

### **3.0 ALTERNATIVES**

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A fundamental principle of NEPA is that an agency should consider reasonable alternatives to the proposed action to ensure that the project objectives are met while minimizing environmental impacts. To satisfy this requirement, we have evaluated a range of alternatives to the KMLP Project. The proposed action before the Commission is to consider issuing a certificate of public convenience and necessity under section 7 of the NGA.

The alternatives to the proposed action considered in this section of the EIS include: (1) no action—the Commission does not approve the pipeline or it postpones the approval (section 3.1); (2) use of other pipeline systems, which may already exist, are proposed, or are previously approved by the Commission and not yet constructed (section 3.2); (3) major route alternatives for significant portions of the proposed pipeline route (section 3.3); and (4) route variations for relatively short distances to avoid a site-specific resource (section 3.4).

The criteria for evaluating alternatives included whether the alternatives can achieve the goals of the Project at significantly reduced environmental impacts, while being technically and economically practicable. The objectives of the KMLP Project are:

- Provide substantial take-away capacity from the Sabine Pass LNG Terminal;
- Integrate LNG supplies into the U.S. pipeline grid and gas storage infrastructure by providing substantial downstream interconnecting capacity to other pipelines;
- Provide the LNG shippers flexibility of access to multiple markets by means of this interconnecting capacity; and
- Meet the project in-service date of October 2008 for Leg 2 and April 2009 for Leg 1 and its interconnects with other pipelines, including the FGT Lateral.

The shippers of record for the Project include Total LNG USA (a subsidiary of Total AG) and Chevron USA, who together have acquired 2 Bcf/d of regasification capacity at the Sabine Pass LNG Terminal. Total LNG USA and Chevron have signed binding precedent agreements with KMLP for use of the full capacity of the pipeline for 20-year terms.

In considering the alternatives, we proceeded from a comparison of whether alternatives could meet the above objectives of the Project, to more detailed considerations of specific siting and environmental trade-offs. Further, our analysis focused on those aspects of the Project for which an alternative could minimize or avoid environmental impacts, such as wetlands, residences, or other sensitive areas of concern. The results of our analysis are presented below.

#### **3.1 NO ACTION OR POSTPONED ACTION ALTERNATIVE**

The Commission can take one of three actions in processing the KMLP application. It can grant the certificate with or without conditions; deny the certificate; or postpone the action pending further study. If the Commission denies KMLP's application, the short- and long-term environmental impacts identified in this draft EIS would not occur. If the Commission postpones action on the application, the environmental impacts identified in this draft EIS would be delayed, or if KMLP decided not to pursue the Project, the impacts would not occur at all. However, if the Commission were to select the no action or proposed action alternative, the objectives of the Project would not be met, and KMLP would not be able to deliver re-gasified LNG to markets in Louisiana and the rest of the United States as proposed.

Denying the certificate for KMLP would force all of the output from the Sabine Pass LNG Terminal to go through the Cheniere Sabine Pass Pipeline (SPP), which has been approved by the Commission as part of the Sabine Pass LNG and Pipeline Project. Total LNG USA and Chevron have not contracted for capacity on this pipeline. The Cheniere SPP also would have less capacity and fewer interconnections with downstream pipelines than would the KMLP Project. Since Cheniere SPP is sized to carry only 2.6 Bcf/d, this potentially could reduce the amount of gas available to the market by up to 1.4 Bcf/d or about 0.5 Tcf/year. Also, because the certificated pipeline would have fewer pipeline interconnections, not approving the KMLP Project would tend to limit the geographic access of the re-gasified LNG.

Energy alternatives to this reduced gas supply could include increased use of more polluting fuels such as oil and coal in the markets that would have been served by KMLP. It is more likely, however, that the difference in gas supply would be made up by gas from other LNG terminals, imports from Canada, or from other sources of domestic supply. The overall effect of the no action alternative could be somewhat higher gas prices due to less supply reaching markets than under the KMLP proposal. Higher prices in turn could push users toward coal, oil, or other less costly alternative energy sources, some of which would be more polluting.

Energy conservation potentially could make up for the difference in supply under the no action alternative. Energy conservation programs aimed primarily at residential and commercial markets are being promoted by state regulators and the federal government through broad-based efficiency programs and demand side management (DSM) and integrated resource planning (IRP) initiatives. These programs rely on economic tests of avoided energy costs to determine which conservation program designs and technologies should be implemented. With the no action alternative, less gas supply entering the market could result in slightly higher gas prices, which in turn would improve the economics of conservation, as well as the attractiveness of other less costly but more polluting fuels. These effects would be small across the size of the markets served by the Project. It is difficult to draw a connection between these programs' effectiveness and a single LNG pipeline, and hence energy conservation is not considered an adequate alternative to the proposed action.

### **3.2 SYSTEM ALTERNATIVES**

System alternatives are alternatives that could use different pipeline systems to achieve the same objectives as the Project, but at a reduced level of construction and environmental impact. Our analysis of pipeline system alternatives included examination of the use of existing or approved pipelines that could be modified and combined to accept KMLP throughput, reasonably and economically, and still meet the objectives of both systems. These objectives include the transportation of vaporized LNG (up to 4 Bcf/d) into the interstate and intrastate natural gas pipeline system for subsequent transportation to markets in Louisiana and elsewhere in the United States.<sup>1</sup> KMLP's contractual agreement with its shippers is that it will not install compression on the pipeline and therefore not charge its shippers a fuel charge.

One of the principal metrics used to evaluate system alternatives is whether a potential alternative provides sufficient downstream interconnecting capacity with other pipelines serving the markets that KMLP's shippers intend to serve. Downstream interconnecting capacity refers to the sum of the capacities of the pipelines that interconnect with the KMLP Project and the system alternatives. Neither the KMLP Project nor the system alternatives discussed in this section directly serve gas markets; all of

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<sup>1</sup> We evaluated alternatives for Leg 1 mainline only.

them interconnect with long-haul pipelines that do serve gas markets, hence the relevance of the downstream interconnecting capacity. In order for a system alternative to be viable, the total downstream interconnecting capacity for the system alternative should equal, and ideally exceed, the KMLP Project's capacity. This allows shippers the flexibility to swing their gas supplies between pipelines and markets to meet demand or respond to price movements.

### 3.2.1 Use of Existing Pipeline Systems

Currently, there is no existing pipeline system that could be used to move vaporized LNG from the Sabine Pass LNG Terminal location to the existing interstate and intrastate natural gas pipeline systems. Within 3 miles of the LNG Terminal in the Sabine Pass area, there are two 30-inch-diameter NGPL pipelines and two 24- and one 16-inch-diameter Transco pipelines. The combined capacity of these existing pipeline systems are inadequate to meet the objectives of the KMLP Project.

### 3.2.2 Use of Proposed Pipeline Systems

We also evaluated whether other proposed pipeline systems in the vicinity of the KMLP Project could replace all or a part of the Project. We determined that the following other proposed systems in the area are not viable system alternatives for the reasons stated.

- **Cheniere SPP.** This pipeline provides only 3.86 Bcf/d in downstream interconnecting pipeline capacity, compared to the 11.37 Bcf/d that would be provided by the KMLP Project. This project is only 16 miles long and would require significant additional facilities to serve KMLP's customers, and by itself would not meet the Project's objectives and has been eliminated from further evaluation.
- **Liberty Pipeline.** This is a short pipeline intended to connect the Liberty Storage facility with the pipeline network. It would not meet the KMLP Project's objectives.
- **Trunkline Pipeline Lateral.** This is another relatively short pipe connecting the Lake Charles LNG Terminal to Trunkline's main pipeline. As such, it would not meet the KMLP Project's objectives.
- **Golden Pass Pipeline.** This pipeline is designed to serve the Golden Pass LNG Terminal, under development by ExxonMobil. It runs westward around the western side of Port Arthur, Texas. It interconnects with the Transco main line, with a number of Texas intrastate pipelines, and with ExxonMobil's Beaumont Refinery. This alternative provides only 7.68 Bcf/d in downstream interconnecting capacity compared to the 11.37 Bcf/d that would be provided by the KMLP Project. It therefore would lack the degree of flexibility to serve those markets that the KMLP Project requires. As a result, we have eliminated it from further evaluation.
- **Port Arthur Pipeline.** This pipeline is associated with the Sempra Port Arthur LNG Terminal, located just northwest of the Golden Pass LNG Terminal, across the Sabine River from the Sabine Pass LNG Terminal. The pipeline would interconnect with four pipelines: Sabine, Tennessee, Texas Eastern, and Transco, with a total downstream interconnecting capacity of 3.92 Bcf/d compared to the 11.37 Bcf/d that would be provided by the KMLP Project. This system thus lacks the amount of downstream interconnecting capacity and diversity of pipelines to be a viable alternative to the proposed action. Further, *Gas Daily* (September 29, 2006; p. 6) reported that Sempra was considering delaying the construction of the Port Arthur Terminal by a year. Because of the lack of an equivalent amount of

downstream interconnecting capacity and the uncertainty around the project, we eliminated it from further evaluation.

- **Cameron Pipeline.** This pipeline is designed to take the sendout from the Sempra Cameron LNG Terminal, about 7 miles south and west of the Lake Charles LNG Terminal and about 15 miles north of the Creole Trail LNG Terminal. The pipeline would interconnect with Florida Gas, Tennessee, Texas Eastern, and Transco, with a total downstream interconnecting capacity of only 4.09 Bcf/d compared to the 11.37 Bcf/d that would be provided by the KMLP Project. Therefore, we eliminated this pipeline from further evaluation.

We identified two pipeline systems—which we call System Alternative #1 and System Alternative #2 in this draft EIS—that potentially meet the KMLP Project’s objectives in terms of take-away capacity from the Sabine Pass LNG Terminal and downstream interconnecting capacity to other pipelines that serve the same markets proposed to be served by KMLP’s shippers. These system alternatives are shown in figure 3.2-1 and compared to the proposed system in table 3.2-1.

System Alternative #1 would consist of looping three pipelines proposed by Cheniere: (1) the Chenier SPP (approved); (2) the Creole Trail Segment 1 Amendment that has recently been proposed by Cheniere to interconnect the Cheniere SPP with the Creole Trail Pipeline (proposed); and (3) the Creole Trail Pipeline (approved Segments 2 and 3). The latter is intended to provide take-away capacity from the Creole Trail LNG Terminal.

System Alternative #2 would consist of looping the same three elements included in System Alternative #1 but only to a point 20 miles north of the Creole Trail LNG Terminal, where the KMLP proposed route for Leg 1 would cross the Creole Trail Pipeline (at approximately MP 48). From this point, the KMLP proposed route would follow its proposed easterly route to its terminus at MP 132.2 near Eunice, Louisiana.

System Alternatives #1 and #2 would consist of looping the three segments described above to meet the commercial objectives of the KMLP Project as well as to provide market access for natural gas volumes from the Creole Trail LNG Terminal. Staff reviewed KMLP’s submitted hydraulic modeling of System Alternative #1 and determined that the submitted model is hydraulically feasible and could provide the proposed volumes and delivery pressures. However, significant additional facilities would be required, as discussed in more detail below.

### **3.2.2.1 System Alternative #1**

On August 4, 2006, Cheniere Creole Trail Pipeline L.P. filed an amendment to the Creole Trail Pipeline Project (CTPP) to extend the approved CTPP by adding 18.1 miles of pipeline and appurtenant facilities in Cameron Parish, Louisiana. This extension, called the Segment 1 Amendment Project, would connect Cheniere’s CTPP with the Cheniere SPP. With this interconnection, a potential new system alternative to the KMLP Project became available. This system alternative could allow gas from the Sabine Pass LNG Terminal to flow ultimately into an enhanced Creole Trail Pipeline, where it would share pipeline capacity with the Creole Trail LNG Terminal output. Total downstream pipeline interconnecting capacity would be 15.56 Bcf/d, which is more than the 11.37 Bcf/d that would be provided by the KMLP Project.

Under System Alternative #1, KMLP would have to increase the capacities of the Cheniere SPP, the proposed Creole Trail Segment 1 Amendment, and the Creole Trail Pipeline to accommodate the sendout volumes from both the Sabine Pass and Creole Trail LNG Terminals. In particular, the following would be required:

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Figure 3.2-1 System Alternatives for the KMLP Project

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TABLE 3.2-1

## Comparison of KMLP's Proposed System with System Alternatives

	Unit	KMLP's Proposed System and Route <sup>a</sup>	System Alternative #1 <sup>b</sup>	System Alternative #2 <sup>b</sup>
<b>Pipeline Facilities<sup>c</sup></b>				
Total length of pipeline	miles	132.2	167.5	158.2
New pipeline (42-inch-diameter)	miles	132.2	0.0	101.8
Loop pipeline (42-inch-diameter)	miles	0.0	167.5	56.4
<b>Environmental Factors</b>				
Construction right-of-way <sup>d</sup>	acres	2030.3	2537.9	2397.0
Permanent right-of-way <sup>d</sup>	acres	806.3	1015.2	958.8
Length adjacent to existing right-of-way	percent	54.0	31.1	52.6
Length in wetlands <sup>e</sup>	miles	35.8	48.4	28.5
Total perennial waterbodies crossed <sup>f</sup>	number	55	46	52
Major river crossings (>100 feet)	number	9	6	9
Natural and scenic rivers	number	0	2	0
Federally listed threatened or endangered species	number	8	8	8
Federal land crossed <sup>g</sup>	miles	0	0	0
State land crossed <sup>g</sup>	miles	0	0	0
Other recreational/designated land use areas crossed <sup>g</sup>	number	0	0	0
Existing residences within 50 feet of construction work area	number	0	10 <sup>h</sup>	10 <sup>h</sup>
Cultural resources <sup>i</sup>	number	0	0	0

<sup>a</sup> We evaluated alternatives for Leg 1 mainline only.

<sup>b</sup> Data for Sabine Pass, Creole Trail Segment 1 Amendment, and Creole Trail Pipelines were gathered from "Final Environmental Impact Statement; Sabine Pass LNG and Pipeline Project; Sabine Pass LNG, L.P. Docket No. CP04-47-000; Cheniere Sabine Pass Pipeline Company, Docket Nos. CP04-38-000, CP-04-39-000, CP04-40-000," "Cheniere Creole Trail Pipeline, LP's Resource Report 1- General Project Description to its application requesting authorization to extend the Cheniere Creole Trail Pipeline under CP05-357" (FERC Online Document No. 2006-0810-0089) and "Cheniere Creole Trail Pipeline LP submits revised pages from Resource Report 1, 2, 3, 6, and 8 to correct the acreage discrepancies under CP05-357" (FERC Online Document No. 20060825-0059), and "Final Environmental Impact Statement; Volumes I & II; Creole Trail LNG Terminal and Pipeline Project; Creole Trail LNG, L.P. Docket No. CP05-360-000; Cheniere Creole Trail Pipeline Company, Docket Nos. CP05-357-000, CP05-358-000, CP05-359-000."

<sup>c</sup> Facilities listed for system alternatives are those facilities required to be added to the proposed/approved system to accommodate the capacity of KMLP's proposed system. Compression facilities were not considered in the analysis because KMLP's precedent agreements would not bear compression fuel charges.

<sup>d</sup> We assumed a 125-foot construction right-of-way and a 50-foot permanent right-of-way for the total pipeline lengths. Right-of-ways are for only the Leg 1 mainline and do not include extra work spaces, access roads, pipe yards, and interconnecting pipelines and sites because those details are unknown for System Alternatives #1 and #2.

<sup>e</sup> Wetland data were obtained from the National Wetlands Inventory database.

<sup>f</sup> The waterbody crossings for each system alternative were gathered by querying the available ESRI Tiger U.S. Census dataset using estimated pipeline locations. When necessary, the data were adjusted to reflect only one waterbody crossing for Sabine and Calcasieu Lakes.

<sup>g</sup> Presented values for the federal, state, and other recreational/designated land uses (such as wilderness areas, parks, ballfields, campgrounds, etc.) were gathered from the identified references for each pipeline. These values are for the original proposed construction rights-of-way and could not be adjusted for the expanded construction right-of-way needed for looping in the system alternatives. We do not anticipate that the presented values would vary significantly for the expanded construction right-of-way needed for looping.

<sup>h</sup> A total of 10 residences within 50 feet of the proposed construction right-of-way were identified for the original Creole Trail Pipeline (Segments 2 and 3) and 0 residences have been identified within 50 feet of the proposed construction right-of-way for the proposed Creole Trail Segment 1 Amendment. However, it was not possible to identify the number of residences within 50 feet of the expanded construction right-of-way for system alternatives that include the Creole Trail Pipeline without performing a field survey and review of recent aerial photography.

<sup>i</sup> Based on surveys and consultations completed to date, there are no National Historic Landmarks or properties listed on the National Register within the area of potential effect of the proposed route or any alternative.

- Additional facilities would be required. As shown in table 3.2-1, the additional facilities would include 167.5 miles of 42-inch-diameter looping of proposed pipeline. This would be necessary in lieu of installing compression to carry the combined volumes of both terminals. The total length of pipeline in System Alternative #1 would be 35.3 miles longer than the proposed KMLP Project.
- We assume a 125-foot construction right-of-way and 50-foot permanent right-of-way would be required for the looped pipeline.
- Because of the additional pipeline looping, the cost of System Alternative #1 would exceed the combined cost of the KMLP Project and the three Cheniere segments by an estimated \$200.9 million.
- Contractual agreements between Total LNG USA and Chevron and KMLP would have to be modified to accommodate the combined facilities and they may affect shipper commitments to the project.
- It is possible that some of the proposed interconnecting points with downstream pipelines that are on the Creole Trail Pipeline segment of System Alternative #1 do not have the same capacities as envisioned by the KMLP precedent agreements with its shippers, and therefore may require further modification. This would be in spite of the fact that the total downstream interconnecting capacity of System Alternative #1 exceeds that of the KMLP Project.

System Alternative #1 would avoid having to construct the entire 132.2-mile Leg 1 pipeline, along with its attendant environmental impacts. However, it would entail substantial construction of expanded right-of-way by looping the three Chenier pipeline segments, which would disturb a total of 2,537.9 acres during construction. That would be 507.6 acres more than the proposed system would disturb during construction. Compared to KMLP's proposed system, System Alternative #1 would cross nine fewer perennial waterbodies, but would cross two waterbodies listed as natural and scenic rivers. System Alternative #1 would require 208.9 acres more in permanent right-of-way, parallel existing rights-of-way to a smaller extent (31.1 percent compared to 54.0 percent) and cross 12.6 more miles of wetlands. In addition, since this alternative is similar to the first 34 miles of KMLP's Southern Route Alternative #2 (see figure 3.3-1), it would have the same adverse impacts as described in section 3.3.2 below. Based on this analysis, the proposed system is environmentally less damaging than System Alternative #1.

### **3.2.2.2 System Alternative #2**

As shown in table 3.2-1, this alternative would require 158.2 miles of pipeline. It is estimated that this routing would have a downstream interconnecting capacity of 12.93 Bcf/d, which is more than the 11.37 Bcf/d that would be provided by the KMLP Project. This system alternative would require the following:

- Approximately 101.8 miles of new 42-inch-diameter pipeline and 56.4 miles of 42-inch-diameter pipeline looping would have to be constructed.
- As for System Alternative #1, we assume looping would require a 125-foot construction right-of-way and 50-foot permanent right-of-way.
- The 18.1-mile Creole Trail Segment 1 Amendment and the eastern half of the KMLP Leg 1, stretching about 84 miles, would have to be constructed.

- The additional cost of this system alternative over the combined KMLP and Cheniere pipeline segments would be \$149.2 million.
- All of the major interconnects with downstream pipelines would remain the same as with the KMLP Project. One exception is the interconnect with the Southwest Loop, where that interconnect would be replaced by one at Johnsons Bayou.

System Alternative #2 would avoid having to construct the western KMLP Leg 1 segment (MP 0 to MP 48) and its associated environmental impacts. However, this alternative would still result in construction impacts across 2,397.0 acres compared to 2,030.3 acres for the proposed system. Compared to the proposed system, System Alternative #2 would cross 7.3 less miles of wetlands and three less perennial waterbodies, but it would require 152.5 acres more in permanent right-of-way. In addition, as with System Alternative #1, this alternative would have the same impacts in its first 34 miles as described in section 3.3.2 for Southern Route Alternative #2. Based on this analysis, the proposed system is environmentally less damaging than System Alternative #2.

### **3.3 MAJOR ROUTE ALTERNATIVES**

In evaluating alternatives that would meet the Project’s purpose and need, we reviewed both major route alternatives and route variations for Leg 1 of the Project. Major route alternatives follow different alignments for a significant portion of the proposed route whereas route variations are relatively short deviations from the proposed route that would potentially avoid or reduce project impacts on specific localized resources that may include cultural resource sites, residences, sensitive habitats, or site-specific terrain conditions. We did not consider major route alternatives for Leg 2 of the Project because it would be only 1.2 miles long and located entirely within the Sabine Pass LNG Terminal property. Similarly, we did not consider major route alternatives for the FGT Lateral because there are no viable alternatives for getting from Leg 1 to the FGT compressor station that would be substantially different than the proposed route.

During the pre-filing process for this Project, we evaluated major route alternatives considered by KMLP and assisted in developing the proposed route in consultation with the COE, FWS, NOAA Fisheries Service, and LDWF. This evaluation used information from field studies, aerial photographs, National Wetlands Inventory (NWI) maps, and U.S. Geological Survey (USGS) quadrangle maps to generate a variety of routes that would each meet the project objectives while avoiding excessive environmental impacts. We focused on five possible routes (see figure 3.3-1):

- Proposed Route;
- Southern Route Alternative #1;
- Southern Route Alternative #2;
- Northern Route Alternative; and
- Center Route Alternative.

We also considered the possibility of paralleling portions of the Liberty Pipeline and Cameron Pipeline routes that are in the vicinity of the Project; however, we concluded that these routes are not



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Figure 3.3-1 Major Route Alternatives for the KMLP Project

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viable as major route alternatives because they could only serve as variations to parts of the Northern Route Alternative and would not avoid the sensitive areas associated with that alternative, as discussed in section 3.3.3.

The major route alternatives that we considered in detail are compared in table 3.3-1 according to various criteria and are discussed in separate sections below. We give primary consideration to the use or extension of existing rights-of-way to reduce potential impacts on sensitive resources. Installation of the new pipeline along existing, cleared utility rights-of-way (such as those of power lines, roads, railroads, and existing pipelines) may be environmentally preferable to construction along new rights-of-way. In particular, construction effects and cumulative impacts may often be reduced by means of previously cleared rights-of-way, which avoid the creation of new rights-of-way through undisturbed areas, reducing long-term and permanent environmental impacts. Based on this analysis, the proposed route is environmentally least damaging and we are recommending use of the proposed route as the preferred alternative.

### **3.3.1 Southern Route Alternative #1**

As shown in figure 3.3-1, this alternative would proceed east from the Sabine Pass LNG Terminal along the north side of SH 82 to Johnsons Bayou. From there it would turn north along an existing pipeline corridor to an intersection with an existing NGPL pipeline. Paralleling the NGPL pipeline, it would pass through 6.3 miles of the Sabine National Wildlife Refuge (SNWR), cross Calcasieu Lake west to east, continue in a generally northeastern direction across Jefferson Davis and Acadia Parishes, and terminate north of Eunice in Evangeline Parish. This alternative would avoid the Sabine Lake crossing of KMLP's proposed route, but it would cross Calcasieu Lake instead.

As shown in table 3.3-1, Southern Route Alternative #1 would cross less open water (2.9 miles), less forested areas (1 mile), and less agricultural areas (9.9 miles), and have one fewer road crossing and three fewer railroad crossings, when compared to the proposed route. However, it would have 13 more waterbody crossings, impact more wetlands (14.3 miles), and disturb a greater area for construction (69.7 acres), and is 1.5 miles longer overall. This alternative would also run adjacent to existing rights-of-way for 18 miles less than the proposed route.

The significantly greater length of wetlands crossed and the sensitivity of the areas crossed raised serious concerns about Southern Route Alternative #1. In particular, federal and state agencies objected to the crossing of the NWR and expressed concern about passing through several miles of coastal marsh east of Calcasieu Lake. KMLP's proposed route would avoid the NWR entirely and the pipe would be installed by HDD at the southern and northern shores of Sabine Lake and across most of the wetlands to the north of Sabine Lake to minimize impacts to aquatic resources. Therefore, we believe that the proposed route is environmentally less damaging than Southern Route Alternative #1.

### **3.3.2 Southern Route Alternative #2**

As shown in figure 3.3-1, this alternative would proceed east from the Sabine Pass LNG Terminal along the north side of SH 82 and continue past Johnsons Bayou and Holly Beach to the west bank of the Calcasieu River near Cameron. It would then proceed north, cross Calcasieu Lake, turn east to avoid residential areas southeast of Lake Charles, proceed in a generally northeast direction across Jefferson Davis and Acadia Parishes, and terminate north of Eunice in Evangeline Parish. We considered this alternative to avoid the Sabine NWR crossing of Southern Route Alternative #1.

**TABLE 3.3-1**

**Comparison of KMLP's Proposed Route with Major Route Alternatives for Leg 1**

<b>Characteristic or Resource</b>	<b>Leg 1 Proposed Route</b>	<b>Southern Route Alternative #1</b>	<b>Southern Route Alternative #2</b>	<b>Northern Route Alternative</b>	<b>Center Route Alternative</b>
Total Length	132.2 miles	133.7 miles	137.6 miles	133.5 miles	137.2 miles
Area Disturbed for Construction	2995.9 acres <sup>a</sup>	3065.6 acres	3154.3 acres	3060.2 acres	3145.1 acres
Length Adjacent to Existing Rights-of-Way	71.4 miles	53.4 miles	53.9 miles	76.9 miles	77.8 miles
Length in Wetlands	35.8 miles	50.1 miles	40.0 miles	35.9 miles	38.5 miles
Number of Waterbody Crossings	53	66	49	59	58
Number of Natural and Scenic River Crossings	0	0	0	1	0
Length in Open Water (incl. lakes, streams, and canals)	16.5 miles	13.6 miles	16.1 miles	15.6 miles	16.2 miles
Length in Forested Areas	3.8 miles	2.8 miles	2.8 miles	22.5 miles	4.0 miles
Length in Agricultural Areas	90.5 miles	80.6 miles	88.2 miles	65.6 miles	93.3 miles
Length in National Wildlife Refuges	0	6.3 miles	0	0	0
Length in Other Areas of Recreational/Designated Land Use <sup>b</sup>	0	0	0	0	0
Residences within 50 feet of Construction Work Area	0	TBD <sup>c</sup>	TBD <sup>c</sup>	TBD <sup>c</sup>	TBD <sup>c</sup>
Number of Federally Listed Threatened or Endangered Species	8	8	8	8	8
Number of Cultural Resources <sup>d</sup>	0	0	0	0	0
Number of Road Crossings	125	124	128	109	144
Number of Railroad Crossings	5	2	5	5	2

<sup>a</sup> This number differs from the one reported in table 3.2-1 because it includes the estimated areas for extra work spaces, aboveground facilities, pipe yards, and access roads associated with Leg 1.

<sup>b</sup> Such as wilderness areas, parks, ballfields, campgrounds, etc.

<sup>c</sup> TBD = to be determined. The alternate routes have not been studied in detail through aerial photographs and field surveys to determine the presence of residences within construction work areas.

<sup>d</sup> Based on surveys and consultations completed to date, there are no National Historic Landmarks or properties listed on the National Register within the area of potential effect of the proposed route or any alternative.

Table 3.3-1 compares this alternative to the proposed route according to several criteria. Compared to the proposed route, Southern Route Alternative #2 would cross four fewer waterbodies, less open water (0.4 mile), less forested areas (1 mile), and less agricultural areas (2.3 miles). However, it would disturb a greater area for construction (158.4 acres), impact more wetlands (4.2 miles), have three more road crossings, and it would be 5.4 miles longer overall. This alternative would also run adjacent to existing rights-of-way for 17.5 miles less than the proposed route.

Geological review conducted subsequent to the development of this route alternative revealed that the chenier on which SH 82 is built is the one remaining chenier east of Johnsons Bayou, leaving no space for a new pipeline. As a result, the pipeline would have to be constructed in the coastal emergent marsh to the north of the chenier. In addition, the chenier on which SH 82 is built is highly vulnerable to storm damage, which raises concerns about the long-term stability of the road. The Louisiana Department of Transportation and Development stated that they have had insufficient budget to repair SH 82 if it was severely damaged by a storm and would consider abandoning the road, as was done in Texas when SH 87 between Sabine Pass and High Island was destroyed by a storm. In the event that SH 82 is damaged by a storm and not repaired, access to the pipeline to ensure continued maintenance and integrity could be jeopardized. The area was under water during the recent hurricanes (Katrina and Rita). Hurricane Rita completely wiped out the town of Holly Beach located along SH 82.

Other potential problems associated with this alternative include:

- Greater potential impacts to oysters in Calcasieu Lake than in Sabine Lake (Southern Route Alternative #2 would cross an oyster seed ground in Calcasieu Lake, whereas the proposed route would cross a public oyster tonging area in Sabine Lake);
- Impacts to wildlife refuges and sensitive marsh near Calcasieu Lake; and
- Longer crossings of coastal emergent marsh and impacts to associated EFH compared to the proposed route.

For these reasons, we believe that the proposed route is environmentally less damaging than Southern Route Alternative #2.

### **3.3.3 Northern Route Alternative**

As shown in figure 3.3-1, this alternative would leave the Sabine Pass LNG Terminal and enter Sabine Lake in a northbound direction. It would pass through Sabine Lake in a generally north-northeast direction and exit the lake near Shell Island. It would then parallel the eastern bank of the GIWW to Perry's Ridge. Crossing into Calcasieu Parish, it would follow Perry's Ridge north, pass to the west of Vinton, Louisiana, and go to an intersection with an existing Transco pipeline near Starks, Louisiana, which it would parallel in a generally east-northeast direction across the Calcasieu River and across Jefferson Davis Parish. At MP 110 in Acadia Parish, it would turn northeast and continue to a point north of Eunice in Evangeline Parish where it would terminate.

Agencies expressed concern regarding the potential impacts to distinctive managed pine and hardwood forests along the Northern Route Alternative, which could include habitat for the endangered Red-cockaded Woodpecker. In total, the Northern Route Alternative would cross 18.7 more miles of forest than the proposed route, as reported in table 3.3-1. In addition, in order to target the narrowest point for crossing the Calcasieu River, which the LDWF designates as a Louisiana Natural and Scenic River in the area north of Lake Charles, this alternative would have to go through about 6 miles of bottomland hardwood. It would not be feasible to cross this entire 6-mile stretch using HDD.

Also, compared to the proposed route, the Northern Route Alternative would cross less open water (0.9 mile), less agricultural areas (24.9 miles), and 16 fewer roads, as shown in table 3.3-1. The Northern Route Alternative would run adjacent to existing rights-of-way for 5.5 miles longer than the proposed route. However, it would cross six more waterbodies, disturb a greater area for construction (64.3 acres), cross more wetlands (0.1 mile), and be slightly longer (1.3 miles).

In summary, the Northern Route offers no real advantage compared to the proposed route and would create more environmental concern by trading impacts to agricultural areas with more impacts to forested areas and the potential habitat of an endangered species. Therefore, we believe that the proposed route is environmentally less damaging than the Northern Route Alternative.

### **3.3.4 Center Route Alternative**

As shown in figure 3.3-1, this alternative would follow the proposed route until approximately MP 62.5 southeast of Lake Charles. However, rather than taking a northern turn at that point like the proposed route, the Center Route Alternative would continue east and then dip south to make numerous pipeline connections. It would then turn northeast, rejoin the proposed route near Bayou Nezpique around MP 99.4, and continue northeasterly along the proposed route before terminating at a point north of Eunice in Evangeline Parish.

Table 3.3-1 compares this alternative to the proposed route in terms of several environmental criteria. Compared to the proposed route, the Center Route Alternative would cross less open water (0.3 mile), cross three fewer railroads, and run adjacent to existing rights-of-way for 6.4 more miles. However, it would be 5 miles longer than the proposed route and it would impact 149.2 acres more during construction, cross five more waterbodies, cross more wetlands (2.7 miles), cross more forested areas (0.2 mile), cross more agricultural areas (2.8 miles), and cross 19 more roads. Based on this analysis, the Center Route Alternative does not offer any significant environmental advantages and would create more impacts to waterbodies, wetlands, forests, and agricultural lands than the proposed route. Therefore, we believe that the proposed route is environmentally less damaging than the Center Route Alternative.

## **3.4 ROUTE VARIATIONS**

Route variations differ from system or route alternatives in that they are identified to avoid or reduce potential construction impacts to specific localized resources such as wetlands, waterbodies, residences, cultural resources, recreational lands, and specific terrain conditions. While route variations may be a few miles in length, most are relatively short and in proximity to the proposed route.

As part of its project development and route selection process prior to filing its application, KMLP considered 15 route variations to Leg 1. These variations were considered as the result of issues raised by the staff, other agencies, landowners, and KMLP. Variations that lessened environmental impacts were adopted by KMLP as part of the proposed route.

These 15 variations are shown in the figures included in appendix F and summarized in table 3.4-1. A description of each variation, including a table summarizing the characteristics and environmental resources for the variation and the proposed route, is provided below.

**TABLE 3.4-1**

**Route Variations Considered in Developing the Proposed Route for Leg 1**

<b>Route Variation (Page in Appendix F Showing Map)</b>	<b>MP Range on Proposed Route for Leg 1</b>	<b>Reason for Consideration</b>	<b>Comments</b>	<b>Adopted (Y/N)</b>	<b>Original Length (miles)</b>	<b>Variation Length (miles)</b>
Blue Buck Point (F-1)	1.1 – 7.1	Avoid marsh south of Sabine Lake – variation considered at request of the Commission and other agencies	Would avoid marsh but cause greater impact to oysters	No	6.1	7.3
Garrison's Ridge (F-2)	2.1 – 4.6	Share a greater length of right-of-way with another proposed pipeline – variation considered at request of the Commission	Would increase pipeline length and length of wetlands crossed	No	2.5	3.4
Vinton Drainage Canal (F-3)	31.2 – 35.7	Ensure sufficient workspace; reduce the risk of pipeline exposure due to shoreline erosion	Would reduce risk associated with shoreline erosion but cause greater impact to wetlands	Yes	4.8	4.6
Bayou Choupique (F-4)	40.1 – 45.2	Distance the route from a landfill – variation considered at request of Waste Management Inc.	Would also avoid impact to high-quality forested wetland	Yes	4.5	5.2
Calcasieu River (F-5)	40.1 – 45.2	Comply with constructability requirements; distance the route from wetlands	Would avoid need for HDD workspace in COE dredge disposal site; would not come within 50 feet of a residence	Yes	4.6	4.5
Tom Herbert Road #1 (F-6)	57.2 – 59.7	Minimize the subdividing of properties – variation considered at request of landowners	Allows maximum collocation with existing pipelines	Yes	2.6	2.6
Tom Herbert Road #2 (F-6)	57.2 – 59.7	Minimize the subdividing of properties – variation considered at request of landowners	Would not be collocated with existing pipelines	No	2.6	2.6
Interstate Highway 10 (F-7)	74.9 – 78.4	Enable an HDD instead of a horizontal bore (thereby allowing an existing pipeline corridor to be used rather than new right-of-way)	Would also avoid an existing and proposed residential area	Yes	3.6	3.4
Freeland Road (F-8)	88.6 – 89.1	Distance the route from residences	Would be 260 feet from nearest residence	Yes	0.4	0.5
Bayou Nezpique #1 (F-9)	95.3 – 100.5	Distance the route from residences – variation considered at request of landowners	Would be 320 feet from nearest residence	No	5.2	5.2
Bayou Nezpique #2 (F-9)	95.3 – 100.5	Distance the route from residences – variation considered at request of landowners	Would be 720 feet from nearest residence	Yes	5.2	5.3
U.S. Highway 190 (F-10)	111.9 – 112.5	Distance the route from a residence; avoid construction in new right-of-way	Would be 360 feet from nearest residence	Yes	0.5	0.6
South Forty Acre Subdivision (F-11)	114.8 – 115.7	Distance the route from a proposed residential area	Would be 940 feet from nearest existing residence and at least 50 feet from proposed subdivision boundary	Yes	0.7	0.9
Old Schoolhouse Road (F-12)	122.0 – 123.2	Distance the route from residences	Would be 160 feet from nearest residence	Yes	1.3	1.3
Perron Road (F-13)	127.6 – 129.8	Distance the route from residences	Would be 160 feet from nearest residence	Yes	2.1	2.2

### 3.4.1 Blue Buck Point Route Variation (Leg 1 MP 1.1 – MP 7.1)

This variation would diverge from the proposed route at MP 1.1, enter the Sabine Shipping Channel almost immediately and rejoin the proposed route at MP 7.1 in Sabine Lake. Table 3.4.1-1 compares environmental factors of the Blue Buck Point Route Variation with the proposed route.

Environmental Factor	Proposed Route	Variation
Total Length	6.1 miles	7.3 miles
Number of Road Crossings	1	1
Number of Water Crossings <sup>a</sup>	5	3
Length in Streams and Canals <sup>b</sup>	0.04 mile	0.6 mile
Length in Wetlands <sup>b</sup>	3.3 miles	0.2 mile
Length in Industrial Areas <sup>b</sup>	0.2 mile	0
Length in Lakes <sup>b</sup>	2.5 miles	6.5 miles
Potential Submerged Cultural Resource Sites within Study Corridor in Sabine Lake	0	4

<sup>a</sup> 2000 ESRI Tiger Data (US Census Bureau 2004)  
<sup>b</sup> 1990 USGS Land Use and Land Cover Data (USGS 2006a)

This variation was evaluated to minimize construction impacts to wetlands between the Sabine Pass LNG Terminal and Sabine Lake. As shown in table 3.4.1-1, the Blue Buck Point Route Variation would cross only 0.2 miles of wetlands, whereas the proposed route would cross 3.3 miles of wetlands. However, the impact of this variation on oyster populations and oyster habitat would be greater than that of the proposed route. From the results of the oyster survey, bottom substrate of the Blue Buck Point Route Variation through Sabine Lake was divided into seven bottom substrate categories, as listed in table 3.4.1-2. The mollusks present, generally the *Atlantic rangia*, were located within the bottom substrates designated as reef and exposed shell, equating to a total area of 494.1 acres of bottom substrate suitable for or containing mollusks along the route variation. The majority of the oyster resources were found in approximately the first 4.5 miles of the Blue Buck Point Route Variation, although isolated patches of

Substrate	Acreage within Survey Corridor	Percentage of Survey Corridor
Soft Mud with Buried Shell	5,430.3	80.9
Reef	487.8	7.3
Moderately Firm Mud	281.5	4.2
Firm Mud	238.0	3.5
Soft Mud with Exposed Scattered Shell	229.6	3.4
Soft Mud	36.2	0.5
Exposed Shell	6.3	0.1

oyster habitat occurred within the survey corridor until the route variation would join with the proposed route. Utilization of this variation would cause a disruption to 482.8 acres of oysters or oyster habitat that would be avoided by the use of the proposed pipeline route. In addition, the Blue Buck Point Route Variation would disrupt areas supporting higher densities of oysters. Along the route variation, samples indicate that approximately 8.2 live oysters per square meter occur within areas designated as reef, whereas only 0.6 live oysters per square meter occur along the reef areas of the proposed route.

There is also concern that the Blue Buck Point Route Variation would take the pipeline into the Sabine Pass shipping channel. This channel has substantial marine traffic that would pose an increased risk to pipeline safety.

For the above-mentioned reasons, we concluded that the Blue Buck Point Route Variation is environmentally inferior and hence not adopted.

### 3.4.2 Garrison’s Ridge Route Variation (Leg 1 MP 2.1 – MP 4.6)

This variation would diverge from the proposed route at MP 2.1 and rejoin it at MP 4.6 in Sabine Lake. Table 3.4.2-1 compares environmental factors of the Garrison’s Ridge Route Variation with the proposed route. We considered this variation as a way to run northwest along a chenier to Sabine Lake, potentially eliminating impacts to wetlands lying in lower areas. However, KMLP found that the chenier fades before reaching the lake and determined that the variation would not only add to the length of the pipeline but also increase the length of wetlands crossed by the Project. Acreage of wetlands impacted would be further increased by the need to use the saturated wetlands construction method along the route variation, which requires a 125-foot-wide right-of-way, rather than the marsh-buggy construction method, which requires a 100-foot-wide right-of-way (see section 2.3.1.2). Because of the potential for increased impacts to wetlands, this variation was not incorporated into the proposed route.

<b>TABLE 3.4.2-1</b>		
<b>Environmental Comparison of Garrison’s Ridge Route Variation</b>		
<b>Environmental Factor</b>	<b>Proposed Route</b>	<b>Variation</b>
Total Length	2.5 miles	3.4 miles
Number of Road Crossings <sup>a</sup>	0	0
Number of Water Crossings <sup>a</sup>	3	3
Length in Wetlands <sup>b</sup>	2.5 miles	3.1 miles
Length in Uplands <sup>b</sup>	0.04 mile	0.3 miles

<sup>a</sup> 2000 ESRI Tiger Data (US Census Bureau 2004)  
<sup>b</sup> 1988 National Wetlands Inventory Data (USGS 2006b)

### 3.4.3 Vinton Drainage Canal Route Variation (Leg 1 MP 31.2 – MP 35.7)

This variation would diverge from the route originally considered during the pre-filing process at MP 31.2 and rejoin it at MP 35.7, with the two alignments running parallel to each other for 3.8 miles to the GIWW. Table 3.4.3-1 compares environmental factors of the variation with the original route. KMLP adopted this variation because its field surveys showed that the route originally considered ran too close to the GIWW for construction to be possible. The proposed route (variation) is intended to reduce risk of shoreline erosion of the GIWW and exposure of the proposed Leg 1 pipe over the life of the Project. It would, however, result in greater impacts to wetlands.



**TABLE 3.4.3-1****Environmental Comparison of Vinton Drainage Canal Route Variation**

<b>Environmental Factor</b>	<b>Proposed Route (Variation)</b>	<b>Originally Considered Route</b>
Total Length	4.6 miles	4.8 miles
Number of Road Crossings <sup>a</sup>	0	1
Number of Water Crossings <sup>a</sup>	1	1
Length in Cropland and Pasture <sup>b</sup>	1.2 miles	1.5 miles
Length in Wetlands <sup>c</sup>	4.5 miles	3.4 miles
Length in Uplands <sup>c</sup>	0.1 mile	1.3 miles
Length in Open Water <sup>c</sup>	0.03 mile	0.04 mile

<sup>a</sup> 2000 ESRI Tiger Data (US Census Bureau 2004)  
<sup>b</sup> 1990 USGS Land Use and Land Cover Data (USGS 2006a)  
<sup>c</sup> 1988 National Wetlands Inventory Data (USGS 2006b)

**3.4.4 Bayou Choupique Route Variation (Leg 1 MP 40.1 – MP 45.2)**

This variation has been incorporated into the proposed route. The route originally considered by KMLP during the pre-filing process diverged from the proposed route at MP 40.1 and rejoined it at MP 45.2. The proposed route (variation) was developed to address concerns raised by Waste Management Inc. regarding the proximity of the original alignment to an existing landfill less than 1,000 feet from the route. Table 3.4.4-1 compares environmental factors of the proposed route (the adopted Bayou Choupique Canal Route Variation) with the originally considered route. Although 0.7 miles longer, the proposed route (variation) would result in one less water crossing and would avoid impacts to high-quality forested wetlands adjacent to Bayou Choupique.

**TABLE 3.4.4-1****Environmental Comparison of Bayou Choupique Route Variation**

<b>Environmental Factor</b>	<b>Proposed Route (Variation)</b>	<b>Originally Considered Route</b>
Total Length	5.2 miles	4.5 miles
Number of Road Crossings <sup>a</sup>	11	7
Number of Water Crossings <sup>a</sup>	2	3
Length in Cropland and Pasture <sup>b</sup>	4.8 miles	4.2 miles
Length in Wetlands <sup>c</sup>	1.4 miles	0.7 miles
Length in Uplands <sup>c</sup>	3.7 miles	3.8 miles
Length in Open Water <sup>c</sup>	0.1 mile	0.1 mile

<sup>a</sup> 2000 ESRI Tiger Data (US Census Bureau 2004)  
<sup>b</sup> 1990 USGS Land Use and Land Cover Data (USGS 2006a)  
<sup>c</sup> 1988 National Wetlands Inventory Data (USGS 2006b)

### 3.4.5 Calcasieu River Route Variation (Leg 1 MP 47.8 – MP 52.4)

This variation would diverge from the originally considered route at MP 47.8 and rejoin it at MP 52.4. KMLP developed this variation and incorporated it into the proposed route to: (1) avoid wetlands and ponds on the west side of the Calcasieu River; (2) avoid placing a HDD workspace within the COE dredge disposal site north of Devil’s Elbow; and (3) avoid wetlands on the east side of the Calcasieu River. Table 3.4.5-1 compares environmental factors of the proposed route (the adopted Calcasieu River Route Variation) with the originally considered route. As shown, the proposed route variation would cross one less road, one less waterbody, and 0.7 miles less of wetlands. Also, the proposed route (variation) would be more than 50 feet from an existing residence.

<b>TABLE 3.4.5-1</b>		
<b>Environmental Comparison of Calcasieu River Route Variation</b>		
<b>Environmental Factor</b>	<b>Proposed Route (Variation)</b>	<b>Originally Considered Route</b>
Total Length	4.5 miles	4.6 miles
Number of Road Crossings <sup>a</sup>	7	8
Number of Water Crossings <sup>a</sup>	4	5
Length in Cropland and Pasture <sup>b</sup>	2.1 miles	2.1 miles
Length in Wetlands <sup>c</sup>	1.2 miles	1.9 miles
Length in Uplands <sup>c</sup>	2.9 miles	1.8 miles
Length in Open Water <sup>c</sup>	0.4 mile	0.8 mile

<sup>a</sup> 2000 ESRI Tiger Data (US Census Bureau 2004)  
<sup>b</sup> 1990 USGS Land Use and Land Cover Data (USGS 2006a)  
<sup>c</sup> 1988 National Wetlands Inventory Data (USGS 2006b)

### 3.4.6 Tom Herbert Road Route Variations (Leg 1 MP 57.2 – MP 59.7)

At the request of affected landowners who do not want their properties to be divided by the Project, KMLP evaluated two variations to the route originally considered during pre-filing for the crossing of Tom Herbert Road. Variation #1 would diverge northeast from the originally considered route at MP 58.0 and rejoin it at MP 59.7. Variation #2 would diverge southeast from the originally considered route at MP 57.2 and rejoin it at MP 59.7. Table 3.4.6-1 compares environmental factors of the two Tom Herbert Road Route Variations with the original route. Variation #1 was incorporated into the proposed route in preference to Variation #2 due to the far greater opportunity for collocation with existing pipelines.

**TABLE 3.4.6-1****Environmental Comparison of Tom Herbert Road Route Variations #1 and #2**

<b>Environmental Factor</b>	<b>Proposed Route (Variation #1)</b>	<b>Variation #2</b>	<b>Originally Considered Route</b>
Total Length	2.6 miles	2.6 miles	2.6 miles
Number of Road Crossings <sup>a</sup>	3	2	3
Number of Water Crossings <sup>a</sup>	0	0	0
Length in Cropland and Pasture <sup>b</sup>	2.6 miles	2.6 miles	2.6 miles
Length in Wetlands <sup>c</sup>	0.03 mile	0	0
Length in Uplands <sup>c</sup>	2.5 miles	2.6 miles	2.6 miles
Length Collocated with Other Pipelines	2.6 miles	0	0.8 mile

<sup>a</sup> 2000 ESRI Tiger Data (US Census Bureau 2004)  
<sup>b</sup> 1990 USGS Land Use and Land Cover Data (USGS 2006a)  
<sup>c</sup> 1988 National Wetlands Inventory Data (USGS 2006b)

**3.4.7 Interstate Highway 10 (I-10) Route Variation (Leg 1 MP 74.9 – MP 78.4)**

Table 3.4.7-1 compares environmental factors of this variation, which has been incorporated into the proposed route, with the route originally considered during the pre-filing process. The proposed route (variation) diverges from the original route at MP 74.9 and rejoins it at MP 78.4 near the proposed crossing of I-10. The crossing of I-10 was originally designed for installation using a horizontal bore. However, following field surveys, KMLP determined that using HDD to cross I-10 would allow for an approximately 0.2-mile reduction in pipe length. HDD would also allow the pipeline to be installed adjacent to an existing pipeline corridor rather than requiring construction of a new right-of-way. In addition, near MP 76.2, the proposed route (variation) would cross over an existing pipeline corridor to avoid an existing residential area and a future residential area, which the original route would have crossed.

**TABLE 3.4.7-1****Environmental Comparison of I-10 Route Variation**

<b>Environmental Factor</b>	<b>Proposed Route (Variation)</b>	<b>Originally Considered Route</b>
Total Length	3.4 miles	3.6 miles
# of Road Crossings <sup>a</sup>	4	5
# of Water Crossings <sup>a</sup>	3	3
Length in Cropland and Pasture <sup>b</sup>	3.3 miles	3.5 miles
Length in Uplands <sup>c</sup>	3.4 miles	3.6 miles

<sup>a</sup> 2000 ESRI Tiger Data (US Census Bureau 2004)  
<sup>b</sup> 1990 USGS Land Use and Land Cover Data (USGS 2006a)  
<sup>c</sup> 1988 National Wetlands Inventory Data (USGS 2006b)

### 3.4.8 Freeland Road Route Variation (Leg 1 MP 88.6 – MP 89.1)

Table 3.4.8-1 compares environmental factors of the Freeland Road Route Variation, which has been incorporated into the proposed route, with the originally considered route. The proposed route (variation) would diverge from the originally considered route at MP 88.6 and rejoin it at MP 89.1. It was developed to avoid residences south of Bryan Road around MP 88.9. The proposed route (variation) is 260 feet away from the nearest residence, whereas the originally considered route was less than 50 feet from the nearest residence. It is about 0.1 mile longer than the originally considered route.

Environmental Factor	Proposed Route (Variation)	Originally Considered Route
Total Length	0.5 mile	0.4 mile
Distance to Nearest Residence	260 feet	less than 50 feet
Number of Road Crossings <sup>a</sup>	2	2
Number of Water Crossings <sup>a</sup>	0	0
Length in Cropland and Pasture <sup>b</sup>	0.5 mile	0.4 mile
Length in Uplands <sup>c</sup>	0.5 mile	0.4 mile

<sup>a</sup> 2000 ESRI Tiger Data (US Census Bureau 2004)  
<sup>b</sup> 1990 USGS Land Use and Land Cover Data (USGS 2006a)  
<sup>c</sup> 1988 National Wetlands Inventory Data (USGS 2006b)

### 3.4.9 Bayou Nezpique Route Variations (Leg 1 MP 95.3 – MP 100.5)

At the request of a landowner who wanted the pipeline moved farther away from a residence, KMLP evaluated two variations to the route originally considered during pre-filing for the crossing of Bayou Nezpique. Variation #1 would diverge south from the original route around MP 96.7, cross over to the north of the original route at MP 99.0, and rejoin the original route at MP 100.5. Variation #2 would diverge south from the original route at MP 95.3, join Variation #1 at MP 97.9, and continue on the Variation #1 route until it rejoins the original route at MP 100.5. Table 3.4.9-1 compares environmental factors of the two Bayou Nezpique Route Variations with the originally considered route. Although both variations are very similar in terms of most environmental parameters, Variation #2 was incorporated into the proposed route in preference to Variation #1 because it enabled the Project to be located farther from residences.

### 3.4.10 US Highway 190 Route Variation (Leg 1 MP 111.9 – MP 112.5)

This variation would diverge from the originally considered route at MP 111.9 and rejoin it at MP 112.5. The variation was developed and incorporated into the proposed route to avoid a residence east of MP 112.2. Table 3.4.10-1 compares environmental factors of the proposed route (the adopted U.S. Highway 190 Route Variation) with the original route. As shown, the proposed route (variation) would be 0.1 mile longer, but it would be approximately 180 feet farther away from the nearest residence. The proposed route (variation) would also allow greater collocation with an existing pipeline right-of-way.

**TABLE 3.4.9-1****Environmental Comparison of Bayou Nezpique Route Variations #1 and #2**

<b>Environmental Factor</b>	<b>Proposed Route (Variation #2)</b>	<b>Variation #1</b>	<b>Originally Considered Route</b>
Total Length	5.3 miles	5.2 miles	5.2 miles
Number of Residences within 50 feet	0	0	6
Distance to Nearest Residence	720 feet	320 feet	less than 50 feet
Number of Road Crossings <sup>a</sup>	6	6	6
Number of Water Crossings <sup>a</sup>	3	3	3
Length in Cropland and Pasture <sup>b</sup>	4.2 miles	4.2 miles	4.2 miles
Length in Mixed Forest Land <sup>b</sup>	0.6 mile	0.6 mile	0.5 mile
Length in Wetlands <sup>c</sup>	0.4 mile	0.5 mile	0.5 mile
Length in Uplands <sup>c</sup>	4.9 miles	4.8 miles	4.7 miles

<sup>a</sup> 2000 ESRI Tiger Data (US Census Bureau 2004)  
<sup>b</sup> 1990 USGS Land Use and Land Cover Data (USGS 2006a)  
<sup>c</sup> 1988 National Wetlands Inventory Data (USGS 2006b)

**TABLE 3.4.10-1****Environmental Comparison of US Highway 190 Route Variation**

<b>Environmental Factor</b>	<b>Proposed Route (Variation)</b>	<b>Originally Considered Route</b>
Total Length	0.6 mile	0.5 mile
Distance to Nearest Residence	360 feet	180 feet
Number of Road Crossings <sup>a</sup>	2	2
Number of Water Crossings <sup>a</sup>	0	0
Length in Cropland and Pasture <sup>b</sup>	0.2 mile	0.1 mile
Length in Evergreen Forest Land <sup>b</sup>	0.4 mile	0.4 mile
Length in Wetlands <sup>c</sup>	0	0.02 mile
Length in Uplands <sup>c</sup>	0.6 mile	0.5 mile

<sup>a</sup> 2000 ESRI Tiger Data (US Census Bureau 2004)  
<sup>b</sup> 1990 USGS Land Use and Land Cover Data (USGS 2006a)  
<sup>c</sup> 1988 National Wetlands Inventory Data (USGS 2006b)

**3.4.11 South Forty Acre Subdivision Route Variation (Leg 1 MP 114.8 – MP 115.7)**

This variation would diverge from the originally considered route at MP 114.8 and rejoin it at MP 115.7. The variation was developed and incorporated into the proposed route to avoid a proposed residential area, the South Forty Area Subdivision. Table 3.4.11-1 compares environmental factors of the proposed route (the adopted South Forty Acre Subdivision Route Variation) with the original route. As shown, the proposed route (variation) would be 0.35 miles longer, but it would be approximately 900 feet farther away from the nearest existing residence. In addition, the proposed route (variation) has been located more than 50 feet away from the expected boundary of the South Forty Area Subdivision, whereas the original route would run through the middle of this proposed subdivision.

**TABLE 3.4.11-1****Environmental Comparison of the South Forty Acre Subdivision Route Variation**

<b>Environmental Factor</b>	<b>Proposed Route (Variation)</b>	<b>Originally Considered Route</b>
Total Length	0.9 mile	0.65 mile
Distance to Nearest Residence	940 feet	less than 50 feet
Number of Road Crossings <sup>a</sup>	3	3
Number of Water Crossings <sup>a</sup>	0	0
Length in Cropland and Pasture <sup>b</sup>	0.9 mile	0.65 mile
Length in Uplands <sup>c</sup>	0.9 mile	0.65 mile

<sup>a</sup> 2000 ESRI Tiger Data (US Census Bureau 2004)  
<sup>b</sup> 1990 USGS Land Use and Land Cover Data (USGS 2006a)  
<sup>c</sup> 1988 National Wetlands Inventory Data (USGS 2006b)

**3.4.12 Old Schoolhouse Road Route Variation (Leg 1 MP 122.0 – MP 123.2)**

This variation would diverge from the originally considered route at MP 122.0 and rejoin it at MP 123.2. The variation was developed and incorporated into the proposed route to avoid several residences. Table 3.4.12-1 compares environmental factors of the proposed route (the adopted Old Schoolhouse Road Route Variation) with the original route. As shown, the proposed route (variation) would be 160 feet away from the closest existing residence, compared to the original route that would have been within 50 feet of three residences.

**TABLE 3.4.12-1****Environmental Comparison of the Old Schoolhouse Road Route Variation**

<b>Environmental Factor</b>	<b>Proposed Route (Variation)</b>	<b>Originally Considered Route</b>
Total Length	1.3 miles	1.3 miles
Number of Residences within 50 feet	0	3
Distance to Nearest Residence	160 feet	less than 50 feet
Number of Road Crossings <sup>a</sup>	2	2
Number of Water Crossings <sup>a</sup>	0	0
Length in Cropland and Pasture <sup>b</sup>	1.3 miles	1.3 miles
Length in Uplands <sup>c</sup>	1.3 miles	1.3 miles

<sup>a</sup> 2000 ESRI Tiger Data (US Census Bureau 2004)  
<sup>b</sup> 1990 USGS Land Use and Land Cover Data (USGS 2006a)  
<sup>c</sup> 1988 National Wetlands Inventory Data (USGS 2006b)

### 3.4.13 Perron Road Route Variation (Leg 1 MP 127.6 – MP 129.8)

This variation would diverge from the originally considered route at MP 127.6 and rejoin it at MP 129.8. The variation was developed and incorporated into the proposed route to avoid residential areas near MPs 128.4 and 129.7. Table 3.4.13-1 compares environmental factors of the proposed route (the adopted Perron Road Route Variation) with the original route. As shown, the proposed route (variation) is 0.1 mile longer. However, the proposed route (variation) would be 160 feet away from the closest existing residence, compared to the original route that would have been within 50 feet of two residences.

<b>TABLE 3.4.13-1</b>		
<b>Environmental Comparison of the Perron Road Route Variation</b>		
<b>Environmental Factor</b>	<b>Proposed Route (Variation)</b>	<b>Originally Considered Route</b>
Total Length	2.2 miles	2.1 miles
Number of Residences within 50 feet	0	2
Distance to Nearest Residence	160 feet	less than 50 feet
Number of Road Crossings <sup>a</sup>	4	4
Number of Water Crossings <sup>a</sup>	0	0
Length in Cropland and Pasture <sup>b</sup>	2.2 miles	2.1 miles
Length in Uplands <sup>c</sup>	2.2 miles	2.1 miles

<sup>a</sup> 2000 ESRI Tiger Data (US Census Bureau 2004)  
<sup>b</sup> 1990 USGS Land Use and Land Cover Data (USGS 2006a)  
<sup>c</sup> 1988 National Wetlands Inventory Data (USGS 2006b)

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