

2.0 ALTERNATIVES

2.1 Preliminary Alternatives

The Bypass Feasibility Study (see **Attachment 1**) considered six build alternatives on three alignments: three primarily elevated facilities and three primarily at-grade facilities. Alternatives reviewed under the Bypass Feasibility Study included:

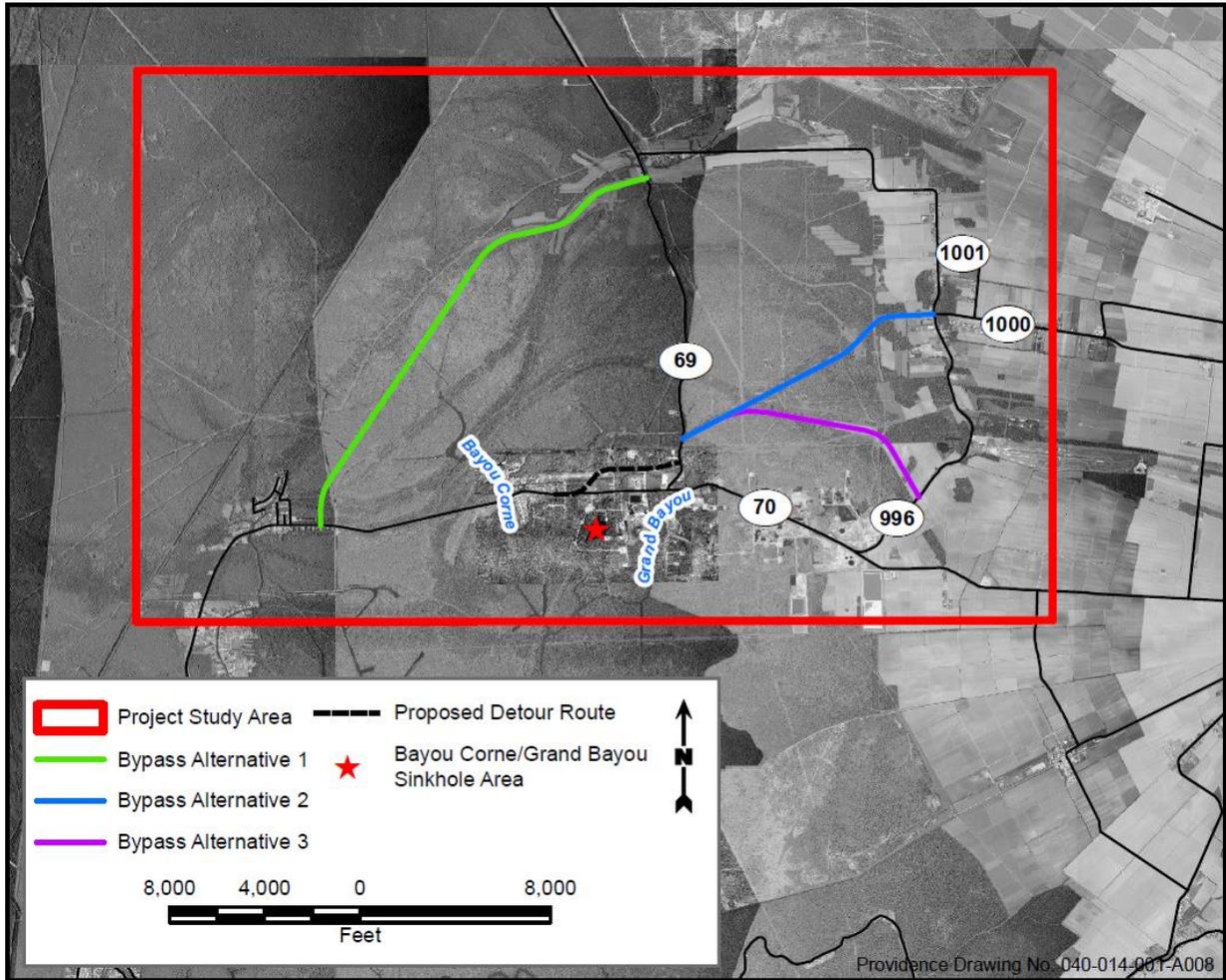
- Bypass Routes 1 and 1A
 - Originates at LA 70 near Rue De Cajun and ends at LA 69 south of its intersection with Louisiana Highway 996 (LA 996)
 - Approximately 4 miles in length
 - Bypass Route 1A is the at-grade option

- Bypass Routes 2 and 2A
 - Originates on LA 69 north of LA 70 and ends at the intersection of LA 996 and Louisiana Highway 1000 (LA 1000)
 - Approximately 2 miles in length
 - Bypass Route 2A is the at-grade option

- Bypass Routes 3 and 3A
 - Originates on LA 69 north of LA 70 and ends on LA 996 between LA 1000 and LA 70
 - Approximately 2 miles in length
 - Bypass Route 3A is the at-grade option

None of the three at-grade options were considered feasible due to excessive impacts to wetlands. Therefore, three preliminary build alternatives in addition to the No-Build were carried forward from the Bypass Feasibility Study for consideration in this EA. These routes are now referred to as alternatives (see **Figure 2**).

**FIGURE 2
PRELIMINARY ALTERNATIVES**



Stage 0 alternatives obtained from CB&I on 1/21/14. Base map provided by CB&I on 4/15/14.

2.2 Alternative Screening

The Bypass Feasibility Study noted conflicts with pipelines and the need for additional bridges associated with Bypass Alternative 1. This, along with significant wetland impacts and high construction cost, makes it more expensive and less feasible than the other two proposed bypass alternatives. However, it was carried forward because it was the only one of the three build alternatives that connected back to LA 70 west of LA 69.

Bypass Alternative 2 does not meet the purpose and need without the presence of the LA 70 Detour Route as a permanent option. Assuming the detour route is a permanent option, it could be extended east of LA 69 to provide a more direct dual connection to LA 70 than what Bypass Alternative 2 provides. The extension of the detour route is more reasonable and feasible than Bypass Alternative 2. Therefore, Bypass Alternative 2 was eliminated from further study, and an extension of the

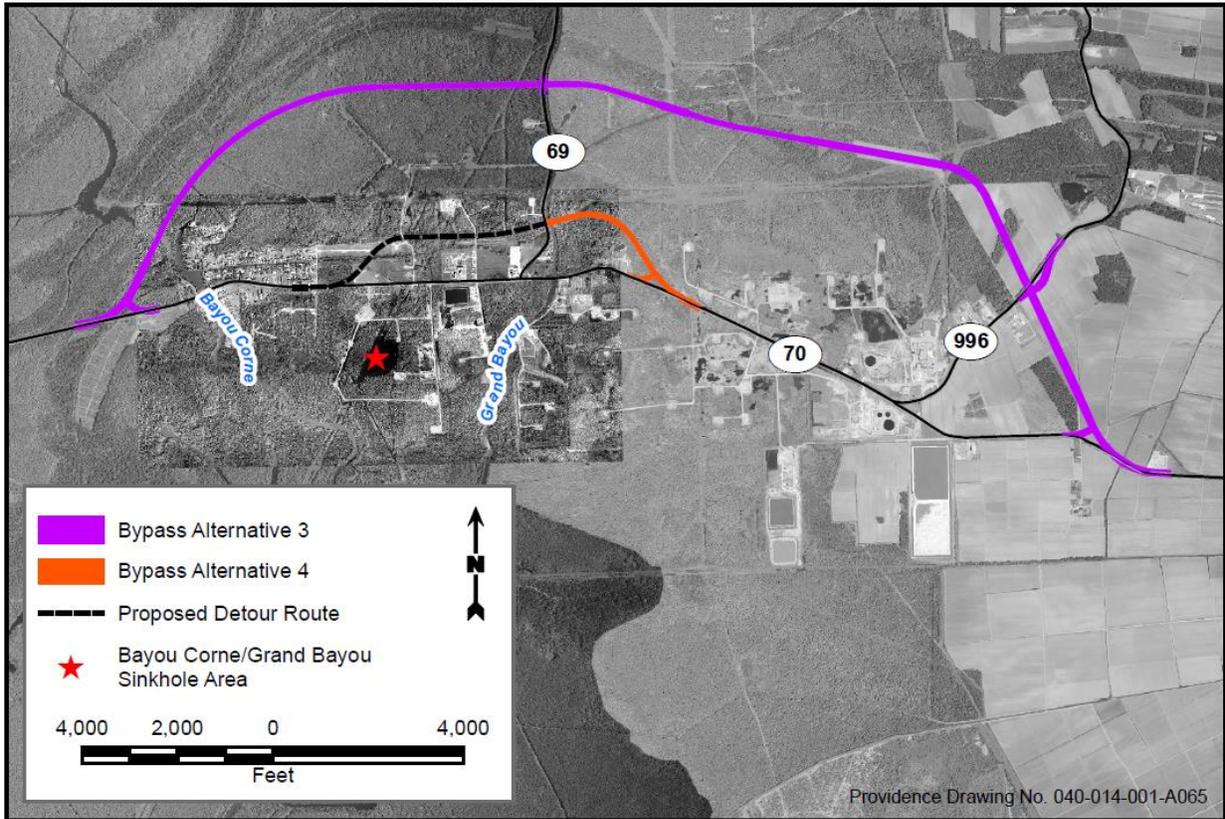
detour route east of LA 70, referred to as Bypass Alternative 4, was added to the study.

A majority of the comments received from the public during the Bypass Feasibility phase resulted in the modification of Bypass Alternative 3. Concerns were raised that overall the preliminary build alternatives did not provide a direct connection with LA 70. Several comments were received related to Bypass Alternative 2 and 3 redirecting traffic onto LA 996 in order to get back to LA 70. Residents that live along LA 996 were not in favor of these preliminary routes, two of which would terminate at LA 996. A letter from the Assumption Parish Police Jury dated December 12, 2013 (**Appendix A**) requested an alternative that provides access to LA 70 from both the east and west ends. Comments received during the Bypass Feasibility Study can be found in Appendix E of **Attachment 1**.

In response to stakeholder comments, an east and west extension was added to Bypass Alternative 3 to provide a dual connection to LA 70. The western extension allows the alternative to connect to LA 70 west of Bayou Corne. The eastern extension continues from LA 996 to the intersection of LA 70 and Dow Road. This allows traffic to stay on the bypass instead of being redirected onto LA 996. With the modification of Bypass Alternative 3, Bypass Alternative 1 could be eliminated from further study.

As a result, only Bypass Alternatives 3 and 4, as well as the No-Build Alternative, are studied in detail in this EA. **Figures 3, 3a, and 3b** show the alternatives in detail. Direct impacts associated with the construction of Bypass Alternatives 3 and 4 are presented in **Table 2-1**.

**FIGURE 3
BUILD ALTERNATIVE**



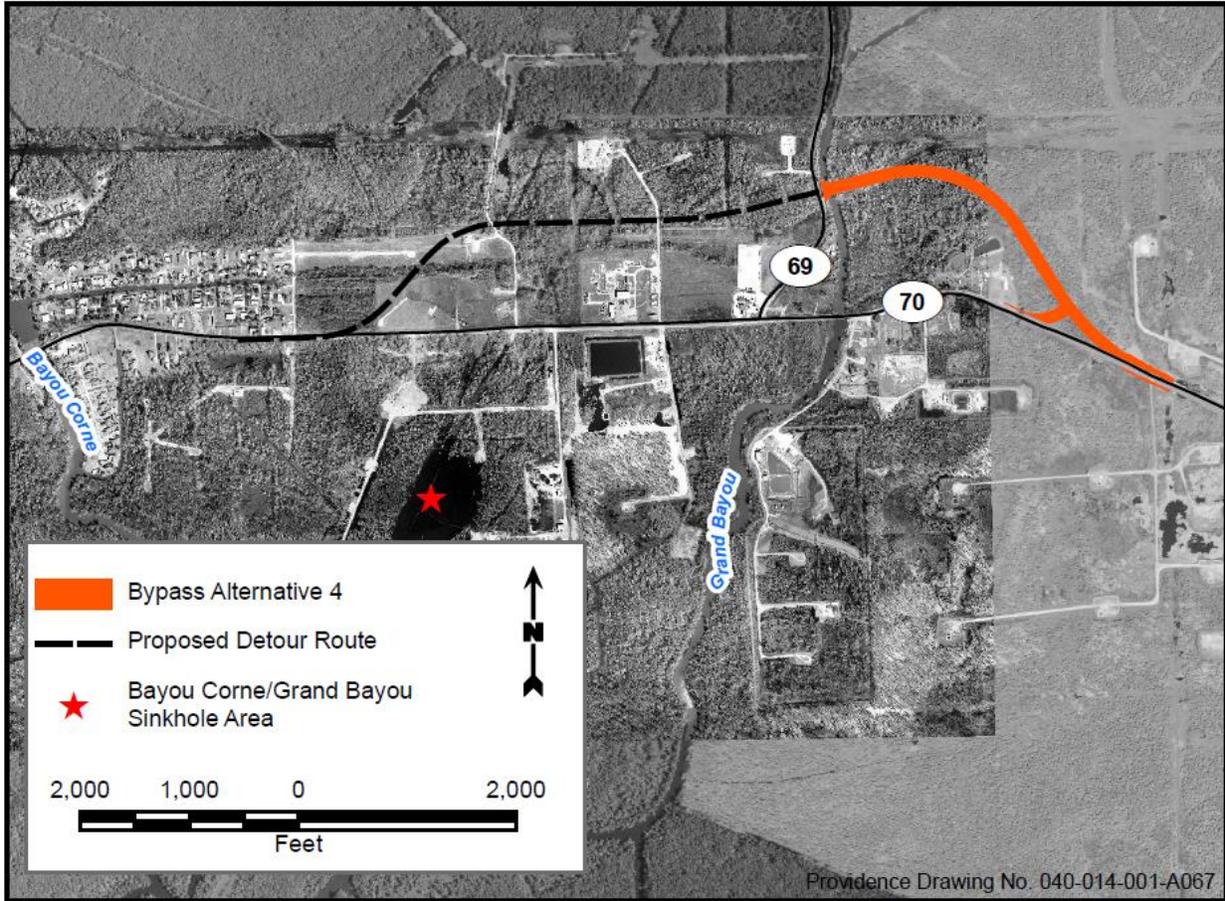
Base map provided by CB&I on 4/15/14.

FIGURE 3A
BUILD ALTERNATIVES – BYPASS ALTERNATIVE 3



Base map comprised of aerials provided by CB&I on 4/15/14.

**FIGURE 3B
BUILD ALTERNATIVES – BYPASS ALTERNATIVE 4**



Base map provided by CB&I on 4/15/14.

**TABLE 2-1
BUILD ALTERNATIVES COMPARISON MATRIX**

| Evaluation Criteria | Alternative 3 | Alternative 4 |
|---|----------------------|----------------------|
| Purpose and Need | | |
| Meets Purpose and Need | Yes | Yes |
| Cultural Resources | | |
| Potential to Impact Historical Resources | No | No |
| Potential to Impact Archaeological Resources | No | No |
| Potential Jurisdictional Wetlands ¹ | | |
| Total Potential Jurisdictional Wetlands | 50.99 | 11.43 |
| Palustrine Emergent (acres) | 3.64 | 3.51 |
| Palustrine Forested (acres) | 14.27 | 1.88 |
| Cypress/Tupelo (acres) | 33.08 | 6.04 |
| Potential Other Waters of the U.S. (acres) | 1.43 | 0.17 |
| Threatened/Endangered/Protected Species | | |
| Potential Impact to Threatened and Endangered Species | None | None |
| Community Impacts | | |
| Residential Structures | 1 | 0 |
| Commercial Property | 0 | 0 |
| Churches | 0 | 0 |
| Recreational Areas | 0 | 0 |
| Other Community Facilities | 0 | 0 |
| Land Use | | |
| Prime Farmland (acres) ² | 37.10 | 0.11 |
| 100-yr Floodplain (acres) | 65.83 | 9.30 |
| Environmental Liability Concerns | | |
| Potential Impacts to Hazardous Sites | Low | None |
| Active Oil and Gas Well Locations | 1 | 0 |
| Observation Relief Wells Affected ³ | 1 | 0 |
| Other Environmental Concerns | | |
| Potential Impacts to Noise Receptors | Yes | Yes |
| Air Quality Impacts | None | None |
| Potential Visual Quality Impacts | Low | Low |

NOTES:

1. Data based on wetlands delineation conducted on 11/17/14 and 11/19/14 by Providence personnel.
2. Based on NRCS-CPA-106 form completed by United States Department of Agriculture (USDA) on 12/18/14.
3. According to the Well Avoidance Study, any ORWs within 160 feet of proposed right-of-way (ROW) will need to be plugged and abandoned.

2.3 Design Criteria

Early on in the planning process, the Rural Arterial 2 (RA-2) design classification was selected for the bypass. The RA-2 was used for Bypass Alternative 3, which allows for two 12-foot travel lanes, eight-foot shoulders, and a 60 miles per hour (mph) design speed with a maximum superelevation rate of 10%.

The RA-2 design classification was not used for Bypass Alternative 4 since it is an extension of the detour route. For continuity purposes, a Rural Arterial 1 (RA-1) classification was used for Bypass Alternative 4. The RA-1 classification allows for two 12-foot travel lanes, eight-foot shoulders, and a 50 mph design speed with a maximum superelevation rate of 10%.

A typical section for each of the proposed alternatives is included with the preliminary plans in **Appendix B-1**.

2.4 Alternative Development

Bypass Alternative 3 was originally designed to follow a route identified by stakeholders as the most logical route around the sinkhole area. The route provides connections at existing LA 70, LA 69, and LA 996. The design underwent several modifications after it was originally identified as the most reasonable and feasible alternative serving as a bypass corridor. The most important considerations when the route was originally designed was to minimize impacts by avoiding wells, active and abandoned, remain an appropriate distance from the potential sinkhole area, and minimize the impacts to local residents. Avoiding wetlands in this area was not feasible for the majority of the route. Therefore, efforts were taken throughout the preliminary design process to minimize impact to wetland areas. The majority of Bypass Alternative 3 is an elevated structure with the minimum bottom chord elevation of all structure types designed so that the 100-year flood elevation (6.5 feet) will not be impacted. The only area that does not provide this clearance is where the bypass ties into existing roadways and where the elevated structure is a slab bridge. The western portion of Bypass Alternative 3 originally had a horizontal location more north and east of the current route. After review from the DOTD, it was determined that the route should be adjusted to minimize impacts to mature trees. The vertical alignment also received adjustment after receiving input from the stakeholder meeting conducted during Stage 1. Several pipeline companies expressed concern over access to their ROW in the area. The project team asked that each pipeline company that had a concern send in a request that identified both the location of the ROW in question, as well as their desirable vertical clearance in that area. Florida Gas was the only company that requested their ROW have a specific clearance. The vertical clearance over their line was adjusted to allow 15 feet of clearance in the area of the pipeline. The intersection angle of the proposed Bypass Alternative 3 and the existing LA 996 was also a stakeholder concern. It was determined that the bypass should remain as designed, and LA 996 should be adjusted to provide an intersection angle of 90 degrees. The shoulder width also received adjustments. RA-2 allows for eight-foot-wide shoulders. Incident management was a concern due to the long elevated spans for this alternative. Therefore, the shoulder widths were increased to ten feet for Bypass Alternative 3. The impacts and cost discussed in this EA for Bypass Alternative 3 account for the additional shoulder width.

The design of Bypass Alternative 4 provided a continuation of the LA 70 Detour Route detailed in a separate EA document. As previously mentioned, this EA

assumed the detour route is already in place, and the bypass considers a more permanent option. Should there be no additional threat to the detour route, a connection to LA 70 would be necessary to achieve intersection improvements that would allow the detour route to remain as a permanent option. The topography in this area is swampland with no feasible alternative to avoid impacting wetlands. Therefore, every effort was taken to minimize the impacts. In order to minimize the overall footprint of the roadway, the route is designed to be completely elevated with the exception of tie-ins at existing roadways. The connection with LA 70 is made as soon as possible to minimize the length of construction and avoid expensive utility relocations.

2.5 Alternatives Cost Comparison

The preliminary cost comparison of the three preliminary bypass alternatives was prepared during the Bypass Feasibility Study (see **Attachment 1**). A more detailed opinion of probable cost for the bypass build alternatives was developed as part of this EA process. The anticipated costs of Bypass Alternatives 3 and 4, respectively, are approximately \$222.6 million and \$43.0 million, as outlined in **Table 2-2**, and are detailed in **Appendix B-2**. The true cost of not constructing the Preferred Alternative during an emergency closure of LA 70 will be the inability for emergency services to reach residences, which will no longer be readily accessible due to the closure and length of current detour routes. Other factors to consider include additional gas cost, lost time, and wear on existing detour routes, which require traveling approximately 44 miles to get to Napoleonville by passenger vehicle and 70 miles on the truck detour route.

**TABLE 2-2
OPINION OF PROBABLE COST FOR BYPASS ALTERNATIVES 3 AND 4**

| Item Description | Bypass Alternative 3 | Bypass Alternative 4 |
|---------------------------------------|-------------------------|------------------------|
| Estimated Construction Cost | \$162,997,340.54 | \$33,025,985.03 |
| Contingency (20%) | \$32,599,468.11 | \$6,605,197.01 |
| Engineering Design (8%) | \$13,039,787.24 | \$2,642,078.80 |
| Required ROW ¹ | \$274,800.00 | \$9,300.00 |
| Utility Relocations ² | \$9,686,458.85 | \$481,884.40 |
| Environmental Mitigation ³ | \$3,971,530.00 | \$207,570.00 |
| TOTAL ⁴ | \$222,569,384.73 | \$42,972,015.24 |

NOTES:

1. ROW costs for Bypass Alternative 3 are derived from the Conceptual Stage Relocation Plan appended to the EA document. ROW costs for Bypass Alternative 4 are based on raw land impacts of 9.30 acres valued at \$1,000/acre as derived from the DOTD.
2. Utility relocation costs were based on the assumptions made in the Bypass Stage 0 Feasibility Study (Attachment 1, Appendix I: Utility Location Survey and Relocation Cost Estimate, dated November 2013). These costs only include utilities directly impacted by the ROW and do not include relocating roadside utilities from the existing LA 70 to the bypass. All underground utilities crossing the bypass are assumed to be encased from ROW to ROW. Any utility crossing the roadway at less than 20° is assumed to require relocation at a cost of \$200 per linear foot.
3. Wetlands mitigation costs were calculated by using acreage data collected during the wetlands delineation and estimating \$27,000 per acre for palustrine emergent wetlands, \$60,000 per acre for palustrine forested wetlands, and \$80,000 per acre for cypress/tupelo forested wetlands. Noise mitigation costs for Bypass Alternative 3 are approximately \$370,650 and were derived from the Traffic Noise Analysis appended to the EA document.
4. This is a preliminary cost estimate. Costs will be adjusted during the Stage 3 Design once the survey and geotechnical studies are complete.

2.6 Preferred Alternatives

Due to the uncertainty surrounding the growth of the Bayou Corne/Grand Bayou Sinkhole, this EA recommends both Bypass Alternatives 3 and 4 as “Scenario-based” Preferred Alternatives. In the event that the LA 70 Detour Route is constructed and deemed not threatened at the time the LA 70 Bypass is determined necessary, this EA recommends Bypass Alternative 4. In the event the LA 70 Detour Route is constructed, but determined to be threatened and not a viable long-term facility, this EA recommends Bypass Alternative 3. **Appendix B-1** contains the preliminary plans including typical section, plan/profile sheets, and intersection layouts for both Bypass Alternatives 3 and 4.

2.7 Traffic

Since the alternatives studied during this EA process were not fully derived from the Bypass Feasibility Study, only a portion of the information provided in the traffic

study was able to be utilized during this EA process. A copy of the final Bypass Feasibility Study with the traffic study is included as **Attachment 1**. The traffic counts provided in the Bypass Feasibility Study were adjusted as needed for use with the extended Bypass Alternative 3 and added Bypass Alternative 4. The information from the traffic study is sufficient for planning purposes. However, it is recommended, that if the project moves forward, that a supplementary traffic study be performed during design.

2.8 Context Sensitive Solutions

The proposed project is a permanent bypass to allow traffic and access in the event of a closure to the existing LA 70 or the proposed LA 70 Detour Route in the vicinity of LA 69. Land use patterns, cultural resources, environmental resources, and community input were all considered in the development of the bypass build alternatives along with early stakeholder involvement. The proposed routes primarily utilize undeveloped land and were designed to avoid cultural resources and impacts to residences and businesses in the area.