

August, 2004

**REVISED**  
**ALTERNATIVES**  
**DEVELOPMENT AND**  
**SCREENING**



Section of Independent Utility No. 14  
State Project No. 736-99-1032  
Arkansas State Project No. 070212  
Federal Aid Project No. CBI-9901(516)  
Junction I-20 near Haughton, LA to US 82 near El Dorado, AR  
Route I-69  
Bossier, Claiborne and Webster Parishes, Louisiana  
Columbia and Union Counties, Arkansas



Federal Highway Administration



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Coyle Engineering Company, Inc.,  
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R. Christopher Goodwin & Associates, Inc.

## **Notice to the Reader:**

This report has been revised to reflect modifications in the EIS Alternatives suggested by the public, agency representatives, and project team members in meetings held in June 2004. See Section 4.1 of this report for details of these modifications.

**ALTERNATIVES DEVELOPMENT AND SCREENING  
TECHNICAL MEMORANDUM**

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**Louisiana State Project No. 736-99-1032  
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## **1.0 INTRODUCTION**

### **1.1 Background**

The Louisiana Department of Transportation and Development (LDOTD), the Arkansas Highway Transportation Department (AHTD) and the Federal Highway Administration (FHWA) are proposing to construct a four-lane divided interstate highway between El Dorado, Arkansas and Shreveport, Louisiana. The project will be part of the National I-69 Corridor and is also identified as Section of Independent Utility (SIU) No. 14.

In accordance with the National Environmental Policy Act (NEPA) of 1969, the LDOTD, in coordination with the AHTD, has employed a consulting team (Team) to conduct an Environmental Impact Statement (EIS) for this project. The sponsor agency for this EIS is the Federal Highway Administration. In accordance with NEPA's spirit of prudent, cooperative decision-making, several federal agencies have been invited to cooperate with the FHWA in the review of the EIS for this project. Their cooperative review and input throughout the process will ensure that this EIS will comply with each of the cooperating agency's requirements and can therefore also serve the NEPA compliance tool for each agency's actions. The United States Army Corps of Engineers (USACE), the United States Fish and Wildlife Service (USFWS), and the United States Environmental Protection Agency (USEPA) have accepted the FHWA's invitation to be cooperating federal agencies on this EIS.

The scoping period for this project began on March 6, 2003 and ended on April 28, 2003. Identification and evaluation of alternative 2-mile-wide Corridors proceeded from this date. Following a series of public open houses and an agency meeting held in Junction City in the late summer 2003, the FHWA, LDOTD, and AHTD announced the preference of Corridor 1D for detailed alignment study. As cooperating agencies, the USFWS, the USACE, and the USEPA reviewed and concurred with the preference for Corridor 1D on which detailed alignment study would be conducted.

During the winter and spring of 2004, the project team developed individual 300-foot-wide alignments that both meet the intended purpose and need for the project and minimize adverse effects to communities and the environment. The results of this detailed *Alternatives Development and Screening Process*, or Alternatives Selection, are provided in this report with details of the modifications to the alternatives incorporated between May and August 2004.

Public open houses were held in June 2004 to present the four build alternatives for consideration in the EIS. An agency meeting was also held. Comments from public and agency representatives were considered and used to refine alternatives to be fully evaluated in the EIS.

## 1.2 Purpose of the Report

It is important to fully evaluate all potential alternatives in the development of the final EIS alternatives, so that delays associated with re-introducing alternatives after the DEIS are not encountered. Accordingly the project team has developed this report, which illustrates the extensive process undertaken to identify the best 300-foot-wide highway alignments inside of the preferred 2-mile-wide Corridor 1D.

The initial objective of this report was to provide sufficient information to resource agency representatives to confirm that their agency's interests communicated to the project team were addressed, and that the alternatives proposed for detailed study in **Section 4.0** of this report were indeed the best alternatives among those considered.

Information in this report was presented to resource agencies on June 2, 2004, and to the public in a series of meetings and open houses described in **Table 1.1**. Comments received from the agencies and public on the Alternatives Selection determined which alternatives or combination of alternatives would be evaluated in the EIS to a greater level of detail.

**Table 1.1 Alternatives Selection Agency Meeting  
and Public Open House Schedule**

Time, Date, and Audience	Location
<b>Wednesday, June 2</b> 2:00-4:00 P.M. Agency Meeting	<b>Junction City, LA</b> Junction City Senior Citizens Center 104 West 3 <sup>rd</sup> Street
<b>Tuesday, June 22</b> 1:00-2:30PM Elected Officials 4:00-7:00PM Public	<b>El Dorado, AR</b> Parkers Chapel School 401 Parkers Chapel Road
<b>Wednesday, June 23</b> 1:00-2:30PM Elected Officials 4:00-7:00PM Public	<b>Haynesville, LA</b> Claiborne Parish Fair Barn Complex 1563 Fairgrounds Drive
<b>Thursday, June 24</b> 1:00-2:30PM Elected Officials 4:00-7:00PM Public	<b>Minden, LA</b> Minden Civic Center 520 Broadway
<b>Friday, June 25</b> 9:00-11:00AM Public	<b>Homer, LA</b> I-69 SIU No. 14 Program Office 425 West Main Street

Based on revisions made for the version of the *Alternatives Development and Screening Report*, the purpose of this report now also includes presenting the modifications made to the alternatives presented to the public in June 2004 with the reasons why these modifications were made. Four alternatives were presented to the public and agencies in June 2004. Only two alternatives are currently proposed for full evaluation. These two alternatives are Alternative 4; and a new alternative, Alternative 5, which combines the best portions of Alternatives 1, 2, and 3. Optional crossings of Bayou Dorcheat and Cornie Bayou are also presented.

### 1.3 Incorporation by Reference of Other Documents

This report contains all of the most relevant information considered during the Alternatives Selection phase of the project; however, some information referenced in this report is detailed in other documents. Documents that have already submitted to resource agency representatives and are incorporated into this report by reference are:

- *Scoping Report (May 2003);*
- *Purpose and Need Report (June 2003);*
- *Corridor Evaluation Report (July 2003);*
- *Corridor Selection Report (October 2003);*
- *Corridor Selection Public and Agency Presentation and Comment Summary Report (September 2003); and*
- *Alignment Study Presentation and Comment Summary (August 2004).*

These documents are also available on the project website at [www.i69arkla.com](http://www.i69arkla.com).

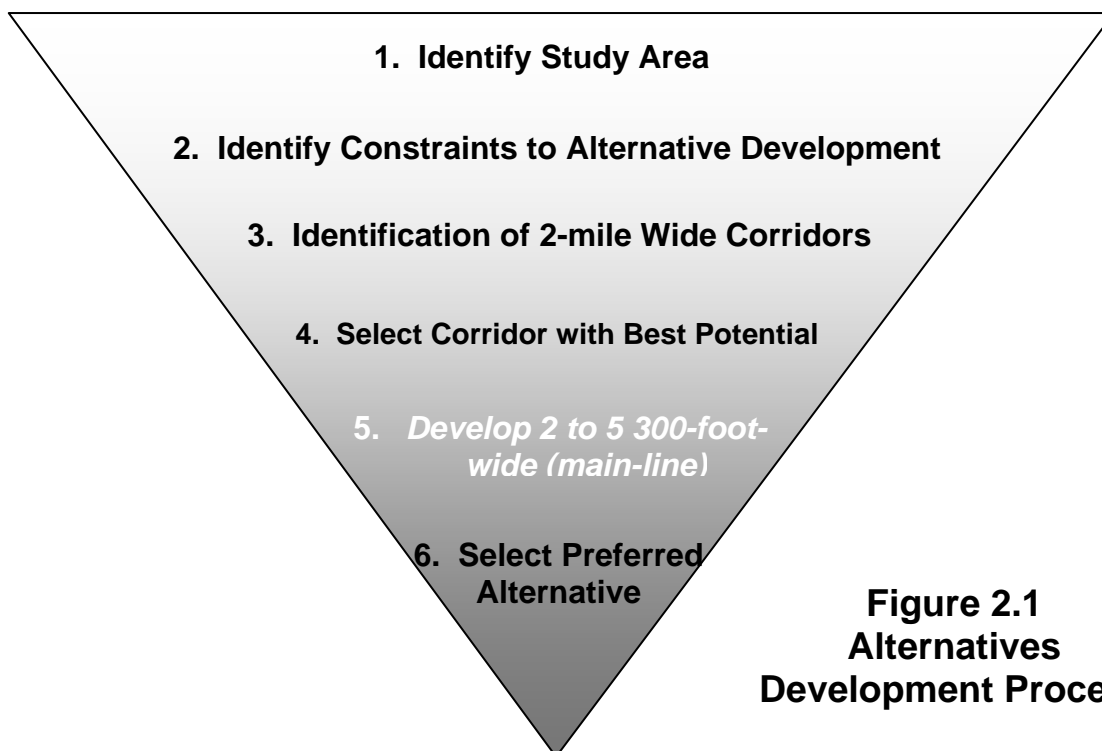
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## 2.0 ALTERNATIVES SELECTION METHODOLOGY

The methodology used for the selection of the best alternatives for evaluation in the EIS for this project is similar in nature to that used in the development and selection of the preferred 2-mile-wide corridor, which winnowed-down the scope of corridors through successively more stringent evaluations.

**Figure 2.1** graphically displays the methodology that the project team is using in developing the alternatives for evaluation in the EIS. This methodology begins with the identification of the study area and development considerations, and ends with the selection of the preferred alternative (PA) to be fully evaluated in the final EIS for this project.

**Figure 2.2** displays this Study Area, whose development is discussed along with Steps 2, 3, and 4 of **Figure 2.1** in the *Corridor Evaluation* and *Corridor Selection* reports distributed to agency representatives in the summer of 2003.<sup>1</sup> The project team has completed steps 1, 2, 3, 4, and 5 of **Figure 2.1**, with Step 5, the subject of this report.



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<sup>1</sup> An Adobe Acrobat version of these documents and other documents prepared for this project are available on the project web site at [www.i69arkla.com](http://www.i69arkla.com).

**FIGURE 2.2**  
**STUDY AREA**  
*(PLEASE DOWNLOAD FIGURE 2\_2.PDF)*

## 3.0 ALTERNATIVE DEVELOPMENT AND SCREENING

### 3.1 Identify Considerations for Alternative Alignment Development and Evaluation

The evaluation of individual 300-foot-wide highway alignment alternatives (Alternatives) began in a similar way to the Corridor Selection, with the identification of evaluation parameters. Many evaluation parameters were already available from the Corridor Selection study, for which a substantially detailed Geographic Information System was developed. However, not all of the evaluation parameters from the Corridor Selection were used in the Alternatives Selection, and several new parameters were developed for the Alternatives Selection study. For the purpose of the Alternative Selection, necessary right of way widths were modeled as discussed in **Section 3.4** and used as the project's "footprint" or extent of direct effects. Details of additional data collection efforts associated with new or revised evaluation parameters noted in ***bold italics*** below are provided in **Section 3.2** of this report. Items not in ***bold italics*** are evaluation parameters used in the Corridor Selection study completed in the fall of 2003.<sup>2</sup> Parameters used in the evaluation and selection of the Alternatives to be included in the EIS are:

1. ***Acreage of Wetlands within the proposed right of way***
2. Acreage of Floodplains within right of way
3. Acreage of Sparta Aquifer Recharge Zone within right of way
4. ***Acreage of Chicot Terraces Recharge to Sparta Aquifer within right of way***
5. ***Acreage of prime and unique farmland soil within right of way***
6. ***Acreage of Pine Plantation (Silvaculture) within right of way***
7. ***Acreage of naturally wooded land within right of way***
8. ***Acreage of cleared land within right of way***
9. ***Acreage of Developed / Urban Land within right of way***
10. Number of Scenic Stream Crossings
11. Number of Archaeological and architectural resources within the right of way
12. ***Predicted percentage of area with high predicted Archeological site potential***
13. Acreage of Wildlife Management Areas within right of way
14. Number of recreational areas within right of way
15. ***Number of hazardous sites within 1000 feet of alignment centerline***
16. ***Number of active and inactive oil and gas wells within right of way***

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<sup>2</sup> An Adobe Acrobat version of the *Corridor Evaluation* and *Corridor Selection* Reports and other documents prepared for this project are available on the project web site at [www.i69arkla.com](http://www.i69arkla.com).

17. *Number of communication towers within right of way*
18. *Number of required pipeline and powerline crossings*
19. *Number of registered water wells within right of way*
20. *Number of commercial facilities within right of way*
21. *Number of commercial facilities within 400-feet of alignment centerline*
22. *Number of Institutional facilities (churches, schools, hospitals, etc.) within right of way*
23. *Number of Institutional facilities (churches, schools, hospitals, etc.) within 400 feet of alignment centerline*
24. *Number of residential structures within right of way*
25. *Number of residential structures within 400 feet of alignment centerline*
26. *Number of mobile homes within right of way*
27. *Number of mobile homes within 400 feet of alignment centerline*
28. *Estimated population within right of way*
29. *Estimated population within 400 feet of alignment centerline*
30. *Estimated facility costs*

## **3.2 Supplementary Data Collection**

While a portion of the data necessary for the alternatives evaluation described in **Section 3.1** of this report was already collected for the Corridor Selection phase of the study, field work and additional research was necessary for most evaluation parameters used in the Alternatives Selection Study. Individual supplementary efforts are described in the remainder of **Section 3.2** of this report.

### **3.2.1 Structure Inventory**

Using both 1998 Louisiana and 2002 Arkansas 1-meter-pixel resolution color infrared aerial imagery and 1.5-foot-pixel resolution black and white imagery, project team staff panned the interior and up to 1000 feet outside of Corridor 1D to identify the locations of structures. Structures were identified as residential single-family dwellings, mobile homes, commercial structures, or institutional structures, which included churches, schools and other. Information from the US Geographic Survey's Geographic Information Names System was used to help distinguish between institutional and non-institutional structures; however, most determinations were based solely on aerial photography interpretation.

### **3.2.2 Hazardous Site Inventory**

Information on recorded hazardous sites was collected from a third-party vendor of these services named GeoSearch. Hazardous site databases that were searched for this effort in Arkansas, Louisiana, and federal records included:

- Louisiana Historic Leaking Underground Storage Tanks and Leaking Underground Storage Tank databases;

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- Louisiana Solid Waste Landfills database;
- Louisiana Underground Storage Tanks database;
- Louisiana Voluntary Remediation Program sites where releases of future liability have been granted to property owners;
- Arkansas Emergency Response Incidents where hazardous materials releases have been recorded;
- Arkansas Leaking Registered Storage Tanks database;
- Arkansas Recycling Market Directory that identifies all recycling facilities;
- Arkansas Registered Storage Tank database;
- Arkansas Solid Waste Facility database;
- Federal Resource Conservation and Recovery Act Information System (RCRIS) for Small, medium, and large-quantity handlers, generators of hazardous waste; transporters, violations, Corrective Actions; and Treatment, Storage, and Disposal Facilities;
- Federal Comprehensive Environmental Response, Compensation and Liability Information System List (CERCLIS);
- Federal National Priority List (NPL) Sites and delisted NPL sites from the CERCLIS;
- Federal Toxic Release Inventory System for sites about releases and transfers of toxic chemicals;
- Federal Emergency Response and Notification System Database;
- Federal Facility Index System of regulated facilities;
- Federal Hazardous Materials Incident Reporting System that contains hazardous materials release information of the US Department of Transportation;
- Federal No Further Remedial Action Planned database from the US EPA's CERCLA program records; and
- Federal National Pollutant Discharge Elimination System database from the EPA's Water Permit Compliance System that tracks Clean Water Act permits.

The GeoSearch query provided locations of recorded hazardous sites in the study area, confirming suspicions that this rural study area presently has few recorded hazardous sites. However, investigations into the historic oil and gas activities of the region suggest that there is potential for unrecorded hazardous sites along rail lines, older roads and Bayou Dorcheat. Detailed field investigations will take place during the EIS preparation phase of this project. To augment data collected and mapped for this purpose, project staff took one week to conduct windshield surveys along existing roadways in the Study Area to identify sites of concern and to investigate anomalies identified from aerial photographs. Interviews with the Mayors of Cotton Valley and Haynesville were conducted to get help provide an historic account of oil and gas activities in their regions. Additionally, team staff coordinated with representatives and/or reviewed records from the following offices for the purpose of confirming information and augmenting information from the GeoSearch query that may have been omitted:

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- Louisiana Department of Environmental Quality Northeast Regional Office
- Louisiana Department of Natural Resources
- Arkansas Department of Environmental Quality
- Arkansas Soil and Water Conservation Commission
- Arkansas Geologic Commission
- Arkansas Oil and Gas Commission

Field and research notes were also translated onto informational mapping layers in the GIS and used in alternatives development and evaluation.

### 3.2.3 Refined Wetland Boundary Estimate

Because neither USFWS National Wetland Inventory data nor the USDA Natural Resources Conservation Service digital soil survey data were available for the study area at the initiation of the project, initial wetland limits inside the study area were estimated with the aid of topographical details, aerial imagery interpretation, and the location of hydric terrace soil units. The resulting coarse detail of these wetland boundaries used for the Corridor Selection was refined for this phase of the project. Project team wetland and aquatic biologists worked with 1-meter-pixel resolution color infrared aerial imagery to identify imagery signatures corresponding with known wetland limits identified in field visits in the summer 2003 and winter 2004. It should be noted that a detailed, USACE-compliant wetland survey was not completed as part of this effort. Such effort will be expended for the alternatives evaluation conducted in the EIS for this project. The revised delineations based on more detailed aerial map interpretation and field data are more accurate and reduced in size. These new boundaries are used in this detailed alternatives evaluation and selection phase of the project.

### 3.2.4 Detailed Evaluation of Bayou Dorcheat and Cornie Creek Crossing Options

In January 2004, resource agencies were given an opportunity to attend field exercises with the project team and to attend a pre-meeting to discuss the field exercise plan. The only areas of interest by the attending resource agencies included Bayou Dorcheat and the Cornie Creek crossing region of Corridor 1D. Field visits were conducted over the period of a week during January 2004, resulting in the identification of several permissible Bayou Dorcheat crossings and several preferred crossing locations for the Cornie Creek system. Data obtained during these exercises greatly assisted in the reevaluation of the wetland data using the color aerial imagery discussed in **Section 3.2.2** of this report.

### **3.2.5 Refined Sparta Recharge Zone Delineation**

Among the 53 individual issues on which the five Corridors were evaluated in the summer of 2003 was the Sparta Aquifer High Recharge Zone locations. Based on information on the locations of the high-recharge potential of the Sparta Aquifer outcrops inside the Study Area, the project team identified Corridor 1D as one of the alternatives that results in no substantial effect to the recharge potential of the Sparta Aquifer. Comments requesting a more thorough evaluation of the potential effect to the Chicot Terrace formation, which also helps to recharge the Sparta Aquifer, resulted in a reevaluation of this issue. Coordination with the Louisiana Department of Natural Resources was initiated, and in a letter dated March 9, 2004 (**Appendix A**), the Louisiana Department of Natural Resources noted that none of the Corridors, or their alignments, would be expected to have an effect to the Sparta Aquifer.

### **3.2.6 Prime and Unique Farmland Soil Identification and Delineation**

Because digital data on the locations of particular soils units in the study area is currently unavailable, the evaluation of prime and unique farmland soils was reserved for the alternatives evaluation phase of the project, when a smaller area of concern made this task manageable. Using photocopied plates from soil surveys for Louisiana parishes and Arkansas counties in the Study Area, locations were identified of soil units considered to be prime or unique farmland soils by the Natural Resources Conservation Service. These data were then digitized and entered into the GIS for the project.

### **3.2.7 Land Coverage Assessment**

In order to help assess the relative change in rural character that the proposed project would have in this rural setting, the *type* of undeveloped land under each alignment was assessed. For this purpose, land coverage for each of the alignments was evaluated with the interpretation of color infrared aerial imagery.<sup>3</sup> Types of land coverage identified in this effort were:

- **Pine Plantation** - lands identified on aerial imagery to be active silvaculture areas;
- **Naturally Wooded Forest** - those areas identified to be naturally-wooded, undisturbed areas;
- **Agriculture / Farmland** - lands identified in aerial imagery as lands used in pastoral or other agricultural uses;

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<sup>3</sup> Secondary land coverage data is available at this time for Louisiana but not Arkansas. The US Geographic Survey's Gap Analysis Program data provides land coverage through remote sensing of aerial imagery. However, this data is based on 1990s' aerial imagery, is coarse (i.e., 30-meter pixel resolution), and not available for Arkansas. For these reasons, map interpretation was used instead for this data.

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- **Cleared Land** - lands identified from aerial imagery to be cleared but undeveloped; and
- **Developed / Urbanized Land** - lands that were observed to be developed with structures and/or other improvements.

Identification of these types of undeveloped land helped to qualify the type of undeveloped land considered for alignments and was used in the evaluation and selection of the alternatives for detailed study in the EIS.

### 3.2.8 Refined Predictive Model for Unrecorded Cultural Resources

For the purpose of Alternative Selection, an evaluation was conducted similar to that conducted for Corridor Selection, where distance to water, slope, and soil association were used to develop GIS polygons of Low, Moderate, and High archeological potential. Classification of area was based on the following ratings:

- **Slope:** High (<5 percent), Moderate (5-15 percent), Low (>15 percent);
- **Distance to Water:** High (<1,000 m), Moderate (1,000 to 3,000 m), Low (>3,000 m); and
- **Soil Type:** Nineteen soil groups were divided into high, medium and low probability classes based on a combination of soil morphology, presence of archeological sites on the same soil, and associated topographic features (i.e., presence of ridges, knolls, terraces, etc.).

These same variables were used and further refined for the Alternatives Selection evaluation. Specifically, the *distance to water* variable was reevaluated, and changed to:

**Distance to Water:** High (<100 m), Moderate (100 to 400 m), Low (>400 m).

Using this revised assumption, the percentage of high and low probability areas for encounters with unrecorded archeological sites was calculated for each of the alternatives.

### 3.2.9 Refined Oil and Gas Well Activity Data

For the alternatives evaluation and selection phase of the project, the latest oil and gas well permitting data were obtained in the spring of 2004 from the Louisiana Department of Natural Resources and the Arkansas Oil and Gas Commission for Louisiana and Arkansas, respectively. These data differed slightly from data used for the Corridor Selection study, mainly in the status of wells. Well status was classified as one of the following three categories:

- Active: Wells that are presently used for commercial mining.
- Inactive: Wells that were not presently in use, but which have been permitted, drilled or used in the past and which may have future utility.

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- Plugged and Abandoned: Wells that have been plugged and abandoned with no future utility.

In addition to this permit data, project team staff met with the oil and gas extraction operators in the study area (i.e., XTO, Marathon Oil Company, Sunoco Logistics, and Great Lakes Chemical Corporation) to determine the locations of areas considered particularly productive, valuable or soon to be abandoned. Some wells were identified to be in geologic units that produce hydrogen sulfide gas, a toxic gas that can be fatal if inhaled at even low concentrations. Wells located in these units have protective buffers that provide sufficient area for hydrogen sulfide gas concentrations to dissipate, reducing concentrations to safe levels. These wells and their buffer areas were digitized with all newly acquired oil and gas well data and used in the evaluation and selection of the alternatives to be studied in detail in the EIS.

### 3.2.10 Refined Utility Infrastructure Data

The original pipeline data used for the Corridor Selection was obtained from available sources from the initial project GIS that was assembled. Upon review of alignments, it became evident that other pipelines that were not recorded on current mapping were nonetheless present in the region. Data requests from the LDOTD and AHTD to the United States Department of Transportation, Office of Pipeline Safety, were made, and updated pipeline locations were then mapped for use in evaluating alternatives. Additionally, locations of public water wells were obtained from the LDOTD records, and all communications towers were obtained from the Federal Communications Commission. These data were digitized and used in alternatives development and evaluation. Additional data on power lines and other were identified during the course of aerial imagery review, and were also identified for use in alternatives development and evaluation.

### 3.2.11 North Hills Lakes Project

While mentioned by several commentators during the Corridor Selection Study for this project, the Piney Hills Lakes Project details were unknown until early in 2004, when the Claiborne Parish Police Jury hosted a program, titled, *Piney Hills Legislators Economic Development Initiative*. The day-long program held in Homer on 25 February 2004 detailed economic opportunities of the 10-parish Piney Hills region that borders the Red and Ouachita rivers. Among the perceived economic opportunities discussed was the North Hills Lakes Project. Local leaders propose nine new reservoirs in the Piney Hills region, with the northernmost four lakes located in the project Study Area. These lakes are proposed to help recharge the Sparta Aquifer through a series of injection wells and also provide water-based recreational opportunities and attractive residential retirement communities on their shores. At this time, local leaders suggest that funding would be provided by the employment of a tax increment financing district that would dedicate future improvements to property value to service the debt incurred from constructing the reservoirs and other common infrastructure requirements associated with the North Hills

Lakes project. As of the May 2004, no permit applications have been filed with the US Army Corps of Engineers related to the inundation of land and wetlands in the region, which would include land and wetlands bordering Flat Lick Creek, Black Bayou and the Louisiana Scenic Stream Bayou D'Arbonne, as well as land in the Kisatchie National Forest.

### **3.2.12 Estimated Population**

With the identification of particular residential structures from aerial imagery as discussed in **Section 3.2.1** of this report, a more accurate estimate of the number of affected residents was possible. The average household size for the Study Area (i.e., 2.6 persons) was determined from US Department of Commerce, Bureau of the Census data from the 2000 Census, and used in calculating the estimate of population affected. This method is far more accurate than typical GIS methods that assume that population is directly proportional to land area in a populated region.

### **3.2.13 Refined Unit Cost Data**

While gross per-mile cost estimates were prepared and applied to all five preliminary Corridor centerlines for the purpose of selecting the preferred Corridor for detailed study, more accurate estimates were desired for the selection of alternatives to be fully evaluated in the EIS. While cost estimates will be further refined in the EIS, cost estimates for the alternatives selection were developed based on several detailed line items and modeled quantities of earthwork necessary for each alignment. Line items on which costs for each alignment were based include:

- Linear distance of pavement
- Volume of Excavation (Cut)
- Volume of Excavation (Fill)
- Number of railroad crossings
- Number and type of interchanges
- Number of main line overpasses
- Number of local road grade separations
- Number of box culvert drainage structures
- Number of pipe culvert / inlet drainage structures
- 25 % of total Construction Costs to cover unknown Contingencies
- 20 % of total Construction Costs for Engineering Plans, Specifications, etc.

Details of the cost estimates by Corridor Section are provided in **Appendix B** of this Report.

### 3.3 Identification of Corridor Sections

For planning purposes, Corridor 1D was parsed into sections terminated by major regional roadways. Sections identified and their terminating interchanges or locations are discussed in **Table 3.1**. Corridor sections facilitated reference, discussion, and team assignments. A final Corridor Section was later identified and evaluated as discussed in detail in **Section 3.7** of this report.

**Table 3.1 Corridor 1D Sections**

Section Identifier	Southern Terminus	Northern Terminus	Approximate Length	Notes
A	I-20	US 371	15 miles	Cotton Valley Oil and Gas Field
B	US 371	LA 159	13 miles	Bayou Dorcheat Crossing
C	LA 159	US 79	12 miles	Haynesville Section
D	US 79	Columbia 16	7 miles	No Interchange
E	Columbia 16	US 82	17 miles	Cornie Creek System

### 3.4 Alignment Segment Identification

Following the identification of the Corridor 1D Sections A-E, preliminary individual 300-foot-wide highway alignments were developed by project team designers. These alignments began with alignment segments that provided for the flexibility of various combinations with abutting segments. Alignment constraints from the project GIS identified in **Section 3.1** of this report were used in the identification of alignment segments. Highway alignments were developed in full compliance with the design criteria established for the project, which are described in detail in *Design Criteria Technical Memorandum* for this project<sup>4</sup>. After the identification of an alignment segment in a section, the project team would pose the following questions:

- Is there any reason to provide another alignment north/south/east or west of those noted?
- Will any new alignment have any relative advantages (e.g., less adverse effects, lower cost) than those that already have been drawn?
- Is this alignment potentially acceptable in terms of design standards for interstate freeways?

Additional alignment segments were added until the answers to any of these questions became negative. The resulting Universe of Alternative alignments for each Corridor

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<sup>4</sup> Design criteria assumes a 70 miles per hour (mph) design speed, four-lane controlled-access highway with a 90 foot median and an approximate 300-foot right-of-way.

Section comprised all alternative alignment segments that appeared to be potentially reasonable and feasible. This Universe of Alternative alignment was then reviewed by the project team, and modeled by the roadway designers to confirm that the hand-drawn alignments indeed met interstate design standards, and to determine the estimated right of way width, which typically spanned between 300 and 400 feet. In some cases, resulting modeled alignments differed from hand-drawn alignments. Efforts to ameliorate revised alignments were made with successive iterations of modeling. Refined alternative alignments were then evaluated with the parameters discussed in **Section 3.1** of this report.

### **3.5 Composite Alignment Alternatives Development**

While the identification of Alignment segments discussed in **Section 3.4** of this report was useful in providing the greatest flexibility in developing alternatives, the need to evaluate *alternatives* rather than *alternative segments*, required the development of *Composite Alignment Alternatives*. Composite Alignment Alternatives were developed by connecting segments into full alignments for evaluation purposes. This began at the Corridor Section level to help compare Corridor Section alignment alternatives. Later, once alignment screening had been completed, alternatives spanning from the southern to northern terminus were developed for evaluation and presentation to the agencies and public. Final Composite Corridor Alignment Alternatives proposed for evaluation in the EIS are discussed in **Section 4.0** of this report.

### **3.6 Alignment Segment and Alternative Screening**

The Corridor segment and Composite Alignment Alternatives evaluation was considered a “screening-level” evaluation as most of the evaluation parameters were based upon secondary, or existing, data except as noted in **Section 3.2** of this report. Alignments were evaluated in terms of both net quantities of effect and quantities of effect per linear unit. GIS queries were the basis for these evaluations.

Alternative segments were compared on a quantity per mile basis as each segment is a different length, and resulting quantities vary based on these differences. Composite Alignment Alternatives, discussed in **Section 3.5** of this report, were compared on a net quantity of effect basis because the length of each Composite Alignment Alternative is similar among others within its Corridor Section, and each Composite Alignment Alternative accomplishes the same basic objective inside its Corridor Section; i.e., connecting the southern and northern ends of the Corridor Section.

Alignment alternative screening was iterative. First, the Corridor Section segments and Composite Alignment Alternatives were reviewed to determine alignments within the Corridor Section that had appeared to have the good potential for the overall least adverse effects.

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Some Corridor Section alignments were evaluated to have too little benefit relative to other Corridor Section alignments, yet result in greater adverse effects. Others had too great of impacts, costs or both. These Corridor Section alignments were determined to be unreasonable relative to other alignments and were omitted from further consideration as alternatives for detailed evaluation in the EIS. Omitted Corridor Section alignments are displayed in **Figures 3.1A–E**, with the reasons that they are omitted from further consideration.

Refinements to remaining Corridor Section alignments were made based on the following guiding principals:

- Avoid recorded and known hazardous sites;
- Avoid community facilities such as parks, churches, schools, and hospitals;
- Avoid relocation of major utility facilities including pipelines, powerlines, communication towers;
- Avoid recorded cemeteries to the extent that their locations are known;
- Avoid relocations of residential and commercial structures to the extent practicable, and minimize effects to communities in which not all adverse effects could be avoided;
- Avoid active and inactive oil and gas wells to the extent practicable in that order of priority, and minimize the number of unavoidable well sites that are encompassed by alternative rights of way;
- Avoid wetlands to the extent practicable, and minimize unavoidable wetland effects by choosing alignments that are estimated to be less valuable than other sites;
- Avoid recorded cultural resources sites to the extent practicable, and minimize the number of recorded cultural resources encompassed by Alternatives rights of way;
- Avoid developed lands and lands that are deemed to be naturally wooded to the extent practicable, and concentrate alignments in cleared areas and areas that have been recently planted in pine;
- Minimize costs;
- Minimize estimated population within 400 feet of alternatives' centerlines as this population roughly can be equated to the upper limit of those who may be adversely affected by noise from the new facility; and
- Minimize quantities of other constraints encompassed within alternative rights of way.

Corridor Section Alignment Alternatives that were not omitted from further consideration were refined and combined into Composite Alignment Alternatives for the entire Corridor 1D. The three composite Corridor alternatives are displayed for the Study Area in **Figure 3.2**. Alternatives are displayed with selected alignment constraints in greater detail in **Figures 3.1A-E**.

### **3.7 Reconsideration of Corridor 2A/2B**

Following the fall 2003 announcement of the preference of Corridor 1D for detailed alignment study, some citizens, Claiborne Parish, the City of Homer, and the City of Minden requested that the project study team reconsider Corridor 2A/B as the preferred corridor. Reasons used by commentors to justify this reconsideration included:

- Corridor 2A/B is more direct and therefore, presumably less expensive to construct than Corridor 1D;
- Corridor 1D jeopardizes the viability of the North Hills Lakes project;
- Corridor 2A/B provides an alignment that traverses a greater distance of the North Louisiana Rural Renewal Community;
- Corridor 1D traverses the Cotton Valley Oil and Gas Field and would presumably have substantial adverse effects to field operations or mitigation costs associated with well impacts.
- Corridor 2A/B provides a better location for containing hazardous materials spills and avoiding potential Sparta aquifer contamination than Corridor 1D;
- Corridor 1D traverses a longer distance of land that recharges the Sparta Aquifer than Corridor 2A; and
- Corridor 2A provides better crossings of Bayou Dorcheat than Corridor 1D.

While Corridor 2A was deemed potentially reasonable and feasible, Corridor 2B was not for the following reasons:

- Corridor 2B is located south and east of Haynesville; therefore alternatives inside this corridor do not meet the project purpose of intercepting southbound hazardous materials shipments destined for I-69 before traveling through Haynesville; and
- Corridor 2B requires the crossing of the Middle Fork Bayou D'Arbonne, a Louisiana Scenic Stream.

Accordingly, the project team initiated a reevaluation of Corridor 2A in greater detail, identifying several potentially reasonable and feasible alignments extending from three Bayou Dorcheat crossings south of Corridor 1D. These new alignments were evaluated in the manner discussed in **Sections 3.4 – 3.6** of this report. For the purpose of discussion, this portion of the Study Area, which generally follows along Corridor 2A was termed Corridor Section F. Corridor Section F alignments that were omitted from further consideration and the single alternative that was retained (i.e., Alternative 4) is displayed in **Figure 3.3F 1-4**. A summary matrix of the anticipated advantages and disadvantages of Alternative 4 is provided in **Table 3.2**. Details of the relative advantages and disadvantages for each Section of Alternatives 1, 2, 3 and 4 are provided in a series of tables, by Section in **Appendix B** of this report. Advantages and disadvantages of Alternative 4 relative to selected issues of public interest are provided in the remainder of **Section 3.7** of this report.

**FIGURE 3.1**  
**KEY MAP**  
*(PLEASE DOWNLOAD FIGURE 3\_1KEY.PDF)*

**FIGURE 3.1A**  
**OMITTED AND RETAINED SEGMENTS:**  
**ALTERNATIVES 1, 2, & 3**  
***(PLEASE DOWNLOAD FIGURE 3\_1A.PDF)***

**FIGURE 3.1B**  
**OMITTED AND RETAINED SEGMENTS:**  
**ALTERNATIVES 1, 2, & 3**  
***(PLEASE DOWNLOAD FIGURE 3\_1B.PDF)***

**FIGURE 3.1C**  
**OMITTED AND RETAINED SEGMENTS:**  
**ALTERNATIVES 1, 2, & 3**  
*(PLEASE DOWNLOAD FIGURE 3\_1C.PDF)*

**FIGURE 3.1D**  
**OMITTED AND RETAINED SEGMENTS:**  
**ALTERNATIVES 1, 2, & 3**  
***(PLEASE DOWNLOAD FIGURE 3\_1D.PDF)***

**FIGURE 3.1E**  
**OMITTED AND RETAINED SEGMENTS:**  
**ALTERNATIVES 1, 2, & 3**  
***(PLEASE DOWNLOAD FIGURE 3\_1E.PDF)***

**FIGURE 3.1NOTES**  
**OMITTED AND RETAINED SEGMENTS:**  
**ALTERNATIVES 1, 2, & 3**  
***(PLEASE DOWNLOAD FIGURE 3\_1NOTES.PDF)***  
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**FIGURE 3.2**  
**BUILD ALTERNATIVES 1, 2, & 3**  
***(PLEASE DOWNLOAD FIGURE 3\_2.PDF)***

**FIGURE 3.3**  
**KEY MAP**  
*(PLEASE DOWNLOAD FIGURE 3\_3KEY.PDF)*

**FIGURE 3.3F 1 OF 4**  
**OMITTED AND RETAINED SEGMENTS:**  
**ALTERNATIVE 4**  
***(PLEASE DOWNLOAD FIGURE 3\_3F-1.PDF)***

**FIGURE 3.3F 2 OF 4**  
**OMITTED AND RETAINED SEGMENTS:**  
**ALTERNATIVE 4**  
***(PLEASE DOWNLOAD FIGURE 3\_3F-2.PDF)***

**FIGURE 3.3F 3 OF 4**  
**OMITTED AND RETAINED SEGMENTS:**  
**ALTERNATIVE 4**  
***(PLEASE DOWNLOAD FIGURE 3\_3F-3.PDF)***

**FIGURE 3.3F 4 OF 4**  
**OMITTED AND RETAINED SEGMENTS:**  
**ALTERNATIVE 4**  
***(PLEASE DOWNLOAD FIGURE 3\_3F-4.PDF)***

**FIGURE 3.3NOTES**  
**OMITTED AND RETAINED SEGMENTS:**  
**ALTERNATIVE 4**  
***(PLEASE DOWNLOAD FIGURE 3\_3NOTES.PDF)***  
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**TABLE 3.2  
Alternatives Evaluation Matrix Summary**

Criteria Category and Sub-Category	Criterion ID <sup>1</sup>	Evaluation Measure	Units	Alternatives			
				1	2	3	4
<b>Overall Segment Length</b>							
<b>Length</b>	1	Total Length of Segment within Section	miles	63.69	63.64	64.62	62.60
<b>Physical and Natural Environmental Considerations</b>							
<b>Wetlands</b>	4	Wetlands within Right of Way (ROW)	acres	87.8	100.0	91.9	124.0
<b>Floodplains</b>	6	Floodplains within ROW	Acres	277.8	262.5	255.4	367.3
<b>Aquifer Impacts</b>	8	Sparta Aquifer Outcrop Zone Acreage within ROW	Acres	---	---	---	8.78
	9	Chicot Terraces Outcrop to Sparta Aquifer Area within ROW	Acres	497.6	487.1	492.4	286.5
	10	Total Aquifer Outcrop Acreage within ROW	Acres	497.6	487.1	492.4	295.3
<b>Scenic Streams</b>	19	Scenic Stream Crossings along Segment Centerline	name crossing	Dorcheat	Dorcheat	Dorcheat	Dorcheat
<b>Other Environmental Considerations Including Cost Factors</b>							
<b>Industrial Facilities</b>	44	Active Oil/Gas Well Sites within ROW	Count	6	4	4	4
	45	Inactive Oil/Gas Well Sites within ROW	Count	3	3	---	---
<b>Utilities</b>	52	Powerline Crossings within ROW	Count	3	3	3	3
	53	Pipeline Crossings within ROW	Count	17	16	12	14
<b>Community Facilities</b>	55	Number of Commercial Facilities within ROW	Count	2	2	---	---
	56	Number of Commercial Facilities within 400' Buffer <sup>2</sup>	Count	3	2	1	---
<b>Residential Inventory</b>	59	Number of Residential Structures within ROW	Count	5	6	5	11
	60	Number of Residential Structures within 400' Buffer <sup>2</sup>	Count	19	24	18	35
	61	Number of Mobile Homes within ROW	Count	---	---	3	4
	62	Number of Mobile Homes within 400' Buffer <sup>2</sup>	Count	6	8	7	8
<b>Other Considerations</b>							
<b>Demographics</b>	70	Estimated Population within ROW	Count	13	16	21	39
	71	Estimated Population within 400' Buffer <sup>2</sup>	Count	65	83	65	112

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Criteria Category and Sub-Category	Criterion ID <sup>1</sup>	Evaluation Measure	Units	Alternatives			
				1	2	3	4
<b>Preliminary Project Cost Estimate (in 1,000s of Dollars)</b>							
Wetlands	73	Wetland Mitigation Cost <sup>3</sup>	\$	\$878	\$1,000	\$919	\$1,240
ROW	80	Total ROW Cost	\$	\$5,274	\$5,507	\$5,437	\$5,799
Industrial Facilities	88	Total Industrial Facility Mitigation Cost	\$	\$6,750	\$4,750	\$4,000	\$4,000
Utility Relocations	93	Total Utility Relocation Mitigation Cost	\$	\$4,950	\$4,750	\$3,750	\$4,200
Relocations	98	Total Relocation Cost	\$	\$3,825	\$4,600	\$2,775	\$4,975
Structures	105	Total Cost of Structures	\$	\$126,010	\$130,844	\$128,484	\$116,542
Roadway	109	Total Cost of Roadway and Drainage	\$	\$286,282	\$294,931	\$296,432	\$312,985
<b>Cost Summary</b>	<b>112</b>	<b>Total Estimated Cost, includes 25% contingency</b>	<b>\$</b>	<b>\$542,460</b>	<b>\$557,978</b>	<b>\$552,246</b>	<b>\$562,177</b>

**Notes:**

Several cost and impact updates were incorporated into **Table 4.1** to allow comparison of new Alternatives 4 and 5 to the Alternatives presented to the public are not incorporated in **Table 3.2**. As a result, some values in this table differ from values for the same entry in **Table 4.1**.

1. Several criterion ID numbers (and evaluation measures) are missing because these categories were either not impacted by the alternatives or did not show a meaningful difference among the alternatives. Criterion for which no impacts are anticipated by any of the alternatives include: 21-43, 46-49, and 57-58. Please refer to **Appendix B** for a complete list of the evaluation measures including those for which no adverse effects are anticipated from any of the alternatives.
2. The buffer was 400 feet and is representative of the distance for potential noise impacts.
3. The wetland mitigation costs are based on a mitigation cost of \$10,000 per acre.

**Sources:** URS Corporation 2003 and 2004. Data obtained from aerial imagery interpretation and field observations. Other sources of data referenced in *Alternative Development and Screening Report*.

### 3.7.1 Effects to Scenic Streams

All alternative crossings of Bayou Dorcheat (i.e., Alternatives 1, 2, 3, and 4) are under consideration for permitting by the Louisiana Scenic Stream Coordinator at this time; however, no permit application has been filed. An evaluation was conducted by the project team to qualitatively compare the Bayou Dorcheat crossings in order to determine which of the crossings appears to be the overall best crossing in terms of the Louisiana Scenic Stream permitting guidelines available at <http://www.wlf.state.la.us>.

Permit applications are evaluated by the Louisiana Scenic Stream Coordinator, with consideration given to the content of an environmental assessment for the proposed action for which the permit is applied. Individual topics that must be addressed in this environmental assessment are provided in the remainder of **Section 3.7.1** of this report.

**Existing Land Use:** This criterion pertains to the potential magnitude of change that the crossing would have on existing land use at and in the vicinity of the crossing. The

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existing land use around the Bayou Dorcheat crossings of Alternatives 1, 2, and 3 consists of timber management, oil and gas exploration, and pockets of undisturbed bottomland hardwood habitat. Existing land use around the Alternative 4 crossing of Bayou Dorcheat is the same as Alternatives 1, 2, and 3, with the exception that Alternative 4 also has developed land on the east side of the bayou, which consists of a few residential structures.

**Historical/Archaeological Sites:** This criterion pertains to the potential adverse effects that the crossing would have on recorded and unrecorded cultural areas, including archaeological sites, standing historic structures, and historic Native American lands. There are no recorded historical or archaeological sites within the required right-of-way of the Bayou Dorcheat crossings of Alternatives 1, 2, and 3. However, due to the proximity of available water, soil types in the area and slope of the land, the entire area around the crossings of Alternatives 1, 2 and 3 have a high probability for potential unrecorded archaeological findings. Like Alternatives 1, 2, and 3, Alternative 4 does not encompass recorded historical or archaeological sites within its required rights of way. However, due to the proximity of available water, soil types in the area, and slope of the land, there is a high probability for potential unrecorded archaeological findings.

**Economic Impact of Project:** This criterion pertains to the potential that the crossing would directly or indirectly affect commerce. Much of the land surrounding Bayou Dorcheat in the vicinity of Alternatives 1, 2, and 3 is actively under silviculture and is bordered by oil and gas wells. Conversely, land surrounding the Bayou Dorcheat crossing of Alternative 4 is swampy, with limited silviculture or development opportunities. However, several gravel mining operations are located along the southern reach of Bayou Dorcheat in the vicinity of Alternative 4.

**Wilderness/Rural Quality:** This criterion pertains to the potential changes that may result to the existing wilderness and/or rural quality of the area from the crossing. Due to the fact that there is no development along Bayou Dorcheat or within its floodplain at its crossings by Alternatives 1, 2, and 3, the rural quality of the general area is high. However, the wilderness quality of the specific Alternative 1, 2, and 3 crossing is rather low for several reasons. Timber management along both sides of the bayou is present, with cleared areas visible from the water. Several logging and oil and gas activity access roads are visible from the water as is a pipeline crossing of the bayou. The area surrounding the Bayou Dorcheat crossing for Alternative 4 has residential development on the eastern side of the bayou lowering the rural quality of the area, as well. While the floodplain is fairly intact and development is not visible from the bayou, there is timber management on both sides of the floodplain reducing the wilderness quality of Bayou Dorcheat in its reach around Alternative 4. The wilderness quality of this reach is further reduced by a railroad crossing of the bayou intersecting the Bayou crossing of Alternative 4.

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**Scenic/Aesthetic Value:** This criterion pertains to the potential effects that a crossing would have on the existing scenic vistas along the Scenic Stream. In the area of Alternatives 1, 2, and 3, Bayou Dorcheat's banks are covered by native, undisturbed vegetation, including mature cypress at the water's edge and mature pine woods or bottomland hardwood forests extending from the bank. While there is a buffer, timber harvesting is visible from the water reducing the aesthetic value. The bayou is a single, fairly large channel at this location, allowing for a broad view shed of the bayou's open reach bordered by large, old growth trees. In the vicinity of Alternative 4, Bayou Dorcheat is braided with no main channel. The closed-canopy swamp with no sizable open areas is mature and dense. While sight distance is limited, scenic views are abundant. Residential development and timber management is present in the area; however, these activities are not readily visible from the bayou in the vicinity of Alternative 4. The railroad crossing of Bayou Dorcheat at Alternative 4 will require an overpass structure that will be approximately 40 feet above the average water level of Bayou Dorcheat. While this structure will become the dominant feature in the landscape, the mature, dense swamp in this region limits sight distance and views of the landscape from the water. Proposed crossings of Bayou Dorcheat in the vicinity of Alternatives 1, 2 and 3 are crossings in areas where there are substantially long reaches of Bayou Dorcheat with unobstructed views along these reaches. Like Alternative 4, the proposed Bayou Dorcheat crossing bridge will become the dominant feature in the landscape along these reaches of Bayou Dorcheat; however, the smaller scale of the structure, which will not need the 23.5-foot vertical clearance for the railroad overpass for Alternative 4, may reduce perceived adverse effects to the scenic quality resulting from this new structure in the landscape. **Photos 1 - 6** display views in the vicinity of proposed crossings.

**Recreational Use / Opportunities:** This criterion pertains to the potential beneficial or adverse effects that a crossing would have on existing and future recreational opportunities associated with the scenic stream. The remote nature of Bayou Dorcheat in the vicinity of its crossings along Alternative 4 has limited the recreational opportunities in this region. The braided and broad nature of the waterway along this reach of Bayou Dorcheat does not provide for parking areas, boat ramps or other means of public access. Alignments through this region would necessarily be approximately 40 feet high at the Kansas City Southern Railroad in order to provide the necessary 23.5-foot vertical clearance required for railroads. Noise and visual effects from this alignment may adversely affect hunting and nature viewing in this region or have a perceived effect. Bayou Dorcheat in the vicinity of Alternatives 1, 2, and 3 has a well-defined channel that is navigable under all flow conditions. Access from existing logging and oil and gas activity access roads could be improved with parking to facilitate access to Bayou Dorcheat via boat ramps, piers and other means in the vicinity of Alternatives 1, 2, and 3. Additionally, the deep waters of Bayou Dorcheat south and north of its crossing of Alternatives 1, 2, and 3 provide a far longer navigable stretch for boating and fishing activities. Based on existing conditions, Bayou Dorcheat in the vicinity of Alternatives 1, 2, and 3 appears to have better recreational opportunities. An

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alignment through this area would become the dominant visual feature in the area although would be far lower in stature than the crossing required for Alternative 4 over the Kansas City Southern Railroad. This new visual feature in the vicinity of its crossings on Alternatives 1, 2, and 3 may adversely affect enjoyment of these relatively long and straight reaches of Bayou Dorcheat.



Photo 1: Looking east at the Alternative 4 crossing of Bayou Dorcheat



Photo 2: Looking west at the Alternative 4 crossing of Bayou Dorcheat

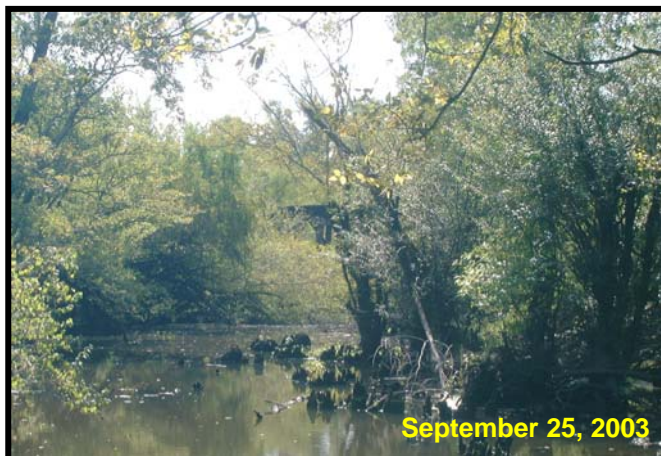


Photo 3: Looking downstream at the Alternative 4 crossing of Bayou Dorcheat, railroad trestle in background



Photo 4: Looking upstream at the Alternative 4 crossing of Bayou Dorcheat

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Photo 5: Looking downstream at the Alternative 1 and 2 crossing of Bayou Dorcheat



Photo 6: Looking upstream at the Alternative 3 crossing of Bayou Dorcheat

**Ecological Systems Present:** This criterion relates to the broad (landscape-scale) context of the proposed crossing, including major vegetative cover types and patterns of fragmentation and connectivity. The area within a one-mile radius of the approximate center of the active stream channel crossings of Alternatives 1, 2, and 3 consists of a mixture of managed upland pine forest, pasture, riparian wetland forest, and landscaped residential areas to the east. To the west is riparian wetland forest and managed pine forest. The active channel of Bayou Dorcheat meanders through the landscape from northwest to south-southeast, although the frequency and acuity of the bends are somewhat greater in the northwestern two-thirds. This channel is near the toe of a ridge on the eastern side, whereas the active floodplain extends about 4,500 to 4,900 feet westward. The channel is well-incised, between 90 and 130 feet wide, and about 27 feet deep near the thalweg at bankfull stage. While the crossings of Alternatives 2, and 3 are located further south, the crossing of Alternative 1 is parallel to, and about 200 feet downstream (south) from a liquid petroleum pipeline corridor. The pipeline corridor and two gas-field roads fragment the riparian (floodplain) forest in the vicinity. The area within the vicinity of the Alternative 4 crossing and the easternmost bayou channel consists of a mixture of managed upland pine forest, pasture, riparian wetland forest, and landscaped residential areas to the east. Riparian wetland forest and managed pine forest are located to the west. Bayou Dorcheat in the vicinity of Alternative 4 is better characterized as a swamp with numerous and braided shallow sloughs. Under base-flow conditions, it appears that there is no continuous surface flow through this reach of the bayou's valley. The active floodplain in this area is about 2,000 feet wide; however, the proposed crossing is on a diagonal traversing about 3,800 feet of swamp. The high structure that will be present for the Alternative 4 crossing will allow for safe and more confident passage by wildlife under the structure.

**Fish and Wildlife in the Area:** This criterion pertains to the known or potential occurrence of natural animal communities (both aquatic and terrestrial), including representatives of rare taxa. Although slightly depressed by the localized erosion of the

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east bank at and near the pipeline crossing for Alternative 1, physical habitat characteristics for a low-gradient stream, based on USEPA Rapid Bioassessment Protocols (RBPs), were relatively favorable as recorded during a September 2003 field study. Similar conditions were present for Alternatives 2 and 3. Many anecdotal observations during this survey indicated the presence of a robust and diverse warm-water aquatic community. According to the 2002 *Louisiana Water Quality Inventory, Section 305(b)* Report, much of the entire bayou upstream from Lake Bistineau supports “good to excellent fish populations.” The proposed crossing area for Alternative 4 is not characterized by this statement except ephemerally when there are higher flows in the system. Anecdotal observations during this survey indicated the presence of a limited resident aquatic community in the vicinity of the Alternative 4 crossing. The forested floodplain on the west side of the stream near all four alternative crossings is extensive and generally secluded; it would therefore be expected to support a diverse community of lowland and ubiquitous terrestrial wildlife. Information provided by the Louisiana Natural Heritage Program (LNHP) and the U.S. Fish and Wildlife Service in 2003 did not indicate any local records of rare elements or threatened and endangered species. However, the aforementioned 2002 305(b) Report indicates that several protected/rare/endangered/threatened species (PRETS) occur along Bayou Dorcheat.

**Botanical Elements:** This criterion relates to the known or potential occurrence of natural vascular plant communities, including representatives of rare taxa. Immediately adjacent to the bayou on both sides of the crossings of Alternatives 1, 2, and 3, are mature mixed forests; that of the west side is dominated by baldcypress and overcup oak, interspersed with a few loblolly pine, while on the east the same ranking exists but pines are more prevalent. A few feet inland the canopy is virtually complete, so that understory is sparse except along the stream, where water elms and an occasional buttonbush are present. Except in the pipeline corridor near Alternative 1, there is very sparse herbaceous ground cover. About 100 to 150 feet inland, on both sides of the stream, the forest becomes dominated by loblolly pine, with those to the west obviously having been planted in the vicinity of Alternatives 1, 2 and 3. Canopy closure in this stand of pines is intermittent, with the result that understory (mainly sweetgum, American holly, and yaupon) and herbaceous ground cover (various grasses and forbs) are more prevalent. The swamp in the vicinity of the proposed crossing of Alternative 4 is dominated by overcup oak, water hickory, and baldcypress. Apparent storm damage and the railroad corridor have opened the forest canopy in many areas, resulting in localized high densities of understory (mainly water elm, buttonbush, and sweetgum,) and herbaceous ground cover (various grasses [especially panic grass] and forbs). Where there are canopy gaps associated with sloughs, the margins are frequently populated with thickets of water elm, buttonbush, and black willow. Information provided by the Louisiana Natural Heritage Program (LNHP) and the U.S. Fish and Wildlife Service in 2003 did not indicate any local records of rare elements or threatened and endangered species along any of the crossings of Alternatives 1 - 4.

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**Geological Features:** This criterion pertains to the potential suitability of the project given the existing soils and geologic conditions at the site, as well as the effects to unique geologic features present in the area. In the vicinity of the Bayou Dorcheat crossings of Alternatives 1, 2, and 3, Bayou Dorcheat has a fairly broad floodplain with natural levees along the bayou's single main channel. The terrain rises from the floodplain into typical pine wood hills of North Louisiana. Soils along Alternatives 1, 2, and 3 are a sandy-clay mix and tend to be highly erodible, especially when vegetation is removed. There is evidence of erosion along the banks in the form of sloughing from the bank walls and wash-out holes in the banks crown. Bayou Dorcheat in the vicinity of Alternative 4 is extremely braided with no substantial channels. Due to this braiding, the area surrounding the Bayou Dorcheat crossing of Alternative 4 is fairly flat and swamp-like with no natural levees as banks. The geologic features of Alternatives 1, 2, and 3 differ greatly from that of Alternative 4.

**Hydrological Features:** This criterion pertains to the overall hydrological features of the stream at the proposed crossing location including the overall flow regime and the potential for soil erosion (scour). Concerning potential for scour, all crossing locations are predominated by Guyton-Ouachita silt, loams, frequently flooded, which are common for flood plains of major streams. The soils are mostly silty and poorly drained, which typically leads to a "crust" on the outer covering of the soil. Once exposed, the soils can be susceptible to erosion even at moderate flow rates. Based on preliminary hydraulic evaluation, none of the proposed crossing would result in an appreciable increase in flow rates at moderate (25-year) or high (100-year) flood events. Additionally, Alternatives 1, 2, and 3 appear to cross Bayou Dorcheat in an area where the stream is relatively straight. This will minimize potential scour potential. Alternatives 1, 2, and 3 sites have already had hydraulic impacts due to existing bridges at LA 2 (upstream), an oil-field road bridge (downstream), LA 160 (downstream), and an existing pipeline crossing. The existing flow regime of the Alternative 4 crossing appears to be hydrologically impacted to a higher degree than the crossing location of Alternatives 1, 2, and 3. Alternative 4 crosses Bayou Dorcheat in the immediate vicinity of a railroad crossing of the bayou. The existence of the railroad along the western boundary of the Dorcheat floodplain in this area has impacted the area's flow regime by directing all flow through the relatively limited opening of the railroad bridge.

**Water Quality / Quantity:** This criterion pertains to the potential of the crossing to degrade water quality and/or reduce instream flow requirements for aquatic plant and animal communities. As noted above, aside from the pipeline corridor and some localized bank erosion, the riparian corridor in the vicinity of the crossing is well vegetated and would be expected to protect the downstream reach from excessive inputs of suspended solids. There is no evidence of any significant point or non-point sources of anthropogenic contaminants for several miles upstream from any of the crossings of Alternatives 1-4. The 2002 Section 305(b) Report presents information from the only LDEQ water-quality monitoring station that suggests that fish and wildlife propagation and outstanding natural resource uses are not fully supported in

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Subsegment 100501 (Arkansas boundary to Lake Bistineau). This monitoring station, however, is more than 30 stream miles below the Alternatives 1-3 crossings. The monitoring station is at least 5 miles below Alternative 4, as well as immediately downstream from an urbanized area, so it is highly unlikely to be representative of any portions of the bayou above such disturbances. Because of the relatively large cross-sectional area of the single active bayou channel at the proposed crossing for Alternatives 1, 2, and 3, flow volumes are consistently adequate to support substantial lotic communities. The swamp in the vicinity of the Alternative 4 crossing is well vegetated and would be expected to protect the downstream reach from excessive inputs of suspended solids. Along this reach of Bayou Dorcheat, flow volumes are inadequate to support resident lotic communities.

### 3.7.2 Effects to Sparta Aquifer

The Corridor Selection concluded that Corridor 1D avoids the Sparta Aquifer primary recharge areas that are outcrops of this water-bearing formation. Corridor 2A/2B traversed 166 acres of these primary recharge areas. Comments received from the sponsors of the North Hills Lakes Project, however, criticized the method used to evaluate the potential effects that any highway alignment would have to the Sparta Aquifer. Specifically, some comments suggested that equal weight be given to the recharge of the Sparta from the Chicot Terraces that are more commonly found in the Study Area. More area of land considered to have some recharge potential for the Sparta Aquifer is traversed by Corridor 1D compared to Corridors 2A/2B when this evaluation method is used. To determine the significance of these findings, the project team submitted a packet of information to the Office of Conservation in the Louisiana Department of Natural Resources on February 19, 2004 (**Appendix A**). This packet explained the evaluation of the potential effects to the Sparta Aquifer that was conducted in the Corridor Evaluation study. It further requested comments related to this evaluation. A response to this request was received from the Office of Conservation on March 9, 2004 (**Appendix A**), that concludes that “. . .the I-69 project should not have a negative effect on the recharge of the Sparta Aquifer.”

### 3.7.3 Effects to North Hills Lakes Project

As discussed in **Section 3.2.10** of this report, the North Hills Lakes Project proposes four new reservoirs in the study area region to form a basis for economic development related to residential retirement development, water-based recreation, and Sparta aquifer recharge. Comments have been made by North Hills Lake Project proponents that Corridor 1D “. . .”is not even remotely accessible to the four lakes proposed for Claiborne and Webster Parish” (Letter from James Michael dated January 12, 2004 [**Appendix A**]). Similar comments from other proponents have also been received, which suggests that choosing an alignment in Corridor 1D rather than Corridor 2B would jeopardize the North Hills Lakes project, presumably by decreasing the attractiveness of real estate along the shores of the proposed reservoirs. Empirical evidence and review of the relative access to these areas from both Corridor 1D and 2A suggests that this

should not be a concern. **Figure 3.4** displays the potentially reasonable and feasible alternatives from both Corridor 1D and 2A in relation to the proposed reservoirs of the North Hills Lake Project located in the study area region. Review of access points and travel times from I-69 suggest any of the Corridor 1D alignments will likely add up to 10 minutes of travel to access the proposed lakes on Flat Lick Bayou and Middle Fork of Bayou D'Arbonne, but not affect travel time and access to the proposed Black Bayou Lake. Experience in transportation planning, suggests that 10 minutes can dissuade some travelers making shorter duration trips; however, this sensitivity to travel time is expected to be far lower in a retirement community, with fewer commuting trips expected to outlying areas. Additionally, empirical evidence from other similar freeway projects, suggests that commercial development tends to concentrate at the interchange but extends up to 7 miles from a rural interchange, roughly suggesting a 10-minute travel time. Based on this reasoning, alternatives within Corridor 1D do not appear to have strong potential to jeopardize the viability of the North Hills Lakes Project.

#### **3.7.4 Effects to Regional Oil and Gas Activities**

While it is true that Corridor 1D traverses the Cotton Valley Oil and Gas Field as well as a portion of the Haynesville Oil and Gas Field, comments related to adverse effects to these fields and activities therein exaggerate this problem. **Figure 3.5** displays the locations of plugged and abandoned wells; inactive wells that have the potential for future utility; and wells that are currently active. **Figures 3.1A-E** and **3.3F 1-4** show the locations of active and inactive wells sites in relation to alternatives. Coordination with the oil and gas operators in the region has resulted in an alignment that avoids all of the most productive wells and most others, resulting in a relatively low cost of mitigating well impacts. Coordination with oil and gas operators in the Haynesville and Arkansas regions likewise has resulted in optimum alignments (see **Section 3.2.9** for details). However, an alternative along Corridor 2A would avoid these fields and provide for greater flexibility of alignments.

#### **3.7.5 Proposed Retention of Alternative 4**

Based on the findings discussed in Section 3.7 of this report, Alternative 4 has some advantages that suggest it should be considered for detailed evaluation in the EIS. Related reasons follow:

- The general Corridor along which Alternative 4 is aligned is preferred by most Homer, Minden, and Claiborne Parish commentors;
- Alternative 4 appears to be viable and have reasonable costs when compared to Alternatives 1, 2, and 3;
- Alternative 4 appears to have potentially acceptable adverse effects to communities and the environment;
- Alternative 4 avoids the Cotton Valley oil and gas field and traverses fewer acres of land considered to recharge the Sparta Aquifer; and

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- The crossing of Bayou Dorcheat for Alternative 4 appears to have less adverse effect to the Bayou Dorcheat Scenic Stream resource than the crossings of Alternatives 1, 2 or 3.

However, there are several limitations to Alternative 4 that suggests that this alternative should *not* be considered for full evaluation in the EIS for this project. Related concerns follow:

- Alternative 4 has the highest costs among Alternatives 1-4;
- Alternative 4 has the greatest wetland impacts of all Alternatives 1-4;
- Alternative 4 has the greatest number of residential structures that would likely be adversely affected by noise; and
- Alternative 4 is the only alternative to traverse outcrops of the Sparta Aquifer.

Nevertheless, it appears that because Alternative 4 meets the project purpose and needs, addresses many public concerns, and appears to be potentially reasonable and feasible, Alternative 4 is proposed for detailed evaluation in the EIS.

**FIGURE 3.4**  
**ALTERNATIVES IN RELATIONSHIP TO NORTH HILLS LAKES**  
**PROJECT**  
*(PLEASE DOWNLOAD FIGURE 3\_4.PDF)*

**FIGURE 3.5**  
**OIL AND GAS WELLS IN RELATION TO ALTERNATIVES**  
***(PLEASE DOWNLOAD FIGURE 3\_5.PDF)***

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## 4.0 EIS ALTERNATIVES

### 4.1 Build Alternatives

#### 4.1.1 Build Alternatives Presented to Resource Agencies

Concurrence on Alternatives 1, 2, 3, and 4 for evaluation in the EIS as described in the May 21, 2004 version of this report and displayed in **Figure 4.1** was provided by the cooperating agencies on the project (i.e., USACE, USFWS, and USEPA) in late May 2004. Following this concurrence, a meeting with resource agencies was arranged for June 2, 2004 to present these four build alternatives to agency representatives so that refinements could be made prior to public presentation. Invitations to this meeting were provided to all resource agency representatives for the project used to date. This meeting, held at the Junction City, Louisiana Senior Citizens Center on June 2, 2004, was attended by 16 persons, including representatives of the following agencies:

- Federal Highway Administration
- Louisiana Department of Transportation and Development
- Arkansas Highway and Transportation Department
- United States Army Corps of Engineers
- United States Fish and Wildlife Service
- United States Department of Agriculture, Natural Resources Conservation Service
- Louisiana Department of Wildlife and Fisheries

A draft version of this report dated May 21, 2004 was distributed to attendees at this meeting for use during the presentation. This report was also distributed later in the week of June 1<sup>st</sup> to agency representatives who did not attend this meeting.

Following the formal presentation in the June 2<sup>nd</sup> resource agency meeting, attendees gathered around maps of the alignments and had one-on-one discussions with project team staff.

**FIGURE 4.1**  
**BUILD ALTERNATIVES 1, 2, 3, AND 4**  
***(PLEASE DOWNLOAD FIGURE 4\_1.PDF)***

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No formal written or verbal comments from agencies were received by the close of the commenting period on June 16<sup>th</sup> or by the publication date of this report. However, informal comments received during the Junction City meeting that were related to Alternative alignments are summarized below:

- **New Bayou Dorcheat Crossing parallel to LA 160** - Keith Cascio, Louisiana Department of Wildlife and Fisheries, Scenic Streams Coordinator, suggested that an alignment along the same reach of Bayou Dorcheat as LA 160 be evaluated. This alignment would be consistent with an “improvement” option as LA 160 already has a bridge through this reach. It was decided that Alternative 3 would be revised to include this new crossing and alignment.
- **Evaluation of western, central and eastern termini interchange options** - Bill Richardson, AHTD, noted that all three northern terminus options at US 82 are still under consideration, and that each should be displayed in the public meetings.
- **New Bayou Black Crossing Alignment** - Several team members conferred with Susan Jarvis of the USACE about an alignment of Alternative 4 at LA 2 that required fewer curves. An alignment via Segments 78 and 66 or 78 and 67 was discussed as an improvement to that which was presented in this report.
- **Avoidance of Oak Hills Golf Course** - Team staff also discussed an alignment change of Alternative 4 east of its Bayou Dorcheat crossing to ensure that a newly constructed golf course on the east side of LA 3008 would not be traversed. A new alignment to its west was suggested that would avoid this site.

### 4.1.2 Build Alternatives Presented to the Public

Following the incorporation of the changes suggested in the agency meeting described in **Section 4.1.1** of this report, five public open houses were held during the week of June 22<sup>nd</sup> to present the revised Alternatives 1, 2, 3, and 4 to the public and elected officials.

While the *Alignment Study Presentation and Comment Summary* provides details of the public comments received at and following these meetings, several summary points are reproduced herein to illustrate the reasons for the alignment revisions and the omission of some of the alternatives from further consideration in the EIS.

- **1,396 individual comments** were received from the public, with **91 percent (i.e., 1,271 of 1,396) from Louisiana residents**.
- Only **36 commentors explicitly prefer Alternatives 2 or 3** (i.e., < 2 percent of all commentors).
- Only **36 commentors (i.e., < 2 percent of all commentors) preferred none of Alternatives 1, 2, 3, or 4**. Some of these commentors referenced the North Hills Lakes Project and an alignment along US 79 North from Minden to El Dorado.

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- **Alternative 4 is preferred by over 53 percent of all commentors**, followed by Alternative 1, which was preferred by 36 percent of all commentors.
- Approximately **43 percent of all commentors prefer Corridor 1d Alternatives** (i.e., Alternatives 1, 2, or 3) as opposed to Alternative 4, no alternative, or another alternative.
- **71 percent of all Louisiana comments (i.e., 907 of 1,271) are from Webster Parish residents.**
- **52 percent of Webster Parish commentors prefer Alternative 4**; 39 percent prefer Alternative 1; but 46 percent prefer alternatives in Corridor 1d.
- **79 percent of Claiborne Parish commentors prefer Alternative 4**, with only 8 percent preferring Alternative 1.
- **87 percent of all Arkansas commentors prefer Alternative 1**;
- **58 percent of all Louisiana commentors prefer Alternative 4**;
- A petition signed by **3,700 persons from the region protest a crossing of Bayou Dorcheat inside Corridor 1d** due to its impacts to this scenic waterbody; and
- A petition signed by **1,100 persons from the Cotton Valley, Serepta, Shongaloo, and Springhill communities request that alternatives remain inside Corridor 1d.**

Many public commentors provided multiple reasons why an alignment was preferred. The following are the primary reasons commentors selected a preferred alternative:

- **Economic or community benefits** - these criteria appeared to be the primary reasons in selecting an alternative; over 250 respondents cited these criteria.
- **Time efficiency and emergency response** - approximately 75 individuals felt that a specific alternative would be best for time efficiency and in emergency response situations.
- **Cost efficient** - almost 90 respondents chose an alternative because they felt that it was the most cost efficient.
- **Sparta Aquifer** - just over 60 respondents indicated that water quality and minimizing impacts to the Sparta Aquifer were key factors in their selection of an alternative.
- **Bayou Dorcheat** - approximately 100 respondents indicated that minimizing impacts to Bayou Dorcheat was critical in their selection of an alternative.

### 4.1.3 Build Alternatives Modified from the Public and Project Team Comments

#### 4.1.3.1 Public Design and Alignment Comments

Design-related comments comprised a very small minority of the public comments (i.e., less than 20). These comments and the way that each was addressed by the project team in the EIS Alternatives are provided below:

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- **Provide additional interchanges between US 79 and US 82 (all alternatives).** Additional interchanges will be considered during the EIS development; however, preliminary evaluation suggests that additional interchanges would be difficult to justify in this sparsely developed region.
- **Provide interchanges at LA 3008 and LA 159 (Alternative 4).** Should interchanges be developed at both, LA 3008 and LA 159, as well as LA 2, there would be substantial cost increase to the project that may not provide sufficient transportation benefits for its justification.
- **Provide an interchange at Dorcheat Road (Alternative 4).** An additional interchange on LA 3008 (Dorcheat Road) would provide better access to trips to and from the east side of Bayou Dorcheat; the distance between the US 371 and LA 2 interchanges is approximately 16 miles, which is relatively long compared to other sections of the interstate except for the section between US 79 and US 82, which is approximately 24 miles. Additional study for the need for this and other interchanges between US 79 and US 82 will be completed during the preparation of the EIS for this project.
- **Straighten the alignment across Black Bayou (Alternative 4).** The alignment across Black Bayou has been realigned to connect with adjacent alternative sections with fewer and more gradual horizontal curves.
- **Reroute the alignment south of Black Bayou (Alternative 4).** Realignment fully south of Black Bayou would require an interchange with US 79 south of Haynesville, which precluded the avoidance of the Black Bayou crossing. However, the crossing of Black Bayou was revised eastward to a location closer to Haynesville in a region where Black Bayou's adjacent wetlands narrow to a great extent.
- **Move interchange at LA 2 eastward (Alternative 4).** The interchange of Alternative 4 with LA 2 has been moved approximately 1 mile eastward.
- **Provide an interchange at LA 615 (Alternatives 1, 2, and 3).** LA 615 is approximately 3 miles south of US 79 along the proposed alignment. However, Average Daily Traffic (ADT) estimates for LA 615 is under 1,000 vehicles a day or less than 50 percent of the volume of US 79. While additional interchanges will be considered throughout the development of the EIS, an additional interchange at LA 615 is not proposed for full evaluation in the EIS at this time.
- **Utilize existing highways to minimize cost; Interstate 20, US 79 and Highway 80 were noted.** Use of I-20 to an eastern interchange north to El Dorado requires an additional interchange and double-signing the I-20 along this reach. This design option reduces the transportation utility of the I-69 route without reducing the mileage of new roadway that would be necessary. Additionally, existing roads in an alignment needed for the project (e.g., US 79, LA 9, AR 15) have too much horizontal and vertical curvature to be used without substantial geometric modifications. The extensive modification and expansion in width needed to accommodate the controlled-access interstate section for I-69 would likely require extensive access improvements and potential isolation of

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existing properties, or the displacement and relocation of their structures. For these reasons, an existing roadway improvement option is not practicable, and is not considered as a build alternative for this EIS.

### 4.1.3.2 Project Team Design and Alignment Comments

In addition to comments from the public, the project team developed several alignment improvements which include the following.

- A **shift of the Alternative 1 alignment to the west** was made to avoid a pond and reduce horizontal curvature (**Figure 4.2, Page 1 of 6**).
- The **Bayou Dorcheat crossing of Alternative 3 was realigned** to reduce wetland impacts and be located closer to LA 160 in the same reach of Bayou Dorcheat (**Figure 4.2, Page 2 of 6**).
- A **new transition** between the alignment of Alternatives 1 and 2 was developed south of US 371 to enable using the better interchange location of Alternative 2 (**Figure 4.2, Page 1 of 6**).
- A **new transition** between the alignment of Alternatives 2 and 3 was developed east of the Bayou Dorcheat crossing, allowing for transition to the Alternative 2 alignment north of LA 159 (**Figure 4.2, Pages 2 and 3 of 6**), resulting in a new interchange location on LA 159.
- **New transitions** between the alignment of Alternatives 2 and 3 each developed north of its interchange with US 79 to allow for the transition between the Alternative 2 and 3 alignments (**Figure 4.2, Pages 4 and 5 of 6**).
- The **best segments of Alternatives 1, 2, and 3 were combined into a new Alternative 5**, which will include important options. This new Alternative 5 replaces the independent alignments of Alternatives 1, 2, and 3, which are no longer proposed for full evaluation in the EIS (**Figure 4.2, Pages 1-6 of 6**).

### 4.1.3.3 Modifications Summary

Because very few comments specifically related to Alternatives 2 or 3, and neither alternative provides a benefit when compared to Alternative 1, the best segments of Alternatives 1, 2, and 3 were combined into a single new alternative, Alternative 5. Alternative 5 retains much of the Alternative 1 alignment, with optional crossings of Bayou Dorcheat (Option 1) and Cornie Bayou (Option 2), formerly presented as segments of Alternatives 2 and 3. Alternative 5 and its options replace Alternatives 1, 2, and 3 presented to the public in June 2004.

Alternative 4 remains proposed for full evaluation, but has been modified to include a new Black Bayou crossing and the new optional crossing of Cornie Bayou (Option 2) also proposed for Alternative 5.

In summary, the following modifications have been made to the EIS build alternatives in comparison to the EIS build alternatives presented in the draft version of this report dated May 21, 2004:

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- **A new alignment for Alternative 3 was developed to follow the LA 160 alignment across Bayou Dorcheat** in the same general reach of the Bayou. This new alignment was incorporated for the public meeting and improved following the public meetings for evaluation in the EIS.
- **The overall least impacting and best geometric alignment segments of Alternatives 1, 2, and 3 were combined into one new Alternative 5**, which includes the newly aligned crossing of Bayou Dorcheat adjacent to LA 160, and other improvements proposed by the project team and public.
- Although all three northern termini options at US 82 were added for presentation to the public, **only the preferred terminus at US 82 for SIU No. 13 will be retained for full evaluation with Alternatives 4 and 5 in SIU No. 14**. For the purposes of illustration, the western terminus as shown in the May 21, 2004 draft version of this report is displayed at this time to represent this single terminus.
- **A revised crossing of Black Bayou for Alternative 4 was provided for the public meetings and later moved further east in response to public comments**. The current alignment addresses all comments received at the public meetings.
- **A new alignment of Alternative 4 north of its Bayou Dorcheat crossing was developed to miss a newly constructed golf course prior to the June 2004 public open houses**. This alignment was presented in the public meeting and retained.
- **Four new, short transitions, a new LA 159 interchange location for Alternative 5, and two geometric improvements proposed by the team following the June 2004 open houses were incorporated**.

**Table 4.1** provides the alternative evaluation matrix for Alternatives 1, 2, 3 and 4, as well as the revised Alternative 4, new Alternative 5 and their options. Several cost and impact updates have been incorporated into the results for Alternatives 1, 2, 3 and 4 to allow comparison to new Alternative 5 and Alternative 4 and their options (i.e. optional crossings of Bayou Dorcheat [Option 1] and Cornie Bayou [Option 2]). These final proposed alternatives for full evaluation in the EIS (i.e., Alternatives 4, 4.2, 5, 5.1, 5.2, and 5.1 and 2.) are illustrated in **Figure 4.2**, with the transparent white alignments representing the alternative alignments presented at the public meetings in June, 2004. Comparison of these matrices illustrates that the adverse effects and costs are further minimized by the new Alternative 5 options, supporting the creation of this new alternative rather than retention of Alternatives 1, 2, and 3 independently. Furthermore, the revised Alternative 4 alignments are shorter and reduce costs substantially.

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**TABLE 4.1**  
**Modified EIS Alternatives Evaluation Matrix Summary**

Criteria Category and Sub-Category	Criterion ID <sup>1</sup>	Evaluation Measure	Units	Public Open House Alternatives June 2004				Modified EIS Build Alternatives					
				1	2	3	4	4	4 Option 2	5	5 Option 1	5 Option 2	5 Options 1 & 2
<b>Overall Segment Length</b>													
Length	1	Total Length of Segment within Section	Miles	63.69	63.64	63.21	62.65	61.68	61.32	62.73	61.39	62.37	61.03
<b>Physical and Natural Environmental Considerations</b>													
Wetlands	4	Wetlands within Right of Way (ROW)	acres	87.8	100.0	91.9	124.0	118.20	139.75	83.43	83.37	104.98	104.92
Floodplains	6	Floodplains within ROW	acres	277.8	262.5	255.4	367.3	325.85	361.85	248.58	289.42	284.58	325.42
Aquifer Impacts	8	Sparta Aquifer Outcrop Zone Acreage within ROW	acres	---	---	---	8.78	10.25	10.25	---	---	---	---
	9	Chicot Terraces Outcrop to Sparta Aquifer Area within ROW	acres	497.6	487.1	492.4	286.5	274.38	274.38	516.68	556.15	516.68	556.15
	10	Total Aquifer Outcrop Acreage within ROW	acres	497.6	487.1	492.4	295.3	284.63	284.63	516.68	556.15	516.68	556.15
Scenic Streams	19	Scenic Stream Crossings along Segment Centerline	name crossing	Dorcheat	Dorcheat	Dorcheat	Dorcheat	Dorcheat	Dorcheat	Dorcheat	Dorcheat	Dorcheat	Dorcheat
<b>Other Environmental Considerations Including Cost Factors</b>													
Industrial Facilities	44	Active Oil/Gas Well Sites within ROW	count	6	4	4	4	4	4	5	5	5	5
	45	Inactive Oil/Gas Well Sites within ROW	count	3	3	---	---	2	1	3	3	2	2
Utilities	52	Power line Crossings within ROW	count	3	3	3	3	3	3	3	3	3	3
	53	Pipeline Crossings within ROW	count	17	16	12	14	16	16	14	14	14	14
Community Facilities	55	Number of Commercial Facilities within ROW	count	2	2	---	---	2	2	2	2	2	2
	56	Number of Commercial Facilities within 400' Buffer <sup>2</sup>	count	3	2	1	---	2	2	2	2	2	2
Residential Inventory	59	Number of Residential Structures within ROW	count	5	6	5	11	12	12	6	3	6	3
	60	Number of Residential Structures within 400' Buffer <sup>2</sup>	count	19	24	18	35	24	24	14	7	14	7
	61	Number of Mobile Homes within ROW	count	---	---	3	4	3	3	---	---	---	---
	62	Number of Mobile Homes within 400' Buffer <sup>2</sup>	count	6	8	7	8	7	6	5	5	4	4
<b>Other Considerations</b>													
Demographics	70	Estimated Population within ROW	count	13	16	21	39	39	39	16	8	16	8
	71	Estimated Population within 400' Buffer <sup>2</sup>	count	65	83	65	112	81	79	49	31	47	29
<b>Preliminary Project Cost Estimate (in 1,000s of Dollars)</b>													
Wetlands	73	Wetland Mitigation Cost <sup>3</sup>	\$	\$878	\$1,000	\$919	\$1,240	\$1,182	\$1,398	\$834	\$834	\$1,050	\$1,049
ROW	80	Total ROW Cost	\$	\$4,396	\$4,506	\$4,518	\$4,559	\$4,619	\$4,609	\$4,557	\$4,466	\$4,548	\$4,456
Industrial Facilities	88	Total Industrial Facility Mitigation Cost	\$	\$6,750	\$4,750	\$4,000	\$4,000	\$4,500	\$4,250	\$5,750	\$5,750	\$5,500	\$5,500
Utility Relocations	93	Total Utility Relocation Mitigation Cost	\$	\$4,950	\$4,750	\$3,750	\$4,200	\$4,600	\$4,600	\$4,100	\$4,100	\$4,100	\$4,100
Relocations	98	Total Relocation Cost	\$	\$3,825	\$4,600	\$2,775	\$4,975	\$2,725	\$2,725	\$1,750	\$1,375	\$1,750	\$1,375
Structures	105	Total Cost of Structures	\$	\$126,010	\$130,844	\$148,084	\$114,684	\$114,684	\$114,684	\$132,884	\$147,084	\$132,884	\$147,084
Roadway	109	Total Cost of Roadway and Drainage	\$	\$286,282	\$294,931	\$303,445	\$316,591	\$307,044	\$307,731	\$283,637	\$278,305	\$284,324	\$278,992
Cost Summary	112	Total Estimated Cost, includes 25% contingency	\$	\$541,363	\$556,727	\$584,365	\$562,812	\$549,192	\$549,996	\$541,890	\$552,391	\$542,695	\$553,195

**Notes:**

Several cost and impact updates were incorporated into **Table 4.1** to allow comparison of new Alternatives 4 and 5 to the Alternatives 1, 2, 3 and 4 presented to the public in June 2004. Therefore, data in some entries for Alternatives 1, 2, 3 and 4 differ from that displayed for the same entries in **Table 3.2**.

4. Several criterion ID numbers (and evaluation measures) are missing because these categories were either not impacted by the alternatives or did not show a meaningful difference among the alternatives. Criterion for which no impacts are anticipated by any of the alternatives include: 21-43, 46-49, and 57-58. Please refer to **Appendix B of this report** for a complete list of the evaluation measures including those for which no adverse effects are anticipated from any of the alternatives.
5. The buffer was 400 feet and is representative of the distance for potential noise impacts.
6. The wetland mitigation costs are based on a mitigation cost of \$10,000 per acre.

**Sources:** URS Corporation 2003 and 2004. Data obtained from aerial imagery interpretation and field observations. Other sources of data referenced in *Alternative Development and Screening Report*.

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## 4.2 Existing Facility Improvement Alternatives

Because the design criteria for the proposed I-69 requires an approximate 300-foot right of way and controlled-access at interchanges only, existing facilities were determined to be inadequate for conversion to interstate standards. Only AR 15 and US 79 / LA 9 provide advantageous alignments for inclusion into an I-69 alignment. These roadways would require substantial changes in the horizontal alignment throughout the region to reduce the roadway curvature and meet federal design standards for interstate facilities. The Corridor Selection evaluation completed in fall of 2003 concluded that an alignment along US 79 / LA 9 is not desirable as this area is already served by US 79/ LA 9 and because a good portion of the alignment is paralleled by Interstate 20 already. The Corridor Selection evaluation, however, did note that an alignment along the strike of AR 15 would be beneficial as Corridor 1E and 2B follow this alignment. Nevertheless, because improving AR 15 to interstate standards was determined to be potentially reasonable for only a short distance of the corridor, **improvement of existing facilities is not proposed as a reasonable and feasible alternative for detailed study in the EIS for this project.**

## 4.3 Non-Construction Alternatives

Non-construction or operational alternatives include both mandated and voluntary policy and programs. Such programs and policies are typically employed to expand the peak period of traffic to reduce congestion. Carpools, telecommuting, staggered employment hours in dense employment areas, and other are examples of such policies that are encouraged in densely populated areas or in areas of dense employment. Signalization improvements are another non-construction alternative that is sometimes considered to address transportation deficiencies and needs. However, because the main transportation-related need for the project is to improve *connectivity* and not to relieve *congestion*, **non-construction or operational improvements were determined to be ineffective at addressing the transportation needs for the project and are not proposed for detailed study in the EIS for this project.**

## 4.4 No-Build Alternative

In addition to building a new Interstate facility via one of the build alignments proposed in **Section 4.1.3.3** of this report, not building this proposed interstate facility is an alternative that must be considered in the EIS. The No-Build or No-Action Alternative does not assume that no improvements are made in the Study Area. Rather, the No-Build Alternative assumes that only the proposed action, which is the construction of a new interstate facility for I-69 SIU No. 14, will not be implemented. Other, already programmed and committed projects would proceed. The 2-lane Homer Bypass is the only transportation capacity improvement project underway in the I-69 SIU No. 14 Study Area at this time. However, widening of AR 15 from US 82 to Newell, and widening US

371 throughout the Study Area are both programmed for implementation. Additionally, because construction permits have not yet been received and no imminent construction schedules exist for other projects discussed for the region (e.g., I-69 SIU Nos. 13 and 15, and the North Hills Lakes Project), these projects will not be considered in the No-Build Alternative.

## **4.5 Future Alternatives to be Developed**

The Project Team has made efforts to exhaustively evaluate reasonable design and alignment options during the preliminary planning stage of this study. However, it is probable that variations on the EIS Build Alternatives described in **Section 4.1.3.3** of this report will be developed and evaluated during the course of completing the EIS for this project. If substantial modifications appear to be advantageous in terms of optimizing project benefits and minimizing adverse effects and costs, this (these) new alternative(s) will be presented to the public. **However, as of August 2004, there are no imminent plans to develop additional alternatives to evaluate in the EIS.**

## **4.6 Preferred Alternative**

A PA has not been identified for this project and will not be identified until public and agency comments on draft EIS have been fully considered. Following the draft EIS public and agency commenting period in the fall of 2004, the Project Team will convene and determine the single 300-foot-wide alternative that appears to provide the most reasonable combination of public benefits, costs, and unavoidable adverse effects. This PA and the subjective discussion explaining how the PA was selected will be presented to the Cooperating Agencies for concurrence in a meeting. Following receipt of cooperating agency concurrence on the PA, the final EIS will be prepared. Effects of the PA will be discussed along with the basis for the decision.

Responses to remaining agency comments on the final EIS will be included in the Record of Decision (ROD) prepared by the FHWA. This ROD will propose implementation of the overall least environmentally damaging practicable alternative that meets the intended purposes and needs for the project, in the context of the current conditions in the Study Area. Alternatively, the No-Action or No-Build Alternative could be proposed. This ROD will also include details on mitigation measures that will be incorporated into the PA to make the alternative acceptable to the public, resource agencies, and the FHWA.

**FIGURE 4.2**  
**KEY MAP**  
**REVISED EIS ALTERNATIVES**  
***(PLEASE DOWNLOAD FIGURES 4\_2.PDF)***

**FIGURE 4.2**  
**REVISED EIS ALTERNATIVES, PAGE 1 of 6**  
***(PLEASE DOWNLOAD FIGURE 4\_2-1.PDF)***

**FIGURE 4.2**  
**REVISED EIS ALTERNATIVES, PAGE 2 of 6**  
***(PLEASE DOWNLOAD FIGURE 4\_2-2.PDF)***

**FIGURE 4.2**  
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***(PLEASE DOWNLOAD FIGURE 4\_2-3.PDF)***

**FIGURE 4.2**  
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***(PLEASE DOWNLOAD FIGURE 4\_2-4.PDF)***

**FIGURE 4.2**  
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***(PLEASE DOWNLOAD FIGURE 4\_2-5.PDF)***

**FIGURE 4.2**  
**REVISED EIS ALTERNATIVES, PAGE 6 of 6**  
***(PLEASE DOWNLOAD FIGURE 4\_2-6.PDF)***

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**FIGURE 4.2NOTES**  
**REVISED EIS ALTERNATIVES**  
*(PLEASE DOWNLOAD FIGURE 4\_2Notes.PDF)*

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