. Exhibit C-2 shows surface topography in the project area.

3.7.1.4 Soils

Soil associations have developed on surficial geologic deposits to form unique landscapes with complex relationships of soils, relief, drainage, and parent material. Four soil associations are located within the project study area in Peoria County, six within Marshall County, four within Putnam County, and two within Bureau County. The soil associations within the project area by county are as follows:

- **Peoria County—**Rozetta-Keomah-Sylvan, Hickory-Strawn-Marseilles, Warsaw-Dickinson-Plainfield, and Jules-Paxico-Lawson
- **Marshall County—**Radford-Ross-Landes, Moundprairie-Slacwater, Dakota-Wea, Catlin-Saybrook-Osco, Hennepin,-Birkbeck-Senachwine, and Rozetta-Keomah
- **Putnam County—**Moundprairie, Wea-Ade-Alvin, Rozetta-Fayette-Miami, and Hennepin-Miami-Morley
- **Bureau County—**Moundprairie and Rozetta-Fayette-Hennepin

Detailed descriptions of these soil associations can be found in the NRCS county soil surveys. Appendix C, Exhibit C-3 summarizes the soil types found in the project corridor. The associations typically consist of two or three major soil series and several minor series. Properties of the soil series within areas of construction may place limitations on activities relevant to the construction.

Seventy-eight different NRCS soil types are identified in the project study area. The 10 most prevalent cover 13,540 acres of the 26,570 acres in the project study area (about 51 percent). The 10 soil types are listed below, in decreasing order of coverage. See Appendix C for a description of these soil types (Exhibit C-4).

- Dickinson Sandy Loam 2,608 acres
- Plainfield Loamy Sand 1,642 acres
- Dakota Loam 1,499 acres
- Jasper Loam 1,329 acres
- Rozetta Silt Loam 1,316 acres
- Landes Loam 1,284 acres
- Warsaw Silt Loam 1,188 acres
- Strawn Silt Loam 1,022 acres
- Worthen Silt Loam 819 acres
- Osco Silt Loam 806 acres

Highly erodible soils are defined as soil series phases with slope designations of C or higher (that is, with slopes of 4 percent or steeper). Appendix C, Exhibit C-5 lists the highly erodible soils identified in the project study area. Erodible soils occupy approximately 5,450 acres within the project study area. Highly erodible soils in the project study area are present primarily in the sloping Illinois River valley wall, on the margins of drainage cuts in the upland areas, and on the margins of stream deposits and river terraces (Exhibit 3-17).

Hydric soils occupy 1,588 acres within the project study area (6 percent of the total area). The soils are present primarily in the floodplains and terraces of the Illinois River valley and tributary streams. Appendix C, Exhibit C-6 lists the hydric soils identified in the project study area.

3.7.1.5 Landslides and Land Subsidence

Landslides. Landslides resulting from unstable geotechnical conditions and underground voids are of concern in parts of the project corridor (Exhibit 3-18). From north of Chillicothe to north of Sparland, landslide potential in the project area are discussed separately for the area (west of the Illinois River valley bluff) and for the area east of the bluffs near existing IL 29.

IL 29 traverses the project area from north of Chillicothe to north of Sparland. There IL 29 is directly adjacent to the toe of the bluffs for most of its length. Evidence of landslides is present at several locations along the corridor. The evidence consists of visible landslides on the slopes west of the corridor, past observations of disturbed pavement along IL 29, and data from inclinometers installed both west and east of IL 29 in the 1980s and 1990s. ISGS's analysis of landslide potential based on surface topography and assumed depths to groundwater (ISGS 2002b) indicates that landslide potential is high along parts of the Illinois River valley wall adjacent to IL 29. Exhibit 3-18 shows locations of landslides and disturbed pavement previously documented by ISGS.

Evidence of two large landslides has been observed on the slopes west of IL 29 in the area: one extending from 0.5 mile to 1.5 miles north of Sparland, and the other 1 mile south of Sparland (Goodfield 1971; Engineers International 1986). Disturbed pavement also was identified in the past at a third area near Hopewell. ISGS and Engineers International investigated the areas of past disturbance with inclinometers. At the first landslide area north of Sparland, numerous depressed areas and ridges formed by shallow slope failures are present up the slope, starting as close as 10 feet above the pavement. Disturbed pavement has been reported in this area in the past, and one telephone pole was observed to be canted slightly downslope from vertical in the area (perhaps a visual indication of recent

slope movement). Conditions are similar at the second landslide area south of Sparland (Exhibit 3-18).

Inclinometers were installed in the 1980s and 1990s at the potential slide location discussed above. Data from the inclinometers generally indicate slow creep movement of surficial materials above weathered bedrock. At the major landslide area north of Sparland, data from inclinometers located between 20 and 120 feet west of IL 29 indicate consistent horizontal creep of between 1.5 and 5 inches over a period of up to 10 years. The creep appears to occur primarily along an interface between weathered bedrock (mostly shale) and the overlying soils. Data from inclinometers east of the roadway also show creep movement but of lower magnitude than those to the west. Inclinometer data from other locations along IL 29 show similar trends, including at the landslide south of Sparland. The inclinometer data do not indicate any evidence of sudden, mass failure landslides during the period of monitoring.

The project area from south of Henry to north of Putnam coincides with the flat Illinois River valley terraces and floodplain, with a moderate grade at the transition between them. The granular fluvial surficial deposits of the Henry Formation are not expected to be overly compressible. Localized zones of soft silts or clays, expected to be present in localized terrace areas and in floodplain areas, can be undercut or strengthened as necessary to prevent excessive consolidation settlement. Bedrock typically is deeper than 60 feet throughout the area, as evaluated by ISGS (Appendix C, Exhibit C-1).

In the northern 5 miles of the project area, IL 29 approaches the bluffs. The ISGS slope stability analysis indicates that landslide potential in that area is high. Except for a relatively short section about 0.7 mile south of the Bureau County line, IL 29 is located several hundred feet east of the toe of the slope. North of Kentville Road, IL 29 proceeds through a road cut with 3:1 sideslopes in glacial till and loess soils. Evidence of slope instability has not been observed along IL 29 between Henry and north of Putnam.

Mine Subsidence. Mine subsidence due to unstable geotechnical conditions and underground voids are of concern in parts of the project corridor (Exhibit 3-19). From north of Chillicothe to north of Sparland, mine subsidence potential in the project area are discussed separately for the area (west of the Illinois River valley bluff) and for the area east of the bluffs near existing IL 29.

ISGS data and publications (ISGS 2003, 2000a, 2000b, 2000c) were consulted regarding potential mine locations (coal and other mines) within the study area. These sources identify many abandoned mines in the central part of the project area, some of which extend west of the slope of the river bluff. Exhibit 3-19 shows approximate mine locations. Appendix C (Exhibit C-7) contains a table summarizing available mine information. This information indicates that the areas west of the bluffs show evidence of localized slope instability and pose moderate potential for mine subsidence.

Numerous abandoned mines are present along the bluff slopes west of IL 29. Mine locations are shown in Exhibit 3-19, and mine details are presented in Appendix C (adapted from ISGS 2002c). All but a few of these were mines advanced in the Danville (No. 7) coal. These typically were drift mines constructed by the room and pillar method and were advanced west from the bluff face west of IL 29. Mine depths ranged from 10 feet to more than 80 feet, depending on the distance into the hillside that the mine extended. Few if any of the abandoned mines likely extend east to existing IL 29.

One coal mine (Fulton County Coal Company, Mine Index 286) was operated in the Colchester coal seam (No. 2 coal) in the early 1900s. The mine likely was operated at an elevation of about 300 feet above mean sea level, based on a rock core log for the mine entrance. Thickness of the mined seam was about 30 inches. According to the mine extents depicted in Exhibit 3-16, part of the mine was likely advanced under the current location of IL 29. The mine was operated by the longwall method and likely collapsed as it was advanced. However, the 180-foot depth to the mine, combined with the limited thickness of the mined seam, limit the potential for associated surface subsidence.

One clay mine was operated south of Sparland (Hydraulic Press Brick Company, Mine Index 3883). The mine was advanced by room and pillar method over an extensive area. The mined seam was 5 to 6 feet thick. Operation reports indicate that parts of the mine have collapsed (Goodfield 1971). Parts of the mine were advanced beneath the current location of IL 29, as shown in Exhibit 3-16.

In 2002, the ISGS conducted a seismic reflection survey along IL 29 to identify mining disturbances in bedrock (ISGS 2002a). The seismic reflection survey extended approximately 9.5 miles from 3 miles north of Sparland to 1 mile north of Chillicothe, which coincides with the part of IL 29 adjacent to the western wall of the Illinois River valley. The survey identified seven intervals of disturbed shallow or deep bedrock under IL 29 that may be associated with past mining operations. The survey identified the following potentially affected areas, from south to north:

- **Near Hopewell—**A disturbed shallow bedrock surface was identified in an area of past landslides along the slopes adjacent to IL 29. The disturbance may or may not be associated with an undocumented abandoned mine.
- **1.5 miles south of Sparland—**Deep bedrock disturbances were identified in this area. The area is collocated with the Hydraulic Press Brick Company clay mine, a room-and-pillar mine operated at depths of 170 to 260 feet below ground. This is also an area of past landslides along the slopes adjacent to IL 29.
- **1 mile south of Sparland—**A disturbed shallow bedrock surface was identified in an area associated with past landslides, and a 0.5-mile retaining wall is present on the east side of IL 29 along part of the area. The disturbance may or may not be associated with an undocumented abandoned mine.
- **South of Sparland—**A disturbed bedrock surface was identified in an area associated with past landslides, and a 0.5-mile retaining wall is present on the east side of IL 29 along part of the area. The disturbance may or may not be associated with an undocumented abandoned mine.
- **Southern half of Sparland—**A disturbed bedrock surface was identified that may indicate the presence of an undocumented coal mine.
- **Northern half of Sparland—**Several relatively small disturbances were identified in the area, which collectively may indicate the presence of an undocumented coal mine.
- **0.5 mile north of Sparland—**Disturbed surficial bedrock was identified in the area, possibly associated with the Fulton County Coal Mine, a longwall mine operated in the

Colchester (No. 2) coal. This apparent disturbance may be due to incomplete corrections for relatively thick quaternary deposits during the survey, and may not indicate subsurface disturbance.

Based on the information above, the project areas north of Chillicothe to north of Sparland east of the bluffs of the Illinois River valley along IL 29 show evidence of localized slope instability and pose potential for mine subsidence.

Potential mine locations (coal and other mines) within the study area have been reviewed based on ISGS data and publications (ISGS 2003, 2002a, 2002b, 2002c). The ISGS data and publications (ISGS 2003, 2002a, 2002b, 2002c) indicate no identified coal and other mines near the potential roadway locations in the project area from south of Henry to northern project terminus north of Putnam. Thus, the area is not expected to pose substantial landslide or land subsidence problems.

3.7.1.6 Mineral Resources

The USGS and the ISGS have worked collectively to identify nonfuel mineral resources in the state. Construction sand and gravel were identified as the primary nonfuel mineral resources produced in all four counties of the project area.[17] There are three active quarries in the project area near the proposed improvements. Galena Road Gravel is mining on its property north of Truitt Road and west of IL 29. The mining operations are located immediately north and south of the BNSF Santa Fe Railroad. The crushed stone and ground limestone mined there are used in the production of cement, agricultural lime, ballast, and construction aggregates. Riverside Materials Inc. is quarrying on the east side of IL 29 near the intersection of IL 29 and Yankee Lane. North of Henry and Goodrich Road (on the south side of 1500 E), sand is mined on the Oltman and Sons Ready-Mix Concrete property.

Former quarries are located throughout the general project area. Those closest to the proposed IL 29 improvements include the Chillicothe Recreation Area on the north side of Chillicothe immediately west of IL 29, a former quarry immediately west of IL 29 just north of the Marshall-Putnam County line, and a former clay pit west of IL 29 (on 395E/Center Street) south of Putnam.

Abandoned mines are found only in the center of the project corridor. Many abandoned coal mines (drift, shaft, and slope type mines) are located along IL 29. ISGS conducted a seismic reflection survey along IL 29 and found multiple bedrock surface disturbances with varying levels of potential for association with documented and undocumented coal and clay mines.

Material Service Corp. owns a large amount of undeveloped land east of IL 29 and immediately south of Henry that could be mined. There is also a proposal to develop a 640-acre sand quarry north of Henry that would include a new harbor on the Illinois River in the Henry industrial park.

3.7.1.7 Groundwater Resources and Quality

Groundwater recharge areas are categorized between Zones 1 and 7, Zone 1 indicating the highest potential for groundwater recharge. According to Keefer and Berg's 1990 map of groundwater recharge zones in Illinois, the entire project area lies within Zone 1.

[17] U.S. Geological Survey. 2002. *Minerals Yearbook.*

ISGS refers to the map "Potential for Contamination of Shallow Aquifers from Land Burial of Municipal Wastes" (Berg et al. 1984) to identify potential for proposed corridors to contaminate shallow aquifers. According to Berg et al., potential resides in one of 18 zones between Zones A1 and G, A1 indicating the highest potential for contamination. In its preliminary environmental site assessments for the proposed corridor, ISGS determined that the project corridor from I-180 to Chillicothe is in a location (Zone AX) where the potential for groundwater contamination is high, described as alluvium, a mixture of gravel, sand, silt and clay along streams. From IL 6 to Chillicothe, the project corridor is located within Zone A2, the second highest level of potential for contamination.

ISGS well records indicate that water in the project area from the north terminus to 2 miles south of Henry is obtained from sands and gravels of the Sankoty Formation at depths ranging from 150 to 300 feet below ground. From 2 miles south of Henry to the Marshall-Peoria county line, water is obtained from sands and gravels of the Henry Formation at depths ranging from 50 to 150 feet below ground. Water in the project area south of the Marshall-Peoria county line is obtained from various sands and gravels at depths ranging from 50 to 300 feet below ground.

The project crosses a wellhead protection recharge area[18] for Sparland's municipal wells. The wellhead protection area is crossed by IL 29 from 2,000 feet north of the north IL 29/IL 17 intersection to 2,000 feet south of the south IL 29 intersection.

ISGS performed a limited groundwater study in the Miller-Anderson Woods area in the summer of 2004. The purpose of the study was to assess the possible impact of improving IL 29 on water levels in various natural communities found in Miller-Anderson Woods west of IL 29 and the natural area east of IL 29. ISGS installed eight monitoring wells to measure water levels east and west of IL 29 and sampled the wells in August, September, and October 2004. The study found that groundwater elevations were highest in the wells in the bluff and decreased toward the Illinois River, indicating the flow is eastward through Miller-Anderson Woods. No strong groundwater upflow was observed, indicating that a water-table condition likely predominates. No confined aquifers were encountered. Groundwater was observed discharging at the base of the bluff west of IL 29, but water levels were below land surface in the terrace area immediately west of IL 29. It was noted that surface water in the beaver pond west of IL 29 recharges groundwater. The rapid transfer of water from west to east through the pond likely contributes to higher levels at the east end of the pond relative to the groundwater system. Groundwater levels also drop rapidly to the east across IL 29, while the pond is bermed by the IL 29 embankment enhancing the difference between ground and surface water levels near the east end of the pond.

The Ashmore-Pearl-Sankoty sand conglomerate is the source of the seeps occurring in the northern project limits. For detailed information on the seeps in the project corridor, see Section 3.9, Wetlands.

Illinois has no sole source aquifers, as defined in Section 1424(E) of the Safe Drinking Water Act (USEPA's list of designated sole source aquifers [draft May 1997]). Therefore, no such aquifer will be affected by the Preferred Alternative.

[18] An area identified to prevent the contamination of groundwater supplying public drinking water wells.

The 2004 Illinois Water Quality Report (IEPA May 2004) presents the results of groundwater quality monitoring at a subset of the community water supply wells in Illinois. Exhibit 4-8 of that report shows that two wells within the project area designated as "nonsupport," indicating that one or more analytes have been detected at concentrations above the applicable Illinois Class I Groundwater Quality Standard (GWQS). Two other wells are designated as "partial use support," indicating that one or more organic compounds were detected but below the GWQS, or that one or more inorganic compounds were detected above background concentrations but below the GWQS.

IEPA provided further documentation on the two nonsupport and two partial use support wells within the project area. The two nonsupport wells had detections of nitrate above the GWQS. One of the wells is part of the Henry community water supply, and the other supports a subdivision in Marshall County. Both draw water from the sand and gravel aquifer, from depths of less than 150 feet below ground. Concentrations of nitrate in treated water at the Henry facility have been below the GWQS in each periodic sample collected since the summer 2000, and at the second facility since the fall of 2001. The two partial use support wells supply Sparland and Lacon, and both draw water from the sand and gravel aquifer, from depths of less than 50 feet below ground. Samples from both wells indicated concentrations of nitrate above background but below the GWQS.

IEPA provided results of a water well database query, which indicates that 25 community water supply wells are present within the project area. Of those 25 wells, all but one draw water from the sand and gravel aquifer, from depths between 30 and 150 feet below ground. These sand and gravel wells supply the communities of Lacon, Sparland, Chillicothe, Rome, Putnam, and Henry plus a number of independent subdivisions. One community water supply well that supplies Hopewell draws water from the Cambrian/Ordovician bedrock aquifer, from a depth of more than 1,700 feet below ground.

3.7.2 Environmental Consequences

Geological and soil conditions vary throughout the project area. Environmental consequences of the Preferred Alternative related to geology and soils are discussed below. Additional geotechnical information must be obtained during design of the retaining walls.

3.7.2.1 Bedrock Geology

No impacts on bedrock geology are expected in the project area between IL 6 to north of Chillicothe or from north of Sparland to the northern project terminus. Bedrock typically is overlain by 50 to 200 feet of overburden soils in those areas, and construction work is not expected to encounter bedrock. It is expected that the bedrock would be encountered in some locations north of Chillicothe to north of Sparland.

From north of Chillicothe to north of Sparland, the Preferred Alternative would proceed along the existing alignment of IL 29. Throughout most of the alignment, the roadway would be expanded by converting existing 2-lane IL 29 into northbound lanes and adding a median, two southbound lanes to the west, and an outside shoulder. This would require variable depth of cut into the slopes west of IL 29. In some areas, lane elevations would be split, with construction of the southbound lanes at a higher elevation requiring less cut into the slope than a same-elevation configuration. Bedrock outcrops are prevalent within the slopes west of IL 29, and it is expected that the bedrock would be encountered in cuts for the

roadway expansion. Bedrock in the expected zone of excavation for retaining walls consists of alternating layers of shale, limestone, sandstone, and some coal, at various degrees of weathering, and as described in subsection 3.7.1.1. Groundwater seeps likely would be encountered at the contacts between low and high permeability bedrock.

In most areas along the roadway, the extent of bedrock excavation would be limited to overburden soils and the upper 10 feet of bedrock, and would not extend west of the southbound lanes. Inclinometers indicate that creep downslope has developed within the upper weathered bedrock zones at some locations. Retaining structures in those areas may need to derive their strength from competent bedrock. Potential reinforcement methods include rock socketed piles or drilled shafts below the retaining walls or rock tiebacks west of the walls. In areas of environmental sensitivity and restricted right of way, it is expected that rock anchors will not need to extend west of the southbound lane retaining walls. Rock socketed piles, drilled shafts, or rock anchors would be grouted into cored holes in the rock and are not expected to have detrimental impacts on bedrock quality except immediately adjacent to the core locations.

In addition to areas of cut along the mainline of IL 29, construction of one interchange ramp is expected to require cut into bedrock. The southbound exit ramp of the Sparland interchange may require cuts of up to 50 vertical feet into bedrock north of IL 17. The slope of the cut, and the need for potential reinforcement and benching, will be based on geotechnical conditions of the rock. A slope of 1H:1V, or nearly vertical cuts with benching, may be used if rock quality is sufficiently high. Flatter slopes or retaining structures may be needed if exposed rock is sufficiently weathered or vulnerable to deterioration when exposed. Water well installation logs for the uplands west of the slope indicate the bedrock in the cut likely will consist primarily of shale. However, additional geotechnical data must be collected before final decisions are made on the bedrock cut in that area.

The technical stability constraints posed by the bedrock conditions and proposed cuts into bedrock can be overcome through appropriate design and construction techniques. Height of cut walls along the mainline will be reduced by construction of split-elevation profiles along some segments of the roadway. The backslope cut for construction of the southbound exit ramp of the Sparland interchange will be designed to provide appropriate backslope stability and to prevent additional impacts to the bedrock after construction.

3.7.2.2 Surficial Geology and Topography

Between IL 6 and north of Chillicothe, the Preferred Alternative would proceed through the relatively flat terrace areas of the Illinois River Valley. Surficial soil deposits consist primarily of Henry outwash deposits and Parkland sand dunes, which create a gently rolling topography throughout the Chillicothe Terrace areas. These materials typically consist of normally consolidated silts, clays, and sands. As the Preferred Alternative proceeds north and crosses Senachwine Creek, the topography drops in elevation and Cahokia stream deposits are present within the Senachwine Creek floodplain.

Within the terrace area, roadway construction typically will require only short fills of a few to 10 feet and minimal cut. Embankments of variable height (some up to 30 feet) will be required for the IL 29 mainline and cross-roads at some roadway crossings and interchanges, specifically at Cedar Hill Drive, Old Galena Road, Rome West Road,

Cloverdale Road, Truitt Avenue, and relocated Benedict Street. Similar embankment heights will be required for the IL 29 bridge crossings at the BNSF Railroad and at Senachwine Creek, as well as along the roadway interval between the two bridges.

Soil settlement and stability concerns associated with embankment fills in the terrace areas can be addressed through appropriate design and construction techniques. At the embankment fills within the Senachwine floodplain (between the BNSF Railroad and Benedict Street), soft, compressible stream deposits may require more extensive undercutting and replacement. However, settlement and stability concerns in the area can be managed through appropriate design and construction techniques.

The north Chillicothe interchange IL 29 will require up to 20 feet of embankment fill over alluvial and outwash deposits near the Senachwine Creek floodplain.

The most notable impacts to surface geologic conditions from north of Chillicothe to north of Sparland are associated with cuts and retaining walls in the bluff slopes west of the new southbound lanes, and effects on soft and compressible soils under high fills for bridge embankments.

Construction of the new southbound lanes would require cutting of soils in the slopes west of existing IL 29 in some areas. Bedrock in this area is very close to the surface, with unconsolidated soil thickness at the new southbound roadway location ranging from zero (at rock outcrops) to a few tens of feet. Unconsolidated soils on the slopes typically consist of slopewash colluvium of the Peyton formation over loess deposits. Soils on the bluff slopes are marginally stable to unstable in their current condition (as described in subsection 3.7.1), and it is expected that retaining structures that derive stability from competent bedrock will be required along parts of the alignment to support the soil cuts. Soil retention or improved subsurface drainage may be required in some areas upslope of the retaining walls to mitigate potential soil creep towards the roadway.

Several high fills and retaining structures will be constructed as part of the proposed Sparland interchange. At the proposed IL 29 crossing of existing IL 29 and the Lincoln & Southern Railroad at the south end of this interchange, up to 35 feet of embankment height may be required. The high fill will continue to the north as embankments for bridges across Gimlet Creek and IL 17 (approximately 40 feet of fill), through the crossing of Thenius Creek and northern recrossing of IL 29 (approximately 30 feet of fill).

North of IL 17 and south of the recrossing, the alignment will proceed near a settling basin. Fill with sideslopes of 2H:1V may be placed adjacent and west of the settling basin to accommodate the alignment; also at Ramp A connecting existing IL 29 with southbound IL 29 south of IL 17. A retaining wall may be installed west of the ramp.

Most of the embankment fills for the IL 29 proposed Sparland interchange will be constructed over alluvial and outwash deposits in the Illinois River floodplain. Wetlands are present in some of these areas. It is expected that soft, compressible stream deposits and hydric soils will be encountered in the fill areas. Undercutting of soft soils and other settlement mitigation techniques (such as wick drains or preloads) may be necessary. It is expected that concerns with the compressible and soft soils in the area can be overcome through appropriate design and construction techniques, though the need for these may be extensive.

On the north crossing of IL 29 at the Sparland interchange, a cut up to 50 feet deep may be required for the southbound ext ramp. If a backslope is constructed for the cut, an extensive amount of material will need to be removed from the slope west of the ramp. The cut may extend several hundred feet west of the ramp, depending on soil and rock conditions in the cut. The excavated rock may be useful as fill within interchange embankments. Rock outcrops are present at the slope in the area, and the thickness of unconsolidated soils in the cut is not expected to be greater than 10 to 20 feet, based on available data. Therefore, most of the cut will be through rock.

At other locations along the mainline north of Sparland, fill heights typically will be limited to less than 10 feet. In areas where a split-profile configuration has been recommended, the southbound lanes will be constructed at a higher elevation than the northbound lanes, and in those areas the southbound lanes typically will be constructed to balance cut and fill. Some moderate embankment fills of about 15 feet will be required over a number of water bodies, including Coon Creek, Barrville Creek, and Crow Creek. At such shallow fill locations, concerns with compressible and soft soils can be overcome through appropriate design and construction techniques.

From south of Henry to the northern project terminus, the Preferred Alternative would proceed through the relatively flat terrace areas of the Illinois River valley west of Henry. In these areas, surficial soil deposits consist of Henry outwash, Cahokia alluvium, and Parkland sand dunes. The Preferred Alternative would proceed north through the Senachwine Creek (South) floodplain, and then north to within a few hundred feet east of the bluffs of the Illinois River Valley. Soils in the bluff consist of loess soils over glacial till. Bedrock typically is more than 50 feet below ground along the proposed improvement, and deeper in the bluff areas.

Roadway construction typically will require less than 15 feet of fill and minimal cut throughout the terrace areas. Fill heights of between 15 and 30 feet will be required at a few water body crossings, including at the Crow Creek North crossing, Dry Hollow Creek, and Senachwine Creek (North). Similar fill heights will be required for bridge embankments at road crossings over IL 29, including at Western Avenue and Old Indian Road. Also, embankment fill heights of up to 20 feet will be required where IL 29 will cross Kentville Road. Soft and compressible soils will likely be encountered at the drainage crossings. However, the stability and settlement constraints posed by these soil conditions can be overcome through appropriate design and construction techniques.

About 0.5 mile north of Cabin Hill Road (near the south end of the Miller-Anderson Woods), the Preferred Alternative would begin to shift east of IL 29, such that the proposed northbound lanes are east of existing IL 29. North of that area, the proposed southbound lanes are collocated with existing IL 29. Fill retaining walls, typically less than 10 feet high, would be constructed between the northbound lanes and the railroad in the area. The height of the proposed retaining wall would exceed 10 feet in some areas within a 1-mile section near the Miller-Anderson Woods. Near Kentville Road (north of the Miller-Anderson Woods), the Preferred Alternative would diverge west from the railroad and the proposed retaining wall terminates. Along the alignment of the retaining wall, soils likely consist of Cahokia alluvial deposits, which may contain soft, compressible intervals. The stability and settlement constraints posed by soil conditions at the retaining walls can be overcome through appropriate design and construction techniques. During Phase II soil borings will be taken to

determine if there are unstable soils, and where they are located. Construction in unstable soils would involve the use of tie-back walls, nailing, and similar techniques.

North of Kentville Road, the Preferred Alternative would proceed along a road cut through the bluff slopes constructed for existing IL 29. Additional cut of 15-foot depth throughout the backslope east of IL 29 would be required to construct the proposed northbound lanes. In some areas, the additional cut would extend a few hundred feet to the east, to the top of the slope; reducing the height of the hill by 5 to 10 feet. Soil types in the backslope are expected to consist of glacial till deposits, overlain by loess in some areas. The existing backslopes appear to have minimal evidence of slope instability, so the proposed backslopes are not expected to pose substantial stability concerns.

3.7.2.3 Soils

Table 3-30 lists the soil types in the area used by the Preferred Alternative.

Highly erodible soils (with slope designations of C or higher, indicating 4 percent or steeper slopes) are present within the preliminary right of way for the Preferred Alternative. Of the 1,889 acres within the proposed right of way, 228 acres (12 percent) are designated as highly erodible. Most of the erodible soils are located at the bluffs adjacent to IL 29, from north of Chillicothe to south of Henry (Exhibit 3-14).

Most of the 192 acres of erodible soils located within the preliminary right-of-way are located in the bluff slopes west of existing IL 29. Split profiles have been developed between the southbound and northbound lanes in these areas, in part to minimize the lateral extent of soil disturbance. Most of the erodible soils present at the locations of the future southbound lanes will either be cut out to construct the retaining wall, or in some cases covered by sideslope fill.

Areas of erodible soil located west of the southbound lane retaining walls, but within the right-of-way, are not expected to be notably affected by roadway construction (that is, construction will be performed primarily from the eastern side of the retaining walls). However, soil stabilization by soil nailing may be considered in some areas of highly erodible or unstable soil west of the southbound lane retaining walls, if necessary. Locations of such stabilization will be developed during Phase II design.

Other approaches used when dealing with highly erodible soils include the following:

- Use commercially available spray on polymers that can limit or hold the soil in place.
- Limit the amount of area that is disturbed at any one time.
- Leave buffer strips if possible to catch and filter the sediment.
- As a last resort, create detention/retention ponds at the base of the erodible slopes.

Efforts will be made to minimize soil disturbance outside the right of way within environmentally sensitive areas.

TABLE 3-30
Soil Types in the Project Area

Soil Type	Acres	Soil Type	Acres
Beaucoup Silty Clay Loam	15	Moundprairie Silty Clay Loam	62
Birbeck Silt Loam	1	Onarga Sandy Loam	20
Birbeck Silty Clay Loam	12	Orthents, Loamy	67
Brenton Silt Loam	7	Orthents, Urban Land Complex	6
Camden Silt Loam	1	Paxico Silt Loam	3
Chute Loamy Fine Sand	4	Plainfield Loamy Sand	56
Dakota Silt Loam	202	Plano Silt Loam	15
Dickinson Sandy Loam	171	Proctor Silt Loam	4
Dodge Silt Loam	6	Radford Silt Loam	4
Drummer Silty Clay Loam	6	Raveenwash Silt Loam	69
Dumps, Mine	3	Rodman Gravelly Loam	1
Elburn Silt Loam	14	Sawmill Silty Clay Loam	44
Fayette Silt Loam	1	Saybrook Silt Loam	0.4
Gravel Pits	7	Senachwine Silt Loam	4
Harvard Silt Loam	1	Senachwine-Hennepin Complex	1
Hennepin Loam	35	Slacwater Silt Clay Loam	8
Huntsville Silt Loam	52	Sparta Loamy Sand	22
Jasper Loam	114	Starks Silt Loam	16
Jules Silt Loam	89	Strawn Silt Loam	9
La Hogue Loam	4	Strawn Silty Clay Loam	8
Landes Loam	266	Strawn-Hennepin Loam	4
Lawler Loam	3	Urban	1
Littleton Silt Loam	23	Virgil Silt Loam	27
Miami Loam	0.3	Warsaw Silt Loam	93
Marseilles Silt Loam	24	Water	10
Martinsville Fine Sandy Loam	41	Wea Silt Loam	93
Martinsville Silt Loam	20	Worthen Silt Loam	116
Minneiska Loam	2	**Total[a]**	**1,888.7**
Morley Silt Loam	1		

[a] The total includes area required for construction of proposed highway, 111 acres south of Cedar Hills Drive currently owned and leased by IDOT, and farmland on landlocked parcels.

3.7.2.4 Landslides and Land Subsidence

Retaining structures and cut backslopes will be required in the central part of the project area to provide adequate slope stability. These will also be required to a lesser degree in the northern part of the project area. Approximate locations of these structures to support cuts and fills within bedrock and unconsolidated deposits are discussed in subsections 3.7.2.1 and 3.7.2.2, respectively.

The potential for surface subsidence due to the presence of abandoned mines is described in subsection 3.7.1.5. For most of the Preferred Alternative north of Chillicothe, the southbound lanes would be constructed immediately west of existing IL 29. Since additional surcharge will be minimal and the Danville Coal mines are not expected to undercut the proposed southbound lanes in this area, potential for roadway subsidence near most of proposed the IL project is expected to be minimal.

There are, however, a few areas of potential subsidence concern. Immediately south of the Sparland interchange, the proposed IL 29 project deviates a few hundred feet west of existing IL 29, and rises in elevation, before swinging back east to cross IL 29 and the railroad. This area is near the former Hydraulic Press Brick Company mine (Mine ID 3883), which underlies existing IL 29 and the Preferred Alternative. Roadway subsidence there from documented and undocumented mines in the Danville Coal is possible and should be investigated during detailed design. Another location of potential mine subsidence is the northern part of the IL proposed Sparland interchange. The area is collocated with the Fulton County Coal mine (Mine ID 286), which was advanced in the deeper Colchester (No. 2) coal. Embankment fills of up to 30 feet are proposed in this location, where the proposed IL project passes over existing IL 29. The potential for future subsidence of this mine should be investigated during detailed design.

Mine entrances (drifts, slopes, or shafts) may be exposed in new slope cuts west of the proposed southbound lanes in the central part of the project area, especially in the deep cut west of IL the southbound exit ramp at the proposed Sparland interchange. Where these are encountered, they likely will need to be abandoned in place to prevent public access concerns or detrimental effects on retaining wall performance.

3.7.2.5 Mineral Resources

The Preferred Alternative would acquire land from two active gravel quarries—Galena Road Gravel and Riverside Materials—and might pass over several abandoned coal and clay mines. Former quarries and undeveloped areas identified as having the potential for future mining operations (east of IL 29 and near Henry) would not be affected by the Preferred Alternative.

Galena Road Gravel. The Preferred Alternative would cross the western side of the Galena Road Gravel property starting at Truitt Road and extending past a utility corridor just north of the property. The area has not been mined. The part of the property to be converted to transportation use would no longer be available for quarry operations. In addition, 15 acres north of the BNSF Santa Fe Railroad and west of the Preferred Alternative would become landlocked and no longer available for quarry operations (Aerial Exhibit sheet 6).

Riverside Material. The Preferred Alternative would pass through the western part of the Riverside Material property, running northeasterly from IL 29 past Yankee Lane. The area

has not been mined. The part of the property to be converted to transportation use no longer would be available for quarry operations (Aerial Exhibit sheet 8).

Abandoned Coal and Clay Mines. The ISGS seismic reflection survey along IL 29 indicates that the project area has a high potential to pass over several abandoned coal and clay mines in the central part (between Hart Lane and Camp Grove Road) of the project area. See subsection 3.7.2.4, Landslides and Land Subsidence, for a discussion of future design analyses and construction measures in these areas.

3.7.2.6 Groundwater

As discussed in subsection 3.7.1.6, ISGS has designated the groundwater aquifer within the project corridor as Zones AX (north of Chillicothe) and A2 (IL 6 to Chillicothe), where potential for groundwater contamination is high. These zones generally are described as alluvium along streams that are not protected by an overlying low-permeability layer. IEPA designated four water supply wells within the project study area as nonsupport or partial use support. Each designation is based on detections of nitrate at concentrations exceeding background, likely associated with agricultural practices. These detections confirm that the sand and gravel aquifer in the project corridor has a high potential for contamination.

Potential sources of contamination associated with roadway construction include sedimentation, surficial siltation, and hydrocarbon runoff. During operation, potential sources of contamination include road oils and operation activities that involve the storage of pesticides and fertilizers. In areas where the Preferred Alternative follows existing IL 29, operations are not expected to differ much from existing conditions. Overall impacts from road oil and other potential highway runoff contaminants should be minimal because future traffic volumes are below the threshold of concern (30,000 average daily traffic) established by FHWA for potential impacts (RD-88-006-9). Operational activities involving pesticide or fertilizer handling should be implemented carefully to avoid potential impacts to water resources.

The Preferred Alternative would cross the Sparland wellhead protection area along a 1-mile segment near Sparland. The proposed alignment generally follows IL 29 in this crossing, and therefore operational impacts are expected to be similar to existing conditions within the wellhead protection area.

Data sources indicate that there may be potable water wells within 200 feet of the right of way for the Preferred Alternative. This threshold, however, is relevant only when new routes (drywell or borrow pits) or courses (bulk road oil or deicing salt storage facilities) of the groundwater pollution are introduced. These routes or sources would not occur with the Preferred Alternative; therefore, no violation would occur for the wellhead setback requirements.

The proposed IL 29 is not expected to adversely modify groundwater flow conditions. Along the roadway from south of Hopewell to south of Henry, the Preferred Alternative's northbound lanes generally would be collocated with the alignment and elevation of the existing roadway. The southbound lanes would be constructed at a split elevation, where appropriate, that would limit the depth of cut in the slopes west of the roadway in this area. In some areas, the cut may intersect the groundwater table or groundwater seeps, and drainage features along the walls may lower the groundwater elevation west of the roadway and thereby increase slope stability. In other areas, the Preferred Alternative

would not be collocated with the existing roadway (such as the bypasses of Chillicothe and Henry, and at the Sparland interchange). In those areas, roadway structures, culverts, and other drainage features would be constructed to maintain surface water flow patterns to the extent practical, and so impacts on groundwater flow patterns are expected to be minor.

ISGS performed a groundwater study in the Miller-Anderson Woods area in 2004 (ISGS 2005). Existing conditions there are described in subsection 3.7.1.6. The ISGS study considered impacts of the proposed IL 29 construction on groundwater and surface water flow patterns near the Miller-Anderson Woods. The report concluded that if culvert invert elevations are not substantially lowered or capacities increased, the Build Alternative should not adversely affect groundwater conditions in the Miller-Anderson Woods area. At this time it is not expected that culvert elevations would be lowered; therefore, impact to the groundwater at Miller-Anderson Woods is not expected. As a precautionary measure, a commitment would be placed in the official project file stating that if culvert invert elevations are lowered or capacities increased through Miller Anderson Woods the effects to groundwater conditions would be reevaluated.

3.7.3 Measures to Minimize Harm and Mitigation

The proposed highway would be constructed through many areas with high erosion potential. Exhibit 3-14 indicates the highly erodible soils that occur in the construction area. Highly erodible soils are subject to special erosion control procedures under a National Pollutant Discharge Elimination System (NPDES) construction permit. Approaches that would be considered when dealing with highly erodible soils include:

- The use of commercially available spray on polymers that can limit or hold the soil in place.
- Limit the amount of area that is disturbed at any one time.
- Leave buffer strips, if possible, to catch and filter sediment.
- The creation of detention retention ponds at the base of the erodible slopes.

Also see the special erosion control measures identified in subsection 3.8.3, Surface Water Resources and Quality.

Benching of high cut and fill slopes is proposed, where necessary, to minimize soil erosion and long-term maintenance including sloughing. Areas susceptible to subsidence, from abandoned mines, can be overcome through appropriate design and construction techniques. Various surficial geological conditions in the project area are prone to slumping and landsliding. Stability will be considered in road design.

The use of split profiles for certain segments of the project will reduce disturbance to erodible soils, the risk of landslides, and the risk of encountering abandoned mines.

As a precautionary measure a commitment should be placed in the official project file stating that if culvert invert elevations are lowered or capacities increased through Miller-Anderson Woods, the effects to groundwater conditions will be reevaluated.

3.8 Surface Water Resources and Quality

3.8.1 Affected Environment

This section describes physical, biological, and chemical characteristics of surface water bodies in the project area. Analysis of such characteristics provides evidence relevant to water quality and provides a baseline from which to assess water quality impacts related to the Preferred Alternative. In this section, descriptions of the streams within the project area are ordered from south to north. Most water bodies and watersheds are depicted on Exhibit 3-22.

The Preferred Alternative lies entirely within the Central Illinois River drainage basin (Hydrologic Unit Code [HUC] 07130001). Table 3-31 summarizes the extent of water resources within the Central Illinois River drainage basin. Twelve streams are located within the project corridor near the proposed improvements discussed in Section 2. Table 3-32 describes the physical characteristics of the 12 streams based on field observations between 2002 and 2004. Riverine and lacustrine (shallow lake) cover types represent 0.3 percent and 1.2 percent of the project corridor, respectively. The lakes in the Chillicothe Recreation Area will not be affected by the Preferred Alternative and are not discussed herein. The pond in the Miller-Anderson Woods Nature Preserve is a wetland and is discussed in Section 3.9.

3.8.1.1 Physical and Biological Description of Surface Water Bodies

This subsection describes physical characteristics of streams in the project area and the corresponding biotic assemblages of these streams. Key physical characteristics of the streams listed in Table 3-32 are defined as follows:

TABLE 3-31
Extent of Water Resources within Project Corridor Watershed (HUC 07130001)

	Acres
Shallow Lake	15,910
Intermittent Riverine	1,369
Perennial Riverine	263
Lakeshore	42
Total	**17,584**

Source: NWI data as reported in Suloway and Hubbell (1994).

- **Flow Regime.** Streams have either a perennial or intermittent flow regime. A perennial flow regime is required to support fish and mussels. An intermittent flow regime may support a limited assemblage of fish species during seasonal high water periods. Stream flow was determined by field observation. Six of the 12 streams have perennial flow.
- **Woody Riparian Vegetation.** Woody riparian habitats are plant communities that occur along rivers, streams, and creeks. They are usually comprised mainly of willow, cottonwood, sycamore, and silver maple, and provide cover for fish and other wildlife, keep streams cool, slow erosion and stream flow, and add organic material to the aquatic food chain. Woody riparian habitat is a key requirement for healthy streams and aquatic communities (see next page).
- **Stream Substrate.** Streams bottoms are composed of sand, gravel, cobble, detritus, silt, or clay. Excessive sand and silt in the stream substrate can diminish habitat quality for fish and aquatic macroinvertebrates. Other substrate types such as gravel, cobble, and detritus can contribute to a diverse fish and aquatic macroinvertebrate assemblage.

Woody Riparian Habitat
Senachwine Creek (South), facing upstream (WNW) from the IL 29 bridge, September 2002

Source: INHS 2003.

Nonwoody Riparian Habitat
Gimlet Creek, facing downstream (east), along south side of IL 17, just east of Sparland, March 2, 2004. UTM (NAD 83) Zone 16T, 295411m East, 4544662m North. Stream is channelized, bank overflow is rare, and canopy cover is absent.

Source: INHS 2005.

TABLE 3-32
Physical and Biological Parameters for Streams in the IL 29 Project Corridor

Stream	Flow Regime	Woody Riparian Vegetation	Stream Substrate	Stream Width (ft)	Habitat Quality (score)	Predominant Fish Species	Stream Tributary To	Aerial Exhibit #
Dickison Run[a]	Intermittent	Absent	Gravel, sand, and mud	4.3	71.5 poor	Not sampled[b]	Illinois River	1
Senachwine Creek (South)	Perennial	Present	80% sand, 20% gravel	40–70	99.5 fair, upper creek; 76.0 poor, lower creek	Central stoneroller; red shiner; bigmouth shiner; sand shiner; blacknose dace; logperch	Illinois River	6, 7
Coon Creek	Perennial	Present	5% cobble, 40% gravel, 45% sand, 10% detritus	< 0.5–5	91.0 fair	Not sampled[b]	Meadow Lake	7
Unnamed tributary (Illinois River)	Intermittent	Absent	45% gravel, 50% sand, 5% mud/silt	1.5–7	80.0 fair	Central stoneroller; creek chub; fantail darter	Illinois River	8
Rattlesnake Hollow Creek	Intermittent	Present	10% cobble, 50% gravel, 40% sand	1.6–35	90.0 fair	Not sampled[b]	Illinois River	9
Barrville Creek[c]	Intermittent	Absent	Not available	Not available	Not available	Not available	Illinois River	9
Gimlet Creek	Intermittent	Absent	10% cobble, 60% gravel, 30% sand	10–17	91.0 fair	Not sampled[b]	Illinois River	10
Thenius Creek	Perennial	Present	10% cobble, 20% gravel, 70% sand	10–20	94.5 fair	Not sampled[b]	Illinois River	10
Crow Creek West	Perennial	Present	10% gravel, 90% sand	1–5	89.0 fair	Not sampled[b]	Weis Lake	12
Dry Hollow	Intermittent	Absent	Grassed waterway; dry on all Visits	N/A	44.5 poor	Not sampled[b]	Senachwine Lake	15, 16
Senachwine Creek (North)	Perennial	Absent	30% gravel, 30% sand, 10% silt, 10% clay	8–30	66.0 poor	Grand shiner; quillback carpsucker; logperch	Senachwine Lake	17
Unnamed Tributary Goose (N) Lake	Perennial	Present	Mud and detritus	1.5-3	95.0 fair	Mosquito fish	Goose Lake (N)	18

Source: INHS 2003, 2005.
[a] Parameters for Dickison Run also apply to its tributary.
[b] Not sampled-Stream dry at time of sampling.
[c] Not sampled by INHS.

- **Stream Width.** A wide stream may have more variation in substrate type than narrow stream, and thus support a more diverse assemblage of aquatic biota. However, the flow regime is a more important determinant of aquatic species richness.
- **Habitat Quality Score.** Habitat quality scores, based on a modification of a standard USEPA method, derive from 12 physical stream parameters including stream substrate, canopy cover, sediment deposition, and streambank stability. Habitat quality scores greater than 130 indicate excellent condition, 110 to 129.9 good conditions, 80 to 109.9 fair conditions, and below 80 poor conditions. No sites were ranked "good" or "excellent," and the average of all habitat assessment scores was 82, indicating that most of the sites barely obtained a habitat quality rating of "fair." These scores indicate the presence of degraded habitat or the presence of pollutants. Several sites were dry during the survey, which may have shifted the scores lower.
- **Predominant Fish Species.** Predominant fish species are those encountered most frequently during sampling. Thirty-five species of fish were sampled within project area streams. Ten of these fish species dominated these streams (Table 3-32). Some fish assemblages (red shiner, creek chub, orangethroat darter, bigmouth shiner) can be found in degraded streams but are not necessarily indicative of lower quality conditions. Other assemblages (fantail darter, blacknose dace, logperch) can be indicative of higher stream quality. Of the four streams in which fish assemblages were assessed, Senachwine Creek (South) had the highest fish diversity (19 species). Senachwine Creek (North) had 16 species, and Hardscrabble Hollow Creek and the unnamed tributary Illinois River (at Hopewell) each had 8. All fish species documented to occur in the project area are common inhabitants of central Illinois streams. Fish diversity in the four streams sampled was relatively low because of low base flow and historical stream disturbances.

Water Quality within the project area is assessed based on the Illinois Water Quality Report (IEPA 2006), Hilsenhoff's Family Level Biotic Index, and chemical constituents of area streams from data collected during the 2002 and 2004 field seasons (INHS 2003, 2005). The Illinois EPA uses various criteria (numeric and narrative water quality standards) to assess the level of support (attainment) of each applicable designated use (aquatic life, fish consumption, swimming, recreation, aesthetic quality) in the streams of the state. Each assessed use receives a use-support rating of Full support or Nonsupport (IEPA 2006). All waters of the IL 29 project area are designated as general use.

Of all streams in the IL 29 project area, IEPA has evaluated designated uses and use support for only Senachwine Creek (South). The aquatic life designated use is fully supported in Senachwine Creek (South). Designated uses for Crow Creek (West), Coon Creek, Gimlet Creek, Thenius Creek and Dickison Run have not been assessed for these streams by IEPA.

Water bodies that attain full support are considered to be unimpaired; those that attain partial support or nonsupport are considered to be impaired. Impaired streams are those that are included on the IEPA "303d List." Streams on the "303d List" will require future preparation of a total maximum daily load analysis focused on the water quality constituents that are causing the impairment. None of the streams within the proposed IL 29 footprint are on the IEPA Section 303(d) List of Impaired Waters.

Aquatic macroinvertebrates were sampled in 9 streams throughout the IL 29 project corridor. Generally, streams in the project corridor are not outstanding in terms of the assemblage of aquatic macroinvertebrates. The taxon richness of aquatic macroinvertebrates was highest in Rattlesnake Hollow Creek and Gimlet Creek. Some aquatic macroinvertebrates are indicative of good water quality; for example, mayflies, stoneflies, and caddisflies. The presence of other aquatic macroinvertebrates, such as tube worms, is indicative of degraded water quality. Several metrics of aquatic macoinvertebrate assemblages are used to assay water quality and focus on the order, family, genus, or species taxonomic levels. Table 3-33 summarizes family level macroinvertebrate data for project area streams using the Hilsenhoff method.

Table 3-33 summarizes the stream aquatic macroinvertebrate biota analyzed with Hilsenhoff's Family Level Biotic Index (HBI). The HBI is based on tolerance values assigned to macroinvertebrate families. The tolerance values are based on the ability of macroinvertebrates to withstand organic pollutants. The HBI is reported on a 1–10 scale. An HBI value of 1 indicates a macroinvertebrate community that is intolerant of organic enrichment, whereas a 10 indicates high tolerance of organic enrichment.

Based on the HBI metric, streams with low scores generally have better water quality than those streams with high scores. Four streams in the project area are rated "poor" and six "fair." The upper reaches of Senachwine Creek (South) have better water quality than the lower reach of the stream. One stream, Unnamed Tributary Goose (N) Lake, was rated "very poor." None of the streams were rated very good or good, but one stream, Unnamed Tributary (Illinois River), was rated "excellent." Barrville Creek was not a water body sampled by INHS, and Dry Hollow (a grassed waterway) was not assessed because it was dry during INHS site visits (Table 3-33).

TABLE 3-33
Sampled IL 29 Stream Aquatic Macroinvertebrates Analyzed with Hilsenhoff's Family-Level Biotic Index

Stream	Family-Level Biotic Index	Water Quality	Degree of Organic Pollution
Dickison Run	6.95	Poor	Very substantial pollution likely
Senachwine Creek (South) Lower	6.08	Fairly poor	Substantial pollution likely
Upper	5.37	Fair	Fairly substantial pollution likely
Coon Creek	5.30	Fair	Fairly substantial pollution likely
Unnamed Tributary (Illinois River)	3.65	Excellent	Organic pollution likely
Rattlesnake Hollow Creek	5.34	Fair	Fairly substantial pollution likely
Barrville Creek	NS	NS	NS
Gimlet Creek	5.83	Fairly poor	Substantial pollution likely
Thenius Creek	5.71	Fair	Fairly substantial pollution likely
Crow Creek (West)	5.64	Fair	Fairly substantial pollution likely
Dry Hollow	NS	NS	NS
Senachwine Creek (North)	5.52	Fair	Fairly substantial pollution likely
Unnamed Tributary Goose (N) Lake	7.59	Very poor	Severe organic pollution likely

Note: A low Family-Level Biotic Index per Hilsenhoff's method is associated with good water quality. The HBI is reported on a 1–10 scale.
NS = not sampled

Table 3-34, which compares water quality constituents for project area streams against the state's general use water quality standard (for the same constituents), shows that project area streams are within applicable water quality standards. Only the level of pH (Dickison Run) exceeds the general use standard.

TABLE 3-34
Measured Levels of Water Quality Constituents vs. Water Quality Standards in Project Area Water Bodies

Parameter	Water Body							Water Quality Standard
	Crow Creek	Dickison Run	Gimlet Creek	Miller-Anderson (stream)	Miller-Anderson (pond)	Senachwine Creek (South)	Thenius Creek	
Dissolved oxygen	7.44	11.87	11.48	8.63	11.69	11.05	8.52	5.0 minimum[a]
pH (s.u.)	8.21	**9.01**	8.29	7.99	8.30	8.43	8.03	6.5 minimum 9.0 maximum[a]
Total dissolved carbon	64.9	68.8	59.0	59.6	56.7	53.5	57.5	NS[a]
Dissolved SO_4	35.7	59.4	89.9	77.0	85.7	43.0	84.4	500 mg/L[a]
Total phosphorus	0.04	0.39[b]	0.07[b]	0.04	0.07[b]	0.05[b]	0.03	0.05 mg/L[a]
Hardness	350	412	416	309	316	346	410	NS[a]
Chloride	22.0	219	34.4	7.58	7.73	26.7	29.6	500 mg/L[a]
Total dissolved solids	378	748	474	347	332	390	431	1,000 mg/L[a]
Dissolved copper	0.01	0.01	0.01	0.01	0.01	0.01	0.01	exp[A+B ln(H)][c] A = -1.464 B = 0.9422 µg/L
Dissolved lead	0.05	0.05	0.05	0.05	0.05	0.05	0.05	exp[A+B ln(H)][c] A = -1.301 B = 1.273 µg/L
Dissolved zinc	0.002	0.002	0.002	0.002	0.002	0.002	0.002	exp[A+B ln(H)][c] A = 0.9035 B = 0.8473 µg/L

Note: Measured levels of parameters in this table generally are the average of three sampling events: spring, summer, and fall of 2004.

NS = no water quality standard

pH values in **bold** violate the standard.

[a]General use water quality standards

[b]The measurement does not exceed the water quality standard because the standard applies in particular inland lakes and reservoirs in streams at the point of entry into these inland lakes and reservoirs. The reported measurements were taken upstream of this point.

[c]Acute standard, where Exp(x) = base of natural logarithms raise to x power.
ln(H) = natural logarithm of hardness of the receiving water in mg/L

3.8.1.2 Important Streams

Senachwine Creek (South) and Crow Creek (West) are described in further detail because these streams are larger in size, have larger watersheds, have flowing water for longer periods, and are subject to conservation efforts unlike other project-area streams.

Senachwine Creek (South). A total of 25 species of fish (4 families) were collected by seine during field surveys from Senachwine Creek (South) during 2002 and 2004. Sixteen species were collected from the upper reach of the stream and 19 species from the lower reach. The IDNR in 1999 using both seining and electroshocking techniques caught 2,218 fish representing 26 species. The sampling site was in the lower reach of the stream. The dominant fish species included the sand shiner, central stoneroller, river carpsucker, and largemouth bass which represented 38.9 percent, 24.0 percent, 8.7 percent, and 4.4 percent of the catch, respectively. The IEPA/IDNR Biological Stream Characterization (BSC) Work Group is a classification based on the attributes of lotic fish communities. The classification consists of five categories that range from Class A (Unique Aquatic Resource) to Class E (Restricted Aquatic Resources). Based on 1996 information, Senachwine Creek (South) is rated as a Class B stream (Highly Valued Aquatic Resource).

The Illinois River Soil Conservation Task Force prepared a watershed plan to decrease nonpoint source pollution in Senachwine Creek (South) and the Illinois River. The nonpoint source control projects implemented as a result of the plan resulted in 53 nonpoint source control projects between 1993 and 1997 and 107 projects between 2000 and 2003. It is estimated that the nonpoint source control projects implemented between 1993 and 1997 prevented 23,600 tons of soil from entering Senachwine Creek (South) annually.

Crow Creek (West). Crow Creek West crosses the project area between Sparland and Henry, about 800 feet north of Camp Grove Road. Surrounding land use is sparse forest, agricultural and scattered rural residences. Crow Creek (West) is a perennial stream with a relatively large upstream watershed area. It does not support an assemblage of mussels; a limited fish assemblage is present only during high flow periods. IDNR collected 513 individuals representing 20 species of fish from Crow Creek (West) in 1999. The dominant fish species included the red shiner (32.4 percent of catch), smallmouth bass (13.3 percent), bluntnose minnow (12.1 percent), and striped shiner (7.8 percent).

According to *The Crow Creek (West) Watershed Resource Plan,* Crow Creek West has been historically subject to a high sediment load. Total sheet, rill, and streambank erosion entering Crow Creek (West) has been measured at 98,000 tons/year. Sediment delivered to the Crow Creek (West) outlet at its confluence with the Illinois River amounts to 34,000 tons/year, or 31 acres of sediment with an average depth of 1 foot. Sediment deposition here has contributed to the buildup of a large delta in the Cameron Billsbach National Wildlife Refuge and in Weis Lake, a backwater of the Illinois River.

The goals of *The Crow Creek (West) Watershed Resource Plan* are to muster the resources of local, county, state, and federal agencies to curtail surface erosion, to understand watershed dynamics, to maintain creek banks, and to increase the water quality within the subwatershed. The recommended plan includes accelerated land treatment, constructing numerous small dams, installing in-stream grade control structures, streambank stabilization in the middle and upper reaches of the watershed, and selective log jam removal. Because the watershed plan remains in the draft stage, no improvement projects have taken place in the watershed. The IDOT met with the Committee on February 23, 2005, to discuss the project and its work in the project area. See meeting minutes in Appendix A, Local Officials/Other Coordination, for more information.

3.8.2 Environmental Consequences

The No-Build Alternative may cause negligible water quality impacts because of erosion and sedimentation during pavement and structure maintenance activities over and near waterways. There may be potential impacts associated with highway operations (runoff) and maintenance activities (spraying, deicing).

The Preferred Alternative could affect the 12 streams discussed in subsection 3.8.1. Surface water impacts generally are related to the potential for increased sedimentation, siltation, and suspended solids loads in project area water bodies from the construction, operation, and maintenance of the proposed roadway. The project's potential construction, operation, and maintenance impacts are discussed below. Permits and certifications required for potential impacts to surface water resources are discussed in Section 3.16, Permits/ Certifications.

3.8.2.1 Construction Impacts to Surface Water

Typical operations associated with roadway construction involve clearing, grading, filling, and excavation. These activities all increase the erosion potential of surface soils because of the reduction in vegetative cover and increased impervious areas resulting from compaction of soil by heavy equipment.

The Preferred Alternative would cross 11 streams (Dry Hollow is a grassed water way and does not normally carry water), all of which would require new bridges (Table 3-35). While most of the stream crossings would be along existing IL 29 and would involve replacing existing structures; the crossings of Dickison Run and its tributary, and one crossing of Senachwine Creek (South) would occur at locations where there are no existing structures.

During construction of bridges with piers in the water, at Senachwine Creek South (at the stream crossing north of the BN&SF railroad and at the IL 29 Connector in Peoria County), Benedict Street, Coon Creek and Senachwine Creek (Putnam County), construction equipment and materials would be placed in the stream channel during demolition of the existing structure, and construction of the proposed structure. Equipment in the stream channel would be necessary for pile driving and pier construction operations, as well as for the installation of sheet piling. Channel grading is expected to occur upstream and downstream of the proposed structures to accommodate the proposed wildlife-crossing ledges and to shape the channel to accommodate the proposed structure configuration. Equipment would be used within the floodplain to construct the concrete slopewalls and to place riprap along the abutment cones and the channel bottoms, at a distance of up to three times the channel velocity through the bridge both upstream and downstream.

For construction of bridges without piers in the water at Dickison Run, Rattlesnake Hollow, Barrville Creek, and Senachwine Creek Overflow Structure (Putnam County), for an unnamed stream crossing north of STA. 3453, and for two wildlife crossings north of Stations 6220 and 6270, the same construction process would be used except equipment would not be required within the stream channel for pile driving and pier construction. The same process also would be used at the new bridge locations (Gimlet Creek, Thenius Creek, and Dry Hollow Creek) except the existing bridges need not be removed.

A "remove and replace" method will be used to construct the box culverts in stream channels. This will require installing a temporary culvert to divert stream water during construction of the new box culvert. Round culverts will be installed to convey surface water at crossings of diverted streams. Installation will require excavation, riprap, and earthwork in the channel. Most of the proposed box culverts would be enlarged to provide a ledge for wildlife crossings, and so some minor channel excavation is expected for all proposed box culvert stream crossings. Minor channel excavation also is expected at locations where existing box culverts are to be extended. It is not known at this time what treatments, if any, are to be provided for ramps leading up to the wildlife crossing ledges. As much as possible, the ramps should be placed outside the limits of the stream banks in order to minimize impacts to surface waters during and after construction.

The box culvert near Station 6250 provides an overflow outlet for the Miller-Anderson Woods pond. The culvert will be replaced with a larger opening to provide a proposed wildlife-crossing ledge. During construction, it will be necessary to provide temporary sheet piling or another barrier to maintain the existing water levels in ponds at the upstream or west side of IL 29. The improvements also would require that a berm be placed around the upstream invert, with a low-flow and an emergency overflow weir. This proposal matches the existing configuration at the site, as the existing berm must be maintained under the proposed improvement.

As noted above, construction will involve heavy equipment crossing and working in the streams. Crossing through and working in streams will cause an increase in turbidity and sedimentation, and temporarily alter downstream hydraulics and substrate conditions. The level of water present in the streams while work is being conducted would affect the amount of sediment transported downstream. The potential increase in turbidity and sedimentation from in-stream work may be less in the intermittent streams than the perennial streams (see Table 3-35). With the mitigation measures normally employed by the IDOT, the in-stream work and construction activities adjacent to streams would not be expected to adversely affect the streams' overall habitat quality. Of the streams assessed, the habitat quality of three streams where new bridges are to be constructed is poor and seven are fair (one crossing was not assessed).

TABLE 3-35
Streams Crossed by the Preferred Alternative

Stream Crossing	Construction Activities	Additional Information
Dickison Run (perennial)	Construct two new bridges.	No piers would be located in the water.
Dickison Run Tributary (perennial)	Construct new culvert.	Two cell box with concrete bottom.
Senachwine Creek (South) (intermittent)	Construct two new bridges at the west crossing. Demolish the Benedict Street bridge and construct a new bridge. Demolish the IL 29 bridge north of Chillicothe and construct two bridges.	The new Senachwine Creek bridge would have 1 pier in the creek. The existing Benedict Street bridge has 1 pier in Senachwine Creek, the new structure would have 2 in the creek. The existing IL 29 bridge also has two piers in the creek. The new structure would also have 2 piers in the creek.

TABLE 3-35
Streams Crossed by the Preferred Alternative

Stream Crossing	Construction Activities	Additional Information
Coon Creek (perennial)	Construct four new bridges.	The existing bridge would be demolished and a new bridge constructed in its place to serve the proposed Hart Lane extension that accommodates the 50-year high water elevation. Two new bridges would be located east of existing IL 29 along the new alignment. A fourth bridge would be constructed to carry the proposed frontage road serving the Chillicothe Driving Range over the creek. None of the structures would have piers in the water.
Unnamed Creek (intermittent)	Located south of the Hopewell entrance drive. Demolish the existing bridge and construct two new bridges in the same location.	The existing bridge clear spans the creek, as would the proposed bridge.
Rattlesnake Hollow Creek (intermittent)	Demolish the bridge and construct two new bridges in the same location.	The existing bridge clear spans the creek, as would the proposed bridge.
Barrville Creek (intermittent)	Demolish the historic bridge on Old IL 29 and the existing structure, and construct two new bridges in the same location.	The existing bridge clear spans the creek, as would the proposed bridge.
Gimlet Creek (intermittent)	Maintain the existing structure on IL 29. The creek will flow under the two new bridges that will carry IL 29 over IL 17 at the east edge of Sparland.	The existing bridge clear spans the creek, as would the proposed bridge.
Thenius Creek (perennial)	Maintain the existing structure on IL 29. Construct two new bridges at the new crossing slightly east of the existing bridge. Construct a third bridge downstream of the two new bridges.	The existing bridge clear spans the creek, as would the proposed bridges.
Crow Creek (perennial)	Demolish the existing structure and construct two bridges slightly west of the existing structure. Demolish the existing culvert (north of the bridge crossing) and replace it with a longer culvert.	The existing bridge has 1 pier in Crow Creek, but the new bridge would clear span the creek. During construction, IDOT would remove debris that has collected in the creek within the proposed right of way to allow demolition of the bridge and construction of the new structure.
Dry Hollow (ephemeral)	Maintain the existing structure on IL 29. Construct two new bridges west of IL 29 to accommodate the Henry bypass.	Dry Hollow is a grassed waterway and only carries water in the 10-year storm and storms of greater intensity than the 10-year storm.
Senachwine Creek (North) (perennial)	Maintain the bridge on Senachwine Valley Rd. Demolish the bridge at the overflow south of the creek crossing, and construct two new bridges in the same location. Demolish the creek crossing bridge and replace it with two new bridges.	The existing bridge has 2 piers in the creek. The proposed bridge would clear span the creek.
Unnamed Tributary of Illinois River (perennial)	Demolish the existing structure and construct two new bridges in the same location.	The proposed bridge will clear span the creek.

Any long-term increases in suspended sediments can reduce aquatic productivity by limiting photosynthesis, lowering oxygen levels, and covering food sources and fish spawning areas. The potential impact of suspended sediments on fish and macroinvertebrates may be an issue only at the three streams where fish were found: Senachwine Creek South, the unnamed tributary to the Illinois River at Hopewell, and Senachwine Creek (North).

The major short-term water quality impacts due to construction are increases in turbidity and sedimentation resulting from erosion of disturbed areas and in-stream work. No surrounding soils at water bodies in the project area are classified as highly erodible.

The Preferred Alternative may affect the streambank protection, weirs, and riffle along the bank of Senachwine Creek (South) on the west side of the existing IL 29 bridge and the revetment mattresses along the bank of Senachwine Creek (South) on the west side of the existing Benedict Street Bridge during construction (see Exhibit 3-20). Stream enhancements affected during construction would be replaced in kind. There are no stream enhancement projects in Crow Creek (West) near the Preferred Alternative.

3.8.2.2 Operational Impacts to Surface Water

Operational impacts of the project on water quality result from stormwater runoff from highway surfaces, bridge decks, median areas, and adjoining rights of way. The increase in impervious area would increase stormwater runoff volumes and could increase in-stream erosion. The runoff carries pollutants that have accumulated as a result of roadway use. The primary highway runoff components include suspended sediments (pavement wear and dirt), lead (gasoline, tire filler), zinc (tire filler, motor oil stabilizers), copper (metal platings, brake linings), and petroleum (gasoline, antifreeze, hydraulic fluids).

Throughout the mid-1980s, the FHWA conducted nationwide studies to determine highway runoff constituents, amounts relative to roadway types and traffic conditions, and the potential impacts to surface water resources (*Pollutant Loadings and Impacts from Highway Stormwater Runoff, Volume I*, April 1990). FHWA's research concluded that pollutants in highway runoff are not present in amounts sufficient to threaten surface water or groundwater where average daily traffic volumes are below 30,000. Forecast traffic for IL 29 (up to 14,700) for the design year (2032) is well below that threshold.

Although adverse impacts to surface water quality are not expected, features are incorporated into the roadway design to reduce stormwater runoff loadings. Proposed designs include grassed medians and roadside ditches. These features will reduce pollutant loadings to nearby waterways. Pollutant removal in vegetated swales occurs through filtration by the vegetation, deposition of particulate matter in low velocity areas, and infiltration through soils. In general, a well-designed, well-maintained grass swale system can remove 70 percent total suspended solids, 30 percent total phosphorus, and 50 to 90 percent of trace metals (FHWA 1996).

3.8.2.3 Maintenance Impacts to Surface Water

Maintenance impacts associated with the Preferred Alternative include application of deicing agents and spraying for weeds within the right of way.

Deicing salts can affect water quality by increasing chloride levels in runoff and snowmelt. Impacts are associated with the movement of salt from the roadway into drainage ditches

and waterways. The proposed road improvements would increase the number of lane miles in the project area, thereby increasing the total salt loading over current levels. This could increase the delivery of sodium chloride ions to receiving surface waters. Research shows that occasional high levels of chlorides occur in drainage ditches and waterways because of rapid runoff and snowmelt. The research also indicates that no long-term buildup of chlorides occurs in waterways because of regular salt applications in winter. Studies by the USGS (Research Project R-18-0) of sodium chloride concentrations originating from highway runoff have shown that the additional input of sodium chloride ions from deicing salts would be offset by a proportional increase in runoff for dilution.

Streams in the project area generally have chloride levels ranging from 8 to 38 parts per million. In Dickison Run, the level is 210 to 225 parts per million. Because the Illinois General Use Standard (water quality) for chloride is 500 parts per million, it is reasonable to expect that the additional chloride that may reach project-area streams from salting IL 29 will not result in chloride levels that violate state water quality standards.

Spraying is prohibited at stream crossings, ponds, or other water bodies crossing or adjacent to the highway right of way, within 150 feet of a state listed natural area, or near an occurrence of a threatened and endangered species.

3.8.3 Measures to Minimize Harm and Mitigation

Principles and standards from IDOT's *Construction Procedure Memorandum on Erosion and Sediment Control*, Chapter 59-8 of the *IDOT Bureau of Design & Environment Manual*, Section 280 of the *Standard Specification for Road and Bridge Construction* (January 1, 2007), and other erosion control best management practices will be used to minimize the Preferred Alternative's potential water quality impacts. Construction in or near waterways will be performed in accordance with IDOT's *Standard Specifications for Road and Bridge Construction.* State-of-the-art erosion control devices will be installed before erosion prone construction activities begin. Construction at stream crossings would be conducted during low or normal flow periods and would comply with all federal and state laws, local ordinances, and regulations. An erosion control plan being developed as part of this study will reflect IDOT's erosion control practices. The preliminary plan includes the following concepts:

- **Temporary Ditch Checks—**Ditch check material will vary according to velocity of flow in ditch. Spacing of ditch checks will be adjusted according to ditch slope.
- **Ditch Linings—**Temporary linings (excelsior blankets) will be installed according to ditch velocity during construction (before revegetation). Permanent linings (paved ditches, riprap) will be installed according to ditch velocity after construction (after revegetation).
- **Culverts—**Downstream channels will be protected as required (riprap, energy dissipater basins) according to culvert outlet velocities.
- **Perimeter Erosion Barrier** will be installed in areas where sediments run off the construction area in sheet flow.
- **Inlet and Pipe Protection** will be installed immediately after inlets and pipes are constructed until surrounding area is paved or revegetated.

- **Stormwater Detention Ponds** will be installed at several locations in the project area to allow sediments to settle out of highway runoff. Five detention facilities are proposed: on the east side of Old Galena Road opposite the Audubon Wildlife Area, on the east side of Krause Road northeast of the proposed Rome West Road interchange, in the southwest quadrant of the proposed McGrath Road interchange, on the south side of Senachwine Valley Road near Senachwine Creek (North), and south of Putnam near Center Street.

Basic erosion control principles and best management practices that will be used include the following:

- The size of disturbed area exposed at any one time and the duration of exposure will be minimized. Construction contracts could include limits on the amount of soil that can be exposed, measures to prevent erosion during spring thaw if construction is not completed before winter, and specifications to complete grading as soon as possible and revegetate with temporary and permanent cover. The exact type and methods of erosion control to be utilized will be determined during the project's design phase.
- Control methods will be used to prevent erosion and sedimentation in sensitive areas. Such methods include proper design of drainage channels with respect to width, depth, gradient, side slopes, and energy dissipation; protective ground cover such as vegetation, mulch, erosion mat, or riprap; diversion dikes and intercepting embankments to divert sheet flow away from disturbed areas; and sediment control devices such as ditch checks, erosion bales, silt fences, and retention/detention basins.

3.8.4 Indirect Impacts

Indirect impacts considered in this section include those to project-area streams caused by project-induced growth and those to the Illinois River (and its backwater lakes) caused by construction-related sedimentation and highway runoff post construction. Impacts to the Illinois River are discussed as indirect impacts to distinguish them from the direct impacts to streams within the project's footprint. Each impact category is discussed below.

Indirect impacts are possible near interchanges in or near project area communities. See the discussion of indirect impacts under Section 3.3, Agriculture, for more information. The only proposed interchange in the project area near a surface water body is the north Chillicothe interchange. The proposed interchange is near Senachwine Creek (South) and Coon Creek. Chillicothe's future land use plan (Exhibit 3-8) has designated a large area adjacent to the north bank of Senachwine Creek (South) as recreational buffer land—a designation that will preclude secondary developments there. In addition, the access restrictions in the north Chillicothe interchange area will affect the ability of highway service uses from locating near the interchange. In discussions with Chillicothe officials, no reasonably foreseeable indirect development was identified in the interchange area. Thus, improvements to IL 29 are not expected to result in secondary development that would adversely affect surface water quality.

The Illinois River flows along the entire eastern boundary of the project area. The Illinois River is a major perennial river with a watershed comprising a large part of the state of Illinois. The Illinois River is an important economic resource; navigable by cargo barge, it provides an

important shipping route from Chicago to the Mississippi River. The Illinois River is also an important recreational resource, providing hunting, fishing, and boating opportunities.

Over the past century, the Illinois River has become polluted with sedimentation, fecal coliform bacteria, and chemical constituents associated with agriculture and industry. Reaches of the Illinois River within the project area are on the IEPA 303d (2006 version) list of impaired waters. The causes of impairment are PCBs and mercury, but the sources of impairment are unknown.

The Illinois River's backwater lakes have experienced a similar decline in water quality. Senachwine Lake is included on the 303d List of Impaired Waters (2006). Causes of impairment are low levels of dissolved oxygen and high levels of Aldrin, silver, sedimentation/siltation, total suspended solids, total phosphorus, and algal growth. The sources of impairment are agriculture, urban runoff/storm sewers, and contaminated sediments. Because of these impairments, Senachwine Lake is in nonsupport of its aquatic life and aesthetic quality designated uses. Sediment delivered to the Crow Creek (West) outlet at its confluence with the Illinois River amounts to 34,000 tons/year, with an average depth of 1 foot. Sediment deposition has contributed to the buildup of a large delta in the Cameron Billsbach National Wildlife Refuge and in Weis Lake.[19]

Construction of IL 29 and highway runoff will cause some sedimentation in the Illinois River and its backwater lakes. In the case of construction, the impact will be temporary and virtually immeasurable in comparison to other nonpoint contributors in the general project area such as agriculture. While watershed improvement projects in the Senachwine Creek (South) watershed between 1993 and 1997 are estimated to have prevented 23,600 tons of soil annually from reaching the Illinois River, thousands of tons of soil still enter the river each year.

Table 3-36 summarizes some of the chemical constituents of the back water lakes that project area streams drain to. All the parameters in the table are within the Illinois Water Quality Standards for that parameter. The entry for dissolved oxygen (4.42 mg/L) in Goose (N) Lake is below the minimum standard of 5.00. The value in the table represents the spring sampling period as the Lake was dry during the summer and fall sampling periods. This value may not be representative of the lakes condition.

TABLE 3-36
Chemical Constituents of the Backwater Lakes

Stream	Chloride	Total Dissolved Solids	pH	Dissolved Oxygen
Meadow Lake	64.7	372.6	8.32	8.15
Weis Lake	43.9	307.7	7.78	6.78
Senachwine Lake	58.4	338.3	8.46	10.20
Goose (N) Lakes	48.6	335.7	7.54	4.42

Source: INHS, 2005.

Note: Chloride, total dissolved solids, and dissolved oxygen are reported in mg/L.

[19] Crow Creek (West) Watershed Committee, 2003. *Crow Creek (West) Watershed Resource Plan.*

The erosion control measures that will be implemented during and after construction will minimize the impacts of project-related sedimentation and other pollutants on the river and the backwater lakes.

3.8.5 Cumulative Impacts

This section has a dual focus: to assess the project's impacts on the broad range of water resources and quality in the general area, and to evaluate whether the project contributes to cumulative impacts that would undermine state and federal efforts to reduce erosion and sedimentation into Crow Creek (West) and Senachwine Creek (South).

The streams in the project area have been affected by past practices such as removing native vegetation for crop production, stream channelization to improve drainage, and mining of sand and gravel deposits along stream corridors. The streams originate in the uplands west of the Illinois River and flow down through the bluffs before entering the Illinois River or one of its backwater lakes. Two of the watershed areas—Senachwine Creek (South) and Crow Creek (West)—erode a large amount of sediment that tends to clog stream channels or form deltas in adjacent backwater lakes. Over the years, the Illinois River has suffered the increased flow of water from the flow reversal of the Chicago River, the establishment of the lock and dam system, maintenance dredging of the river channel, and sediment loads from tributary streams. The backwater lakes adjacent to the Illinois River have suffered from severe sedimentation.

Short-term construction and long-term operation of IL 29 will contribute some level of sedimentation/pollution to the Illinois River and its tributaries and backwater lakes, but that contribution is minor in relation to the impacts caused by the activities described above. The multiple studies (Crow Creek West Watershed, Senachwine Creek South Watershed, Illinois River feasibility study [USACE, Rock Island], the Mossville Bluffs Watershed Plan), waterway improvement projects (Senachwine Creek Phase I and II, Hennepin & Hopper Lakes Restoration) and programs (CRP, CREP, and WRP) either are or were intended to address the problems described in the previous paragraph. Although the IL 29 project contributes to water resource and quality impacts, those impacts do not rise to the level where they could be considered to have a cumulative impact on water resources and quality.

As noted, the other focus of this section is to analyze whether there are projects/activities that would undermine state and federal efforts to reduce erosion and sedimentation into Crow Creek (West) and Senachwine Creek (South), two major project area streams. Crow Creek (West) and Senachwine Creek (South) historically have contributed a large sediment load into backwater lakes of the Illinois River, reducing their habitat quality and compromising water quality.

Federal and state efforts to reduce erosion and sedimentation in Senachwine Creek (South) and Crow Creek (West) include the Senachwine Creek Watershed Nonpoint Source Control Project, which was funded under Section 319 of the Clean Water Act, the Crow Creek (West) Watershed Resource Plan and several programs in the 2002 Farm Bill. The Senachwine Creek (South) and Crow Creek (West) plans are discussed in Section 3.8.1.2. The Farm Bill programs benefit Crow Creek (West) and Senachwine Creek (South) without being targeted specifically to those streams. The Farm Bill programs include the following:

- **The Conservation Reserve Program** and **Conservation Reserve Enhancement Program** remove highly erodible land and environmentally sensitive land from agricultural production and convert them to grasslands. The CREP's focus is on improving the water quality and wildlife habitat of the Illinois River.
- **The Wetland Reserve Program** is a voluntary program in which landowners receive financial incentives to enhance or restore drained or degraded wetlands in exchange for retiring marginal agricultural land.
- **The Environmental Quality Incentives Program (EQIP)** provides a voluntary conservation program for farmers that promotes agricultural production and environmental quality as compatible national goals. EQIP offers financial and technical help to assist eligible participants install or implement structural (for example, dry dam) and management practices on eligible agricultural land. EQIP offers contracts with a minimum term that ends 1 year after the implementation of the last scheduled practices and a maximum term of 10 years.

Of the programs listed, data on the reduction of sediment loading into Senachwine Creek (South) or Crow Creek (West) are available only as part of the Senachwine Creek Watershed Nonpoint Control Project. According to the February 2003 Final Report, the 53 sediment reduction projects completed during the first phase of the Senachwine Creek Watershed Nonpoint Control Project prevented 23,600 tons of soil from entering Senachwine Creek annually. During the second phase, 107 sediment reduction projects were credited with preventing 16,484 tons of soil from entering the creek. Landowners participating in the Farm Bill programs clearly are reducing the amount of sediment entering Senachwine Creek (South) or Crow Creek (West), but there are no published data on the amount of the reduction.

Despite the efforts described above to improve water quality in the Senachwine and Crow creeks, numerous sources continue to contribute sediment to those water bodies. There are, however, no known projects that would adversely affect the erosion control measures implemented by the state or federal programs to reduce sediment loading into those two streams.

3.9 Wetlands

The *U.S. Army Corps of Engineers Wetland Delineation Manual* (1987) defines wetlands as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions."

3.9.1 Affected Environment

Published data, including National Wetland Inventory (NWI) maps, were used to conduct a preliminary evaluation of the extent of wetlands within the project area. Wetland resources per NWI mapping for Bureau, Marshall, Peoria, and Putnam counties are summarized in Suloway and Hubbell (1994). Statewide, 3.3 percent of Illinois's land surface is palustrine wetland (Suloway and Hubbell 1994). Of the four project area counties only Putnam County has a larger percentage of palustrine wetlands than the statewide average (Table 3-37). NWI mapping is an estimate of wetland extent based on a remote sensing effort. The acreage of jurisdictional wetland, based on more accurate wetland delineation, may differ from NWI mapping. Table 3-37 summarizes the NWI data for the four-county project corridor.

TABLE 3-37
Palustrine Wetlands within the IL 29 Project Corridor Counties

County	Acres within County	Palustrine Wetland Acres[a]	Percent Palustrine Wetlands[a]
Bureau	554,218	11,528	2.1
Marshall	252,808	6,638	2.6
Peoria	399,182	12,353	3.1
Putnam	109,134	4,931	4.5
Total	**1,315,342**	**35,450**	**2.7**

Source: NWI as reported in Suloway and Hubbell (1994).

[a]Includes only palustrine and excludes riverine and lacustrine wetlands mapped by NWI.

The project corridor occurs within the Central Illinois River Basin (Hydrologic Unit Code [HUC] 07130001), as catalogued by the U.S. Geological Survey (USGS). This hydrologic basin is equivalent to "Illinois River—Ottawa to East Peoria" (Suloway and Hubbell 1994), with an area of 1,248,118 acres. Based on the NWI survey, the basin contains 50,373 acres of palustrine wetland, or 4.0 percent of the basin area. Table 3-38 summarizes extent of wetland types that occur within the basin.

Between 2002 and 2004, 123 routine onsite wetland delineations were performed in the project corridor. Of that total, 77 met the requirements as jurisdictional wetlands: hydrophytic vegetation, hydric soils, and wetland hydrology. Many delineated wetlands within the project area are mosaics of several wetland types. For the purpose of this document, mosaics of wetland types are termed *wetland complexes*. To account for the acreage of wetland types in the project area more accurately, the acreage of wetland complexes is divided into wetland type components. Thus, a 3-acre wetland complex comprising forested wetland/scrub-shrub wetland/wet meadow wetland is assumed to

include 1 acre of forested wetland, 1 acre of scrub-shrub wetland, and 1 acre of wet meadow wetland. Wetland types within the project area are discussed below.

Most delineated wetlands in the project corridor are part of a large wetland complex comprising a mosaic of floodplain forest, emergent marsh, and other wetland types along the Illinois River. Project area wetlands are identified on the Aerial Exhibit.

TABLE 3-38
Mapped Wetland Types within the Project Corridor Watershed: Hydrologic Unit Code 07130001

	Acres
Swamp	180
Bottomland Forest	23,066
Shallow Marsh/ Wet Meadow	4,021
Deep Marsh	1,333
Scrub-Shrub	2,910
Open Water	2,911
Shallow Lake	15,910
Lake shore	42
Emergent lake	0
Total	**50,373**

Source: NWI data as reported in Suloway and Hubbell (1994).

3.9.1.1 Wetland Plant Communities

The wetlands within the project area are extensive and diverse. Based on delineations, wetland acreage within the project area totals 1,068.5 acres, approximately twice the acreage represented by NWI mapping. Much of the wetland acreage is accounted for by forested wetland complexes (890.0 acres) located in the floodplain of the Illinois River. There are 47.1 acres of wet meadow wetland in the project area. Emergent marsh wetlands account for 95.6 acres, scrub-shrub wetlands 12.5 acres, pond wetlands 17.3 acres, and seep wetlands 6.0 acres within the project area. Table 3-39 (next page) summarizes characteristics of individual wetlands in the project area, and these areas are depicted on the Aerial Exhibit.

The six wetland cover types (plant communities) within the project corridor are described below in order of decreasing predominance (see also Table 3-40).

TABLE 3-40
Extent of Wetland Cover Types within the IL 29 Project Corridor

Wetland Cover Type	Total Wetland Area from Field Delineation (ac)	Percentage of Total Wetland Area	Percentage of Project Area[a]
Forested Wetland	890.0	83.3	3.6
Emergent Marsh Wetland	95.6	8.9	0.4
Wet Meadow Wetland	47.1	4.4	0.2
Scrub-Shrub Wetland	12.5	1.2	0.05
Pond Wetland	17.3	1.6	0.07
Hillside seep	6.0	0.6	0.02
Totals	**1,068.5**	**100**	**4.3**

Source: Illinois Natural History Survey (2003, 2004).

[a]Assumes total project area is 25,000 acres. *Project area* is defined as the area surveyed by the INHS, including the original effort and Addendums A, B, and C.

TABLE 3-39
Wetland Sites within the IL 29 Project Corridor

Wetland No.[a]	Wetland Type	Dominant Plant Species	Acreage of Wetland Types within the Project Corridor[b]							Total Wetland Size (ac)
			FO	**WM**	**EM**	**SS**	**PO**	**Seep**	**Total**	
W-3	Forested Wetland	Silver maple, eastern cottonwood, American elm, panicled aster, wood nettle, rice cutgrass, poison ivy. FQI = 18.8. 22.6% adventive.	34.9						**34.9**	35.0
W-7	Emergent Marsh	Common reed. FQI = 4.9. 11.1% adventive.			1.7				**1.7**	1.7
W-9	Scrub-Shrub Wetland	Eastern cottonwood, sandbar willow, spikerush, drooping sedge. FQI = 14.8. 25.8% adventive.				0.5			**0.5**	0.5
W-13	Pond	Reed canary grass. FQI = 0.0. 80% adventive.					0.3		**0.3**	0.3
W-14	Pond	Black willow, sandbar willow, duckweed, reed canary grass, wide-leaved cattail. FQI = 7.3. 10% adventive.					0.2		**0.2**	0.2
W-15	Forested Wetland	Silver maple, Ontario aster, wood nettle, clearweed. FQI = 10.4. 5.6% adventive.	20						**20.0**	20.0
W-16	Forested Wetland/ Scrub-Shrub/Wet Meadow/Marsh	Silver maple, black willow, American elm, button-bush, sandbar willow, panicled aster, Virginia wild rye, clearweed. FQI = 23.8. 12.3% adventive.	134.5	NS	NS	NS			**134.5**	144.7
W-17	Wet Meadow	Beggar's tick, Canadian rush, common water horehound, curly dock, cocklebur. FQI = 13.0. 10.7% adventive.		2.1					**2.1**	2.1
W-20	Wet Meadow	Reed canary grass. FQI = 6.0. 18.2% adventive.		1.2					**1.2**	1.2
W-23	Pond	Black willow, duckweed, reed canary grass. FQI = 7.6. 22.2% adventive.					0.5		**0.5**	0.5
W-24	Pond	Duckweed, reed canary grass. FQI = 3.4. 27.3% adventive.					1.0		**1.0**	1.0
W-25	Pond	Rice cutgrass, duckweed, reed canary grass, wide-leaved cattail. FQI = 8.9. 14.3% adventive.					0.1		**0.1**	0.1
W-26	Forested Wetland	Silver maple, sandbar willow, panicled aster, wood nettle. FQI = 21.7. 11.9% adventive.	46.2						**46.2**	46.2

TABLE 3-39
Wetland Sites within the IL 29 Project Corridor

Wetland No.[a]	Wetland Type	Dominant Plant Species	Acreage of Wetland Types within the Project Corridor[b]							Total Wetland Size (ac)
			FO	**WM**	**EM**	**SS**	**PO**	**Seep**	**Total**	
W-27	Wet Meadow	Touch-me-not, reed canary grass, clearweed. FQI = 11.1. 28.1% adventive.		0.03					**0.03**	0.03
W-28	Forested Wetland	Silver maple, green ash, American elm, panicled aster, Virginia wild rye, wood nettle, moneywort, reed canary grass. FQI = 17.2. 10.9% adventive.	9.3						**9.3**	9.3
W-30	Forested Wetland/ Scrub-Shrub/Wet Meadow	Silver maple, eastern cottonwood, sandbar willow, panicled aster, wood nettle, moneywort, reed canary grass, stinging nettle. FQI = 16.2. 14.3% adventive.	21.0	NS		NS			**21.0**	21.0
W-31	Forested Wetland	Silver maple, panicled aster. FQI = 18.6. 10.4% adventive.	30.1						**30.1**	30.1
W-32	Forested Wetland	Silver maple, black willow, buttonbush, halbred-leaved rose mallow, sandbar willow, wood nettle, rice cutgrass, clearweed, water smartweed, river bulrush. FQI = 22.3. 9.7% adventive.	59.5						**59.5**	59.5
W-33	Pond	Redtop, rice cutgrass, floating evening primrose, fogfruit. FQI = 7.8. 17.6% adventive.					0.6		**0.6**	0.6
W-34	Pond/Scrub-Shrub	Halbred-leaved rose mallow, floating evening primrose, pale dock. FQI = 12.6. 12.5% adventive.				1.0	1.0		**2.0**	2.0
W-37	Pond	Nodding beggars tick, duckweed, reed canary grass, smartweed, wide-leaved cattail. FQI = 9.7. 2.8% adventive.					0.3		**0.3**	0.3
W-40	Wet Meadow	Reed canary grass. FQI = 5.5. 23.5% adventive.		0.1					**0.1**	0.1
W-44	Pond	Reed canary grass, wide-leaved cattail. FQI = 4.9. 30.0% adventive.					0.3		**0.3**	0.3
W-47	Pond	Sandbar willow, narrow-leaved cattail, wide-leaved cattail. FQI = 6.7. 20.0% adventive.					0.9		**0.9**	0.9
W-48	Wet Meadow/Marsh	Reed canary grass, wide-leaved cattail. FQI = 12.9. 7.1% adventive.		2.6	2.6				**5.1**	5.1

TABLE 3-39
Wetland Sites within the IL 29 Project Corridor

Wetland No.[a]	Wetland Type	Dominant Plant Species	Acreage of Wetland Types within the Project Corridor[b]							Total Wetland Size (ac)
			FO	**WM**	**EM**	**SS**	**PO**	**Seep**	**Total**	
W-49	Forested Wetland/ Scrub-Shrub/Wet Meadow	Silver maple, sandbar willow, wood nettle, reed canary grass, cut-leaved coneflower. FQI = 13.4. 15.0% adventive.	36.0	NS		NS			**36.0**	36.0
W-51	Wet Meadow/Marsh	Reed canary grass, common reed, wide-leaved cattail. FQI = 10.3. 12.5% adventive.		15.9	15.9				**31.8**	31.8
W-52	Marsh/Forested Wetland/Scrub-Shrub Wetland	Silver maple, black willow, box elder, sandbar willow, touch-me-not, rice cutgrass, reed canary grass, common arrowhead, river bulrush, stinging nettle. FQI = 20.8. 3.4% adventive.	97.5		NS	NS			**97.5**	97.5
W-53	Forested Wetland	Silver maple, hackberry, green ash, rough-leaved dogwood, Ontario aster, wood nettle, reed canary grass. FQI = 15.9. 9.1% adventive.	6.9						**6.9**	6.9
W-54	Pond	Duckweed, reed canary grass. FQI = 3.5. 50.0% adventive.					0.0		**0.0**	6.3
W-56	Seep (Wet Meadow)	Sedge sp., red-footed spikerush, horsetail, moneywort, field mint, fogfruit. FQI = 16.1. 8.3% adventive.						1.4	**1.4**	2.8
W-57	Forested Wetland	Eastern cottonwood, black willow, American elm, box elder, rough-leaved dogwood, stout reed, Canada honewort, touch-me-not, wood nettle. FQI = 18.4. 10.6% adventive.	3.3						**3.3**	3.3
W-58	Forested Wetland/ Scrub-Shrub/Wet meadow	Silver maple, eastern cottonwood, sandbar willow, panicled aster, wood nettle, moneywort, clearweed, cut-leaved coneflower. FQI = 26.2. 7.6% adventive.	127.2	NS		NS			**127.2**	127.2
W-59	Pond	Rice cutgrass, duckweed, floating evening primrose, common arrowhead. FQI = 12.2. 5.3% adventive.					3.6		**3.6**	3.6
W-62	Pond	Halbred-leaved rose mallow, rice cutgrass, duckweed, floating evening primrose, common arrowhead. FQI = 13.9. 3.7% adventive.					1.0		**1.0**	1.0

TABLE 3-39
Wetland Sites within the IL 29 Project Corridor

Wetland No.[a]	Wetland Type	Dominant Plant Species	Acreage of Wetland Types within the Project Corridor[b]							Total Wetland Size (ac)
			FO	**WM**	**EM**	**SS**	**PO**	**Seep**	**Total**	
W-64	Seep (Forested Wetland)	Canada waterleaf, touch-me-not, wood nettle, clearweed, skunk cabbage. FQI = 16.8. 9.1% adventive.						0.1	**0.1**	0.1
W-65	Forested Wetland/Scrub – Shrub Wetland	Silver maple, eastern cottonwood, black willow, gray dogwood, Ontario aster, touch-me-not, clearweed, cut-leaved coneflower, giant goldenrod. FQI = 18.2. 7.1% adventive.	3.0			NS			**3.0**	3.0
W-66	Pond	Nodding beggars tick, touch-me-not, rice cutgrass, duckweed, knee grass, common reed, drooping smartweed. FQI = 18.1. 13.1% adventive.					4.8		**4.8**	12.2
W-67	Seep (Marsh)	Joe-pye weed, touch-me-not, clearweed, swamp goldenrod. FQI = 23.3. 10.6% adventive.						0.0	**0.0**	2.6
W-68	Wet Meadow/Scrub-shrub	Eastern cottonwood, black locust, sandbar willow, Ontario aster, hairy aster, panicled aster, fogfruit, river bulrush. FQI = 19.4. 21.9% adventive.		6.2		6.2			**12.4**	12.4
W-69	Marsh	Duckweed, floating evening primrose, water smartweed. FQI = 11.8. 5.9% adventive.			7.4				**7.4**	7.4
W-70	Forested Wetland	Silver maple, eastern cottonwood, black willow, American elm, buttonbush, halbred-leaved rose mallow, sandbar willow, Ontario aster, panicled aster, wood nettle, rice cutgrass, clearweed. FQI = 24.3. 9.3% adventive.	78.6						**78.6**	78.6
W-71	Marsh	Rice cutgrass, water smartweed, common arrowhead, river bulrush. FQI = 11.0. 5.0% adventive.			22.1				**22.1**	22.1
W-72	Scrub-Shrub Wetland	Sandbar willow, redtop, Ontario aster, American bellflower, Joe-pye weed. FQI = 15.5. 11.8% adventive.				0.2			**0.2**	0.2

TABLE 3-39
Wetland Sites within the IL 29 Project Corridor

Wetland No.[a]	Wetland Type	Dominant Plant Species	Acreage of Wetland Types within the Project Corridor[b]							Total Wetland Size (ac)
			FO	**WM**	**EM**	**SS**	**PO**	**Seep**	**Total**	
W-73	Scrub-Shrub Wetland/Pond/Marsh	Red-osier dogwood, sandbar willow, redtop, cupplant, bulrush, narrow-leaved cattail, wide-leaved cattail. FQI = 17.2. 16.7% adventive.			0.4	0.4	0.4		**1.2**	1.2
W-74	Marsh/Scrub-Shrub	Sanbar willow, redtop, red-footed spikerush, cupplant, common reed, bulrush, wide-leaved cattail. FQI = 12.7. 14.3% adventive.			0.8	0.8			**1.6**	1.6
W-75	Seep (Forested Wetland)	Hairy aster, stout reed, touch-me-not, clearweed, skunk cabbage. FQI = 21.0. 2.0% adventive.						0.5	**0.5**	0.5
W-76	Wet Meadow/Scrub – Shrub	Sandbar willow, panicled aster, sedge sp., reed canary grass, smartweed, dandelion. FQI = 8.5. 32.1% adventive.		1.1		1.1			**2.2**	2.2
W-77	Forested Wetland	Box elder, panicled aster, Virginia wild rye. FQI = 11.5. 6.9% adventive.	0.8						**0.8**	0.8
W-78	Forested Wetland	Box elder, silver maple, eastern cottonwood, black willow, Ontario aster, panicled aster, wood nettle, moneywort, hairy sweet cicely, cut-leaved coneflower. FQI = 17.3. 8.7% adventive	50.2						**50.2**	50.2
W-79	Marsh	Common reed, common arrowhead, river bulrush. FQI = 22.7. 9.3% adventive.			29.4				**29.4**	29.4
W-80	Seep (Marsh)	Indigo bush, hairy aster, Joe-pye weed, touch-me-not, clearweed, river bulrush, wide-leaved cattail. FQI = 23.4. 2.5% adventive.						3.9	**3.9**	3.9
W-81	Wet Meadow	Reed canary grass. FQI = 11.6. 20.0% adventive.		3.0					**3.0**	3.0
W-82	Wet Meadow	Sandbar willow, panicled aster, Joe-pye weed, reed canary grass, Canada goldenrod, wide-leaved goldenrod. FQI = 11.1. 16.7% adventive.		0.5					**0.5**	1.6
W-83	Marsh	Rice cutgrass, reed canary grass, river bulrush, wide-leaved cattail, narrow-leaved cattail. FQI = 20.8. 16.3% adventive.			1.6				**1.6**	1.6

TABLE 3-39
Wetland Sites within the IL 29 Project Corridor

Wetland No.[a]	Wetland Type	Dominant Plant Species	Acreage of Wetland Types within the Project Corridor[b]							Total Wetland Size (ac)
			FO	**WM**	**EM**	**SS**	**PO**	**Seep**	**Total**	
W-A2	Wet Meadow	Sandbar willow, hairy aster, late-flowering thoroughwort, reed canary grass. FQI = 6.6. 17% adventive.		1.4					**1.4**	1.4
W-A3	Wet Meadow	Reed canary grass. FQI = 3.0. 25% adventive.		7.2					**7.2**	7.2
W-A4	Wet Meadow	Reed canary grass. FQI = 5.7. 35% adventive.		3.0					**3.0**	3.0
W-A6	Marsh	Reed canary grass. False nettle, rice cutgrass. FQI = 17.1. 11% adventive.			0.4				**0.4**	0.4
W-A7	Floodplain Forest	Silver maple, hackberry, wood nettle. FQI = 14.8. 10% adventive.	0.2						**0.2**	0.2
W-A10	Floodplain Forest	Green ash, black willow, eastern cottonwood, sandbar willow, Jerusalem artichoke, reed canary grass. FQI = 12. 18% adventive.	0.7						**0.7**	0.7
W-A11	Wet meadow	Reed canary grass, giant foxtail, water smartweed, hedge bindweed. FQI = 12. 18% adventive.		0.1					**0.1**	0.1
W-A15	Marsh	Common reed. FQI = 5. 11% adventive.			5.5				**5.5**	5.5
W-A18	Marsh	Small naiad, common reed, horsetail. FQI = 9.6. 17% adventive.			0.7				**0.7**	0.7
W-A20	Marsh	Common reed. FQI = 6.9. 10% adventive.			5.0				**5.0**	5.0
W-A23	Marsh	Common reed, red-stemmed spikerush, cyperus (sedge). FQI = 11.3. 4% adventive.			1.5				**1.5**	1.5
W-A28	Floodplain Forest	Eastern cottonwood, stinging nettle. FQI = 12.3. 12% adventive.	2.6						**2.6**	2.6
W-B1	Pond/Sedge Meadow	Mousetail grass, panicled aster, sedge, narrow-leaved cattail. FQI = 12.1. 31.3% adventive.		0.3			0.3		**0.6**	0.6
W-B2	Pond/Wet Meadow	Panicled aster, reed canary grass, Kentucky bluegrass. FQI = 11.2. 42.1% adventive.		0.2			0.2		**0.4**	0.4

TABLE 3-39
Wetland Sites within the IL 29 Project Corridor

Wetland No.[a]	Wetland Type	Dominant Plant Species	Acreage of Wetland Types within the Project Corridor[b]							Total Wetland Size (ac)
			FO	**WM**	**EM**	**SS**	**PO**	**Seep**	**Total**	
W-B4	Forested Wetland	Silver maple, panicled aster, wood nettle, moneywort. FQI = 16.7. 10.9% adventive.	82.5						**82.5**	82.5
W-B5	Pond	Duckweed, reed canary grass, leafy pondweed, wide-leaved cattail. FQI = 9.5. 15.8% adventive.					1.2		**1.2**	2.0
W-C1	Forested Wetland/Wet Shrubland/Wet Meadow	Silver maple, eastern cottonwood, sandbar willow, false nettle, reed canary grass. FQI = 14.7. 20.3% adventive.	45.0						**45.0**	45.0
W-C2	Seep (Wet Meadow)	Great angelica, touch-me-not, reed canary grass. FQI = 20.1. 19.6% adventive.						0.1	**0.1**	0.1
W-C3	Wet meadow/Scrub-Shrub Wetland	Eastern cottonwood, sandbar willow, panicled aster, reed canary grass, alsike clover. FQI = 6.1. 22.2 % adventive.		1.6		1.6			**3.1**	3.1
W-C5	Pond	Black willow, sandbar willow, panicled aster, barnyard grass. FQI = 6.6. 25.0% adventive.					0.6		**0.6**	0.6
W-C6	Scrub-Shrub Wetland	Eastern cottonwood, black willow, sandbar willow, panicled aster, reed canary grass. FQI = 8.5. 22.2% adventive.				0.7			**0.7**	0.7
W-C7	Marsh/Wet Meadow	Reed canary grass, narrow-leaved cattail. FQI = 7.0. 22.0% adventive.		0.6	0.6				**1.2**	1.2
		Total	**890.0**	**47.1**	**95.6**	**12.5**	**17.3**	**6.0**	**1,068.5[c]**	**1,098.2**

FQI = Floristic Quality Index
[a]"A," "B," or "C" in the unique wetland identifier signifies the addendums to wetland delineation effort. The original delineation effort has no "A," "B," or "C" in the unique wetland identifier.
[b]Wetland types are abbreviated in this table as follows: **FO** = forested wetland, **WM** = wet meadow, **EM** = emergent marsh, **SS** = scrub-shrub, **PO** = pond, and **Seep** (unabbreviated).
[c]The sum of individual acreages is not exact as a result of rounding.
NS = not significant acreage

Forested Wetlands. The most prevalent wetland type—forested wetland—generally was very similar throughout the project corridor, dominated principally by silver maple (*Acer saccharinum*), eastern cottonwood, American elm, black willow, green ash, and box elder. Most forested wetlands are disturbed and at various levels of regrowth after logging and cutting. Common herbaceous dominants within these communities included panicled aster, Canada wood nettle, Ontario aster, moneywort, reed canary grass, and Canada clearweed. Forested wetlands comprise 83.3 percent of the total wetland acreage in the project area.

Based on the vegetative sampling of five forested wetland sites, the following generalizations can be made:

- All sites supported relatively small numbers of tree species, ranging from 6 to 9 species.
- Overstories were dominated by silver maple alone, or by silver maple and either cottonwood or green ash. In all sites, silver maple was strongly dominant, making up more than 50 percent of the overstory trees present.
- Tree densities ranged from 88 to 179 trees/acre with basal areas ranging from 85 to 240 square feet/acre.
- Snag density (snags/acre) ranged from 7.8 to 18.8 snags/acre. A snag is either a dead tree or a living tree in which cavities are observed.
- Two sampled forested wetlands (W-32 and W-58) had an FQI greater than 20, indicative of relatively undisturbed sites. The range of FQI in the sampled forested wetland sites was 10.4 to 26.2.
- The sapling layers were dominated by one or two species and ranged in density from very sparse (5 saplings/acre) to fairly dense (143 saplings/acre). Generally, high sapling density is positively correlated with tree canopy openings (disturbance-related) and extended droughty periods.
- Total number of plant species present at the sampled forested wetland sites ranged from 18 to 76.

Table 3-41 summarizes the characteristics of sampled forested wetlands.

TABLE 3-41
Summary of Characteristics of Sampled Forested Wetlands in the IL 29 Project Area

Wetland Identifier	FQI	Snag Density (snags/acre)	Tree Density (trees/acre)	Sapling Density (saplings/acre)	Shrub Density (shrubs/acre)	Seedling Density (seedlings/acre)
W-3	18.8	7.8	88	5.2	611.9	1,781
W-15	10.4	17.5	111.4	31.2	184.6	1,052.2
W-32	22.3	14.9	112.4	29.1	1,207.6	4,370.7
W-58	26.2	14.3	126.7	49.2	378.8	14,649.9
W-78	17.3	18.8	179.1	143.1	97.1	2,347.2

Forested wetlands within the project area generally are subjected to either a temporarily flooded or a seasonally flooded water regime, per Cowardin's terminology. *Temporarily flooded*

means that surface water is present only for brief periods during the growing season, with the water table well below the soil surface for most of the season. *Seasonally flooded* means that surface water is present for extended periods in the growing season but not at the end of the growing season. Typically, forested wetlands subjected to seasonally flooded regimes are less diverse in plant species than are temporarily flooded forested wetlands because fewer plant species are adapted to withstand a long duration of inundation.

Emergent Marsh Wetlands. Emergent marsh accounts for 8.9 percent of the total wetland acreage in the project area. Numerous emergent and herbaceous species dominate seasonally or semipermanently flooded marshes within the project corridor. Most common among these dominant species were reed, reed canary grass, wide-leaved cattail, arrowhead, bulrush, rice cutgrass, water smartweed, and spike rush. Three marshes or marsh-dominated complexes (W-52, W-79, and W-83) had FQI values greater than 20.

Wet Meadow Wetlands. Generally, wet meadows are wetlands that are saturated or inundated for only a brief period during the growing season. Wet meadows comprise 4.4 percent of the wetland acreage within the project area. They may be isolated hydrologically or may be situated near the perimeter of wetlands with a wetter hydrologic regime. Within the project area, wet meadows commonly were dominated by reed canary grass and typically had low floristic quality. One wet meadow–dominated wetland complex (W-68) contained the federal/state threatened species, decurrent false aster.

Scrub-Shrub Wetlands. Wetlands dominated by saplings and shrubs are identified as scrub-shrub wetlands (PSS1A, PSS1C). Scrub-shrub wetlands account for 1.1 percent of the wetland acreage within the project area. Species of willow and dogwood dominate the scrub-shrub wetlands in the project area. Many of these wetland types are found in conjunction with forested wetlands (PFO1). In these cases, periodic flooding and overland flow provide the primary source of hydrology. Small areas of scrub-shrub wetland also are found along the margins of some ponds and lakes.

Pond Wetlands. These sites consist primarily of constructed farm and stock ponds. The pond in Miller-Anderson Woods Nature Preserve is a pond wetland. The ponds are often small, less than 1.2 acres in size, and often support wetland vegetation including willow and various emergent species particularly at the pond perimeter. Common dominants in pond wetlands included sandbar willow (*Salix exigua*) and duck weed. Pond wetlands comprise 1.6 percent of the wetland acreage within the project area.

Seep Wetlands. Hillside seeps, dominated by hydrophytic plant species, may be forested, scrub-shrub, or herbaceous in composition. The hydrology of hillside seeps, often calcareous, typically flows laterally along a confining layer and "daylights" at a hillside. Often seeps support uncommon plant communities characterized by the presence of plant species with a high affinity for calcium. Seep wetlands are rare within the project area, comprising 0.6 percent of the wetland acreage.

Six seep wetlands have been identified in the project corridor: three in forested settings, two in emergent marsh settings, and one in a wet meadow. The three forested seeps—W-64, W-75, and W-C2—had good floristic quality given their small size. Wetland W-75 and W-C2 each had an FQI of 21.0. Dominant species in forested seeps included Canada waterleaf, touch-me-not, Canada wood nettle, carpetweed, skunk cabbage, panicled aster, and wood reed.

Dominant species in hillside herbaceous seeps within the project area include a sedge species, spike rush, field horsetail, moneywort, field mint, fog fruit, spotted Joe-pye-weed, touch-me-not, carpetweed, spreading goldenrod, wood reed, swamp aster, skunk cabbage, false indigo, bulrush, rough-leaved dogwood, honewort, Canada wood nettle, and wide-leaved cattail.

3.9.1.2 Wetland Functions

Wetland functions were assessed qualitatively for all sites during field delineations. Field assessments were based on visual observation, including plant community composition and structure, landscape position, surrounding land uses, hydrologic inputs and outflows, and soils. Specific functions included wildlife habitat, flood storage, ground water discharge, recreation values, and heritage characteristics. Heritage characteristics include FQI, presence of threatened or endangered species, or inclusion of designated lands. A brief description of the suite of wetland functions follows.

Wildlife Habitat. All wetlands might provide habitat for some wildlife, but those that are part of a larger complex of wetland types have the potential to provide habitat for a more diverse wetland fauna. Wetland complexes provide a variety of strata—tree, shrub, and herbaceous—that different wildlife guilds can occupy. Further, several large tracts of land along the Illinois River within the project area are managed to benefit wildlife. Factors important for wildlife include abundant cover for hunting, loafing, and movement. Tree snags and cavities are important to wildlife using forested habitat. There are numerous wetlands within the project area that were identified as wetland complexes. Sampled wetlands in the project area that have a relatively high snag density (snags/acre), listed in order of decreasing snag density are W-78 in the Miller-Anderson Woods area (18.8 snags/acre), W-15 adjacent to Meadow Lake south of Sparland (17.5), W-32 adjacent to Goose Lake near Crow Creek (14.9), W-58 near Miller-Anderson Woods Natural Area (14.3), and W-3 east of Chillicothe and near Spring Branch Unit (7.8). Wetlands in the project area that have a high number of potentially breeding birds include W-3, W-62, W-66, W-67, W-68, W-69, and W-70. With the exception of W-3, which is east of Chillicothe, the remaining wetlands that have a high number of potentially breeding birds are located in the Miller-Anderson Woods area.

Floristic Quality and Percent Adventive. Floristic quality was measured using the Floristic Quality Assessment (FQA) methodology of Taft et al. (1998). The FQA method was applied to wetland plant communities identified in the project area. The FQA method is based on a numerical rating (FQI) of plant communities. The numerical rating describes the natural quality of plant communities. A low FQI often indicates disturbance and low natural quality, whereas a high FQI indicates low disturbance and high natural quality. The basis for the numerical rating is the assignment of coefficients of conservatism (numbered 0 to 10) to each plant species known to occur in Illinois. Higher coefficients of conservatism generally are assigned to species that are native and found in specialized habitats, whereas lower coefficients are assigned to species that are nonnative, common, and habitat generalists. Once a comprehensive plant species list has been compiled for a natural area remnant, its FQI is calculated. An FQI below 10 suggests a site of low natural quality, while a score of below 5 may denote a highly disturbed site. An FQI above 20 suggests that a site has evidence of native character and may be an environmental asset. The implementing rules of the Illinois Interagency Wetland Policy Act require a 5.5-to-1.0-acre mitigation ratio for impacts to wetland sites having an FQI of 20 or greater. Calculated FQIs in this document include all native and nonnative plant species recorded at the site. The FQA method also measures

"percent adventive" of a plant community. Adventive plant species are not native to Illinois. The term *adventive* is synonymous with *alien* or *exotic.* Percent adventive is the number of nonnative plant species divided by the total number of plant species in an area. A high percentage of adventive plants indicates a high level of ecological disturbance, whereas a low percentage indicates a low level of disturbance. See Table 3-39 for the FQI and percent adventive of each delineated wetland within the project area.

Wetlands in the project area with FQIs greater than 20 are W-16, W-26, W-32, W-52, W-58, W-67, W-70, W-75, W-79, W-80, W-83, and W-C2. Of these 12 wetlands, 6 are forested/forest complex wetlands, 4 are seep wetlands, and 2 are marsh wetlands. The FQI values ranged from 20.1 (W-C2) to 26.2 (W-58), and the percent adventive values ranged from 2 percent (W-75 forest seep) to 19.6 (W-C-2, hillside seep). Only three of the 12 wetlands are located west of IL 29 (W-52-Crow Creek area, W-67-Miller-Anderson Woods Nature Preserve, and W-C2-near Brewmaster's Restaurant north of Putnam). Geographically, 4 of the wetlands were located from south of Sparland (W-16) to Crow Creek (W-52) and the remaining 8 were located in the Miller-Anderson Woods area and north.

Heritage Characteristics. Heritage characteristics refer to wetlands that provide habitat for state or federal listed species and wetlands located in designated lands such as Illinois Nature Preserves, natural areas, parks and wildlife refuges. Wetlands that provide habitat for listed species or are located in public designated lands include W-3, W-15, W-16, W-17, W-26, W-31, W-32, W-33, W-64, W-66, W-67, W-68, W-69, W-70, W-80, and W-C1. With the exception of W-64 and W-67 in Miller-Anderson Woods Nature Preserve and W-C1 south of Chillicothe, all of the wetlands with heritage characteristics are located east of IL 29.

Flood Storage. Generally, wetlands that, because of landscape position, can readily receive floodwaters are those that provide the greatest flood storage function. This includes wetlands situated in the floodplain (the lowest on the landscape) and also those in the upper parts of the watershed that have the opportunity to detain and desynchronize floodwaters from tributaries. For comparison, wetlands that are hydrologically isolated from the Illinois River or tributaries have little opportunity to detain or desynchronize flood waters. Wetland data on hydrologic connectivity and flood storage functions of individual wetlands are based on hydrology observations as part of the wetland delineations completed in the project area.

Groundwater Discharge. Wetlands within the project area that express the function of groundwater discharge are identified as hillside seeps. Groundwater discharge is an important wetland characteristic because of the unique water chemistry, plant communities, and uncommon plant species that seep areas support. Wetlands within the project area that are seeps are W-56, W-64, W-67, W-75, W-80, and W-C2.

Recreation Values. Wetlands east of IL 29 generally are associated with the Illinois River. The vast complex of wetlands along the river provide opportunities for passive and consumptive recreation. A large part of this wetland complex is within state or federal land designated for various types of outdoor recreation; for example, Marshall State Fish and Wildlife Area and the Cameron-Billsbuck Unit of the Illinois River National Wildlife Refuge. Several private hunt clubs also have acquired large tracts of land along the Illinois River near the northern terminus of the project area. Wetlands within the project area that provide recreation value include W-15, W-16, W-17, W-26, W-31, W-32, W-33, W-64, W-66, W-67, and W-C1.

3.9.2 Environmental Consequences

Of the 77 field-delineated wetlands in the project area, the Preferred Alternative would affect 14 individual wetlands totaling 20.0 acres. Besides the loss of wetland area, wetland functions and values would be affected by the Preferred Alternative. The effect of the Preferred Alternative on wetlands is discussed below. The No-Build Alternative would not affect wetlands.

3.9.2.1 Acreage Impacts

The total wetland impact associated with the Preferred Alternative is 20.0 acres (14 individual wetlands). Table 3-42 summarizes wetland impacts by wetland type.

3.9.2.2 Functional Impacts

The Preferred Alternative would affect 14 individual wetlands. The functions qualitatively analyzed for the wetlands, defined under Affected Environment, include wildlife habitat, floristic quality and percent adventive, heritage characteristics, flood storage, groundwater discharge, and recreation values. These wetland functions and the affected wetlands that express them are summarized below.

Wildlife Habitat. Characteristics relevant to wildlife habitat are snag density and plant community structure. Wetlands that consist of several wetland types such as forested wetland/scrub-shrub wetland/emergent marsh generally provide varied habitat and are attractive to wildlife. Wetlands that will be affected that consist of wetland complexes, high breeding bird presence, or high snag density are W-52 (Crow Creek slough—wetland complex), W-73, W-74 (near Kentville Road—small wetland complex), and W-68 (Miller-Anderson Woods Natural Area—bird breeding). W-52 (Crow Creek West) is particularly important to wildlife in part because of its large size (110.4 acres). However, the impacts to wetlands that have characteristics particularly attractive to wildlife are all edge impacts. The 2.3 acres acquired from the edge of the 110.4-acre W-52 is expected to have a minor effect on the attractiveness of that wetland to wildlife. Similarly, the 0.1 acre edge impact to the 12.3-acre W-68 is not expected to affect its attractiveness as a bird breeding location. The remaining affected wetland complexes (W-73 and W-74 near Kentville Road) are small and as such have limited wildlife value. Thus, impacts to W-73 and W-74 will have negligible impacts to its attractiveness to wildlife.

Floristic Quality and Percent Adventive. Wetlands having an FQI of 20 or greater have high floristic quality. The Preferred Alternative would affect the following wetlands with an FQI greater than or equal to 20: W-16, W-26, W-52, and W-C2. The percent adventive for these wetlands range from 3.4 to 19.6 percent. Earthmoving associated with road improvements can create an environment suitable for reed canary grass and other invasive species. Introduction of invasive species can lead to decline of floristic diversity and FQI and an increase in percent adventive. Potential impacts would occur along the edge of these wetlands including W-C2, where 0.03 acre of the wetland within the existing right of way would be filled, while 0.07 acre of the wetland would remain behind a retaining wall. Edge impacts likely would have less of an impact on floristic quality than would wetland bisection or total wetland impacts. Given the amount of new right of way acquired from the edges of W-C2, W-16, and W-52 compared to the size of these wetlands, it is expected that the project would have minimal impact on their floristic quality.

TABLE 3-42
Summary of Wetland Acreage and Functional Impacts in the IL 29 Project Area

Wetland ID	Aerial Exhibit Sheet No.	Wetland Type	Total Wetland Size (acre) [a]	Impact Area (acre)	FQI (% adventive)	Function
W-C7	1	Marsh/ wet meadow	1.2	0.5	7.0 (22%)	Wildlife value
W-16	9	Forested wetland/ scrub-shrub/ wet meadow marsh	144.7	0.2	23.8 (12.3%)	Heritage, recreation (Marshall County State Fish and Wildlife Area), flood storage, wildlife habitat
W-B4	10	Forested wetland	82.5	1.4	16.7 (10.9%)	Flood storage, wildlife habitat
W-26	10	Forested wetland	46.2	1.3	21.7 (11.9%)	Heritage, recreation (Marshall County State Fish and Wildlife Area), FQI, flood storage, wildlife habitat
W-28	10	Forested wetland	9.3	5.9	17.2 (10.9%)	Flood storage, wildlife habitat
W-30	10	Forested wetland/ scrub-shrub wetland/ wet meadow	21.0	1.3	16.2 (14.3%)	Flood storage, wildlife habitat
W-49	11	Forested wetland/ scrub-shrub wetland/ wet meadow	36.0	2.0	13.4 (15.0%)	Flood storage, wildlife habitat
W-52	11,12,13	Marsh/ forested wetland/ scrub-shrub wetland	97.5	2.3	20.8 (3.4%)	FQI, flood storage, wildlife habitat
W-53	13	Forested wetland	6.9	1.6	15.9 (9.1%)	Flood storage, wildlife habitat
W-57	17	Forested wetland	3.3	2.5	18.4 (10.6%)	Flood storage, wildlife habitat
W-C2	17	Seep (wet meadow)	0.1	0.03	20.1 (19.6%)	FQI, Groundwater discharge
W-68	18	Wet meadow/ scrub-shrub wetland	12.4	0.1	19.4 (21.9%)	Wildlife habitat (breeding birds), flood storage
W-73	18	Scrub-shrub wetland/ pond/ marsh	1.2	0.7	17.2 (16.7%)	Wildlife habitat
W-74	18	Marsh/scrub-shrub wetland	1.6	0.2	12.7 (14.3%)	Wildlife habitat
Total				**20.03**		

[a]Only wetland acreage within the limits of the project area are shown in this column.

Heritage Characteristics. Wetlands that lie partly within designated lands or provide refugia for federal- or state-listed species express the function of heritage characteristics. Individual wetlands that express heritage characteristics are W-16 (partially within the Marshall State Fish and Wildlife Area), W-28 (located within the Marshall State Fish and Wildlife Area) and W-68 (bald eagles' nests, decurrent false aster population, partly within Miller-Anderson Woods Natural Area). Potential impacts to wetlands that express heritage characteristics are edge impacts although the Preferred Alternative does sever a 2.4-acre part of W-28 from the larger wetland complex. The potential impacts would have a negligible effect on designated lands and bald eagle habitat, and no effect on the decurrent false aster.

Flood Storage. The wetlands on the east side of IL 29 generally are not impeded from receiving floodwaters of the Illinois River and its backwaters. With the exception of wetlands adjacent to Crow Creek, wetlands on the west side of IL 29 generally are prevented from receiving floodwaters as a result of the damming effect of the road and railroad embankment. Individual wetlands that function to store floodwaters are W-16, W-28, W-30, W-49, W-52, W-53, W-68, and W-B4. Given the extent of the Illinois River basin, losses to flood storage volume resulting from the proposed improvements to IL 29 would be negligible.

Groundwater Discharge. The only affected wetland that expresses the function of groundwater discharge (that is, a hillside seep) is wetland W-C2. The 0.03-acre part of W-C2 in the existing right of way would be filled by the Preferred Alternative. The 0.07-acre part of the seep west of the proposed retaining wall would not be affected. Groundwater will continue to seep out of the hillside, and the wetland will continue to support the flora and fauna presently associated with the wetland.

Recreation Values. Wetlands valued for recreation generally are in public ownership and maintained for passive and consumptive recreation. Individual wetlands within publicly managed recreation land are W-16 (partially within the Marshall County State Fish and Wildlife Area).

Table 3-42 summarizes the affected wetlands in the project area with respect to functions they provide.

3.9.3 Measures to Minimize Harm and Mitigation

Executive Order 11990, Protection of Wetlands, requires federal agencies to avoid, to the extent practicable, long- and short-term adverse impacts associated with the destruction or modification of wetlands. More specifically, the Order directs federal agencies to avoid new construction in wetlands unless there is no practicable alternative. It states further that where wetlands cannot be avoided, the proposed action must include all practicable measures to minimize harm to wetlands. Section 404 of the Clean Water Act regulates discharges of dredge and fill material into waters of the United States. Section 404(b) mandates that discharges of dredge and fill material conform to guidelines developed by the USEPA. As such, IDOT has prepared a Section 404(b)(1) Evaluation Report (Appendix D). In accordance with state and federal policies and regulations for wetland preservation, including the Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR, Part 230), the discussion below summarizes the Preferred Alternative's wetland mitigation strategies.

3.9.3.1 Wetland Avoidance

Because long stretches of the Preferred Alternative are oriented to the existing IL 29 corridor, where there are wetlands/wetland complexes adjacent to the highway and in places on both sides of the highway, it is not possible to avoid wetland impacts completely. In some cases the presence of the Lincoln & Southern Railroad immediately east of the highway made alignment shifts to avoid wetlands impractical. Although off-alignment alternatives were considered (for example, the Bluff Alignment), they either did not sufficiently address purpose and need or had wetland impacts comparable to the Preferred Alternative. Alignments with notable wetland impacts, such as Alignment N-4 east of IL 29 from Putnam to the north terminus, were eliminated from consideration (Section 2).

3.9.3.2 Minimize Wetland Impacts

Minimization of wetland impacts was an important factor in the development and screening of alternatives. The Preferred Alternative, described in Section 2, incorporated alignment shifts where practicable to minimize impacts to wetlands. The following are descriptions of design measures taken to minimize impacts to wetlands:

- Impact to W-16 will be greatly minimized by not providing access to the properties south of the Spring Branch Unit of the Marshall State Fish and Wildlife Area. Providing access to the properties along this stretch of IL 29 would have required a 2-mile relocation of the railroad. Rather, IDOT proposes to purchase these properties for environmental mitigation.
- Impact to W-26 will be minimized by not providing access to the property south of the IL 29/IL 17 interchange. Providing access to the property would have required relocation of the railroad entirely within the limits of W-26 and therefore, resulted in a larger impact to the wetland. Instead, IDOT proposed to purchase this property for environmental mitigation purposes.
- Using a 22-foot median between Crew Lane (rest area) north of Chillicothe and approximately 580 feet north of the IL 29/1100E intersection will also limit impacts on W-16 and W-26.
- Retaining walls, guardrail and steeper side slopes will be used in the Crow Creek area to minimize impacts to W-52 and W-53.
- Using a longer retaining wall than otherwise required is proposed to limit impact to C-2.
- A 22-foot median will be used where IL 29 is adjacent to Miller-Anderson Woods Nature Preserve and Natural Area to minimize wetland impacts.

In a future design phase, IDOT will investigate additional measures to minimize wetland impacts, such as keeping roadway sideslopes as steep as practicable, using equalizer pipes to maintain wetland hydrology, and employing strict erosion control measures to minimize sedimentation and siltation into adjacent wetlands. The mitigation measures discussed in Section 3.8.3 also would minimize sedimentation into wetlands.

3.9.3.3 Wetland Compensation

Where there is no practicable alternative to filling wetlands, state and federal regulations require compensatory mitigation. Mitigation will involve constructing new wetlands, restoring former wetlands that have been altered by agricultural or drainage activities, and preservation of high quality wetlands. Compensation for affected wetlands is based on the IDOT's Wetlands Action Plan. Wetland issues have been coordinated with IDNR according to the processing procedures of Standard Review Actions in the plan. The IDOT's Procedures Memorandum provides preliminary compensation ratios based on level of wetland impact and location of wetland compensation with respect to impact locations. Preliminary wetland compensation goals have been developed for the IL 29 project following guidelines regarding replacement and sequencing stated in the Illinois Interagency Wetland Policy Act. Generally, the rule establishes replacement requirements that vary depending on whether mitigation occurs onsite, offsite (in-basin), or offsite (out-of-basin). Other factors, such as presence of state or federal listed species, designation as an Illinois Natural Area, or FQI score of ≥ 20, also determine compensation goals.

Wetland impacts occur within one hydrologic basin (HUC 07130001) and involve several wetland types. The project qualifies as a standard review action under the implementing regulations of the Illinois Interagency Wetland Policy Act and the IDNR-approved IDOT Agency Action Plan. As a standard review action with the wetland mitigation occurring onsite, only three ratios apply to the project. These ratios are 1.5 to 1.0 for impacts less than 0.5 acre; 2.5 to 1.0 for impacts greater than 0.5 acre; and 5.5 to 1.0 for impacts affecting wetlands that have endangered and threatened species, essential habitat for endangered and threatened species, a floristic quality index above 20 or is designated by IDNR as a natural area.

The wetland compensation requirements for the Preferred Alternative are shown in Table 3-43. A total of 20.0 acres of wetland would be affected and would require a total of 61.7 acres of wetland compensation.

A total of 657 acres of land located east of IL 29, between from just south of the Peoria/Marshall County Line to just north of Sparland, would be purchased to mitigate the project's environmental impacts. These parcels include 240.0 acres of wetlands that have an FQI greater than 20 (Exhibit 3-21, Aerial Exhibit sheets 8 and 9). An FQI above 20 suggests that a site has evidence of native character and may be an environmental asset. The land would be transferred to IDNR to provide protection for these high quality wetlands. Wetland preservation credits of 30.5 acres will be granted for the high quality wetlands protected by the purchase and transference of these wetlands to IDNR. In addition, three farm fields located within these parcels will be converted to wetlands. The conversion of these fields, numbered 3, 4, and 6 on Exhibit 3-21, will yield 28.1 acres of new wetland. The remaining 2.4 acres of wetland compensation required would be obtained by expanding wetlands W-C3, W-C5, and W-C6 northeast of the existing IL 6 interchange near Mossville and by expanding wetlands W-B1 and W-B2 in the northeast quadrant of the proposed Western Avenue/IL 29 interchange in Henry. (See Aerial Exhibit sheets 1 and 14.)

TABLE 3-43
Summary of Wetland Mitigation Requirements for IL 29

Wetland	Type	Impact Area (acres)	Ratio Category	Ratio X:1	Compensation Required (acres)
W-C7	Emergent Marsh	0.5	Onsite	2.5	1.3
W-16	Forested	0.2	FQI>20	5.5	1.1
W-B4	Forested	1.4	Onsite	2.5	3.5
W-26	Forested	1.3	FQI>20	5.5	7.2
W-28	Forested	5.9	Onsite	2.5	14.8
W-30	Forested/Scrub-Shrub/Wet Meadow	1.3	Onsite	2.5	3.3
W-49	Forested/Scrub-Shrub/Wet Meadow	2.0	Onsite	2.5	5.0
W-52	Marsh/Forested/Scrub-Shrub	2.3	FQI>20	5.5	12.7
W-53	Forested	1.6	Onsite	2.5	4.0
W-57	Forested	2.5	Onsite	2.5	6.3
W-C2	Seep	0.03	FQI>20	5.5	0.2
W-68	Scrub-Shrub/Wet Meadow	0.1	Onsite	1.5	0.2
W-73	Pond/Marsh/Scrub-Shrub/	0.7	Onsite	2.5	1.8
W-74	Marsh/Scrub-Shrub	0.2	Onsite	1.5	0.3
	Total	**20.0**			**61.7**

3.9.4 Indirect Impacts

Indirect impacts to wetlands are expected to be negligible as a result of proposed improvements to IL 29. Secondary development caused by the Preferred Alternative may be possible at or near proposed interchanges. The only proposed interchange that might experience secondary development that could affect wetlands is located at the Sparland interchange.

It is unlikely the Sparland interchange would induce indirect impacts to wetlands. Wetlands near the proposed interchanges at Sparland are located east of IL 17 and are within the Illinois River's 100-year floodplain. Sparland officials indicated that there would be no new development east of IL 29 because of the presence of the floodplain.

3.9.5 Cumulative Impacts

Two projects proposed in the Henry area may contribute to adverse cumulative wetland impacts. The proposal to develop a sand quarry north of Henry includes developing a new harbor on the Illinois River in the industrial park. The proposed ethanol plant in Henry's industrial park would also include a harbor. The proposed harbor could fill some wetlands and convert others into deepwater habitat. The potential wetland impact associated with developing a harbor are unknown because of the lack of specifics about both proposals. In addition to the larger projects, Henry's future land use plan shows residential development that could affect wetlands W-B1 or W-B2, or both, in the northeastern quadrant of the proposed Western Avenue

interchange. No other existing or reasonably foreseeable projects were identified in discussions with municipalities in the project area that might adversely affect wetlands.

Several large-scale wetland restoration efforts in the project area may benefit wetlands. In 2001, The Wetlands Initiative acquired 2,600 acres of floodplain land on the east side of the Illinois River that were protected by a levee and farmed. Although technically outside the area of secondary and cumulative analysis, the restoration effort is close enough to the project area to warrant mention. Restoration of the property, known as the Hennepin & Hopper Lakes Restoration Project, began in April 2001 by turning off the levee district's pump, allowing springs, seeps, and rainfall to fill the former lake beds. After drain tiles were removed or disabled, groundwater also began to refill the area. Water rose in the constructed drainage ditches and flowed across the former floodplain. By February 2002, the lakes covered nearly half the site. The lakes are now 9 to 10 feet deep. A wide variety of plants and animals recolonized the site and started restructuring the marshes, sedge meadow, and wet prairies that once existed there.

The range of wetland types that once existed on the site will be restored, including deep and shallow marsh, wet prairie, sand prairie, and sedge meadows. In addition, a small savanna on a sandy knoll in the middle of the district will be rehabilitated. The two backwater lakes, Hennepin and Hopper, will be restored. To function as they once did, the lakes should be reconnected to both the river and its tributaries.

The CRP, CREP, and Wetland Reserve Program (WRP), while not all specifically targeted to wetland enhancement/restoration, will positively affect wetlands. The CRP has the potential to improve water quality from nonpoint sources discharging to wetlands. The focus of the CREP is improving water quality and habitat in the Illinois River basin. The Wetlands Initiative acquired land for the 2,600-acre Hennepin and Hopper Lakes Restoration Project with CREP funding. The WRP offers incentives to landowners to enhance or restore drained or degraded wetlands in exchange for retiring marginal agricultural land. There are approximately 370 acres of farmland enrolled in the three programs in the project area.

The USACE and the IDNR have been working on two major ecosystem restoration efforts in the Illinois River Basin: USACE on the Illinois River Ecosystem Restoration Study and IDNR on the Illinois River Basin Restoration. The goals of those efforts are to maintain and restore biodiversity of native species, reduce sediment delivery to the Illinois River, restore aquatic habitat diversity of side channels and backwater lakes of the Illinois River, improve floodplain and riparian functions, restore and maintain dam-related fish passage (connectivity), stabilize hydrologic regimes of the Illinois River and its tributaries, and improve water quality in the Illinois River and its tributaries. Like the Farm Bill programs noted above, the focus of the programs is larger than wetland enhancement/restoration, however, wetlands would be expected to benefit by the studies' recommendations and restoration activities.

Finally, Ducks Unlimited has recently purchased a 370-acre property south of IL 17 in Sparland. It is expected that Ducks Unlimited will convert some part of the property's agricultural land to wetlands to improve waterfowl habitat.

3.9.6 Wetlands—Only Practicable Alternative Finding

This section sets forth the basis for a finding that there is no practicable alternative to construction in the wetlands located along the project corridor. This finding is made in accordance with the requirements of Executive Order 11990 on the Protection of Wetlands dated May 24, 1977.

The project description, the description of wetlands, and wetlands affected are covered in the appropriate sections of the EIS. The Preferred Alternative would affect 14 individual wetlands totaling 20.0 acres. Because long stretches of the Preferred Alternative are oriented to the existing IL 29 corridor, where there are wetlands or wetland complexes adjacent to the highway and, in places, on both sides of the highway, it is not possible to avoid wetland impacts completely and still meet the purpose and need. In some cases the presence of the Lincoln & Southern Railroad immediately east of the highway made alignment shifts to avoid wetlands impractical. Although off-alignment alternatives were considered (for example, the Bluff Alignment), they either did not sufficiently address purpose and need or had wetland impacts comparable to the Preferred Alternative. The No-Build Alternative was eliminated from consideration because it would fail to meet the project's purpose and need objectives (see Section 2, Alternatives).

The Preferred Alternative satisfies the transportation objectives set out in the purpose and need section of the Final EIS. Measures to minimize harm to wetlands are discussed in Section 3.9.3. The Draft EIS has been coordinated with federal and state agencies and the public.

Based upon the above factors and considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands of the project area, and that the Preferred Alternative includes all practicable measures to minimize harm to the wetlands that may result from such use.

3.10 Floodplains

3.10.1 Affected Environment

Floodplains provide flood and storm water attenuation by decreasing water velocities and providing temporary water storage. By temporarily storing water floodplains help to filter sediments and provide erosion control. They also provide important ecosystem functions such as nutrient export, increased primary productivity, and wildlife habitat and movement corridors. The extent to which these functions are expressed varies depending on vegetative structure, stream hydrology, and distance from the stream. Floodplains are often fertile and used for agriculture. Consequently, the wooded parts of most floodplains associated with tributaries of the Illinois River within the project corridor tend to be narrow and confined to the area immediately adjacent to the stream channel. Unlike its tributaries, the Illinois River has a great expanse of floodplain that extends up to and includes IL 29 for long stretches of the project corridor.

The following definitions relevant to this section are per Illinois Administrative Rules:

- *Floodplain* is the land adjacent to a body of water with ground surface elevations at or below the 100-year frequency flood elevation.
- *Floodway* is the channel of a river, lake, or stream and that part of the adjacent land area that is needed to safely store and convey flood waters. Some floodways are delineated; in other areas their extent is estimated using hydrologic and hydraulic calculations. Floodways are identified as locations where construction would disrupt the flood patterns of a surface water body.

3.10.1.1 Floodplains

Nine water bodies within the project corridor have designated 100-year floodplains (Table 3-44). All water bodies and associated 100-year floodplains lie within Central Illinois Drainage Basin HUC 07130001. The 100-year floodplain boundaries for water bodies in the project area were obtained from flood insurance rate maps published by the Federal Emergency Management Agency (FEMA) for Peoria, Marshall, Putnam, and Bureau counties. Exhibit 3-22 depicts the 100-year floodplains. There are no drainage districts or flood protection levees in the project corridor.

3.10.1.2 Natural and Beneficial Floodplain Values

Floodplains in their natural or relatively undisturbed state serve water resource values (natural moderation of floods, water quality maintenance, and groundwater recharge); living resource values (fish, wildlife and plant resources); cultural resource values (open space, recreation); and cultivated resource values (agriculture, aquaculture and forestry). To better understand the state of floodplains in the project area and the resource values they serve, the cover types within the 9 floodplains are summarized in Table 3-45.

TABLE 3-44
Designated 100-Year Floodplains within the Project Corridor

Water Resource[a]	County	Total Floodplain Area (acres)[b]	Floodplain within Project Area (acres)[b]
Dickison Run	Peoria	105.3	19.2
Senachwine Creek (South)	Peoria	3,602.6	1,114.5
Coon Creek	Peoria	110.3	106.9
Barrville Creek	Marshall	3.0	3.0
Illinois River	Peoria, Putnam, Marshall, Bureau	NA	1,941.7
Gimlet Creek	Marshall	22.6	21.9
Thenius Creek	Marshall	46.6	19.2
Crow Creek (West)	Marshall	2,323.1	201
Senachwine Creek (North)	Putnam	1,052.9	33.9

[a]All streams and associated 100-year floodplains lie within Central Illinois Drainage Basin HUC 07130001.
[b]Area is based on GIS calculation of digitized FEMA floodplain data.

TABLE 3-45
Cover Types within the Project's Designated 100-Year Floodplains

Water Resource[a]	**County**	**Floodplain in Project Area (acres)[b]**	**Cover Types in the Floodplain (acres)**
Dickison Run	Peoria	19.2	Cropland (14.3), Urban and Built-up Land (0.3), Shrubland/Fence Rows (4.6)
Senachwine Creek (South)	Peoria	1,114.5	Cropland (912.5), Urban and Built-up Land (5.2), Nonnative Grassland (1.5), Forest (188.6), Forested Wetland (2.6), Marsh (0.3), Wet Meadow (0.1), Riverine (3.7)
Coon Creek	Peoria	106.9	Cropland (55.3), Urban and Built-up (1.1), Shrubland/Fence Rows (44.7), Nonnative Grassland (1.7), Mining Area (4.1)
Barrville Creek	Marshall	3	Urban and Built-up Land (3.0)
Illinois River	Peoria, Putnam, Marshall, Bureau	1,941.7	Pasture and Hayland (45.2), Cropland (558.5), Urban and Built-up Land (74.8), Shrubland/Fence Rows (22.1), Nonnative Grassland (87.3), Forest (44), Forested Wetland (763.9), Scrub-shrub Wetland (4.3), Marsh (34), Wet Meadow (25.2), Pond (16.5), Lacustrine (209.2), Riverine (56.7)
Gimlet Creek	Marshall	21.9	Urban and Built-up Land (20.5), Shrubland/Fence Rows (0.4), Nonnative Grassland (1.0)
Thenius Creek	Marshall	19.2	Urban and Built-up Land (14.0), Nonnative Grassland (0.4), Forest (4.8)
Crow Creek (West)	Marshall	201	Cropland (19.6), Urban and Built-up Land (1.1), Shrubland/Fence Rows (5.2), Forest (7.5), Forested Wetland (79.6), Scrub-shrub Wetland (7.2), Marsh (52.6), Wet Meadow (28.2)
Senachwine Creek (North)	Putnam	33.9	Pasture and Hayland (10.3), Cropland (22.5), Urban and Built-up Land (0.7), Shrubland/Fence Rows (0.2), Nonnative Grassland (0.2)

[a]All streams and associated 100-year floodplains lie within Central Illinois Drainage Basin HUC 07130001.
[b]Area is based on GIS calculation of digitized floodplain data.

The floodplains within the project's area of potential effect include a mix of cover types and floodplain values. In general, the cover types for most of the floodplains have limited water, living, and cultural resource values. The three smallest floodplains (Barrville, Thenius, and Gimlet) are mostly in urban and built-up land. The Senachwine Creek (South and North) and Coon Creek floodplains are dominated by cropland (and pasture/hayland), a cultivated resource floodplain value. Cover types that would be part of the other three floodplain values are largely absent from the floodplains. The Crow Creek (West) and Illinois River floodplains represent the best balance among the four natural floodplain values discussed above. Each floodplain includes cropland, but there are also substantial acres of other upland and wetland cover types that contribute to water, living, and cultural resource values.

3.10.1.3 Floodways

No floodways were computed for reaches of the Illinois River in unincorporated areas of Bureau, Putnam and Marshall counties or in Sparland. The Illinois DNR (Office of Water Resources) indicated that no part of the proposed project is within the Illinois River floodway (Appendix A). IDOT used hydrologic and hydraulic modeling to estimate the floodway limits of Senachwine Creek (South) north of Chillicothe. See Section 3.10.2 for more information. No other floodways were identified within the project corridor.

3.10.1.4 Flood Buyout Properties

In 1997, Sparland participated as a Property Acquisition Project in FEMA's Hazard Mitigation Grant Program. Sparland participated in this program to reduce future risk for property damage that may be caused by flooding of the Illinois River and Gimlet Creek. IDNR purchased 19 qualifying properties and transferred them to community ownership (Exhibit 3-23). All insurable structures on the properties have been removed. According to the requirements of the Hazard Mitigation Grant Program, properties are to remain in public ownership and free of impervious surfaces and enclosed structures other than restrooms. Use of the properties is limited to open space, recreation or wetland management. No federal disaster relief assistance will be granted in the future.

3.10.2 Environmental Consequences

Executive Order 11988 and 23 CFR 650 Subpart A direct federal agencies to take action to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. The Order also requires agencies to elevate structures above the base flood level whenever possible. The object of the Order is to avoid the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

3.10.2.1 Floodplains

The Preferred Alternative will affect 214 acres within the 100-year floodplain. Given the Illinois River tributaries with floodplains that cross the Preferred Alternative and the Illinois River floodplain that is located parallel to the Preferred Alternative, there is no practicable alternative to construction in floodplains. Table 3-46 summarizes potential floodplain encroachments. The No-Build Alternative would not affect floodplains.

TABLE 3-46
Summary of Potential 100-Year Floodplain Encroachments

Floodplain Name	Floodplain in Project Area (acres)	Total Affected Area (acres)	Impacts by Cover Type (acres)	Type & Length of Floodplain Encroachment (ft)	Existing Structure at Proposed Crossing (Y/N)
Dickison Run	19	4	Cropland (3), Urban and Built-Up (0.1), Shrubland/Fencerows (1)	Transverse (450)	No
Senachwine Creek (South)					
North of BNSF railroad crossing	1,115	58	Cropland (45), Forest (10), Urban and Built-Up (1), Nonnative Grassland (1), Riverine (1)	Transverse (1,800)	No
East of Ratliff Road				Longitudinal (3,050)	No
At Benedict Street				Transverse (600)	Yes
At existing IL 29				Transverse (1,700)	Yes
Coon Creek	107	11	Cropland (8), Urban and Built-Up (1), Shrubland/Fencerows (2)	Transverse (550, 849 and 590)	Yes
Barrville Creek	3	1	Urban and Built-Up (1)	Transverse (150)	Yes
Illinois River (Central Section)	853	77	Cropland (15), Urban and Built-Up (20), Shrubland/Fencerows (4), Nonnative Grassland (20), Forest (4), Forested Wetland (14)	Longitudinal (19,900)	No
Illinois River (North Section)	1,089	29	Pasture and Hayland (1), Cropland (1), Urban and Built-Up (7), Shrubland/Fencerows (2), Nonnative Grassland (3), Forest (12), Forested Wetland (1), Scrub-Shrub Wetland (1), Wet Meadow (0.1), Pond (1)	Longitudinal	No
Gimlet Creek	22	4	Urban and Built-Up (3), Shrubland/ Fencerows (0.3), Nonnative Grassland (1)	Transverse (1,050)	No, there is a crossing at existing IL 29, not proposed IL 29
Thenius Creek	19	2	Urban and Built-Up (1.8), Nonnative Grassland (0.4)	Transverse (240)	No, there is a crossing at existing IL 29, not proposed IL 29
Crow Creek (West)	201	19	Cropland (4), Urban and Built-Up (2), Shrubland/Fencerows (3), Forest (1), Forested Wetland (7), Marsh (2)	Transverse (730 and 4,700)	Yes
Senachwine Creek (North)	34	10	Pasture and Hayland (3), Cropland (6), Urban and Built-Up (1), Shrubland/Fencerows (0.1), Nonnative grassland (0.1)	Transverse (2,200)	Yes
Total	**3,462**	**214**			

All the potential floodplain impacts, except those to the Illinois River and Senachwine Creek (South), would be caused by transverse floodplain crossings. Transverse crossings are approximately perpendicular to the floodplain edge, such as a perpendicular bridge crossing of a river or stream. The Illinois River and one of the Senachwine Creek (South) floodplain impacts are caused by longitudinal encroachments. Longitudinal encroachments run approximately parallel with the floodplain edge. IL 29 along the Illinois River floodplain is an example of a longitudinal encroachment. The floodplain encroachments listed in Table 3-46 were determined during a meeting with FHWA on November 23, 2004. (See meeting minutes in Appendix A, Other Agency Coordination.) Floodplains, such as the one associated with Coon Creek, that are crossed in more than one location by the Preferred Alternative have more than one impact length noted in Table 3-46.

All structures crossing floodplains will be sized to handle the 50-year flood without interruption to public transportation caused by flood damage to the roadway or structures. None of the floodplain crossings would interrupt or terminate a transportation route needed for emergency vehicles or serve as the area's only evacuation route. Crossings would be consistent with local floodplain management goals and objectives. The project would be constructed to be 3 feet above the 50-year flood elevation. Bridges would be constructed to allow 2 feet of freeboard above the 50-year flood elevation.

3.10.2.2 Natural and Beneficial Floodplain Values

Of the roughly 214 acres of floodplain affected, the cover types within those floodplains include 86 acres of agricultural land, 38 acres of urban and built-up land, 26 acres of wetlands, 27 acres of forest, 25 acres of nonnative grassland and 12 acres of shrubland and fencerows. The 38 acres of urban and built-up land serve no natural floodplain values. The 25 acres of nonnative grassland, a large part of which is within IDOT's right of way or parking areas, contribute little to natural floodplain values.

The single largest cover type affected within floodplains is agricultural land at 86 acres, of which 82 acres is cropland and 4 acres pasture and hayland. Although agriculture is a recognized natural floodplain value in Executive Order 11988, the Order acknowledges that agricultural uses may be incompatible with wildlife production and may induce aggravated erosion and sedimentation. Of the remaining natural floodplain values, the loss of cropland may affect only the water resources value in that its loss reduces the amount of land available for flood storage and possibly the natural moderation of floods.

The loss of wetlands, forests, and, to a lesser extent, shrubland and fencerows has implications for water, and forestry resources values. In theory the loss of naturally vegetated floodplains may aggravate the flood hazard through loss of their ability to slow floodwaters and reduce flood velocities and peaks. Given the small acreage affected compared to the size of the floodplain, loss of cover type is not expected to alter the flood hazard. For similar reasons, the loss of naturally vegetated areas may adversely affect water quality maintenance. The slowing of floodwater (and runoff) by ground cover allows the deposition of sediments. Finally, loss of forested wetlands, forests, and shrublands may diminish the cultural resources value of floodplains. Loss of cover and the habitat it supports may diminish passive and active recreation possibilities in the project area.

All the transverse and longitudinal encroachments within the project limits are within the acceptable limits for rural or urban criteria, as applicable.

3.10.2.3 Floodways

The Preferred Alternative would affect the floodway of the Senachwine Creek (South). HEC-RAS modeling identified an area south of Benedict Street where the proposed project would place fill in the floodway from about 1,000 feet upstream from Benedict Street to existing IL 29. Modeling showed that the fill would cause the elevation of the flood flow to increase by 0.3 foot for a distance of 1,000 feet upstream of the fill. In urban areas a 0.1-foot increase is permissible while in rural areas a 0.5-foot increase is allowed. Because Chillicothe's land use plan calls for an open space buffer along the Senachwine Creek (South), the IDNR Office of Water Resources agreed that the rural standard should apply to the project (Appendix A). No other floodways would be affected in the project area.

3.10.3 Measures to Minimize Harm and Mitigation

The object of Executive Order 11988 is to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. When a proposed action is to occur in the base floodplain, the Executive Order requires that practicable alternatives to avoid affecting the floodplain be identified.

Given the Illinois River tributaries with floodplains that cross the Preferred Alternative and the Illinois River floodplain located parallel to the Preferred Alternative, there is no practicable alternative to construction in floodplains. The width of the Preferred Alternative's transverse floodplain crossings ranges from 150 to 2,200 feet. Providing bridges to span the entire floodplain at all crossings would cost an additional $90 million. Therefore, IDOT has determined that it is not practicable to span the floodplains perpendicular to the Preferred Alternative. The No-Build Alternative, which would avoid floodplain impacts but not meet purpose and need, is not practicable.

3.10.3.1 Floodplain Minimization

Minimization of floodplain impacts was considered in the project's alternatives development/ screening phase. Several alignments with notable floodplain impacts, such as Alignment N-4 east of IL 29 from Putnam to the north terminus, were eliminated from consideration (Section 2). The Bluff Alignment, which would have affected fewer acres of floodplain than the proposed project, was eliminated because it would not sufficiently meet purpose and need.

Because the project's largest floodplain impacts will be to the Illinois River (106 acres), Senachwine Creek (South) (58 acres), and Crow Creek (West) (19 acres), they were the focus of the minimization efforts. From north of Chillicothe to south of Henry, IL 29 generally widens to the west, away from the largest area of the Illinois River floodplain. The narrow (22-foot) median used for long stretches of this area also reduced floodplain impacts that would have occurred with the standard 50-foot median. The narrow median used in the Miller-Anderson area north of Henry also reduced impacts on the Illinois River floodplain. Despite those efforts, the Illinois River floodplain still will be affected because parts of it are on both sides of IL 29.

With the Senachwine Creek (South) floodplain oriented east-west immediately north of the BNSF Railroad tracks and all alignments considered between IL 6 and the north Chillicothe interchange also aligned east-west for some distance north of the railroad, longitudinal impacts to the Senachwine Creek (South) floodplain are unavoidable. To minimize those impacts, the project was aligned to the north edge of the floodplain. The bluff to the north prevented moving IL 29 farther north and out of the floodplain. (See Aerial Exhibit sheet 6.)

Because the Preferred Alternative has a transverse crossing of the Crow Creek floodplain north of Camp Grove Road, the FHWA considers it to be a transverse crossing, even though part of the improvements are aligned parallel to the floodplain (Aerial Exhibit sheet 12). In the Crow Creek area, retaining walls will be used to minimize the floodplain impacts (see Exhibit 2-12). While Crow Creek floodplain impacts could have been minimized by widening to the east, this would increase the impact to the Illinois River floodplain and affect the Lincoln & Southern Railroad.

All structures along the Preferred Alternative have adequate capacity for the 50-year flood flow without damage to the roadway or structures interrupting public or emergency vehicles. The floodplain crossings have little potential to interrupt or terminate a transportation facility needed for emergency vehicles or the community's only evacuation route. Several structures, such as the proposed IL 29 bridge (north of Chillicothe) and the Crow Creek bridge, have been designed to have fewer bridge piers in the water than the existing structures.

3.10.3.2 Floodplain Development

As noted, one intent of Executive Order 11988 is to avoid direct and indirect support of floodplain development. According to the Order, an action supports floodplain development if it encourages, allows, serves, or otherwise facilitates additional floodplain development. Although parts of proposed IL 29 would be located in the three largest floodplains in the project area (Senachwine Creek South, the Illinois River and Crow Creek West), there are several reasons why the project would not support development in those floodplains. The Senachwine Creek (South) floodplain adjacent to proposed IL 29 will be protected by lack of access to the new facility and Chillicothe's land use plans for the area. Proposed IL 29 north of Chillicothe will be a freeway facility that can be accessed only at interchanges. Strict access control will be a deterrent to development. Beyond that, Chillicothe has identified a large block of land beginning west of Benedict Street and extending to existing IL 29 as a "recreational buffer" in its land use plan (see Exhibit 3-8). That designation is intended for passive recreational uses rather than residential or commercial development. The combination of the freeway facility type and the recreational buffer land use surrounding the proposed north Chillicothe interchange will prevent the proposed interchange from creating development opportunities in the Senachwine Creek (South) floodplain.

The Illinois River floodplain will be protected from development largely because it is publicly owned. Large areas of the Illinois River floodplain east of IL 29 are owned by state and federal agencies and a wetland trust, and they are not available for development. Between the IDOT wayside north of Chillicothe and Crow Creek north of Camp Grove Road are large tracts of IDNR's Marshall State Fish and Wildlife Area (Spring Branch Unit), the Wetlands America Trust south of Sparland, IDNR's Marshall State Fish and Wildlife Area (Sparland Unit), Sparland Natural Area, and the Cameron-Billsbach National Wildlife Refuge owned by the

U.S. Fish and Wildlife Service. (See Aerial Exhibit sheets 8 to 12.) IDOT proposes to purchase and turn over to IDNR 657 acres of property in the Illinois River floodplain between Chillicothe and Sparland. With the addition of the property that IDOT will purchase and turn over to IDNR, virtually the entire Illinois River floodplain east of IL 29 between the IDOT rest area north of Chillicothe and Camp Grove Road will be under the ownership of the USDOI, USFWS, IDNR, or Ducks Unlimited, who will not allow development of the floodplain. Also contributing to the protection of the Illinois River floodplain is the flood buyout program in which Sparland participated. The buyout program paid property owners to relocate outside the floodplain. Exhibit 3-23 shows the properties that Sparland and the IDNR own as a result of the program. No permanent structures may be developed on the Sparland/IDNR properties. Even though Sparland and the IDNR do not own all properties east of IL 29 in the floodplain, Sparland officials have indicated that potential new development would not take place east of IL 29. The restrictions on development imposed by the flood buyout program, Sparland's general unwillingness to develop east of IL 29 and the IDNR's Sparland Unit are the reasons that the proposed Sparland interchange east of existing IL 29 is not expected to encourage floodplain development.

The Crow Creek (West) floodplain boundary closely follows the boundaries of wetlands adjacent to the creek. (See Aerial Exhibit sheet 12.) The presence of the Cameron-Bilsbach National Wildlife Refuge and the railroad would act as deterrents to floodplain development east of IL 29. Developing in the floodplains west of IL 29 would mean developing the wetlands of the Crow Creek (West) slough. The permitting process to develop the wetlands/floodplain should provide long-term protection against development.

3.10.3.3 Floodplain Mitigation

In order to "restore and preserve the natural and beneficial values served by floodplains" as required by Executive Order 11988, IDOT is proposing the following mitigation measures:

- **Dickison Run Creek Floodplain**
  - A 61-acre area previously purchased by IDOT and located along the stream between Stations 2700 and 2720 will remain protected from development and be used for wetland and tree mitigation. (See Aerial Exhibit sheet 1.)
  - A 14-acre area between Stations 2740 to 2760, previously purchased by IDOT and located east of the stream, will be protected from development and planted with trees. (See Aerial Exhibit sheet 1.)
- **South Senachwine Creek (South) Floodplain**
  - A 15-acre area within the Senachwine Creek Floodplain owned by Galena Road Gravel Inc. would be landlocked by the project. (See Aerial Exhibit sheet 6.) Being landlocked means that there is no connection between this 15-acre parcel and the local road network. Currently, the only access for the entire Galena Road Gravel property (including the landlocked portion) is from Benedict Street. Because the proposed IL 29 would sever the 15-acre parcel from the remainder of the property to the east, the 15-acre parcel would lose its access to Benedict Street. It is proposed to protect the landlocked parcel from development by transferring ownership to IDNR and planting the farmed section of the parcel with trees.

  - A privately owned 21-acre area within the Senachwine Creek Floodplain, located between Stations 3205 and 3225, would be landlocked by the project. (See Aerial Exhibit sheet 6.) IDOT will purchase the parcel and fund preservation of the vegetation along the stream bank, planting part of the parcel with trees and part with prairie grass. IDOT will maintain the parcel.

- **Illinois River Floodplain**
  - An area of 657 acres of land in private ownership located east of IL 29, from just south of the Peoria/Marshall County Line to just north of Sparland, including 321 acres of floodplain forest and 57 acres of cropland would be purchased by IDOT. (See Aerial Exhibit sheets 8, 9, and 10.) It is proposed to protect this acreage from development by transferring ownership to IDNR and to convert three of the cultivated parcels to wetlands.

3.10.3.4 Floodplain Finding—Only Practicable Alternative Finding

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

3.11 Upland Plant Communities

The project corridor lies within two natural divisions in Illinois. Low-lying areas are within the Illinois River Section of the Upper Mississippi River and Illinois River Bottomlands Division. Other more elevated areas lie within the Grand Prairie Section of the Grand Prairie Division (Schwegman 1973). The project corridor is divided approximately equally between the two natural divisions (INHS 2003).

Most of the project corridor south of Henry lies within an area designated as a resource rich area, specifically "Peoria Wilds." The Peoria Wilds Resource Rich Area covers 434 square miles and is centered on the Illinois River between Peoria and Henry. The Peoria Wilds encompasses the floodplain of the Illinois River, the deeply dissected bluffs and hills bordering the floodplain, and the relatively flat agricultural areas occurring on the bluff tops. Approximately 80 percent of the IL 29 corridor lies within the Peoria Wilds. The Resource Rich Area is an IDNR program that identifies large areas containing concentrated natural resources (forests, wetlands, natural areas/nature preserves, and biologically important streams) so that cooperative public-private partnerships can be formed that merge natural resource stewardship with compatible economic and recreational development.

Floristic surveys and assessments of plant communities were conducted on approximately 25,000 acres in the project area between 2002 and 2004. Of that amount, 23,344 acres were upland cover types. Vegetation assessments conducted included cover type mapping, floristic quality assessment, Natural Heritage Plant Community Grading (White 1978), floristic studies, and quantitative forest sampling. Only upland cover types are discussed in this section. Wetland cover types, including floodplain forests, are discussed in Section 3.9, Wetlands. Riverine and lacustrine cover types are discussed in Section 3.8, Surface Water Resources and Quality.

3.11.1 Affected Environment

3.11.1.1 Cover Types

Sixteen cover types were mapped in the project area during the 2002 to 2004 field studies, nine of which are upland cover types (Table 3-47). Cover type categories are based on a modification of the U.S. Fish and Wildlife Service Cover Types for the Habitat Evaluation Procedure. Exhibit 3-24 depicts the distribution of cover types that were evaluated as part of this study.

As noted in Table 3-47, cropland, upland forests, and urban built up land are the three largest upland cover types in the project area. Based on the analysis of 1940 and 2002 aerial photographs of the project area, cropland has decreased 13 percent, upland forest has increased 26 percent, and urban built-up land has increased 45 percent. Cropland covers about 65 percent of the study area's upland area, the largest upland cover type. Although cropland provides an important food source for wildlife in the project area, it contains a limited natural plant community and provides limited wildlife cover. Within the general cropland cover type, natural plant communities are limited to fencerows, fallow fields, and fields that have been enrolled in the CRP program or similar set aside programs. Cropland is not discussed further in this section. Urban built up land covers approximately 9 percent of the upland project area. Like cropland, it provides limited wildlife cover and a limited

natural plant community. Natural plant communities in urban built up land would be found in landscaped areas. Urban and built-up land are not discussed further in this section. The focus of this section is upland forests, the largest natural upland plant community and the second largest upland cover type in the project area, and to a lesser extent grassland (prairie).

TABLE 3-47
Cover Types in the Project Area

Cover Type	Acreage in Project Area	% Cover in Project Area
Cropland (row crops)	15,951	65
Upland Forest	3,568	14
Urban/ Built-up Land	2,179	9
Wetlands	1,069	4
Pasture/ Hayland	551	2
Nonnative Grassland	522	2
Lacustrine	302	1
Shrubland	300	1
Mining Area	224	0.9
Riverine	63	0.3
Grassland (Prairie)	26	0.1
Orchard/ Vineyards	23	0.1
Totals	**24,778**	**~100**[a]

Source: INHS 2005.
[a]Sum is inexact because of rounding.

To enhance the discussion of the natural plant communities, terms used throughout the rest of this section are defined below.

- **Total Basal Area.** Basal area is the amount of forest floor space occupied by the stem cross sections of all individuals within a forested plot. Forests with a low degree of disturbance tend to have a slightly higher basal area than disturbed forests.
- **Percent Adventive.** The number of plant species encountered in a plant community that are not native to Illinois divided by the total number of plant species recorded in the plant community (multiplied by 100). A low percent adventive is indicative of a low degree of disturbance, whereas a high percent adventive is indicative of a high degree of disturbance.
- **Density.** Density is the average number of individuals of a given species per unit area. Forests with little disturbance tend to have a low tree density, whereas highly disturbed forests tend to have a high tree density.
- **Dominant Species.** A species that is most characteristic (in abundance, size, and distribution) of an ecological community and usually determines the presence, abundance, and type of other species. Highly disturbed forests tend to be dominated by disturbance tolerant species (red elm, Osage orange, black locust, black cherry), whereas intact forests tend to be dominated by species that are intolerant of disturbance (white oak, black oak, red oak, white ash).
- **Snag.** Any dead or dying standing tree. We also included within this category live trees containing cavities. These cavity trees represent a small percentage of the snag totals given in Table 3-49. Snags and cavities are specialized habitats used for nesting, shelter, and feeding by various species of wildlife.

Forest. Approximately 15 percent of the upland areas in the IL 29 project area is covered in upland forest. Table 3-48 summarizes forest resources in the project area counties and compares presettlement with present acreages. The loss of more than 60 percent of upland forest since 1820 represents not merely a loss of trees but, more important, habitat for a wide range of plant and animal species. Some generalist plant and animal species associated with upland forests have maintained their numbers despite the loss of upland forests, but other

plant and animal species such as arrowwood and some species of neotropical migrants have declined to a level that requires state or federal protection to prevent complete disappearance of the species. The loss of forest would also affect migrant bird species that rely on the cover and food sources they provide for limited periods of the year. In addition, the large loss of forest would have implications for the health of project area streams and for plants and animals that depend on riverine habitat. Tree cover adjacent to streams provides cover for fish and other wildlife, keeps streams cool, slows erosion and stream flow, and adds organic material to the aquatic food chain.

TABLE 3-48
Summary of Forested Acreage in Bureau, Marshall, Peoria, and Putnam Counties: 1820 vs. ~1980

County	Acres in County	Forested Acres			
		1820	~1980	% Loss	Present % of County
Bureau	554,218	120,000	40,000	67	7.2
Marshall	252,808	65,000	25,000	62	9.9
Peoria	399,182	190,000	62,000	67	15.5
Putnam	109,134	44,000	16,000	64	14.7

Source: Forest Resources of Illinois: An Atlas and Analysis of Temporal and Spatial Trends (Iverson et al. 1989).

Qualitative assessment and quantitative forest sampling were conducted on 10 upland forest stands within the project corridor. Table 3-49 summarizes characteristics of the forest stands that generally are located adjacent to the west side of IL 29 in the Hopewell-Sparland area and at the north terminus of the study area. Sampled forested stands in the project area ranged from high to low quality stands. Stand quality is based on total basal area, density, percent adventive, and species composition of each stand. Three stands (F2, F8, and F9) have larger trees (total basal areas), a medium number of trees per acre (density), a relatively low number of exotic species (percent adventive), and a species composition dominated by oaks and sugar maple. These characteristics represent mature to old, second-growth forests and are considered high quality forest stands. Three stands (F5, F6, and F7) have smaller trees, a larger number of trees per acre, relatively high number of exotic species, and a species composition dominated by non-oaks. These characteristics represent young, second-growth forests that has been grazed in the past and are considered low quality forest stands. The four remaining forest stands show evidence of past grazing and logging and are considered medium quality stands.

In addition to the forest stands mentioned above, the narrow wooded strip between IL 29 and the railroad in the area of the Miller-Anderson Nature Preserve also was evaluated. That stand is approximately 70 feet wide and thus composed entirely of edge habitat. It is characterized as a disturbed, second growth forest. Some dominant species are characteristic of mesic floodplain forest, whereas others are characteristic of mesic upland forest. The dominant species are eastern cottonwood, hackberry, box elder, white oak, and Ohio buckeye. Of the 14 tree species observed, 11 are native and 3 nonnative. Fourteen snags were observed in this forest. Snags have the potential to provide habitat for wildlife.

TABLE 3-49
Characteristics of Selected Forest Stands in the Project Area

	Upland Forest Identifier	Total Basal Area (ft^2/ ac)	Percent Adventive	Density (trees/acre)	Total Plant Species	Dominant Species	Snag Density (total snags/acre)
F1	North of Hopewell	120	3.3	157	91	White oak, sugar maple, and sassafras	11.3
F2	Marshall County State Conservation Area	167	6.7	157	75	Sugar maple, red oak, and white oak	16.2
F3	South of Sparland	118	3.4	168	87	Sugar maple, white oak, and black oak	10.4
F4	North of Sparland	133	4.8	208	84	Red oak, black oak, and white oak	17.8
F5	Sanctuary Ranch west of Sparland on the Bluff Alignment	134	13.9	216	108	Osage orange, red elm, and black locust	22.7
F6	Riverview Drive, junc-tion of Camp Grove Rd.	98	12.8	223	86	Red elm, walnut and black cherry	16.5
F7	395 E South of Putnam	103	7.8	155	77	Hackberry, red elm, and black locust	19.1
F8	Miller-Anderson Woods Nature Preserve	136	4.9	160	103	Red elm, sugar maple, and white oak	32.4
F9	Miller-Anderson Woods Nature Preserve	173	4.7	185	106	Sugar maple, white oak and red elm	19.7
F10	Near northern terminus between I-80 and IL 29	152	3.7	183	112	Sugar maple, red oak and white ash	9.4

Source: INHS 2002.

There are two forested areas of at least 500 acres in and near the survey corridor: Miller-Anderson Woods Natural Area and Nature Preserve, and a block of forest between the Hopewell Estates and the Marshall County Conservation Area. Large forest stands can provide important habitat for various interior forest species, whereas edge-dependent species are more dominant in smaller forest stands. See Section 3.12, Wildlife Resources, for information on wildlife usage of large forest tracts.

Grassland (Prairie). Hill prairies occur as patches of prairie amid upland forest on steep hillsides that often face south to west. In this landscape position, hill prairies are subjected to the hot afternoon sun and dry prevailing westerly winds, conditions that, with occasional fire, favor the growth of prairie species with an affinity for dry conditions rather than forest communities (Robertson et al. 1995; Evers 1955). The type of hill prairies present in the IL 29 project area generally are restricted in distribution to the bluff areas on the western side of the Illinois River.

Twenty-two hill prairies were identified in the IL 29 project area. The hill prairies, totaling 0.29 acre, averaged 0.013 acre in size. Floristic inventories were completed on five hill prairies

in the IL 29 project area. Most of the hill prairies were dominated by a mixed matrix of grasses (big bluestem, side-oats grama, little bluestem, Indian grass) and forbs (lead plant, green milkweed, prairie clover, pale purple coneflower, hoary puccoon). Most of the hill prairies in the project area occur in Hopewell Hill Prairie Natural Area, Hopewell Hill Prairie Nature Preserve, Marshall County State Conservation Area, and the Marshall County State Hill Prairie Natural Area. (See Aerial Exhibit sheet 9.) Table 3-50 summarizes locations and characteristics of hill prairies for which floristic inventories were completed in and near the project corridor. Table 3-50 indicates the presence of large numbers of species within very small-sized prairie parcels. These five prairie remnants also contain a large number of species that do not tolerate much habitat degradation, represented in the table by the high values of the Mean Coefficient of Conservatism.

TABLE 3-50
Characteristics of Hill Prairies in the Project Area

Hill Prairie Unique Identifier	Location	Acreage	Hill Prairies Stand Characteristics		
			# of Plant Species	Mean Coefficient of Conservatism	Percent Adventive
Hill Prairie #4	Within the Hopewell Estates development	0.019	99	4.4	4
Hill Prairie #1	Marshall County State Conservation Area	0.008	75	4.7	4
Hill Prairie #2	Marshall County State Conservation Area	0.016	74	4.3	4
Hill Prairie #3	Marshall County State Conservation Area	0.024	69	4.9	2.8
Hill Prairie #5	Just north of Barrville Creek, near the Marshall County State Conservation Area	0.019	74	4.5	6.7

Source: INHS 2002.

Hill prairies will not be affected as a result of proposed road improvements to IL 29, so they are not discussed further under Environmental Consequences.

3.11.1.2 Invasive Plant Species

Executive Order 13112 (Invasive Species) directs federal agencies to expand and coordinate their efforts to combat the introduction and spread of plants and animals not native to the U.S. Noxious species are those regulated by statute (municipality, county, state, or federal) and listed in the *U.S. Department of Agriculture Noxious Weeds List for Illinois.* Of the noxious species listed in the Noxious Weeds List for Illinois, musk thistle (*Carduus nutans*) and bull thistle (*Cirsium vulgare*) are the species that are present in the project corridor. Unlike noxious species, invasive species is a broader term without regard to statute. Approximately 28 percent of the flora of Illinois is considered alien, though only a subset of the alien species is considered invasive.

3.11.2 Environmental Consequences

3.11.2.1 Construction Impacts

Table 3-51 identifies the amount of each cover type to be converted to highway uses with the Preferred Alternative. The proposed improvements to IL 29 would result in a total of 122 acres of impacts to upland forest. Of the 122 acres affected, 66 acres, or 54 percent, are

within IDOT's existing right of way. The No-Build Alternative would not affect upland forests. The locations and characteristics of upland forest impacts are discussed below and summarized in Table 3-52.

Four lanes will be constructed on new alignment in the project area around Chillicothe and Henry (the bypass areas). In the remaining area between Chillicothe and I-180, the existing two lane pavement will be expanded to four lanes. The wooded areas along these sections of roadway are on and adjacent to the existing roadway.

There are no forest impacts between IL 6 and the BNSF Railroad north of Truitt Road. Eighteen acres of trees will be removed from three locations from the Truitt Interchange to Benedict Street: a wooded area associated with Hallock Creek, a wooded riparian area along Senachwine Creek (South), and small groups of trees near the outer limits of the Senachwine Creek (South) floodplain. The first location consists of vegetation associated with Hallock Creek, a mesic, second growth, upland forest with trees no more than 60 years old. Past grazing is evident. Species within the area consist of hackberry, redbud, basswood, white oak, shingle oak, burr oak, and black oak. The proposed IL 29 improvements would bisect the wooded corridor on the Galena Road Gravel property that currently extends from Hallock Creek to the ponds that have developed in the quarried part of the property. The second location, a wooded riparian corridor along Senachwine Creek (South), is narrow, and because of the stream's width, there is no canopy above the channel. The vegetation consists of cottonwood, sycamore, silver maple and mulberry. The proposed structure over Senachwine Creek at this location would bisect the wooded corridor along the creek north and south of the proposed bridge. The third location consists of clumps of various oak trees

TABLE 3-51
Acres and Percentages of Cover Types Converted to Highway Use

Habitat Type (Cover Type)	Acreage Lost	Percent of Cover Types Lost
Cropland (Row crops)	803[a]	75.7
Upland Forest	122[b]	11.5
Urban/Built-up Land	50[a]	4.7
Wetlands	20.0[b]	1.9
Pasture/Hayland	7[a]	0.7
Nonnative Grassland	32[a]	3.0
Lacustrine	0[a]	0.0
Shrubland	21[a]	2.0
Mining Area	2[a]	0.2
Riverine	0[a]	0.0
Grassland (Prairie)	0[a]	0.0
Orchard/Vineyards	4[a]	0.4
Totals	**1,061.0**	

[a] Acreage of cover type within the proposed roadway ROW.
[b] Acreage of cover type within the proposed roadway ROW, existing roadway ROW, and temporary and permanent easements.

TABLE 3-52
Acreage Impacts to Upland Forest within the Project Area

Location	Acreage Impacts
Proposed Truitt Interchange to Benedict Street	18
Proposed North Chillicothe Interchange	10
North of Chillicothe to South of Sparland	35
South of Sparland to South of Henry	25
Henry Bypass	2
North of Henry Bypass (Miller-Anderson area between IL 29 and the railroad)	32
Total	**122**

in the Senachwine Creek (South) floodplain. The proposed IL 29 improvements would create an edge impact to the wooded riparian corridor on the north side of the creek.

The 10 acres of trees to be removed from the North Chillicothe Interchange area (extending from Benedict Street to Hardscrabble Road) includes two thin strips of upland forest west of IL 29 (south of Hart Lane) and some along the west side of IL 29 around the Hardscrabble Road intersection. The reconstruction of the Benedict Street bridge would remove a swath of trees from wooded area on both sides of Senachwine Creek (South). Construction of the north Chillicothe interchange ramps and mainline would remove most of a very narrow corridor of trees that follows through a drainage area extending from Hart Lane south to near the existing IL 29 crossing of the Senachwine Creek (South). The third area affected would be an edge impact to scattered stands of trees along the west side of the proposed extension of Hart Lane that will tie into the Hardscrabble Road intersection. Trees to be removed include silver maple, green ash, and cottonwood in the floodplain areas and scrub oaks, box elder, elms, hackberry, and mulberry in the upland areas.

Thirty-five acres of tress will be removed from the area north of Chillicothe (Hardscrabble Road) to south of the proposed Sparland interchange. Construction will occur on either side of the existing 2-lane roadway. A few trees between the railroad and existing IL 29 will be removed. Most of the tree removal will be between the existing road and the base of the bluff and include crossings of the unnamed tributary to Illinois River and Coon, Rattlesnake Hollow, and Barrville creeks. Species along the creeks include silver maple, green ash, and cottonwoods. Species in upland areas include white oak, black oak, red oak, slippery elm, black cherry, redbud, and black locust.

Twenty-five acres of trees will be removed in the area from south of the proposed Sparland interchange to south of Henry (the start of the Henry bypass). The wooded areas affected are largely within the existing IL 29 right-of-way near the base of the bluff. The edge impacts between Sparland and the 1100E intersection south of Camp Grove Road would be approximately 50 to 100 feet wide. Included in that area would be the wooded corridors along Barville, Thenius, and Crow creeks. Trees along the creeks include silver maple, green ash, box elder, American elm, and sandbar willow. Trees in the upland areas include slippery elm, black locust, cottonwood, hackberry, and various species of oaks.

Two acres of trees will be removed from the Henry Bypass, where a 4-lane roadway will be constructed on new alignment. The removal area consists of two linear fencerows separating agricultural fields. The area is within a landscape dominated by agricultural fields.

Thirty-two acres of trees will be removed from the area north of Putnam to I-180, 21 acres of which will be removed from within the existing highway right of way. Trees also will be removed during the replacement of an access point to a property north of Putnam and the improvement of Log Cabin Road. The wooded area in the railroad right of way that will be affected is highly variable in species composition. The area is dominated by various combinations of cottonwood, hackberry, snags, box elder, white oak, Ohio buckeye, American elm, and black locust. Many of the snags have loose bark. The cottonwoods tend to be large (more than 20 inches in diameter), and many have damaged tops containing peeling bark and cavities. The proposed raising of the IL 29/Kentville Road intersection will also affect a relatively small wooded area at that intersection.

Of the 10 forests evaluated quantitatively and qualitatively during the project, the proposed improvements would affect 5 of them (F1, F2, F3, F4, and F10 in Table 3-49) for a total of 26 acres. As noted, upland forest lost as a result of proposed road improvements is all at the forest edge. The improvements will not result in the fragmentation of upland forest. The floristic composition of forest edge is more indicative of disturbed conditions than is the composition of forest interior. Trees with high importance values in disturbed forest edge habitat generally include red elm, hackberry, osage orange, black cherry, walnut, basswood, and black locust. Forest edge does not provide quality nesting habitat for neotropical migratory birds as does forest interior. However, forest edge provides some wildlife habitat, aesthetic values, windbreaks, shading, and air quality enhancement.

Beyond the Preferred Alternative's direct impact on upland plant communities is the issue of whether areas of exposed soil during construction will allow nuisance plant species to become a problem. When soil is stripped of vegetation, it creates an opportunity for exotics in the soil's "seed bank" or encroaching into the area (by wind, animal droppings) to establish themselves and expand their range. The Preferred Alternative's sideslopes and ditches would be most at risk for supporting nuisance species. IDOT's erosion control measures will, however, mitigate against the disturbed areas from being overtaken by exotics. The seed mix IDOT will recommend for the ditches and backslopes and the cover that will be used to protect the seed mix (straw, erosion matting, nurse crop) will limit the potential for exotics to take root. By limiting the extent of newly disturbed soil and the length of time it is left unvegetated, IDOT will minimize the potential for nuisance species to be a project issue.

3.11.2.2 Maintenance Impacts

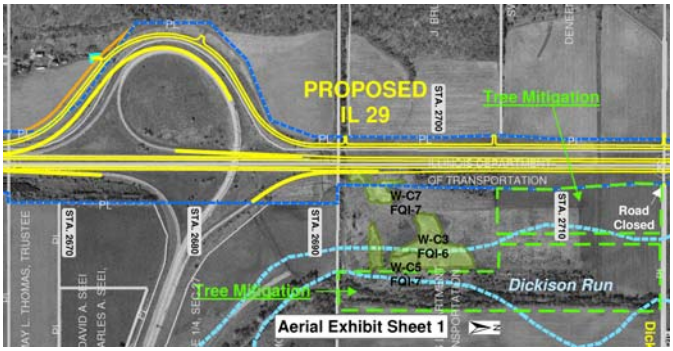
The potential for salt spray or other deicing agents to affect upland plant communities is limited in its threat and area of influence. The salt transport process begins when salt is applied to the road. The salt then leaves the road surface by itself (by gravity) or by the action from traffic. By runoff, the salt will reach the roadside/drainage system. By being forced into the air by traffic or by plowing, the salt leaves the road as splash, spray or dry crystals to be deposited on the road surface or roadside.

Research has shown that during moderate to severe winters in the urban areas of northeastern Illinois, on multilane, high speed highways with very high traffic ADTs, salt spray and salt crystals can be transported through the air for distances up to 2,000 feet. In central Illinois, however, the winters tend to be more mild and road salt usage is lower, and traffic volumes are projected to be low (less than 30,000 vehicles per day). Therefore, salt spray and salt crystals deposition on upland or bottomland cover types should not influence species composition or other vegetation parameters within the project corridor.

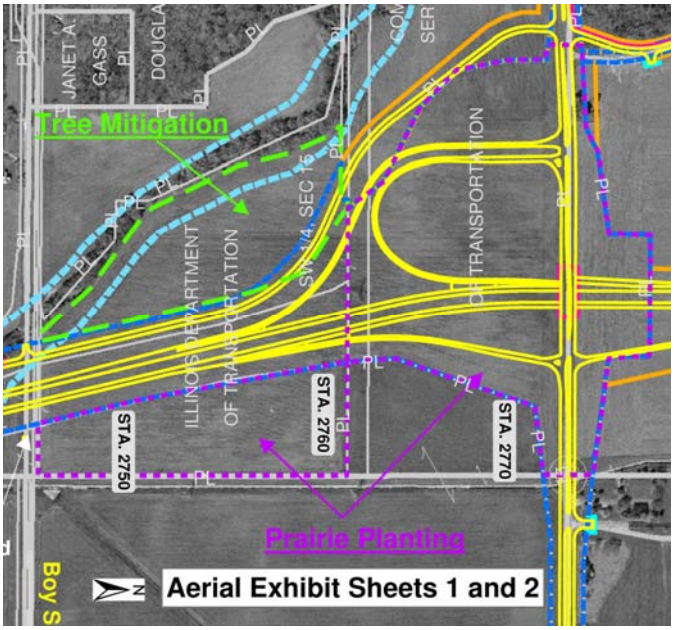
Control of weeds along the right of way typically requires application of herbicides. The Preferred Alternative would increase the right of way area and possibly the volume of herbicide applied. Incorrect application practices and surface water runoff could transport herbicides to upland plant communities in and outside the right of way. Implementing correct application practices and natural attenuation that occurs in the soils and drainage ditches would minimize the amount of herbicide reaching desirable upland plant communities.

3.11.3 Measures to Minimize Harm and Mitigation

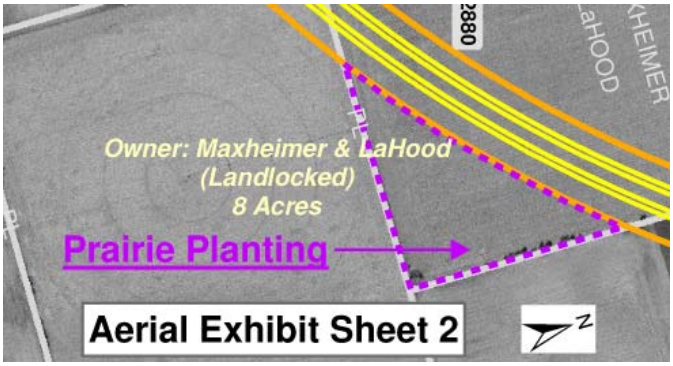
IDOT will develop a landscaping plan during a future engineering phase that will identify areas where native grasses, shrubs and trees will be planted on highway sideslopes and backslopes and in the median, except where clear vision needs to be maintained at intersections and median openings. IDOT has preliminarily identified the following mitigation areas for tree and prairie replacements.



38 acres of trees, to be planted on land owned by IDOT located northeast of the existing IL 6 interchange near Mossville.

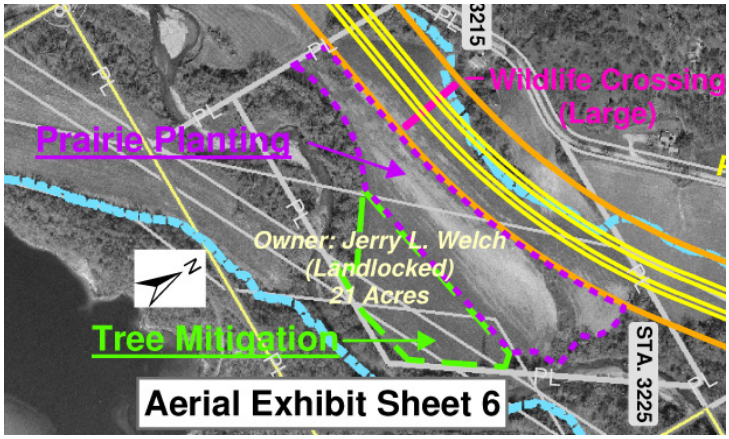


14 acres of trees and 43 acres of prairie grass, to be planted on land owned by IDOT at the proposed Cedar Hills Drive interchange.

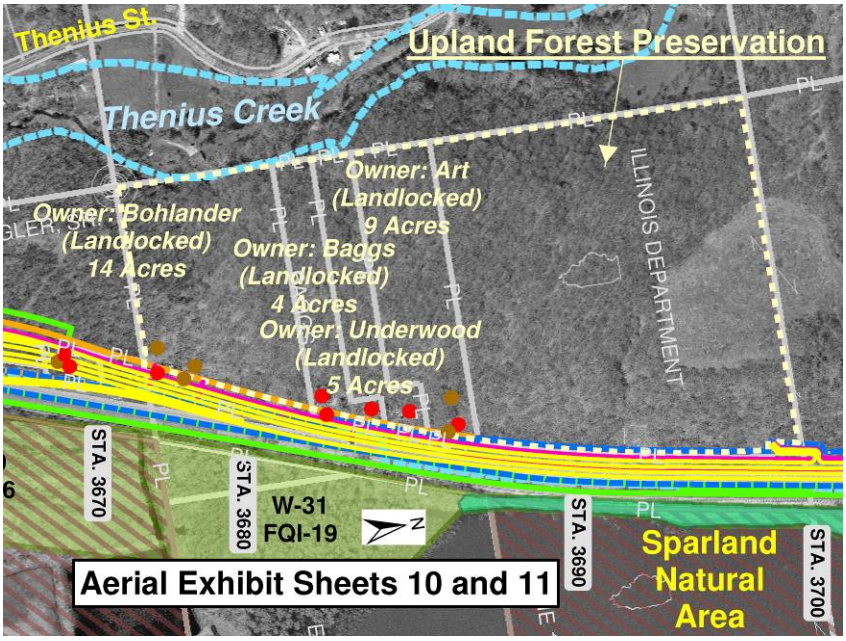


8 acres of prairie grass, to be planted on a landlocked parcel located between Stations 2876 and 2888.

4 acres of trees to be planted on a landlocked parcel located north of the Burlington Northern & Santa Fe Railroad.



8 acres of trees and 4 acres of prairie grass, to be planted on a landlocked parcel located along Senachwine Creek between Stations 3210 and 3224.



32 acres of high quality upland forest on landlocked parcels north of IL 17 and 59 acres on land owned by IDOT, to be protected from development by transferring the land to IDNR.

Where appropriate, the backslopes of the proposed roadway would be seeded with Class 4 (native grasses) and Class 5 (forb mixture) seed mixture. These are prairie seed mixes. This would result in approximately 200 acres of prairie.

IDOT, in conjunction with IDNR, would enhance the hill prairies at the Hopewell Hill Prairie and the Marshall County Hill Prairie Land and Water Reserve. IDNR will design enhancement methods to be applied at a latter date.

3.11.4 Indirect Impacts

As noted in the discussion of indirect impacts in Section 3.3, Agriculture, the project's indirect impacts are expected to occur primarily at or near the proposed interchanges. Among the proposed interchanges, only the north Chillicothe and Sparland interchanges have upland plant communities that could be affected by secondary development. The other proposed interchanges are located in areas dominated by cropland. As shown in Exhibit 3-8, Chillicothe's future land use plan includes a broad band of "recreation buffer" that would protect the land between the Chillicothe Recreation Area and Hart Lane from development. Planned residential development is shown in the bluff north of Hart Lane. With the planned extension of Hart Lane to Boehle Road, it is possible that secondary residential development could occur along the north side of the extension. It is difficult to predict the level of secondary development beyond Chillicothe's planned development in that area, but impacts largely would be to forested land.

In Sparland, indirect impacts to upland plant communities (forested land) might occur west of IL 29 at the south and north ends of the interchange. There is no land use plan in Sparland, and local officials have indicated that any development would be welcomed. Few factors limit the potential for secondary development at each end of the interchange, including Sparland's historic slow development trend. Beyond that, direct access to IL 29 near the interchange will be precluded for a distance of 1,500 feet beyond the entrance ramps. This would either push development north or south of the corporate limits or

require an extension of the local street network to serve the development. The expense of providing that type of access would pose some deterrent to development. At the north end of the interchange, secondary development would also be constrained by the landlocked parcels that IDOT will turn over to IDNR for permanent protection.

3.11.5 Cumulative Impacts

As noted in Table 3-48, project area counties have lost more than 60 percent of their forests between 1820 and 1980. Some of the more notable implications of that loss are the declining populations of forest species like arrowwood and the cerulean warbler (among other neotropical migrants) to the point where they require state and/or federal protection. Although there has been an increase in wooded areas within the project area between 1940 and 2002 of 26 percent, the characteristics and quality of the wooded areas would be quite different from the forests lost before 1940. As a result, the viability of forest species, such as the two mentioned above, still remains in question.

The development of borrow areas that will be required to construct the proposed IL 29 improvements could adversely affect upland plant communities, including forests. IDOT's normal practice is to prohibit the use of IDNR land, floodplains, wetlands, or endangered species locations as borrow sites. That would leave upland areas as a borrow source. To reduce impacts to upland communities from borrow sites, farm fields on landlocked properties will be evaluated for borrow during the design. In addition, IDOT will evaluate the potential to use dredge material from the Illinois River and adjacent backwater lakes.

Residential development, whether individual lot or subdivisions, also could affect upland plant communities, particularly forested areas. Forested areas in the bluffs at the south end of the project area may be most at risk, but the impact is not limited to that area. Development south and west of Camp Wokanda and along Fawn Hills Drive is an example of past impacts to forested areas that is expected to continue. Chillicothe's future land use plan calls for additional residential development in the bluffs north of Hart Lane. The recently approved Valley View Ridge Subdivision (9 lots on 42.4 acres) in a woodlot north of Putnam is an example from the north end of the project area. During interviews with local communities, no specific information on recent projects or reasonably foreseeable projects was provided that would adversely affect upland plant communities. Although unforeseen development is likely in the corridor, it is very difficult to estimate its potential impact on upland plant communities.

On the positive side, land acquired or placed under conservation easement will preserve remaining forests. The abundance of designated lands in the project area, such as Miller-Anderson Woods Nature Preserve, Marshall County State Hill Prairie Natural Area, Marshall County State Hill Prairie Land and Water Reserve, Hopewell Hill Prairie Natural Area and Nature Preserve, and County Line Hill Prairie Natural Area will preserve forested areas.

3.12 Wildlife Resources

Approximately 76 percent of the project area is agricultural land (row crops, pasture, and hay land) and urban or builtup land (Table 3-47). Agricultural land within the project area generally is concentrated in the southern part of the study area, between the IL 6 interchange and north of Chillicothe and from south of Henry to Putnam. Wildlife occupying disturbed habitat typically are common generalist species. Most of the remaining 24 percent of land area in the project area are upland plant communities with varying degrees of natural character. Such plant communities are found in the wooded bluffs adjacent to parts of the west side of IL 29 from Chillicothe to the northern project terminus at I-180. Wildlife species occupying such habitat are less common and tend to have affinities for specialized niches.

Based on fieldwork and literature review, faunal groups potentially within the project area include 44 species of mammals, 203 species of birds (from 48 families), and 42 species of amphibians and reptiles.

The proximity of the Illinois River and its backwater lakes to the project area is noteworthy because of the extensive wildlife habitat the river system provides. Based on data compiled in the Illinois River Comprehensive Conservation Plan, the Chatauqua National Wildlife Refuge, part of which lies within the project area, is used by 40 percent of the waterfowl that use the Illinois River segment of the Mississippi River Flyway (USFWS 1999). The extensive mosaic of contiguous undeveloped land along the bottomlands and bluffs of the Illinois River provides important foraging and loafing habitat and migration corridors for wildlife.

3.12.1 Affected Environment

3.12.1.1 Habitat

The project area can be divided into two major wildlife habitats that coincide with the major vegetational communities present (Table 3-47). The major habitat division is between wooded and non-wooded areas. Some of the project area is of a transitional nature between these two habitat divisions. The distribution of habitats in the project area (Exhibit 3-24) and the activity patterns of many generalist wildlife species result in some overlapping of faunal communities. Forest dwelling species may occasionally occur in open areas around forest stands, and species particular to non-wooded habitats may occasionally be found in wooded areas. Edges between major habitats are preferred by many generalist wildlife species. These edge areas are preferred not only for the diversity of food materials available, but also for the usually dense cover provided through the characteristic overlap of vegetational communities. Generalist wildlife species that occur in the project area are identified in the following paragraphs. Those wildlife species that require more specialized habitats are identified in the following section.

Forested Habitat. Bottomland forest is scattered throughout the floodplains of the Illinois River and its tributaries within the project area. Upland forest is present in the bluffs from the Chillicothe to south of Henry and also from north of Putnam to the north project terminus (Exhibit 3-24). The forested areas within the project corridor have a relatively large number of snags and trees with cavities (Table 3-49). These structures provide nesting, shelter and feeding areas for many species of mammals, birds, and amphibians.

Mammal species observed in the project area that have strong affinities for forested habitat include the eastern gray squirrel, eastern fox squirrel, and eastern chipmunk. The Virginia opossum, red fox, white-footed mouse, raccoon, and white-tailed deer are associated primarily with forests but also use other habitat types. Little brown bats, big brown bats, northern long-eared bats, eastern pipistrelles, and evening bats forage in or along forest edges, but roost in buildings or other artificial structures as well as in trees (Barbour and Davis 1969). Eastern cottontails and woodchucks occupy forest edges rather than forest interiors.

Habitats used by birds vary with the seasons. A few species utilize the forested areas during the winter months and include such species as red-bellied woodpeckers, blue jays, and tufted titmouse. During the spring and fall migration, large numbers of birds use the project area for feeding and resting. These include such species as warblers, shorebirds, ducks, herons, hawks, and eagles. The time from April through mid-July is when most birds breed in the project area. One hundred twenty-two species of birds were recorded within the project corridor during the breeding season census. Forty-four of these species are neo-tropical migrants.

Grassland Habitat. Grassland habitat includes several upland cool and warm season grass-dominated plant communities and some grass-dominated wetter plant communities. These plant communities are scattered generally throughout rural parts of the project area.

Mammals restricted to grassland habitat and observed in the project area include the thirteen-lined ground squirrel. Bird species observed in either upland prairie or several grass and sedge dominated wetland plant communities within the project area include the horned lark, vesper sparrow, savannah sparrow, and eastern meadowlark.

3.12.1.2 Important Wildlife

Neotropical Migrants. Neotropical migrants are bird species that winter in the tropics and migrate northward to the U.S. and Canada to breed. Some species are area sensitive; that is, they require large tracts of forested habitat for nesting. Four thousand three hundred acres of forest occur within the project corridor. The forested areas mainly occupy the western bluffs and floodplain of the Illinois River and adjacent lakes from Mossville north to I-180. Toward the north end of the project corridor, the bluffs and floodplain merge to form a large, more or less contiguous forest. Fifty-two species of neotropical migrants were encountered within the project corridor during the avian censuses. Thirty-six of those species have been recorded during the breeding season and are presumed to breed in the project corridor. They include warblers, flycatchers, vireos, tanagers, and orioles. The most common species within the project corridor include the eastern wood-pewee, great-crested flycatcher, red-eyed vireo, and blue-gray gnatcatcher. Species listed by Herkert et al. (1993) as being highly sensitive to habitat fragmentation include yellow-throated vireo, black and white warbler, ovenbird, mourning warbler, and American redstart. Most of these species are not common in the project corridor. Moderately sensitive species in the project area include black-billed cuckoo, yellow-billed cuckoo, Acadian flycatcher, summer tanager, scarlet tanager, red-eyed vireo, northern parula, and blue-gray gnatcatcher.

Shorebirds. Most shorebirds are long-distance migrants that require suitable wetlands. These areas must have shallow water or mudflat habitats with sparse vegetation. Shorebirds migrate through the Illinois River Valley in large numbers. Birds are often seen in small, single or multi-species flocks. The Lake Chautauqua National Wildlife refuge is host to thousands of

shorebirds every spring and autumn. Areas within the project corridor that contain suitable habitat include lake shorelines, river floodplains, and flooded agricultural fields. Avian censuses of the project corridor identified seven species of shorebirds: greater yellowlegs, lesser yellowlegs, spotted sandpiper, least sandpiper, pectoral sandpiper, solitary sandpiper, and common snipe. The habitats for these species are associated with the gravel lakes northwest of Chillicothe, forested and ponded areas along the Illinois River north of Chillicothe, Crow Creek Lake, and the forested and ponded area of Miller-Anderson Woods.

Raptors. Raptors include hawks, falcons, eagles, vultures, and owls. The bluffs along the west side of the Illinois River and the river itself are important migration routes for several species of hawks, eagles, and falcons. Many species of hawks use the thermals produced by air currents along the bluffs during their spring and fall migrations, including hundreds of broad-winged hawks. Eleven species of raptors were identified in the project corridor. The most common species during the breeding season included the red-tailed hawk, Cooper's hawk, bald eagle, turkey vulture, and American kestrel. Breeding areas are scattered throughout the project corridor and occur in forested wetlands, upland forests, and shrubland/forest cover types (habitats). The bald eagle is discussed further under subsection 3.13.1.1, Threatened and Endangered Species.

Herons. Some birds each require a nest site surrounded by nests of other similar birds. An area of clustered nests is called a rookery. Colonies usually are made up of a single species of bird, but sometimes two or more species may be present. This is particularly true of species like herons and egrets, which require similar nesting sites. Nests may be at any height but often are in the tallest trees in the area.

Three heron rookeries occur within or near the project corridor. One rookery is about 2 miles northeast of Chillicothe along the west bank of the Illinois River. The rookery has been used by herons since before 1984. Approximately 150 great blue heron nests were observed in the rookery during 2004. In the past, a few great egret nests were also present. A second rookery is east, southeast of Henry along the east bank of the Illinois River. The rookery was first observed in 1997 and contains approximately 30 great blue heron nests. A third rookery is about 1.5 miles southwest of DePue along Lake DePue. The rookery has been used by herons since at least 1984. Approximately 600 great blue heron nests were observed at the site in 1997. Twenty to fifty nests of great egrets have occurred there in the past.

Waterfowl. The Illinois River Valley is part of the critical central flyway for North American waterfowl, and 500,000 waterfowl move through the area every year. Twenty-five species of migratory waterfowl may be found in the IL 29 project corridor, and 19 were observed during censuses. The most common species that breed in the corridor are Canada goose, mallard, and wood duck. Five species of waterfowl commonly overwinter along the Illinois River. Waterfowl are economically important in the project corridor as game birds and are hunted within the backwater lakes that occur along the Illinois River. Major habitat areas for these species occur outside the project corridor and include the backwater lakes and adjacent wetlands and the Illinois River. Minor habitat areas for waterfowl within the project area include the gravel lakes around Chillicothe, the Crow Creek wetland, and the pond at Miller-Anderson Woods Nature Preserve.

3.12.1.3 Areas of High Wildlife Importance

To identify areas of high animal movements across IL 29, IDOT conducted a monthly roadkill study along IL 29 from July 2001 to June 2002. The survey route was driven during the morning on the first working day of each week. For survey purposes, IDOT personnel divided IL 29 into 1-mile sections which they subdivided into segments of varying lengths based on the cover types adjacent to the highway. A total of 389 mammalian remains and 53 amphibian or reptile remains were recorded along the survey route. The most commonly noted mammalian roadkill included raccoons, squirrel (various species), Virginia opossum, white-tailed deer, and rabbits. In general, mammal-rich areas in the project area are stream crossings and forested areas. These habitat types provide loafing, foraging, and traveling cover for mammals. Frogs, snakes, and turtles were the most common amphibian and reptile roadkill. Crow Creek (West) and Miller-Anderson area were the locations where most reptile and amphibian roadkill were observed. Table 3-53 and Exhibit 3-25 indicate locations where most roadkills occurred. Although there are differences between the locations with the highest number of mammalian and amphibian/reptile roadkills, the characteristics of the most popular crossing locations are the same—woods on at least one side of IL 29 or crossing a stream corridor (see Table 3-53).

3.12.2 Environmental Consequences

3.12.2.1 Habitat Loss

The No-Build Alternative will not cause the loss of wildlife habitat. The Preferred Alternative will cause the conversion of 1,061.0 acres of cover types to highway use (Table 3-51). Loss of wildlife habitat can be measured through estimates of cover type losses that support wildlife. Construction of the Preferred Alternative will result in the conversion of several cover types that support various species of wildlife. These habitats include upland forest, nonnative grassland, wetlands, and shrubland. Potential impacts to the wildlife species (neotropical migrants, shorebirds, raptors, herons, waterfowl) that occupy these habitats are discussed in the following paragraphs.

3.12.2.2 Wildlife Impacts

No adverse impacts are expected to the continued abundance of the generalist wildlife species mentioned in this section.

Neotropical Migrants. One hundred twenty-two acres of trees would be removed by the proposed improvements at six locations. Approximately 14 acres of mature woodland would be removed between IL 29 and the railroad from north of Putnam to the Miller-Anderson Woods area. That area is 70 feet wide and several miles in length. Impacts to the wooded parcel would result in the loss of neotropical migrant breeding bird habitat. Species expected to occur within that area include the red-eyed vireo, blue-gray gnatcatcher, eastern wood-pewee, common yellowthroat, summer tanager, and American redstart. Impacts to the remaining 109 acres of wooded areas are not expected to affect neotropical migrants.

Shorebirds. There are no large shorebird stopover areas in the project corridor. Approximately 1.1 acres of wet meadow, pond, and marsh wetlands that provide suitable habitat for shorebirds in the project area would be affected. The loss of habitat would not

TABLE 3-53
Summary of High Vehicle/Animal Conflict Sections in the IL 29 Project Area

Location[a]	Roadside Vegetation	Total	Type of Animal
At Peoria/Marshall County line; River is near road (Mile 4)	Woods–W River–E	13	7 raccoons, 3 snakes, 1 skunk, squirrel, bird
Rattlesnake Hollow (Mile 6)	Woods–W Grass–E	24	14 raccoons, 5 rabbits, 2 squirrels, 1 fox, snake, bird
Rattlesnake Hollow (Mile 6)	Woods–W River–E	16	10 raccoons, 2 opossums, 3 squirrels, 1 turkey
Thenius Creek (Mile 8)	Woods–W Grass–E	12	9 squirrels, 2 raccoons, 1 chipmunk
Sparland Unit Natural Area; River is near road (Mile 9)	Woods–W Wetland–E	18	6 raccoons, 6 opossums, 2 deer, squirrels, frogs
Crow Creek/Tributary Area (Mile 11)	Stream–E & W	22	11 raccoons, 4 opossums, 1 deer, 2 frogs, turtles, birds
Crow Creek/Tributary Area (Mile 11)	Crops–W Grass–E	13	8 raccoons, 3 frogs, 1 rabbit, bird
Crow Creek/Tributary Area (Mile 12)	Woods–W Grass–E	13	7 raccoons, 1 deer, mink, opossum, squirrel, frog, snake
Crow Creek/Tributary Area (Mile 12)	Stream–W & E	15	7 raccoons, 2 turtles, 1 deer, mink, opossum, squirrel, frog, snake
Wooded Corridor (Mile 22)	Woods–W & E	12	10 raccoons, 2 squirrels
S. end of Miller-Anderson; River is near road (Mile 23)	Woods–W & E	18	12 raccoons, 4 opossums, 1 squirrel, frog
N. end of Miller-Anderson, pond on west; River is near the road (Mile 24)	Woods–W & E	14	6 raccoons, 4 frogs, 1 opossum, squirrel, frog, bird
N. of IL 29/I 180 split (Mile 25)	Grass–W & E	13	4 frogs, 3 birds, 2 squirrels, 1 deer, rabbit, raccoon, snake

Source: IDOT's Roadkill Survey.

[a]Miles noted in parentheses are measured from the southern terminus of the IL 29 project area.

have a negative effect on shorebirds, which would benefit from the proposed wetland mitigation (see subsection 3.9.3).

Raptors. The Preferred Alternative would remove 122 acres of trees but none within raptor habitat (except bald eagle). Construction, operation, and maintenance of the roadway would not have a direct or indirect impact on raptor species or their habitat.

Herons. Heron rookeries occur within or near the project corridor but none within the project area. No direct or indirect impacts from the construction, operation, or maintenance of the proposed roadway will affect these sites.

Waterfowl. Approximately 1.1 acres of wet meadow, pond, and marsh wetlands would be affected. Compared to the amount of waterfowl habitat adjacent to the project corridor, this loss is considered minor. Construction, operation, and maintenance of the proposed roadway would have no direct or indirect impacts on migrating waterfowl.

3.12.2.3 Movement Corridor Impacts

Highway construction might affect wildlife not only through the direct loss of habitat but also by disrupting animal movement. Besides the highway itself, two features of the Preferred Alternative could affect wildlife movement: the highway fencing planned along the part of the project from IL 6 to the north Chillicothe interchange, and the retaining walls and median barriers proposed along stretches of IL 29 from north of IDOT's rest area to near Cabin Hill Drive. The potential impacts of highway fencing and median barriers/retaining walls on wildlife movement are discussed below.

Highway Fencing. Fencing installed at the right of way limit along the project's freeway section from the IL 6 interchange through the north Chillicothe interchange would preclude access to the highway. The continuous fencing would be 4 feet high. Although fencing is not intended to be a barrier to wildlife movement, it could limit movement of small mammals and, to a lesser extent, deer. In areas associated with large wildlife crossings, 8-foot fencing will be installed. A report published by the Michigan DNR's Wildlife Division (Feldhammer et al. 1986) found that a 106-inch fence reduced the number of deer groups on interstate right of way, compared to an 86-inch fence, but it was not effective in reducing the number of road kills. Falk et al. (1978) reported a modified 88-inch fence along highways was an effective barrier to deer when in good repair. No continuous fencing is planned along the Preferred Alternative from north of Chillicothe to the north project terminus.

The predominance of agricultural land in the freeway section (IL 6 to north of Chillicothe) limits that part of the project area's attractiveness to all types of wildlife. The lack of varied habitat south of Chillicothe would limit the desire of wildlife to move from one habitat type to another (for example, bluff to river). Rather than acting as a barrier that will adversely affect wildlife, the fencing has some potential to reduce wildlife-vehicle collisions and to divert wildlife toward the wildlife passages proposed for the project south of Chillicothe.

Split Road Profile. Between the proposed north Chillicothe interchange and Camp Grove Road, approximately 2 miles of split profile is to be constructed (Exhibit 2-3). The 22-foot median would be divided by a retaining wall that varies in height from 2 and 18 feet. In addition, retaining wall is proposed on the west side of IL 29 along most of the split profile section. The height of the retaining wall would vary from 2 to 11 feet. Walls at least 7 feet high, whether on the west side of IL 29 or in the median, would prevent wildlife from crossing into or across the highway. Road segments where retaining walls are proposed coincide with three mammal crossing "hotspots" identified in the roadkill survey; specifically, Barrville Creek (north of Hopewell), Sparland Natural Area (between Hopewell and Sparland), and Miller-Anderson Woods Nature Preserve.

Six other mammal crossing "hotspots" are located (Exhibit 3-25) near Rattlesnake Hollow (two), Thenius Creek, and Crow Creek (two), and within the Miller-Anderson Woods Nature Preserve area. There is no split profile proposed between Camp Grove Road and the north project terminus; however, there are sections of retaining wall. See "Operational Mortality" below for more information.

3.12.2.4 Construction Mortality

Construction of a roadway, from clearing to paving, can result in the death of slow-moving and nesting animals in the path of the road. The most pronounced and immediate effects

may be on burrowing rodents and reptiles (or other species) with small territories. Individuals of those species either would be killed or permanently displaced by excavation, filling, and other ground disturbance. More mobile wildlife species in the project area would move from the construction area into surrounding habitats during construction. In addition, some degree of construction-related wildlife impact may result from the disruption of wildlife travel patterns arising from construction noise and activity. Road construction in road segments where wildlife frequently cross the highway can impair efficient crossing. As a result of noise and construction-related barriers, wildlife may spend more time on the highway searching for a safe place to cross. Increased wildlife road crossing time is correlated with a higher probability of animal/vehicle collisions.

Aside from mortality issues, another potential impact would be temporarily displacing wildlife species by habitat alteration or noise disturbance (including nesting birds) from construction equipment.

3.12.2.5 Operational Mortality

Recent studies by the USEPA and the Highway Safety Information System (HSIS) report that the overall rate of vehicle/animal collisions has steadily increased over a 7-year period. The HSIS study, which included data from Illinois and four other states, also found the rate of animal crashes, expressed as number of accidents per million vehicle kilometers, was greatest on 2-lane rural roads, followed by multilane rural and urban road types. The study reported collision rates for rural roads ranged from 0.07 to 1.16 crashes per kilometer per year (Hughes and Saremi 1995). Within Peoria County, it is estimated that deer/vehicle collisions have risen 81 percent between 1994 and 2004 (Buedel 2004). This is due in part to population growth in Peoria County, increased traffic, and the ever-growing white-tailed deer population.

As noted, IDOT conducted a roadkill study along IL 29 from July 2001 to June 2002 to identify areas where animal movements might result in high mortality caused by vehicles. A total of 389 mammalian remains and 53 amphibian or reptile remains were recorded along the survey route. The most commonly noted mammalian roadkill included raccoons, squirrel (various species), Virginia opossum, white-tailed deer, and rabbits. Frogs, snakes, and turtles were the most common amphibian and reptile roadkill. Table 3-53 and Exhibit 3-25 indicate locations where most mammal, reptile and amphibian roadkills were located.

It is reasonable to assume that mammal and amphibian/reptile species in the project corridor will continue to be drawn to the crossing locations identified in IDOT's roadkill survey. Assuming that the populations of mammals and herptiles remain at approximately their current levels, what operational impact would the Preferred Alternative have on wildlife mortality? Issues that would likely affect operational mortality for wildlife are discussed in the following paragraphs.

Traffic volumes are predicted to increase throughout the corridor. The greatest increases would occur along IL 29 between Chillicothe and Sparland where five (three in the Rattlesnake Hollow area, one at Barrville Creek, and one at Thenius Creek) of the 11 high animal crossing are located. Of the five crossings, four were locations of high mammal roadkill and one was a high herptile roadkill location.

IL 29 would be widened from a 2-lane undivided highway to a 4-lane divided highway that has two sections on new alignment (IL 6 to the north Chillicothe interchange and the Henry

bypass). The posted speed on the Preferred Alternative would be raised from the existing 55 mph to 65 mph. With the wider road, wildlife would be expected to take more time to cross the road. Increased wildlife crossing time may result in a higher probability of animal-vehicle collisions. The increase in posted speed on the new project likely would result in an increase in the operating speed. Balanced against the potential increased operating speed (and potential decrease in reaction time) is the fact that a wider facility may give drivers more room to maneuver safely around wildlife crossing the highway.

The Preferred Alternative also would have barriers (fencing and retaining walls) along the right of way for certain stretches and a barrier in the median for about 2 miles of split profile typical section proposed between Chillicothe and Camp Grove Road. As noted, fencing along the entire right of way is proposed between IL 6 and the north Chillicothe interchange (approximately 10 miles). Although the 4-foot-high fence is not "deer proof," it may reduce the number of deer and small mammals that enter the highway.

North of the proposed Chillicothe interchange, there will be approximately 8 miles of retaining wall. Most of the retaining wall would be between Chillicothe and Camp Grove Road (5.5 miles), and in most of that section the wall would be on the west side of the highway. Approximately 0.5 mile of retaining wall would be located in the Crow Creek area west of IL 29. North of Crow Creek, there would be slightly less than 2 miles of retaining wall, with most of it on the east side of the Preferred Alternative. The retaining wall would vary in height from 2 to 15 feet. Retaining walls 3 to 5 feet high would be a deterrent to small mammals, and walls higher than 7 feet would be barriers to small mammals and deer. Because the walls are not continuous along the east or west sides of the project, they would not reduce wildlife-auto collisions substantially. The walls might reduce the number of animals crossing IL 29, but they might also change the crossing points along IL 29 to those locations where wildlife is able to cross the retaining walls. In the split profile sections, the median barrier would vary in height from 2 to 18 feet. Wildlife that is able to cross into the right of way could become trapped by the median barrier until a point is reached where the height of the barrier is low enough for wildlife to cross it.

3.12.3 Measures to Minimize Harm and Mitigation

Expanding IL 29 adjacent to the existing facility from north of Chillicothe to Camp Grove Road and in the Miller-Anderson Woods area will prevent bottomlands and uplands adjacent to the highway from being bisected or fragmented. The use of a narrowed typical section for approximately 11 miles along the Preferred Alternative also will help to minimize wildlife habitat impacts, although it is acknowledged that the split profile narrowed typical section may pose barriers for wildlife crossing the Preferred Alternative.

To preserve wildlife habitat in the corridor, the IDOT in cooperation with IDNR will purchase and manage 321 acres of floodplain forest on property east of IL 29 north of Chillicothe. Maintaining the floodplain forest in public ownership affords the IDOT and IDNR the opportunity to improve wildlife habitat in that area through tree or prairie grass plantings and active management to remove invasive species. Those properties may also be used as wetland mitigation sites. Beyond preserving the floodplain forest parcels, IDOT is committed to tree mitigation and seeding for prairie grasses in its right of way along the Preferred Alternative.

The IDOT's existing right of way between IL 6 and Cedar Hills Drive among other areas has been identified as an area to establish prairie grasses.

The loss of potential breeding habitat for neotropical migrant bird species will be mitigated in several ways. First, the inadvertent loss of nesting birds in the construction area will be avoided by imposing a tree clearing restriction. Tree removal will not be allowed between April 15 and August 15 of any given year. Second, the loss of habitat will be mitigated by the purchase of 91 acres of upland forest and 294 acres of forested wetland. These areas will be transferred to the IDNR where they can be managed for the benefit of many species of neotropical migrants. Third, approximately 37 acres of forested mitigation will occur onsite and be adjacent to existing wetlands. The filling in of open areas next to forested areas will expand the forested areas and increase the use of the existing forests for neotropical migrants by reducing the edge effect.

To minimize the animal-vehicle collisions and the effects of retaining walls and median barriers on wildlife movement, 41 wildlife passages (spaced approximately at 0.5-mile intervals) are incorporated into the design of the project (Table 3-54). The wildlife crossings are located to coincide with the high mammal and herptile roadkill areas (Exhibit 3-25). Wildlife passages consist of bridges and culverts. At all 19 proposed bridges, the bridge length/opening will be extended approximately 25 feet to provide a sufficiently wide dry crossing area adjacent to the stream for large animals (Exhibits 3-26 and 3-27). Fencing will be installed for a distance from the bridge abutments parallel to the highway to direct deer and other wildlife to the mouth of the wildlife passage. Large and small culverts also will be used as wildlife passages. The 6 large culverts, which are meant to accommodate deer and smaller wildlife, would be at least 10 feet high and sufficiently wide to attract and accommodate deer.

Exhibit 3-28 depicts a culvert designed to accommodate small and medium animals and Exhibit 3-29 one for large mammals. Provisions would be made for allowing daylight into the culverts that would pass under the median as a means of attracting deer. The culverts for smaller mammals (raccoon, muskrat, fox) and herptiles would be about 5 feet high. Because the culverts will be used for drainage, there will be occasions when the water level in the culvert may be a deterrent to use by some species. However, the culverts are designed to provide a 2-foot-wide ledge to allow dry crossings for up to a 2-year storm. As at bridge wildlife crossing locations, fencing would be added to the wingwalls of culverts to guide wildlife to the opening.

As a further measure to minimize the effect of median barriers on wildlife movement, medians that do not trap wildlife are being considered at several locations throughout the project area. Openings in the barrier about 2 feet wide would allow smaller species to move along the barrier to these locations and then cross through the barrier.

IDOT is also considering other minimization measures, such as perch poles and raptor nests, in suitable locations in the project area and requiring "quiet construction" techniques in sensitive areas such as adjacent to eagle nests. IDOT will continue to consider options such as these and develop a more specific list of minimization/mitigation measures in the future design phase.

TABLE 3-54
Summary of Proposed Wildlife Crossings in the IL 29 Project Area

Project Area Location (stationing)	Crossing Type	Intended Wildlife Size
Dickison Run (2743+00)	Bridge	Large
Senachwine Creek South (3176+50)	Bridge	Large
3214+00	Culvert	Large
3236+50	Culvert	Large
Benedict Street (50+00) at Senachwine Creek	Bridge	Large
Coon Creek (3322+00)	Bridge	Large
3329+36	Culvert	Small
IL 29 Connector at Senachwine Creek (72+50)	Bridge	Large
3390+69	Culvert	Small
3452+87	Culvert	Large
Rattlesnake Hollow (3488+50)	Bridge	Large
Barrville Creek (3515+00)	Bridge	Large
3545+22	Culvert	Small
3583+62	Culvert	Large
Gimlet Creek (3629+50)	Bridge	Large
Thenius Creek (3651+00)	Bridge	Large
3758+56	Culvert	Small
3777+99	Culvert	Large
Crow Creek (3792+00)	Bridge	Large
3833+44	Culvert (dry)	Small
Crow Creek overflow (3020+50)	Culvert	Small
Dry Hollow Creek (5287+00)	Bridge	Large
6089+00	Culvert	Large
6099+00	Culvert	Small
Senachwine Creek (6132+00)	Bridge	Large
6159+30	Culvert	Large
6179+20	Culvert	Large
6213+25	Culvert	Small
6225+00	Culvert	Large
6274+00	Culvert	Small

3.12.4 Indirect Impacts

Project interchanges are the most likely locations for potential indirect impacts in the project area. With the possible exception of the proposed north Chillicothe and Sparland interchanges, the other proposed interchanges are within areas dominated by agricultural land. Interchanges in agricultural locations would have little to no impact on wildlife and no impact on wildlife biodiversity. The proximity of the north Chillicothe interchange to the bluffs makes the potential for wildlife impacts a possibility, but discussions with Chillicothe officials did not identify any reasonably foreseeable indirect impacts at the interchange. Even if unplanned development did occur at the interchange, it might adversely affect some species, but the impact would not rise to the level of affecting biodiversity.

Wildlife habitat at the proposed Sparland interchange could be affected by secondary development, but Sparland officials have indicated that new development will not occur east of IL 29 because of the presence of the Illinois River floodplain. Officials did not identify any reasonably foreseeable secondary development west of IL 29. As at Chillicothe, even if unplanned development occurred at the interchange, it might adversely affect some species, but the impact would not rise to the level of affecting biodiversity.

3.12.5 Cumulative Impacts

The focus of discussion in this section is the Preferred Alternative's potential impacts to biodiversity per *Incorporating Biodiversity Considerations into Environmental Impact Analysis Under the National Environmental Policy Act* (Council on Environmental Quality 1993). Areas of high biodiversity near the IL 29 project area are the vast habitat mosaic of the Illinois River bottomlands east of IL 29 and the forested bluffland generally west of IL 29. The Illinois River bottomlands provide refugia for a diverse assemblage of plant, songbird, raptor, waterfowl, shorebird, heron, mammal, herptile, mussel, and fish species. The forested blufflands provide refugia for an assemblage of plants, songbirds, raptors, mammals, and herptiles quite different from those present in the Illinois River bottoms.

Conversion of prairie, wetland, and forest land to agricultural and residential uses, pollution, and overharvest in the Illinois River bottomlands historically have led to declines across a wide range of species, including waterfowl, shorebird, fish, and mussel populations and an overall loss in biodiversity.

The field surveys conducted between 2002 and 2005 helped establish the current state of wildlife biodiversity in the project area. Bird surveys identified 150 species of 44 families in the project area; 203 species of 48 families have been recorded in the project area. Three Illinois threatened species—bald eagle, pied-billed grebe, and brown creeper—were observed in the project area, although it was determined that the pied-billed grebe and brown creeper did not nest there. At least one nesting pair of bald eagles was observed. Forty-four mammal species are known or likely to occur in the project area. That number represents nearly 75 percent of the mammal species in the state. Most of the 44 species are common, with exceptions being the state threatened river otter and possibly the bobcat (formerly state threatened). Twenty amphibian/reptile species were observed during the field studies, and 42 species are known from the project area. Amphibian and reptile species encountered in the project corridor are considered common or abundant in the state, with the exception of the plains leopard frog.

In addition to the Preferred Alternative, many other projects and activities contribute to the cumulative impact (both adverse and beneficial) on wildlife biodiversity. Beginning with those activities that might adversely affect wildlife diversity, there are and will continue to be numerous wildlife-vehicle collisions. IDOT's 1-year roadkill survey found that 53 herptile and 389 mammal species had been killed by vehicles along IL 29. Clearly these numbers would increase if every road in the project area had been surveyed. As a representative picture of the problem, however, the survey results suggest that while substantial numbers of wildlife species are being killed by vehicles, the amphibian/reptile and mammal species being killed (deer, raccoons, opossums, squirrels) are abundant in the project area and are expected to remain so in spite of the collisions that may increase as traffic volumes increase.

A narrower range of wildlife species ("game species") are affected by hunting and trapping in the project corridor. Whether these activities maintain wildlife numbers or not, the fact that the number of game species taken annually is regulated by IDNR prevents this activity from adversely affecting wildlife biodiversity.

Discussions with local communities during the study about reasonably foreseeable projects that could affect wildlife biodiversity yielded a small number of projects. In the Henry area, there is the potential for a sand quarry and ethanol plant in the area of the industrial park and agricultural land near the industrial park. Both projects could include developing a new harbor on the Illinois River in the industrial park. Both projects would affect agricultural land or undeveloped industrial land and would likely have no effect on wildlife biodiversity. The harbor could have greater wildlife impacts caused by the potential loss of riverine wetlands and the disruption caused by dredging and the associated potential for sedimentation at and downstream of the harbor. Although impacts on wildlife from a new harbor could be greater than those of development in the industrial park, it is highly unlikely the impact would adversely affect biodiversity unless a protected species were affected by the project.

The planned development shown on Henry's and Chillicothe's future land use plans would occur in areas that are dominated by agriculture. As a result the direct impacts to wildlife and biodiversity would be minor. Chillicothe's plan calls for a small amount of residential development in the bluffs north of Hart Drive. Because of woodlands in that area, potential impacts to wildlife could be more noticeable there, such as developing a new harbor, but there would not be an adverse impact on wildlife biodiversity unless a protected species were affected. Development not guided by land use plans will occur in the project area. An example of this is the proposed Valley View Ridge subdivision north of Putnam. There are other examples west of Chillicothe. In general, if the individual lot developments or subdivision are converting agricultural land, there would be no impact on wildlife biodiversity. Development along the bluffs and in other forested areas would generally have greater effects on wildlife and possibly on biodiversity. Not only would there be the direct loss of forest (or grassland) habitat, but also in the case of bluff development, the resulting concentrated runoff can contribute to ravine erosion and habitat loss in the ravines. Because the wooded areas provide habitat for a large number of species, impacts to that habitat type has a greater potential to affect species that could adversely affect biodiversity.

More recently, the following large-scale land acquisitions and state and federal programs in the Illinois River valley have the potential to improve biodiversity in the project area:

- The teaming of Ducks Unlimited and the Illinois DNR to acquire and manage several parcels for wildlife habitat, including the Duck Ranch Unit (356 acres) in 2002, and Ducks Unlimited's acquisition of a primarily agricultural property south of Illinois 17 at Sparland (about 200 acres).
- The active management of public land such as Camp Wokanda and Singing Woods Nature Preserve (Peoria Park District) and Miller-Anderson Woods Nature Preserve (among others by IDNR) to restore the original habitat could have biodiversity benefits by increasing the numbers of a limited range of species that are currently found in small numbers in those areas, such as the neotropical migratory bird species.
- Various programs in the federal Farm Bill administered by the NRCS and FSA, including the Conservation Reserve Program, Conservation Reserve Enhancement Program, and Wetland Reserve Program, that are converting agricultural land into cover types that provide better wildlife habitat. In addition, federal and state funded programs designed to improve water quality and stream/riverine habitat, such as the work conducted on Senachwine Creek (south), may have side benefits for biodiversity.

The most visible example of biodiversity being enhanced in the general project area may be the Hennepin and Hopper Lake Restoration Project. According to the project's Web site, "after water was restored to the Hennepin and Hopper backwater lakes, surrounding marshes, wet-prairies, and forests species of birds, frogs, and aquatic plants that had not been seen on the site for close to a century reappeared. Among the birds were the Cattle egret, rarely seen north of St. Louis; an extraordinary number (1,600) of Bonaparte's Gulls; one of the largest concentrations of Franklin's gulls ever seen in Illinois; and the pied-billed grebe and black tern, both of which are state-threatened species, and 18 species of shorebirds. Soon after, muskrats, frogs, and other amphibians arrived on the scene. Wood ducks nested in the flooded woods at the edge of the property, and grassland birds, such as dickcissels, grasshopper sparrows, and eastern and western meadowlarks, exploited the uplands, where a mixture of native and exotic grasses spread across the former cropland."

The IDOT's planned purchase and transfer of 657 acres of property east of IL 29 and the railroad and 91 acres of upland forest to DNR will allow DNR to manage that property for the benefit of wildlife, thereby potentially increasing wildlife diversity in the project area.

In summary, although various projects and activities may reduce the numbers of various herptile, mammal, and bird species in the project area, the impacts do not threaten the continued existence of the species. Habitat conversion, pollution, and overharvesting clearly have reduced biodiversity in the project area, but there seems to be enough of a balance between activities that adversely affect and those that promote wildlife to make it fairly certain that the current state of biodiversity as observed during this study's field work will be maintained in the future.

3.13 Threatened and Endangered Species

3.13.1 Affected Environment

The threatened and endangered species assessment was accomplished through consultation with state and federal resource agencies, review of published and file information, and field surveys. Appendix A contains consultation and correspondence with the U.S. Fish and Wildlife Service (USFWS) concerning federal-listed species and the IDNR Agency Action Report concerning potential state-listed species within the project corridor. The USFWS Section 7 Consultation List (Appendix A; A-93) and the IDNR Natural Heritage Database were consulted to determine federal- and state-listed species that could occur in the project area. Correspondence from IDNR concerning the project's potential impacts on protected resources in found in Appendix A (page A-127). Flora and fauna surveys for federal- and state-listed species were completed in the project corridor between 2002 and 2004. Protected species survey results are summarized below.

3.13.1.1 Federal-Listed Species

Mammalian Species.

Indiana Bat (Myotis sodalis) *(federal and state endangered).* Indiana bat winter habitat consists of caves and mines where individuals hibernate (October through March) in characteristic dense clusters. Summer habitat (April through September) includes a variety of wooded settings (uplands, wetlands, and riparian).

Summer roosts (produce young in June and July) usually are located beneath the exfoliated bark of live and dead trees. The most important characteristic of roost trees probably is structural exfoliating bark with space for bats to roost between the tree's bark and bole. To a limited extent, tree cavities and crevices are also used for roosting. Maternity colonies use multiple roost trees. Each colony has at least one "primary" roost that is used intermittently and by fewer bats in times of extreme weather. A maternity colony may consist of a dozen or more roost trees. Tree species that have been used by Indiana bat maternity colonies in Illinois are slippery elm, northern red oak, shagbark hickory, bitternut hickory, white oak, American elm, sycamore, cottonwood and green ash. Indiana bats forage in and around tree canopies of floodplain, riparian, and upland forest. They also forage over old fields, along the borders of cropland and wooded fence rows, and over farm ponds in pastures. Bats feed exclusively on flying insects (IBRT 1999).

There are no records of the Indiana bat from Bureau, Marshall, Peoria, and Putnam counties. The project area contains 4,300 acres of forested habitat (forested wetlands and upland forests). Habitat in the project area contains a suitable mix of tree species and a high snag density. Mist-netting at nine sites throughout the project corridor during 2002 and 2004 were unsuccessful in capturing any Indiana bats, though 31 individuals of 5 other bat species were captured. Mist netting surveys conducted at seven sites within the project corridor in 1988, 1996, and 2000 caught bats, but none were Indiana bats.

The nearest sizable hibernaculum for Indiana bats to the project corridor is in LaSalle County, about 30 miles north of the project corridor. Clay and coal mining shafts are known to be abundant in the wooded hills from Chillicothe to north of Sparland (Exhibit 3-19). Such shafts can provide hibernation habitat for the Indiana bat; however, a walking survey revealed that mining shafts in the project area have been mostly sealed.

Gray Wolf *(Canis lupus)* (state threatened). A gray wolf was shot near Henry in December 2002. This individual is believed to be a lone animal traveling outside its home range (Wisconsin). Signs of the species were not observed during surveys of the project area. Based on these data, it is concluded that the gray wolf does not occur in the project corridor, and it is not discussed under Environmental Consequences.

Avian Species.

Bald Eagle (Haliaeetus leucocephalus) *(state threatened).* On June 28, 2007, the Secretary of the Interior announced the removal of the bald eagle from the federal list of threatened and endangered species. The delisting became effective on August 8, 2007. Though delisted, the bald eagle is still protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. To ensure that eagles continue to thrive, the USFWS will work with state wildlife agencies to monitor them for at least 5 years. The bald eagle remains a state threatened species in Illinois.

The bald eagle occurs in the northern part of the project area year around. Habitat includes wintering habitat, night roosts, night roost staging area, and nesting. During the winter (October through March) migrating bald eagles are present along the Illinois River and its adjacent lakes throughout the project area. Over the last 5 years, the numbers of wintering bald eagles (mature and juvenile) along the Illinois River has ranged from 437 (2004) to 1,049 (2002). The bald eagle prefers tall trees near rivers or reservoirs. Mature floodplain trees, often cottonwoods, are considered prime habitat. Eagles roost or nest in the upper branches of the tallest trees. Edges and openings in forests (riverbank, rangeland, cropland) are important for easy surveillance of food and accessibility. Large dead or dying trees also are frequently used as perches for similar reasons. Eagles feed primarily on small fish but also on small mammals, waterfowl (particularly when injured), small birds, and carrion (INHS 2000).

Winter night roosts generally offer bald eagles seclusion from human disturbance and protection from cold winds. At many roost sites, a windbreak is provided by the walls of a ravine. Two night roosts for bald eagles have been documented in Miller-Anderson Woods Nature Preserve west of IL 29. During the winter of 2003–2004, more than 50 bald eagles used the night roosts. During the winter of 2004–2005, about 53 eagles used the roosts.

Helicopter surveys for bald eagle nesting sites were performed on May 20, 2004, and June 1, 2005, along the Illinois River between Chillicothe and Hennepin. Of the 11 nests observed during these surveys, three (nests 6, 7, and 9) are located in the project area. Nest 6 was active in 2002 and 2003 but was not in 2004 or 2005. A ground survey on August 11, 2005, found the nest destroyed (in a pile on the ground). Nest 7 was new in 2004 but was not active in 2005. Nest 9 was new in 2005 (Enstrom 2004a, b; 2005). It is believed that a single pair of bald eagles may have been responsible for the construction of nests 6, 7, and 9 (Enstrom 2005).

Nest 6 occurred in a large cottonwood tree in a fence row between two agricultural fields 700 feet east of IL 29. Nest 6 is thought to have produced chicks in 2002 and 2003 based on adult eagle behavior consistent with the presence of chicks. Nest 6 was not active in 2004 and 2005. The nest may have been abandoned because of construction work on an adjacent levee during the spring of 2004. The nest was found on the ground in August 2005.

Nest 7 occurs within Miller-Anderson Woods and is 1,200 feet west of IL 29. The nest occurs in a large red oak tree on a steep east-facing slope. Nest 7 was new in 2004 and produced

two eaglets. The nest was not active in 2005. The nest is thought to belong to the pair of eagles that abandoned nest 6 and built nest 9.

Nest 9 was built in the spring of 2005 and is 900 feet east of IL 29. The nest occurs in a large cottonwood tree at the edge of a forested wetland bordering an agricultural field. A helicopter survey on June 1, 2005, indicated the presence of two nestlings in the nest. The nest is thought to be built by the pair of eagles that abandoned nests 6 and 7.

Plants.

Decurrent False Aster (Boltonia decurrens) *(federal and state threatened).* The decurrent false aster is a perennial plant that grows from one to five feet in height. It reproduces through both sexual and vegetative reproduction. The flowering periods occurs from July to October. The decurrent false aster is a big river floodplain plant species found typically in open wetland habitats. It favors full sun and is tolerant of somewhat disturbed conditions. The local biogeographic distribution of the decurrent false aster may depend in part on large river flooding events. It is restricted to relatively high light environments where the soils are frequently disturbed by long hydroperiod floods or plowing.

Eighteen decurrent false aster colonies were observed within the project area. The number of flowering stems within these colonies ranged from 1 to 46,260. Colony size and habitat occurrences for the decurrent false asters that occur in the project area are depicted in Table 3-55. Impacts to the decurrent false aster are discussed under Environmental Consequences.

TABLE 3-55
Summary of Generalized Locations and Characteristics of Decurrent False Aster Populations in the Project Area

Unique Population Identification Number	General Location	Population Size	Comments
BD #1	Marshall County	~5,800	Within Wetland #17 (edge of soybean field)
BD #2	Bureau County	19	Within Wetland #67 (margin of beaver pond)
BD #3	Bureau County	~46,000	Within Wetland #71 and #78 (margin of cornfield)
BD #4	Bureau County	2,235	Within Wetland #70 and #71 (edge of soybean field)
BD #5	Peoria County	~200	Within Wetland #3 (edge of railroad embankment)
BD #9	Peoria County	~20	Within Wetland #15 (edge of cornfield)
BD #10	Peoria County	~725	Within Wetland #16 (edge of field)
BD #12	Marshall County	~600	Within Wetland #16 (edge of cornfield)
BD #13	Marshall County	50	Within Wetland #16 (edge of cropfield)
BD #14	Marshall County	620	Within Wetland #17 (edge of cropfield)
BD #15	Marshall County	350	Within Wetland #26 (edge of soybean field)
BD #16	Bureau County	~10	Within Wetland #71 (marshy area)
BD #17	Bureau County	~20	Within Wetland #79 (edge of field)
BD #98	Peoria County	~25	Within Wetland #15 (edge of cropfield)
BD #99	Peoria County	1	Just North of Wetland #15 (edge of fence row)
BD #1994	Marshall County	~100	Within Wetland #31. In the Sparland Natural Area. (shore of Goose Lake, South)
BD #1998	Marshall County	~60	Within Wetland #16 (edge of cropfield)
BD #2000	Peoria County	NA	Just North of Wetland #3

Source: Illinois Natural History Survey (2003).

3.13.1.2 State-Listed Species

Mammals.

Franklin's Ground Squirrel (Spermophilus franklinii) *(state threatened).* Franklin's ground squirrel is a true hibernator and is active less than half of the year (April to September). It is diurnal and spends less than 10 percent of its life above ground. The most important habitat for Franklin's ground squirrel is a tall, dense cover of grasses, forbs, shrubs, and even small trees. They often occur along railroad embankments and some roadsides.

There are no museum specimens of the Franklin's ground squirrel from Bureau, Putnam, Marshall, and Peoria counties. Necker and Hatfield mention a record for Peoria County (in Hoffmeister), and a map by Mohr (1943) depicts observations in Peoria, Marshall, and Putnam counties from 1931 to 1942. There have been no published reports of the species in the project area since that time. Habitat that could support ground squirrels occurs in hill prairies and along some section of the Lincoln & Southern Railroad from Chillicothe to Putnam. No Franklin's ground squirrels were seen, heard, or live trapped at the survey sites. Based on this, we have concluded that the project will not affect the Franklin's ground squirrel.

Cerulean Warbler (Dendroica cerulean) *(state threatened)*

The cerulean warbler is listed as state threatened in Illinois. We are aware that the FWS lists this species as a "Species of Concern." It has gone through several reviews and data gathering, but it has never been listed as a Candidate Species nor has it been proposed for the listing. The cerulean warbler is a neotropical migrant that breeds in Illinois. Within Illinois, it is restricted to tall, diverse floodplain forests or white oak dominated slopes. The warbler occurs with greater frequency in forest tracts more than 500 acres in size and infrequently in wooded tracts less than 200 acres in size. It suffers from relatively high rates of nest parasitism by brown-headed cowbirds.

Rosenberg, Barker, and Rohrbaugh (2000) included a brief summary of the population of warblers in Illinois. In that report, Robinson and Vanderah indicate that there were 20 to 50 breeding cerulean warblers in the upper Illinois River valley. Robinson (personal communication with Natural History Survey) did indicate that he did not find breeding cerulean warblers in the project corridor. An Illinois Natural Heritage biologist sighted a cerulean warbler in Miller-Anderson Woods Nature Preserve in 2000. Miller-Anderson Woods, with its deep ravines and mature forest, has habitat similar to other areas in the state that support cerulean warblers. The Nature Preserve is part of a 500-acre forest area adjacent to the project area. Spring, summer, and fall avian surveys in Miller-Anderson Woods and other areas during 2002 and 2004 did not detect the presence of the cerulean warbler in the project corridor. For this reason, it is concluded that the project will not affect the cerulean warbler.

Reptiles and Amphibian.

Four-Toed Salamander (Hemidactylium scutatum) *(state threatened).* The four-toed salamander is quite rare in Illinois (Smith 1961). It occurs in scattered localities that are relicts of a time when forests covered much of northern Illinois and the distribution of four-toed salamanders was more continuous (Phillips et al. 1999). They are found in boggy pools or spring-fed ravines in undisturbed or mature deciduous forests. Several localities are in second-growth forests below dams of manmade lakes. A population of four-toed

salamanders recently was discovered about 18 miles north of the IL 29 project corridor. A forested ravine with seeps, springs, and a small stream is located in the northeasternmost part of the IL 29 corridor, this locality occurs just outside the project area. The ravine contains moss-covered logs adjacent to springs and seeps, which could contain four-toed salamanders.

Amphibian and reptile surveys were conducted in the project area during 2002, 2003, and 2004. The forested ravine mentioned in the preceding paragraph is the only area that could contain the four-toed salamander, but none was observed at the site during the 2002 and 2003 surveys. The forested ravine lies 1,600 feet outside the northern terminus of the project adjacent to Old IL Route 29. The project will not affect that area and, therefore, we conclude that the project will not affect the four-toed salamander.

Blanding's Turtle (Emydoidea blandingii) *(state threatened).* Blanding's turtle is both terrestrial and aquatic. The species typically nests in sandy dry habitat near various wetland habitats, such as emergent marshes, prairie wetlands, sedge meadows, and shallow vegetated lakes (Smith 1961, Phillips et al. 1999). In Illinois, Blanding's turtle is known from the northern half of the state (Smith 1961). A record of Blanding's turtle known from Peoria County deemed valid by Smith (1961) is from the mid-1800s. A shallow wetland (Wetland "W-52"; see Section 3.9, Wetlands, for more information) near the shores of Meridian Lake (near the northern part of the project area) was surveyed for the presence of Blanding's turtle. Suitable habitat was found there, but no individuals were observed. The presence of Blanding's turtle was not documented during field surveys of the project corridor in 2002 and 2004. It is concluded that suitable habitat for Blanding's turtles exists within the IL 29 project corridor. We conclude that the project will not affect the Blanding's turtle.

Plants.

Queen-of-the-Prairie (Filipendula rubra) *(*state endangered*).* Queen-of-the-prairie inhabits springy fens in the northern half of Illinois (Mohlenbrock 1986). Within the IL 29 project corridor, suitable habitat consists of wet seeps that border larger bodies of water. During floristic surveys, two populations of queen-of-the-prairie were identified, one within the project corridor and another within 1 mile of it. Both populations are within Bureau County and in wet seep habitat. One population, consisting of approximately 100 plants, is located in Miller-Anderson Woods Nature Preserve; the other, consisting of approximately 400 plants, is located in a seep east of IL 29.

The two populations of queen-of-the-prairie do not occur in areas that would be affected by the Preferred Alternative; the project will not impact this species.

Arrowwood (Viburnum molle) *(state threatened).* Arrowwood is a forest understory shrub occupying steep mesic forested ravines, rocky banks along streams, hillsides, and limestone bluffs in central and western Illinois. Arrowwood is known from seven counties in Illinois, mostly along or near the Illinois River, with a disjunct population known from Clark County in east-central Illinois. Arrowwood is easily located in the fall of the year, as its leaves change to a dark maroon color. Floristic surveys identified several populations of arrowwood in the project area in 2002 and 2004. Ten populations (Table 3-56) of this species were located to the west and north of Chillicothe. Population numbers ranged from one isolated individual to 2000 individuals (1,000 adult and 1,000 juveniles). This latter population covered an area of approximately 22 acres.

TABLE 3-56
Characteristics and Locations of Populations of Arrowwood

Unique Population Identifier	# of Individuals	Population Area (ac)	Location	Remarks
North Hampton	107	2.0	Henry Creek between confluence with Senachwine Creek and Krause Road	In mesic upland to floodplain forest; trees no more than 30 years old; southeast-facing bluff
Near Root Cemetery	2,000	22.5	Just west and southwest of Root Cemetery	In mesic upland to floodplain forest; trees no more than 60 years old; south-facing slope
Near Benedict Street bridge	50	1.1	North-facing slope above Senachwine Creek on east side of bridge	In mesic upland to floodplain forest; trees no more than 20 years old; north-facing slope
Northwest of Chillicothe	755	51.1	North side of Old Galena Road and along Senachwine Creek terraces	In mesic upland to floodplain forest; trees no more than 60 years old; south and west-facing slopes
West of Chillicothe	2	0.5	Along Hart Lane in a residential area	In mesic upland forest cove; trees no more than 60 years old; north-facing slope
North of Chillicothe	100-240	ND	North side of Hart Lane, slope above Senachwine Creek floodplain	In mesic upland to floodplain forest; trees no more than 60 years old; west-facing slope
Above Coal Creek Hollow	160	ND	South-facing bluff near Yankee Lane	Edge of second growth forest; past logging, ORV trails throughout
Yankee Lane	1	ND	Adjacent to Yankee Lane, 0.4 mile from IL 29	Highly disturbed, recently cut area

ND=Not determined

3.13.2 Environmental Consequences

Habitat for four federal or state listed species is known to occur in the project area. Three of the species (bald eagle, decurrent false aster, and arrowwood) have been observed in the project area. The fourth (Indiana bat) has not been observed in the area, but there is ample habitat for the species. Despite efforts to avoid encroachments into existing and potential habitat areas, construction within identified habitat will occur. The anticipated potential impacts to each identified species are discussed below.

3.13.2.1 Bald Eagle (*Haliaeetus leucocephalus*)

Project effects are described for nests 6, 7, and 9 and the winter roost. Nest 6 has been inactive for 2 years, and in 2005 it was found in a pile on the ground. Nest 7 has been inactive for 1 year, and nest 9 is new and is being used. The analysis includes nest 6, even though the nest no longer exists, because eagles may build a nest in the tree in the future. Similarly, nest 7 is being considered even though it has been inactive because it could become active in the future. Impact analysis for nesting and winter night roosting follows USFWS guidelines. A circle with a radius of 1,320 feet was established around each of the three nests. According to the guidelines, each circle was subdivided into primary, secondary, and tertiary zones. The primary zone extends to 330 feet from the nest, and recommends no human use within this zone year round. The secondary zone extends from 330 to 660 feet from the nest. Land use

activities involving clear cutting, land clearing, or major construction are prohibited. The tertiary zone extends from 660 to 1,320 feet from the nest and is the least restrictive. Most activities are permissible except during the nesting period.

Nests 6, 7, and 9 and the winter night roost occur near the north project terminus in the general area of the Miller-Anderson Woods Nature Preserve. In this area, IL 29 is aligned between nest 7 and the winter roost in the Miller-Anderson Nature Preserve and nest 9 (and the former nest 6) east of IL 29.

Construction within the area will consist of upgrading the highway to a 4-lane, divided, limited access highway. The typical section in this area consists of two 12-foot southbound lanes (existing roadway), a 22-foot median, two 12-foot northbound lanes, and a retaining wall on the east side (between the roadway and the railroad). Right of way will not be required from the Nature Preserve west of IL 29. A 2-acre permanent easement, and a 0.24-acre temporary easement will be required from the railroad east of IL 29. The area between the eastern embankment of the existing highway and the western embankment of the railroad is approximately 76 feet wide. The area is vegetated with trees dominated by cottonwood, box elder, Ohio buckeye, black locust, and hackberry. The vegetation screens the roadway from the railroad.

Construction in the area around Miller-Anderson Woods Nature Preserve will be limited to the right of way, including easements, and include addition of a 22-foot median, and two 12-foot lanes and retaining wall east of the existing roadway and west of the railroad. A total of 5.5 acres of existing highway and railroad right of way will be converted to highway use. This land is occupied by a 70- to 80-foot-wide strip of trees located between the existing highway and the railroad, as described above. Construction will include replacing a bridge with one that can be used as a wildlife crossing.

Taking into consideration the construction and operational aspects of the Preferred Alternative, the following potential effects are described using USFWS guidelines.

Nest Site 6. The project is located 700 feet west of nest site 6. The cover types within a radius of 1,320 feet include forested wetland, wet meadow, marsh, upland forest, pond, cropland, and railroad and roadway right of way. The project occurs within the tertiary zone. Within that zone, the project will remove a strip of upland trees (7.77 acres) that occurs east of the existing highway. Before nest 6 was destroyed, it and the tree supporting it were not visible from the highway. The proposed removal of trees between IL 29 and the railroad would make it potentially more visible from the new roadway. Construction and operation of the new roadway will not affect nest site 6.

Nest Site 7. The project is located 1,200 feet east of nest site 7. The nest occurs within or adjacent to the Miller-Anderson Woods Nature Preserve. The cover types within a radius of 1,320 feet include upland forest, old field, cropland, pond, residential, and railroad and highway rights of way. The project occurs within the tertiary zone. Within that zone, the project will remove a strip of upland trees (7.77 acres) that occurs east of the existing highway. After project construction, eagles would have to fly over a 4-lane roadway instead of a 2-lane roadway to reach the nest. Construction and operation of the new roadway will not affect the nest site.

Nest Site 9. Nest site 9 lies about 1 mile south of nest sites 6 and 7 and the winter night roost area. The site is 900 feet east of IL 29. The cover types nearby consist of cropland, forest wetland, nonnative grassland, and highway and railroad right-of-way. The nest is located in the tertiary zone and is visible from the roadway. Construction work in this area will occur west of the railroad and occur within roadside and nonnative grassland type habitats. Construction and operation of the new roadway will not affect the nest site.

Winter Night Roost. The winter night roost areas occur within the Miller-Anderson Woods Nature Preserve. These two areas are 1,200 feet west of IL 29. The roost areas are up-slope of the roadway and the intervening distance is mature upland forest. IL 29 falls within the tertiary zone. Project construction within this zone will remove 7.8 acres of trees between the roadway and the railroad. After construction of the roadway, bald eagles will have to fly over a 4-lane roadway instead of a 2-lane roadway to reach the winter night roost. Since the roosts are 1,200 feet from the roadway and are shielded by forest, it is concluded that the project will not have an affect on the bald eagle night roosts or the eagle's access to the roost.

Observations indicate that the eagles do not directly approach the winter night roost from the east. They generally approach a staging area on a staggered basis. The staging area is south of the roost site, located on a wooded ridge that runs southeast to northwest. Eagles use various trees on the ridge tops and slopes for perching before they enter the night roost. The southeastern part of the ridge occurs 500 feet west of IL 29, whereas the northeastern part is more than 1,200 feet from the roadway. The bald eagle staging area falls within the secondary and tertiary zones. The southeastern part of the wooded ridge is separated from IL 29 by a pasture/hayfield, whereas the northwestern part is separated by mature upland forest. Project construction in this area is limited to the area between the existing roadway and railroad. Construction and operation of the new roadway will not affect the bald eagle staging area.

We conclude, from the discussion of nest sites, night roosts, and staging areas above, that the project is not likely to adversely affect the bald eagle.

3.13.2.2 Decurrent False Aster *(Boltonia decurrens)*

The proposed roadway construction will not affect the colonies of decurrent false aster. However, IDOT proposes to purchase and preserve a number of parcels east of IL 29 and the railroad. The colonies associated with five of the farm fields located 220 to 300 feet east of IL 29 are BD1998 in field 1, BD12 in field 2, BD13 in field 3, BD14 in field 4, and BD12 in field 5. Exhibit 3-12 shows the fields, and Table 3-55 lists the colonies. IDOT proposes to create forested wetlands on three of the five farm fields containing decurrent false aster (fields 3, 4, and 5). Eventually this would lead to the loss of the three decurrent false aster colonies on these fields, comprising approximately 6,500 flowering stems. Field 1, containing colony BD1998, would not be affected by the wetland compensation plan. Field 2, containing colony BD12, is proposed to be used to mitigate the loss of colonies BD1, BD13, and BD14.

Based on the above discussion and the expansion of two colonies of decurrent false aster, it is determined that the project is not likely to adversely affect this species.

3.13.2.3 Arrowwood (*Viburnum molle*)

The Preferred Alternative will affect two stands of arrowwood. Those stands, identified in 2004, are located east of Root Cemetery and adjacent to the Benedict Street bridge east of the

creek (Table 3-56). A total of 11.5 acres of the 22.5-acre near the Root Cemetery population (Table 3-56) and 500 individual plants will be affected by the project. At the Benedict Street Bridge, the impact will affect 0.4 acre of this site and the loss of 20 individual plants.

The project near the Root Cemetery site will create a 15-acre landlocked parcel containing 1,500 individual arrowwood plants. This landlocked parcel will be purchased and turned over to the IDNR for management. This will establish a public reserve for arrowwood and provide a buffer to the Root Cemetery Nature Preserve. We conclude that the project will not adversely affect the arrowwood.

3.13.2.4 Indiana Bat (*Myotis sodalis*)

Although there are no Indiana bat records for Bureau, Marshall, Peoria, and Putnam counties, there are 4,300 acres of forested land within the project corridor. It has been determined that there are no hibernacula in the project area. Nine sites within the project area were mist netted during 2002 and 2004. Bats were captures at eight of the sites, but no Indiana bats were captured. Mist netting in previous years (1988, 1996, and 2000) in areas adjacent to the project corridor caught bats, but none of these were Indiana bats.

The project involves the removal of 123 acres of trees from six areas between west of Chillicothe to I-180. These wooded areas are described in Section 3.11.2.1. Most of the tree removal (67 acres) occurs on the existing IL 29 right of way. Most of the remaining tree removal occurs adjacent to the existing right of way except for the approximately 23 acres associated with the Chillicothe and Henry bypasses. Based on the lack of Indiana bat records for the project area and that most of the tree removal is associated with areas within or directly adjacent to the highway right of way, we conclude that the project is not likely to adversely affect the Indiana bat.

3.13.3 Measures to Minimize Harm and Mitigation

3.13.3.1 Decurrent False Aster (*Boltonia decurrens*)

As noted, IDOT will mitigate impacts to the decurrent false aster at field 2 located east of IL 29 and the railroad. The field (approximately 16 acres in size) contains colonies of decurrent false aster (BD12). IDOT will purchase the field and transfer it to IDNR for management and protection.

The *Decurrent False Aster Recovery Plan* published by the U.S. Department of Interior, U.S. Fish & Wildlife Service in 1990 lists three criteria for the recovery of this species. Criterion 2 states "Twelve geographically distinct self-sustaining natural or established populations of the species must be protected through purchase in fee, easement or by cooperative management agreements." IDOT's mitigation proposal would meet this criterion. Criterion 3 of the plan states "Populations must be monitored for a period of five years to determine if they are self-sustaining." To meet this criterion, INHS will monitor the decurrent false aster fields for 5 years.

Both the IDNR and USFWS reviewed IDOT's Biological Assessment/Detailed Action Report. The USFWS offered no additional comments pertaining to threatened and endangered species based on its review. The IDNR offered one recommendation: that the 500 adult and 500 juvenile state threatened arrowwood plants be moved, to the extent

possible, to an area of suitable habitat with the potential for long-term protection, such as the Galena road Gravel property that will be transferred to IDNR. IDOT will transplant as many of the saplings as practicable. The number of plants to be transplanted cannot be determined until the time of construction. Based on the implementation of this recommendation, the IDNR concurred that the Preferred Alternative would not adversely affect state threatened species, natural areas, or nature preserves.

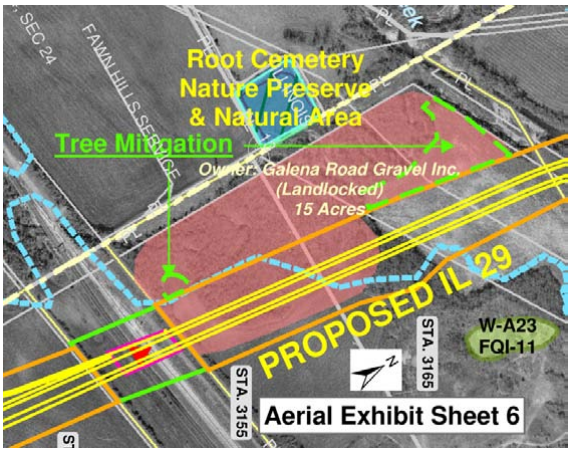
3.13.3.2 Arrowwood (*Viburnum molle*)

Approximately 500 adult and juvenile plants will be affected as a result of the Preferred Alternative. These impacts are unavoidable because of other constraints in the Truitt Road interchange area. Moving the alignment east would require crossing a mined part of the Galena Gravel Quarry, substantially increasing the project cost for the structure that would be required. Moving the alignment west not only would have greater impacts on agricultural land south of the interchange, it also would affect more arrowwood west of the population affected. Root Cemetery Nature Preserve is another constraint to moving west.

Several arrowwood plants located on property owned by Galena Road Gravel Inc. are in jeopardy of being destroyed by mining operations. The proposed improvement would landlock 15 acres of the property, thereby protecting the plants. The landlocked part of the property would be transferred to IDNR for future protection and management.

3.13.4 Indirect Impacts

As noted, the project's indirect impacts are expected to be limited to interchanges in project-area communities. The Western Avenue interchange in Henry is the northernmost and closest interchange to the known bald eagle habitat in the project area. The prohibition of development in the Miller-Anderson Woods Nature Preserve (the location of nest 7 and the winter roosts) and the expansive Illinois River floodplain east of IL 29 in the Miller Woods area (location of nest 9) make impacts to the bald eagle from secondary development very unlikely.



If the project's direct impacts to the Indiana bat are uncertain, its indirect impacts are equally or more uncertain. Tree removal associated with secondary development could theoretically affect the Indiana bat. However, given the overall lack of reasonably foreseeable development in the corridor, particularly in areas that would provide suitable Indiana bat habitat, it is reasonable to conclude that the project would have no perceptible indirect impact on Indiana bats.

The decurrent false aster has been located at the edges of farmed fields adjacent to the Illinois River floodplain. The general prohibition of developing in floodplains is an important deterrent to the plant's habitat being converted to another use by secondary development. Beyond that, the relatively limited secondary development envisioned in the project area is most likely to occur at interchanges distant from decurrent false aster populations.

Most arrowwood identified during field studies is located in a thin band north of the BNSF railroad in Chillicothe. The plants were located within the wooded Senachwine Creek (South) corridor and in wooded areas north and south of the creek. Chillicothe officials could not identify any reasonably foreseeable actions that would affect the known arrowwood populations. The fully access-controlled typical section in the Senachwine Creek (South) area will not promote adjacent development. Beyond that, there are several factors that limit the potential for unforeseen development to disturb the plant. The arrowwood in the Senachwine Creek (South) stream corridor should be protected from unforeseen development because of the improbability of construction occurring within the creek. The arrowwood in forested ravines may be at more risk from unforeseen development than the stream corridor population, but only marginally so. The most concentrated populations of arrowwood near the Preferred Alternative are located at the south and west edge of the Fawn Hills subdivision and immediately west of the alignment north of the BNSF tracks (north of Chillicothe). Near the Fawn Hills subdivision northwest of the Preferred Alternative, the plants are located in ravines that cannot be developed. The wooded area north of the railroad and west of the Preferred Alternative will be landlocked by the project. The landlocked parcel will be turned over to IDNR for permanent protection. Finally, Chillicothe's future land use plan contains a large area of recreation buffer that will permit only open space uses (Exhibit 3-8). The recreation buffer will directly protect a few plants and allow arrowwood to spread throughout the stream corridor.

3.13.5 Cumulative Impacts

Although the bald eagle population had dropped precipitously before the 1970s, it has risen since then as use of dichloro-diphenyl-trichloroethane (DDT) stopped and residues of DDT in the environment have diminished. The bald eagle population in the Upper Midwest is now at such a high level that it was removed from the federal list of threatened and endangered species, though it is still afforded protection by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The bald eagle is still a state threatened species. The critical issue for the continued growth of the bald eagle population within and beyond the project area is the ability to locate undisturbed nesting sites. The *Northern States Bald Eagle Recovery Plan* (1983), with its restrictions on activities that can occur near nests, appears to be successfully reducing disturbances near them. It should be noted that nest site 6 may have been abandoned because of construction in 2003 and 2004 around a small levee that is near the nest site. The nest is on private land. The nests that occur on private property can be subject to landowner maintenance activities. These types of disturbances could occur in other nesting areas, but these are land management activities that are independent of highway development.

Arrowwood is relatively rare in Illinois, but field surveys have revealed that several large populations are present within the project area. The species can be transplanted with good success. No relatively recent past actions or reasonably foreseeable future actions were uncovered that would adversely affect the arrowwood although clear cutting the wooded area on the Galena Gravel property east of Root Cemetery or mining in the area could adversely affect a large number of arrowwood. With the plant's preferred habitat being steep mesic forest ravines and rocky banks along streams and hillsides, continued residential development in the bluffs and the erosion that occurs in the forested ravines with and without development could also be threats to arrowwood. With pockets of arrowwood

identified in the Hart Lane area, development could threaten those plants. As noted, no specific residential developments in the bluffs that could affect arrowwood were mentioned by local municipalities. The only known proposed development near the Preferred Alternative—Valley View Ridge north of Putnam—does not coincide with known populations of the species.

Planning efforts such as the Mossville Bluffs Watershed Plan, which includes recommendations for addressing ravine and bluff erosion, are helping to preserve the habitat that arrowwood requires to flourish. Programs such as CRP and CREP, designed to prevent sedimentation into streams and stream bank erosion, may help to preserve arrowwood habitat along rocky banks adjacent to streams.

Field surveys for the decurrent false aster have identified several large populations within the project area. Its continued presence in the project corridor would seem to rely on the availability of its preferred habitat, the edge of cropped fields in floodplains. IDOT's proposal to purchase two agricultural fields in the Illinois River floodplain east of IL 29 as mitigation sites for the plant is intended to maintain or increase the current number of decurrent false asters within the project's footprint. Turning the mitigation fields over to IDNR for long-term management increases the likelihood of sustaining the decurrent false aster in the project area. Despite IDOT's planned mitigation efforts, it is important to remember that decurrent false aster is known to disappear and reappear, possibly as a result of dynamics between soil seed banks, flooding, and drought cycles. No recent past actions or reasonably foreseeable future actions unrelated to the project were uncovered that might have adverse or positive cumulative effect on the decurrent false aster population.

In addition to the species mentioned above, the project would not contribute to adverse cumulative impacts on the other protected species discussed in this section.

3.14 Designated Lands

3.14.1 Affected Environment

This section describes publicly owned land in the project area and privately owned lands identified as Illinois Natural Areas, Illinois Land and Water Reserve, Illinois Nature Preserve, National Wildlife Refuge, State Fish and Wildlife Areas, parks and other open space. The public land and privately owned natural areas are labeled and shown in green on the Aerial Exhibit.

3.14.1.1 Illinois Natural Areas

An Illinois Natural Area is an area of land in public or private ownership that the IDNR has identified as having a significant natural feature. Significant features include high quality natural communities, endangered species sites, relict species sites, outstanding geologic and aquatic areas, or unique natural features. Table 3-57 lists the six designated Illinois Natural Areas that exist within the project area and one just outside the project area. Three of the Illinois Natural Areas are privately owned, two are publicly owned, and two are in combined public and private ownership.

TABLE 3-57
Illinois Natural Areas in the Project Area

Natural Area Name	County	Aerial Sheet #	Natural Area #	Acres	Ownership	Function
Root Cemetery	Peoria	6	1494	2.5	Hallock Township	High quality mesic savanna.
County Line Hill Prairie	Peoria	8	213	71.9	Private	Glacial drift hill prairie.
Hopewell Estates Hill Prairie	Marshall	8	231	81.5	Private	Glacial drift prairies and woodland habitat.
Marshall County State Hill Prairie	Marshall	9	189	49.5	Public and Private	Contains three glacial drift hill prairies; there is also a noteworthy woodland/ savanna remnant associated with at least one of the glacial drift hill prairie complexes.
Sparland	Marshall	10, 11	1128	22.1	Public	Contains *Boltonia decurrens* (state and federal threatened plant species).
Oak Bluff Prairie	Marshall	—[a]	1559	15.2	Private	Prairie, dry-mesic savanna, and forest habitat.
Miller-Anderson Woods	Putnam/ Bureau	17, 18	382	473.5	Public and Private	Dry-mesic upland forest, mesic upland forest, sedge meadow, seep spring, and hill prairie. Contains bald eagle (*Haliaeetus leucocephalus*) nest (state threatened bird species), *Boltonia decurrens* (state and federal threatened plant species), and suitable habitat for the state-endangered *Filipendula rubra* (state listed endangered plant species).

Source: INHS and coordination with IDNR.

[a]Beyond extent of the Aerial Exhibits

3.14.1.2 Illinois Land and Water Reserves

The Register of Land and Water Reserves constitutes a land and water protection program wherein lands and waters supporting natural heritage resources or archaeological resources are recognized and given protection and stewardship. Part of the Marshall County Conservation Area Hill Prairies is formally designated as an Illinois Land and Water Reserve. The total acreage of the reserve is 42.9 acres. Natural communities include glacial drift hill prairies with surrounding savanna-like areas, woodland, and forest.

3.14.1.3 Illinois Nature Preserves

Areas designated as Illinois Nature Preserves are dedicated remnants of natural habitat included in *The Directory of Illinois Nature Preserves, Volumes 1 and 2* (McFall and Karnes 1995), with ongoing revisions. Illinois Nature Preserves are afforded the highest protection against future changes in land use by language in The Illinois Natural Areas Preservation Act. Generally, Illinois Nature Preserves are high-quality plant communities with a high degree of natural integrity and the potential to provide refuge for threatened and endangered species. There are five dedicated Nature Preserves within the study area (see Exhibit 3-30).

- **Singing Woods Nature Preserve** is a 900-acre property located on the bluffs north of Cedar Hills Drive and west of Ivy Lake Lane. The nature preserve designation applies to roughly 700 acres of the 900-acre parcel. Singing Woods is the largest contiguous tract of oak-hickory forest in the state north of the Shawnee National Forest. The preserve provides important migratory and breeding habitat for forest interior birds.
- **Root Cemetery Savanna Nature Preserve** is a 2.5-acre site located 1 mile northwest of the Chillicothe Corporate limits (Aerial Exhibit sheet 6). The preserve contains mesic savanna of the Illinois River section of the Upper Mississippi and Illinois River Bottomlands Natural Division.
- **Hopewell Estates Hill Prairies Nature Preserve** is an 8.3-acre parcel within the larger 81.5-acre Hopewell Estates Hill Prairies Natural Area. This property is located west of IL 29 on the bluff in the Village of Hopewell (Aerial Exhibit sheet 8). The area includes glacial drift prairies and woodland habitat.
- **Oak Bluff Savanna Nature Preserve** is a 5-acre site within the 15.2-acre Oak Bluff Prairie Natural Area (recognized on the Illinois Natural Areas Inventory (INAI) for a 1.5-acre dry-mesic savanna). The property is southwest of Henry. The nature preserve features prairie, savanna, and forest habitat representative of the Grand Prairie Section of the Grand Prairie Natural Division.
- **Miller-Anderson Woods Nature Preserve** is a 329-acre property located in Bureau and Putnam counties, just west of IL 29 (Aerial Exhibit sheet 18). The preserve contains natural communities representative of the Grand Prairie Section of the Grand Prairie Natural Division. The bluff area consists of old-growth oak-hickory upland forest with maple-basswood forest occurring in the eroded ravines. Other small communities such as sedge meadow, seep spring, and hill prairie add unique vegetation to the rich diversity. IDNR manages two parcels adjacent to Miller-Anderson Woods as buffer areas, but they are not part of the Nature Preserve.

3.14.1.4 National Wildlife Refuges and State Fish and Wildlife Areas

The object of the National Wildlife Refuge (NWR) system is to accommodate habitat needs for wildlife while maintaining public opportunities for outdoor recreation and education. The Cameron-Billsbach Division of the Chautauqua National Wildlife Refuge, which is administered by the U.S. Fish and Wildlife Service, is located along the Illinois River between Sparland and Henry (Aerial Exhibit sheet 12). The refuge is bisected by the Illinois River, creating two separate areas—the Cameron and the Billsbach units—that extend from river mile 192 to 195. The purpose of the refuge is to serve as a sanctuary for migratory birds. It is 1,708 acres in size. The Cameron Unit located on the west side of the Illinois River is 636 acres, and the Billsbach Unit on the east side is 1,072 acres.

The IDNR owns and operates the 6,000-acre Marshall State Fish and Wildlife Area that spans nearly 10 miles of Illinois River backwaters. It is divided into three units that support various outdoor pursuits, including camping, boating, fishing, picnic areas, and hunting:

- The Marshall Unit consists of 3,000 acres east of the Illinois River, adjacent to IL 26 south of Lacon. The area headquarters is found there, along with a small campground, boat ramp, fishing channel, hunter check station, and hiking trails. Terrain varies from ravine-cut bluffs to bottomland lakes, islands and sloughs.
- The Spring Branch Unit contains 1,642 acres on the west side of the Illinois river between Chillicothe and Sparland. There is a 6-acre picnic area, fishing, and access to hunting and hiking trails adjacent to IL 29. The habitat ranges from upland forest to river bottom to cropland.
- The Sparland Unit consists of 1,280 acres and is located between IL 29 and the Illinois River north of IL 17. This area is used predominantly as a waterfowl hunting area and for fishing.

3.14.1.5 Parks and Other Open Space

Camp Wokonda. Located off Boy Scout Road near Mossville, Camp Wokonda is a 276-acre facility owned by the Peoria Park District. It is a special use park available to school groups, scout groups, and civic groups. The camp's primary mission is as a resident outdoor education center for area schools and others. The property includes a lake, trails, dining hall, cabins, program buildings, and tent camping. The camp offers a variety of naturalist tours, environmental education, and rental options for retreats, family reunions, weddings, or special group camp outings.

Audubon Wildlife Area. Located off Old Galena Road north of the Caterpillar complex, the Audubon Wildlife Area is owned by the Peoria Park District and identified in the 2000 Peoria Park District Master Plan as a "Wildlife Preserve." The easternmost 78 acres are in the farming management program to keep the area clear of invasive vegetation. The remainder of the site is wetland. There is no specific master plan for the site. The Peoria Park District and the Peoria Audubon Society are investigating the feasibility of developing suitable habitat on some part of the site for shorebirds.

Senachwine Township Picnic Shelter. The township maintains a small picnic shelter on the former site of the Putnam town hall. The small open-air, one-story shelter with concrete slab floor is located west of IL 29, at the corner of Center Street and Main Streets in Putnam. The

site is available for community use. No organized athletic or other community activities are held at the site.

Baseball Field at the Former Putnam School. The baseball field and adjacent open space is on the property of the former Putnam Grade School located off High Street in Putnam. The Putnam grade school was closed in 1983, marking the end of the regular use of the school's baseball field. Since the school closed, Senachwine Township has owned the property and used it as the township hall and municipal garage. The baseball field and adjacent open space is roughly 2.7 acres. The baseball field is not used for any organized recreational activities, nor is it regularly used by Putnam's children. The field is not fenced except for the backstop. Because of the lack of use, there are no maintained features such as the infield limits or other "use marks" that would indicate the size of the field. The township cuts the grass on the baseball field and adjacent open space.[20]

3.14.2 Environmental Consequences

The effects of the Preferred Alternative on designated lands are described below. Direct impacts to designated lands are categorized into four impact types: proposed new right of way, proposed permanent easement, permanent impact within existing right of way, and isolated IDNR property. Proposed temporary easements are not considered a direct impact. The No-Build Alternative would not affect designated lands. Table 3-58 summarizes the direct impacts to designated lands discussed below.

TABLE 3-58
Summary of Direct Impacts to Designated Lands within the IL 29 Project Area

Designated Land	Land Type	Acres of Impact
Hopewell Estates Hill Prairie Natural Area	Natural Area	0.50
Marshall County State Hill Prairie Natural Area	Natural Area	0.73
Marshall State Fish and Wildlife Area—Spring Branch Unit	State Fish and Wildlife Area	
• Near the IDOT rest area		0.67
• North of Barrville, east of IL 29		0.39
• North of Barrville, west of IL 29		0.32
Marshall State Fish and Wildlife Area—Sparland Unit	State Fish and Wildlife Area	8.1

3.14.2.1 Illinois Natural Areas

The Preferred Alternative will affect two natural areas: Hopewell Estates Hill Prairies (INAI #231) and Marshall County State Hill Prairie (INAI #189). There will not be a direct impact at County Line Hill Prairie (INAI #213) or Sparland Natural Area (INAI #1128), because only a temporary easement will be necessary. See Exhibits 3-31 to 3-34.

County Line Hill Prairie Natural Area. The Preferred Alternative in the area of this natural area is expanding to the west. To limit impacts to the bluff and natural area, a concrete barrier is proposed adjacent to a short segment of the north end of the natural area. To provide the proper grading and drainage west of the barrier wall, the Preferred Alternative would require a 0.002-acre temporary easement within the natural area adjacent to the highway

[20] Information provided per a coordination meeting with Rhonda Downey, Senachwine Township Clerk, on November 18, 2004. See Section 5 Public and Agency Coordination.

right of way. The IDOT would not permanently acquire any property from the natural area. The IDNR has indicated that the proposed work in the buffer area associated with the temporary easement would not be considered a direct impact to the natural area. There would be no adverse impact to the function of the natural area, therefore, there will be no direct impact to the County Line Hill Prairie Natural Area.

Hopewell Estates Hill Prairies Natural Area. The Preferred Alternative will widen to the west in the area of the Hopewell Estates Hill Prairies Natural Area. Roughly 0.50 acre of Hopewell Estates Hill Prairies Natural Area adjacent to the highway would be acquired by the Preferred Alternative. A retaining wall is proposed to minimize impacts to the natural area. Of the 0.50-acre impact, 0.14 acre of new right of way would be acquired from the east edge of the natural area buffer. The new right of way would be acquired from an area containing shrubs and second-growth upland forest. The remaining 0.36-acre impact would be to the part of the natural area within IDOT's right of way. Impacts to this area would be to the mowed highway ditch, shrubland, and a strip of second-growth upland forest. There would be no adverse impact to the function of the natural area.

Marshall County State Hill Prairie Natural Area. Roughly 0.73 acre of Marshall County Hill Prairie Natural Area would be affected by the Preferred Alternative. Similar to the Hopewell Estates Hill Prairie Natural Area, the highway is being widened to the west, and a retaining wall is proposed to minimize impacts to the natural area. The 0.73-acre impact along the east edge of the natural area buffer is within the existing right of way. The impact would be to the highway shoulder and ditch and a strip of submature, second growth upland forest. There would be no adverse impact to the function of the natural area.

Sparland Natural Area. A temporary easement of 0.17 acre would be required to connect the improved Y-type driveway to the existing access point on IL 29. The temporary easement would affect the existing driveway, which provides access to a boat launch, and a 5-foot-wide buffer to allow grading. The driveway is between two wetlands but does not affect either wetland. There will not be a permanent impact to the Sparland Natural Area and no adverse impact to the function of the natural area. Therefore, there will be no direct impact to the Sparland Natural Area.

3.14.2.2 State Fish and Wildlife Areas

Marshall State Fish and Wildlife Area, Spring Branch Unit. The Preferred Alternative would affect three small areas in the Spring Branch Unit (Exhibit 3-35). One area is on the east side of IL 29 north of Chillicothe and south of IDOT's rest area. The access point to IL 29 would be closed and a new driveway connection made from the Spring Branch Unit to IDOT's rest area. The new connection would require 0.67 acre of right of way to provide access to the private field located to the south and 0.02 acre temporary easement. The second area in the Spring Branch Unit that would be affected is north of Barrville Creek on the west side of IL 29. By widening and extending the existing driveway the Preferred Alternative would acquire the entire 0.32 acre parcel owned by IDNR that is completely surrounded by IDOT's right of way. The third area is north of Hopewell, east of IL 29 at the IDNR boat launch. An area of 0.39 acre of new right of way would be acquired to relocate the railroad to provide a safe crossing less than 550 feet south of the existing driveway. A temporary easement of 0.23 acre would also be affected by construction of the proposed driveway. There would be no adverse impact to the function of the Spring Branch Unit.

Marshall State Fish and Wildlife Area, Sparland Unit. The proposed Sparland interchange would acquire 8.11 acres of the 1,280-acre Sparland Unit north of IL 17 and east of IL 29. The new right of way acquisition would sever the Sparland Unit, leaving a 3.6-acre parcel west of the proposed IL 29. The IDNR discussed the possibility of allowing its property east of Sparland to be used for bow hunting. Although the proposed improvements would remove a small amount of land that could have been used for deer hunting, there would be no adverse impact to the function of the Sparland Unit.

3.14.2.3 Land and Water Reserves

The Preferred Alternative would not acquire property from the Marshall County Hill Prairie Land and Water Reserve. A 0.01-acre temporary easement would be required to grade where the existing driveway would be removed. There would be no adverse impact to the function of the Land and Water Reserve.

3.14.2.4 Illinois Nature Preserves

The Preferred Alternative would have no direct impacts on any Illinois Nature Preserves.

3.14.2.5 National Wildlife Refuges

The Preferred Alternative would have no direct impact in the Cameron-Billsbuch Division of the Chautauqua National Wildlife Refuge.

3.14.2.6 Parks and Other Open Space

There would be no impact to Camp Wokanda or to the Audubon Wildlife Area, which are administered by the Peoria Park District.

Senachwine Township Picnic Shelter. In Putnam, the Preferred Alternative would widen IL 29 to the west and acquire a 16-foot-wide strip from the east edge of the Picnic Shelter property located north of Courtland Street. The acquisition would not affect the open-air shelter, which is 86 feet west of the proposed right of way. Alternative alignments to avoid the Putnam Pavilion property are discussed in Section 3.18.4.

Baseball Field at the Former Putnam School. The proposed improvements would affect 3 acres of the baseball field and adjacent open space at the former Putnam School to accommodate a realignment of High Street on the west and north sides of the baseball field, and improvements to IL 29 on the east side. Realignment of High Street would shift the proposed right of way up to 210 feet closer to the baseball field. The IL 29 improvements would shift the proposed right of way about 140 feet closer to the baseball field. The proposed improvements would acquire a strip of land 93 to 255 feet wide along the west and north sides of the property, respectively, and a 130-foot-wide strip from its east edge.

3.14.2.7 Section 4(f) Applicability

Table 3-59 summarizes the applicability of the Section 4(f) law to designated lands in the IL 29 project area. See Section 3.18, Section 4(f) and Section 106 Applicability, for a discussion of recreational and cultural resources in the project area. Section 3.3, Cultural Resources, identifies other historic and archeological sites within the study area that will not be affected by the proposed improvements.

TABLE 3-59
Summary of Section 4(f) Applicability for Designated Lands in the IL 29 Project Area

Designated Land	Ownership and Description	Section 4(f) Conclusion
Marshall State Fish and Wildlife Area	Owned by the IDNR. Primary use of the site is fishing, hunting and hiking.	FHWA concluded that Section 4(f) is not applicable to this property because the use is occasional (that is, the site is not managed as or planned to be a park or recreational area), and the site is not designated for the protection of specific wildlife species.
County Line Hill Prairie Natural Area	Privately owned land. Designated a Category I Natural Area: high quality remnants of the original natural communities of Illinois; glacial drift hill prairie.	Not applicable because the area is privately owned.
Hopewell Estates Hill Prairie Natural Area	Privately owned land. Natural area is designated Category I: high quality remnants of the original natural communities of Illinois; contains glacial drift prairies and woodland habitat.	Not applicable because this area is privately owned.
Marshall County Hill Prairie Land and Water Reserve	Owned by the IDNR. Primary designated use is to protect hill prairies (a plant reserve).	FHWA concluded that Section 4(f) is not applicable because the primary designated use of this property is plant reserve/ preservation. The site is not managed as or planned to be a park or recreational area, and it is not designated for the protection of specific wildlife species.
Senachwine Township (Putnam) Pavilion	Owned by Senachwine Township. Primary use is a meeting spot for area youth.	FHWA concluded that Section 4(f) is not applicable because the site is not significant as a park or recreation area.
Putnam Baseball Field	Owned by Senachwine Township. Primary use is baseball.	FHWA concluded that Section 4(f) is not applicable because the site is not significant as a park or recreation area.

3.14.3 Measures to Minimize Harm and Mitigation

Several road design strategies were used to minimize impacts to designated lands within the IL 29 project area. These strategies are summarized below, then described in more detail with respect to their usage near project area designated lands:

- **Split Profile**. Long stretches of the Preferred Alternative from the IDOT rest area north of Chillicothe to the IL 29/Camp Grove Road intersection have been designed such that proposed southbound lanes are higher in elevation than northbound lanes. This strategy reduces the expansion into the bluff and the impact on designated lands west of IL 29.
- **Narrowed Median**. A 22-foot median has been used adjacent to every designated land north of Chillicothe to reduce impacts. The standard median width in other areas of the corridor is 50 feet.
- **Retaining Walls, Barrier, and Guardrail**. Several retaining wall, barrier and guardrail designs have been incorporated into the Preferred Alternative to minimize the amount of new right of way required from designated lands and other uses.

3.14.3.1 Illinois Natural Areas

Hopewell Estates Hill Prairies Natural Area. The original design adjacent to the Hopewell Estates Hill Prairie Natural Area used a 22-foot median with all travel lanes at the same elevation and retaining walls with tie-back anchors used on the west side to minimize impacts to the bluff. The current design also uses the 22-foot median but with a spilt profile (southbound lanes up to 7 feet higher than the northbound lanes). Because the southbound lanes require less cut into the bluff, the retaining walls on the west side do not need tie-back anchors in the bluff.

The split profile concept alone reduced the impact to the natural area by 0.32 acre. Because the split profile concept does not require a tie-back anchor design for retaining walls, the need for the 0.29-acre permanent easement in the original design has been eliminated. Overall, the current design reduced the impact to the natural area to 0.50 acre.

IDOT will provide IDNR funding for use in restoring the hill side prairies.

Marshall County State Hill Prairie Natural Area. The original design adjacent to the Marshall County Hill Prairie Natural Area used a 22-foot median, with travel lanes at the same elevation and cantilever soldier pile retaining walls and soldier pile retaining walls with tie-back anchors. The current design uses the 22-foot median but with a spilt profile (southbound lanes are 7 feet higher than the northbound lanes). Concrete barriers, mechanically stabilized earth retaining walls, and cantilever soldier pile retaining walls (without tie-back anchors) would be used on the west side. Cantilever walls in the median may require tie-back anchors for stability.

The split profile concept alone reduced the impact to the natural area by 1.31 acres. Because the split profile concept does not require the tie-back anchor design for retaining walls, the need for the 0.69-acre permanent easement in the original design has been eliminated. Overall, the current design reduced the impacts to the natural area to 0.73 acre.

IDOT will provide IDNR funding for use in restoring the hill side prairies.

3.14.3.2 State Fish and Wildlife Areas

Marshall State Fish and Wildlife Area, Spring Branch Unit. The Preferred Alternative would affect three small areas in the 1,642-acre Spring Branch Unit. For the area on the east side of IL 29 north of Chillicothe, two designs were considered. The Preferred Alternative would use guardrail instead of a standard ditch on the east side to eliminate permanent impacts. The area in the Spring Branch Unit is north of Barrville Creek on the west side of IL 29. Alternatives to shift the alignment to the east and add retaining wall were eliminated; they were not practicable because of required relocation of the railroad. Replacing the existing driveway in kind also was reviewed. Coordinated efforts with IDNR resulted in widening and extending the driveway to provide for improved access to the IDNR property. At the third location, north of Hopewell at the IDNR boat launch, the proposed access would be replaced 550 feet south of the existing driveway because this has the results in the least impact to the INDR property. Along the entire segment, the median would be narrowed to 22 feet from the standard 50 feet.

Marshall State Fish and Wildlife Area, Sparland Unit. Because of the requirement to avoid flood buyout properties in Sparland, it was not possible to select interchange option 3,

which minimized impacts to the Sparland Unit. The proposed interchange design has a greater impact (1.14 acres) on the Sparland Unit and creates a severed parcel west of the proposed mainline 2.21 acres larger than that under interchange option 3.

3.14.3.3 Land and Water Reserves

Marshall County Hill Prairie Land and Water Reserve. The original design adjacent to the Land and Water Reserve used a 22-foot median, all travel lanes were at the same elevation, and retaining walls on the west side were cantilever soldier pile retaining walls and soldier pile retaining walls with tie-back anchors. The current design also uses the 22-foot median but with a spilt profile (southbound lanes are 7 to 10 feet higher than the northbound lanes). Concrete barrier and cantilever retaining wall would be used on the west side. The split profile concept alone did not reduce the impact to the Land and Water Reserve. The benefit of the split profile concept is that it allowed a change in the retaining wall design. Because the split profile reduces the wall height so that tie-back anchors may not be required, the need for the 0.44-acre permanent easement in the original design has been eliminated. Tie-backs may be required in the median wall, but it is not likely that the easements would extend into the Land and Water Reserve area. The design change eliminated all permanent impacts at the Land and Water Reserve.

IDOT will provide IDNR funding to be used in restoring the hill side prairies.

3.14.3.4 Additional Mitigation for Impacts to IDNR Property and Natural Areas

Four landlocked parcels located immediately west of IL 29 and north of IL 17 will be transferred to IDNR. These parcels are expected to total 32 acres. The exact area will be determined after the design phase of the project is completed. Jurisdictional transfer of 59 acres of IDOT property located adjacent to the landlocked parcels also is proposed. This would place a total of 91 acres containing oak upland forests with an FQI of 33.4 under the protection of IDNR. (Refer to Exhibit 3-21.)

Several parcels located east of IL 29, between the railroad and the Illinois River, will be purchased by IDOT and used to mitigate the project's environmental impacts. The parcels total 657 acres. The vegetative cover on the parcels consists of 57 acres of cropland, 321 acres of forested wetlands and 267 acres of backwater from the Illinois River. Land totaling 294 acres south of Sparland is of exceptional quality, with an FQI greater than 20. The 27 acres of forested wetlands north of Sparland are also of high quality with an FQI of 19. The land transferred to IDNR, along with two parcels currently owned by IDNR, will provide a continuous strip of IDNR land from roughly ¾ of a mile south of IL 17 in Sparland to Senachwine Creek north of Chillicothe. Transfer of these lands would increase IDNR land holdings in the unique environmental setting by 734 acres.

A landlocked parcel north of the BNSF Railroad and east of IDNR's Root Cemetery Nature Preserve and Natural Area is to be transferred to IDNR. Several populations of arrowwood (*Viburnum molle*), an Illinois threatened plant, are located on the 15-acre parcel. IDNR could expand the boundaries of the Root Cemetery Nature Preserve and Natural Area to encompass that land.

In addition IDOT has reached an agreement with IDNR to provide the following mitigation at the Miller-Anderson Woods Natural Area:

- Funding for restoration of a 15-acre old field community within the boundaries of Miller-Anderson Woods Nature Preserve
- Funding for weed control
- Removal of an abandoned barn
- Construction of a 40- by 60-foot gravel parking lot just off the Miller-Anderson Woods entrance road
- Transfer of excess right-of-way located at the south end of Miller-Anderson Woods Nature Preserve

3.14.4 Indirect Impacts

The Preferred Alternative would not have indirect impacts on designated lands owned by IDNR because IDNR would not allow private development on its property. The Preferred Alternative would not have indirect impacts at Hopewell Estates Prairies Nature Preserve, even though the scattered preserves are privately owned. Property owners are restricted from adversely affecting the nature preserves. Only the following designated lands have the potential to be affected by secondary development: County Line Hill Prairie Natural Area, Hopewell Estates Prairies Natural Area, the part of the Marshall County State Hill Prairie Natural Area that is privately owned, the Picnic Shelter property and ballfield in Putnam, and the Miller-Anderson Woods Natural Area.

Discussion with local communities did not identify reasonably foreseeable secondary development in privately owned natural areas that would be caused by the project. The natural area most susceptible to secondary development is the Hopewell Estates Hill Prairies Natural Area, simply because the site includes undeveloped platted lots in Hopewell. Although the Preferred Alternative is not expected to influence the attractiveness of Hopewell for continued development, its location toward the south end of the corridor and the availability of lots in an established community makes it plausible that some part of the natural area could support new residential development. Residential development could alter the natural features of the property to the extent that its natural area designation would be removed. There are no similarly compelling reasons to expect that the other privately owned natural areas would be logical locations for secondary development as a result of the Preferred Alternative.

While Putnam could approve new development on the Picnic Pavilion property and the ballfield, the lack of a development trend in Putnam makes secondary development on those publicly owned parcels unlikely.

3.14.5 Cumulative Impacts

Because no other projects or actions were identified that would affect the private or public designated lands in the project area, there will be no cumulative impact discussion for designated lands. The project's direct and indirect impacts on resources (surface water, wildlife, upland plant communities) found in the designated lands are discussed by natural resource topic throughout Section 3.

3.15 Special Wastes

3.15.1 Affected Environment

3.15.1.1 Hazardous

The Illinois State Geological Survey (ISGS) conducted a Preliminary Environmental Site Assessment (PESA) for special waste (hazardous and nonhazardous wastes) in the project area. The ISGS reviewed the USEPA listing of potential, suspected, and known hazardous waste or hazardous substance sites in Illinois (that is, the Comprehensive Environmental Response Compensation and Liability Information System [CERCLIS]) on March 15 and June 10, 2002, and July 22, 2004, to ascertain whether the project will affect any listed sites. Two archived CERCLIS sites were identified in the project area: Caterpillar Technical Center and Caterpillar Mossville Engine Center. The CERCLIS database, updated on April 14, 2004, was reviewed to identify new CERCLIS listings added since the reviews done as part of the PESA. No new CERCLIS sites in the project corridor were found.

3.15.1.2 Nonhazardous

As part of these investigations, the Office of the State Fire Marshall's underground storage tank (UST) database was reviewed for listings in the project corridor on March 15 and June 11, 2002, as was the IEPA's leaking underground storage tank (LUST) database on May 3 and October 18, 2002. ISGS identified 14 sites of environmental concern, all on or along the project corridor. The IEPA's LUST database, updated April 26, 2004, was reviewed to identify new sites added to the database subsequent to the issuance of the PESA. No new database changes were found.

3.15.2 Environmental Consequences

The Preferred Alternative will neither involve nor affect any CERCLIS sites.

The ISGS conducted three PESAs for special waste on May 17, 2002 (ISGS #1331), November 6, 2002 (ISGS #1331A), and August 20, 2004 (ISGS #1331B). Standards issued by the American Society for Testing and Materials (ASTM) indicate that property audits for special waste/regulated substance contamination should only be considered valid for a period of six months. Per BDE Manual, Chapter 27, Section 2.07, the district has re-evaluated the project area.

It has been determined that it is not necessary to complete a supplement PESA for the project. This determination was based upon a review of the existing land use throughout the proposed corridor. In addition, the EPA CERCLIS Hazardous Waste Site database and the IEPA Lust Site database were reviewed to determine the presence of any new sites within the project corridor. These searches did not uncover any new sites or significant land use changes within the project corridor; therefore, the PESAs dated May 17, 2002, November 6, 2002, and August 20, 2004, are revalidated effective July 31, 2006. Appendix A, State and Federal Agency Coordination, contains the PESA review memorandums.

The PESA assessment concluded that the Preferred Alternative could involve sites potentially affected by regulated substances and that not all the sites can be avoided. Sites that cannot be avoided include Site 1331A-25 in Chillicothe (see Aerial Exhibit sheet 6), Site 1331-G in

Chillicothe (sheet 7), Site 1331-21 in Sparland (sheet 10), and Site 1331-17 south of Henry (sheet 13). During a field review, two aboveground storage tanks were identified next to a commercial storage building between Sparland and Henry (see Aerial Exhibit sheet 12). This site was not identified in the PESAs noted above. Table 3-60 summarizes the excavation stipulations at the sites and nature of the proposed work in each area. IDOT has issued a waiver for additional investigations during this phase of engineering design. In subsequent phases, the sites will be programmed and tasked for Preliminary Site Investigations.

TABLE 3-60
Hazardous and Nonhazardous Special Waste Impacts

Site and ISGS Number	Type of Site	Comment
1331A-25	Railroad site (battery vault)	PESA stated no concern as long as no grading or excavation occurs at the site. This stipulation cannot be met. Excavation would be required for new bridge piers.
1331-21	Railroad site (battery vault)	PESA stated no concern as long as no grading or excavation occurs at the site. This stipulation cannot be met. Excavation would be required to reconstruct the intersection of IL 29 and Ferry Street.
1331-G	Pipeline site	PESA stated no concern as long as construction excavation and utility relocation do not exceed the maximum testing depth at each site and do not exceed 3 feet within 50 feet of soil boring 801-6B. This stipulation cannot be met. The pipeline would need to be replaced as part of the railroad viaduct reconstruction.
Aboveground fuel tanks between Sparland and Henry	Unknown	Two aboveground fuel tanks are located on a property between Sparland and Henry. The buildings and the tanks will be acquired by the Preferred Alternative. Soil testing to determine contamination level will be done prior to construction. The fuel tanks were not discussed in PESA.
1331-17	Commercial site	PESA stated no concern as long as no grading or excavation occurs at the site. This stipulation cannot be met. Excavation and grading would be required for new roadway paving and ditches.

Evidence from aerial photographs and Sanborn Fire Insurance Maps indicates that some buildings along the proposed right-of-way were constructed before 1972 and may therefore contain friable asbestos-containing materials as a component of floor tiles, wall and pipe insulation, roof materials, patching or painting compounds, ceiling materials or stove and furnace insulation. After the property is purchased and prior to construction, a Preliminary Site Investigation will be preformed at each building to determine if asbestos is present. If asbestos is present it will be removed according to established environmental regulations.

IDOT would manage and dispose of areas of contamination in accordance with applicable federal and state laws and regulations, and in a manner that would protect human health and the environment.

3.16 Permits / Certifications

Regulatory permits would be required with the proposed improvements. The permits would include:

- Section 404 of the Clean Water Act from the USACE

- Section 401 of the Clean Water Act Water Quality Certification from the IEPA
- Section 402 National Pollutant Discharge Elimination System (NPDES) Construction Permit from the IEPA
- Construction in Floodways of Rivers, Lakes, and Streams from IDNR, Office of Water Resources
- Notification of Demolition and Renovation permit from IEPA
- UST Permit from the Office of the State Fire Marshall

Section 404 of the Clean Water Act regulates the deposition of fill or dredged material into waters of the U.S. A Section 404 Permit from the USACE is required for the construction, expansion, modification, or improvement of linear transportation crossings in waters of the U.S. including wetlands. Nationwide Permit (NWP) 14, reissued effective March 2002, is applicable if the activity does not cause a loss of more than 0.5 acre of waters of the U.S. in nontidal waters and the length of fill is 200 feet or less. Where a road segment has multiple crossings of streams (several single and complete projects), the USACE considers whether it should use its discretionary authority to require an Individual Section 404 Permit. If more than 0.5 acre is affected or the length of fill is greater than 200 feet, an Individual Section 404 Permit is required. Table 3-61 lists the 17 resources, impacts, and likely permit type at those sites.

States are granted authority to review activities in waterways and wetlands and to issue water quality certifications under Section 401 of the Clean Water Act. A Section 401 Water Quality Certification is issued by the IEPA for all activities requiring a dredge and fill permit. Under the state's antidegradation policy, individual water quality certifications would be subject to public review. A project description and results of the antidegradation analysis would be posted on the IEPA Website for comment. Additional state agency requirements are established under the Illinois Interagency Wetland Policy Act of 1989. The act pertains to state-funded actions affecting wetland areas and establishes both procedures for agency coordination and a wetland mitigation policy for the State of Illinois. See Sections 3.8 and 3.9 for discussion of the impacts to water resources and wetlands from the Preferred Alternative.

The Preferred Alternative would disturb more than 1 acre of land area. Accordingly, a NPDES permit for stormwater discharges from the construction site would be needed. Permit coverage for the project will be obtained either under the IEPA General Permit for Stormwater Discharges from Construction Site Activities (NPDES Permit No. ILR10) or under an individual NPDES permit. Contractors would follow the requirements applicable to such a permit, including the preparation of a Stormwater Pollution Prevention Plan. Such a plan would identify reasonably expected potential sources of pollution that could affect the quality of stormwater discharges from the construction site. It also would describe and ensure the implementation of practices used to reduce pollutants in the discharges associated with construction site activity. The plan would help to ensure compliance with the terms of the permit. Construction activities related to the project are discussed in subsections 3.8.2, 3.12.2, and 3.13.2.

The IDNR's Office of Water Resources issues permits for work within regulatory floodways or public waters, and for the crossing of streams with more than 640 acres of drainage area.

TABLE 3-61
U.S. Army Corps of Engineers Dredge and Fill Permit Locations

Aerial Exhibit Sheet Number	Resource (Stream Crossing[a] or Wetland ID)	Impact in Acres	Likely Permit Type
1	W-C7	0.5	IND
1	**Dickison Run Tributary**	**Culvert**	**NWP 14**
1	**Dickison Run**	**Channel grading**	**NWP 14**
6	IL 29 Mainline	Piers (2)	NWP 14
6	Benedict Street	Pier (1)	NWP 14
7	IL 29 Connector	Piers (2)	NWP 14
7	**Coon Creek (Hart Lane Extension)**	**Piers (2)**	**NWP 14**
7	**Coon Creek (IL 29 Mainline)**	**Piers (2)**	**NWP 14**
9	**Unnamed Creek (south of Hopewell Dr.)**	**Channel grading**	**NWP 14**
9	**Rattlesnake Hollow Creek**	**Channel grading**	**NWP 14**
9	**Barrville Creek**	**Channel grading**	**NWP 14**
9	W-C16	0.2	NWP 14
10	**Gimlet Creek**	**Piers (2)**	**NWP 14**
10	W-B4	1.3	IND
10	W-26	1.4	IND
10	W-28	5.5	IND
10	**Thenius Creek**	**Pier lengthening and channel grading**	**NWP 14**
10	**Thenius Creek (over access road)**	**Channel grading**	**NWP 14**
10	W-30	1.1	IND
11	**Crow Creek**	**Piers (2)**	**NWP 14**
11	W-49	2.0	IND
12	W-52	2.3	IND
12	W-53	1.6	IND
12	North Crow Creek	140-foot culvert	NWP 14
17	**Senachwine Creek (North) (overflow structure)**	**Piers (2)**	**NWP 14**
17	**Senachwine Creek**	**Piers (2)**	**NWP 14**
17	W-57	2.5	IND
17	W-C2	0.03	NWP 14
18	W-68	0.2	NWP 14
18	W-73	0.7	IND
18	W-74	0.2	NWP 14
18	**Unnamed Tributary of Illinois River**	**Culvert**	**NWP 14**
	Total Wetland Impact	**20.0**	

NWP 14 = Nationwide Permit 14 IND = individual permit

The IDNR issues permits for incidental takes of state-listed threatened or endangered species. Because the Preferred Alternative would affect the arrowwood (*Viburnum molle*), a state-listed species, and the decurrent false aster (*Boltonia decurrens*), a federal and state listed species, this permit would be required. IEPA requires notification of demolition and renovation of structures. Because there would be building displacements with the proposed improvements, this permit would be required.

If the project requires the removal of USTs, an UST permit must be obtained from the Office of the State Fire Marshall. See Section 3.15 for information on hazardous and nonhazardous special wastes.

3.17 Visual Resources

3.17.1 Affected Environment

Throughout the project corridor, IL 29 follows the Illinois River terrain, although views of the Illinois River from IL 29 often are obscured by trees and residential and commercial development. The project area can be divided into three primary visual landscape units:[21] natural features, farmland, and small communities. The most striking visual characteristic of the project area is the contrast between the natural and manmade environments (for example, as seen in Chillicothe and Rome).

Although the project corridor traverses the Illinois River Valley, IL 29 and the proposed bypass areas have a fairly different visual character in many locations. Given the size of the project area, the description of the affected environment is separated by the existing and proposed relocated corridors and also by geographical areas. The entire length of IL 29 (from IL 6 interchange to I-180) has been described for continuity and as a point of reference, although from the IL 6 interchange to the north side of Chillicothe and through the town of Henry, the proposed improvements would be entirely on new alignment.

The analysis focuses on viewers and the visual resources that appear within the corridors. The views documented here are those that would be seen from the corridor by travelers (those using the highway) and those of the highway as seen by neighbors (those on property adjacent to the project.) It is important to note that for the part of the IL 29 corridor proposed to be on new alignment, no one sees the territory today from the road and few people see it from adjacent residences. Following is a summary of the land forms, land covers, and manmade developments on existing IL 29 followed by a description of the relocated IL 29.

3.17.1.1 Existing IL 29 Corridor

The land form throughout the corridor is flat to a combination of hills and ravines. IL 29 generally parallels the Illinois River Bluffs' bottomland forest, backwater lakes, and plains.

From the IL 6/IL 29 intersection to the town of Rome, the land cover is primarily a mix of deciduous woods to the east and cropland, stands of deciduous trees, and residential homes to the west. The highway is parallel to railroad tracks to the east and utility lines to the west.

[21] Landscape units are a framework for the assessment and management of visual resources and the effect of highway projects upon them. Based on visual characteristics, and responsive to regional differences in these characteristics, landscape units are a tool for mapping "outdoor rooms." (*Visual Impact Assessment for Highway Projects*, FHWA, Office of Environmental Policy, Publication Number FHWA-HI-88-054, March 1981).

The railroad tracks and utility lines generally parallel IL 29 for the length of the corridor. IL 29, which consists of two lanes in each direction separated by a grass median, crosses the viewshed of a number of residential units that front the highway to the west. As the town of Rome is approached, a mix of residential and commercial strip land uses can be viewed from the road. Views of IL 29 from residential areas not fronting IL 29 are obstructed by other development.

View of IL 29 in Rome; two lanes in each direction

From Rome through Chillicothe, views from IL 29 generally consist of various types of development, and deciduous street trees. In general the area can be considered moderately to fully developed. Through the center of Chillicothe, views are of a mixed-use nature, including residential areas and commercial developments. Commercial centers with detached buildings and parking in front are common. There are more buildings in this area than in any other urban area within the project area. There is very little visual cohesion in terms of signage, architecture, layout of parking lots, access to commercial sites, and so on. Residential neighborhoods of varying age are within the area. The view of IL 29 as seen from adjacent properties is that of a 4-lane urban highway with a bidirectional left-turn lane down the middle. Views of IL 29 from residential areas not fronting IL 29 are obstructed by other development. There are no proposed improvements along these parts of the corridor.

IL 29 in Chillicothe; two lanes in each direction with a bidirectional left-turn lane down the middle

IL 29; typical farmland view

North of Chillicothe (from the BNSF railroad tracks) to Yankee Lane, views include a mix of agricultural fields, stands of deciduous trees, and dispersed residential and other development. This segment crosses the flat Senachwine Creek floodplain then abruptly transitions to the Illinois River bluff to the west and the flat Illinois River floodplain to the east. Manmade developments include a petroleum terminal facility just north of the railroad viaduct, an entrance road to the Chillicothe Recreational Area, and scattered residences and farmsteads. IL 29 as viewed from adjacent properties is seen as a rural 2-lane highway.

From Yankee Lane to south of Sparland, the viewshed changes as IL 29 crosses the glacial drift hill prairies and wooded habitats. The most noteworthy landscape features in this segment is the 100- to 130-foot tall river bluffs on the west side of IL 29. Here views of the Illinois River bluffs and its associated natural areas are primarily of densely wooded areas. The sloping terrain of the bluff immediately to the west of IL 29 and density of deciduous trees, similar to the other natural areas further north along the corridor, offer user visual relief in a region where the predominant vegetation is row crops. The topography and vegetative cover limit views of IL 29. IL 29 crosses a viewshed of only a few homes. The roadway as viewed from adjacent properties is seen as a rural 2-lane highway.

IL 29 and bluffs rising to the west, looking north

Where IL 29 passes through Sparland, the land cover is primarily a mix of deciduous woods, residences, and small commercial developments. The residences that front IL 29 are primarily small single-family detached homes with grass lawns in front. The commercial establishments are detached buildings, typically with unpaved parking in front or to the sides. Several blocks west of IL 29, the land form begins to rise along the bluff. Second and third tier homes from IL 29 have a view towards the Illinois River.

IL 29 in Sparland

North of Sparland to Henry, the land cover returns to a mixture of wooded river bluffs, row crops, small clusters of single family and mobile homes, and industrial development. The bluffs rise to the west of IL 29 at the north edge of Sparland. As the facility curves to the northeast toward Henry, the bluffs recede into the background as the land form returns to level plain. IL 29 as viewed from adjacent properties is seen as a rural 2-lane highway.

IL 29; near view includes wetland complexes to the east and farmland to the west; distant view of the bluffs

There are no proposed improvements through Henry. The proposed facility is located 0.5 mile west of existing IL 29 (see 3.17.1.2, Relocated IL 29 Corridor). Existing IL 29 passes to the west of downtown Henry. Views from IL 29 in this section include residential homes and small commercial developments. Residential homes are primarily small single-family detached homes, although an apartment building is within the viewshed of IL 29. The

commercial establishments are detached buildings, typically with parking in front or to the sides of the buildings. Public facilities within the viewshed of IL 29 are the Henry-Senachwine Consolidated High School and the County Fair Grounds. On the north side of Henry, views to the east include industrial/manufacturing buildings within the industrial park along BF Goodrich Road.

View of IL 29 in Henry

There are no proposed improvements through Henry. The proposed facility is located 0.5 mile west of existing IL 29 (see 3.17.1.2, Relocated IL 29 Corridor). Existing IL 29 passes to the west of downtown Henry. Views from IL 29 in this section include residential homes and small commercial developments. Residential homes are primarily small single-family detached homes, although an apartment building is within the viewshed of IL 29. The commercial establishments are detached buildings, typically with parking in front or to the sides of the buildings. Public facilities within the viewshed of IL 29 are the Henry-Senachwine Consolidated High School and the County Fair Grounds. On the north side of Henry, views to the east include industrial/manufacturing buildings within the industrial park along BF Goodrich Road.

IL 29 at Miller-Anderson Woods, near view includes tree stands and wetland complexes; far view is of rolling forested hills

There are no proposed improvements through Henry. The proposed facility is located 0.5 mile west of existing IL 29 (see 3.17.1.2, Relocated IL 29 Corridor). Existing IL 29 passes to the west of downtown Henry. Views from IL 29 in this section include residential homes and small commercial developments. Residential homes are primarily small single-family detached homes, although an apartment building is within the viewshed of IL 29. The commercial establishments are detached buildings, typically with parking in front or to the sides of the buildings. Public facilities within the viewshed of IL 29 are the Henry-Senachwine Consolidated High School and the County Fair Grounds. On the north side of Henry, views to the east include industrial/manufacturing buildings within the industrial park along BF Goodrich Road.

View of IL 29 in Putnam; Rumhold & Kuhn grain elevator to the east (right)

North of Henry to Putnam, the most common view is agricultural land. Because of the topography there are few noteworthy distant views. Through Putnam, the land cover includes a mix of industrial, commercial, and residential development. Views from IL 29 include several large grain elevators, small commercial establishments and a few single-family residences. The historic Condit House, listed on the National Register of Historic Places, is about 400 feet west of IL 29. It has a partially obstructed view to IL 29. As viewed from adjacent properties, IL 29 is seen as a rural 2-lane highway.

View of Caterpillar Mossville Plant to the north and bluffs to the west (left)

North of Putnam IL 29 crosses Senachwine Creek floodplain. The most common view north of Putnam is agriculture fields (including the centennial Shady Bluffs Farm), until the traveler reaches the Miller-Anderson Woods Nature Preserve. Land cover through the area distinctly changes to include a mix of upland forests, meadows, and wetlands, a pleasant visual environment for travelers. There are no residences adjacent to the highway in the Miller-Anderson Woods area.

Ground level view of proposed relocated IL 29 as the improvements extend northeasterly toward IL 29

3.17.1.2 Relocated IL 29 Corridor

The land form along the relocated IL 29 corridor is predominantly level plain.

View north along the proposed relocated IL 29 alignment; west of existing IL 29 in Henry

From the IL 6 interchange, west of Rome to north of Chillicothe the land cover includes a mix of cropland, farmsteads, residences, and industrial developments. Large stands of oak–hickory forest situated on the Illinois River bluff are the only notable views of natural elements. Views of the manmade developments are dispersed across the agricultural landscape. From the corridor they include the large industrial complex of the Caterpillar Mossville plant, Buckeye Terminal and its bulk storage facilities, a transmission line off Truitt Road, a farmstead on Rome West Road, the Galena Knolls subdivision, Galena Road Gravel (a gravel quarry operation), the BNSF railroad tracks and Senachwine Creek. Near the Galena Knolls subdivision, the proposed roadway crosses within 800 feet of the northwestern corner of the subdivision. In Chillicothe, Knox

Street is being extended though a field north behind a line of residents on Rome West Road. In both locations, views to the corridor are limited to the backyards of residents adjacent to the proposed improvements.

The Preferred Alternative crosses farmland west of Chillicothe, then follows the terrain northeasterly below the Illinois River bluffs to north of Chillicothe. The land cover is a mix of cropland, isolated residences, stands of trees on sloping terrain/bluffs, recreational and industrial developments. There, the relocated corridor leaves the flat Senachwine floodplain and connects to existing IL 29.

Improvements follow existing IL 29 from Crow Creek until south of Henry. The relocated corridor in Henry would cross Western Avenue, Old Indian Town Road, Whitefield Road, 300N Road and Dry Hollow Creek 0.5 mile west of existing IL 29. Views from the facility would predominantly be flat farmland, mostly used for row crop production. The corridor passes the viewshed of several farmsteads and residences along Western Avenue. Approximately 500 feet east of the corridor are the Calvary and St. Patrick cemeteries.

3.17.2 Environmental Consequences

The No-Build Alternative would not affect the visual characteristics of the project area.

Construction of the IL 29 improvements would affect the visual characteristics of the project area, including travelers with views from the highway (local traffic, commuter traffic, tourist traffic) and neighbors with views of the highway (adjacent residences, recreational). This assessment provides a general overview of visual effects in the project area, then focuses on the change in views at visually sensitive locations, primarily from residences along the corridor and to and from the natural areas along the corridor.

3.17.2.1 Visually Sensitive Locations

Visually sensitive locations were identified for their visual quality, cultural significance, or viewer characteristics. Overall, visual impacts from the proposed highway are minor. The project crosses the viewsheds of several residences, natural areas, and parklands. Most residences are isolated farm structures, clustered residential homes, or part of the communities that the proposed improvements pass through. Residences with views of the proposed improvements are located at:

- IL 6 interchange (Dickison Lane)
- Old Galena Road
- Rome West Road
- Galena Knolls subdivision
- Truitt Road
- Ratliff Road
- IL 29 just south of the BNSF railroad
- Boehle Road
- Crew Lane
- Hopewell
- Sparland
- North of Sparland along 1100E Road
- North of Crow Creek along 1025N
- Boy Scout Road
- Wayne Road
- Krause Road
- Cloverdale Road
- Military Road (Fawn Hills subdivision)
- Hart Lane
- Yankee Lane
- Hardscrabble Road
- North of Crew Lane on IL 29
- Barrville Drive (south of MSFWA)
- Whiffle Tree House
- Camp Grove Road
- 1150N (Old Route 29)

- Western Avenue
- Putnam
- Whitefield Road (1450N)
- Adjacent to Brewmaster's Supper Club

Where applicable, views from residential homes with similar effects under the proposed improvements are grouped together. The Preferred Alternative also crosses the viewshed of the following natural areas and park lands:

- Audubon Wildlife Area
- Spring Branch Unit of the Marshall State Fish and Wildlife Area
- Sparland Unit of the Marshall State Fish and Wildlife Area
- Root Cemetery Nature Preserve and Natural Area
- County Line Hill Natural Area
- Marshall County Hill Prairie Land and Water Reserve and Natural Area
- Miller-Anderson Woods Natural Area and Nature Preserve
- Hopewell Estates Hill Prairies Natural Area and Hopewell Hill Prairies Nature Preserve

From the highway, visually sensitive locations generally coincide with the natural areas and parklands adjacent to the improvements. The effect for highway users is described in subsection 3.17.2.3, Visual Effects.

3.17.2.2 Visual Character of the Proposed Improvements

Design features of the proposed improvements include cuts in and fills on the existing terrain, the paved highway surface, bridge structures, retaining walls, and guardrails. Where lighting exists along the corridor, it will be replaced in kind. The project would clear existing vegetation within the existing and proposed rights of way at various locations along the Preferred Alternative. Cut and fill locations and other features vary along the project corridor.

3.17.2.3 Visual Effects

This subsection addresses the visual change that would result from the improvements and its potential effect on viewer groups. The views were evaluated for their potential to alter near or distant views of the roadway and views from the roadway. The discussion begins with a general overview, then highlights potential changes at specific sensitive locations.

General Overview. The visual impacts on the landscape would tend to be greater at locations where the Preferred Alternative is on new alignment. The footprint of the relocated facility generally would be 118 feet wide—a new element in a rural landscape that is predominantly farmland. In contrast, improvements along existing IL 29 typically would consist of an additional 34 feet of paved surface and a barrier median on a landscape that already consists of transportation facilities. The visual impacts would tend to be greater within the small towns than in the rural areas outside the communities.

The Preferred Alternative starts at the IL 6 interchange bypassing the communities of Mossville, Rome, and Chillicothe to the west. That segment, on new alignment, would introduce a new roadway and interchanges into a landscape that is predominantly farmland. North of Chillicothe, the proposed alignment connects to existing IL 29 where it passes between wooded bluffs to the west and the Illinois River to the east, and skirts the town of Hopewell. The hilly, forested area of the bluffs provides scenic variety for motorists.

In Sparland, the proposed IL 29/IL 17 interchange would have a pronounced effect on the small town landscape. The views of the Illinois River Valley from residential homes on the bluff west of IL 29 would include the elevated interchange structure. North of Sparland the views return to agricultural lands and continue through the proposed Henry bypass. In Putnam the small town landscape would be affected by the improvements displacing the first row of residential homes in the community. North of Putnam the Preferred Alternative would have minimal visual impacts on the landscape in the project area. The addition of two lanes would increase the scale of the highway, but the generally flat, open terrain adjacent to the highway would diminish the visual impact of the proposed improvements.

Visually Sensitive Locations. The proposed improvements would have the following visual effects at the visually sensitive locations identified in subsection 3.17.2.1 and illustrated on the Aerial Exhibits.

IL 6 Interchange. The proposed improvements would add a new frontage road from Mossville Road, west of the loop ramp and mainline at the IL 6 interchange. The IL 6 loop ramp would be reconstructed and shifted to the west. The paved surface area of the IL 6 mainline would not change in this location. The frontage road and reconstructed loop ramp would be built at approximately the existing ground level (see Aerial Exhibit sheet 1). The new frontage road would be visible from nearby homes. There would be minimal change in views of the reconstructed loop ramp. The right of way for the new frontage road is owned by IDOT and currently farmed. Views of farmland from nearby homes along Mossville Road would be replaced by 22 feet of paved surface of new frontage road.

Boy Scout Road. The proposed improvements include relocating IL 29 and a western frontage road providing local access between Mossville Road and Cedar Hills Drive. The right of way for the relocated facility is owned by IDOT and currently farmed. Within the proposed right of way, approximately 22 feet would be paved for the frontage road and 100 feet for the mainline. The proposed facilities would be elevated about 10 feet above the existing ground line at Boy Scout Road to accommodate bridge structures over the adjacent Dickson Run (see Aerial Exhibit sheet 1). The view of farmland from a nearby residence about 800 feet west of the frontage road would be replaced by fill near Dickison Run, and the paved surface of the frontage road and IL 29 mainline.

Audubon Wildlife Area. The site consists of a 78-acre agricultural field and a 20-acre wetland complex located at the west edge of the parcel. The proposed improvements run from southwest to northeast, from 1,900 feet south of the southwest corner of the parcel to the southeast corner of the parcel at Old Galena Road. The proposed facility is grade separated over Old Galena Road, about 22 feet above the property from 1,100 feet west of Old Galena Road to 1,300 feet east of Old Galena Road (see Aerial Exhibit sheet 2). Although there are no existing or proposed public use facilities at the site, the uninterrupted views of farmland would be replaced by more limited views of farmland and views of the bridge over Old Galena Road and its associated approach fill. Because of the alignment of the Preferred Alternative and the elevation of the highway, there would be a full view of the parcel from the proposed alignment. This view would be a notable change from existing conditions, where there is a limited view of the property from its east boundary on Old Galena Road.

Old Galena Road. The proposed alignment would cross Old Galena Road on a bridge that is approached on fill (see Aerial Exhibit sheet 2). The Preferred Alternative would interrupt the views of farmland at one farmstead located 500 feet north of the improvement.

Wayne Road, Rome West Road, and Krause Road. The proposed IL 29 alignment runs from southwest to the northeast across Wayne Road, Rome West Road, and Krause Road. The improvements includes a mainline, two ramps providing local access from Wayne Road to Rome West Road, and an extension of Wayne Road that connects to Krause Road. Wayne Road would be removed at the location where it is crossed by the proposed alignment. Rome West Road would be elevated approximately 15 feet over the proposed mainline (see Aerial Exhibit sheet 3). The right of way is predominantly farmland. Views of paved surfaces, fill, and bridge structure of Rome West Road would replace existing views of farmland as seen from nearby farmsteads. The Wayne Road extension would be located immediately south of two residences, altering the view of an expansive agricultural field.

Galena Knolls Subdivision. East of Krause Road, the proposed improvements pass within 800 feet of the northwest corner of the Galena Knolls subdivision at its closest point (see Aerial Exhibit sheet 4). Views of farmlands from the backyards facing north and west would be replaced with paved surface generally following the existing topography.

Cloverdale Road. Cloverdale Road would be grade separated over the Preferred Alternative. To minimize the impacts of the fill slope on residential properties on the south side of Cloverdale, the road would be realigned about 75 feet north of existing homes (see Aerial Exhibit sheet 4). The north view of residents on Cloverdale, which today is agricultural fields, would be replaced by views of the overpass fill. Views of farmlands would be interrupted by the paved surface of the IL 29 mainline as it passes to the east of several homes fronting Cloverdale Road.

Truitt Road. The improvements include the relocated IL 29 facility and an interchange. Truitt Road would be grade separated over IL 29. The elevation of the fill on Truitt Road would begin to rise 1,100 feet west of the proposed IL 29 to 1,500 feet east of IL 29, rising to about 17 feet in elevation at IL 29 (see Aerial Exhibit sheet 6). One farmstead would be displaced. The right of way includes farmland and land owned by the Galena Road Gravel mining operation. Views of farmland from one residence 600 feet west of the right of way would be replaced by the approach fill along Truitt Road, and paved surfaced of the relocated IL 29 and off ramps to the east.

Root Cemetery Nature Preserve and Natural Area The 2.5-acre Root Cemetery Nature Preserve and Natural Area is 600 feet west of the proposed improvements (see Aerial Exhibit sheet 6). The vegetation between the Nature Preserve/Natural Area and proposed improvements would continue to obstruct views from the Nature Preserve/Natural Area to the proposed improvements.

Military Road (Fawn Hills Subdivision), Ratliff Road. Several residences of the Fawn Hills subdivision and along Ratliff Road overlook the farmed valley north of Chillicothe (see Aerial Exhibit sheet 6). Although the proposed alignment would be more than 100 feet below the homes, the facility would be a considerable change to the foreground views of the valley. One residence, south of the Fawn Hills subdivision, would be displaced.

Chillicothe Recreation Area. The Chillicothe Recreation Area, a former gravel mining pit, is located between Benedict Street and existing IL 29 (see Aerial Exhibit sheets 6 and 7). Improvements adjacent to this area would be constructed on fill along the IL 29 mainline

and IL 29 connector (that is, existing IL 29). Given the dense vegetation and topography of the site, there would be limited views of the proposed improvements.

Hart Lane. Several residences on Hart Lane east of Benedict Street overlook the farmed river valley north of Chillicothe (see Aerial Exhibit sheet 7). The proposed alignment would be built approximately at ground level, or 40 feet below the grade of Hart Lane. Foreground views of farmland would include 100 feet of the paved surface of the proposed improvements and interchange.

IL 29 Just South of the BNSF Railroad Tracks. In this area, IL 29 would be expanded from two to four lanes at approximately existing grade (see Aerial Exhibit sheet 7). Three homes and two mobile homes would be displaced by the improvements. Homes in this area face a local street perpendicular to IL 29. Views of the paved surface from the side and front yards of adjacent homes would increase by approximately 24 feet.

Yankee Lane, *Boehle Road*, *Hardscrabble Road.* The proposed improvements include replacing existing IL 29 and the interchange with the proposed "relocated" IL 29 alignment. A frontage road would be built to provide access to a residence and business west of IL 29, and Hart Lane and Boehle Road would be upgraded and realigned. South of the relocated Boehle Road, and for a short distance north of the relocated Boehle Road, existing IL 29 would be removed (see Aerial Exhibit sheet 7). The interchange and its associated local improvements would substantially change the view for neighboring homes. Views of IL 29 and farmland would be replaced by views of frontage roads and the paved surface, fill, and bridge structure associated with the interchange.

Opposite Boehle Road and east of the proposed alignment, a new frontage road would provide access to the Chillicothe Driving Range and Yankee Lane on what is flat farmland (see Aerial Exhibit sheet 7). The views of IL 29 would be replaced by the paved surface of the frontage road, and the paved surface and fill of the proposed alignment.

Crew Lane. The proposed improvements near Crew Lane shift to the west to avoid impacts to the Marshall State Fish and Wildlife Area (see Aerial Exhibit sheet 8). Four homes between Crew Lane and the proposed improvements would be displaced. Homes with property backing to the west side of Crew Lane would continue to have limited to no view of the proposed improvements, given the topography and dense vegetation/trees in the area. Homes fronting Crew Lane to the west would continue to have foreground views of Crew Lane, and their view of the paved surface of IL 29 would increase.

County Line Hill Prairie Natural Area. The proposed improvements would run parallel to the 72-acre County Line Hill Prairie Natural Area for a short segment near the northeastern corner of the parcel (see Aerial Exhibit sheet 8). The natural area is part of the river bluff, which at its highest point is more than 100 feet higher in elevation than the proposed improvements. This natural area is on privately owned properties. There are no developed facilities in the area for viewing, although one residence is adjacent to the natural area. Given the topography and density of deciduous trees the view of the proposed improvements from the natural area would be limited, similar to the existing view of IL 29.

The proposed improvements expand the paved surface and include a split profile for northbound and southbound traffic. Southbound traffic will be at a higher elevation than northbound traffic. Views from southbound traffic to the natural area would include a

concrete barrier approximately 3.5 feet high in the foreground. Given the split profile, additional paved area, and a new retaining wall in the median, manmade structures would become more prominent in the foreground view of northbound traffic. Views to the east would remain relatively unchanged, although a guardrail would be added to that shoulder.

Hopewell. Residences in Hopewell are located on top of the bluff and have limited views of IL 29. Given the topography and density of deciduous trees in the area, the view of the proposed improvements would be limited, similar to the existing view of IL 29.

Hopewell Hill Prairies Natural Preserve and Hopewell Estates Hill Prairies Natural Area. The 8.3-acre Hopewell Estates Prairies Natural Area is located within the larger 81.5-acre Hopewell Estates Hill Prairies Natural Area. These designated lands are located on private properties (see Aerial Exhibit sheet 8). There are no developed facilities in the area for viewing. Given the density of deciduous trees, the view of the proposed improvements from adjacent homes would be limited, similar to the existing view of IL 29.

The proposed improvements run parallel to eastern edge of the natural area for a distance of about 700 feet. The proposed improvements would expand the paved surface by 90 feet and include a split profile for northbound and southbound traffic. Southbound traffic would be at a higher elevation than northbound traffic. Views from southbound traffic to the natural area would include a concrete barrier of various heights (3.5 to 4.4 feet high) in the foreground. Given the split profile, additional paved surface area and construction of a retaining wall in the median, manmade structures would become more prominent in the foreground view of northbound traffic. Views to the east would remain relatively unchanged although a guardrail would be added to the shoulder.

Cluster of Homes near Barrville Creek Bridge. The Barrville Creek Bridge, on the Illinois State Historic Bridge List, is located on Old Route 29 west of existing IL 29 (see Aerial Exhibit sheet 9). The structure is not obvious to drivers on IL 29. The proposed improvements would remove the structure. (See Sections 3.4, Cultural, and 3.18, Section 4(f).) The paved surface of IL 29 in this area would increase by 66 feet. Views of adjacent homes would be replaced by the new bridge structure over Barrville Creek and its associated fill.

Spring Branch Unit of the Marshall State Fish and Wildlife Area, Marshall County Hill Prairie Land and Water Reserve, and Marshall County Hill Prairie Natural Area. The proposed improvements run along the eastern boundary of these properties for nearly 1 mile (see Aerial Exhibit sheet 9). The proposed improvements would increase the paved surface by approximately 66 feet and include a split profile for northbound and southbound traffic. Given the topography and density of vegetation in the area, the additional paved surface would not be visible from most areas at these designated lands. The exception is driveway west of IL 29 at the Spring Branch Unit. The driveway is at a higher elevation than IL 29 with views of the additional paved surfaces.

Southbound traffic would be at a higher elevation than northbound traffic. Foreground views from southbound traffic would include a 3.5-foot concrete barrier and a retaining wall of various heights (to 5.5 feet) adjacent to the bluff. Views of dense vegetation adjacent to the facility would remain. Given the split profile, additional paved surface area and construction of a retaining wall in the median, manmade structures will become more prominent in the

foreground view of northbound traffic. Views to the east would remain relatively unchanged, although a guardrail or concrete barrier would be added to that shoulder.

Sparland and Whiffle Tree House. The proposed improvements include a new alignment of IL 29 to the east on what is now farmland, residences, and a small segment of the Sparland Unit of the Marshall State Fish and Wildlife Area. Entrance and exit ramps would continue to provide local access to IL 29 and for access to/egress from IL 17 (see Aerial Exhibit sheet 10). Seven houses and five mobile homes would be displaced. Foreground views from residents fronting IL 29 on the south and north sides of Sparland generally would be unchanged. Through central Sparland the improvements are on new alignment several hundred feet east of IL 29. Existing IL 29 would retain its current configuration. The views of the Illinois River Valley from residential homes on the bluff west of IL 29 would include the elevated interchange structure. Existing views of farmland from residences fronting IL 17 on the south would be replaced by a new elevated IL 29 facility. On the east side of IL 17, the view of adjacent residences would be replaced by the new elevated IL 29 facility. Existing views of the Illinois River Valley from residences west of IL 29 on the slope of the bluff would include a mid-ground view of the new elevated IL 29 facility.

The proposed IL 29 improvements would affect the east side of the Whiffle Tree House property. The structure is eligible for the National Register of Historic Places (see Section 3.4, Cultural). The closest distance from the Whiffle Tree House to the proposed retaining wall is 84 feet. The elevation of the proposed IL 29 adjacent to the Whiffle Tree House is 28 feet above existing ground with a retaining wall. Views of the open space east of the Whiffle House would be replaced by a retaining wall and fill slope for the new highway.

Sparland Unit of the Marshall State Fish and Wildlife Area. The Sparland Unit consists of 1,280 acres and is located between IL 29 and the Illinois River (see Aerial Exhibit sheets 10 and 11). The proposed IL 29 right of way would affect about 8 acres at the western edge of this parcel (see Section 3.14, Designated Lands). There are no developed facilities in this part of the IDNR property. Given the dense vegetation in the area, views of the elevated structure on fill would be limited to areas immediately adjacent to the facility.

1100E Road (North of Sparland). The proposed improvements near 1100E Road would shift to the west to avoid impacts to the Sparland Unit of the Marshall State Fish and Wildlife Area. Access to 1100E Road would be relocated by a new connector road farther north (see Aerial Exhibit sheet 11). Four residences between 1100E Road and the proposed improvements would be displaced and part of 1100E Road removed. The proposed improvements would be on graduated fill from the existing IL 29 facility. The view of paved surface from the backyards of adjacent residence would increase by 24 feet.

Camp Grove Road and 1025N. The proposed improvements near Camp Grove Road include another 24 feet of paved surface generally to the west (see Aerial Exhibit sheet 11). One mobile home on Camp Grove Road would be displaced. One home at 1025N, just north of Crow Creek, would be displaced. Two mobile homes north of 1025N would be displaced. From the adjacent homes in this area, viewers would see the road and the fill.

1150N (Old Route 29) and 1300E. The proposed improvements near 1150N and 1300E include another 52 feet of paved surface generally to the west (see Aerial Exhibit sheet 13). Access to 1300E would be realigned by a connector road east and west of IL 29. The proposed

improvements generally would have the same grade to slight fill as existing IL 29. One home would be displaced. From the adjacent homes in this area, viewers would see the road and fill.

County Highway 6 (Western Avenue). The proposed improvements would include an interchange on land that is currently flat farmland (see Aerial Exhibit sheet 14). Five homes would be displaced. The interchange and proposed alignment would replace views of their neighbors and surrounding farmland.

Whitefield Road (1450N). The proposed improvements would cross Whitefield Road on land that is currently flat farmland (Aerial Exhibit sheet 15). Viewers would see the new road from nearby farmsteads.

Putnam (residences on 370E, Center Street in Putnam, along Main Street in Putnam, and on 665N east of IL 29). The proposed improvements through Putnam would include another 64 feet of paved surface west of existing IL 29 (see Aerial Exhibit sheet 16). Six homes would be displaced. The additional pavement would be constructed at the same profile as the existing highway. Viewers in nearby residences would see the expanded paved surface of the road.

Residence Adjacent to Brewmaster's Supper Club. The proposed improvements near the Brewmaster's Supper Club would include another 52 feet of paved surface and a new frontage road and entrance to IL 29. The driveway would be removed. The additional pavement would be constructed at a profile approximately 4 to 5 feet higher than the existing highway (see Aerial Exhibit sheet 17). The view would include the expanded paved surface of the road and fill.

Miller-Anderson Woods Nature Preserve and Natural Area. The Miller-Anderson Woods property covers 340 acres (including buffer areas) and has 5,700 feet of frontage along IL 29 (see Aerial Exhibit sheets 17 and 18). Approximately 130 acres of the property is located on top of the bluff and cannot be seen from IL 29.The proposed improvements would expand east and increase the paved part of the highway by 66 feet. The additional pavement would be constructed at the same profile as that of the existing highway and might not be visible from some parts of Miller-Anderson Woods, such as the wetland complex west of IL 29, that are lower than IL 29. The improvements would not be visible from the part of Miller-Anderson Woods on top of the bluff. The loss of trees in the IL 29 east right of way would increase the visibility of the railroad east of the highway. No improvements would be made west of the existing shoulder, although a guardrail would be added to the shoulder.

3.17.3 Measures to Minimize Harm and Mitigation

The visual quality of the adversely affected areas can be improved by:

- Landscape planting, including trees and prairie plant species, and natural revegetation of cut and fill slopes
- Landscaping along the right of way in Putnam and Sparland
- Replacing vegetation cleared from the existing or proposed rights of way with grasses (except at habitat loss mitigation areas)

3.18 Section 4(f) and Section 106 Applicability

3.18.1 Barrville Creek Bridge

The Preferred Alternative will affect bridge 062-0011 over Barrville Creek in Marshall County. The Barrville Creek Bridge is listed on the Illinois Historic Bridge Survey and is eligible for inclusion in the National Register of Historic Places. The Barrville Bridge is protected under the USDOT's Section 4(f) law (49 USC 303), which states that federal funds may not be approved for projects that use land from a significant publicly-owned park, recreation area, wildlife or waterfowl refuge, or any significant historic site unless it is determined that there is no feasible and prudent alternative to the use of land from such properties, and the action includes all possible planning to minimize harm to the property resulting from such use. Since the Barrville Bridge is a structure eligible for inclusion in the National Register, the bridge is also protected under Section 106 of the National Historic Preservation Act of 1966.

3.18.2 Description of the Proposed Action

The proposed action is to improve IL 29 to a 4-lane divided highway from IL 6 near Mossville in Peoria County to I-180 in Bureau County**.** From IL 6 to Hart Lane north of Chillicothe, the Preferred Alternative would be on a new alignment bypassing Chillicothe on the west. North of Chillicothe to I-180, it generally would follow existing IL 29 with a bypass of Henry. The alignment is shown in the Aerial Exhibit.

The proposal is being considered to improve north-south highway access west of the Illinois River, enhance travel efficiency, and support economic development in the region.

3.18.3 Description of Barrville Creek Bridge

The Barrville Creek Bridge (SN 062-0011), located just north of Hopewell, was constructed in 1924. Exhibit 3-36 illustrates its location in relationship to the existing roadway. It is a reinforced concrete through-girder bridge. It does not have a floor beam system. It has an overall length of 42 feet and roadway width of 20 feet. The deck is a concrete surface. The road on which the bridge is located was the original IL 29. When IL 29 was realigned and reconstructed to the east, the roadway then became a frontage road to access properties bordering it. The bridge deck is in fair condition, its superstructure is in satisfactory condition, and the substructure is in good condition.

Historic Bridge at Barrville Creek

The IDOT Historic Bridge Survey Listing identifies the structure as a historic bridge. The bridge has formally been determined eligible for listing on the National Register of Historic Places.

3.18.4 Impacts on Barrville Creek Bridge

The proposed alignment would directly affect the historic bridge and require the removal of structure SN 062-0011 owned by IDOT. Refer to Exhibits 3-37 and 3-38 to view the proposed design at this location.

3.18.5 Avoidance Alternatives

3.18.5.1 No-Build Alternative

The No-Build Alternative would not address the needs of the existing facility for transportation continuity, facilitate modal interrelationships, improve travel efficiency, or enhance economic stability. It would not provide enough capacity to accommodate forecast traffic volumes or address safety issues. Therefore, the No-Build Alternative does not meet the purpose and need of the project.

3.18.5.2 Build IL 29 on New Location

Constructing IL 29 on new location was considered in the project's central section from approximately the north side of Chillicothe (near Hart Lane) to north of Sparland (near Camp Grove Road)along an area called the Bluff Alignment. The Bluff Alignment would avoid direct impacts to the Barrville Bridge. The purpose of the proposed action is to enhance transportation continuity between the freeway connections at IL 6 and an expressway connection at I-180 by improving IL 29 to be a safe and efficient highway that will serve existing and future travel demand for both regional and local travelers while minimizing disturbance to the natural and built environments. The proposed highway facility will improve transportation continuity, facilitate modal interrelationships, improve travel efficiency, and enhance economic stability.

As part of the study, the project team evaluated the amount of traffic that would be carried by either an improvement on IL 29 or by the Bluff Alignment in the design year (2032). The analysis found that between 9,000 and 15,600 vehicles per day would use a widened facility along existing IL 29 in the central section. The Bluff Alignment would carry 2,850 to 3,500 vehicles daily and would leave 5,700 to 11,900 vehicles per day on existing 2-lane IL 29. Refer to Exhibit 3-39 and Table 3-62.

TABLE 3-62
Average Daily Traffic

Roadway	South of IL 17	North of IL 17
Bluff Alignment	3,500	2,850
IL 29 – 2 lane, with Bluff Alignment	11,900	5,700
IL 29 – 4 lane, without Bluff Alignment	15,600	9,000

Marshall County residents living east of the Illinois River use the IL 17 River Bridge to access the west side of the river at Sparland. Alternate river crossings are located either 7 miles north on IL 18 or 24 miles south on US 24/US 150. Frequent or recurring travelers from east of the Illinois River working, visiting, or doing business in Sparland, Chillicothe, or Peoria will use the route most reasonable to them—either existing IL 29 or widened IL 29.

If the Bluff Alignment were constructed, the route of choice for most travelers would still be IL 29. A larger than 25 percent diversion to the Bluff Alignment would be expected to occur only if the travel time on existing IL 29 were to increase by 15 to 20 minutes. Failure of the Bluff Alignment to attract travelers and alleviate future congestion on IL 29 means that it would not fulfill the purpose statement of providing a safe and efficient highway that would serve existing and future travel demands.

See subsection 2.2.4.2 and Appendix A, State and Federal Agency Coordination (email from FHWA dated May 31, 2005) for more information.

3.18.5.3 Design Considerations and Site-Specific Avoidance Alternatives

Alignment shifts north of Hopewell near the Barrville Creek Bridge were considered to determine if impacts to the Section 4(f) property could be avoided. These options are discussed below, and the constraints are shown in Exhibits 3-37 and 3-40.

As a means of avoiding the Barrville Creek Bridge, an alternate alignment to the east (a 20-foot shift) was investigated. This option is neither feasible nor prudent for two reasons:

- Maintenance of traffic during construction would be more difficult and costly, resulting in one extra stage of construction. With the Preferred Alternative, IL 29 is designed with the northbound lanes located on existing IL 29 and construction requiring two stages. Shifting the alignment 20 feet to the east would require the first stage to involve the installation of temporary pavement on the east side of the existing lanes, thus requiring a total of three stages and increasing project impacts and cost, including railroad costs.
- By shifting east, a 4,000-foot retaining wall with an average height of 7.5 feet would be needed between the highway and the railroad because there would not be enough room for sideslopes. The retaining wall would add $1,500,000 to the construction cost.

3.18.6 Measures to Minimize Harm

IDOT has committed to several measures to minimize harm to the Section 4(f) properties.

Avoidance of the Barrville Creek Bridge is neither feasible nor prudent. The Preferred Alternative would require the removal of structure SN 062-0011 from the Illinois Historic Bridge Survey. Under the stipulations of a Programmatic Agreement for Historic Bridges ratified by IHPA and FHWA in 2004, a Memorandum of Agreement was formulated and signed by IHPA, FHWA, and IDOT in November of 2005 which specifies mitigation measures for the adverse effects of the removal of SN 062-0011 (Appendix A, Other Agency Coordination). Such measures include attempting to find a replacement venue for the bridge and, if unsuccessful, seeking a similar bridge to substitute the Barrville Creek bridge's place on the Historic Bridge Survey.

A retaining wall has been proposed along the west side of proposed IL 29 east of the Whiffle Tree House property to avoid affecting the Whiffle Tree House.

3.18.7 Section 4(f) Coordination and Public Involvement

A notice requesting comments concerning removal of the Barrville Creek Bridge was published in the *Peoria Journal Star* on March 15, 2005. A copy of the notice appears in Appendix A, Local Official/Other Coordination. The potential impacts to the bridge were shown on aerial maps displayed to the public at informational meetings held on July 14 and 15, 2004. No comments about the bridge impacts were received as a result of the March 2005 notice or the public hearing.

3.19 Short-Term Use and Long-Term Productivity

Highway construction projects require the investment or commitment of some part of resources found in the general study area. Short-term use refers to the immediate consequences of the project, whereas long-term productivity relates to its direct or secondary effects on future generations.

Short-term use of the environment generally would be that associated with construction of the highway. Construction of the project would involve the short-term use of resources such as labor and construction materials. The project would contribute to the reduced maintenance and enhancement of long-term productivity for the communities in the project area by providing improved travel efficiency and reliability on IL 29. This would reduce transportation costs for commuters, commercial trips, and other trips through the study area and improve safety and traffic flow.

Long-term economic benefits resulting from the Preferred Alternative include the potential for increased tax revenues and employment. The Preferred Alternative supports the industrial and agricultural interests in the study corridor, and facilitates modal interrelationships for products being shipped and received along the highway network, rail network (Lincoln & Southern Railroad and CSX), and barge terminal (Illinois River Waterway terminals). The improved access resulting from the construction of the Preferred Alternative is expected to enhance the state's economic advantage and to retain existing economic bases (including the viability of the agricultural sector) and employment in rural areas. By improving access to the area, the proposed improvements may result in higher regional productivity.

The local, short-term uses of resources by the Preferred Alternative are consistent with the maintenance and enhancement of long-term productivity.

3.20 Irreversible and Irretrievable Commitment of Resources

Impacts resulting from construction that can be neither mitigated nor replaced in the future include the following:

- Approximately 1,038 acres of land would be committed to the construction of the proposed improvement of IL 29. Although the land required to construct the project could be converted to another use in the future if the proposed roadway is determined no longer to be needed, there is no reason to expect that conversion would be desirable or necessary.
- With the Preferred Alternative, agricultural land would be removed from production and farming operations would be adversely affected.
- Large amounts of natural resources, such as fossil fuels, aggregate cement, asphalt, sand, and steel, would be required to construct the Preferred Alternative. These materials generally are not retrievable. However, they are not in short supply, and their use in the project would not adversely affect future availability.
- This is a "fill type" project requiring large amounts of earth suitable for raising the profile and widening to four travel lanes.
- State and federal funds and manpower used to build the Preferred Alternative represent an irretrievable monetary commitment. However, the long-term economic and traffic benefits expected to result from the project would outweigh the initial investment.

3.21 Summary of Measures to Minimize Harm

The following section summarizes the measures to minimize harm and additional commitments for the Preferred Alternative. Discussions that are more detailed are provided

in the referenced sections. Final mitigation plans would be incorporated into final engineering plans and specifications prepared for the proposed highway. Mitigation/enhancement measures involving the IDNR are included in a Memorandum of Agreement signed August 15, 2006 (see Appendix A, State and Federal Agency Coordination/Other Agency Coordination).

3.21.1 Agriculture

- The alignments were designed to parallel property lines, where feasible, to keep farm severances, severance management zones, and uneconomical remnants to a minimum.
- Where practical, field access roads will be constructed to maintain access to farm fields.
- Existing surface and subsurface drainage will be maintained.
- Subsurface field tiles draining to, or intersected by, the proposed highway's right of way will be located by trenching in order to ensure that proper field drainage is maintained during construction.
- Areas of cropland and nonnative grasses on landlocked parcels will be investigated for use as borrow areas. If suitable, they will be given priority as sources of borrow, thereby reducing additional impacts to agricultural lands.
- Agricultural impacts will be lessened by using landlocked parcels for mitigation purposes.

3.21.2 Cultural

- Under the stipulations of a Programmatic Agreement for Historic Bridges ratified by IHPA and FHWA in 2004, a Memorandum of Agreement was formulated and signed by IHPA, FHWA, and IDOT in November of 2005 which specifies mitigation measures for the adverse effects of the removal of SN 062-0011 (Appendix A, Other Agency Coordination). The measures include attempting to find a suitable relocation venue for the bridge and if unsuccessful, locate a similar bridge that can substitute for the displaced Barrville Creek bridge.
- All the archaeological sites that have moderate or high research potential located within the construction limits of the Preferred Alternative will be subjected to subsurface evaluations (test excavations).

3.21.3 Noise and Air Quality

- To reduce the potential for noise impacts during construction, IDOT will require contractors to adhere to the latest edition of the *Standard Specifications for Road and Bridge Construction*. These specifications include guidelines for screening stationary equipment, exhaust noise, noise from loose equipment parts, and excessive tailgate banging.
- Special provisions will require that motorized construction equipment not be operated between 10 P.M. and 6 A.M. without prior written approval of the project engineer.
- Dust control during construction will be accomplished in accordance with the *Standard Specifications for Road and Bridge Construction* which requires application of water or approved dust control measures during grading operations and on haul roads.

- The location of pavement material batch plants will be in accordance with the *Standard Specifications* or any special provisions developed during coordination with the IEPA regarding air quality standards and emissions.
- Open burning of construction waste or brush will be done in accordance with local ordinances.
- Demolition and disposal of structures is regulated under the *Standard Specifications for Road and Bridge Construction.*

3.21.4 Geology, Soils, and Surface Water Resources

- High cut and fill slopes will be benched, where necessary, to minimize soil erosion and long-term maintenance including sloughing.
- The use of split profiles for certain segments of the project will reduce the disturbance to erodable soils, the risk of landslides and the risk of encountering abandoned mines.
- Principles and standards from IDOT's *Construction Procedure Memorandum on Erosion and Sediment Control* and other erosion control best management practices will be used to minimize soil erosion. An erosion control plan will be developed as part of this study that will reflect IDOT's erosion control practices. The preliminary plan includes the following concepts:
  - **Temporary Ditch Checks**
    - Ditch check material will vary according to velocity of flow in ditch.
    - Spacing of ditch checks will be adjusted according to ditch slope.
  - **Ditch Linings**
    - Temporary linings (excelsior blankets) will be installed according to ditch velocity during construction activities (prior to revegetation).
    - Permanent linings (paved ditches, riprap) will be installed according to ditch velocity after construction activities (after revegetation).
  - **Culverts—**Downstream channels will be protected as required using riprap, energy dissipater basins, and so on, according to culvert outlet velocities.
  - **Perimeter Erosion Barrier** will be installed in areas where sediments run off the construction area in sheet flow.
  - **Inlet and Pipe Protection** will be installed immediately after inlets and pipes are constructed until surrounding area is paved or revegetated.
  - **Stormwater Detention Ponds** will be installed at several locations in the project area to allow sediments to settle out of highway runoff. Five detention facilities are proposed along the Preferred Alternative: on the east side of Old Galena Road opposite the Audubon Wildlife Area, on the east side of Krause Road northeast of the proposed Rome West Road interchange, in the southwest quadrant of the proposed McGrath Road interchange, on the south side of Senachwine Valley Road near Senachwine Creek (North), and south of Putnam near Center Street.

- Basic erosion control principles and best management practices that will be used on the project include the following:
  - The size of disturbed area exposed at any one time and the duration of exposure will be minimized. Construction contracts will include limits on the amount of soil that can be exposed at any one time, measures to prevent erosion during spring thaw if construction is not completed before winter, and specifications to complete grading as soon as possible and revegetate with temporary and permanent cover.
  - Control methods will be used to prevent erosion and sedimentation in sensitive areas. Such methods include proper design of drainage channels with respect to width, depth, gradient, side slopes, and energy dissipation; protective ground cover such as vegetation, mulch, erosion mat, or riprap; dikes and intercepting embankments to divert sheet flow away from disturbed areas; and sediment control devices such as ditch checks, erosion bales, and silt fences, and retention or detention basins.

If a stream enhancement was impacted during construction it would be replaced in-kind.

3.21.5 Wetlands, Floodplains, and Designated Lands

- Alignments with notable wetland and floodplain impacts, such as Alignment N-4 east of IL 29 from Putnam to the north terminus, were eliminated from consideration (Section 2).
- The Preferred Alternative incorporates alignment shifts where practicable to minimize wetland impacts.
- To minimize impacts on wetlands, floodplains, and designated lands, a 22-foot median will be used between Crew Lane (rest area) north of Chillicothe and approximately 580 feet north of the IL 29/1100E intersection (Aerial Exhibit sheets 10 to 11) and where IL 29 is adjacent to Miller-Anderson Woods (Aerial Exhibit sheets 17 to 18).
- Retaining walls will be used in the Crow Creek area to minimize wetland and floodplain impacts.
- By maintaining the eastern edge of pavement along the 2-mile stretch of W-16 south of the IDNR property, the impact to W-16 has been limited to the 0.2 acre of impact on the south side of the IDNR boat launch.
- By not providing access to the Barnes/Barnes & Kidder property south of the proposed IL 29 and IL 17 interchange, the impact to W-26 has been limited to the 1.3 acres along realigned IL 29 in Sparland.
- To minimize impacts at W-52 and W-53 in the Crow Creek area a retaining wall was used to reduce the impacts from 4.6 acres to 2.3 acres, and 2.0 acres to 1.6 acres, respectively.
- To minimize impacts at W-C2, a retaining wall was used to reduce the impact from 0.1 acre to 0.03 acre.
- The mitigation measures listed in the soils and surface water discussion (subsection 3.21.4) will minimize sedimentation into wetlands.

- Several structures, such as the proposed IL 29 bridge (north of Chillicothe) and the Crow Creek bridge, are designed to have fewer piers in the water than the existing structures.
- In the Illinois River floodplain, 657 acres located east of IL 29, from just south of the Peoria/Marshall County Line to just north of Sparland, will be purchased by IDOT to mitigate the project's environmental impacts. The property east of IL 29, which will be transferred to IDNR, includes 294 acres of forested floodplain wetlands, which have a high native character and are an environmental asset (FQI greater than 20) and 27 acres of forested floodplain wetlands with FQIs of 16 to 19. This land will be transferred to IDNR in order to protect the high quality floodplain wetlands. Three farm fields within the floodplain east of IL 29 will be converted to wetlands. (See Aerial Exhibit sheets 8 to 10.)
- Wetlands W-C3, W-C5 and W-C6 located northeast of the existing IL 6 interchange near Mossville (see Aerial Exhibit sheet 1) and wetlands W-B1 and W-B2 in the northeastern quadrant of the proposed Western Avenue/IL 29 interchange in Henry (see Aerial Exhibit sheet 14) will be expanded to create new wetlands.
- The following design measures will be implemented to minimize impacts to the County Line Hill Prairie Natural Area, Hopewell Estates Hill Prairie Natural Area, Marshall County State Hill Prairie, Marshall County State Land and Water Reserve, Marshall State Fish and Wildlife Area Spring Branch, Marshall State Fish and Wildlife Area—Sparland Unit, and Miller-Anderson Woods Nature Preserve:
  - **Split Profile—**Long stretches of the Preferred Alternative from the IDOT rest area north of Chillicothe to the IL 29/Camp Grove Road intersection will be designed so that proposed southbound lanes are higher in elevation than northbound lanes. This strategy reduces the expansion into the bluff and the impact on designated lands west of IL 29. (Split profile design would not benefit Miller-Anderson Woods Nature Preserve and so is not proposed in that area.)
  - **Narrowed Median—**A 22-foot median will be used adjacent to the designated lands north of Chillicothe to reduce impacts and near the Miller-Anderson Woods Nature Preserve. The standard median width in other areas of the corridor is 50 feet.
  - **Retaining Walls, Barrier, and Guardrail—**Several retaining wall, barrier, and guardrail designs will be incorporated into the Preferred Alternative to minimize the amount of new right of way required from designated lands and other uses.
  - **Alignment Shift—**During the alignment studies, the proposed widening of IL 29 was shifted to the east to minimize impacts to the natural areas and nature preserves west of existing IL 29.
- The following measures will be implemented to minimize and mitigate impacts to land owned by IDNR (see Appendix A, State and Federal Agency Coordination/Other Agency Coordination):
  - Four landlocked parcels immediately west of IL 29 and north of IL 17 will be transferred to IDNR. The parcels total 32 acres. The exact size of the land will be determined after the design phase of the project is completed. Jurisdictional transfer of 59 acres of IDOT property adjacent to these landlocked parcels to IDNR is also

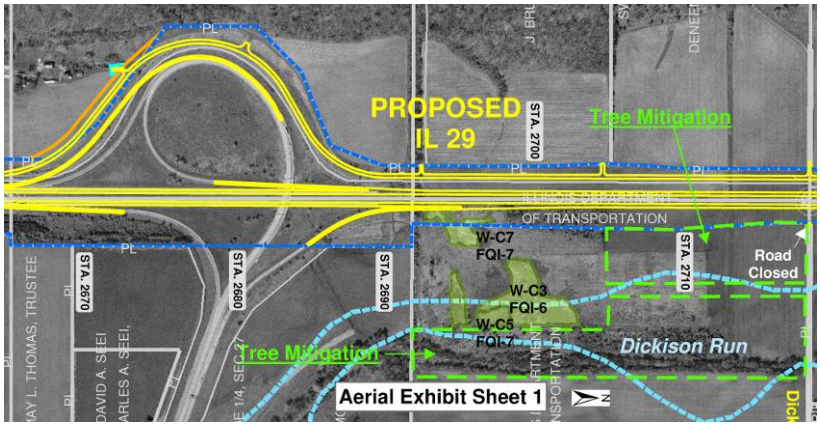
proposed. This would place a total of 91 acres containing oak upland forests with an FQI of 33.4 under the protection of IDNR. Refer to Aerial Exhibit sheets 10 and 11.

- Several parcels located east of IL 29, between the railroad and the Illinois River, will be purchased by IDOT and used to mitigate the project's environmental impacts. The parcels, which total 657 acres, consists of 57 acres of cropland, 321 acres of forested wetlands, and 267 acres of backwater of the Illinois River. Of the 321 acres of forested wetlands, 294 acres located south of Sparland are of exceptional quality with FQI ratings of 22 and 24. The 27 acres of forested wetlands north of Sparland also are of high quality with an FQI of 19.
- Ownership of these parcels will be transferred to IDNR. These lands, combined with two parcels owned by IDNR, will provide a continuous strip of IDNR land from about 0.75 mile south of IL 17 in Sparland to Senachwine Creek north of Chillicothe.
- Transfer of these lands will increase IDNR land holdings in the unique environmental setting by about 748 acres.
- The landlocked parcel located north of the BNSF Railroad (and the proposed Truitt Road interchange) will be transferred to IDNR. The parcel, which is 15 acres in size, is located east of IDNR's Root Cemetery Nature Preserve and Natural Area. Several populations of arrowwood (*Viburnum molle*), an Illinois threatened plant, are located on the parcel, and IDNR could expand the boundaries of the Root Cemetery Nature Preserve and Natural Area to encompass the land.
- IDOT, in conjunction with IDNR, will enhance the hill prairies at the Hopewell Hill Prairie and the Marshall County Hill Prairie Land and Water Reserve.
- IDOT, in conjunction with IDNR, will restore a 15-acre old field community within the boundaries of Miller-Anderson Woods Nature Preserve.
- IDOT, in conjunction with IDNR, will implement for weed control measures at Miller-Anderson Woods Nature Preserve.
- IDOT will construct a 40- by 60-foot gravel parking lot located off the existing entrance road to Miller-Anderson Woods Nature Preserve.
- Excess right of way at the south end of Miller-Anderson Woods Nature Preserve will be transferred to IDNR.
- As a precautionary measure, culvert invert elevations would not be lowered or capacities increased from the existing conditions through Miller-Anderson Woods Nature Preserve. If for engineering reasons this commitment cannot be met, the effects on groundwater conditions would need to be re-evaluated and coordinated with IDNR.

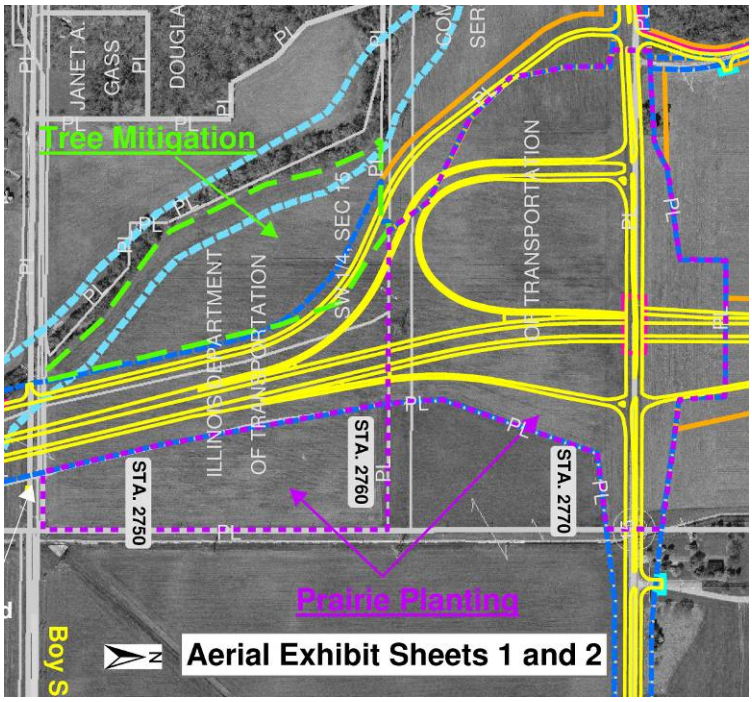
- All potential borrow sites, waste areas, and other contractor generated use areas will require biological, wetland, and cultural resource clearances from IDOT.

3.21.6 Plant Communities and Wildlife Resources

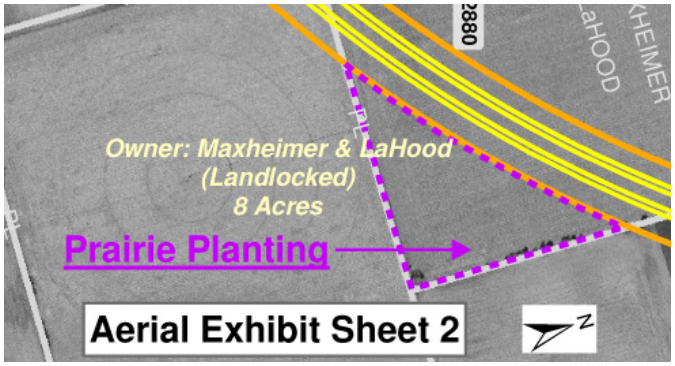
IDOT has identified the following mitigation measures for upland plant communities and wildlife habitat.



38 acres of trees will be planted on land currently owned by IDOT northeast of the existing IL 6 interchange near Mossville.

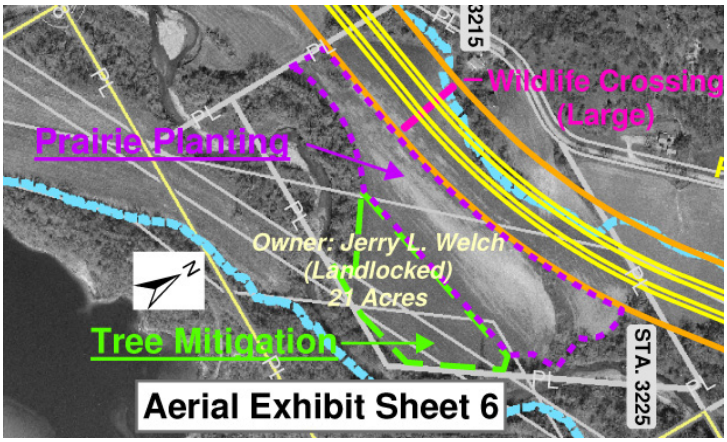


14 acres of trees and 43 acres of prairie will be planted on land currently owned by IDOT at the proposed Cedar Hills Drive interchange.

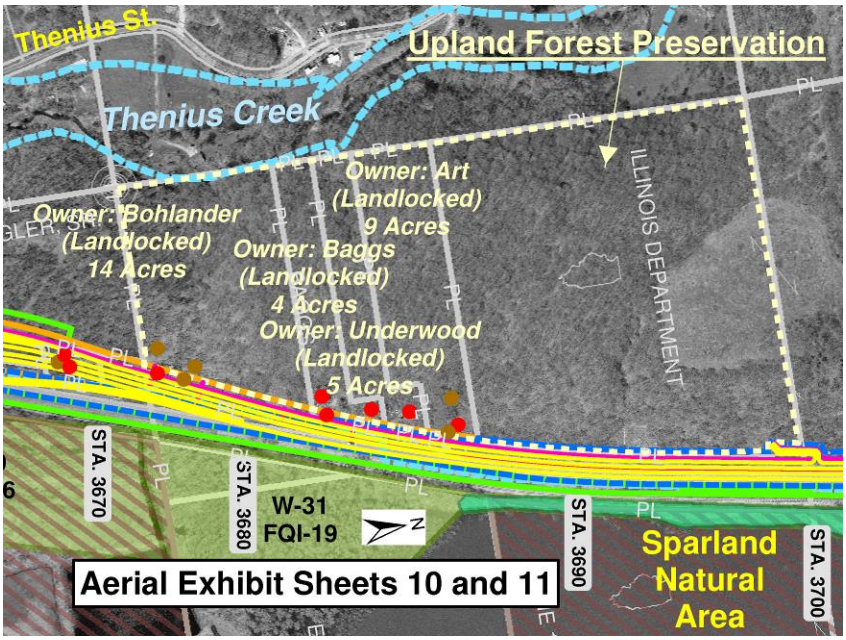


8 acres of prairie grass will be planted on a landlocked parcel between Stations 2876 and 2888.

4 acres of trees will be planted on a landlocked parcel north of the BNSF Railroad.



8 acres of trees and 4 acres of prairie will be planted on a landlocked parcel located along Senachwine Creek between Stations 3210 and 3224.



Approximately 32 acres of high quality upland forest on landlocked parcels north of IL 17 and 59 acres on land currently owned by IDOT will be protected from development by transferring the land to IDNR.

- In accordance with BD&E Procedure Memo #14-00, the backslopes of the proposed roadway will be seeded with Class 4 and Class 5 seed mixture where appropriate. These are prairie seed mixes. This will result in approximately 200 acres of prairie.
- IDOT, in conjunction with IDNR, will enhance the hill prairies at the Hopewell Hill Prairie and the Marshall County Hill Prairie Land and Water Reserve.
- Several parcels east of IL 29, between the railroad and the IL River, will be purchased by IDOT and used to mitigate the project's environmental impacts. The parcels east of IL 29, which total 657 acres, consist of 57 acres of cropland, 321 acres of forested wetlands and 267 acres of backwater of the Illinois River. The transfer of land, along with two parcels owned by IDNR, will protect a continuous strip of wildlife habitat land from 0.75 mile south of IL 17 in Sparland to Senachwine Creek north of Chillicothe.
- Expanding IL 29 adjacent to the existing facility from north of Chillicothe to Camp Grove Road and in the Miller-Anderson Woods Nature Preserve will limit impacts to the project area's prime wildlife habitat to edge impacts, thus minimizing loss of wildlife habitat.
- The use of a narrowed typical section for about 11 miles along the Preferred Alternative will help to minimize wildlife habitat impacts, although the split profile narrowed typical section may pose barriers for wildlife crossing the Preferred Alternative.
- To minimize the animal-vehicle collisions and the effects of retaining walls/median barriers on wildlife movement, 41 wildlife passages (spaced at 0.5-mile intervals) have been incorporated into the design of the Preferred Alternative. Wildlife passages consist of bridges and culverts. At all 19 proposed bridges, the bridge length/opening will be extended an additional 10 to 25 feet to provide a sufficiently wide, dry crossing area adjacent to the stream for large animals. Large and small culverts also will be used as wildlife passages. The large culverts, meant to accommodate deer and smaller wildlife, would be at least 10 feet high and sufficiently wide to attract and accommodate deer. Provisions would be made for allowing daylight into culverts that would pass beneath the median as a means of attracting deer. The culverts for smaller mammals (raccoon, muskrat, fox) and amphibians/reptiles would be about 5 feet high. Because the culverts also will be used for drainage, there will be occasions when the water level in the culvert may be a deterrent to use by some species. However, the culverts have been designed to provide a 2-foot-wide ledge to allow dry crossings for up to a 2-year storm.
- To minimize the effect of median barriers on wildlife movement, medians that do not trap wildlife are being considered at several locations throughout the project area. Openings in the barrier about 2 feet wide would allow smaller species to move along the barrier to those locations and then cross through the barrier.
- Tree removal will not be allowed between April 15 and August 15 of any given year.

3.21.7 Threatened and Endangered Species

- Several arrowwood plants, an Illinois threatened species, are in jeopardy of being disrupted by mining operations. The proposed improvement would landlock 15 acres of

Galena Road Gravel property thereby protecting the plants. The landlocked part of the property would be transferred to IDNR for future protection and management. IDOT will also move, to the extent possible, the 500 adult and 500 juvenile arrowwood plants potentially affected by the Preferred Alternative to a location such as the landlocked part of the Galena Road Gravel property that will be transferred to IDNR.

- The decurrent false aster, a federal and state threatened species, will be relocated to an agricultural field (field 2) in the environmental mitigation area east of IL 29 (Exhibit 3-21). Unlike the other fields in the mitigation area, field 2 will not be used for wetland mitigation. All the environmental mitigation parcels will be transferred to IDNR for management and protection. Through an agreement with IDOT, IDNR will maintain the fields of decurrent false asters. The *Decurrent False Aster Recovery Plan* published by the U.S. Department of Interior, U.S. Fish and Wildlife Service in 1990, lists three criteria for recovery of the species. Criterion 2 states "Twelve geographically distinct self-sustaining natural or established populations of the species must be protected through purchase in fee, easement of by cooperative management agreements." This mitigation measure would meet Criterion 2 of the Recovery Plan. Criterion 3 of the plan states "Populations must be monitored for a period of five years to determine if they are self-sustaining." To meet this criterion, INHS will monitor the decurrent false aster fields for 5 years.

3.21.8 Special Waste

IDOT would manage and dispose of areas of contamination in accordance with applicable federal and state laws and regulations, and in a manner that would protect human health and the environment. After real-estate acquisition and prior to construction, a Preliminary Site Investigation will be preformed at buildings to determine if asbestos is present. If asbestos is present it will be removed according to established environmental regulations.

3.21.9 Visual Resources

Although the visual scale of the highway will increase, landscaping features within and adjacent to the highway right of way would minimize adverse effects. A landscaping plan that will be developed during a future engineering phase could include the following provisions:

- Preserve the existing vegetation as much as possible.
- Perform landscape planting, including trees and prairie plant species, and natural revegetation of cut and fill slopes.
- Landscape along the right of way in Putnam and Sparland.
- Replace vegetation cleared from the existing or proposed rights of way with grasses (except at habitat loss mitigation areas).

3.21.10 Section 4(f)

- Under the stipulations of a Programmatic Agreement for Historic Bridges ratified by IHPA and FHWA in 2004, a Memorandum of Agreement was formulated and signed by IHPA, FHWA, and IDOT in November 2005 that specifies mitigation measures for the adverse effects of the removal of SN 062-001 (Appendix A, Other Agency Coordination).

- IDOT also will ensure that a bridge in Illinois analogous to the Barrville Creek Bridge will be sought and substituted for the adversely affected bridge on the Illinois Historic Bridge Survey. No bridges similar to structure SN 062-0011 were located within Marshall County.

3.21.11 Additional Commitments

3.21.11.1 Traffic

A traffic management plan would be developed and implemented during the construction phase of the project to provide reliable access to agricultural fields, residences, businesses, community facilities and services, and local roads. Local roads intersected by the Preferred Alternative will remain open to traffic with minor interruptions during construction. IDOT will coordinate construction activities, sequencing, and traffic management plans with fire, police, and emergency rescue services to minimize delays and response times during the construction period. Lengthy detours will be minimized, but it is expected that, for various durations, side road connections will be closed to accommodate construction activities.

3.21.11.2 Property Acquisition

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, provides for payment of just compensation of private property acquired for a federal-aid project. Offers of just compensation for residential and business properties will be based upon approved estimates of fair market value supported and documented by professional real estate appraisals obtained by the acquiring agency, IDOT. In addition to the just compensation for the acquired property, the Act also provides for certain relocation assistance and payment to displaced homeowners, residential tenants, and businesses that are required to relocate because of the project. IDOT will offer and provide relocation assistance to each displaced family and business. Each displaced family and business will be contacted by IDOT to address specific needs and problems that it may have. Displaced families will be eligible for moving costs and may also be eligible for replacement housing payments. Displaced businesses will be eligible for searching and moving costs to relocate to a replacement business site. IDOT's acquisition and relocation agents will be available to present and explain both the acquisition program and the relocation program to each displaced family and business.

Septic tanks, drain fields, irrigation systems, or wells on acquired properties would be abandoned in accordance with state regulations and local zoning standards.

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Section 4
Agencies, Organizations, and Persons Who Received a Copy of the DEIS

SECTION 4

Agencies, Organizations, and Persons Who Received a Copy of the DEIS

The following entities received a copy of the DEIS to provide the opportunity to review and comment on the document. Recipients with an asterisk (*) next to their names responded with comments. The comments and IDOT's responses are included on the compact disk found in Appendix A of this document.

4.1 Federal Agencies

- Advisory Council on Historic Preservation
- Federal Emergency Management Agency
- U.S. Army Corps of Engineers*
- U.S. Department of Agriculture—Natural Resources and Environment
- U.S. Department of Agriculture—Natural Resources Conservation Service, Bureau County Soil and Water Conservation District Princeton Service Center
- U.S. Department of Agriculture—Natural Resources Conservation Service, Marshall/Putnam County Soil and Water Conservation District Henry Service Center
- U.S. Department of Agriculture—Natural Resources Conservation Service, Peoria County Soil and Water Conservation District Edwards Field Office
- U.S. Department of Commerce—National Oceanic and Atmospheric Administration*
- U.S. Department of Energy—Office of NEPA Policy and Assistance
- U.S. Department of Health and Human Services—National Center for Environmental Health*
- U.S. Department of Housing and Urban Development
- U.S. Department of the Interior—Fish and Wildlife Service*
- U.S. Department of the Interior—Office of Environmental Policy and Compliance*
- U.S. Department of Transportation—Federal Aviation Administration
- U.S. Department of Transportation—Federal Railroad Administration
- U.S. Environmental Protection Agency—Environmental Planning and Evaluation Branch*

4.2 State Agencies

- Department of Agriculture—Division of Natural Resources, Bureau of Land and Water Resources*
- Department of Commerce and Community Affairs
- Department of Corrections
- Department of Natural Resources
- Department of Natural Resources—Division of Environment and Ecosystems*
- Department of Natural Resources—Nature Preserve Commission
- Department of Natural Resources—Office of Water Resources
- Department of Natural Resources—State Natural History Survey
- Department of Natural Resources—State Water Survey
- Department of Transportation—Bureau of Design and Environment
- Department of Transportation—Division of Aeronautics
- Illinois Commerce Commission
- Illinois Environmental Protection Agency*
- Illinois Historic Preservation Agency*
- Illinois State Clearinghouse
- Illinois State Geological Survey
- Illinois State Library

4.3 Agricultural Organizations

- Bureau County Farm Bureau
- Illinois Farm Bureau*
- Marshall-Putnam County Farm Bureau*
- Peoria County Farm Bureau

4.4 Local Officials and Boards

- Arispie Township Supervisor
- Bureau County Board
- Bureau County Engineer
- Chillicothe Township Mayor
- City of Chillicothe Mayor
- City of Henry Mayor

- City of Lacon Mayor
- City of Peoria Mayor
- Hallock Township Supervisor
- Henry Township Mayor
- Lacon Township Supervisor
- Leepertown Township Supervisor
- Marshall County Board
- Marshall County Engineer
- Median Township Supervisor
- Peoria County Board
- Peoria County Engineer
- Peoria Park District
- Putnam County Board
- Putnam County Engineer
- Senachwine Township Supervisor
- Steuben Township Supervisor
- Village of Sparland President
- Whitefield Township Supervisor

4.5 Other

- URS Corporation
- International Mining Company
- Iowa State Railroad

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Section 5
Agency Coordination and Public Involvement

SECTION 5

Agency Coordination and Public Involvement

IDOT provided regular opportunities for residents of the project area, local government officials, and state and federal agencies to become familiar with and participate in the IL 29 study through a structured coordination and communication program designed to encourage input. Participation was open to any interested persons. No one was excluded because of income, race, color, religion, national origin, sex, age, or handicap. This section summarizes the agency coordination and public involvement activities that occurred during preparation of this document, including the early coordination process, coordination activities with resource agency officials, and meetings with area officials, interested groups, and the public.

5.1 Early Coordination

5.1.1 Cooperating Agencies

The Notice of Intent to prepare an EIS for the project appeared in the *Federal Register* on July 24, 2002. In August and September 2002, a preliminary scoping document was mailed to federal and state agencies. State and federal agencies that agreed to serve as cooperating agencies for the project include the USEPA, USACE, USFWS, IDOA, and IDNR.

On August 29, 2002, the USEPA responded to the scoping document by recommending development of the EIS. Appendix A contains the coordination letters under Early Coordination (Agency Scoping Packet). The letter recommended that the EIS be developed so as to include a purpose and need statement, include a comprehensive analysis of a sufficient number of reasonable alternatives, describe the affected environment, describe government-owned resources in the Peoria Wilds in the affected environment, avoid impacts to the government-owned resources and other resources in the Peoria Wilds, describe all possible impacts caused by the reasonable alternatives, estimate impacts caused by induced growth, and analyze potential cumulative impacts, if any.

5.2 State and Federal Agency Coordination

5.2.1 NEPA / 404 Process

The project was coordinated under the Statewide Implementation Agreement for Concurrent National Environmental Policy Act (NEPA)/404 Process, which was designed to involve key agencies early and to avoid possible oversights. The process involved regular meetings between state and federal resource agencies to discuss the project. The NEPA/404 process involved three formal concurrence points: purpose and need, alternatives to be carried forward and the preferred alternative.[1] Appendix A contains documentation of activities and correspondence relating to the process under State and Federal Agency Coordination: NEPA/404 Merger Process.

[1] Concurrence means written determination that information is adequate to agree that the project can be advanced to the next stage of the project development; and agencies agree not to revisit the previous process steps unless conditions change.

On April 19, 2002, IDOT held an interagency meeting with FHWA, USEPA, USFWS, IDNR, and the USACE to discuss the differences between this study and the Heart of Illinois study, which included a corridor to the west of the project area. IDOT explained that the current study focuses on connecting the 4-lane facilities north and south of IL 29 to enhance transportation efficiency for local and regional traffic west of the Illinois River, whereas the Heart of Illinois study investigated regional traffic connections between Peoria and I-39 and I-55. IDOT also requested agency concurrence to use a new format for the EIS, which combined the affected environment and impact discussions by resource topic in one chapter. All the cooperating agencies agreed to the new EIS format.

On April 28, 2003, IDOT held the first merged NEPA/Section 404 meeting to discuss the project and to obtain concurrence for "purpose and need" and "alternatives selected to be carried forward." In addition to IDOT, agencies in attendance included FHWA, USEPA, USFWS, and IDNR. At the meeting, the group concurred with the purpose of and need for the project and the alternatives recommended for further study. IDNR also requested that the eagle habitat and natural areas within IDOT's right of way near Miller-Anderson Woods Nature Preserve be looked at closely and avoided to the extent practicable. A separate meeting was held on April 25, 2003, with the USACE covering the same issues as at the April 28 meeting. The USACE concurred with the purpose of and need for the project and the alternatives recommended for further study.

On March 1, 2005, IDOT conducted the project's second merged NEPA/Section 404 meeting to update agencies on the project alternatives, and to obtain input and concurrence on alternatives to be evaluated in detail in the Draft EIS. As part of the alternatives update, IDOT recommended eliminating the Bluff Alignment from further consideration because it would not "attract" enough traffic to address transportation problems on existing IL 29 and thus not meet the project's purpose and need (see Section 2). Agencies in attendance besides IDOT included FHWA, USEPA, USFWS, IDNR, and USACE. The interagency group deferred concurrence on eliminating the Bluff Alignment until they received more information on how future traffic volumes along existing IL 29 and the Bluff Alignment were determined. IDOT prepared a memorandum discussing the traffic volumes associated with improvements on IL 29 and the Bluff Alignment and sent it to the agencies on April 26, 2005. On May 31, 2005, the agencies concurred with the memorandum's recommendation that the Bluff Alignment be eliminated from further consideration.

On October 3, 2006, FHWA distributed a Preferred Alternative Concurrence Package regarding the selection of the Preferred Alternative. The signatories USEPA, USACE, and USFWS, concurred with the Preferred Alternative discussed in the Concurrence Package. Overall, the interagency group commented that the Preferred Alternative accomplished the project purpose and need with the least impact to environmental resources.

5.2.2 Resource Agency Technical Committee

A Technical Advisory Committee comprising local, state, and federal resource agencies was formed at the beginning of the project. The committee included representatives from the

agencies listed in Table 5-1. The role of committee members was to communicate regulatory requirements associated with resources in the study area, to provide input on alternatives and impacts, and to review technical aspects of the study.

TABLE 5-1
Resource Agency Technical Committee Membership

U.S. Environmental Protection Agency[a]
U.S. Fish and Wildlife Service[a]
U.S. Army Corp of Engineers[a]
USDA Natural Resources Conservation Service
University of Illinois–ITARP
Illinois Department of Agriculture
Illinois Department of Natural Resources[a]
Illinois Natural History Survey
Bureau County Farm Bureau
Marshall-Putnam Farm Bureau
Peoria County Farm Bureau

[a]Also participates in the NEPA/404 process.

Six resource agency technical committee meetings were held during the study to discuss project progress and to provide input at key project decision points. Table 5-2 summarizes the meetings. Appendix A contains the meeting minutes under State and Federal Agency Coordination: Resource Agency Technical Committee.

A technical memorandum providing background information on the indirect and cumulative impact analysis to be completed for the project was distributed to cooperating agency representatives following the June 2004 meeting of the Technical Advisory Committee to solicit input and concurrence on the proposed methodology and geographical boundaries for the analysis. The feedback provided by the USEPA and USACE was taken into consideration during the assessment of indirect and cumulative impacts; see State and Federal Agency Coordination: Resource Agency Technical Committee in Appendix A.

TABLE 5-2
Technical Advisory Committee Meetings

Meeting	Topics
September 2002	Introduction to study, roles of committee members, summary of environmental features in the study area, overview of studies under way (biological surveys, archaeological investigations, boundaries of natural areas, land and water reserve and nature preserves, bird surveys), and preliminary alignments.
November 2002	Process for developing and refining alternative alignments, review of typical sections near Miller-Anderson Woods Nature Preserve, project need considerations, designated IDNR properties in the study area (such as natural areas, nature preserves), and preliminary alternative alignments.
May 2003	Review of purpose and need and of alternative alignments in the north, central, and south sections to be carried through the EIS.
January 2004	Summary of input from Public Information Meeting 1 and NEPA/404 Meeting 1, overview of field studies, overview/status of preliminary alternative alignments, summary of alternative impacts, and review of next steps in the process.
June 2004	Current resource studies, refinements to the alternative alignments in the north, central and south sections, review of alternatives to minimize impacts in Senachwine Creek and Crow Creek floodplains, wildlife crossings, and next steps in the process.
June 2006	Selection of and refinements to the Preferred Alternative in the north, central, and south sections, review of the Preferred Alternative's impacts to natural and socioeconomic resources, review of proposed mitigation and enhancement measures, and next steps in the process.

5.2.3 Other Agency Coordination

IDOT corresponded with and held several meetings with various local, state and federal agencies. Table 5-3 summarizes the results of that coordination. Meeting minutes and correspondence can be found in Appendix A under State and Federal Agency Coordination: Other Agency Coordination.

The following technical reports were prepared in conjunction with the study.

- The consultant team collected Farm Service Agency information for completion of the USDA/NRCS AD 1006 form. IDOA prepared the USDA/NRCS AD 1006 form, based on input from and coordination between IDOT, IDOA, and NRCS (Appendix B).
- The Illinois Natural History Survey prepared an assessment of wetland and biological resources in the study area.
- The ISGS prepared hydrology studies along part of Miller-Anderson Woods Nature Preserve and also three preliminary environmental site assessments summarizing the special and hazardous waste in the project area.
- The ISGS provided IDOT with data about geology and soils in the project area. The consultant team prepared a geotechnical report from this information.
- The consultant team prepared a photo log of historic structures and submitted it to IDOT's Cultural Resources Unit. The University of Illinois's Transportation Archaeological Research Program investigated archaeological resources and prepared an interim report summarizing its findings. The consultant team prepared a report identifying structures on or potentially eligibility for the National Register of Historic Place. Cultural resources subject to the provisions of Section 106 of the Historic Preservation Act of 1966 and Section 4(f) of the Department of Transportation Act of 1966 were coordinated with the Illinois Historic Preservation Agency, as discussed in Section 3.4 Cultural Resources.
- A Biological Assessment was prepared and distributed to IDNR and USFWS. The assessment concluded the proposed project is not likely to have an adverse effect on threatened and endangered species or state natural areas. Both the IDNR and the USFWS reviewed the Biological Assessment/Detailed Action Report. The USFWS, based on its review, offered no additional comments pertaining to threatened and endangered species. The IDNR offered one recommendation, discussed in Appendix D, and has closed consultation under the Illinois Endangered Species Act (see Appendix A, State and Federal Agency Coordination: Other Agency Coordination).

5.3 Community Involvement

5.3.1 Community Officials

Numerous meetings were held with community and elected officials during the course of the study to understand their issues and concerns. The meetings included representatives from Marshall County, Lacon, Henry, Sparland, and Chillicothe. Table 5-4 summarizes the meetings and the correspondence received from local agencies.

TABLE 5-3
Other Agency Coordination

Meeting/ Correspondence Date	Agencies Involved	Topics
May 17, 2002	Illinois State Geologic Survey (ISGS)	IDOT Memorandum-PESA Review.
May 21, 2002	IDNR	Memorandum from IDNR providing clarification to questions on the IDNR Action Report. (Attached to this memorandum is a transmittal memorandum from IDOT dated June 24, 2002.)
November 6, 2002	ISGS	IDOT Memorandum-PESA Review.
November 8, 2002	ISGS	Letter transmittal of ISGS deliverables to the IL 29 project.
April 16, 2003	IDNR-INHS	Letter transmittal of the Assessment of the Biological Resources Report from IDNR.
July 21, 2003	Marshall-Putnam Soil and Water Conservation District	Letter from Marshall-Putnam Soil and Water Conservation District opposing the proposed improvements.
February 2, 2004	IDNR	Letter from IDNR requesting a hydrology study along parts of the Miller-Anderson Woods Nature Preserve.
March 12, 2004	IDNR, INPC, ISGS	Meeting to discuss groundwater equilibrium concern that could arise from widening IL 29 from two to four lanes in the area of Miller-Anderson Woods.
May 3, 2004	Bureau County Farm Service, Marshall and Putnam County Farm Service, Peoria County Farm Service	Letter to county farm services requesting information for agricultural assessment.
May 11, 2004	IDNR	Meeting to solicit input on current and future access points to their property.
August 26, 2004	ISGS	IDOT Memorandum-PESA Review.
September 14, 2004	INPC, IDNR, Illinois Emergency Management Agency	Meeting to discuss process and procedures to determine floodplain impacts and compensation along IL 29 corridor.
October 4, 2004	IDNR	Meeting to present the current IL 29 design, discuss potential impacts to IDNR properties and natural areas, and to receive feedback on potential mitigation. In late 2003, a field review was conducted with IDNR to refine the boundaries of IDNR properties and natural areas south of Sparland.
October 5, 2004	USFWS	Letter from USFWS identifying species, listed or proposed to be listed, that may be present in project area.
November 9, 2004	Section 4(f) Applicability Review-FHWA	Meeting to discuss the applicability of the Section 4(f) regulations to the parks, recreation and wildlife refuges, and historic properties in the project area.
November 23, 2004	FHWA	Meeting to discuss the potential floodplain impacts associated with the proposed improvements.
December 15, 2004	NRCS	Meeting to discuss potential project impacts on NRCS improvements along Crow Creek, Senachwine Creek, and other environmental features in the project area.
January 26, 2005	IDNR, Office of Water Resources	Letter from the Office of Water Resources concerning four potential longitudinal encroachments associated with proposed improvements and applicability of Part 3700

TABLE 5-3
Other Agency Coordination

Meeting/ Correspondence Date	Agencies Involved	Topics
		floodway construction rules.
March 3, 2005	IDNR, Office of Water Resources	E-mail from the Office of Water Resources indicating that the area near Route 29 bypass crossing and longitudinal encroachment along Senachwine Creek (South) is rural and therefore rural area floodway criteria would apply.
March 9, 2005	Illinois Historic Preservation Agency (IHPA)	Concurrence from IHPA that four of the five structures in the project area identified as potentially eligibility to the National Register of Historic Place do not to meet the criteria for listing. The fifth property, Whiffle Tree Place, was identified as significant under Criterion C; this property will not be affected by the proposed improvements.
August 19, 2005	ISGS	IDOT Memorandum—Hazardous Waste Waiver Request.
December 16, 2005	ISGS	IDOT Memorandum—PESA Re-evaluation.
January 3, 2006	FHWA, Advisory Council on Historic Preservation	Letter from FHWA notifying Advisory Council on Historic Preservation on the adverse effect on the historic Barrville Bridge.
January 13, 2006	IHPA	Concurrence from IHPA that the relocation of a driveway to construct the Western Avenue interchange on the west side of Henry would not impact any historic properties.
July 31, 2006	ISGS	IDOT Memorandum—PESA Reevaluation.
August 15, 2006	IDNR	Memorandum of Agreement between IDOT and IDNR describing land transfer from IDOT to IDNR, public use enhancements, prairie restorations, and wetland and endangered plant mitigation.
December 13, 2006	Peoria Tribe of Indians of Oklahoma	Notification from the Tribe that no known Indian Religious Sites are located where construction is proposed. The Tribe cautions that construction must be halted and communication with the Tribe resumed if any items falling under the Native American Graves Protection and Repatriation Act are uncovered.

TABLE 5-4
Community Officials

Meeting/ Correspondence Date	**Community**	**Topics**
October 2, 2002	Chillicothe, Henry, Lacon, Sparland, Marshall County	Meeting to introduce the study, discuss existing traffic patterns, and any proposed city plans.
October 8, 2002	Lacon	Letter of support for widening IL 29.
October 8, 2002	Marshall County	Letter and resolution of support for widening IL 29 along its existing alignment.
May 12, 2003	Henry	Resolution in support of the IL 29 improvements.
June 10, 2003	Bureau County	Resolution of support for IL 29 improvements.
July 3, 2003	Chillicothe	Meeting to discuss the study progress, proposed alternatives, and proposed city plans.

TABLE 5-4
Community Officials

Meeting/ Correspondence Date	Community	Topics
August 20, 2003	Henry Senachwine Community School District 5	Resolution of support for IL 29 improvements.
September 8, 2003	Chillicothe	Letter of support for improvements to IL 29; includes a bypass resolution survey conducted by the Chillicothe Area Chamber of Commerce.
Spring 2004	Sparland	Meeting to discuss the study progress, and interchange options near Sparland.
July 7, 2004	Chillicothe, Henry, Lacon, Sparland, Marshall County	Preview of the materials to be presented at Public Information Meeting #2.
July 14, 2004	Bureau County	Letter supporting the IL 29 project.
July 19, 2004	Sparland	Letter opposing improvements to IL 29; notes that if the improvements are built the City supports an alignment west or east of Sparland.
August 31, 2004	Henry Township	Letter distributing a resolution not supporting the improvement of IL 29.
September 16, 2004	Chillicothe	Meeting to discuss growth issues and the project's potential to cause secondary development.
November 18, 2004	Senachwine Township and Henry	Senachwine Township: meeting to better assess the applicability of Section 4(f) to the Putnam Pavilion site and ball field at the former Putnam grade school. Henry: meeting to discuss the project's potential to cause secondary development.
January 27, 2005	Sparland	Meeting to review the status of the project, and discuss the project's potential to cause secondary development in Sparland.
January 12, 2006	Senachwine Township	Meeting to discuss the applicability of Section 4(f) at the baseball field at the former Putnam grade school.
June 1, 2006	Sparland	Meeting to present the recommended action, the reasons that the bluff alternative was dismissed, and Sparland's improvements in more detail.
June 8, 2006	Senachwine Township	Meeting to discuss the proposed IL 29/Bradford Road intersection as well as access to Putnam's maintenance garage.
January 3, 2008	Sparland	Meeting to present proposed changes to the design in Sparland to the Sparland Village Board, including the IL 17/IL 29/Ferry Street intersection, the IL 29/Hilltop Drive (IL 17) intersection, and the Thenius Road/IL 29 intersection. The Board had no objections to the proposed intersection changes. Concern was raised about inability to directly access Center Street from eastbound IL 17. All residents pick their mail up from the post office on Center Street. Residents and fire officials also raised concern about access to residences along Elm Street from IL 29.

Meetings were held with various organizations to discuss how the proposed improvements may affect their organization, including railroad companies, Caterpillar, Henry Fire Protection District, Senachwine and Crow Creek Watershed committees, and the Peoria Park District. Appendix A contains meeting minutes, and related correspondence, including correspondence from local businesses supporting the proposed improvements under Local Officials/Other Coordination.

5.3.1.1 Railroad Coordination

The project team coordinated with representatives of railroad companies potentially affected by the proposed improvements several times throughout project development. Table 5-5 summarizes the coordination points.

TABLE 5-5
Railroad Coordination

Meeting/ Correspondence Date	Company	Topics
March 11, 2003	Poly One Corporation	Letter introducing the project and the potential relocation of their tracks associated with the proposed improvements.
May 13, 2003	Poly One Corporation	Telephone conversation followup to letter of March 11, 2003. Poly One concurred that it would be acceptable for its tracks to be relocated, with IDOT paying for the relocation.
July 23, 2003	Lincoln & Southern Railroad Co.	Letter expressing ongoing interest in the study and concern that the drainage conditions along their right of way not deteriorate as a consequence of the proposed improvements.
November 10, 2004	Lincoln & Southern Railroad Co., Poly One Corporation, Iowa Interstate RR, URS/CSXT	Meeting to gain general understanding of the railroad companies and their operations, identify the proximity of the railroad tracks to proposed construction, obtain right of way, identify drainage / flooding issues, identify a future contact from each company regarding future information and reviews, and discuss the procedure for and cost to IDOT for railroads to review plan sets.
January 20, 2007	Burlington Northern/Santa Fe (BNSF) Railroad Co.	Meeting to discuss the proposed reconstruction of the railroad viaduct over IL 29 on the north side of Chillicothe and the proposed IL 29 bridge over the BNSF railroad track north of Truitt Road.
July/August 2007	Burlington Northern/Santa Fe (BNSF) Railroad Co.	Correspondence regarding the decisions to relocate the railroad signal to the east of the proposed IL 29 overpass north of Truitt Road, prepare the railroad overpass in Chillicothe to BNSF railroad design criteria, and provide for two railroad tracks in the design of the overpass north of Truitt Road and underpass in Chillicothe.

5.3.1.2 Henry Fire Protection District

Study staff met with representatives of the Henry Fire Protection District on April 22, 2004, regarding the proposed improvements and to understand how they may affect the fire district's operations. The consensus among district officials was that the proposed improvements would not adversely affect operations. See Appendix A under Local Officials/Other Coordination.

5.3.1.3 Senachwine Creek Watershed Committee

Staff met with representatives of the Senachwine Creek Watershed Committee on May 6, 2004, regarding the proposed improvements and to understand how they may affect projects planned by the committee. The committee has received funds to install holding basins, detention ponds, willows, and terraces to minimize the effects of hard rains and flooding. After reviewing the design plans, representatives commented that they would like to work with IDOT on any planned mitigation in the area. See Appendix A under Local Officials/Other Coordination.

5.3.1.4 Crow Creek Watershed Committee

Staff met with representatives of the Crow Creek Watershed Committee on February 23, 2005, to update the committee on the proposed improvements to IL 29 adjacent to Crow Creek (Camp Grove Road to Old IL 29) and to confirm that the project would not affect projects funded by the committee in the watershed. See Appendix A under Local Officials/Other Coordination.

5.3.1.5 Caterpillar

On January 5, 2004, IDOT received a letter from Caterpillar confirming a phone conversation of December 23, 2003. During the phone conversation Caterpillar representatives expressed support for an alternative that would pass to the west and north of the Caterpillar property, identified as alignment S-6B on Exhibit 2-9. (At the time of the telephone conversation this alignment was referred to as Alignment 1.) See Appendix A under Local Officials/Other Coordination.

5.3.1.6 Peoria Park District

Staff met with representatives of the Peoria Park District on September 9, 2004, to learn more about their concerns following the second public information meeting as expressed in a letter dated August 27, 2004. During the meeting the park district provided additional information on its three properties near the project's south section, Camp Wokanda, Singing Woods Nature Preserve, and Audubon Wildlife Area. See Appendix A under Local Officials/Other Coordination.

5.3.2 Public Meetings

Two sets of public information meetings and one set of public hearings were held during the study. Meetings were announced through advertisements in area newspapers and project newsletters. Because of the project length and number of communities involved, each meeting was held in two locations in the project corridor. An additional public meeting was held in Sparland to apprise local residents of recent changes to the proposed design in Sparland. The sessions were held in open house format.

5.3.2.1 First Set of Public Meetings

The first set of public meetings was held on June 11, 2003 in Henry and on June 12 in Chillicothe to review the status of the project, to obtain public input on the preliminary and reasonable range of alternatives, and to offer a forum for people to ask questions. The meetings were publicized through advertisements in five local newspapers: *Lacon Home Journal, Bureau County Republican, Bureau Valley Chief, Chillicothe Times-Bulletin,* and *Henry*

News Republican. Project newsletters announcing the meeting were sent to property owners, local units of government, utilities, state agencies, elected officials, and other interest groups. Meeting exhibits included aerial photography of the project area depicting project alternatives, information comparing project alternative impacts, and project schedule. The meeting in Henry was attended by 326 people, the meeting in Chillicothe by 427 people.

Two hundred forty-nine comments were submitted following the public meetings. Public comments, IDOT's responses and a summary of the public comments are found on the compact disk in Appendix A. Most comments related to the project in general or to a specific alternative. Approximately 58 percent related to the IL 29 project in general, 6 percent to the Rome and Chillicothe alignment alternatives, 24 percent to the Hopewell and Sparland alignment alternatives, 9 percent to the Henry alignment alternatives, and the remainder to Putnam alignment alternatives.

Comments received at the first meetings pertained to the following issues:

- Support for an IL 29 alternative that would cost less than building a new road and improve economic vitality of the area
- Concern about impact to natural resources (for example, wetlands, water supply, timber, wildlife, soil erosion, Illinois River)
- Concern about cost
- Concern about impact to farmland and irrigation systems
- Concern about residential displacements, property values, and noise
- Concern about access points/interchanges if a limited-access highway is recommended
- Concern about traffic need and safety

5.3.2.2 Second Set of Public Meetings

The second set of public meetings was held on July 14, 2004 in Henry and on July 15 in Chillicothe to present the refined alternatives. The meetings were publicized through advertisements in eight local newspapers: *Peoria Journal Star*, *Lacon Home Journal, Bureau County Republican, Bureau Valley Chief, Chillicothe Times-Bulletin, News Tribune, Chillicothe Independent,* and *Henry News Republican*. Project newsletters announcing the meeting were sent to property owners, local units of government, utilities, state agencies, elected officials, and other interest groups. Five local radio and three TV stations were notified about the meeting. Meeting exhibits included aerial photography of the project area depicting project alternatives, information comparing project alternative impacts, and project schedule. The meeting in Henry was attended by 176 people, the meeting in Chillicothe by 408 people.

More than 170 comments were submitted following the public meetings. Public comments and a summary of the comments are found on the compact disk in Appendix A. Most comments at the meeting related to the project in general or a specific alternative. Approximately 47 percent related to the IL 29 project in general, 20 percent to the Rome and Chillicothe alignment alternatives, 18 percent to the Hopewell and Sparland alignment alternatives, and 3 percent to the Henry alignment alternatives. The remainder were not related to a specific improvement (for example, a request for project information).

Comments received at the second meetings pertained to the following issues:

- Support for an improved IL 29 facility with 4 lanes and limited access
- Improvement of IL 29 as soon as possible
- Concern about the expense of the project; improve existing roads
- Concern about traffic need and safety
- Access from IL 29 on new alignment to existing IL 29
- Concern about impact to farmland and irrigation systems
- Concern about impacts to natural areas and other environmental resources
- Concern about residential displacements, property values, noise, and wells

5.3.2.3 Public Hearing

During the 60-day DEIS public comment period (which ended June 25), a public hearing was held on June 14, 2006, in Chillicothe and on June 15 in Henry to present the DEIS to project-area residents and to offer a forum for people to ask questions and to provide comments. The meetings were publicized through advertisements in nine local newspapers: *Peoria Journal Star*, *Lacon Home Journal, Bureau County Republican, Bureau Valley Chief, Chillicothe Times-Bulletin, Chillicothe Choo Advertiser, News Tribune, Chillicothe Independent,* and *Henry News Republican*. Project newsletters announcing the meeting were sent to property owners, local units of government, utilities, state agencies, elected officials, and other interest groups. The same information was presented at both meetings. Meeting exhibits included aerial photography of the project area depicting the project alternatives, conceptual drawings of project area aesthetic improvements, typical sections and information on project impacts. Copies of the DEIS were available for review. A court reporter was present to record oral comments from attendees, a comment box was provided for those wishing to provide written statements, and a comment form with a self-addressed return mailing label was provided for those who wanted to mail their comments. Public comments received during the DEIS public comment period and IDOT responses are found on the compact disk in Appendix A. The meeting in Chillicothe was attended by 346 people, the meeting in Henry by 180 people.

5.3.2.4 Sparland Public Meeting

On January 23, 2008, a public meeting was held to inform Sparland residents about recent changes to the proposed design in Sparland. The meeting was held in an open house format between 4:30 and 7:00 P.M. IDOT personnel and consultant staff were available to discuss the proposed changes and answer questions. Exhibits showing the proposed design were available for attendees to view. Discussion topics included changes in access to specific residences, the ability of the roundabout to accommodate expected traffic volumes, benefits of roundabouts for trucks, and safety concerns regarding the IL 29/Thenius Road intersection. A summary of the public comments received at the meeting is found on the compact disk in Appendix A.

5.3.3 Project Newsletters

Project newsletters were prepared and distributed during the course of the study. The newsletters were sent to local units of government (county, municipal, drainage districts, townships), review agencies, federal and state officials, utilities, and project area residents.

The first newsletter (June 2003) introduced the project, the study team, and the first public information meeting. It provided an overview of the project development process and where this study was relative to that process, described the features of the study, explained the public and agency involvement process, and announced the study schedule. The newsletter contained a self-addressed form for submitting comments. It also provided a project contact name and telephone number.

The second newsletter (June 2004) announced the dates and locations of the second public meetings, described the corridor alternatives that would be presented, and provided a map detailing alternatives. It also contained the self-addressed form for submitting comments, and a contact name and telephone number.

The third newsletter (June 2006) informed recipients that the DEIS was signed and announced the dates and locations of the public hearings. It also provided an overview and map of the Build Alternative and outlined the next steps in the current preliminary phase. The newsletter included a self-addressed form for submitting comments as well as a contact name and telephone number.

A fourth newsletter will be distributed to inform recipients on the results of the NEPA process.

5.3.4 Draft EIS Comments

The Notice of Availability for the Draft EIS was published on May 6, 2006. The comment period closed on July 17, 2006. More than 175 written and oral comments were submitted. Agency comments and IDOT's responses are located in Appendix A. Public comments and IDOT's responses are contained on the compact disk in Appendix A .

5.3.4.1 Agency Comments

Agency comments received during the study process and project public hearings were fully considered in the selection of the Preferred Alternative. Among the respondents were the following regulatory agencies:

- Illinois Department of Agriculture—Division of Natural Resources, Bureau of Land and Water Resources
- Illinois Department of Natural Resources—Division of Environment and Ecosystems
- Illinois Environmental Protection Agency
- US Army Corps of Engineers—Rock Island District
- US Army Corps of Engineers—Planning, Programs and Project Management Division
- U.S. Department of Commerce—National Oceanic and Atmospheric Administration
- U.S. Public Health Service, Department of Health and Human Services—Center for Environmental Health
- U.S. Department of Interior—Office of Environmental Policy and Compliance
- U.S. Environmental Protection Agency

Agencies either expressed satisfaction with the level of analysis given to the project's impact to area resources or requested further analysis or documentation. Consultation was closed where appropriate; other agencies expressed an interest in remaining involved if further consultation is useful.

The IDNR, USACE, USEPA, and U.S. Department of Health and Human Services requested additional consideration be given to specific resource topics in the Final EIS.

All agency comments have been responded to and can be found in Appendix A.

5.3.4.2 Public Comments

Comments were received from more than 175 members of the public including project area residents, interest groups and local communities. The most commonly heard comments expressed concern regarding the following:

- Improved safety with construction of proposed project
- Support for an improved IL 29 facility with 4 lanes and limited access
- Improvement of IL 29 as soon as possible
- The expense of the project
- The need to improve existing roads
- The traffic need for the project
- Impacts to farmland and other environmental resources
- The economic benefit of proposed project
- The effect on rural lifestyle
- The effect on IL 29 as a scenic route

Section 6
References

SECTION 6

References

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Personal Communication

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Section 7
List of Preparers

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List of Preparers

CH2M HILL prepared this EIS under the direction of the IDOT. The following individuals were directly involved in the preparation of the EIS. Their responsibilities included collecting and analyzing data, evaluating impacts, identifying mitigation, consulting with agencies, and writing or reviewing sections of the EIS.

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CH2M HILL (EIS Contractor)		
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Name	Responsibility	Qualifications
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Alfred Benesch & Company (subcontractor)		
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Lin Engineering Ltd. (subcontractor)		
Paul Lin, P.E., S.E.	Project engineer, supervision, drainage studies, structures	M.S. Civil Engineering. Lin Engineering 1991 to present, 20 years' prior transportation engineering experience.
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Name	Responsibility	Qualifications
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Heritage Research (subcontractor)		
Michael McQuillen	Archeological history and historic preservation	M.S. Historic Preservation 1998 to present
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