Draft Environmental Impact Statement

Kinder Morgan Louisiana Pipeline Project

Kinder Morgan Louisiana Pipeline LLC — Docket No. CP06-449-000

FERC EIS-0205

Federal Energy Regulatory Commission
Office of Energy Projects
Washington, DC 20426

Cooperating Agencies:

US Army Corps of Engineers

U.S. Fish & Wildlife Service

January 2007

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FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/Gas Branch 2
Kinder Morgan Louisiana Pipeline LLC
Docket No. CP06-449-000

TO THE PARTY ADDRESSED:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared a draft Environmental Impact Statement (EIS) on the natural gas pipeline facilities proposed by Kinder Morgan Louisiana Pipeline LLC (KMLP) in the above-referenced docket.

The draft EIS was prepared to satisfy the requirements of the National Environmental Policy Act. The staff concludes that approval of the proposed project with the appropriate mitigating measures as recommended, would have limited adverse environmental impact. The draft EIS also evaluates alternatives to the proposal, including system alternatives, major route alternatives, and route variations, and requests comments on them.

The draft EIS addresses the potential environmental effects of the construction and operation of the following facilities in southwest Louisiana:

- Leg 1 – 132 miles of 42-inch-diameter pipeline beginning within the Sabine Pass Liquefied Natural Gas (LNG) Terminal in Cameron Parish and extending northward and easterly through Calcasieu, Jefferson Davis, and Acadia Parishes until it connects with an existing Columbia Gulf Transmission interstate pipeline in Evangeline Parish, Louisiana.

- Leg 2 – 1.22 miles of 36-inch-diameter pipeline beginning within the Sabine Pass LNG Terminal and extending to a point of interconnection with the existing Natural Gas Pipeline Company of America pipeline just south of State Highway 82 in Cameron Parish, Louisiana.

- The Florida Gas Transmission (FGT) Lateral – 2.3 miles of 24-inch-diameter pipeline extending eastwardly from Leg 1 at approximately milepost 110.60

until it connects with the existing FGT Company's Compressor Station No. 7 near the town of Williams in Acadia Parish, Louisiana.

- Associated mainline block valves, metering, tie-in, and pigging facilities.

The purpose of the proposed facilities is to deliver at least 3,395,000 decatherms (Dth) per day of regasified natural gas from the Sabine Pass LNG Terminal into the national pipeline and underground storage grid.

Specific Comment Request

In addition to the proposed system and route, the staff has identified and evaluated in detail two system alternatives, four major route alternatives, and 15 route variations. The staff concludes that the proposed system and route are environmentally least damaging, and therefore prefers the proposed system and route. Any route variation considered to be an environmental improvement has been incorporated into the proposed route. Area residents, local or state governments, intervenors, and other interested parties are asked to provide specific comments on our analysis of alternatives. Comments should also address any effect on project timing and related cost/benefits.

Comment Procedures and Public Meetings

Any person wishing to comment on the draft EIS may do so. To ensure consideration prior to a Commission decision on the proposal, it is important that we receive your comments before the date specified below. **Please carefully follow these instructions to ensure that your comments are received in time and properly recorded:**

- Send **an original and two copies** of your comments to:

  Magalie R. Salas, Secretary
  Federal Energy Regulatory Commission
  888 First Street, N.E., Room 1A
  Washington, DC 20426;

- Label one copy of your comments for the attention of Gas Branch 2, DG2E;

- Reference Docket No. CP06-449-000 on the original and both copies; and

- **Mail your comments so that they will be received in Washington, DC on or before March 12, 2007.**

Please note that we are continuing to experience delays in mail deliveries from the U.S. Postal Service. As a result, we will include all comments that we receive within a reasonable time frame in our environmental analysis of this project. **However, the Commission strongly encourages electronic filing of any comments or interventions or protests to this proceeding.** For information on electronically filing comments, please see Title 18 CFR 385.2001 (a)(1)(iii) and the instructions on the Commission's web site at http://www.ferc.gov under the "Documents and Filings" tab. Under that tab you will find the "eFiling" link and the link to the User's Guide. Before you can submit comments you will need to create a free account, which can be created on-line by clicking on "Sign-up" under "New User." You will also be asked to select the type of filing you are making. This filing is considered a "Comment on Filing." **Comments submitted electronically must be submitted by March 12, 2007.**

We will announce in a future notice, the location and time of three local public meetings to receive comments on the draft EIS. These meetings will be posted on the Commission's calendar located at http://www.ferc.gov/EventCalendar/EventsList.aspx along with other related information.

After these comments are reviewed, any significant new issues are investigated, and modifications are made to the draft EIS, a final EIS will be published and distributed by the staff. The final EIS will contain the staff's responses to timely comments filed on the draft EIS.

Comments will be considered by the Commission but will not serve to make the commentor a party to the proceeding. Any person seeking to become a party to the proceeding must file a motion to intervene pursuant to Rule 214 of the Commission's Rules of Practice and Procedures (18 CFR 385.214).

Anyone may intervene in this proceeding based on this draft EIS. You must file your request to intervene as specified above.[1] **You do not need intervenor status to have your comments considered.**

The draft EIS has been placed in the public files of the FERC and is available for distribution and public inspection at:

[1] Interventions may also be filed electronically via the Internet in lieu of paper. See the previous discussion on filing comments electronically.

Federal Energy Regulatory Commission
Public Reference Room
888 First Street, N.E., Room 2A
Washington, DC 20426
(202) 502-8371

A limited number of copies are available from the Public Reference Room identified above. In addition, copies of the draft EIS have been mailed to federal, state and local agencies, public interest groups, individuals who have requested the draft EIS, newspapers, and parties to this proceeding.

Additional information about the project is available from the Commission's Office of External Affairs, at **1-866-208-FERC** (3372) or on the FERC Internet website (http://www.ferc.gov). Using the "Documents and Filings" tab, click on the "eLibrary link," and select "General Search." Enter the project docket number excluding the last three digits (*i.e.*, CP06-449) in the "Docket Number" field. Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at FERCOnlineSupport@ferc.gov or toll free at 1-866-208-3676, or for TTY, contact (202) 502-8659. The eLibrary link on the FERC Internet website also provides access to the texts of formal documents issued by the Commission, such as orders, notices, and rulemakings.

In addition, the Commission offers a free service called eSubscription which allows you to keep track of all formal issuances and submittals in specific dockets. This can reduce the amount of time you spend researching proceedings by automatically providing you with notification of these filings, document summaries, and direct links to the documents. To register for this service, go to http://www.ferc.gov/docs-filing/esubscription.asp.

Magalie R. Salas
Secretary

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LIST OF ACRONYMS AND TERMS

ACHP	Advisory Council on Historic Preservation
ANR	ANR Pipeline Company
APC	area of probable concern
APE	area of potential effects
API	American Petroleum Institute
AQCR	Air quality control region
ASME	American Society of Mechanical Engineers
BA	Biological Assesment
BACT	Best Available Control Technology
Bcf/d	billion cubic feet per day
BMP	Best Management Practices
BOD	biochemical oxygen demand
Cameron	Cameron Pipeline
CEQ	Council on Environmental Quality
Certificate	Certificate of Public Convenience and Necessity
CGT	Columbia Gulf Transmission
CMD	Coastal Management Division
COE	U.S. Army Corps of Engineers
Construction Conditions	Sea Turtle and Smalltooth Sawfish Construction Conditions
CRP	Conservation Reserve Program
CTP	Creole Trail Pipeline
CUP	Coastal Use Permit
CWA	Clean Water Act
CWPPRA	Coastal Wetland Planning, Protection, and Restoration Act
CZMA	Coastal Zone Management Act of 1972
CZMP	Coastal Zone Management Program
DO	dissolved oxygen
DOE	U.S. Department of Energ
DOT	U.S. Department of Transportation
DSM	Demand Side Management
Dth	decatherms
E2EM	estuarine emergent
E2SS	estuarine scrub-shrub
EFH	essential fish habitat
EI	Environmental Inspector
EIA	Energy Information Administration
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ES&C	Erosion & Sediment Control
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FERC or Commission	Federal Energy Regulatory Commission
FGT	Florida Gas Transmission
FMP	Fishery Management Plan
FWS	U.S. Fish and Wildlife Service
GIWW	Gulf Intracoastal Waterway
GMFMC	The Gulf of Mexico Fishery Management Council
GPP	Golden Pass Pipeline
GPS	Global Positioning System

HAPs	Hazardous Air Pollutants
HCA	High-Consequence Areas
HDD	Horizontal Directional Drilling
IRP	Integrated Resource Planning
KMLP	Kinder Morgan Louisiana Pipeline LLC
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LDOT	Louisiana Department of Transportation
LDWF	Louisiana Department of Wildlife and Fisheries
LOSCO	Louisiana Oil Spill Coordinators Office
LPDES	Louisiana Pollution Discharge Elimination System
LNG	Liquefied Natural Gas
LNWR	Lacassine National Wildlife Refuge
MACT	Maximum Achievable Control Technology
MAOP	Maximum Allowable Operating Pressure
Memorandum	Memorandum of Understanding on Natural Gas Transportation Facilities
MLV	Mainline block valves
MMBtu	million British thermal units
MMBtu/d	million British thermal units per day
MP	milepost
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act of 1969
NGA	Natural Gas Act
NGPL	Natural Gas Pipeline Company of America
NGPSA	Natural Gas Pipeline Safety Act
NHP	National Heritage Program
NHPA	National Historic Preservation Act
NNSR	Non-attainment New Source Review
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries Service	NOAA's National Marine Fisheries Service
NOI	Notice of Intent To Prepare an Environmental Impact Statement for the Proposed Kinder Morgan Pipeline Project and Request for Comments on Environmental Issues
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
NSA	Noise Sensitive Area
NSPS	New Source Performance Standards
NSR	New Source Review
NWF	National Wildlife Refuge
NWI	National Wetlands Inventory
OEP	FERC's Office of Energy Projects
OPS	Office of Pipeline Safety
our Plan	FERC’s Upland Erosion Control, Revegetation and Maintenance Plan
our Procedures	Wetland and Waterbody Construction and Mitigation
PAP	Port Arthur Pipeline
PEM	palustrine emergent
PFO	palustrine forested
PGA	Peak Ground Acceleration
PHMSA	Pipeline and Hazardous Materials Safety Administration
ppt	parts per thousand

PSD	Prevention of Significant Deterioration
psig	pounds per square inch gauge
PSS	palustrine scrub-shrub
RCW	red-cockaded woodpecker
SAV	submerged aquatic vegetation
SCADA	Supervisory Control and Data Acquisition
SH	State Highway
SHPO	State Historic Preservation Office
SNWR	Sabine National Wildlife Refuge
SPECT	Sabine Pass Pipeline/ Creole Trail Extension/ Creole Trail Pipeline
sp.	specie
SPP	Sabine Pass Pipeline
spp.	species
SPRP	Spill Prevention and Response Plan
SWPPP	Stormwater Pollution Prevention Plan
Tcf	trillion cubic feet
TCEQ	Texas Department of Environmental Quality
TPWD	Texas Parks and Wildlife Department
tpy	tons per year
TTS	Temporary Threshold shift
USGS	United States Geologic Survey
UTOS	Enbridge Offshore Pipeline
VOC	volatile organic compound
WRP	Wetlands Reserve Program

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EXECUTIVE SUMMARY

INTRODUCTION

This draft Environmental Impact Statement (EIS) for the Kinder Morgan Louisiana Pipeline Project (Project) has been prepared by the staff of the Federal Energy Regulatory Commission (FERC or Commission) to fulfill the requirements of the National Environmental Policy Act (NEPA). The purpose of this document is to inform the public, the Commission, and federal and state agencies about the potential adverse and beneficial environmental impacts of the Project and its alternatives, and to recommend mitigation measures that would avoid or reduce any significant adverse impacts to the maximum extent possible. This document has been prepared in coordination with our[1] federal cooperating agencies for the Project, the U.S. Army Corps of Engineers (COE) and the U.S. Fish and Wildlife Service (FWS).

This draft EIS was filed with the U.S. Environmental Protection Agency and a formal notice of availability was published in the Federal Register. In accordance with the Council on Environmental Quality regulations implementing NEPA, the public has the opportunity to comment on this draft EIS in the form of written comments or during public meetings to be held in the project area (to be announced in a separate notice). We would review and use the comments to prepare the final EIS for the Project. All timely and substantive comments received on the draft EIS would be addressed in the final EIS.

PROJECT BACKGROUND

Kinder Morgan Louisiana Pipeline LLC (KMLP) filed a request to implement the Commission's Pre-filing Process on January 31, 2006. We approved this request on February 17, 2006 and a pre-filing docket number (PF06-16-000) was established to file related documents into the public record.

On September 8, 2006, KMLP filed an application with the Commission, pursuant to section 7(c) of the Natural Gas Act, as amended, and Parts 157 and 284 of the Commission's regulations. Under Docket No. CP06-449-000, KMLP seeks a Certificate of Public Convenience and Necessity (Certificate) to construct, own, operate, and maintain the natural gas pipelines and associated infrastructure to deliver regasified liquefied natural gas (LNG) from the Sabine Pass LNG Terminal into the national pipeline and underground gas storage grid.

PROPOSED ACTION

The Project would deliver gas to 10 existing interstate pipelines and one existing intrastate pipeline via 14 interconnect installations with a total take-away capacity of about 4.0 billion cubic feet per day (Bcf/d) and a total downstream interconnecting capacity of about 11.4 Bcf/d. Having such broad access to markets in the Gulf Coast, Northeast, Mid-Atlantic, South, Midwest, and Southeast, through multiple pipeline connections, would allow shippers to redirect supplies as pipeline capacity is available and in response to market dynamics. The pipeline system would provide natural gas delivery flexibility in addition to widespread market access. Specifically, the Project facilities would include:

- Leg 1 – 132 miles of 42-inch-diameter pipeline beginning within the Sabine Pass LNG Terminal in Cameron Parish and extending northward and easterly through Calcasieu, Jefferson Davis, and Acadia Parishes until it connects with an existing Columbia Gulf Transmission interstate pipeline in Evangeline Parish, Louisiana.

[1] "Our," "we," and "us" refer to the environmental staff of the Federal Energy Regulatory Commission's Office of Energy Projects.

- Leg 2 – 1.22 miles of 36-inch-diameter pipeline beginning within the Sabine Pass LNG Terminal and extending to a point of interconnection with the existing Natural Gas Pipeline Company of America pipeline just south of State Highway 82 in Cameron Parish, Louisiana.
- The Florida Gas Transmission (FGT) Lateral – 2.3 miles of 24-inch-diameter pipeline extending eastwardly from Leg 1 at approximately milepost (MP) 110.60 until it connects with the existing FGT Company's Compressor Station No. 7 near the town of Williams in Acadia Parish, Louisiana.
- Associated mainline block valves, metering, tie-in, and pigging facilities.

KMLP proposes to commence construction on Leg 1 and Leg 2 in November 2007 and on the FGT Lateral in October 2008. Leg 2 and interconnects would be completed by April 2008 and brought into service by October 1, 2008. Leg 1, the FGT Lateral, and their respective interconnects would be completed by November 2008 and brought into service by April 1, 2009.

PUBLIC OUTREACH AND COMMENTS

As part of the pre-filing process, we issued a *Notice of Intent to Prepare an Environmental Impact Statement for the Proposed Kinder Morgan Louisiana Pipeline Project Request for Comments on Environmental Issues, and Notice of Public Scoping Meetings* (NOI) on March 24, 2006. We sent the NOI to 1,642 interested parties including federal, state, and local officials; agency representatives; conservation organizations; local libraries and newspapers; and property owners along the pipeline routes. We received comment letters in response to our NOI from the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries Service), FWS, and Louisiana Department of Wildlife and Fisheries (LDWF). We received no comment letters from landowners or other stakeholders.

On April 26, 2006, we issued a *Notice of Site Visit and Public Meetings* to provide notice to the public of our site visit and three scheduled public scoping meetings, which were held on May 8, 9, and 11, 2006, in Ville Platte, Sulphur, and Iowa, Louisiana, respectively. At each of the meetings, we heard comments from two individuals. Transcripts of these comments are part of the public record for the KMLP Project. On May 10, 2006, we conducted an aerial review of the Project by helicopter and we took a boat tour of the pipeline route in the northern end of Sabine Lake and vicinity. On May 9 and 11, 2006, we conducted a ground-based site visit of the entire route, which was open to the public.

We also conducted agency consultations and participated in interagency meetings to identify issues that should be addressed in this draft EIS. These consultations included interagency meetings on May 11 and October 5, 2006, both in Lake Charles, Louisiana. Participants at both meetings included representatives from the COE, FWS, NOAA Fisheries Service, and LDWF. We used the scoping comments to help focus the analysis in the draft EIS on potentially significant environmental issues related to the proposed action.

ENVIRONMENTAL IMPACTS

Construction and operation of the Project would result in numerous impacts to the environment. We evaluated the impacts to geology, soils, water resources, wetlands, vegetation, wildlife and aquatic resources, threatened and endangered species, land use, socioeconomics, cultural resources, air quality, noise, and safety. We also considered the cumulative impacts of this Project with current and foreseeable projects in the area. The primary issues with the Project were related to impacts to wetlands and waterbodies. Major findings and conclusions are summarized below.

Most of the land affected by the Project is agricultural land, open land (consisting of rangeland, non-forested wetlands, transitional areas, and sandy areas), and open water. Construction would affect a total of 3,030.7 acres. Operation of the Project would affect 840.9 acres, including 821.7 acres of the permanent right-of-way, 12.3 acres of aboveground facilities, and 6.9 acres of the permanent access roads. All construction would follow our *Upland Erosion Control, Revegetation and Maintenance Plan* (Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures), with a few minor alternative measures that we have specifically reviewed and found acceptable.

The Project would be constructed across 310 waterbodies, including Sabine Lake, the Gulf Intracoastal Waterway (GIWW), and Calcasieu River. To minimize impacts, KMLP proposed to conduct 18 horizontal directional drill (HDD) operations to install the pipeline under 24 waterbodies (some of the HDDs would encompass more than one waterbody). In addition, 147 waterbodies would be crossed by bore and two would be crossed using a flume. Based on the characteristics of the identified waterbodies, KMLP's proposed construction methods and operations procedures, its implementation of waterbody-related measures described in our Procedures, and our recommended measures, we believe that effects to surface waters resulting from construction and operation of the Project would be temporary and localized.

Sabine Lake is a large waterbody with important aquatic resources such as essential fish habitat (EFH) and oyster resources. KMLP proposes to cross Sabine Lake by HDD at the lake's southern and northern shorelines and via open-cut construction methods requiring the use of spud barges across the lake's open water. The use of HDD crossing methods at the northern and southern banks of Sabine Lake would avoid impacts to shoreline erosion, oyster reefs, and EFH wetlands. Open-cut construction across approximately 13 miles of Sabine Lake would affect water quality during construction, temporarily causing sediment re-suspension and related impacts in the water column. The Project would not directly affect known oyster reefs, but oysters inhabiting the area could be affected by increased turbidity or by deposition of sediments suspended by construction activities. KMLP would compensate LDWF for each bottom substrate directly impacted by pipeline construction and also for oysters lost due to sedimentation on the reefs.

The Project would be constructed in areas of extensive estuarine and palustrine wetlands. The construction right-of-way would affect 352 wetlands covering approximately 504.2 acres of wetlands. Of this total, about 99.5 acres are considered EFH wetlands. Most of the wetlands affected by pipeline construction would be restored, reseeded, and allowed to naturally revegetate and return to preconstruction conditions. Forested wetlands within the permanent right-of-way would be converted and maintained as an emergent or scrub-shrub wetland. Operation of the pipeline facilities would result in the permanent conversion of 14.9 acres of forested wetlands. The COE has not yet verified the KMLP wetland delineation for the Project; therefore, the acreage of wetlands affected by the Project may change. To minimize temporary construction impacts on wetlands, KMLP would implement protective measures in our Procedures, the recommendations made in this draft EIS, and the mitigation measures described in an Aquatic Resources Management Plan. Additionally, KMLP would cross several wetlands along the Project using the HDD method, which would avoid impacts on these wetlands.

Based on consultations and comments received from FWS and NOAA Fisheries Service, we evaluated the impacts of the Project on the bald eagle, brown pelican, red-cockaded woodpecker (RCW), and five species of sea turtles. We have determined that there would be no adverse effects for the bald eagle or brown pelican. With the protective measures recommended by NOAA Fisheries Service, the impacts on sea turtles are expected to be temporary, localized, and minor; therefore, the Project would not adversely affect these species. With regard to the RCW, we are recommending that KMLP file documentation of further consultation with FWS along with survey reports and FWS comments on all necessary RCW surveys. We are also recommending that KMLP not begin construction until we complete our consultation with FWS and NOAA Fisheries Service, and KMLP receives written notification from the Director of Office of Energy Projects (OEP) that construction and/or implementation of conservation measures may begin.

Detailed descriptions of all impacts, proposed mitigation measures to minimize these impacts, and our recommendations to further avoid, minimize, and mitigate these impacts are described in section 4.0 of this draft EIS.

ALTERNATIVES CONSIDERED

We evaluated the no action or postponed action alternatives, which would eliminate the short- and long-term environmental impacts identified in this draft EIS. However, the objectives of the Project would not be met, and KMLP would not be able to deliver regasified LNG to markets in Louisiana and the rest of the United States as proposed. We evaluated system alternatives to examine whether other existing or proposed natural gas pipeline systems would meet the Project objectives while offering an environmental advantage over the Project. Currently, there is no existing pipeline system that could be used to meet the Project objectives and we determined that two system alternatives involving proposed pipeline systems, including the approved Sabine Pass Pipeline, do not offer significant environmental benefits relative to the proposed action. We also evaluated four major route alternatives to the Project route. However, none of these major route alternatives would offer significant environmental advantages over the proposed route, and we eliminated them from further consideration. Lastly, we evaluated 15 route variations to avoid or reduce construction impacts to localized, specific resources. Variations that lessened environmental impacts were adopted by KMLP as part of the proposed Project route.

In summary, with KMLP's proposed mitigation and our recommendations, the proposed route is environmentally least damaging and we are recommending use of the proposed route as the preferred alternative.

CONCLUSIONS

We have determined that construction and operation of the KMLP Project would result in limited adverse environmental impacts based on information provided by KMLP and data developed from information requests; field investigations; literature research; alternatives analysis; comments from federal, state, and local agencies; and public input. These limited impacts would be most significant during the construction period.

As part of our review, we developed specific mitigation measures that we believe would appropriately and reasonably reduce the environmental impacts resulting from construction and operation of the Project. We believe that environmental impacts would be minimized if the Project is constructed and operated in accordance with applicable laws and regulations, KMLP's proposed mitigation, and our additional mitigation measures. The primary reasons for our conclusion are:

- About 54 percent of the proposed route would collocate with or parallel existing rights-of-way;
- KMLP would use HDD across most sensitive areas, including major waterbodies, oyster reefs, several wetlands, congested pipeline corridors, and select roads and developed areas;
- KMLP would consult with resource agencies to further avoid and minimize impacts to wetlands, EFH, and threatened and endangered species; and
- Construction would be done in accordance with our Plan and Procedures and all applicable permits and authorizations, and an environmental inspection and monitoring program would ensure compliance with all mitigation measures that become conditions of any Commission authorization.

1.0 INTRODUCTION

On September 8, 2006, Kinder Morgan Louisiana Pipeline LLC (KMLP) filed an application with the Federal Energy Regulatory Commission (FERC or Commission) under section 7(c) of the Natural Gas Act (NGA). As filed in Docket No. CP06-449-000, KMLP seeks a Certificate of Public Convenience and Necessity (Certificate) to construct, operate, and maintain a natural gas pipeline in southwest Louisiana. For the purposes of this draft environmental impact statement (EIS), the project is referred to as the "Project" or "KMLP Project."

The Project has been designed to deliver a peak day capacity of not less than 3,395,000 decatherms (Dth) of regasified natural gas from the Sabine Pass Liquefied Natural Gas (LNG) Terminal to various intrastate and interstate natural gas pipeline systems. The Sabine Pass LNG Terminal is under construction, and will be owned and operated by Sabine Pass LNG, L.P., on an 853-acre tract of land along the eastern bank of Sabine Pass, south of Louisiana State Highway (SH) 82 in southwestern Louisiana. The FERC issued an Order on December 21, 2004, granting approval under Section 3(a) of the NGA for Sabine Pass LNG, L.P.'s proposal (FERC Docket No. CP04-47-000) to construct and operate Phase I facilities at the LNG import terminal and granting approval under Section 7(c) of the NGA for 16 miles of 42-inch-diameter pipeline and associated facilities (called the Sabine Pass Pipeline). This order was based on, among other analyses, the *Final Environmental Impact Statement, Sabine Pass LNG and Pipeline Project* (Phase I Project FEIS) published in November 2004 (FERC 2004). Sabine Pass LNG, L.P. has subsequently applied for, and the FERC issued an Environmental Assessment in May 2006 on, proposed expanded – or Phase II – facilities at the terminal (FERC 2006a). These activities and facilities at the Sabine Pass LNG Terminal are not within the scope of the Project.

Pipelines and associated facilities proposed by KMLP for the Project include:

- Leg 1 – 132 miles of 42-inch-diameter pipeline beginning within the Sabine Pass LNG Terminal in Cameron Parish and extending northward and easterly through Calcasieu, Jefferson Davis, and Acadia Parishes until it connects with an existing Columbia Gulf Transmission (CGT) interstate pipeline in Evangeline Parish, Louisiana.

- Leg 2 – 1.22 miles of 36-inch-diameter pipeline beginning within the Sabine Pass LNG Terminal and extending to a point of interconnection with the existing Natural Gas Pipeline Company of America (NGPL) pipeline just south of SH 82 in Cameron Parish, Louisiana.

- The Florida Gas Transmission (FGT) Lateral – 2.3 miles of 24-inch-diameter pipeline extending eastwardly from Leg 1 at approximately milepost (MP) 110.60 until it connects with the existing FGT Company's Compressor Station #7 near the town of Williams in Acadia Parish, Louisiana.

- Associated mainline block valves (MLVs), metering, tie-in, and pigging facilities.

To the extent feasible, KMLP Project rights-of-way would parallel and overlap existing pipeline and utility rights-of-way, while providing a safe separation distance between the KMLP Project and any existing pipelines and utility lines. The width of the necessary construction rights-of-way for the various KMLP pipeline segments would differ according to the type of terrain encountered and the corresponding pipeline construction method that would be used, as further discussed in section 2 of this draft EIS. Approximately 3,031 acres of land would be temporarily affected by construction of the pipeline, storage yards, access roads, and aboveground facilities. Approximately 841 acres of land would be permanently affected by operation of the Project.

We[1] prepared this draft EIS to assess the environmental impact associated with construction, operation, and maintenance of the KMLP Project in Cameron, Calcasieu, Jefferson Davis, Acadia, and Evangeline Parishes, Louisiana as summarized above and more fully described in section 2 of this draft EIS.

1.1 PROJECT PURPOSE AND NEED

The KMLP Project would site, construct, operate, and maintain the natural gas pipelines and associated infrastructure to deliver regasified LNG from the Sabine Pass LNG Terminal into the national pipeline and underground gas storage grid. The two capacity holders at the Sabine Pass LNG Terminal (Total Gas & Power North America and Chevron U.S.A.) are the shippers on the KMLP Project. The Project would provide access to an additional 11 inter-and intra-state natural gas pipelines at 14 interconnect points with a total take-away capacity of about 4.0 billion cubic feet per day (Bcf/d) and a total downstream interconnecting capacity of about 11.4 Bcf/d. These pipelines serve markets throughout much of the eastern half of the United States. Having such broad access to markets in the Gulf Coast, Northeast, Mid-Atlantic, South, Midwest, and Southeast, through multiple pipeline connections, would allow shippers to redirect supplies as pipeline capacity is available and in response to market dynamics. The pipeline system would provide natural gas delivery flexibility in addition to widespread market access.

The U.S. Department of Energy (DOE) Energy Information Administration (EIA) forecasts increasing demand for natural gas and a need for additional supplies of natural gas. In its *Annual Energy Outlook 2006*, the EIA projects that natural gas demand in the United States will grow from 22.4 trillion cubic feet (Tcf) in 2004 to almost 26.9 Tcf in 2030 (DOE 2006). About 60 percent of the demand growth is projected by EIA to occur east of the Mississippi River, which is the area served by the pipelines that would be connected to the KMLP Project. With an expected decline in imports from Canada, and modest increases from domestic production, LNG is expected to be a major supplier of this need. LNG imports in the EIA reference case reach 12 Bcf/d by 2030, or 16 percent of total demand. The importance of LNG to natural gas markets lies in providing additional supplies that help to moderate prices and in giving North American markets access to broader world-wide natural gas resources.

1.2 PURPOSE AND SCOPE OF THIS STATEMENT

The FERC is the federal agency responsible for authorizing applications to construct and operate natural gas pipeline facilities. The FERC is the lead federal agency for the preparation of this draft EIS in compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40, Code of Federal Regulations (CFR) 1500-1508), and the FERC's regulations implementing NEPA (18 CFR 380). The FERC will use the results of the draft EIS as an element in its review of KMLP's application to determine whether to authorize the project. The FERC will consider the environmental issues, including our recommended mitigation measures, as well as non-environmental issues in making its decision. Final authorization would be granted only if the FERC finds that the Project is in the public interest. The environmental impact assessment and mitigation development described herein are important factors in this final determination.

The U.S. Army Corps of Engineers (COE) and U.S. Fish and Wildlife Service (FWS) are cooperating agencies for the preparation of this draft EIS. A cooperating federal agency has jurisdiction

[1] "We," "us," and "our" refer to the environmental staff of the FERC's Office of Energy Projects (OEP).

by law or special expertise with respect to environmental impacts involved with the proposal and is involved in the NEPA analysis. The Louisiana Department of Wildlife and Fisheries (LDWF) and the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NOAA Fisheries Service) also assisted us in the preparation of this draft EIS.

Our principal purposes in preparing this draft EIS are to:

- Identify and assess potential impacts on the human environment that would result from the Project;
- Describe and assess reasonable alternatives to the Project that would avoid or minimize adverse effects on the human environment;
- Identify and recommend specific mitigation measures to minimize environmental impacts; and
- Facilitate public involvement in identifying the significant environmental impacts.

Our analysis in this draft EIS focuses on the facilities that would be under the FERC's jurisdiction. The FERC jurisdictional facilities included in the Project would consist of three segments of pipelines as described above, including aboveground sites providing delivery interconnections, MLVs, pigging facilities, control systems, and other facilities, as further described in section 2 of this draft EIS. No compressor stations are proposed as part of the Project.

The topics addressed in this draft EIS include geology; soils and sediments; water resources; wetlands; upland vegetation; wildlife; aquatic resources; essential fish habitat (EFH); threatened, endangered, and special-status species; land use, recreation, and visual resources; socioeconomics; cultural resources; air quality and noise; reliability and safety; cumulative effects; and alternatives. This draft EIS describes the affected environment as it currently exists, discusses the environmental consequences of the Project, and compares the Project's potential impact to that of alternatives. This draft EIS also presents our conclusions and recommended mitigation measures.

1.3 PERMITS, APPROVALS, AND REGULATORY REQUIREMENTS

As the lead federal agency for the KMLP Project, the FERC is required to comply with section 7 of the Endangered Species Act (ESA), the Magnuson-Stevens Fishery Conservation and Management Act (MSA), section 106 of the National Historic Preservation Act (NHPA), and section 307 of the Coastal Zone Management Act of 1972 (CZMA). Each of these statutes has been taken into account in the preparation of this document.

Section 7 of the ESA, as amended, states that any project authorized, funded, or conducted by any federal agency (e.g., the FERC) should not "...jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined...to be critical..." (16 United States Code (USC) § 1536(a)(2)(1988)). The FERC, or the applicant as a non-federal party, is required to consult with the FWS and NOAA Fisheries Service to determine whether any federally listed or proposed threatened or endangered species or their designated critical habitat occur in the vicinity of the Project. If, upon review of existing data or data provided by the applicant, the FERC determines that these species or habitats may be affected by the Project, the FERC is required to prepare a biological assessment to identify the nature and extent of adverse impact, and to recommend measures that would avoid the habitat and/or species, or would reduce potential impact to acceptable levels. If, however, the FERC determines that no federally listed or proposed threatened or endangered species or their designated critical habitat would be affected by the Project, no further action is necessary under the ESA. See section 4.7 of this draft EIS for the status of this review.

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a federal fisheries management plan. The MSA requires federal agencies to consult with NOAA Fisheries Service on all actions or proposed actions authorized, funded, or undertaken by the agency that may adversely affect EFH (MSA §305(b)(2)). Although absolute criteria have not been established for conducting EFH consultations, NOAA Fisheries Service recommends consolidated EFH consultations with interagency coordination procedures required by other statutes, such as NEPA, the Fish and Wildlife Coordination Act, or the ESA in order to reduce duplication and improve efficiency (50 CFR 600.920(f)). As part of the consultation process, the FERC has prepared an EFH Assessment included in section 4.6.3 of this draft EIS.

Section 106 of the NHPA requires the FERC to take into account the effects of its undertakings on properties listed on or eligible for listing on the National Register of Historic Places (NRHP), including prehistoric or historic sites, districts, buildings, structures, objects, or properties of traditional religious or cultural importance, and to afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the undertaking. The FERC has requested that KMLP, as a non-federal party, assist in meeting the FERC's obligation under section 106 by preparing the necessary information and analyses as required by the ACHP procedures in 36 CFR 800. See section 4.10 of this draft EIS for the status of this review.

The CZMA calls for the "effective management, beneficial use, protection, and development" of the nation's coastal zone and promotes active state involvement in achieving those goals. As a means to reach those goals, the CZMA requires participating states to develop management programs that demonstrate how these states will meet their obligations and responsibilities in managing their coastal areas. In the state of Louisiana, the Department of Natural Resources (LDNR) is the agency responsible for administering the Coastal Zone Management Program (CZMP). Because section 307 of the CZMA requires federal agency activities to be consistent to the maximum extent practicable within the enforceable policies of a management program, the FERC has requested that KMLP seek a determination of consistency with Louisiana's CZMP. See section 4.8.5 of this draft EIS for additional discussion of Louisiana's CZMP.

In addition to the preceding authorities, the COE has the authority to issue permits for work or structures in navigable waters under section 10 of the River and Harbors Act and the discharge of dredged or fill material into waters of the United States under section 404 of the Clean Water Act (CWA). The COE would regulate the filling and grading activities in wetlands and waterbodies crossed by the Project. The U.S. Environmental Protection Agency (EPA) has the authority to review and veto COE decisions on section 404 permits.

Major permits, approvals, and consultations required at the federal, state, and local levels for the Project are identified in table 1.3-1. At the federal level, required permits and approval authority outside of the FERC's jurisdiction include compliance with the CWA and the Rivers and Harbors Act. The FERC encourages cooperation between applicants and state and local authorities, but this does not mean that state and local agencies, through application of state and local laws, may prohibit or unreasonably delay the construction or operation of facilities approved by the FERC. Any state or local permits issued

TABLE 1.3-1

Major Permits, Approvals, and Consultations for the KMLP Project

Agency	Permit/Approval/Consultation
FEDERAL AGENCIES	
Federal Energy Regulatory Commission	NGA Section 7(c), Certificate of Public Convenience and Necessity
U.S. Army Corps of Engineers	Clean Water Act (CWA) Section 404 Permit
	Rivers and Harbors Act Section 10 Individual Permit
U.S. Fish and Wildlife Service (U.S. Department of the Interior)	Section 7, Endangered Species Act (ESA) Consultation, Migratory Bird Treaty Act Consultation
National Marine Fisheries Service (U.S. Department of Commerce, National Oceanic and Atmospheric Administration)	Section 7, ESA Consultation
	Magnuson-Stevens Fishery Conservation and Management Act, Essential Fish Habitat Consultation
Natural Resources Conservation Service (U.S. Department of Agriculture)	Prime Farmland, Hydric Soil/Soil Erosion and Sedimentation, Seed Mixture, and Conservation Reserve Program (CRP) Lands Consultation
STATE AGENCIES	
Louisiana Department of Natural Resources, Coastal Management Division	Coastal Use Permit (CUP)
	Coastal Zone Management Plan Consistency Determination
Louisiana Department of Wildlife and Fisheries	State-listed Threatened and Endangered Species Consultation
	Consultations Regarding Activities in Sabine Lake and Protection of Oyster Resources
Louisiana Department of Environmental Quality	CWA, Section 401, Water Quality Certification
	Louisiana Pollutant Discharge Elimination System (LAPDES): Construction Stormwater General Permit and Hydrostatic Test Water General Permit
Louisiana Department of Culture, Recreation, and Tourism, Office of Cultural Development, Division of Archaeology	National Historic Preservation Act, Section 106 Consultation
Louisiana Department of Transportation	Road Crossing Permits
LOCAL AGENCIES	
Parish Police Juries	Building and Road Crossing Permits, Floodplain Development Permit
Irrigation Districts	Canal Crossing Approval
Levee Districts	Letter of No Objection
Local entities (e.g., County Roads, Economic Development, etc.)	Planning and Development Consultation

with respect to jurisdictional facilities must be consistent with the conditions of any authorization the FERC may issue.[2]

[2] See, e.g., Schneidewind v. ANR Pipeline Co., 485 U.S. 293 (1988); National Fuel Gas Supply v. Public Service Commission. 894 F.2d 571 (2d Cir. 1990); and Iroquois Gas Transmission System, L.P., et al., 52 FERC ¶ 61,091 (1990) and 59 FERC ¶ 61,094 (1992).

1.4 PUBLIC REVIEW AND COMMENT

On January 31, 2006, KMLP filed a request with the FERC to implement the Commission's Pre-Filing Process for the Project. Also on February 17, 2006, the FERC granted KMLP's request and established a pre-filing docket number (PF06-16-000) to place information filed by KMLP and related documents issued by the FERC into the public record. The purpose of the Pre-Filing Process is to encourage the early involvement of interested stakeholders, facilitate interagency cooperation, and identify and resolve issues before an application is filed with the FERC.

The application for the Project requires the submittal of an Environmental Report to the FERC, consisting of 12 Resource Reports as specified in 18 CFR 157.14(a)(6-a), § 380.3, and § 380.12. Each Resource Report evaluated existing conditions and potential effects on a particular aspect of the environment. KMLP submitted a Preliminary Draft Resource Report 1 and Alternatives Analysis Summary (to be included in Resource Report 10) on March 17, 2006, followed by Draft Resource Reports 1 through 12 on June 2, 2006, and Revised Draft Resource Reports 1 through 12 on July 14, 2006. A list of environmental information requests based on a review of each round of the draft Resource Reports was prepared by the FERC and submitted to KMLP on July 3, 2006 and August 7, 2006. Revised Resource Reports were subsequently prepared by KMLP and submitted to the FERC along with its application filed on September 8, 2006. After accepting this filing, the FERC established a traditional docket number (CP06-449-000) to place related information submitted or developed subsequently into the public record.

KMLP has conducted public outreach activities to inform the public, resource agencies, industry, local government, and other interested parties about the Project and to identify public concerns. Company-sponsored outreach activities included meetings with regulatory agencies and meetings with special interest and stakeholder groups. KMLP held meetings with regulatory agencies on May 12, 2005, July 21, 2005, December 7, 2005, and July 23, 2006. KMLP held public open houses in Hackberry, Iowa, Iota, and Ville Platte, Louisiana during March, 2006. KMLP considered public views and concerns identified during its outreach activities in the preparation of its Environmental Report. On March 6, 7, 9 and 13, 2006, FERC staff toured the pipeline routes and attended the applicant-sponsored open houses to answer questions about the Pre-Filing Review process.

On March 24, 2006, the FERC issued a Notice of Intent To Prepare an Environmental Impact Statement for the Proposed Kinder Morgan Pipeline Project and Request for Comments on Environmental Issues (NOI). The NOI was sent to 1,642 interested parties including federal, state, and local officials; agency representatives; conservation organizations; local libraries and newspapers; and property owners along the pipeline routes. Issuance of the NOI opened the time period for receiving written comments and established a closing date of April 24, 2006 for receiving comments. However, we kept the comment period open beyond that date and informed interested parties that we would continue to take comments throughout our review of the Project. We received letters with comments in response to our NOI from NOAA Fisheries Service, FWS, and LDWF.

On April 26, 2006, the FERC issued a *Notice of Site Visit and Public Meetings*, which provided notice to the public that the FERC staff was conducting a site visit and holding three scoping meetings for the KMLP Project on May 8, 9, and 11, 2006. The April 26 notice included the specific times and locations (Ville Platte, Sulphur, and Iowa, Louisiana) for the scoping meetings. The scoping meetings provided an opportunity for the general public to learn more about the Project and to participate in our analysis by commenting on issues to be included in the EIS. Two persons commented at the Ville Platte meeting, two persons commented at the Sulphur meeting, and two persons commented at the Iowa meeting. Transcripts of these comments are part of the public record for the KMLP Project. On May 10, 2006, we conducted an aerial review of the Project by helicopter and we took a boat tour of the pipeline route in the northern end of Sabine Lake and vicinity. On May 9 and 11, 2006, we conducted a ground-based site visit of the entire route, which was open to the public.

In addition to the public notice process discussed above, we conducted additional agency consultations to identify issues that should be addressed in this draft EIS. These consultations included interagency meetings on May 11 and October 5, 2006, both in Lake Charles, Louisiana. Participants at one or both meetings included representation from the COE, NOAA Fisheries Service, FWS, and LDWF. Issues discussed during these meetings included routing alternatives to avoid impacts to wetlands, potentially affected EFH and oyster beds, construction methods at wetland and waterbody crossings, and potential effects to the Perry Ridge Shore Protection Project and the Black Bayou Hydrologic Restoration Project.

Issues identified in scoping comments and through input from resource agencies are summarized in table 1.4-1. We used the scoping comments to help focus the analysis in the draft EIS on potentially significant environmental issues related to the proposed action.

TABLE 1.4-1

Issues Identified in the Public and Agency Scoping Process for the KMLP Project

Issue	Specific Topics Raised in Comments	EIS Section Where Comments are Addressed
Proposed Action	Purpose of the project; construction methods; depth of pipeline; right-of-way widths.	1.1, 2.2, 2.3
Alternatives	Possibility of using existing pipelines instead of building a new one; routing alternatives to avoid impacts to wetlands, oyster beds, or lands suitable for new housing.	3.0
Geology and Soils	Soil compaction after laying pipe across crawfish ponds and rice fields.	4.2.2.1
Water Use and Quality	Potential impacts on water quality; potential impacts to underground irrigation systems.	4.3
Wetlands	Potential impacts on wetlands; potential impacts on hydrologic restoration projects.	4.4, 4.4.2.5
Vegetation	Potential impacts on riparian habitat; clearing of forested areas for drill sites.	4.3.2.2, 4.4.2, 4.5.2, 4.6.1.2
Wildlife and Aquatic Resources	Potential impacts on fisheries, marine fishery resources, EFH, and nesting habitat for colonial wading birds.	4.6
Threatened and Endangered Species	Potential impacts on federally and state listed threatened, endangered, and special status species.	4.7
Land Use	Potential impacts to the existing dredge material placement area on the northern bank of the Calcasieu River.	4.8
Socioeconomics	Potential secondary impacts.	4.9
Reliability and Safety	Conformance with safety standards; responsibilities of construction contractors.	4.13
Mitigation	Measures to avoid, minimize, and offset impacts to wetlands.	All sections and 5.2

This draft EIS was filed with the EPA. A formal notice indicating the availability of the draft EIS was published in the Federal Register, and the document has been mailed to individuals and organizations on the mailing list prepared for the project (see appendix A). In accordance with the CEQ regulations implementing NEPA, the public has the opportunity to comment on the draft EIS in the form of written comments. We would review and use the comments to prepare the final EIS for the KMLP Project. All timely comment letters received on the draft EIS would be addressed in the final EIS. In addition, the FERC will hold public meetings in the project area to obtain comments on the draft EIS. We will issue a separate notice announcing the times and locations of those meetings.

1.5 NONJURISDICTIONAL FACILITIES

Under section 7 of the NGA, the FERC is required to consider, as part of a decision to certificate jurisdictional facilities, all factors bearing on the public convenience and necessity. Toward this end, the FERC may need to consider the environmental impact of related "nonjurisdictional" facilities that would be constructed upstream or downstream of the jurisdictional facilities for the purpose of delivering, receiving, or using the proposed gas volumes. Nonjurisdictional facilities are those facilities related to the Project that would be constructed, owned, and operated by others not subject to FERC jurisdiction.

The jurisdictional facilities for the Project are described in detail in section 2.1 of this draft EIS. The only nonjurisdictional facility would consist of a pipeline to connect the KMLP Project to the existing Bridgeline intrastate pipeline. The Bridgeline interconnect site would be located at the end of the Enbridge Offshore Pipeline (UTOS) near Johnsons Bayou, on the north side of SH 82, approximately 16 miles east of the Sabine Pass LNG Terminal. The connecting pipeline would be approximately 500 feet long (its diameter is still being determined) and would require about 1.15 acres of land, all contained within an existing natural gas facility. The pipeline would be constructed by its owner/operator, Bridgeline Holdings, L.P., at a time that is expected to coincide with the construction timeframe for the KMLP Project in order to be available when the KMLP Project is placed in service by April 1, 2009. Organizations responsible for approving the connecting pipeline would include the Coastal Management Division of LDNR (for a CUP), the COE (for review of jurisdictional wetland issues, if any), and other resource agencies (e.g., for threatened and endangered species and cultural resources).

We use four factors to determine whether there is sufficient federal control and responsibility over a project as a whole to warrant environmental analysis of Project-related nonjurisdictional facilities. These factors are:

- Whether the regulated activity comprises "merely a link" in a corridor type project (e.g., a transportation or utility transmission project);
- Whether there are aspects of the nonjurisdictional facility in the immediate vicinity of the regulated activity that affect the location and configuration of the regulated activity;
- The extent to which the entire Project would be within the FERC's jurisdiction; and
- The extent of cumulative federal control and responsibility.

With regard to the first factor, the jurisdictional facilities (i.e., the KMLP Project) are a link in a natural gas transportation project. The KMLP Project would connect the Sabine Pass LNG Terminal with other interstate and intrastate pipelines that ultimately deliver natural gas downstream to consumers. Therefore, this factor favors the FERC's review of the proposed nonjurisdictional facility.

With regard to the second factor, the Project would transport natural gas received from the Sabine Pass LNG Terminal to the nonjurisdictional Bridgeline connecting pipeline, but the design and route of the KMLP Project has not been uniquely influenced by the location or configuration of the nonjurisdictional facility. The KMLP Project would interconnect with one other pipeline in the Johnsons Bayou area in addition to the Bridgeline pipeline (at the Southwest Loop Johnson's Bayou Delivery Point). In addition, Kinder Morgan states that the proximity of the NGPL pipeline to the Sabine Pass LNG Terminal, the availability of lease capacity on the existing NGPL and UTOS pipelines, and the multiple pipelines potentially available at the end of the UTOS pipeline were the factors that influenced the decision to transport gas to the Johnsons Bayou area. Therefore, this factor does not favor the FERC's review of the proposed nonjurisdictional facility.

With regard to the third factor, intrastate pipeline facilities are regulated by state and local permitting agencies. The FERC has no authority over the permitting, licensing, funding, construction, or operation of the nonjurisdictional Bridgeline connecting pipeline. Therefore, this factor also weighs against extending the scope of the environmental review.

With regard to the fourth factor, federal control is determined by the amount of federal financing, assistance, direction, regulation, or approval inherent in a project. The nonjurisdictional Bridgeline connecting pipeline would be a private construction project under state and local jurisdiction. The federal government has no financial involvement, and no federal funds are involved. As noted above, the Bridgeline connecting pipeline would be located within the fenced area of an existing natural gas facility that has been previously disturbed. Although no wetlands appear within the footprint of the interconnect site, construction of the connecting pipeline could impact wetlands (e.g., from runoff and erosion) that are part of the nearby coastal marsh. It is anticipated that such impacts, if any, would be minor and temporary and would be authorized under a COE nationwide permit. Other federal agencies are expected to have either very limited or no involvement in the approval of the nonjurisdictional Bridgeline pipeline. Therefore, cumulative federal control is minimal, and this factor does not warrant extending the FERC's environmental review.

Based on the results of this four factor test applied to the KMLP Project, we have determined that only one factor favors examining the nonjurisdictional facility. Therefore, insufficient justification exists to warrant extension of the FERC's environmental review to include the nonjurisdictional facility.

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2.0 DESCRIPTION OF THE PROPOSED ACTION

2.1 PROPOSED FACILITIES

KMLP proposes to construct and operate a natural gas pipeline system (the "Project") to interconnect the Sabine Pass LNG Terminal (Docket No. CP04-47-000) currently under construction with intrastate and interstate pipeline infrastructure in southwest Louisiana. The Project would consist of three segments of pipelines (totaling 135.7 miles), associated pipeline-support facilities (such as pig[1] launchers, pig receivers, and MLVs), and 14 interconnects (including regulation and metering equipment) with existing intrastate and interstate pipelines. Figure 2.1-1 shows the Project vicinity and appendix B provides detailed maps.

This section describes the three pipeline segments (known as Leg 1, Leg 2, and the FGT Lateral), their support facilities, workspaces extra to the pipelines' rights-of-way, interconnect sites, access roads, and yards for pipe storage and contractor use during the construction phase. Table 2.1-1 summarizes the pipelines proposed.

TABLE 2.1-1

Proposed KMLP Pipelines

Parish	MP Begin	MP End	Length (miles)
Leg 1, 42-inch-diameter			
Cameron	0.0	24.6	24.6
Calcasieu	24.6	74.9	50.3
Jefferson Davis	74.9	99.4	24.5
Acadia	99.4	112.5	13.1
Evangeline	112.5	132.2	19.7
Leg 2, 36-inch-diameter			
Cameron	0.0	1.2	1.2
FGT Lateral, 24-inch-diameter			
Acadia	110.6[a]	2.3	2.3
Project Total			**135.7**

[a] The FGT Lateral would start at MP 110.6 on Leg 1 and go for 2.3 miles.

KMLP proposes to commence construction on Leg 1 and Leg 2 in November 2007 and on the FGT Lateral in October 2008. Leg 2 and interconnects would be completed by April 2008 and brought into service by October 1, 2008. Leg 1, the FGT Lateral, and their respective interconnects would be completed by November 2008 and brought into service by April 1, 2009.

[1] A pig is a mechanical device that passes through the interior of a pipeline to clean or to inspect it.

PUBLIC

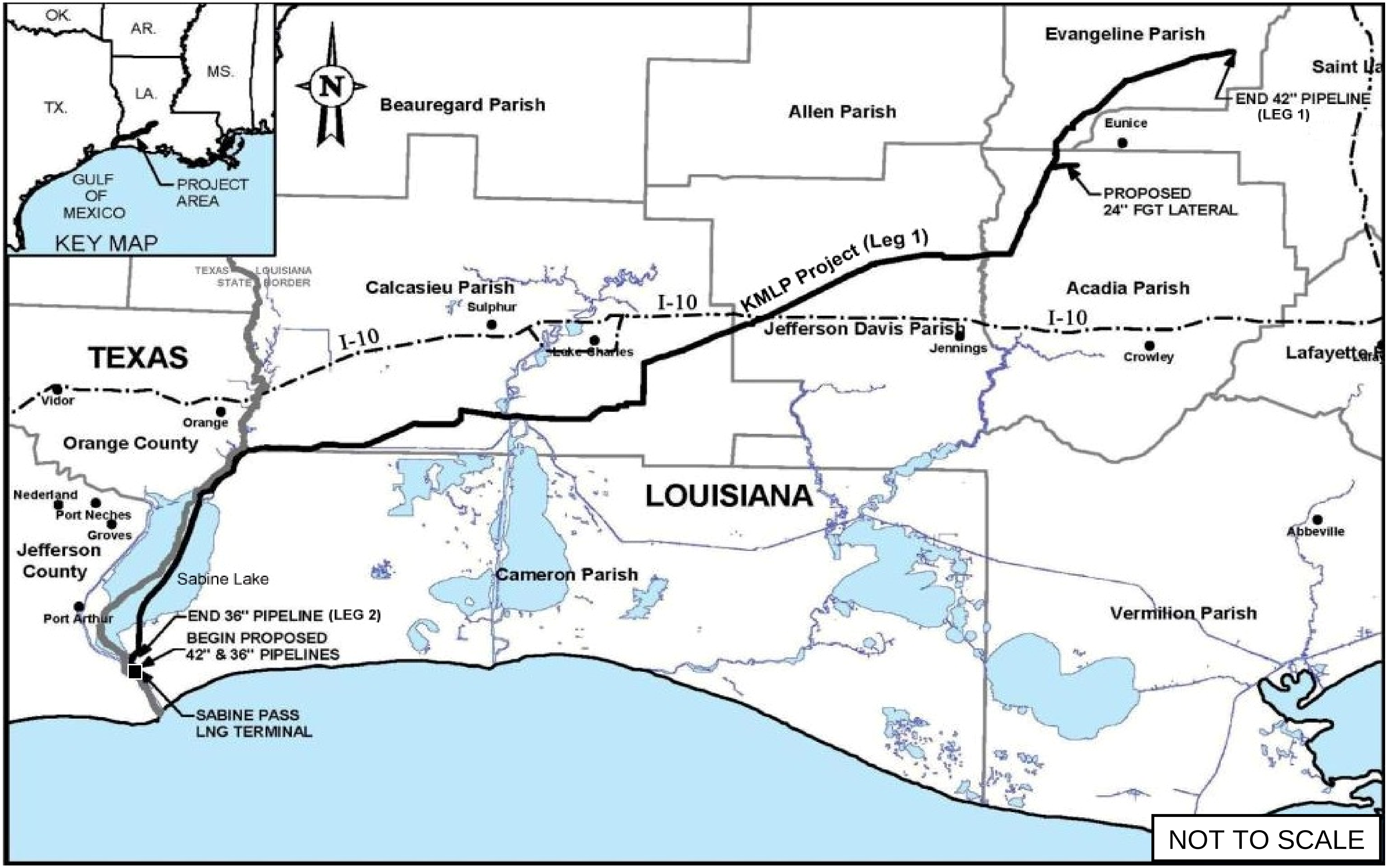

FIGURE 2.1-1
General Location of KMLP Project

2.1.1 Pipelines

The KMLP Project would include the construction and operation of Leg 1, Leg 2, and the FGT Lateral. These three pipelines would be built from carbon-steel pipe manufactured in accordance with API 5L – the American Petroleum Institute's specifications for seamless and welded steel line pipe for conveying gas in the natural gas industries.

Leg 1

Leg 1 would consist of 132.2 miles of 42-inch-diameter pipeline. It would receive gas from the Sabine Pass LNG Terminal at up to 1,440 pounds per square inch pressure gauge (psig) and would have a firm, peak day capacity of at least 2,130,000 decatherms (Dth) per day.

The route followed by Leg 1 would originate at the Sabine Pass LNG Terminal (currently under construction) located on the east bank of the Sabine Pass waterway and the south side of SH 82 in Cameron Parish. From the Terminal it would proceed northwards, crossing SH 82, and enter Sabine Lake, which it would traverse in a north-northeasterly direction without entering the Texas portion of Sabine Lake at any point. Leg 1 would exit Sabine Lake at Shell Island near the mouth of the Sabine River and then proceed eastwards along the southern banks of the Sabine River and then, entering Calcasieu Parish, along the southern banks of the Gulf Intracoastal Waterway (GIWW). After crossing the GIWW in a northeasterly direction, Leg 1 would proceed eastwards again, cross Bayou Choupique, cross the Calcasieu River and Devil's Elbow just north of Choupique Island – thus avoiding Lake Charles to the north – and then turn northwards to a point south of Iowa, Louisiana before turning in an east-northeasterly direction and leaving Calcasieu Parish.

Leg 1 would continue in an east-northeasterly direction, crossing Interstate Highway 10, to a point adjacent to Gum Gully, then turn eastwards, crossing Bayou Nezpique and entering Acadia Parish. After crossing Bayou Nezpique, Leg 1 would proceed in a north-northeasterly direction and cross SH 190 into Evangeline Parish. Once in Evangeline Parish, the route would proceed in a generally northeasterly direction and terminate at an interconnect site with the CGT pipeline system.

Leg 2

Leg 2 would consist of 1.2 miles of 36-inch-diameter pipeline. It would receive gas from the Sabine Pass LNG Terminal at up to 1,100 psig, and would have a firm, peak day capacity of at least 1,265,000 Dth per day. Leg 2 would commence at a receipt point within the Sabine Pass LNG Terminal and continue to a point of interconnection with the existing NGPL pipeline just south of SH 82 in Cameron Parish, Louisiana. Leg 2 would include 200,000 Dth per day of leased transportation capacity on the existing portion of the NGPL pipeline and the UTOS lateral extending to the Johnsons Bayou Southwest Loop area, also in Cameron Parish.

Leg 1 and Leg 2 would be interconnected within the Sabine Pass LNG Terminal to allow bi-directional metering and provide flow capacity of not less than 1,065,000 Dth per day.

FGT Lateral

The FGT Lateral would consist of 2.3 miles of 24-inch-diameter pipeline. It would receive gas at up to 1,440 psig from Leg 1 and would have a potential capacity of up to 319,500 Dth per day. The lateral would originate on Leg 1 at MP 110.6, in Acadia Parish, run eastwards across Bayou des Cannes, and terminate at FGT compressor station #7, also in Acadia Parish.

Pig Launchers/Receivers and Mainline Block Valves

Pig launchers/receivers and MLVs are necessary for proper maintenance and operation of a pipeline. The proposed milepost locations of these facilities are provided in table 2.1.1-1.

TABLE 2.1.1-1

Pig Launchers/Receivers and Mainline Block Valves

Facility	MP	Parish
Leg 1		
MLV #1	0.0	Cameron
Pig Launcher	0.0	Cameron
MLV #2	20.1	Cameron
MLV #3	39.1	Calcasieu
MLV #4	47.7	Calcasieu
MLV #5	54.5	Calcasieu
MLV #6	73.8	Calcasieu
MLV #7	93.1	Jefferson Davis
MLV #8	110.0	Acadia
MLV #9	116.8	Evangeline
Pig Receiver	132.2	Evangeline
MLV #10	132.2	Evangeline
Leg 2		
MLV #1	0.0	Cameron
Pig Launcher	0.0	Cameron
Pig Receiver	1.2	Cameron
MLV #2	1.2	Cameron
FGT Lateral		
MLV #1	0.0	Acadia
Pig Launcher	0.0	Acadia
Pig Receiver	2.3	Acadia
MLV #2	2.3	Acadia

In order to undertake periodic cleaning and inspections by means of intelligent pigging, an appropriately sized pig launcher would be temporarily installed at the origin of each of the three pipelines along with a pig receiver of the same size at the endpoint. Although the installation of these launchers and receivers would be temporary and periodic, the piping and valves for each of the three pipelines would have to be configured to accommodate them.

MLVs would be installed to enable the isolation of individual pipeline segments in order to contain unplanned pipeline-system upsets and permit controlled venting as part of a planned blowdown of the Project. Each pipeline would have a MLV at its origin and endpoint. Leg 1 would have eight additional MLVs installed at locations specified by U.S. Department of Transportation (DOT) safety regulations, i.e., in areas of relatively sparse population in order to minimize the social impacts of blowdown noise and the likelihood of vandalism. All MLVs would be installed within the permanent right-of-way and, to the extent practicable, located near existing roads so as to minimize the construction of access roads. Each MLV would be fenced, gated, and locked; the valve itself would be buried but valve operators and controls would be located above ground. Each MLV would be capable of being remotely operated and controlled by a Supervisory Control and Data Acquisition (SCADA) system that would monitor operating parameters (e.g., valve position, gas pressure, and flow rate) and detect any leaks. The SCADA control room would be located in Houston, Texas.

Jurisdictional Interconnects

Interconnecting pipelines from the Project to interstate (but not intrastate) pipelines are subject to FERC jurisdiction, as is the Sabine Pass LNG Terminal. These 15 interconnecting pipelines are described in section 2.1.2 below along with the 14 interconnect sites at which they would connect with the Project.

2.1.2 Aboveground Facilities

The Project would deliver gas to 15 existing interstate pipelines and one existing intrastate pipeline via 14 interconnect installations. These installations would regulate and meter the flow of gas from the pipelines of the Project to the recipient pipeline system. Each interconnect site would comprise one or more meter runs consisting of:

- Custody-transfer flow meter;
- Pressure regulator;
- Isolation block valves;
- Flow control and high-pressure override valves; and
- Associated instrumentation and controls.

The sites would be fenced and gated and include a communications building that would contain a satellite link to the SCADA system and a telephone service for SCADA back-up as well as vocal communications. Electrical power would be provided for cooling, lighting, and ventilation as well as for the monitoring and control equipment.

Interconnects would be located as close as practicable to the intersections of the Project and each individual customer pipeline system in order for the connecting pipelines to be as short as possible. Approximate locations and lengths of the interconnects are listed in table 2.1.2-1.

The connecting pipelines would be built, owned, and operated by their respective customer pipeline companies[2]. Because each of those companies (with the exception of Bridgeline Holdings, whose lateral would be intrastate) would be required to obtain authorization from the FERC to construct them, these connecting pipelines are not included in the environmental analysis presented in this draft EIS.

[2] It is assumed that the connecting pipelines would be constructed and ready for service when the KMLP Project becomes operational.

TABLE 2.1.2-1

Interconnect Locations and Connecting Pipelines

Interconnect Name	MP	Parish	Lateral Owner/Operator	Length[a] (feet)
Leg 1				
Southwest Loop Delivery Point	28.2	Calcasieu	Transcontinental Gas Pipeline Corporation	0
			Texas Gas Transmission	0
			Florida Gas Transmission	0
Sabine Interconnect	61.4	Calcasieu	Sabine Pipeline, LLC	0
TGTPL Interconnect	87.5	Jefferson Davis	Tennessee Gas Pipeline Company	0
TLG Interconnect	91.5	Jefferson Davis	Trunkline Gas Company, LLC	0
TGT Interconnect	110.0	Acadia	Texas Gas Transmission	300
ANR #1 Interconnect	111.3	Acadia	ANR Pipeline Company	0
ANR #2 Interconnect	112.0	Acadia	ANR Pipeline Company	0
TET Interconnect	117.0	Evangeline	Texas Eastern Transmission, LLC	0
Transco Interconnect	122.1	Evangeline	Transcontinental Gas Pipe Line Corporation	200
CGT Interconnect	132.2	Evangeline	Columbia Gulf Transmission	100
Leg 2				
NGPL Interconnect	1.2[b]	Cameron	Natural Gas Pipeline Company of America	0
Bridgeline Interconnect	N/A[c]	Cameron	Bridgeline Holdings, L.P.	100
Southwest Loop, Johnsons Bayou Delivery Point	N/A[c]	Cameron	Transcontinental Gas Pipeline Corporation	100
			Texas Gas Transmission	100
			Florida Gas Transmission	100
FGT Lateral				
FGT Interconnect	2.3	Acadia	Florida Gas Transmission	0

[a] A value of 0 feet indicates the lateral is expected to be located completely within the interconnect facility.
[b] Located at the end of Leg 2 within Sabine Pass LNG Terminal property.
[c] Located in Johnsons Bayou near the end of the existing UTOS system.

2.1.3 Ancillary Areas

Ancillary areas would include temporary workspaces outside of the construction right-of-way, access roads to the pipeline right-of-way, and pipe storage and contractor yards (see table 2.1.3-1).

Extra Workspaces

KMLP has requested permission for 864 extra workspaces totaling 303.5 acres. These workspaces would be needed in areas where special construction techniques are required, such as road, railroad, wetland, and waterbody crossings, as described fully in section 2.3. The size, shape, and configuration of each proposed extra workspace are unique due to the particular conditions at its proposed location, although they are typically 0.2 acres or less. These are shown in the facility maps in appendix B and are listed in appendix C.

TABLE 2.1.3-1 Number of Ancillary Areas by Parish/County			
Parish/County	Extra Workspaces	Access Roads	Pipe Storage and Contractor Yards
Orange County, TX	3	0	0
Cameron Parish, LA	86	5	0
Calcasieu Parish, LA	354	43	5
Jefferson Davis Parish, LA	213	13	4
Acadia Parish, LA	81	9	0
Evangeline Parish, LA	127	5	3
Total	**864**	**75**	**12**

Access Roads

To the extent possible, KMLP would access the right-of-way and facilities (once built) from existing access roads and from roads crossed by the right-of-way. These include private roads, drives, lanes, and other roads that may require some modifications or improvements in order to support the expected loads and size of construction equipment and materials safely.

Construction of and/or modifications to these access roads would include grading plus maintaining to prevent rutting, and, in some instances, placing of additional gravel onto the existing surface. Wherever possible, new access roads would be constructed of board matting, which would be removed after the construction phase.

Appendix C, table C-2 lists access roads, including their locations and dimensions; the type of construction, including modifications or improvements proposed; and the amount of surface area affected by them.

Pipe Storage and Contractor Yards

KMLP proposes to use 12 temporary yards for pipe storage and contractor staging during construction of the Project facilities. See table C-3, appendix C for the location of the pipe storage and contractor yards.

2.2 LAND REQUIREMENTS

Construction of the Project would disturb 3,031 acres in total. Of this, 841 acres would be required for operation of the Project facilities. The remaining 2,190 acres would be restored to pre-construction land use. Table 2.2-1 summarizes the land requirements of all facilities of the Project.

2.2.1 Pipeline Rights-of-Way and Extra Workspaces

KMLP proposes to use a variety of construction right-of-way widths that would differ not only according to the diameter of the pipeline being installed, but also by land cover and whether topsoil would be segregated or not. Table 2.2-1 identifies land disturbed during construction and operation of the

TABLE 2.2-1

Locations and Land Requirements for the Project

Facility	Land Affected During Construction (acres)	Land Affected During Operation (acres)
Leg 1 Pipeline	2,239.2	806.3
Leg 2 Pipeline	7.0	1.5
FGT Lateral	27.9	13.9
Extra Workspaces	291.5	0.0
Aboveground Facilities	12.3	12.3
Pipe Storage and Contractor Yards	378.7	0.0
Access Roads	74.2	6.9
TOTAL	3,030.7	840.9

Note: Due to rounding, totals may not add up.

Project. Approximately 2,565.5 acres would be disturbed in the rights-of-way and extra workspaces needed to construct Leg 1, Leg 2, and the FGT Lateral. KMLP's proposed construction rights-of-way widths include the following configurations based on its proposed construction methods. The construction methods are described in more detail in section 2.3.1.

Uplands:

- A 125-foot-wide construction right-of-way for the 42-inch-diameter Leg 1 and the 36-inch-diameter Leg 2 with no soil segregation;

- A 155-foot-wide construction right-of-way for the 42-inch-diameter Leg 1 and the 36-inch-diameter Leg 2 with ditch-plus-soil-side segregation;

- A 165-foot-wide construction right-of-way for the 42-inch-diameter Leg 1 and the 36-inch-diameter Leg 2 with full-width segregation;

- A 100-foot-wide construction right-of-way for the 24-inch-diameter FGT Lateral with no soil segregation;

- A 120-foot-wide construction right-of-way for the 24-inch-diameter FGT Lateral with ditch-plus-soil-side segregation; and

- A 130-foot-wide construction right-of-way for the 24-inch-diameter FGT Lateral with full-width segregation.

Unsaturated Wetlands:

- A 100-foot-wide construction right-of-way for the 42-inch-diameter Leg 1 and the 24-inch-diameter FGT Lateral in wetland crossings of less than 100 feet (see section 4.4.2.3 for further discussion);

- A 125-foot-wide construction right-of-way for the 42-inch-diameter Leg 1 and the 24-inch-diameter FGT Lateral in wetland crossings of greater than 100 feet (see section 4.4.2.3 for further discussion); and

- A 155-foot-wide construction right-of-way where the 42-inch-diameter Leg 1 and 36-inch-diameter Leg 2 are parallel and 50 feet apart.

Saturated Wetlands (Marsh):

- A 100-foot-wide construction right-of-way for the 42-inch-diameter Leg 1 and the 24-inch-diameter FGT Lateral in wetland crossings of less than 100 feet (see section 4.4.2.3 for further discussion); and

- A 125-foot-wide construction right-of-way for the 42-inch-diameter Leg 1 in wetland crossings of greater than 100 feet (see section 4.4.2.3 for further discussion).

Open Water (Sabine Lake):

- A 300-foot-wide construction right-of-way for Leg 1 in water less than 8 feet deep; and

- A 200-foot-wide construction right-of-way for Leg 1 in water greater than 8 feet deep.

KMLP requested construction rights-of-way widths greater than 125 feet in upland areas along Leg 1 with ditch-plus-spoil-side or full-width topsoil segregation; along the FGT Lateral with full-width topsoil segregation; and along the segment where Leg 1 and Leg 2 are parallel and 50 feet apart. We approve the request for a 155-foot-wide construction right-of-way where Leg 1 and Leg 2 are parallel and 50 feet apart. We also approve the request for up to 125-foot-wide construction rights-of-way for Leg 1 in uplands due to the large diameter of the pipe and local soil conditions and to accommodate topsoil segregation. However, we do not believe that the other requests for widths greater than 125 feet are justified by KMLP and we do not believe that KMLP has justified the request for a construction right-of-way width of more than 100 feet along the FGT Lateral (see table 2.3-1 in the following section). Therefore, **we recommend that:**

- **KMLP limit its nominal construction right-of-way width for Leg 1 and the FGT Lateral in upland areas to 125 feet and 100 feet, respectively. If additional right-of-way width is necessary, KMLP shall file with the Secretary a site-specific construction plan and written justification for any additional right-of-way width for review and written approval by the Director of OEP prior to construction.**

In wetlands, KMLP requested a 125-foot-wide construction right-of-way for wetland crossings of greater than 100 feet. KMLP further requested that a 100-foot-wide construction right-of-way be used for wetland crossings of less than 100 feet. For comparison, our Procedures limit the construction right-of-way width in wetlands to 75 feet. KMLP justified the expanded rights-of-way in saturated wetlands based the feasibility to cross these wetlands using the push-pull method. The push-pull method would be used in wetland crossings less than 100 feet, but in crossings greater than 100 feet the push-pull method is not feasible due to the excessive distance between accessible fabrication staging areas. In unsaturated wetlands, KMLP justified the expanded rights-of-way based on the large diameter of the pipeline, heavy equipment, poor soil stability, and accessibility to upland areas to place spoil. The justifications provided by KMLP are acceptable for the installation of the 42-inch-diameter Leg 1, but not for the 24-inch-diameter FGT Lateral. Therefore, we are restricting the construction in wetlands along the FGT Lateral to a 75-foot-wide right-of-way as required by our Procedures.

Following construction, KMLP would maintain a 50-foot permanent right-of-way for operation of the pipeline(s). Approximately 806.3 acres would be retained for the permanent right-of-way for Leg 1, 1.5 acres for Leg 2, and 13.9 acres for the FGT Lateral.

2.2.2 Aboveground Facilities

The 14 proposed interconnect sites would be located on a total of 12.3 acres. In general, sites would be 200 feet by 200 feet; and the largest would be 202 feet by 225 feet. Land within the fenced perimeter would be occupied by a communications building, piping, and other equipment. Portions of these sites may be paved, covered with gravel, or landscaped, depending on facility operations and maintenance requirements.

2.2.3 Ancillary Areas

A total of 74.2 acres would be required for access roads during the construction phase, about 7 acres of which would be retained during the operations phase. All temporary access roads would be restored to the preconstruction condition and uses. The dimensions, location, and type of each access road are given in appendix C.

The 12 temporary yards for pipe storage and contractor staging would range in size from approximately 20 acres to 60 acres and in total would require approximately 379 acres of land. The proposed locations of these yards are identified in appendix C. All yards would be returned to the preconstruction condition and former usage.

2.3 CONSTRUCTION AND RESTORATION PROCEDURES

This section describes the general construction procedures proposed by KMLP. Section 4.0 contains more detailed descriptions of proposed construction, mitigation, and restoration procedures as well as additional measures to mitigate environmental impacts.

The Project would be designed, constructed, operated, and maintained in accordance with the DOT regulations 49 CFR Part 192, "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards"; 18 CFR 380.15, "Guidelines to be Followed by Natural Gas Pipeline Companies in the Planning, Clearing, and Maintenance of Rights of Way and the Construction of Aboveground Facilities"; and other applicable federal and state regulations.

KMLP would construct the Project facilities in accordance with its specifications (including a Construction Drawing Package of approved pipeline, facility, and equipment drawings) as well as with the FERC's *Upland Erosion Control, Revegetation and Maintenance Plan* (our Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (our Procedures). KMLP has requested certain alternative measures to our Plan and Procedures, which are addressed in table 2.3-1 and discussed further in section 4.0.

KMLP would prepare a Stormwater Pollution Prevention Plan (SWPPP), which would include an Erosion & Sediment Control (ES&C) Plan and a Spill Prevention and Response Plan (SPRP), for the proposed pipeline system. These plans would address potential spills of fuels, lubricants, and other hazardous materials and describe spill-prevention practices, spill-handling and emergency procedures, and training requirements. The SWPPP would incorporate state, county, and parish requirements and provisions of our Plan and Procedures (in particular, section IV.A of the latter) with any FERC-accepted

TABLE 2.3-1

Acceptance or Denial of Requested Alternative Measures

Applicable Item	Requested Variance	Justification for Variance Request	Accepted/ Denied	Basis for Acceptance/Denial
Upland Erosion Control, Revegetation, and Maintenance Plan				
IV.A.2	A typical temporary construction right-of-way width of 125 feet in uplands (see specific MP locations in appendix D)	To provide a safe work site and space for spoil storage	Accepted only along Leg 1	Accepted only for specific sites along Leg 1 listed in appendix D (not project wide) based on large pipe and local soil conditions and to accommodate topsoil segregation (see section 2.2.1)
V.A.5	Land surfaces restored to pre-construction contours, unless such contours threaten the integrity of the pipeline	To arrest erosion if the existing land surface within the right-of-way is rapidly eroding before construction and to prevent ponding of water	Denied	Denied project wide, but the FERC will consider based on site-specific information to be submitted by KMLP prior to construction (see section 4.1)
VII.A.5	Annual vegetation maintenance (mowing) on a 50-foot corridor	Excessively long growing period in southwest Louisiana	Denied	Denied because annual mowing over entire 50-foot right-of-way would continually disrupt vegetation (see section 4.5.2.1)
Wetland and Waterbody Construction and Mitigation Procedures				
IV.A.1.d & e	Refueling activities in waterbodies	Vessels and waterborne equipment have to be used in Sabine Lake and Sabine River	Accepted	Accepted only for Sabine Lake and Sabine River (see section 4.4.2.3)
VI.A.3	A typical temporary construction right-of-way width of 125 feet in wetlands where the crossing length exceeds 100 feet and a right-of-way width of 100 feet in wetlands where the crossing length is less than 100 feet (see specific MP locations in appendix D)	Larger equipment and soil limitations require a larger right-of-way to assure a safe work site and space for spoil storage	Accepted only along Leg 1	Accepted only for specific sites along Leg 1 listed in appendix D (not project wide) based on large pipe and local soil conditions (see section 4.4.2.3)
VI.A.6	Two aboveground facilities located within jurisdictional wetlands (see specific MP locations in appendix D)	Locations of interconnects dictated by intersection of the proposed pipeline and existing pipelines and by the location of the Sabine Pass LNG Terminal	Accepted	Accepted only for specific MP locations identified in appendix D (not project wide) based on the lack of practicable upland locations (see section 4.4.2.3)
VI.B.1.e	A portion of access roads 2 and 3 constructed in wetlands	Access is required from the GIWW to reach the HDD workspace needed to minimize impacts to wetlands	Accepted	Accepted only for specific portions of access roads 2 and 3 because these roads would permit the use of HDD, which avoids about 25 acres of wetland impacts (see section 4.4.2.3)
VI.B.1.a	Some extra workspaces located within 50 feet of wetland boundaries (see specific MP locations in appendix D)	Justification is site specific (see appendix D)	Accepted	Accepted only for specific sites listed in appendix D (not project wide) based on lack of practicable locations with 50-foot setbacks; also some sites are to facilitate HDD or other methods designed to reduce impacts (see appendix D)
V.B.2.a	Some extra workspaces located within 50 feet of water's edge (see specific MP locations in appendix D)	Justification is site specific (see appendix D)	Accepted	Accepted only for specific sites listed in appendix D (not project wide) based on lack of practicable locations with 50-foot setbacks; also some sites are to facilitate HDD or other methods designed to reduce impacts (see appendix D)

alternative measures. These plans would be in force during the construction and operation phase of the project. To ensure that these plans are developed, **we recommend that:**

- **KMLP file its project-specific SWPPP, including an ES&C Plan and SPRP, with the Secretary for review and written approval by the Director of OEP prior to construction.**

2.3.1 Pipelines

Construction of the Project would involve a range of construction methods that fall into a number of categories shown in table 2.3.1-1. Appendix E shows the pipeline construction methods proposed by milepost (other than for crossings of waterbodies, roads and railroads, and foreign pipelines).

TABLE 2.3.1-1

Construction Methods by Category

Category	Construction Methods
Upland Conventional (described in section 2.3.1.1 of this draft EIS)	• Upland Construction without topsoil segregation • Upland Construction without topsoil segregation, KMLP 42” pipeline adjacent to foreign pipeline • Upland Construction without topsoil segregation, KMLP 24” pipeline adjacent to foreign pipeline • Upland Construction with full-width topsoil segregation, KMLP 42” pipeline • Upland Construction, KMLP 42” pipeline adjacent to foreign pipe with ditch plus spoil side • KMLP 36” and 42” pipelines within LNG Terminal, no topsoil segregation • KMLP 36” pipeline within LNG Terminal, no topsoil segregation
Wetland (described in section 2.3.1.2 of this draft EIS)	• Unsaturated Wetland with topsoil segregation • Saturated Wetland with topsoil segregation • Submerged Wetland without topsoil segregation (“Marsh Buggy Construction”)
Sabine Lake (described in section 2.3.1.3 of this draft EIS)	• Inland Open Water at water depth of less than 8 feet • Inland Open Water at water depth of 8 feet and more
Special (described in section 2.3.1.3 of this draft EIS)	• Horizontal Directional Drilling (HDD) • Water-body crossings (other than Sabine Lake) • Road and railroad crossings • Foreign pipeline crossings • Techniques for construction in rice fields and crawfish ponds • Techniques for construction in cropland and pasture • Techniques for residential areas • Techniques for commercial and industrial areas

2.3.1.1 Conventional Upland Construction Methods

In upland terrain of the Project, KMLP would use conventional overland construction techniques for large-diameter pipelines. Construction would follow a set of sequential operations as shown in figure 2.3.1.1-1 and as further described below. In the typical pipeline construction scenario, the construction spread (crew) would proceed along the pipeline right-of-way in one continuous operation. As the spread moves along, construction at any single point along the pipeline, from initial surveying and clearing to backfilling and finish grading, would last approximately six to ten weeks. The number of construction

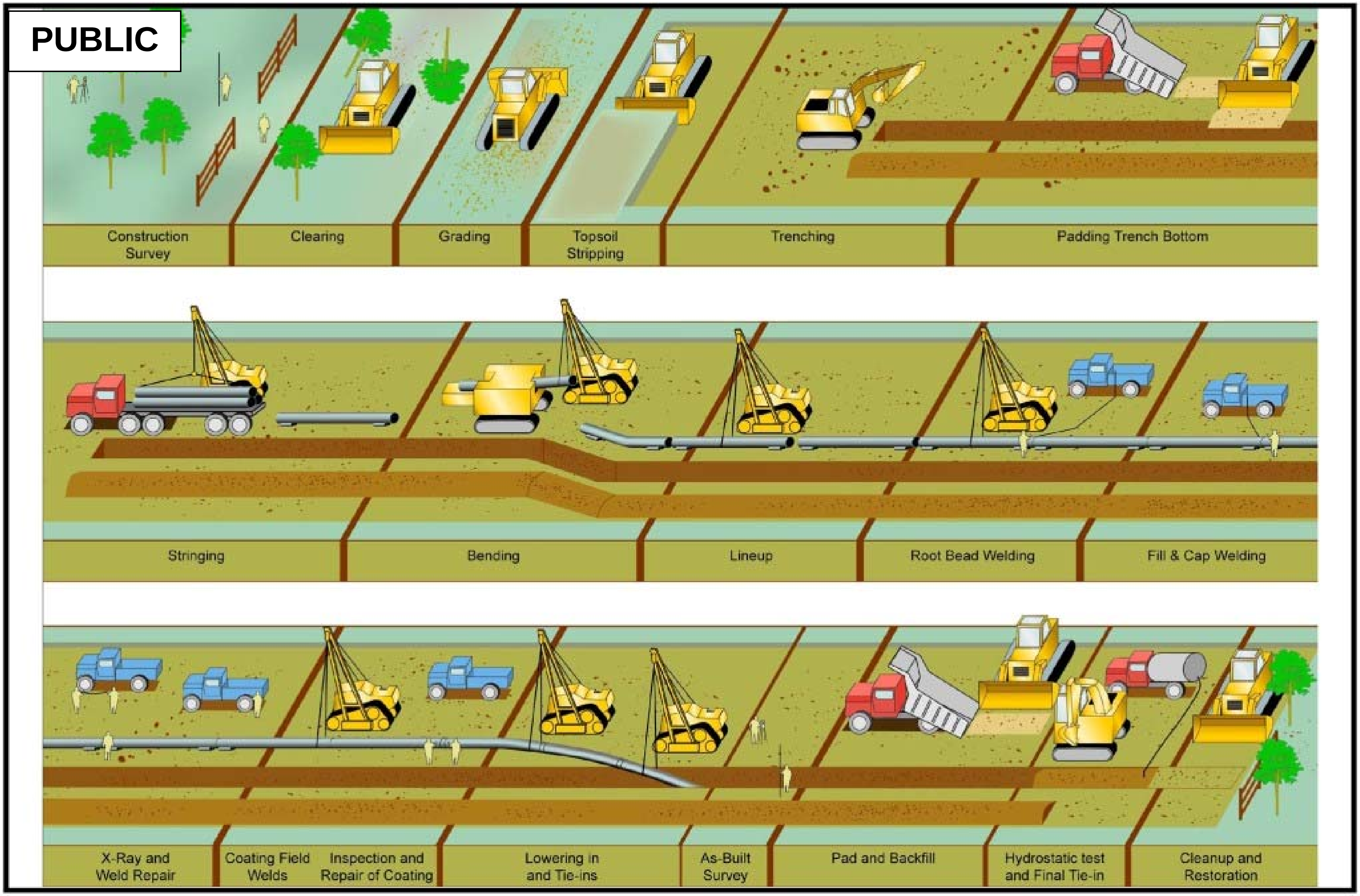

FIGURE 2.3.1.1-1
Upland Pipeline Construction Sequence

spreads will be determined upon selection of a construction contractor. The entire process would be coordinated in such a manner as to minimize the total time an individual tract of land is disturbed and, therefore, exposed to erosion and temporarily precluded from its normal use.

The basic steps of upland construction are described below. This description focuses on upland construction without topsoil segregation, but variations involving topsoil segregation and routing alongside foreign pipelines are also noted. KMLP would use Special Construction Techniques such as HDD in sensitive locations. These techniques are described in section 2.3.1.3 and listed in table 2.3.1-1.

Surveying and Staking

After notification of and coordination with affected landowners, a KMLP crew would conduct a civil survey and stake the outside limits of the right-of-way, the centerline of the pipeline, drainage centerlines and elevations, highway and railroad crossings, and any temporary extra workspace, such as lay down areas or staging areas for stream crossings. The Louisiana One Call system would be contacted and underground utilities (e.g., cables, conduits, and pipelines) would be located and flagged.

Clearing and Grading

Following surveying, KMLP would clear the right-of-way of obstacles. Large obstacles such as trees, rocks, brush, and logs would be removed. Timber would only be removed when absolutely necessary for construction purposes. Timber and other vegetation debris might be chipped for use as erosion-control mulch, burned, or otherwise disposed in accordance with applicable state and local regulations and landowner crossing agreements. Burning would be conducted in such a manner as to minimize the fire hazard and prevent heat damage to surrounding vegetation. Where necessary, fences would be cut and braced along the right-of-way, and temporary gates would be installed to control livestock and limit public access. The right-of-way would then be graded where necessary to create a reasonably level working surface to allow safe passage of construction equipment and materials. Where applicable – such as in residential and certain agricultural areas, as outlined in section 2.3.1.3 – conserved topsoil would be stockpiled separately from excavated subsoil. Temporary erosion control measures, such as silt fencing and interceptor dikes, would be installed immediately after initial disturbance of the soil.

Trenching

A rotary trenching machine, a track-mounted backhoe, or similar equipment would be used to excavate to a sufficient depth to allow a minimum of three feet of soil cover between the top of the pipe and the final land surface after backfilling. Due to the absence of consolidated bedrock near the surface, no blasting is anticipated.

The trench would be excavated at least 12 inches wider than the diameter of the pipe, or a minimum of 54 inches for the 42-inch-diameter Leg 1, 48 inches for the 36-inch-diameter Leg 2, and 36 inches for the 24-inch-diameter FGT Lateral. The sides of the trench would be sloped (for safety) with the top of the trench up to 30 feet across, or more, depending upon the stability of the native soils.

Excavated soils would typically be stockpiled along the right-of-way on the side of the trench (the spoil side) away from the construction traffic and pipe assembly area (the working side). On actively cultivated agricultural tracts (except in most rice fields) and in residential areas, subsoil would be stockpiled separately from topsoil (see section 2.3.1.3). Where the route is collocated adjacent to an existing pipeline, the spoil would be placed on the same side of the trench as, but not directly over, the existing pipeline to keep working equipment off the operating pipeline.

Stringing

Steel pipe for the pipeline would be procured in nominal 40-foot lengths called “joints” that would be protected with an epoxy coating that would have been applied at an external coating yard and shipped to strategically located materials storage areas known as pipe yards. (The beveled ends would have been left uncoated for the welding step.)

The individual joints would be transported to the right-of-way by truck and placed by small crane in a single continuous line (i.e., strung) along the excavated trench. This would leave the strung pipe easily accessible to the construction personnel on the working side of the trench and allow the subsequent lineup and welding operations to proceed efficiently. See section 2.3.1.3 for a variation at waterbody crossings.

Pipe Bending

Since the joints of pipe delivered to the job site would be straight, bending of the joints would be required to allow the pipeline to follow natural grade changes and turns in the right-of-way. Prior to welding, selected joints would be bent to the desired angle in the field by track-mounted hydraulic bending machines.

Pipe Assembly and Welding

After stringing and bending are complete, the joints of pipe would be placed on temporary supports adjacent to the trench. The ends would be carefully aligned and welded together. Multiple passes would be made to achieve a full penetration weld. Only qualified welders would be allowed to perform the welding. Welders and welding procedures would be qualified according to applicable American Petroleum Institute (API) standards.

Non-Destructive Examination and Weld Repair

To ensure that the assembled pipe meets or exceeds the design strength requirements, the welds would be inspected visually and tested for integrity by means of non-destructive examination methods such as radiography (X-ray), or ultrasound, in accordance with American Society of Mechanical Engineers (ASME) standards. Welds displaying unacceptable slag inclusions, void spaces, or other defects would be repaired or cut out and re-welded.

Coating Field Welds, Inspection, and Repair

Following welding, the previously uncoated ends of the pipe at the joints would be epoxy coated. The coating on the completed pipe section would be inspected and any damaged areas would be repaired.

Pipe Lowering

The completed portion of pipe would be lifted off the temporary supports and lowered into the trench by side-boom tractors or equivalent equipment. Prior to lowering the pipe, the trench would be inspected to ensure that it is free of rocks and other debris that could damage the pipe or the coating. De-watering would also be undertaken if there were any stormwater in the trench. Before the pipe is lowered into the trench, the pipe and trench would be inspected to ensure that the pipe and trench configurations are compatible.

Figures 2.3.1.1-2 through 2.3.1.1-8 show typical cross-sections (at the stage of pipe lowering) for construction spreads respectively for different variations of upland construction methods.

Padding and Backfilling

After the pipe is lowered into the trench, the trench would be backfilled. Previously excavated materials would be pushed back into the trench using bladed equipment or backhoes. Wherever the previously excavated material is found to contain large rocks or other materials that could damage the pipe or coating, clean fill or protective coating would be placed instead around the pipe prior to backfilling. Following backfilling, a small crown of material might be left to account for any future soil settling that might occur. Excess soil would be distributed evenly on the right-of-way, only in upland areas, while maintaining existing contours. Wherever topsoil segregation is performed, segregated topsoil would be placed in the trench after backfilling with subsoil is complete.

Hydrostatic Test and Final Tie-In

Following backfilling of the trench, the pipeline would be hydrostatically tested in accordance with DOT regulations to ensure that it is capable of safely operating at the design pressure. The testing process involves filling a segment of the pipeline with water and maintaining a prescribed pressure for a prescribed duration. The exact steps of that process would be as follows:

1. Surface water used for testing is drawn through a screened intake;
2. Test segments of the pipeline are capped and filled with water; and
3. The water in the pipe is pressurized and held for a minimum of 8 hours.

Any loss of pressure that cannot be attributed to other factors, such as temperature changes, would be investigated. If a leak or break in the line were to occur during testing, it would be repaired and the segment of pipe retested until DOT specifications were met.

Upon completion of the test, the water would either be pumped to the next segment for testing or discharged. The test water would be discharged through an energy-dissipating device (two rows of hay bales staked to the ground with a silt fence in between in a 30-35-foot circle) in compliance with NPDES permit conditions. Although topography and the availability of test water would determine the length of each test segment, anticipated hydrostatic test water withdrawal and discharge locations are discussed further in section 4.3.2.2. Test water would contact only new pipe, and no chemicals would be added.

Upon the successful testing and drying of a segment of pipe, the test cap and manifold would be removed, and the pipe would be connected to the remainder of the pipeline. No desiccant or chemical additives would be used to dry the pipe. See section 2.3.1.3 for a variation for pipeline segments installed through HDD.

Cleanup and Restoration

Post-construction restoration activities would be in accordance with our Plan and Procedures as applicable, and FERC's acceptance of the alternative measures requested by KMLP. After the segment of pipe has been installed, backfilled, and successfully tested, the right-of-way, temporary extra workspaces, and other disturbed areas would be finish-graded, and the construction debris would be disposed of properly. After construction, all disturbed areas would be restored to original contours, except at those locations where permanent changes in drainage would be required to prevent erosion, scour, and possible exposure of the pipeline (subject to the FERC's acceptance of a site-specific request by KMLP prior to construction, as noted in table 2.3-1 and discussed further in section 4.1). See section 2.3.1.3 for the use

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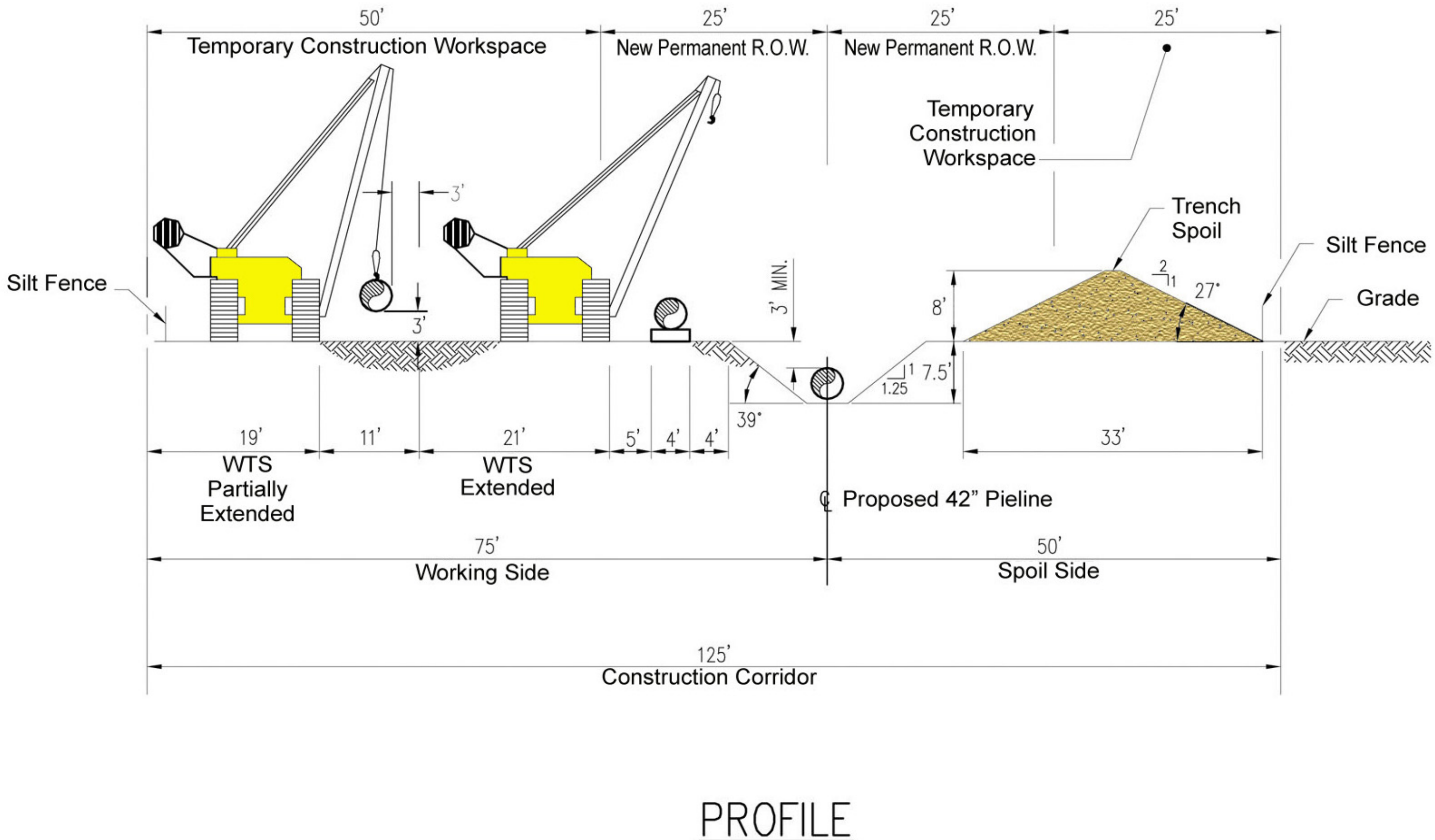

Notes:

A. Trench and spoil pile, as shown assume side slopes of 1:1.25 (Rise:Run) and 1:2, respectively, can be maintained. Less stable soils will utilize more workspace.

FIGURE 2.3.1.1-2
Typical Cross-Section for Upland Construction of 42" Pipe Without Topsoil Segregation

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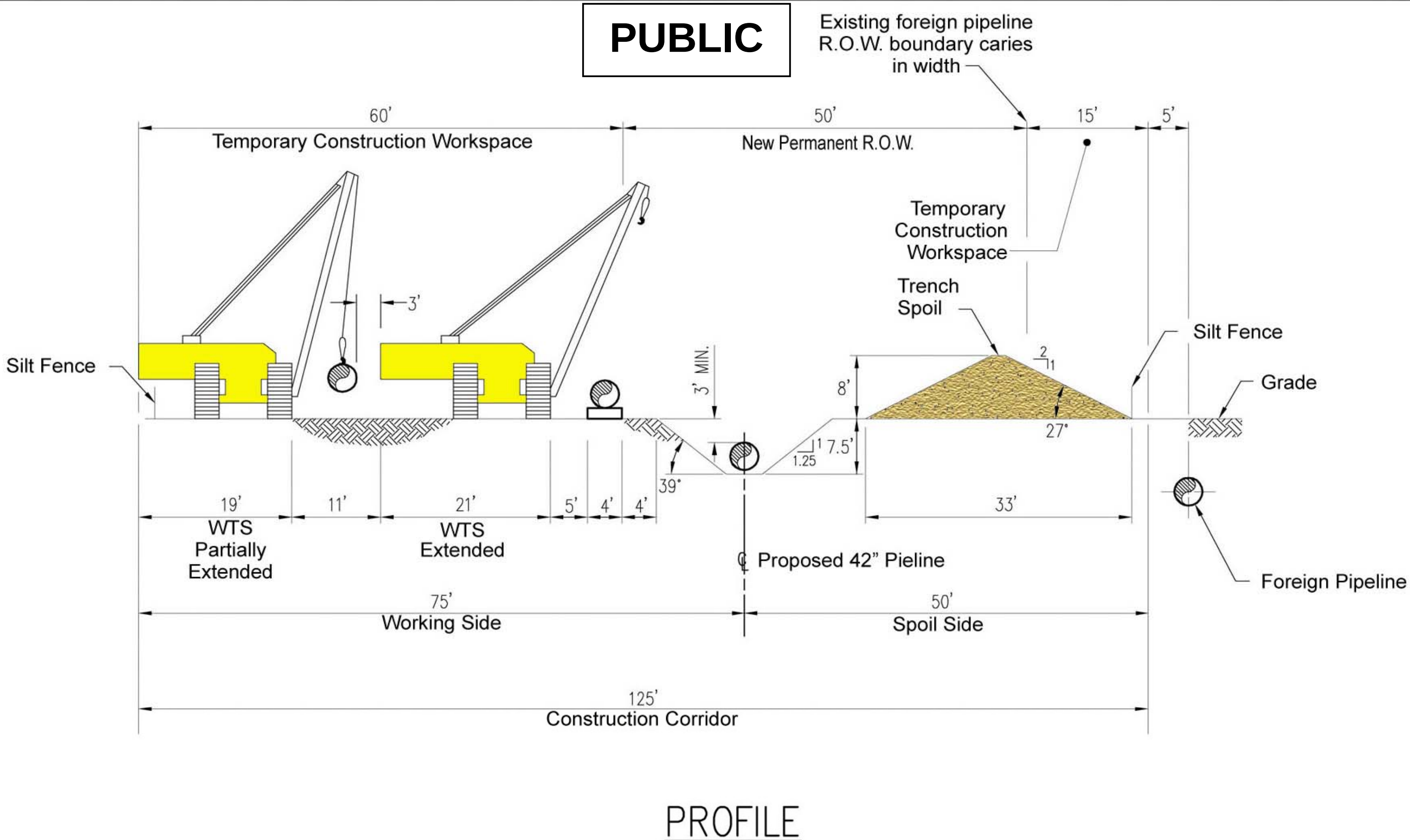

Notes:

A. Trench and spoil pile, as shown assume side slopes of 1:1.25 (Rise:Run) and 1:2, respectively, can be maintained. Less stable soils will utilize more workspace.

FIGURE 2.3.1.1-3
Typical Cross-Section for Upland Construction of 42" Pipe Adjacent to Foreign Pipe without Topsoil Segregation

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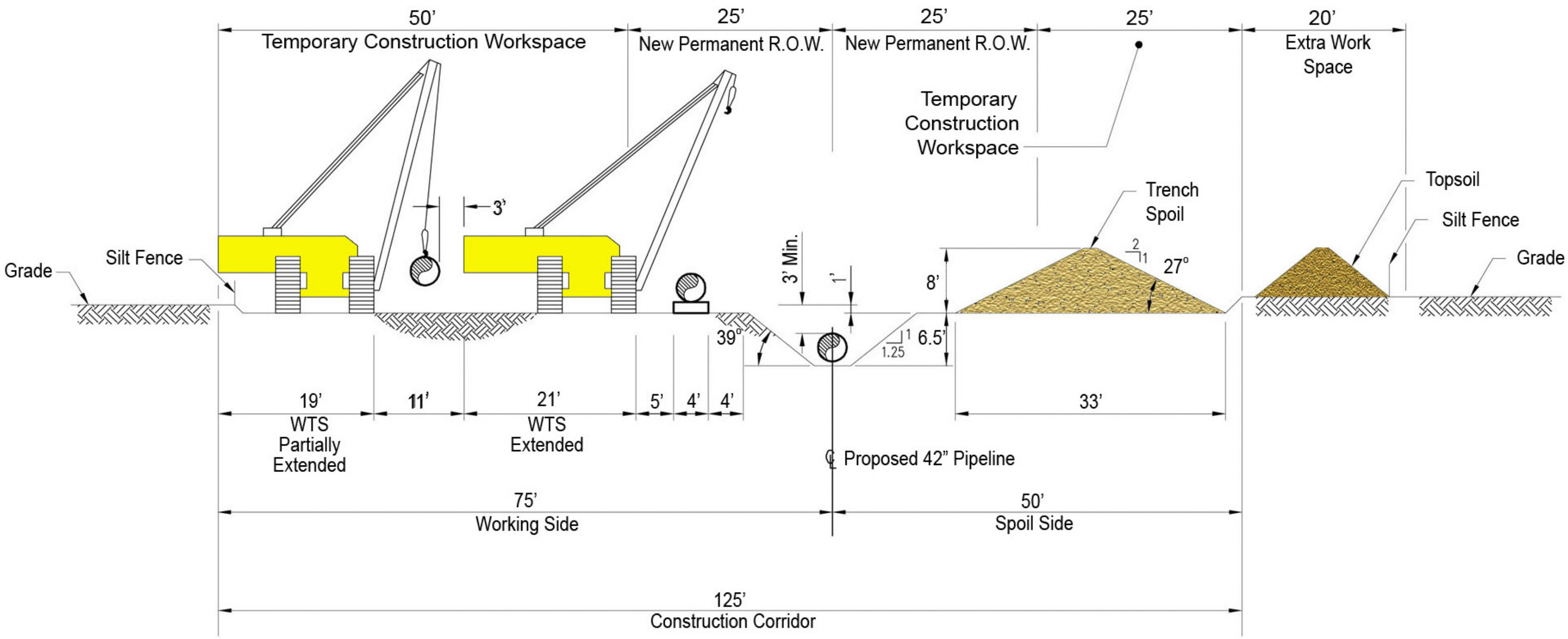

Notes:

A. Trench and spoil side. as shown, assume side slopes of 1:1.25 (rise : run) and 1:2, respectively, can be maintained. Less stable soils will utilize more workspace.

FIGURE 2.3.1.1-4
Typical Cross-Section of 42" Pipe with Full-Width Topsoil Segregation

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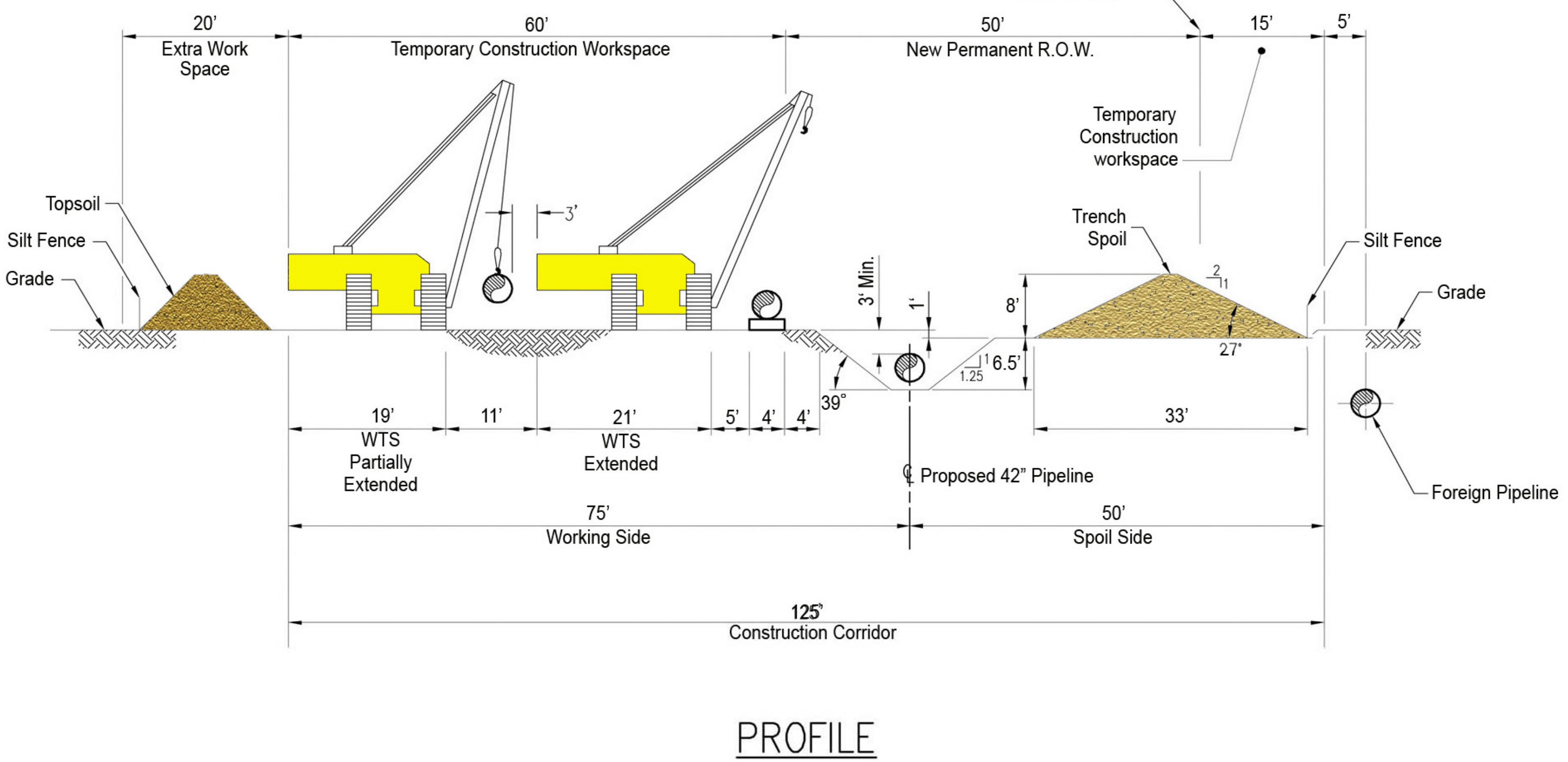

Notes:

A. Trench and spoil side. as shown, assume side slopes of 1:1.25 (rise : run) and 1:2, respectively, can be maintained. Less stable soils will utilize more workspace.

FIGURE 2.3.1.1-5
Typical Cross-Section for Upland Construction of 42" Pipe Adjacent to Foreign Pipe with Ditch-plus-Spoil-Side Topsoil Segregation

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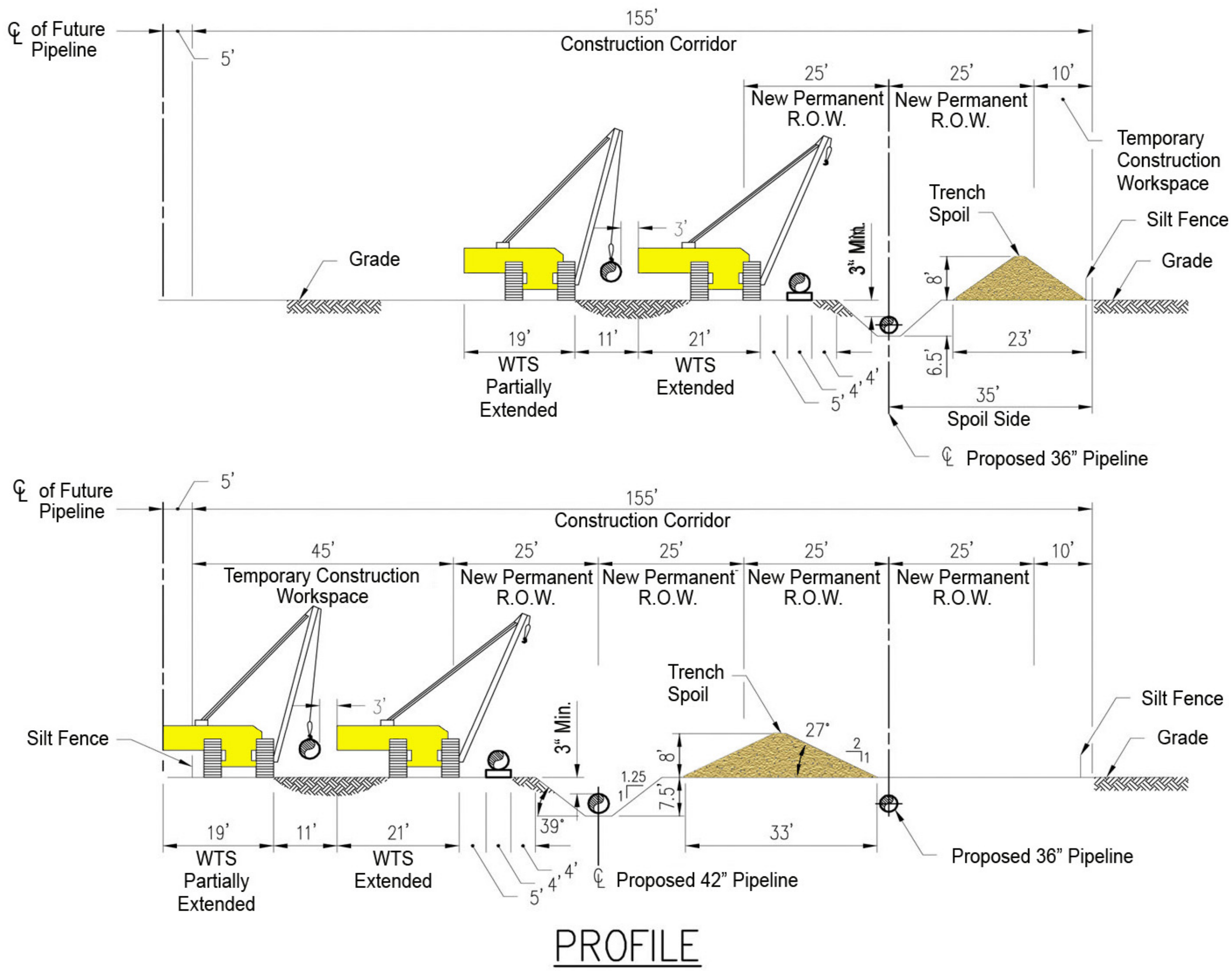

Notes:

A. Trench and spoil side. as shown, assume side slopes of 1:1.25 (rise : run) and 1:2, respectively, can be maintained. Less stable soils will utilize more workspace.

FIGURE 2.3.1.1-6
Typical Cross-Section for Upland Construction of 42" and 36" Parallel Pipes within the Sabine Pass LNG Terminal without Topsoil Segregation

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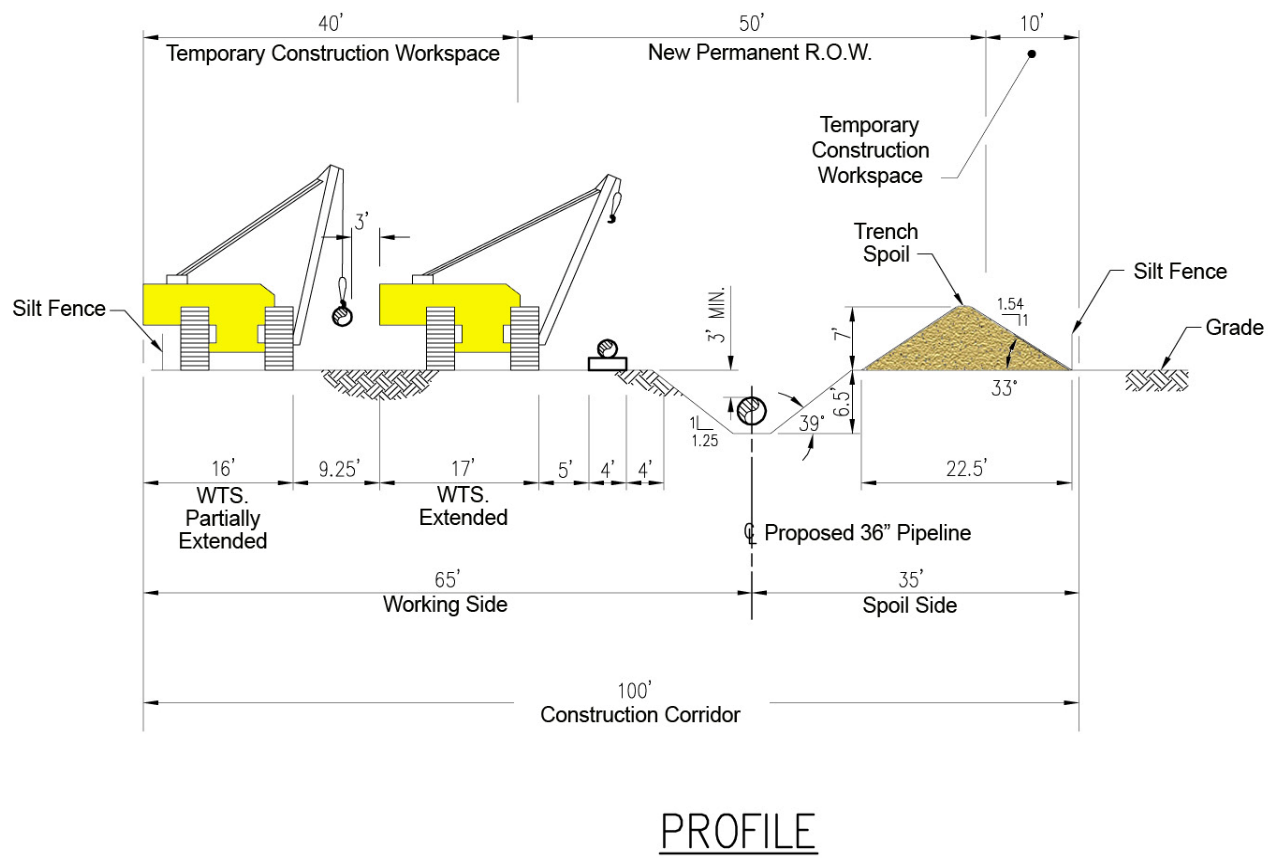

Notes:

A. Trench and spoil pile, as shown, assume side slopes of 1:1.25 (Rise:Run) and 1:1.54, respectively, can be maintained. Less stable soils will utilize more workspace.

FIGURE 2.3.1.1-7
Typical Cross-Section for Upland Construction of 36" Pipe within the Sabine Pass LNG Terminal without Topsoil Segregation

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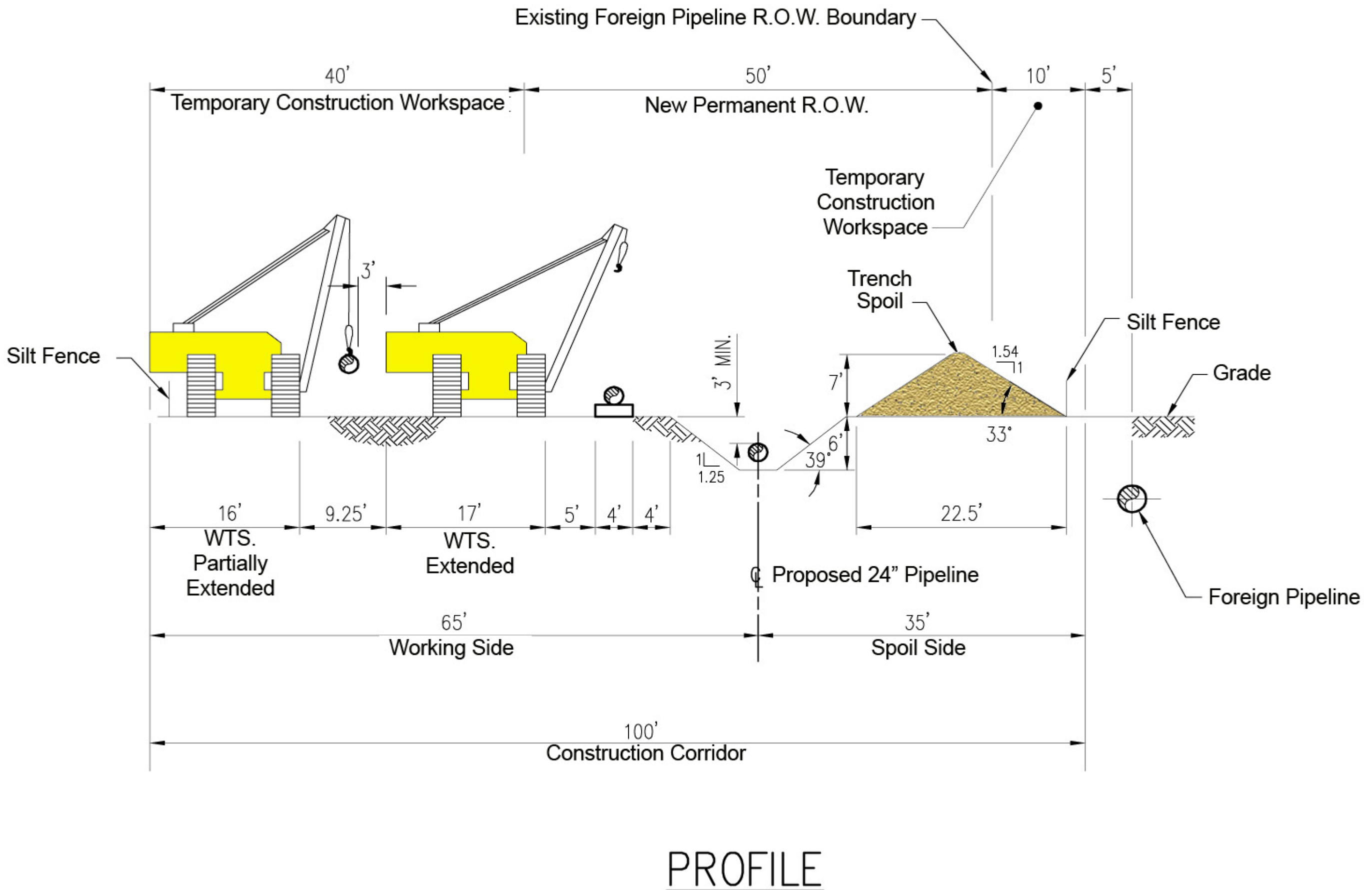

Notes:

A. Trench and spoil pile, as shown, assume side slopes of 1:1.25 (Rise:Run) and 1:1.54, respectively, can be maintained. Less stable soils will utilize more workspace.

FIGURE 2.3.1.1-8
Typical Cross-Section for Upland Construction of 24" Pipe Adjacent to Foreign Pipe without Topsoil Segregation

of measures to return segregated topsoil in areas of cropland and pasture and in rice fields and crawfish ponds.

Temporary and permanent erosion and sediment control measures, including silt fencing, diversion terraces, and vegetation, would also be installed per our Plan and Procedures. In most upland locations, an herbaceous vegetative cover would be re-established by spreading a grass seed and hydro-mulch mixture over the disturbed surface. See section 2.3.1.3 for a variation involving re-vegetation in areas of cropland and pasture.

The type of seed would be selected to match adjacent cover, or as otherwise requested by the landowner or land management agency, or as recommended by the county extension agent. Depending upon the time of year, a seasonal variety, such as ryegrass, might be spread until a more permanent cover could be established. Steep slopes (e.g., stream banks) might require erosion control mats, revetments, or sod. Reseeding, fertilizing, and other measures would be employed until a cover equivalent to approximately 80 percent of similar, adjacent areas were achieved. Forested areas would be allowed to recover, except that no trees would be allowed to grow within the pipeline operational right-of-way so as to facilitate pipeline inspections. See section 2.3.1.3 for re-seeding of cropland, pasture areas, residential areas, and commercial areas.

The success of re-vegetation would be monitored by KMLP (see section 2.5). Temporary and interim erosion control measures would be removed from areas where permanent measures are successfully in place. Private and public property, such as fences, gates, driveways, and roads that are disturbed by the pipeline construction would be restored to original or better condition.

2.3.1.2 Wetland Construction Techniques

Construction across delineated wetlands would occur in accordance of our Procedures, except where requested alternative measures are accepted. The construction technique used would be determined by the wetland conditions. In an unsaturated wetland, soil conditions would allow for topsoil segregation. In saturated wetlands, it would not be practicable to segregate topsoil. If there is enough standing water, floating construction techniques would be used such as push-pull method from a marsh buggy. In sensitive wetland areas or adjacent to large waterbodies, KMLP would use HDD to avoid impacts, as is described in section 2.3.1.3.

Prior to commencement of construction in wetlands, KMLP would work with the COE, FWS, NOAA Fisheries, LDWF, other state and local agencies, and landowners to develop an acceptable site-specific re-vegetation plan.

Construction in Unsaturated Wetland

The construction method employed in these areas would be similar to conventional upland techniques described in section 2.3.1.1, with some exceptions. Figures 2.3.1.2-1 and 2.3.1.2-2 show a typical cross-section for a construction spread in unsaturated wetlands.

If normal construction equipment were to cause rutting or mixing of topsoil and subsoil, either low-ground-pressure equipment would be substituted for it, or a temporary board road would be installed. The choice of which of these two alternatives to use would be up to the construction contractor; both would allow passage of equipment with minimal disturbance to the surface and vegetation.

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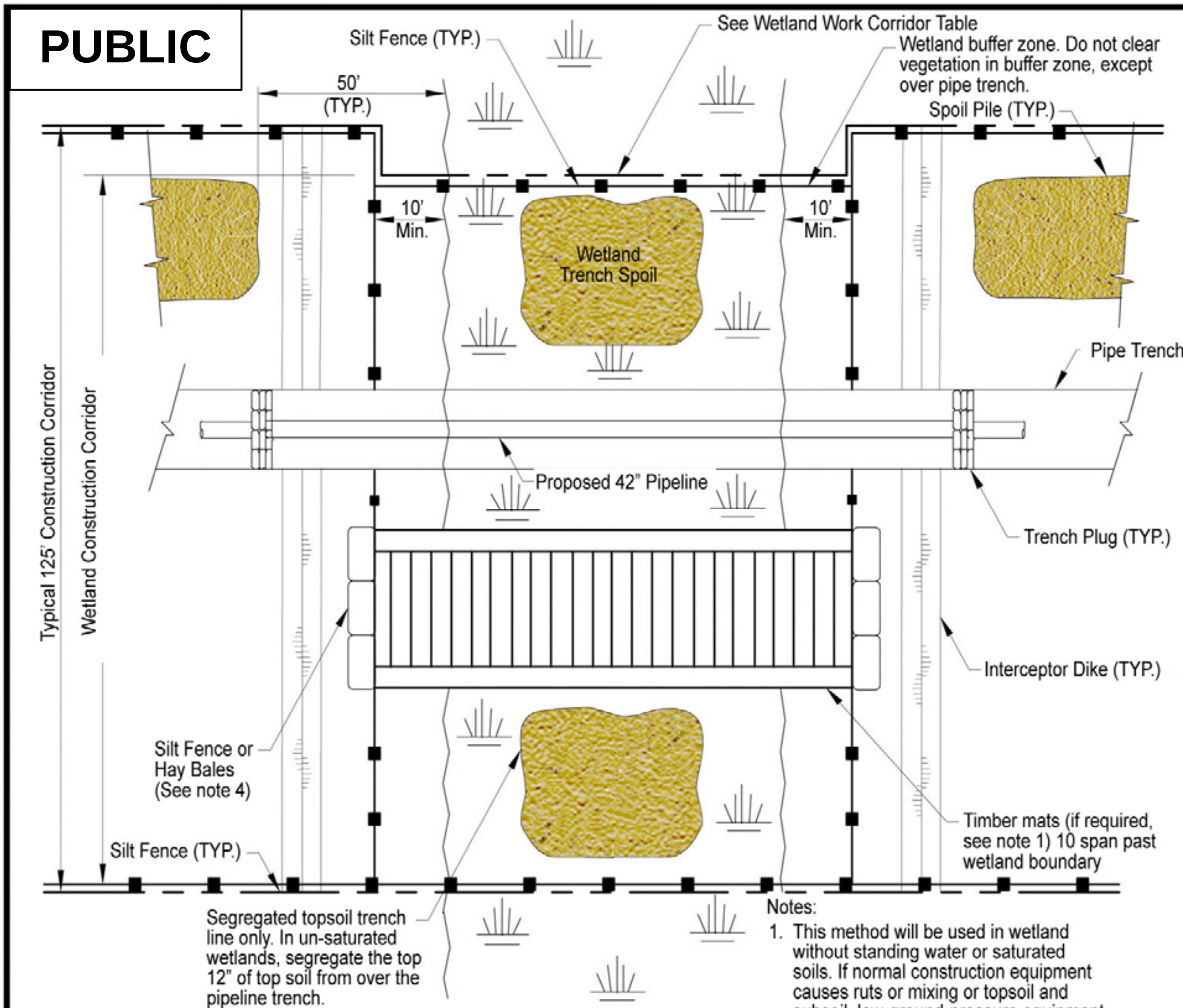

WETLAND WORK CORRIDOR TABLE			
WETLAND LENGTH	CONSTRUCTION CORRIDOR	WORKING SIDE	SPOIL SIDE
LESS THAN 100' LONG	100'	65'	35'
GREATER THAN 100' LONG	125'	90'	35'

UNSATURATED WETLAND CROSSING WITH TOPSOIL SEGREGATION

Notes:

1. This method will be used in wetland without standing water or saturated soils. If normal construction equipment causes ruts or mixing or topsoil and subsoil, low-ground-pressure equipment will be used, or normal equipment will be operated on timber mats.
2. Install permanent intercepors dikes at the base of all slopes adjacent to the wetland.
3. Contractor shall postpone grading of right-of-way adjacent to wetland until staging area is prepared and work in the wetland is ready to commence.
4. Silt fence or hay bales shall be placed in the gap at the timber mats by the end of each day or prior to approaching rain to prevent sediment flow into wetland.
5. Use additional timber mat layers to raise crossing above grade where poor soil conditions exist.
6. Silt fence and interceptor dike to be removed across pipe trench and during conctruction of pipeline. Silt fince and interceptor dike to be replaced after backfill of trench.

FIGURE 2.3.1.2-1
Unsaturated Wetland Crossing with Topsoil Segregation

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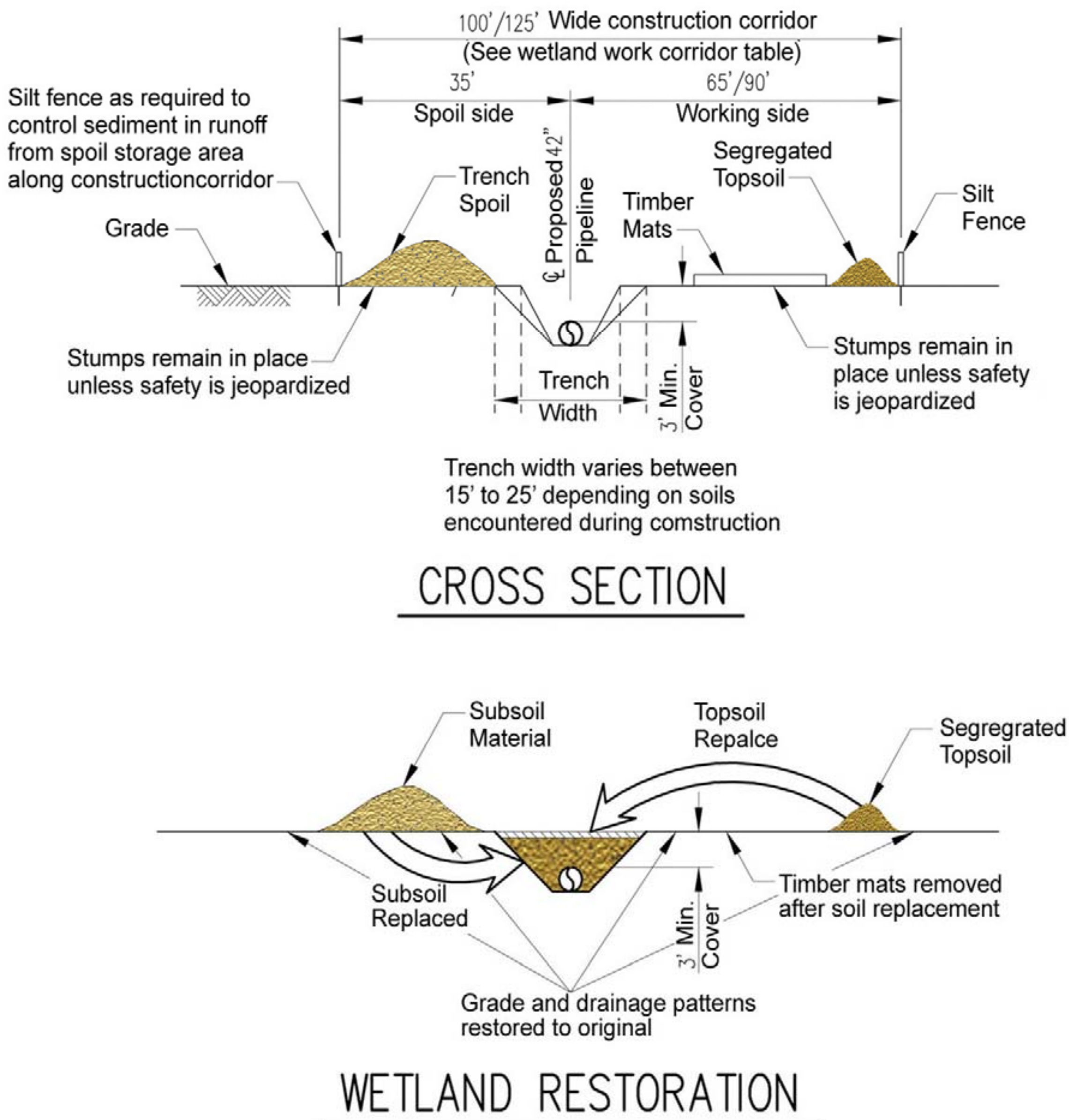


FIGURE 2.3.1.2-2
Unsaturated Wetland Crossing with Topsoil Segregation

Trees would be cut to grade but only the stumps within 15 feet of the edge of the pipe trench would be removed unless safety concerns were to dictate otherwise. Topsoil over the pipe trench would be segregated from subsoils. A vegetated buffer zone would be left between the wetland and the upland construction areas, except in the pipe trench and travel lane. Erosion-control measures such as silt fences, interceptor dikes, and hay-bale structures would be installed and maintained to minimize sedimentation within the wetland. Trench plugs would be installed where necessary to prevent the unintentional draining of water from the wetland.

Upon completion of construction, the right-of-way would be restored. Original surface hydrology would be re-established by backfilling the pipe trench and grading the surface either with backhoes or draglines operating from the board road or with low-ground-pressure tracked vehicles working in the spoil pile, depending upon the ambient water level, degree of soil saturation, and the bearing capacity of the soils. Segregated topsoil would be replaced in unsaturated wetlands.

Marsh and wetlands along the Project range from saline to fresh, with varying degrees of saturation and water elevation, requiring a variety of plant species to be re-established. Unsaturated wetlands would be seeded. Areas where roots and stumps were removed in the pipe trench would allow existing vegetation to recover more rapidly in the remainder of the right-of-way once the board roads and spoil piles have been removed. In forested wetlands, trees greater than 15 feet in height would not be allowed to grow within 15 feet of the pipeline. Otherwise, unsaturated wetlands would be restored to their original state.

Construction in Saturated Wetland

The construction method employed in these areas would be similar to that described above for construction in unsaturated wetlands (see figure 2.3.1.2-3 and 2.3.1.2-4). Topsoil would be segregated except in areas where standing water is present or soils are saturated or frozen. In saturated soils, a concrete-coated pipe may be required to maintain negative buoyancy.

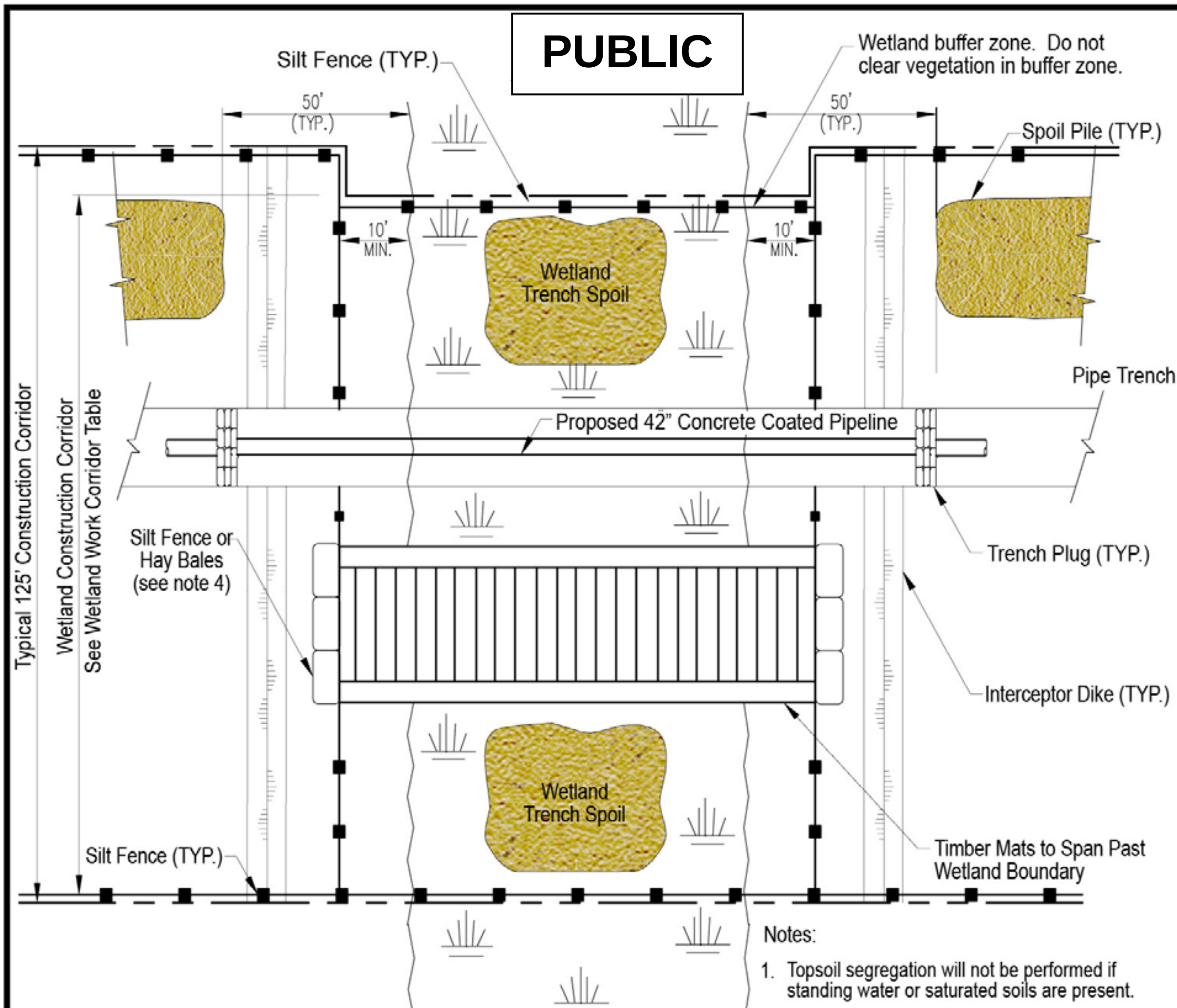
Board mats and timbers would be used to facilitate the movement of equipment through and work within the wetlands. Equipment not associated with construction of the Project would be allowed to pass through the wetland in accordance with the our Procedures.

Upon completion of construction, the right-of-way would be restored. Original surface hydrology would be re-established by backfilling the pipe trench and grading the surface either with backhoes or draglines operating from the board road or with low-ground-pressure tracked vehicles working in the spoil pile, depending upon the ambient water level, degree of soil saturation, and the bearing capacity of the soils. If topsoil is segregated, it would be replaced. Vegetation would be restored in accordance with our Procedures.

Construction in Coastal (and other Submerged) Wetland

Tidal marsh located between SH 82 and the southern shore of Sabine Lake between MP 1.5 to MP 3.92 and submerged freshwater marsh between MP 32.3 and MP 35.2 would be crossed using the push-pull method where conditions are compatible (i.e., wetland crossings less than 100 feet).

A crane mounted on specially designed pontoons equipped with tracks, known as a marsh buggy, would be used to excavate a pipe trench (see figure 2.3.1.2-5). By backing the marsh buggy along the pipe trench centerline, and backfilling by tracking along the remains of the spoil pile after pipe installation, the construction right-of-way would be kept to the minimum width necessary for the pipe trench and the spoil pile, with no separate equipment space or passing lane. However, because of the



WETLAND WORK CORRIDOR TABLE			
WETLAND LENGTH	CONSTRUCTION CORRIDOR	WORKING SIDE	SPOIL SIDE
LESS THAN 100' LONG	100'	65'	35'
GREATER THAN 100' LONG	125'	90'	35'

SATURATED WETLAND CROSSING WITHOUT TOPSOIL SEGREGATION

Notes:

1. Topsoil segregation will not be performed if standing water or saturated soils are present.
2. Install permanent interceptor dikes at the base of all slopes adjacent to the wetland.
3. Contractor shall postpone grading of right-of-way adjacent to wetland until staging area is prepared and work in the wetland is ready to commence.
4. Silt fence or hay bales shall be placed in the gap at the timber mats by the end of each day or prior to approaching rain to prevent sediment flow into wetland.
5. Use additional timber mat layers to raise crossing above grade where poor soil conditions exist.
6. Silt fence and interceptor dike to be removed across pipe trench and during construction of pipeline. Silt fence and interceptor dike to be replaced after backfill of trench.

FIGURE 2.3.1.2-3
Saturated Wetland Crossing without Topsoil Segregation

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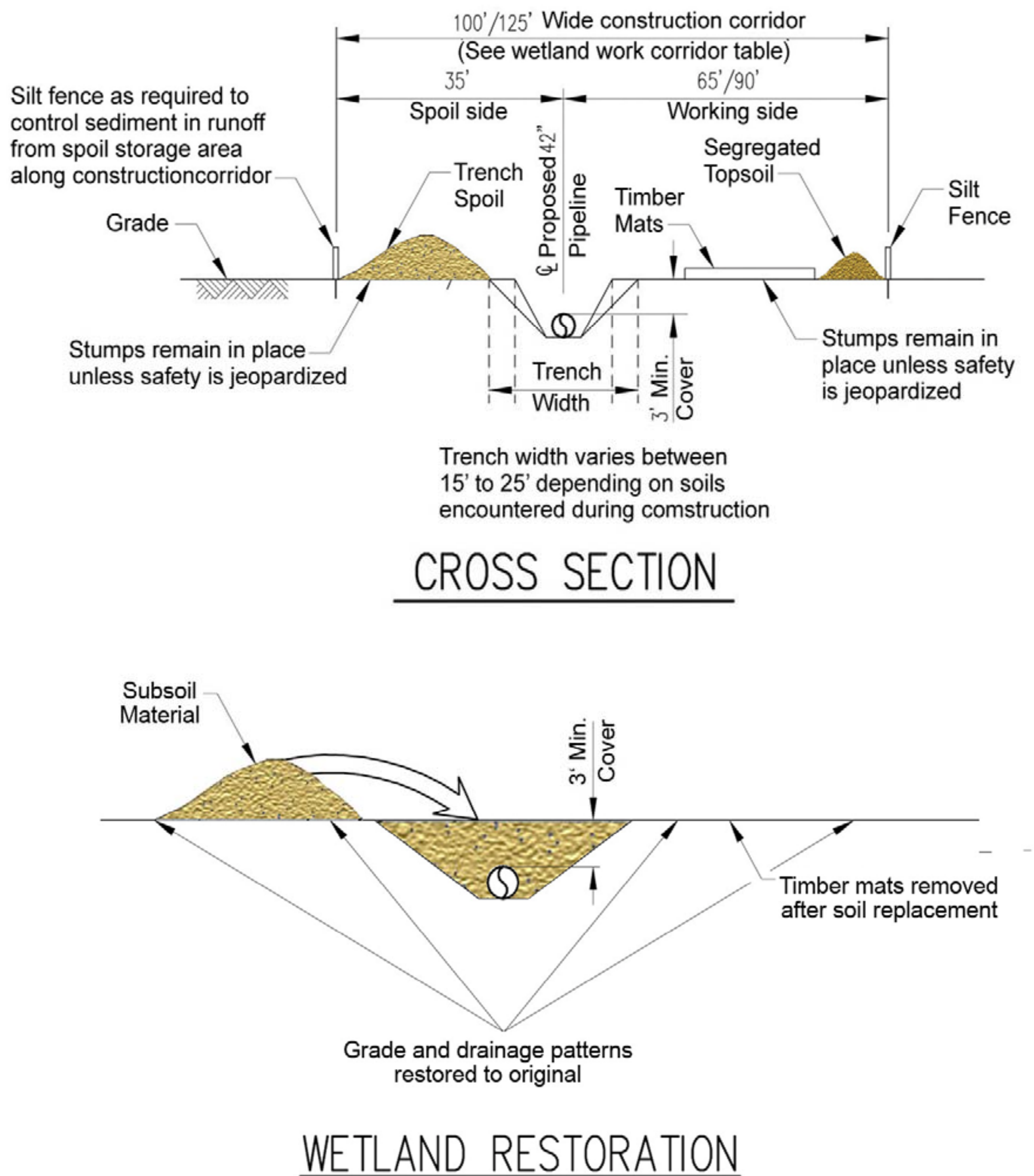

FIGURE 2.3.1.2-4
Saturated Wetland Crossing without Topsoil Segregation

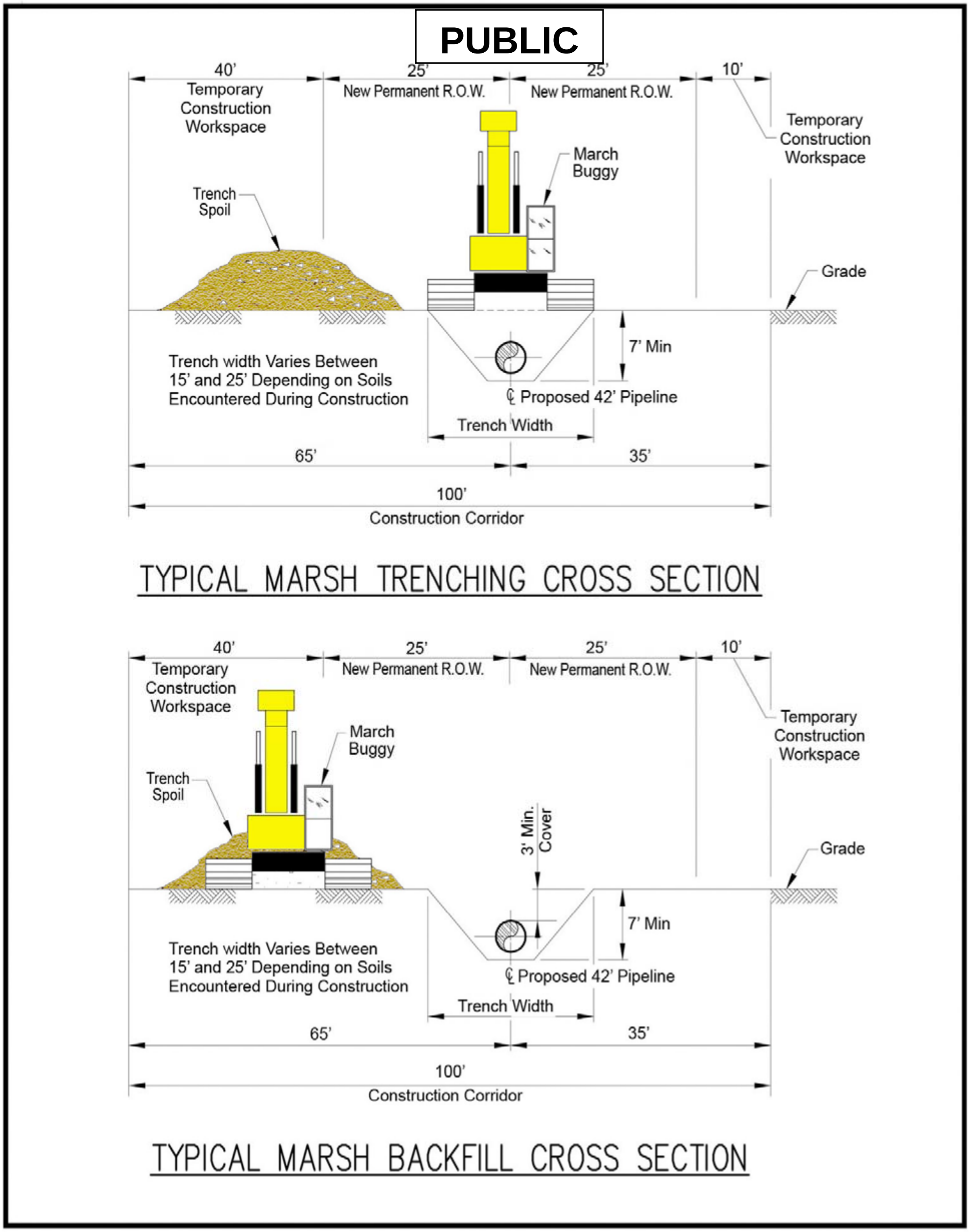

FIGURE 2.3.1.2-5
Typical Submerged Marsh Crossing (Push-Pull)

saturated condition of the soils, the slopes of both the pipe trench and the spoil pile would be very shallow, requiring a proportionately wider construction space for the trench and spoil pile (estimated to be 90 feet). By keeping the stringing and welding of the pipe out of the submerged wetlands between staging areas, the area affected by construction would be kept to a minimum. Topsoil segregation would not be practical because the soil horizon would not be visible under water and the water would cause mixing of the topsoil and the subsoil. The pipe trench would remain flooded with water at all times, allowing flotation of the pipe.

Temporary staging areas would be established at locations along the right-of-way that are accessible for construction equipment, personnel, and the delivery of materials via existing roads or waterways. Some staging areas might be set up on spud barges temporarily anchored in navigable waterways. Push-pull sections would be fabricated within these staging areas using a process similar to that described below for construction on barges in open inland waters. However, rather than moving the barge forward upon completion of each joint, the pipe would be pushed into the pipe trench. Floats would be strapped onto the pipe to keep it afloat to minimize drag on the bottom of the trench. A cable would be strung from the leading end of the push-pull section to the next staging area and placed in tension to guide the pipe along the trench. Because of the large bending radius of the 42-inch-diameter concrete-coated pipe, the trenches between staging areas would have to be nearly straight. The distances between staging areas would be limited by the weight of the pipe section and the pushing/pulling capacity of the construction equipment.

Once the section of pipe has been floated into place, the floats would be cut and the pipe would be allowed to sink to the bottom of the trench. The marsh buggy would then backfill the trench and the disturbed area would be restored. Original surface hydrology would be re-established by backfilling the pipe trench (and flotation channel, where applicable) and grading the surface either with backhoes or draglines operating from low-ground-pressure tracked vehicles working in the spoil pile, depending upon the ambient water level, degree of soil saturation, and the bearing capacity of the soils.

Submerged wetlands would typically be re-vegetated by transplanting mature herbaceous specimens at pre-established spacing. Some of these plants might be ones that were on the right-of-way before construction and were stored in temporary nurseries until restoration. Other plants would be obtained preferably from adjacent wetlands (collected over an area sufficiently large to minimize negative impact in the donor wetland) or else from local commercial nurseries.

2.3.1.3 Special Pipeline Construction Techniques

HDD Crossing Technique

Major and other select waterbodies (not including open water construction across Sabine Lake), select highways, particularly congested pipeline corridors, and some wetland areas would be crossed by means of HDD. HDD would also be used to enter and exit Sabine Lake. KMLP is proposing a total of 18 HDDs for the Project. A typical HDD installation for waterbody crossing is shown in figure 2.3.1.3-1 and proposed HDD locations are listed by milepost in table 4.3.2.1-3 and appendix E. A complete description of the HDD process, including contingency plan, is provided in appendix I.

HDD involves drilling a pilot hole under the waterbody, foreign pipeline, road, railroad, or wetland. The hole would be enlarged through successive reamings until the hole is large enough to accommodate the pipe. Throughout the process of drilling and enlarging the hole, a slurry called drilling mud of naturally occurring non-toxic materials such as bentonite clay and water, would be circulated through the drilling tools to lubricate the drill bit, remove drill cuttings, and hold the hole open. To capture drilling fluids in water-to-water HDDs and to minimize the release of drilling fluids to the surface

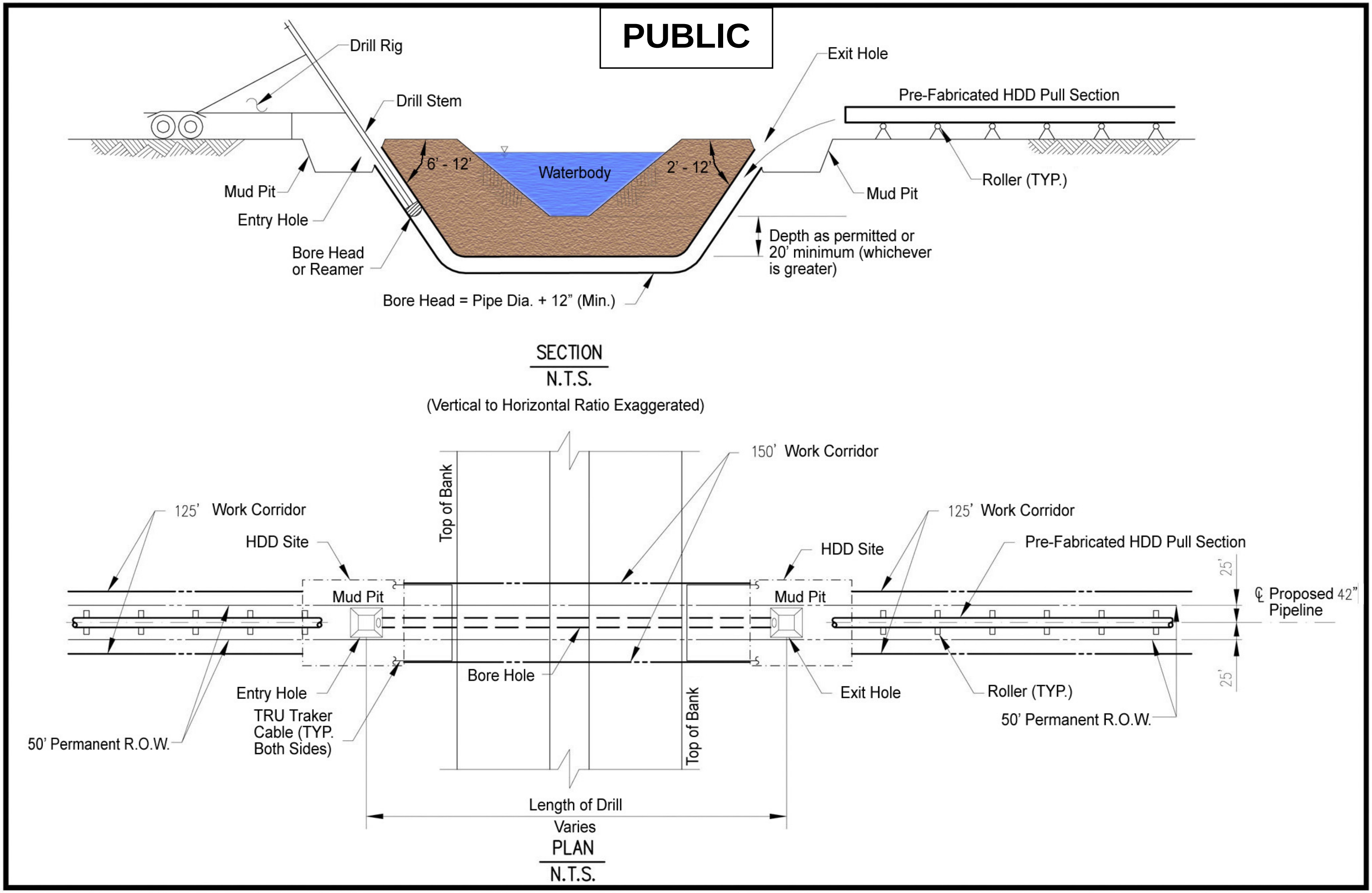

FIGURE 2.3.1.3-1
Typical HDD Waterbody Crossing

waterbody, a casing would be placed between the entry pit and the drill barge. Solids from any drilling fluids released to a surface waterbody would either settle out in the containment pits, or be rapidly dissipated by natural currents. Pipe sections long enough to span the entire crossing would be staged and welded along the construction work area on the opposite side of the waterbody (or other area being crossed) and then pulled through the drilled hole.

The length of pipeline that can be installed by HDD depends upon soil conditions and pipe diameters, and is limited by available technology and equipment sizes (however, the maximum limit of HDD is about 5,000 feet). The main advantage of HDD is that the planned disturbance of the surface between the entry and exit points of the HDD is minimal, i.e., limited to the temporary deployment of telemetry cable, provided there is reasonable access to the entry and exit points for the drilling rig and fluids handling equipment. Also, it requires prefabrication of a section of pipe aboveground that is equal to the length of the HDD portion, and then pull that string back into the hole, the process disturbs the land cover and can create a depression (called a false trench) in areas outside of the construction right-of-way.

Waterbodies crossed by HDD are discussed in section 4.3.2.1. Table 4.3.2.1-3 lists the approximate entry and exit locations, drill length, and features crossed by each proposed HDD.

Open-Cut Waterbody Crossing Technique

The open cut crossing method is proposed for most minor waterbody crossings where dry (unsaturated) coil conditions are anticipated on the banks. This technique is similar to an upland open-cut technique. It would involve excavation of the pipeline trench across the waterbody, installation of a prefabricated segment of pipeline, and backfilling of the trench with native material. No effort would be made to isolate the stream flow from the construction activities. Backhoes and other excavation equipment would typically operate from one or both banks of the waterbody but could operate within the waterbody to achieve the necessary reach. Equipment in the waterbody would be limited to that needed to complete the crossing. All other construction equipment would cross the waterbody over equipment bridges, unless otherwise allowed by our Procedures for minor waterbodies.

KMLP would minimize impacts to aquatic environments by implementing our Procedures. Construction activities would be scheduled so that the trench would be excavated immediately prior to pipe-laying activities. The duration of construction within each waterbody would be limited to 24 hours for minor waterbodies (10-feet wide or less) and 48 hours for intermediate waterbodies (greater than 10-feet wide but less than or equal to 100 feet in width). In accordance with the FERC's Procedures, excavated spoil would be stockpiled in the construction right-of-way at least 10 feet from the stream bank or in approved additional work areas, and would be surrounded by sediment-control devices. The waterbody banks would be restored to as near to pre-construction conditions as possible within 24 hours of completion of each open-cut crossing.

Dry Waterbody Crossing Techniques

Crossings of small perennial and intermediate streams would be accomplished in accordance with our Procedures. The pipeline would be installed by means of a dry-ditch method for crossings of waterbodies up to 30-feet wide (at the water's edge at the time of construction) that are state-designated significant warmwater fisheries. KMLP proposes to cross all waterbodies up to 30-feet wide by dry ditch method, e.g., flume and horizontal bore. Appendix F lists all water bodies crossed and the crossing method.

The dry flume crossing method would be used for some minor and intermediate waterbodies and would involve installation of a temporary dam and a flume pipe to divert the entire stream flow over the construction area and allow for trenching of the crossing in dry or nearly dry conditions (see figure 2.3.1.3-2). A 10-foot vegetated buffer zone would be left between the edge of the waterbody (or any associated wetlands) and the upland construction area. Dams would be constructed of sand bags, sand bags and plastic sheeting, or inflatable bladders to direct the flow into the flume pipe. Spoil removed during the trenching would be stored at least 10 feet away from the water's edge (topographic conditions permitting). A section of pipe long enough to span the entire crossing would be fabricated on one bank and slipped under the flume pipe to the opposite bank. The trench would be backfilled and the bottom of the watercourse and banks restored and stabilized before the flume pipe and dams are removed. Sediment barriers, such as silt fencing, staked straw bales and trench plugs, would be installed to prevent spoil and sediment-laden water from entering the waterbody.

Horizontal boring is a method that would involve pushing the pipe through a hole below minor waterbodies. Often, these waterbodies are drainaige ditches along the side of a road in which case both the waterbody and road would be bored. First, a bore pit would be dug on one side of the crossing and a receiving pit on the other. Both would be excavated to at least 5 feet below the surface. The bore pit would be graded such that the bore would be at the proper elevation for installation of the pipe. A boring machine would then be lowered to the bottom of the bore pit and placed on supports. The boring machine would cut a shaft under the waterbody by means of a cutting head mounted on an auger. The pipe would then be pushed through behind the auger. This method is also used for most major road or railroad crossings, as described below.

Sabine Lake Crossing

Leg 1 of the pipeline would enter and exit Sabine Lake by HDD. The construction methods in these areas would be as described below for HDDs, except that the pre-fabricated HDD pull sections at both the southern and northern end of the lake would be dewatered, floats would be strapped to the pipeline to provide positive buoyancy, and the pipeline would be floated across the water using tugboats (rather than allowed to drag across the lake bottom). KMLP anticipates that the installation of the pull section into the borehole can be completed in less than 24 hours.

For construction in the open waters of Sabine Lake (from approximately MP 4.8 to MP 18.0), Leg 1 of the Project would be installed using shallow draft spud barges. The use of spud barges in areas of the lake that are less than 8 feet deep would require the excavation of a flotation channel within a construction right-of-way up to 300 feet wide. Using barges with anchor spuds would eliminate the need for an anchor spread and anchor-handling boats, minimizing the area affected by construction operations. Based on pre-construction surveys, KMLP proposes the following construction steps in the open water areas of Sabine Lake.

The pipeline route would not cross over the Sabine River, but rather turn east at the mouth of the river around MP 18.6 and proceed along its southern banks through a series of HDDs and open cuts. However, the proposed HDD at the mouth of the Sabine River would have a temporary extra workspace that would protrude into the river and a pull section that would be floated across the river using tugboats. Other HDDs along the southern banks of the Sabine River would also have floating pull sections extending into the river, which would be held in place by timber piles. KMLP anticipates that the pull sections would lie across the water for less than 24 hours.

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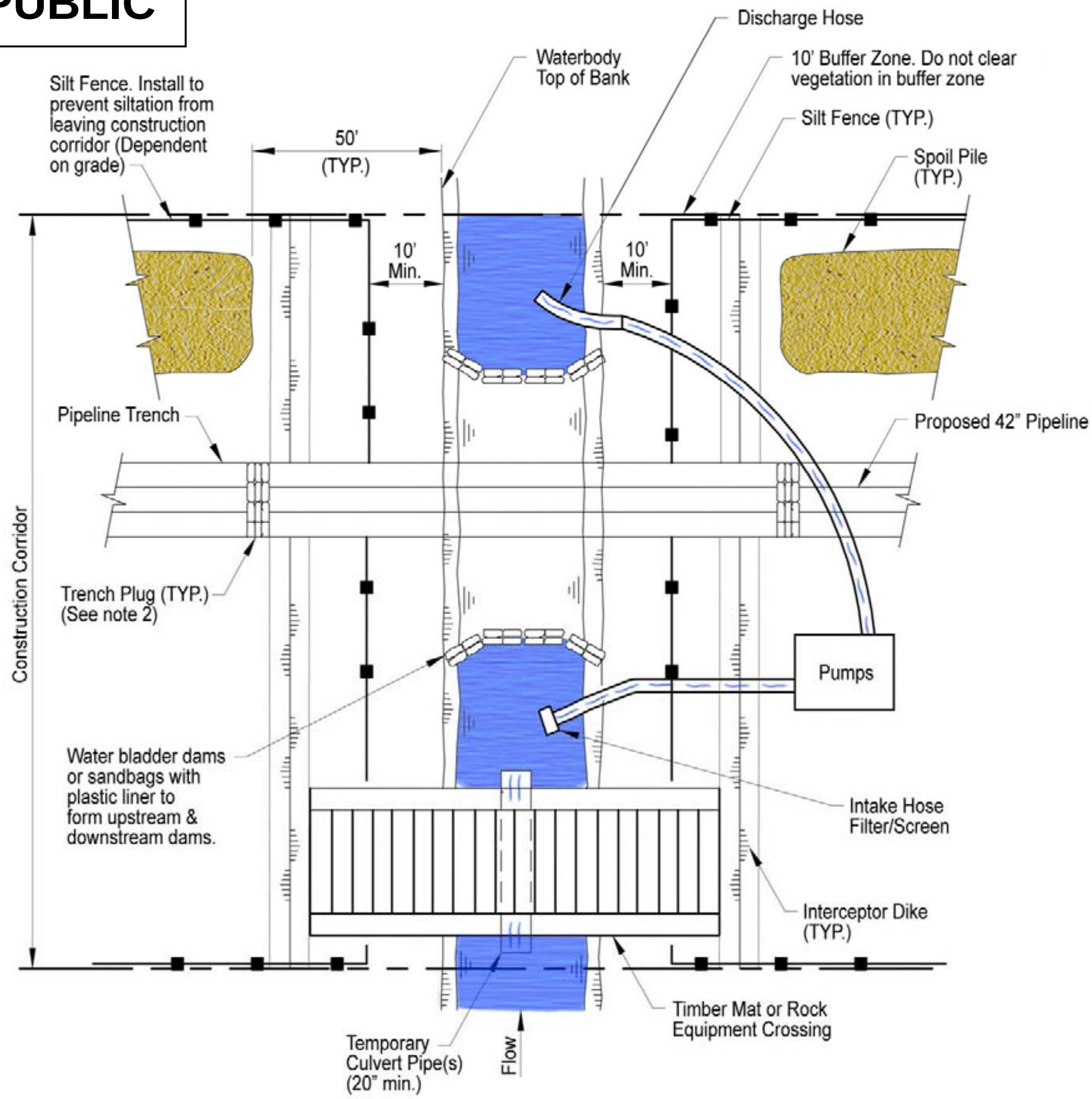

1. Silt fence and interceptor dike to be removed across pipeline trench during construction of pipeline. Silt fence and interceptor dikes to be replaced after backfill of trench.
2. Use hard or soft plug prior to pipe installation. Install permanent trench plugs after pipe installation and prior to backfilling pipeline trench.

FIGURE 2.3.1.3-2
Flume Crossing Method

Pre-Construction Survey

KMLP has conducted a shallow-hazards survey within a 3,000-foot-wide corridor in Sabine Lake to identify existing foreign (i.e., third-party) pipelines, obstructions that may adversely affect construction, and potentially significant submerged cultural resources. Where water depths are sufficiently shallow, the pre-construction survey was accomplished by means of small, shallow draft boats equipped with remote-sensing instrumentation, including a magnetometer/gradiometer, side-scan sonar, sub-bottom profiler, bathometer, and Global Positioning System (GPS) navigation. Adjustments to the proposed centerline were made, where feasible, to avoid magnetic anomalies that might indicate obstructions or significant cultural resources. Where avoidance was not feasible, anomalies were further investigated by probing, sampling, or diving, and either removed or recovered, as appropriate and as approved by local agencies. KMLP plans to conduct a second shallow-hazards survey within the construction right-of-way immediately prior to construction to verify that conditions have not changed since the original survey and to locate foreign pipelines. The right-of-way centerline and boundaries would then be staked with bamboo poles or floating buoys for excavation.

Excavation

The trench for the Project would be excavated by means of a barge-mounted clam-bucket (or equivalent) dredge. With a draft of up to seven feet, it would be necessary for the dredge barge to excavate a flotation channel to provide access for itself from existing navigation channels to the right-of-way (see figure 2.3.1.3-3), and along the right-of-way, in water depths of less than 8 feet (see figure 2.3.1.3-4). In water depths greater than 8 feet, a flotation channel would not be required (see figure 2.3.1.3-5). The dredge barge would cast pipe-trench and flotation-channel spoil to either side of the right-of-way centerline, keeping the spoil below the water surface, where feasible, to minimize wave-generated turbidity.

In waters that support powered marine vessel traffic, the spoil would be placed parallel to the trench in 500-foot-long piles, with 50-foot-wide openings to allow the passage of local watercraft. To ensure the safety of the boating public, the spoil piles and openings would be marked with timber piles, warning signs, and navigation lights. Surveyors would ensure the dredge remains on the approved centerline, verify that the spoil remains within the 300-foot construction right-of-way, and confirm that the bottom of the pipe trench was at the designed depth.

Pipe Fabrication and Lowering

The pipeline would be fabricated aboard a string of shallow-draft spud barges, lashed together in a line to form the lay barge. The concrete-coated pipe would first be offloaded from tugboat-towed supply barges by means of a crane mounted on the lead barge. Each pipe joint would then be aligned end-to-end with the previous joint on a set of rollers that would extend the length of the lay barge. The pipe joints would be assembled into one continuous pipeline by passing them through multiple welding, inspection, repair, and coating stations. Only qualified welders would be allowed to perform the welding. Welders and the welding procedure would be qualified according to applicable API standards. To ensure that the assembled pipe met or exceeded the design strength requirements, the welds would be visually inspected and examined by means of X-ray, ultrasound, or other approved methods, in accordance with American Society of Mechanical Engineers standards. Welds displaying unacceptable slag inclusions, void spaces, or other defects would be repaired or cut out and re-welded. Once each weld had passed inspection and received its final coating, the pipe would be lowered off the back end of the lay barge into the pipe trench by lifting the anchor spuds of the lay barge and moving the lay barge forward the length of one pipe joint. The next pipe joint would be rolled into position for welding and the process would be repeated.

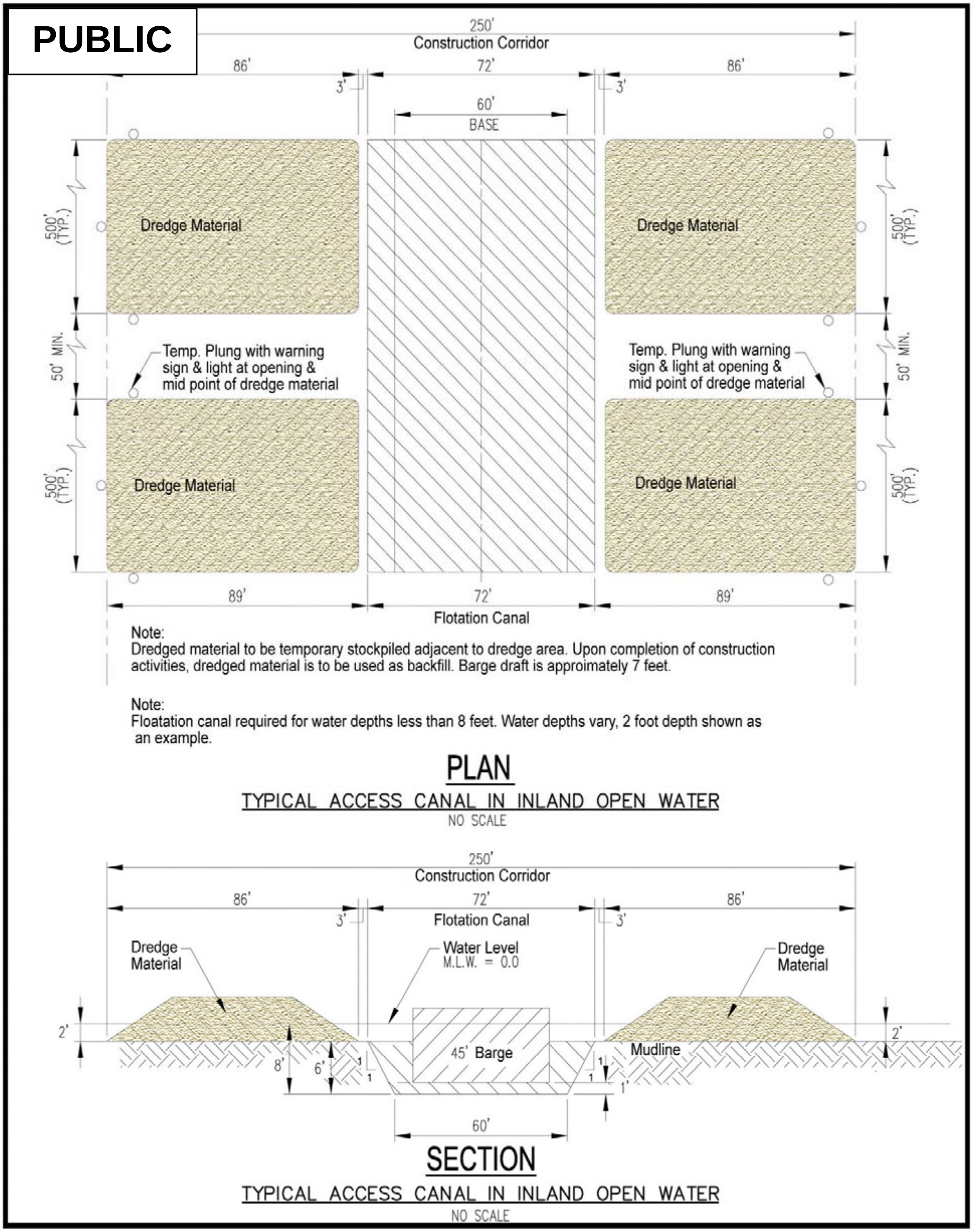

FIGURE 2.3.1.3-3
Typical Access Canal in Open Water

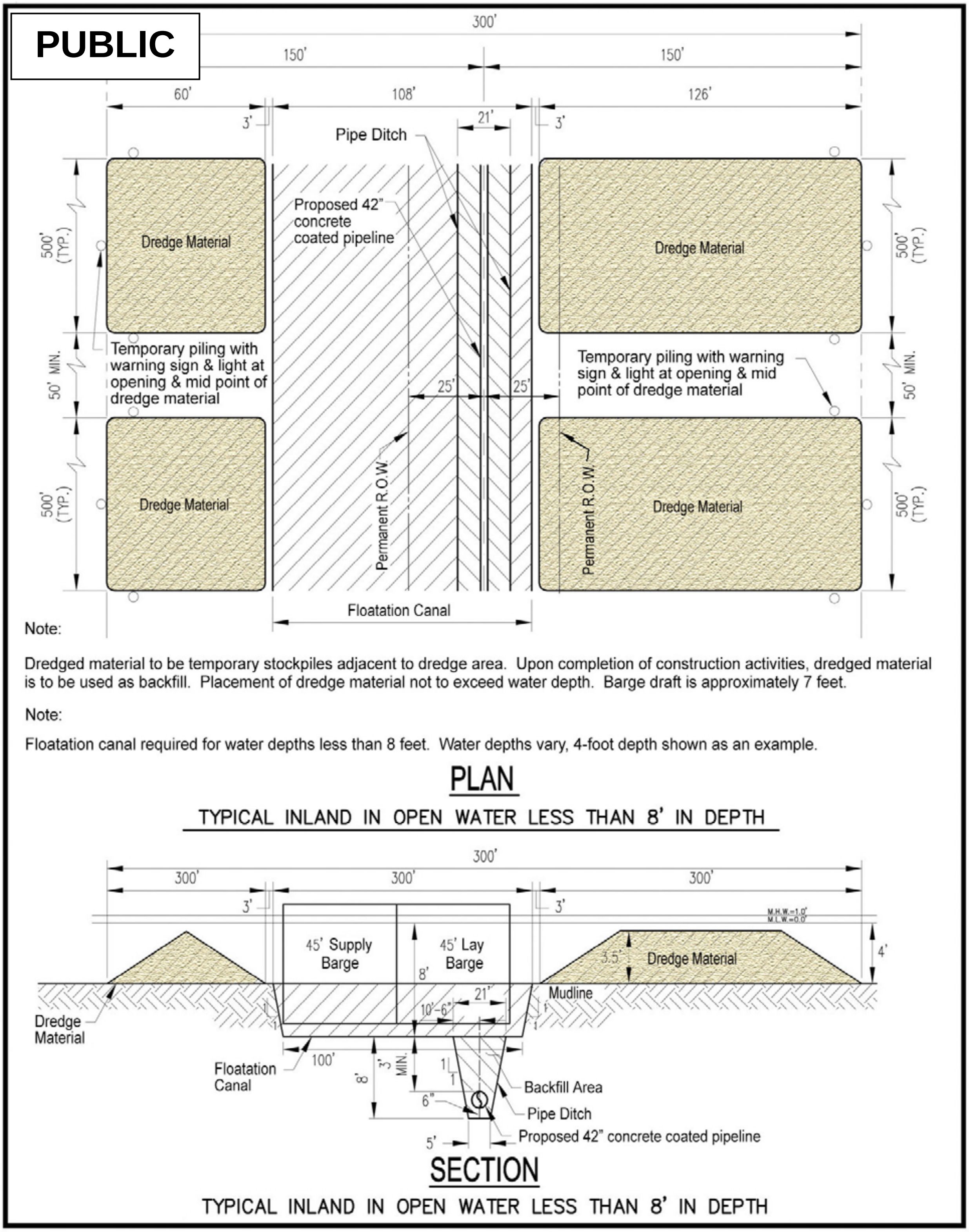

FIGURE 2.3.1.3-4
Typical Inland Open Water Construction, <8 feet depth of water

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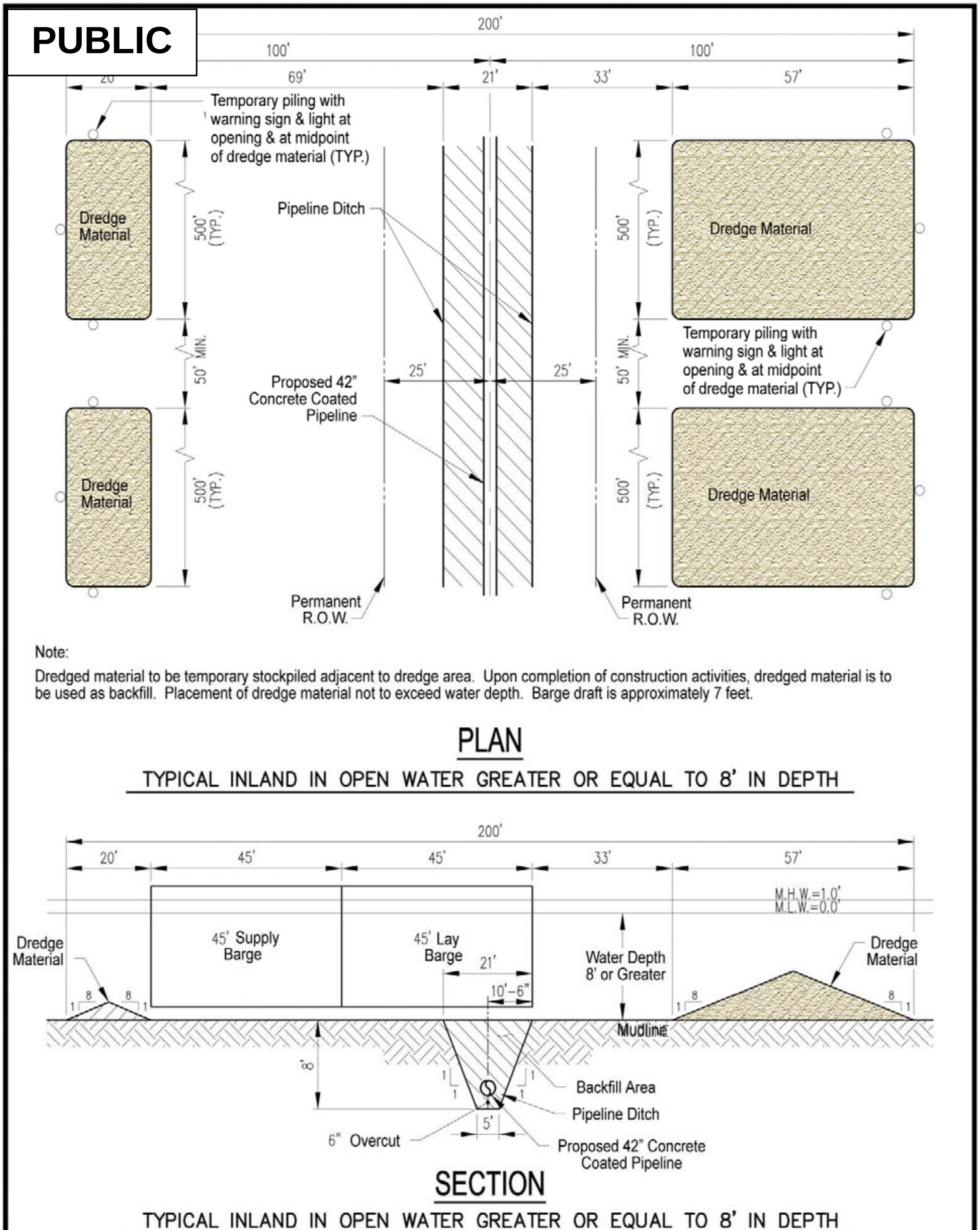

FIGURE 2.3.1.3-5
Typical Inland Open Water Construction, >8 feet depth of water

To ensure boating safety, barges and tugboat traffic associated with construction of the pipeline would comply with all U.S. Coast Guard requirements. KMLP would also provide information to allow the Coast Guard to issue a Notice to Mariners.

Jetting

Following lowering in, surveyors would confirm that the pipe is at sufficient depth to provide a minimum of four feet of soil cover, as required by the COE. Should the minimum cover not have been achieved, the pipe would be lowered farther using a barge-mounted hydraulic jetting system.

Foreign Pipeline Crossings in Open Water

The crossing of foreign pipelines in open water would require a specialty crew and equipment to pass the proposed pipeline under the existing pipeline, raise the proposed pipeline to the surface to make the tie-in, and to place concrete mats between the pipelines to ensure minimum separation distance is maintained.

Backfilling and Final Grading

Once sufficient depth of the pipe has been achieved to provide the minimum soil cover, the dredge barge would return to backfill the pipe trench and flotation channel, using the available spoil adjacent to the excavation. The bottom would be restored to within 1 foot of the original contour using the clam bucket. Surveyors would confirm that final grade and tolerance have been achieved. Where the 1 foot-grade tolerance was not achieved, a joint of pipe or similar device would be mounted on the dredge line and dragged across the bottom to remove high spots, until the contours had been restored to within the allowable tolerance. Where insufficient spoil remained to completely backfill the trench and channel to within 1 foot of original contours due to erosion of the spoil piles and suspension of solids in the water column during handling, the trench and channel would be allowed to naturally fill with sediments over time.

Calcasieu River Crossing

The Calcasieu River and the major tributary that serves as a ship channel to the Trunkline LNG Terminal (from MP 49.6 to MP 51.1) would be crossed just north of Choupique Island by means of two back-to-back HDD crossings separated by an approximately half-mile stretch of conventional upland construction across the intervening peninsula. The entry hole for the first HDD and the exit hole for the second would have to be located in a COE dredge-spoil disposal area in that peninsula. KMLP would design the pipeline through this area with consideration for the potential placement of additional overburden and the consolidation and settlement of dredge spoil materials.

Foreign Pipeline Crossings

The Project would cross numerous foreign pipelines. KMLP pipelines would be installed by horizontal bore under most single pipelines, as shown in figure 2.3.1.3-6. In areas where pipelines are highly congested or are near major waterbodies or wetlands, HDD would be used (see table 4.3.2.1-3). KMLP proposed to use two consecutive HDDs to cross a high concentration of pipelines from MP 25.3 to MP 26.8. Because the HDD plans in KMLP's application were incomplete, **we recommend:**

- **KMLP file with the Secretary a site-specific construction plan for the crossing of foreign pipeline corridors between MP 25.3 and MP 26.8. These site-specific plans should include scaled drawings identifying all areas that would be disturbed by construction.**

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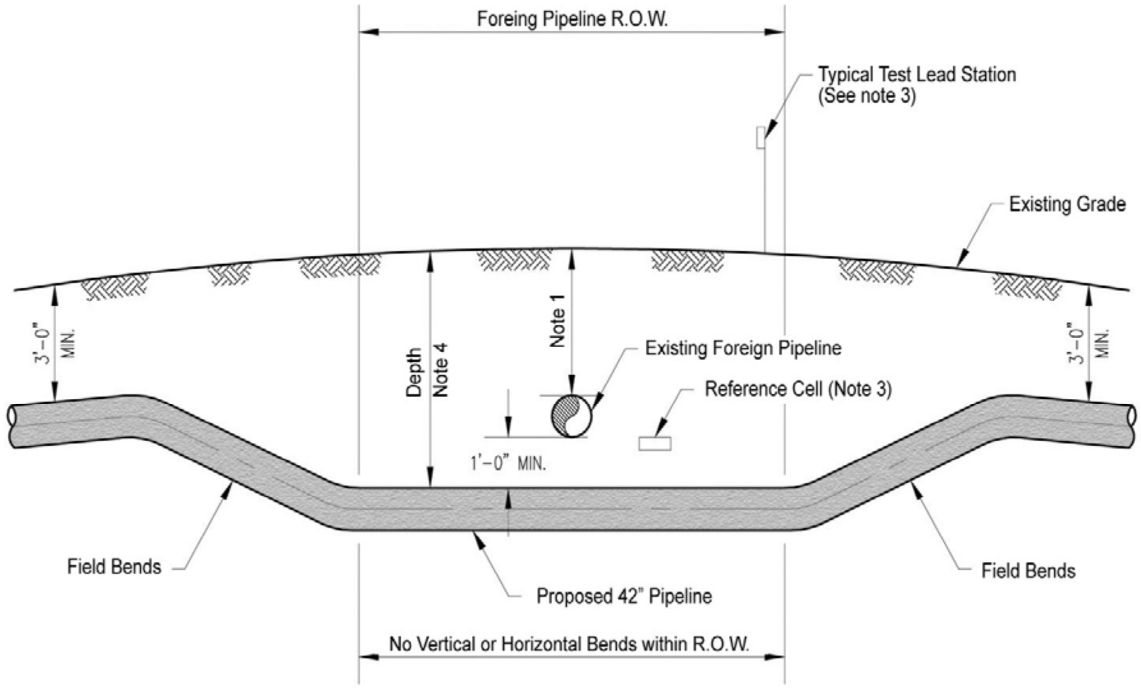

TYPICAL FOREIGN PIPELINE CROSSING DETAIL

Notes:

1. Foreign pipeline locations & depth to be dtermined by electronic means in advance of pipeline construction and confirmed by carefully exposing by hand digging.
2. Owner of foreign pipeline(s) shall be notifed 48 hours in advance of excavation of crossing.
3. Test lead station to be install where practical at the nearest fence, hedge row or field edge, and where readily accessible. Install company-supplied permanent reference cell and extend cell lead to test lead station.
4. Depth of pipeline including 1' - 0" min. clearamce shall be maintained for all full angular width of foreign pipeline R.O.W.
5. Proposed pipeline may only cross above the foreign pipeline(s) where requested by or approved by foreign owner in writing.

FIGURE 2.3.1.3-6
Typical Foreign Pipeline Crossing

KMLP should file these plans for review and written approval by the Director of the OEP prior to construction.

Road and Railroad Crossings

A total of 104 major paved highways and railroads, along which traffic could not be interrupted, would be crossed by horizontal boring or by HDD under the roadbed. Most of the smaller unpaved roads would be crossed by open trenching, and then restored to pre-construction conditions or better. If an open-cut road were to require extensive construction time, provisions would be made for temporary detours or other measures to allow safe traffic flow during construction.

The pipeline would be buried to a depth of at least 5 feet below the road surface, and 10 feet below the rail of the railroad, and would be designed to withstand anticipated external loadings. At points of access to the right-of-way from hard-surfaced roads, a stone pad would be installed as a construction entrance to control mud and dirt from tracking onto the highway. Casings will be installed only where specifically required by railroad or road authorities.

Extra workspaces for the Project as a whole, including those associated with road and railroad crossings, are shown in appendix C.

Crop and Pasture Crossings

KMLP would segregate topsoil in actively cultivated and rotated cropland and improved pastureland. A maximum of 12 inches of topsoil would be segregated in accordance with our Plan and Procedures in these areas, and in other areas at the specific request of the landowner or land management agency, if applicable (e.g., Louisiana State Lands, FWS). The topsoil and subsoil would be temporarily stockpiled in separate windrows on the construction right-of-way and would not be allowed to mix. Where topsoil is less than 12 inches deep, the actual depth of the topsoil would be removed and segregated. The depth of the ditch would be sufficient to allow for at least three feet of cover on top of the pipe.

After construction, compacted subsoil would be disked, and the segregated topsoil would be returned to its original horizon, unless otherwise requested by the landowner. Actively cultivated cropland would be left unseeded at the request of the landowner if preparation of the ground for planting is due to occur right after the completion of construction. Pasture would be reseeded with species similar to pre-construction and nearby vegetation.

Rice Field and Crawfish Pond Crossings

Rice fields and crawfish ponds (or isolatable sections thereof) would be drained before commencement of construction of the Project. KMLP would attempt to schedule construction during times when the fields and ponds are not normally flooded. If necessary, KMLP would also negotiate with the landowners a deferral of flooding or planting for the season or year in which construction were due to take place. This would improve the chances of the soil being dry and thus reduce the chance of soft spots in the soil remaining over the pipeline after construction. Typically, the conventional upland construction methods (described in section 2.3.1.1) would be appropriate. Should soil saturation be too great at the commencement of construction, temporary timber mats would be used resulting in a construction method more similar to unsaturated-wetland construction methods. If soil saturation were even greater, a saturated-wetland construction method would be used.

Topsoil would be segregated unless the water level and degree of soil saturation were too high at the time of construction or if there were no obvious horizon between the topsoil and subsoils. Compacted subsoil would be disked, and the segregated topsoil would be returned to its original horizon, unless otherwise requested by the landowner.

Residential Area Crossings

There are no residences (i.e., homes) within 50 feet of the edge of the proposed construction right-of-way. However, the pipeline would cross several residential areas between MP 38 and 124 which would involve barns and sheds within 50 feet of the edge of the construction right-of-way..

In these areas, KMLP would reduce construction workspace areas as practicable to minimize inconvenience to property owners; at some locations, HDD might be used to minimize surface disturbance to residences and other buildings near the right-of-way. If construction were to require the removal of private property features, such as gates or fences, the landowner or tenant would be notified and consulted prior to the action. Following completion of major construction, the property would be restored as requested by the landowner, insofar as the landowner's requirements are compatible with KMLP's standards regarding restoration and maintenance of the right-of-way, and applicable regulations, except that permanent structures would not be allowed within the 50-foot operating right-of-way. Property restoration would be in accordance with any agreements between KMLP and the landowner. The FERC's residential construction procedures would be followed.

Residential lawns would be re-seeded or sodded according to the variety of the original grass. Wherever practical, shrubs and small trees would be temporarily transplanted and replaced unless they were too close to the right-of-way to begin with.

Commercial and Industrial Area Crossings

Impacts to commercial and industrial areas would be limited to the construction and post-construction restoration periods when construction activities could inconvenience business owners, employees, and customers. KMLP would maintain close coordination with business owners to maintain access, decrease construction duration, and generally minimize impacts. Specifically, impacts to commercial facilities located on the east side of the Calcasieu River would be avoided by HDD.

Commercial lawns would be re-seeded or sodded according to the variety of the original grass. Wherever practical, shrubs and small trees would be temporarily transplanted and replaced unless they were too close to the right-of-way to begin with.

2.3.2 Aboveground Facilities

Construction of the meter station and interconnection facilities would involve typical industrial facility construction procedures. Construction activities and storage of construction materials and equipment would be confined to the facility footprint. Following the initial earth work, excavation would be completed as needed for the concrete foundations for the metering equipment and any buildings. Subsurface friction piles may be required to support foundations, depending upon the bearing capacity of the existing soils and the equipment loads. Forms would be set, rebar installed, and the concrete poured and cured in accordance with applicable industry standards. Backfill would be compacted in place, and excess soil would be used elsewhere or distributed around the site to improve grade. Construction debris and wastes would be disposed of appropriately.

The metering equipment and other materials would be delivered to the site by truck, off-loaded using cranes or front-end loaders (or both), positioned on the foundations, leveled, grouted where necessary, and secured with anchor bolts. All components in high-pressure natural gas service would be hydrostatically tested, and all controls and safety equipment and systems, including emergency shutdown, relief valves, and gas and fire detection equipment would be checked and tested before being placed in service. Following completion of construction, each site would be fenced and most areas in and around the meters and associated piping and equipment would be covered with crushed rock (or equivalent). Roads and parking areas may be crushed rock, concrete, or asphalt. Other ground surfaces, including adjacent areas outside the fence, would be restored, seeded, and revegetated.

Pig launchers and receivers would be installed completely within the boundaries of the associated meter station/interconnect sites. MLVs would be installed within the pipeline right-of-way.

2.3.3 Ancillary Facilities

Each extra workspace would be surveyed and staked, cleared, and graded in a manner that took account the use of the land on which it is to be located. In general, this would be the same manner as the nearest portion of right-of-way (because their land uses would in general be identical). Similarly, after construction, each extra workspace would be restored in a manner appropriate to the original land use.

Previously existing access roads that were modified and used during construction would be returned to original or better condition upon completion of the pipeline facilities installation. New access roads constructed specifically for the Project would be removed, the surface graded to original contours, and the land restored to its original use, unless otherwise requested by the landowner, or unless the roads would be required for ongoing access to the right-of-way during pipeline operations, and in accordance with any permit requirements. Temporary erosion-control measures would be removed upon final stabilization and installation of permanent erosion control measures.

As discussed in section 2.1.3, KMLP proposes to use 12 pipe storage and contractor staging areas during construction of the Project (see appendix C). The modifications that KMLP proposes to make to these areas during construction consist of:

- Grading;
- Adding road base, i.e., geotech lining and gravel; and
- Constructing pipe supports, i.e., dirt berms.

Upon completion of the construction phase, all temporary facilities (e.g., trailers, sheds, latrines, pipe supports, fencing, and gates) would be removed from the pipe storage and contractor yards. Unless otherwise requested by the landowner, each site would be graded to original contours and the land restored to its original use. The site would be re-vegetated, any permanent erosion-control measures would be installed, and temporary erosion-control measures would be removed.

2.4 OPERATION AND MAINTENANCE PROCEDURES

KMLP would operate and maintain the proposed pipeline and aboveground facilities in compliance with 49 CFR 192, the FERC’s regulations at 18 CFR 380.15, and our Plan and Procedures.

KMLP would employ locally based, full-time staff to operate and maintain the proposed pipeline system. Maintenance activities would include monitoring, inspection, and repair of the right-of-way, and cleaning of the pipeline. Periodic aerial and ground inspections would be performed to identify soil erosion that may expose the pipeline; dead vegetation, which may indicate a leak in the pipeline; unauthorized encroachment on the right-of-way, e.g., by buildings; and other conditions that could constitute a safety hazard or require preventative maintenance or repairs. The pipeline impressed-current cathodic protection system would also be monitored and inspected periodically to ensure proper and adequate corrosion protection. All MLV sites would be regularly inspected and maintained. Intelligent pigging would be undertaken periodically to inspect the interior of the pipeline.

KMLP would maintain vegetation on the permanent right-of-way in upland areas by mowing, cutting, and trimming. Large brush and trees would be removed periodically from within the operational right-of-way. Trees greater than 15 feet in height, or deep-rooted shrubs that could damage the pipeline's protective coating, obscure periodic surveillance, or interfere with potential repairs, would not be allowed to grow within 15 feet of the pipeline in wetlands or within 25 feet of the pipeline in uplands. The frequency of vegetation maintenance would depend upon the growth rates, but would not be more frequent than dictated by our Plan and Procedures. Vegetation maintenance would not normally be required in agricultural or grazing areas. Other than preventing tree growth as described above, vegetation maintenance would not normally be required in wetlands.

Pipeline facilities would be clearly marked at line-of-sight intervals and at crossings of roads, railroads, waterbodies, and at other key points in accordance with DOT regulations. Markers would clearly indicate the presence of the pipeline and provide a telephone number and address where a company representative could be reached in the event of an emergency or prior to any excavation in the area of the pipeline by a third party.

2.5 ENVIRONMENTAL COMPLIANCE, INSPECTION, AND MITIGATION MONITORING

KMLP would employ a tracking system to ensure that relevant pre-construction surveys, clearances, permits, and plans were completed prior to releasing the construction contractors to begin construction activities.

For purposes of quality assurance and compliance with mitigation measures, other applicable regulatory requirements, and project specifications, KMLP would be represented on each pipeline spread by a Chief Inspector, one or more Craft Inspectors, and at least one Environmental Inspector (EI). The EI position would be a full-time position. EIs would have authority to stop work and require corrective actions to achieve environmental compliance. Their duties would be consistent with those contained within Paragraph II.B (Responsibilities of Environmental Inspectors) of the FERC's Plan and would include ensuring compliance with any environmental conditions attached to the FERC Authorization, any other permits or authorizations, and environmental designs and specifications. Because KMLP has not yet defined these details for the Project, **we recommend that:**

- **KMLP file with the Secretary for review and written approval by the Director of OEP the proposed number of spreads, EIs per spread and for the entire Project, and the specific duties of those EIs prior to the issuance of the final EIS.**

KMLP also would develop a project-specific environmental training program that would be designed to ensure that:

- Qualified environmental training personnel provide thorough and well-focused training sessions regarding the environmental requirements applicable to the trainees' activities;
- All individuals receive environmental training before they begin work;

- Adequate training records are kept; and
- Refresher training is provided as needed to maintain high awareness of environmental requirements.

KMLP would file with the Commission any updates to its proposed environmental inspection program. KMLP is considering but has not committed to requesting the use of our Third-Party Compliance Monitoring and Variance Request Program for pipeline construction and restoration. In addition to KMLP's program, we would conduct periodic inspections to monitor the project for compliance with the Commission's environmental conditions.

2.6 SAFETY CONTROLS

DOT regulations in 49 CFR Part 192 require that KMLP prepare an Integrity Management Plan, to prevent system losses and failures, and an Emergency Response Plan, to protect the public, workers, and the environment in the event of loss or failure.

Engineering features and maintenance aspects have been incorporated by KMLP in its Project design to prevent system losses and failures. Engineering features include:

- Corrosion protection system;
- Overpressure protection system;
- SCADA and leak-detection system;
- MLVs; and
- Hydrostatic testing as part of commissioning.

Maintenance aspects include:

- Preventative maintenance program;
- Aerial surveillance flights;
- On-ground leak-detection surveys; and
- Intelligent pigging.

Protection against corrosion would be provided by an external fusion-bonded epoxy coating together with an impressed-current cathodic-protection system. Cathodic-protection protection units would be monitored regularly to maintain the requisite pipe-to-soil potential in accordance with the specifications of the relevant DOT regulations.

In accordance with DOT regulations, KMLP would devise and implement an Emergency Response Plan to be followed in the event of an emergency such as a gas leak, fire, explosion, or other damage to the pipeline system. Procedures would include:

- Training of employees on emergency procedures;
- Establishing liaisons with appropriate fire, police, and other community officials; and
- Informing the public on how to identify and report an emergency condition.

2.7 FUTURE PLANS AND ABANDONMENT

At this time, KMLP has no plans for future expansion of any facilities associated with the Project. If ever an expansion is envisioned (for example, additional interconnects to deliver gas to other pipelines, compression facilities to increase system capacity, or new access roads to gain access to these or other new facilities), it would require FERC authorization, following appropriate analysis, and be subject to applicable federal, state, and local regulations in force at that time.

KMLP envisions a 25-year life for the Project. However, the facilities themselves would, with proper maintenance, be capable of being operated for 50 years or more, according to KMLP. Regardless of the duration of utilization of the proposed pipeline system, abandonment of any facilities would require FERC authorization, following appropriate analysis, and be subject to applicable federal, state, and local regulations in force at that time.

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3.0 ALTERNATIVES

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 proponed 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.[1] 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

[1] 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 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:

Non-Internet Public

DRAFT ENVIRONMENTAL IMPACT STATEMENT
KINDER MORGAN LOUISIANA PIPELINE PROJECT
Docket No. CP06-449-000

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Figure 3.2-1 System Alternatives for the KMLP Project

Public access for this Non-Internet Public information is available only through the Public Reference Room, or by e-mail at public.referenceroom@ferc.gov.

TABLE 3.2-1

Comparison of KMLP's Proposed System with System Alternatives

	Unit	KMLP's Proposed System and Route[a]	System Alternative #1[b]	System Alternative #2[b]
Pipeline Facilities[c]				
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
Environmental Factors				
Construction right-of-way[d]	acres	2030.3	2537.9	2397.0
Permanent right-of-way[d]	acres	806.3	1015.2	958.8
Length adjacent to existing right-of-way	percent	54.0	31.1	52.6
Length in wetlands[e]	miles	35.8	48.4	28.5
Total perennial waterbodies crossed[f]	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[g]	miles	0	0	0
State land crossed[g]	miles	0	0	0
Other recreational/designated land use areas crossed[g]	number	0	0	0
Existing residences within 50 feet of construction work area	number	0	10[h]	10[h]
Cultural resources[i]	number	0	0	0

[a] We evaluated alternatives for Leg 1 mainline only.

[b] 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."

[c] 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.

[d] 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.

[e] Wetland data were obtained from the National Wetlands Inventory database.

[f] 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.

[g] 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.

[h] 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.

[i] 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

Characteristic or Resource	Leg 1 Proposed Route	Southern Route Alternative #1	Southern Route Alternative #2	Northern Route Alternative	Center Route Alternative
Total Length	132.2 miles	133.7 miles	137.6 miles	133.5 miles	137.2 miles
Area Disturbed for Construction	2995.9 acres[a]	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[b]	0	0	0	0	0
Residences within 50 feet of Construction Work Area	0	TBD[c]	TBD[c]	TBD[c]	TBD[c]
Number of Federally Listed Threatened or Endangered Species	8	8	8	8	8
Number of Cultural Resources[d]	0	0	0	0	0
Number of Road Crossings	125	124	128	109	144
Number of Railroad Crossings	5	2	5	5	2

a 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.

b Such as wilderness areas, parks, ballfields, campgrounds, etc.

c 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.

d 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

Route Variation (Page in Appendix F Showing Map)	MP Range on Proposed Route for Leg 1	Reason for Consideration	Comments	Adopted (Y/N)	Original Length (miles)	Variation Length (miles)
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.

TABLE 3.4.1-1

Environmental Comparison of Blue Buck Point Route Variation

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

[a] 2000 ESRI Tiger Data (US Census Bureau 2004)
[b] 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

TABLE 3.4.1-2

Bottom Substrate Crossed by the Blue Buck Pipeline Route Variation within Sabine Lake

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.

TABLE 3.4.2-1

Environmental Comparison of Garrison's Ridge Route Variation

Environmental Factor	Proposed Route	Variation
Total Length	2.5 miles	3.4 miles
Number of Road Crossings[a]	0	0
Number of Water Crossings[a]	3	3
Length in Wetlands[b]	2.5 miles	3.1 miles
Length in Uplands[b]	0.04 mile	0.3 miles

[a] 2000 ESRI Tiger Data (US Census Bureau 2004)
[b] 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		
Environmental Factor	**Proposed Route (Variation)**	**Originally Considered Route**
Total Length	4.6 miles	4.8 miles
Number of Road Crossings[a]	0	1
Number of Water Crossings[a]	1	1
Length in Cropland and Pasture[b]	1.2 miles	1.5 miles
Length in Wetlands[c]	4.5 miles	3.4 miles
Length in Uplands[c]	0.1 mile	1.3 miles
Length in Open Water[c]	0.03 mile	0.04 mile

[a] 2000 ESRI Tiger Data (US Census Bureau 2004)
[b] 1990 USGS Land Use and Land Cover Data (USGS 2006a)
[c] 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		
Environmental Factor	**Proposed Route (Variation)**	**Originally Considered Route**
Total Length	5.2 miles	4.5 miles
Number of Road Crossings[a]	11	7
Number of Water Crossings[a]	2	3
Length in Cropland and Pasture[b]	4.8 miles	4.2 miles
Length in Wetlands[c]	1.4 miles	0.7 miles
Length in Uplands[c]	3.7 miles	3.8 miles
Length in Open Water[c]	0.1 mile	0.1 mile

[a] 2000 ESRI Tiger Data (US Census Bureau 2004)
[b] 1990 USGS Land Use and Land Cover Data (USGS 2006a)
[c] 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.

TABLE 3.4.5-1

Environmental Comparison of Calcasieu River Route Variation

Environmental Factor	Proposed Route (Variation)	Originally Considered Route
Total Length	4.5 miles	4.6 miles
Number of Road Crossings[a]	7	8
Number of Water Crossings[a]	4	5
Length in Cropland and Pasture[b]	2.1 miles	2.1 miles
Length in Wetlands[c]	1.2 miles	1.9 miles
Length in Uplands[c]	2.9 miles	1.8 miles
Length in Open Water[c]	0.4 mile	0.8 mile

[a] 2000 ESRI Tiger Data (US Census Bureau 2004)
[b] 1990 USGS Land Use and Land Cover Data (USGS 2006a)
[c] 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			
Environmental Factor	**Proposed Route (Variation #1)**	**Variation #2**	**Originally Considered Route**
Total Length	2.6 miles	2.6 miles	2.6 miles
Number of Road Crossings[a]	3	2	3
Number of Water Crossings[a]	0	0	0
Length in Cropland and Pasture[b]	2.6 miles	2.6 miles	2.6 miles
Length in Wetlands[c]	0.03 mile	0	0
Length in Uplands[c]	2.5 miles	2.6 miles	2.6 miles
Length Collocated with Other Pipelines	2.6 miles	0	0.8 mile

[a] 2000 ESRI Tiger Data (US Census Bureau 2004)
[b] 1990 USGS Land Use and Land Cover Data (USGS 2006a)
[c] 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		
Environmental Factor	**Proposed Route (Variation)**	**Originally Considered Route**
Total Length	3.4 miles	3.6 miles
# of Road Crossings[a]	4	5
# of Water Crossings[a]	3	3
Length in Cropland and Pasture[b]	3.3 miles	3.5 miles
Length in Uplands[c]	3.4 miles	3.6 miles

[a] 2000 ESRI Tiger Data (US Census Bureau 2004)
[b] 1990 USGS Land Use and Land Cover Data (USGS 2006a)
[c] 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.

TABLE 3.4.8-1

Environmental Comparison of the Freeland Road Route Variation

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[a]	2	2
Number of Water Crossings[a]	0	0
Length in Cropland and Pasture[b]	0.5 mile	0.4 mile
Length in Uplands[c]	0.5 mile	0.4 mile

a 2000 ESRI Tiger Data (US Census Bureau 2004)
b 1990 USGS Land Use and Land Cover Data (USGS 2006a)
c 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

Environmental Factor	Proposed Route (Variation #2)	Variation #1	Originally Considered Route
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[a]	6	6	6
Number of Water Crossings[a]	3	3	3
Length in Cropland and Pasture[b]	4.2 miles	4.2 miles	4.2 miles
Length in Mixed Forest Land[b]	0.6 mile	0.6 mile	0.5 mile
Length in Wetlands[c]	0.4 mile	0.5 mile	0.5 mile
Length in Uplands[c]	4.9 miles	4.8 miles	4.7 miles

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

TABLE 3.4.10-1

Environmental Comparison of US Highway 190 Route Variation

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

[a] 2000 ESRI Tiger Data (US Census Bureau 2004)
[b] 1990 USGS Land Use and Land Cover Data (USGS 2006a)
[c] 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		
Environmental Factor	**Proposed Route (Variation)**	**Originally Considered Route**
Total Length	0.9 mile	0.65 mile
Distance to Nearest Residence	940 feet	less than 50 feet
Number of Road Crossings[a]	3	3
Number of Water Crossings[a]	0	0
Length in Cropland and Pasture[b]	0.9 mile	0.65 mile
Length in Uplands[c]	0.9 mile	0.65 mile

[a] 2000 ESRI Tiger Data (US Census Bureau 2004)
[b] 1990 USGS Land Use and Land Cover Data (USGS 2006a)
[c] 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		
Environmental Factor	**Proposed Route (Variation)**	**Originally Considered Route**
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[a]	2	2
Number of Water Crossings[a]	0	0
Length in Cropland and Pasture[b]	1.3 miles	1.3 miles
Length in Uplands[c]	1.3 miles	1.3 miles

[a] 2000 ESRI Tiger Data (US Census Bureau 2004)
[b] 1990 USGS Land Use and Land Cover Data (USGS 2006a)
[c] 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.

TABLE 3.4.13-1

Environmental Comparison of the Perron Road Route Variation

Environmental Factor	Proposed Route (Variation)	Originally Considered Route
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[a]	4	4
Number of Water Crossings[a]	0	0
Length in Cropland and Pasture[b]	2.2 miles	2.1 miles
Length in Uplands[c]	2.2 miles	2.1 miles

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

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4.0 ENVIRONMENTAL ANALYSIS

The environmental consequences of constructing and operating the Project would vary in duration and significance. Four levels of impact duration were considered: temporary, short-term, long-term, and permanent. Temporary impacts generally occur during construction with the resource returning to preconstruction conditions almost immediately afterward. Short-term impacts would continue for approximately three years following construction. Impacts were considered long-term if resources would require more than three years to recover. Permanent impacts would occur as a result of activities that modify resources to the extent that they would not return to preconstruction conditions during the life of the Project, such as with construction of an interconnect. We considered an impact to be significant if it would result in a substantial adverse change in the physical environment.

In this section, we discuss the affected environment, general construction and operational impacts, and proposed mitigation for each resource. KMLP, as part of its proposal, agreed to implement certain measures to reduce impacts, and we evaluated the proposed mitigation measures to determine whether or not additional measures would be necessary to further reduce impacts. These additional mitigation measures that we have identified appear as bulleted, boldface paragraphs in the text. We are recommending that these measures be included as specific conditions to the Certificate that the FERC may issue to KMLP for the Project.

Conclusions in this draft EIS are based on our analysis of the environmental impact and the following assumptions:

- KMLP would comply with all applicable laws and regulations;
- The facilities would be constructed as described in section 2.0 of this draft EIS; and
- KMLP would implement the mitigation measures identified in its application and supplemental filings to the FERC.

This section of the draft EIS is organized by environmental resource. For most resources, the scope of our analysis includes the construction and operation of the facilities, which are limited to the pipelines, their support facilities, workspaces extra to the pipelines' rights-of-way, interconnect sites, access roads, and yards for pipe storage and contractor use during the construction phase. The draft EIS also includes detailed discussion of natural gas pipeline reliability and safety (see section 4.13) and the cumulative impacts of the Project and other projects in the area (see section 4.11).

4.1 GEOLOGIC RESOURCES

4.1.1 Affected Environment

Geologic Setting

The entire state of Louisiana is within the physiographic section referred to as the Coastal Plain Province by the USGS. The surface of this region is underlain by geologically young sediments deposited in or adjacent to rivers and deltas in a coastal plain setting. Below the surface sediments are Tertiary rocks at a depth of thousands of feet. The KMLP Project begins in the Holocene coastal marshes of Cameron Parish and extends across the Pleistocene terraces of Calcasieu, Jefferson Davis, Acadia, and Evangeline Parishes (table 4.1.1-1). The Holocene coastal marshes are alluvium deposits associated with major rivers and tributaries along with coastal deposits of marine sediments, and account for approximately 55 percent of the surface in Louisiana. The Pleistocene terraces consist of sand, gravel,

TABLE 4.1.1-1

Geology Along the Proposed KMLP Project

Epoch	Map Unit			Cumulative Length Crossed (Miles)
	Symbol	Name	Description	
Holocene	HsM	Small river meander-belt deposits	Point-bar and associated overbank deposits underlying meander belts of the Sabine River. The surface of the meander-belt is characterized by ridge and swale topography. These deposits typically consist of gray to reddish brown sand, silt, silty clay, and sandy clay.	7.8
Holocene	Hm	Mermentau Alloformation	Complex interfingering and interbedded, dark-colored marine muds, sandy and shelly beach deposits, organic marsh clays, and lacustrine and bay muds. These deposits bury the surfaces of the Prairie and Deweyville Allogroups. The Louisiana chenier plain forms the surface of the Mermentau Alloformation. The unit extends westward along the coast into Texas as far west as Galveston Bay. Eastward, it extends almost to the west shore of Vermilion Bay, where it interfingers with deltaic sediments of the Teche delta lobe. Seaward of the shoreline, the Mermentau Alloformation grades laterally into unnamed marine sediments.	12.3
Holocene	Hs	Small river deposits, undifferentiated	Undifferentiated alluvium of small coastal rivers, consisting of recognizable but unmapped channel and overbank deposits within the Calcasieu River Valley.	1.5
Holocene	Hua	Undifferentiated alluvium of small upland streams	Alluvial deposits of minor streams and creeks filling valleys cut into older deposits. The modern floodplain within these valleys constitutes the surface of the deposits. The lithology of these alluvial deposits reflects the reworked lithology of their adjacent source.	6.4
Pleistocene	Ppbe	Beaumont Alloformation	Coastal plain deposits of late-to-middle-Pleistocene streams: the oldest and topographically highest surface of the Prairie Allogroup units of southwestern Louisiana. It exhibits the relict channels of the Red and Calcasieu rivers, and includes deposits of the Ingleside barrier trend to the southwest of the Ville Platte quadrangle.	86.1
Pleistocene	Pper	Relict Pleistocene coastal ridges	Low-lying ridges delineated on the surface of the Beaumont Alloformation. Some of these ridges are coast-parallel and others trend obliquely to the coast and radiate from the end of the known meander-belts. Limited drilling indicates that these ridges are either meander-belt ridges or deltaic distributaries of differing ages. The origins of other coastal ridges developed on the Beaumont surface to the west of the Crowley quadrangle remain undetermined.	4.6

and mud deposits and were formed as remnants of pre-existing floodplains tilted in response to the down-wrapping of the crustal floor of the Gulf of Mexico. The Pleistocene terraces account for approximately 25 percent of the surface in Louisiana (Louisiana Geological Survey 2006).

Permeable Quarternary sedimentary deposits overlie sedimentary rock formations at depths of at least 5,000 feet along the northernmost reaches of the Project, and increase to over 10,000 feet near the coastline (Renken 1998). There is no bedrock exposure within 50 miles of the pipeline.

The topography throughout the Project area is characterized by low elevation and relief. Slopes are generally flat to gentle except for river/stream banks, man-made levees, roadways, and areas of fill. The beginning of the Project in the vicinity of Sabine Lake has an elevation at sea level. Elevation rises to 65 feet above sea level at the end of the Project in Acadia Parish.

Cheniers can be found along the Gulf Coast and within the vicinity of the Project. Cheniers are geomorphological formations consisting of ridges and low-lying marshes formed by alternating high and low sediment supply periods. The ridges are typically 1 to 3 feet above adjacent areas and provide elevated land for commercial and residential development. They support maritime forests typically of live oak, which provide important habitat for birds and mammals amongst the marshes of coastal Louisiana. The State of Louisiana provides special protection to chenier formations, requiring that "surface alterations which have high adverse impacts on natural functions shall not occur, to the maximum extent practicable, on barrier islands and beaches, isolated cheniers, isolated natural ridges or levees, or in wildlife and aquatic species breeding or spawning areas, or in important migratory routes" (Louisiana Administrative Code Title 43, Part I, Subchapter B, Coastal Use Guidelines, Section 711 (I)).

Mineral Resources

Mineral resources currently exploited or potentially exploitable in the region where the KMLP Project would be located include oil, gas, coal, salt, sand and gravel, gypsum, lime, and stone.

Southern Louisiana is an active area for oil and gas production. Oil and gas wells in the vicinity of the KMLP Project were identified using maps and ownership databases obtained from the Louisiana Oil Spill Coordinators Office (LAOSCO). According to these data, there are 218 oil and gas wells within ¼ mile of the pipeline. Of those 218 wells, 21 are within 150 feet of the pipeline and 9 wells are within the construction work area. The approximate locations and status of these 21 wells are listed in table 4.1.1-2.

The closest major salt mine, Texas Brine Corp. in northern Jefferson County, Texas, is about 25 miles west of the pipeline. No brine wells or other salt recovery operations have been found within the construction workspace of the KMLP Project.

Sand and gravel operations are present in Calcasieu, Jefferson Davis, and Evangeline Parishes. The closest major sand and gravel operations are located in northwest Jefferson Davis Parish, about 10 miles north of the Project (National Atlas 2006). Two borrow pits are located in the vicinity of the pipeline. One is located completely across the construction right-of-way at approximately MP 52.7. The other is located about 200 feet away from the pipeline with its entrance road at approximately MP 66.0.

TABLE 4.1.1-2

Oil and Gas Wells Within 150 feet of the KMLP Project

MP	Parish	Owner/Operator	Oil and Gas Field	Distance from Proposed Pipeline (feet)	Within Construction Right-of-Way?	Status
1.2	Cameron	Sabine Pass Terminal SWD	Johnsons Bayou, West	52.2	Yes	Salt Water Disposal
40.5	Calcasieu	MGGT-GL	Wildcat – So. LA Lafayette Dist.	122.5	No	Permit Expired
48.4	Calcasieu	Grady Mayeaux	Wildcat – So. LA Lk. Charles Dist.	41.3	No	Dry and Plugged
49.5	Calcasieu	M CAM RE SUA; SL 11524	Moss Lake, East	4.5	Yes	Plugged and Abandoned
49.5	Calcasieu	William T. Burton IND Inc.	Wildcat – So. LA Lafayette Dist.	5.8	Yes	Plugged and Abandoned
57.5	Calcasieu	Walker Unit A	Lake Charles, South	135.8	No	Dry and Plugged
67.9	Calcasieu	Humoris Spears	Manchester	28.7	Yes	Dry and Plugged
69.3	Calcasieu	Farmers Land and Canal Company	Manchester	0.6	Yes	Permit Expired
84.0	Jefferson Davis	William E. Trimble	Welsh, North	120.1	No	Dry and Plugged
104.9	Acadia	Phillip Klumpp	Wildcat – So. LA Lafayette Dist.	35.3	No	Dry and Plugged
106.9	Acadia	T. Ortego A SU; BNKHD Fruge	Tepetate	94.2	No	Plugged and Abandoned
107.0	Acadia	Theogene Ortego	Tepetate	134.3	No	Plugged and Abandoned
107.4	Acadia	T. Ortego A SU; L L Welch A	Tepetate	63.3	No	Plugged and Abandoned
107.5	Acadia	L. L. Welch A	Tepetate	42.5	Yes	Plugged and Abandoned
108.3	Acadia	J. R. Jones	Tepetate	115.5	No	Dry and Plugged
109.5	Acadia	M. L. Vincent Jr.	Tepetate, North	30.5	Yes	Plugged and Abandoned
109.8	Acadia	M. L. Vincent	Tepetate, North	104.4	No	Plugged and Abandoned
109.8	Acadia	HMSKR B SUF; M L Vincent Jr.	Tepetate, North	104.4	No	Plugged and Abandoned
109.8	Acadia	M. L. Vincent Jr.	Tepetate, North	104.4	No	Plugged and Abandoned
112.2	Acadia	M. R. Jenkins Estate	Wildcat – So. LA Lafayette Dist.	44.9	Yes	Dry and Plugged
112.2	Acadia	Mark Jenkins Estate	Basile	44.9	Yes	Plugged and Abandoned

4.1.2 Impacts and Mitigation

The primary effect of pipeline construction on geology would be disturbances to the existing topography along the construction right-of-way. As described in section 2.3, all areas disturbed during pipeline construction would be graded and restored as closely as possible to preconstruction contours during cleanup and restoration. Additionally, blasting is not anticipated because the Project would be unlikely to encounter bedrock exposures. For these reasons, we believe that construction, maintenance, and operation of the Project would be unlikely to result in significant alterations of the topography or geological resources of the Project area.

The Project would cross the western-most portion of a chenier known as Garrison Ridge. This crossing would be done by HDD to avoid impacts to this chenier. Maintenance and operation of the pipeline would not disturb the chenier. There are two other cheniers, Saunders Ridge and Blue Buck Ridge, in the vicinity, but they would not be crossed by the Project.

Mineral Resources

As noted above, 9 oil and gas wells are reported to be within the construction right-of-way. However, no wells within the construction right-of-way were actually observed in locations where survey permission had been granted. Some wells may have been plugged and abandoned and surface features may no longer remain. The centerline has not been adjusted to miss these recorded well locations. The reported location of the well may be incorrect and moving the line could move it to the actual location of the well, or with the high level of oil and gas production in the area, could interfere with another well. To confirm the existence of active or plugged/abandoned wells within the pipeline construction right-of-way, and minimize impacts on those wells that could be affected, KMLP would:

- Conduct a pre-construction physical survey using a magnetometer (or equivalent instrumentation) to identify non-reported or abandoned oil or gas wells, and to confirm the location of reported wells, in those areas along the right-of-way where wells are reported to be within ¼ mile of the pipeline;

- In the event a well is found, determine a safe buffer zone around the well for each construction procedure based on the size and current condition of the well, in consultation with the owner of the well;

- Adjust the pipeline centerline, if necessary, to ensure that the pipe trench excavation would not interfere with the integrity of the well (generally, a minimum separation distance of 50 feet would be maintained between the pipeline and the well);

- Reduce the construction workspace, as necessary, to keep stockpiled spoil and associated equipment a safe distance from the well;

- Flag wells within the construction right-of-way and place barricades at the edge of the buffer zone to exclude construction equipment and personnel;

- Document the condition of each well before construction and repair any damage caused by pipeline construction activities to surface facilities or the well casing, as appropriate; and

- Follow the safety precautions similar to those maintained while crossing foreign pipelines (e.g., no mechanized equipment within a prescribed distance, no open flames or smoking, and monitoring for detection of 25 percent of the lower explosive limit of natural gas in the air) in the vicinity of oil and gas wells, as appropriate.

Minor route changes to reduce impacts on existing mineral resources, such as oil and gas production wells, may result in impacts to additional landowners or may affect other resources. If this occurs, KMLP would contact the FERC for any route realignments. Construction, operation, and maintenance of the Project would not affect future recovery of oil and gas, and nearby oil and gas wells would not affect the Project. The Project is limited to near-surface disturbance over a relatively small area that would not restrict access to oil and gas resources that are typically located at depths of more than 1,000 feet.

There are no salt or brine operations identified near the Project area. The nearest salt mine is about 25 miles west of the Project. No major sand and gravel mining operations are located near the project area. The nearest one is located at about 10 miles away. However, two borrow pits are located along Leg 1 near MP 52.7 and MP 66.0. The borrow pit near MP 52.7 would be crossed by Leg 1 and KMLP plans to cross this pit using HDD. KMLP has indicated the landowner/owner of the pit may receive inert highway demolition material for disposal to fill the pit in the future. KMLP has not provided any documentation of consultation with the owner of the pit. KMLP believes that since the pipeline would be installed by HDD and be separated from the bottom of the pit by a distance determined to be safe by KMLP engineering analysis, no impact to the integrity of the pipeline is anticipated nor would it cause any disruption to the disposal operations. However, in order to minimize impact to the borrow pit at MP 52.7, **we recommend that:**

- **Prior to the closing of the draft EIS comment period, KMLP file with the Secretary a letter from the borrow pit owner addressing the existing and future use of this resource.**

Upon completion of pipeline construction, no excavations would be allowed within the operating pipeline right-of-way to recover sand or gravel. These resources are relatively abundant throughout the area so the Project would have no adverse effect on the future commercial use of sand and gravel if limited areas are excluded from mining.

Based on this analysis, we believe the Project would have an inconsequential effect on mineral resources in the area.

Seismicity and Faulting

Hazards associated with seismicity and faulting include ground shaking, surface rupture of faults, and offset along normal, reverse, or strike-slip faults. These are especially hazardous to linear, rigid structures, such as pipelines, in which the ground is not moving the same distance or in the same direction. According to seismic hazard maps of the United States and Louisiana, the Project would be located in a region of low seismic risk (USGS 2006c). The Gulf Coast, including the Project area, is within Seismic Zone 0, the lowest seismic hazard category, according to the Uniform Building Code's Seismic Risk Map (International Conference of Building Officials 1997). The peak ground acceleration (PGA) with 10 percent probability of exceedance over 50 years (i.e., annual frequency of exceedance of 0.002) in the vicinity of the Project is estimated to be extremely low at between 1 and 2 percent of the gravity acceleration. An earthquake with PGA between 1 and 2 percent of the gravity acceleration would not result in damage to the pipeline.

There are numerous growth faults located throughout the Gulf Coast Region, but they present little risk of earthquakes since no earthquakes have been definitely attributed to any of the specific mapped fault systems (McCulloh 2001). The pipeline likely crosses several growth faults. However, movement along these growth faults, if active, would be a slow creep, measured in a few millimeters or fractions of millimeters per year. The minimum wall thickness proposed for the KMLP Project would be sufficient to withstand any expected ground movement associated with these growth faults.

Based on the low historic seismicity and the slow creep of the faults in the area, we believe seismicity and faulting would not present a significant risk to the Project. Further, construction and operation of the Project would not change the local seismic and faulting conditions.

Soil Liquefaction

Soil liquefaction is a condition that occurs when loosely packed deposits change from a solid to a liquid state because of increased pressure and reduced stress resulted from seismic shaking or other events. The horizontal PGA required to induce soil liquefaction is typically more than 10 percent of the gravity acceleration (Youd and Idriss 2001). Since the PGA in the vicinity of the Project is only 1 to 2 percent of the gravity acceleration, the potential for soil liquefaction would be very low.

Subsidence

Subsidence is lowering of the land surface from changes that take place underground such as dissolution of limestone in karst terrain areas, mining or extraction of underground resources, and consolidation of sedimentary deposits. There is no karst terrain or underground mines in the Project area. Extraction of oil and gas and the consolidation of sedimentary deposits are known to cause ground subsidence in southern Louisiana. However, since this type of subsidence is a gradual movement of the land surface over generally large areas, with little or no localized differential settlement, the potential for subsidence to occur and affect the KMLP facilities is low. At the same time, the construction and operation of the KMLP facilities would not increase subsidence in the area.

Flooding from Hurricanes and Other Major Storms

Coastal areas of Louisiana are subject to flooding and shoreline erosion from storm surge and heavy precipitation associated with hurricanes, tropical storms, and other major storms. Most of the Project in Cameron and Calcasieu Parishes would be located in the 100-year floodplain as defined by the Federal Emergency Management Agency (FEMA). The northeast sections are primarily out of the floodplain except where it crosses lowlands associated with bayous and other waterbodies. In total, 55 miles of the 132 miles (about 42 percent) of Leg 1 of the Project would be within the 100-year floodplain.

After construction, the original grade would be restored. Construction, operation, and maintenance would not significantly alter the floodplain. Flooding could increase the buoyancy of the pipelines, causing them to rise to the surface and become exposed. In areas that are saturated or could become saturated with water, KMLP proposes to use concrete weight-coated pipe to counteract buoyancy. Major waterbodies would be crossed by HDD, which would place the pipe at least 20 feet below the waterbody and minimize the chance that the pipeline would be exposed due to scour by fast moving water and debris. Regular maintenance activities along the right-of-way would identify areas of soil erosion, exposed pipe, or other flood-related damage. KMLP would use terrace repair or backfill replacement in areas of concern.

Based on these precautions, the potential for the project to increase the frequency or magnitude of flooding is very low.

Slope Stability

Impacts to slope stability include landslides, debris flows, and rock falls, which are generally associated with steep slopes and can be instigated by cutting slopes, the use of heavy equipment, and/or unusually heavy precipitation. Topography along the Project is characterized as flat to gently sloping where slope failure would not be expected. Steeper slopes are present at some navigation and stream channel banks, flood control levees, and construction excavation and fill areas such as where Leg 1 crosses Bayou Cannes near MP 124.7. These areas are relatively short in length and therefore any sliding would not result in any damage to the pipe integrity. Pipeline construction would be accomplished in accordance with our Plan, which includes measures to control runoff and erosion and to minimize the potential for slope failures. With these measures, construction, operation, and maintenance of the Project would not affect slope stability.

KMLP proposed an alternative measure to item V.A.5 of our Plan, which requires land surfaces to be restored to pre-construction contours, unless such contours threaten the integrity of the pipeline. While we agree with this concept, KMLP did not provide sufficient justification for the alternative measure either for the Project as a whole or for any particular sites. Therefore, **we recommend that:**

- **KMLP comply with the requirements of item V.A.5 of our Plan. If KMLP identifies a location(s) where it can not implement item V.A.5, KMLP should file with the Secretary for review and written approval by the Director of OEP, any alternative measures that it would use to ensure pre-construction contours are restored without compromising pipeline integrity.**

4.2 SOILS

4.2.1 Affected Environment

The Project would cross three Major Land Resource Areas (MLRAs), as designated by NRCS (2006a). The Project would originate in the Gulf Coast Marsh MLRA, which is generally dominated by Saprist and Aquent soils. These are hydric soils susceptible to frequent flooding because the water table is at or above the surface most of the time. This area supports marsh vegetation and is primarily used for wildlife habitat. The Project would cross the Gulf Coast Prairies MLRA where Aqualfs are the dominant soils. The area naturally drains poorly and in the past it supported forest vegetation. At present this area is primarily artificially drained and farmed for hay, soybeans, grain, cotton, corn, and rice. The Project would terminate in the Western Gulf Coast Flatwoods MLRA in which Aqualfs, Udalfs, and Udults are the dominant soils. These soils range from poorly drained to moderately well drained. About 72 percent of the Western Gulf Coast Flatwoods MRLA is managed for harvest of pine and hardwoods.

Table 4.2.1-1 presents basic characteristics of the soil series along the Project that could affect pipeline construction or maintenance, including the soil series or complex name (and corresponding soil map unit), soil texture, presence of hydric soils, drainage class, flooding frequency and duration, presence of prime farmland, erosion factor, and compaction potential. All of the soils present at the interconnect sites are crossed by the pipeline with the addition of one map unit, Aquents (AN), and one soil complex, Hackberry-Mermentau (Hm). These characteristics were identified using data from NRCS's online Soil Survey Geographic Database (NRCS 2006b and 2006c).

Soil characteristics determine its susceptibility to erosion, flooding, and compaction, or make it suitable for agricultural uses. The erosion factor of a soil represents the likelihood of the soil to erode as determined by soil detachment and water infiltration properties. In general, the soils that would be crossed by the Project are low to moderately susceptible to erosion with erosion factors ranging from 0.24 to 0.49. The majority of soils that would be crossed by the Project drain somewhat poorly to very poorly. The majority of soils also experience frequent and long duration flooding events and are characterized as hydric soils. Drainage properties, frequency and duration of flooding events, or the classification as hydric soils are all indicators of the relative wetness of the soil under natural conditions. Soil compaction can modify the structure and natural properties of the soil and affect hydrology, erodibility, and revegetation. Approximately 50 miles of the Project would cross soils with a severe compaction potential. None of the soils crossed have shallow bedrock and no blasting would be required during pipeline construction. All of the soils have a good revegetation potential after construction disturbance. Approximately two-thirds of the Project would cross through soils designated as prime farmland by NRCS. Soils designated as prime farmland provide the highest crop yield per unit energy expended due to the favorable conditions of the soils for agricultural production.

4.2.2 Impacts and Mitigation

4.2.2.1 Construction Impacts

Construction activities associated with the Project, such as clearing, grading, trenching, and backfilling, have the potential to affect soil resources through multiple mechanisms. The most significant effects include the potential increases in soil erosion and compaction, the loss of soil productivity and fertility by mixing of topsoil and subsoil horizons, and changing drainage patterns. Removal of vegetative cover increases the possibility of erosion by wind and water. Mixing of topsoil with subsoil and compaction caused by passage of heavy construction equipment can adversely affect revegetation

TABLE 4.2.1-1

Soils Crossed by the Proposed KMLP Pipeline

Cumulative Length Crossed (miles)	Map Unit	Soil Series or Complex Name[a]	Soil Texture	Hydric Soil?	Drainage Class	Flooding Frequency and Duration	Prime Farmland	Erosion Factor (0 to 0.69)	Severe Compaction Potential?
1.3	AcB	Acadia	Silt loam	No	Somewhat Poorly	N/A	Yes	0.49	Yes
1.5	AdB	Acadiana	Silt loam	No	Moderately Well	None	Yes	0.49	Yes
1.2	AN	Aquents	Silty clay loam/silty clay/clay	n/a	Very Poorly	Frequent	No	n/a	n/a
0.9	BA	Bancker	Muck	Yes	Very Poorly	Frequent, Very Long	No	0.28	No
0.8	BSA	Basile and Brule	Silt loam/silty clay loam	Yes	Poorly (Basile), Moderately Well (Brule)	Frequent, Long	No	0.43	No
0.1	BEA	Basile and Cascilla	Silt loam	Yes	Poorly	Frequent, Very Long	No	0.43	No
0.7	Bw	Basilen-Wrightsville	Silt loam	Yes	Poorly	Frequent, Long	No	0.43	No
1.8	CO	Clovelly	Muck	Yes	Very Poorly	Frequent, Very Long	No	0.28	No
1.2	CR	Creole	Mucky clay	Yes	Very Poorly	Frequent, Very Long	No	0.29	No
6.5	Cr, CrA, CrB,	Crowley	Silt loam	No	Somewhat Poorly	None	Yes	0.49	Yes
30.7	Cv	Crowley-Vidrine	Silt loam	No	Poorly, Somewhat Poorly	N/A	Yes	0.49	Yes
0.1	FrA	Frost	Silt loam	Yes	Poorly	Occasional, Brief	Yes	0.49	No
1.1	GB	Ged	Clay	Yes	Very Poorly	Frequent, Long	No	0.28	Yes
3.1	GC	Gentilly	Muck	Yes	Very Poorly	Frequent, Very Long	No	0.37	No
0.1	IoD	Iota	Silt loam	No	Well	N/A	No	0.49	No
0.9	Je	Jeanerette	Silt loam	No	Poorly	N/A	Yes	0.49	No

TABLE 4.2.1-1 (continued)

Soils Crossed by the Proposed KMLP Pipeline

Cumulative Length Crossed (miles)	Map Unit	Soil Series or Complex Name[a]	Soil Texture	Hydric Soil?	Drainage Class	Flooding Frequency and Duration	Prime Farmland	Erosion Factor (0 to 0.69)	Severe Compaction Potential?
1.7	Ju	Judice	Silty clay loam	Yes	Poorly	Rare, Brief	Yes	0.32	Yes
4.2	KpA, KpB	Kaplan	Silt loam	No	Somewhat Poorly	N/A	Yes	0.43	No
4.3	KvA	Kinder-Vidrine	Silt loam	Yes	Poorly	N/A	Yes	0.43 – 0.49	Yes
4.9	Lt, LeA	Leton	Silt loam	Yes	Poorly	Rare, Brief	Yes	0.43	No
0.4	MaB	Mamou	Silt loam	No	Somewhat Poorly	N/A	Yes	0.49	No
0.1	ME	Mermentau	Clay	Yes	Poorly	Frequent, Brief	No	0.28	Yes
0.7	Mn, MdA	Midland	Silty clay loam/silt loam	Yes	Poorly	Rare, Brief	Yes	0.43	Yes
11.9	Mr	Morey	Loam	No	Poorly	Rare, Brief	Yes	0.37	No
5.0	Mt, MtA	Mowata	Silt loam	Yes	Poorly	N/A	Yes	0.49	Yes
14.7	Mt, MwA	Mowata-Vidrine	Silt loam	Yes	Poorly	N/A	Yes	0.49	Yes
0.6	Pc	Patoutville-Crowelly	Silt loam	No	Somewhat Poorly	N/A	Yes	0.49	No
1.9	SC	Scatlake	Mucky clay	Yes	Very Poorly	Frequent, Very Long	No	0.24	No
12.6	UA, UD	Udifluvents, varies	Varies	No	N/A	None	No	N/A	N/A
0.1	Up	Urban Land	N/A	No	N/A	None	No	N/A	N/A
16.7	W	Water, Large	N/A	n/a	N/A	None	N/A	N/A	N/A
5.5	Wv	Wrightsville-Vidrine	Silt loam	Yes	Poorly and Somewhat Poorly	N/A	Yes	0.49	Yes

[a] Soil series descriptions are from the Official Soil Series Descriptions (OSD) maintained by NRCS

potential and agricultural productivity. Alteration of the surface topography can affect hydrology, influencing stormwater runoff and soil drainage patterns.

In general, the above impacts would be avoided or minimized through implementation of our Plan. The Plan is intended to identify baseline mitigation measures for minimizing erosion and enhancing revegetation. These measures include erosion controls, reducing soil disturbance, and reestablishing preconstruction contours and vegetative cover as soon as practicable. Some of the relevant aspects of our Plan include:

- segregate a maximum of 12 inches of topsoil in all actively cultivated or rotated croplands, pastures, residential areas, hayfields, and at other areas at the request of the landowner or land management agency;

- provide temporary erosion and sediment control measures such as silt fences, straw bales, slope breakers, seeding, mulch, and erosion control fabric to minimize any impacts related to soil erosion and sedimentation that may result from precipitation runoff;

- mitigate soil compaction following construction and right-of-way restoration activities, as described below;

- ensure revegetation of all areas disturbed by project-related activities; disturbed upland areas would be seeded in accordance with written recommendations from local conservation authorities or as requested by the landowner;

- provide post-construction monitoring of mitigation practices to ensure their success; and

- utilize EIs to ensure implementation of the practices outlined above.

Erosion

The soils affected by the Project have a low to moderate susceptibility to erosion, and construction activities would remove vegetative cover and expose soils to erosive forces. Without mitigative measures, soil erosion can degrade soil quality, adversely affect nearby waterbodies, and impair revegetation efforts. KMLP would implement erosion control practices during construction and operation of the Project. Temporary control measures would be installed immediately after initial soil disturbance. Disturbed areas would be restored to their original contours and revegetation efforts would begin within six days of final grading, weather and soil conditions permitting. With the implementation of the above measures, we believe impacts associated with soil erosion would be minimized.

Soil Compaction

Soil compaction during construction is caused by heavy construction equipment or other unauthorized vehicles. Soil compaction damages the structure of the soil and reduces transport of air and water to plant roots. Compacted soils may have lower productivity, slower plant growth, increased erosion, and change natural drainage of water. Approximately 50 miles of the Project and 11 of the interconnect sites would affect soils with a high soil compaction potential. In these areas, use of heavy equipment would result in compaction. Some of these impacts would be avoided by the use of HDD especially under waterbodies. In other areas, board roads or low-ground pressure equipment would be used to prevent severe compaction. The heavy equipment that would be used to construct the Project are tracked vehicles, with a ground pressure (i.e., pounds per square foot) similar to or less than the large four-wheel-drive tractors commonly used for rice farming in the region.

In areas with compaction potential, KMLP would implement the measures specified in our Plan, as appropriate for the site-specific conditions, such as the use of a para-plow or other deep tillage equipment. Alternatively, KMLP may plant and plow under a green manure crop (a growing crop that is plowed under) to decrease soil density, with landowner approval.

In rice fields and crawfish ponds, KMLP would attempt to schedule construction when fields are not normally flooded or negotiate with landowners to defer flooding so that construction would occur when the soils are dry. Drier soil conditions would allow KMLP to ensure that a reasonable degree of compaction at near-optimum moisture content can be achieved when backfilling the pipe trench. KMLP would ensure that the low permeability layer underlying the field is re-installed to near pre-construction conditions in order to contain water during subsequent flooding for crop production. With these measures, we believe impacts associated with soil compaction would be minor and temporary.

Hydric Soils

Hydric soils are formed under conditions of saturation, flooding, or ponding long enough to cause anaerobic conditions. Hydric soils are poorly drained soils, and may still be considered hydric if artificially drained or protected from flooding. The status of hydric soils is part of the definition used by the COE to determine wetland status. The majority of soils that would be affected by the Project are hydric soils. Construction activities can cause compaction and rutting of hydric soils. Due to the unique condition of these wetland soils, special construction techniques would be used for construction in wetland areas, as described in section 2.3.1.2, to minimize impacts. Following construction, KMLP would restore these areas to their pre-construction conditions including restoring drainage systems and original contours. With these measures, we believe KMLP would minimize impacts to hydric soils.

Revegetation

All of the soils that would be affected by the Project have a moderate to good revegetation potential. KMLP would restore affected areas to preconstruction conditions as practicable in accordance with our Plan and Procedures. For example, in upland areas, an herbaceaous layer would be re-established by seeding. The type of seed would be selected to match adjacent cover or as requested by the landowner, management agency, or county extension agent. In agricultural areas, revegetation would be considered successful if crop yields are similar to adjacent undisturbed portions of the same field. In wetlands, revegetation would occur by the transplantation of similar mature specimens from adjacent areas or temporary nurseries. Revegetation efforts in wetlands would be monitored by KMLP until a cover similar to 80 percent of adjacent areas is achieved. If revegetation efforts in wetlands are not successful at the end of 3 years, KMLP would develop and implement a remedial revegetation plan to actively revegetate the wetland. Revegetation in wetlands would also be controlled according to a project-specific Aquatic Resources Mitigation Plan that KMLP would finalize in consultation with COE, FWS, and NOAA Fisheries Service (see section 4.4.2). Forested areas would also be recovered in a similar manner, except for in the permanent right-of-way where shrubs and small trees are not allowed. The areas inside interconnections would be permanently converted to an industrial use and covered with crushed rock around piping and equipment or reseeded with an easily maintained grass.

Soil Contamination

A potential impact during construction would include the accidental release of petroleum hydrocarbons or other hazardous materials, as well as the discovery of contaminated soils during trench excavation and grading activities. As discussed in section 2.3, KMLP would develop and implement a project-specific SWPPP and SPRP that provide a description of the containment and cleanup procedures that would be employed in the event of a spill or a leak of hazardous materials. In section 2.3 we are recommending these project-specific plans be filed with the Secretary for review and approval prior to construction.

There are no known contaminated soils in the Project area. KMLP searched the National Priorities List (EPA 2006a), Leaking Underground Storage Tanks database (LDEQ 2006a), and Louisiana Department of Environmental Quality (LDEQ) Voluntary Remediation Program (LDEQ 2006b) and found no known contaminated sites within 0.25 miles of the Project. Further, no contaminated soils were identified during field studies. Although the potential to encounter contaminated soils during pipeline construction is relatively low, KMLP's application proposed several steps that would be followed in the event contaminated soils are encountered, including immediately stopping working in the vicinity, restricting access to the suspected area, engaging qualified contractors to determine the nature and extent of contamination, notifying applicable environmental authorities, and devising site-specific plans for cleanup, risk minimization, and continued construction. To ensure that such steps are actually developed and implemented, and that they also address contaminated groundwater that may be associated with the soils, **we recommend that:**

- **Prior to construction, KMLP file with the Secretary for review and written approval by the Director of OEP, a Plan for the Discovery and Management of Contaminated Soils and Groundwater.**

With the use of KMLP's proposed measures and our recommendation, we believe the risks associated with soil contamination would be minimized.

Prime Farmland

The USDA defines prime farmland as "land that is best suited to food, feed, fiber, and oilseed crops" (USDA 1993). This designation includes cultivated land, pasture, woodland, or other lands that are either used for food or fiber crops or are available for these uses. Urbanized land and open water are excluded from prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent, prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., artificial drainage).

Approximately 79 percent (1,437 acres) of the soils that would be affected during construction by the KMLP project are considered prime farmland. Impacts on prime farmland from construction of the proposed pipelines could include interference with agricultural drainage (if present), mixing of topsoil and subsoil, and compacting and rutting. These impacts would result primarily from trench excavating and backfilling, and vehicular traffic along the construction right-of-way.

KMLP would minimize impacts on prime farmland by constructing the pipelines in accordance with our Plan and Procedures. Mitigation measures employed to minimize impacts on prime farmland would include topsoil segregation, compaction relief, removal of excess rock, and restoration of agricultural drainage systems. Any drain tiles, culverts, or other items damaged during construction would be repaired or replaced to preconstruction conditions. Adherence to these measures would minimize impacts on prime farmland and other agricultural land and would promote the long-term productivity of the soil. In addition, impacts caused by the pipeline faculties would be temporary and would not result in permanent conversion of prime farmland to non-agricultural uses.

However, at the nine interconnect sites with soils designated as prime farmland, the operation of these sites would result in the permanent conversion of approximately 7.7 acres of prime farmland to industrial land.

4.2.2.2 Operation Impacts

Operation activities are not expected to result in further impacts to soil resources. The SWPPP and SPRP would remain effective during operation of the pipeline to minimize and mitigate impacts of soil contamination. Monitoring activities would include surveys for soil erosion or other conditions that may expose or harm the pipeline, or indicate a leak in the pipeline.

4.3 WATER RESOURCES

4.3.1 Groundwater

Although the depth to groundwater is variable along the proposed pipeline route, it is often found at or near the ground surface. In all five parishes crossed by the KMLP Project, groundwater is the primary or only source of public water supply (LDOTD 2002). Four of the parishes crossed by the proposed pipeline utilize groundwater for the majority of their total water usage. In these parishes, groundwater is primarily used in the irrigation of rice fields (Jefferson Davis, Acadia, and Evangeline Parishes), for industrial purposes (Calcasieu Parish), and as a public water supply. Information regarding the groundwater resources located along the proposed pipeline route, including aquifers, Sole Source and primary source aquifers, wellhead protection areas, wells and springs, and contaminated groundwater, is presented below.

4.3.1.1 Affected Environment

According to the USGS, the Project is underlain by the Coastal Lowlands Aquifer System (USGS 1998) which extends from coastal counties in Texas eastward into the Coastal Plain of Louisiana, Mississippi, and to a smaller extent southern Alabama and the western part of the Florida panhandle. Groundwater derived from the Coastal Lowlands Aquifer System is used for agricultural, public supply, commercial, and industrial purposes. This system is divided into five permeable zones (A–E) consisting of discontinuous beds of sand, silt, and clay. Permeable Zone A has also been referred to as the top layer of the Chicot Aquifer. The Chicot Aquifer underlies about 9,900 square miles of Louisiana, extending west from the Atchafalaya River into southern Texas and south to the Gulf of Mexico. The landward boundary of the aquifer consists of outcrop areas where the aquifer system feathers out at a point of contact with the underlying Vicksburg-Jackson confining unit (Lovelace et al. 2004). The Gulf-ward boundary is near the coastline where the water becomes increasingly saline and the upper boundary is the land surface (Ryder 1996). The Chicot Aquifer is the most heavily pumped aquifer system in southwestern Louisiana and provides approximately 800 million gallons of water per day for a variety of uses. The primary use is for agriculture (68 percent), in particular, rice irrigation. Other uses include public water supply (11 percent), industrial (9 percent), aquaculture (8 percent), power generation (2 percent), and other (2 percent) (LSU AgCenter 2001). The Chicot Aquifer ranges from 50 to 1,050 feet in thickness and is composed of Pleistocene interbedded sands, silt, gravel, and clay deposited in fluvial, deltaic, and near-shore marine environments.

Sole Source and Primary Source Aquifers

In southwestern Louisiana, the Chicot Aquifer is designated as an EPA Sole Source Aquifer (USEPA 2006b). A Sole Source or primary source aquifer is defined by the EPA as an aquifer that supplies a minimum of 50 percent of the drinking water used in the area overlying the aquifer. The areas served by these aquifers may not have readily available alternate water sources. In southwestern Louisiana, the Chicot Aquifer is designated as an EPA Sole Source Aquifer (USEPA 2006b). All five parishes crossed by the KMLP Project utilize the Chicot Aquifer.

Wellhead Protection Areas

Wellhead protection areas are designated to protect drinking water supplies obtained from municipal or community wells. KMLP identified 10 wellhead protection areas that would be crossed by the Project. The locations of these wellhead protection areas are listed in table 4.3.1.1-1.

TABLE 4.3.1.1-1

Drinking Water Wellhead Protection Areas That Would be Crossed by the KMLP Project

Aquifer	Parish	Begin MP	End MP
Chicot Aquifer	Calcasieu Parish	50.8	52.4
Chicot Aquifer	Calcasieu Parish	51.0	52.8
Chicot Aquifer	Calcasieu Parish	53.5	54.3
Chicot Aquifer	Calcasieu Parish	56.2	57.2
Chicot Aquifer	Calcasieu Parish	58.0	59.1
Chicot Aquifer	Calcasieu Parish	59.8	61.3
Chicot Aquifer	Calcasieu Parish	73.8	74.7
Chicot Aquifer	Jefferson Davis Parish	75.6	77.8
Chicot Aquifer	Jefferson Davis Parish	95.7	96.9
Evangeline Aquifer	Evangeline Parish	119.6	121.7

Wells and Springs

Based on information provided by the Louisiana Department of Transportation and Development, 28 wells would be located within 150 feet of the construction right-of-way, including eight domestic supply wells (two of which are either abandoned or plugged), two industrial wells, nine irrigation wells, four monitoring wells (all four are plugged), and five rig supply wells (three of which are plugged). These wells and their locations relative to the Project are listed in table 4.3.1.1-2. Because the locations of these wells are not precise, KMLP would confirm actual well locations in the field prior to construction and provide us with that information. In addition to the wells identified within 150 feet of the construction right-of-way listed in table 4.3.1.1-2, there are three wells located within 400 feet of proposed construction work areas. These include two domestic supply wells located approximately 194 feet from the construction workspace near MP 104.2. There is also one rural public supply well located approximately 314 feet from the construction workspace near MP 120.7.

No springs have been identified within the vicinity of the Project and therefore, construction and operation of the proposed project would not affect springs.

Contaminated Groundwater

No instances of contaminated groundwater have been identified within the vicinity of the Project.

4.3.1.2 Impacts and Mitigation

Construction of the proposed pipeline would result in several effects to groundwater resources including the Chicot Aquifer, which has been designated by the EPA as a Sole Source aquifer and wellhead protection area. Effects resulting from construction include temporary and permanent changes to infiltration/recharge rates, groundwater flow, and groundwater quality. Specifically, construction activities such as clearing and grading would alter local infiltration/recharge rates, which would affect the quality and quantity of groundwater resources within the immediate vicinity of the Project. Additionally, trenching, trench dewatering, and backfilling would alter infiltration/recharge rates and groundwater flow,

TABLE 4.3.1.1-2

Wells Located Within 150 Feet of the KMLP Project[a]

Well Type	Parish	Approximate MP[b]	Approximate Well Depth (feet)	Approximate Distance from Centerline (feet)	Approximate Distance from Construction Workspace (feet)
Rig Supply	Calcasieu	31.1	606	88.0	13.0
Industrial	Calcasieu	34.3	603	155.0	120.0
Industrial	Calcasieu	34.3	780	82.2	47.2
Monitoring	Calcasieu	44.8	16	8.6	0.0
Monitoring	Calcasieu	44.8	77	8.6	0.0
Monitoring	Calcasieu	44.9	38	80.8	0.0
Monitoring	Calcasieu	44.9	38	80.8	0.0
Rig Supply	Calcasieu	48.4	242	29.9	0.0
Rig Supply	Calcasieu	49.6	265	14.7	0.0
Domestic	Calcasieu	54.1	245	102.0	67.0
Domestic	Calcasieu	55.5	249	36.6	0.0
Irrigation	Calcasieu	61.6	0	214.8	124.8
Domestic	Calcasieu	62.6	205	8.3	0.0
Irrigation	Calcasieu	65.1	30	148.3	113.3
Rig Supply	Calcasieu	69.3	240	154.2	64.2
Domestic	Calcasieu	71.0	215	234.9	144.9
Domestic	Jefferson Davis	87.8	145	96.0	0.0
Domestic	Jefferson Davis	87.8	145	96.0	0.0
Irrigation	Jefferson Davis	90.0	296	188.8	128.8
Irrigation	Jefferson Davis	91.4	0	139.3	95.6
Irrigation	Jefferson Davis	91.4	311	10.4	0.0
Rig Supply	Jefferson Davis	91.4	251	10.4	0.0
Irrigation	Jefferson Davis	94.3	260	53.1	18.1
Domestic	Acadia	106.8	168	32.0	0.0
Irrigation	Evangeline	121.6	275	68.4	0.0
Domestic	Evangeline	124.9	0	48.6	13.6
Irrigation	Evangeline	127.1	235	39.3	4.3
Irrigation	Cameron	0.6	255	200.3	114.2

[a] Actual well locations may vary by as much as 100 feet due to the level of accuracy associated with well coordinate data. KMLP would confirm the actual location of the wells prior to construction.
[b] All MPs are on Leg 1 except for the last row (MP 0.6), which is on the FGT Lateral.

which would also result in changes to the quality and quantity of groundwater resources within the immediate vicinity of the Project. The disturbance of unknown contaminants and/or an inadvertent release of fuel and/or equipment-related fluids during construction could also affect groundwater quality.

In order to minimize effects to groundwater resources resulting from construction of the Project, KMLP would implement groundwater-related measures described in our Procedures, including stormwater management measures, spill prevention and response procedures, and minimization measures related to the discharge of trench water and trench breakers. We are recommending that KMLP develop a plan for the Discovery and Management of Contaminated Soil and Groundwater to address encounters with unanticipated groundwater and soil contamination during construction (see section 4.2.2.1). Implementation of this plan would ensure that any previously existing groundwater contamination that may be encountered during construction would be managed in accordance with applicable regulatory requirements. Following construction, KMLP would also restore contours and manage the revegetation of affected lands, both of which would minimize effects to groundwater resources resulting from construction of the Project.

Additionally, in order to minimize potential adverse effects to wells resulting from construction of the Project, KMLP would notify landowners in the general vicinity of the proposed construction right-of-way of their ability to request well testing and monitoring prior to and after construction. This monitoring would include water quality and well yield. KMLP has not stated the steps it would take if impaired water quality or well yield were observed; therefore, **we recommend that:**

- **Prior to construction, KMLP file with the Secretary a statement that if water quality or yield were found to be impaired due to the Project, KMLP would provide a temporary water supply and re-test the well within 30 days. In addition, KMLP should replace any potable water supply system that it damages during construction and cannot repair to its former capacity and quality. KMLP should identify in its report to the Secretary all potable water supply systems damaged by construction and how they were repaired.**

In general, operation of the Project would not significantly affect groundwater resources; however, the development of impervious surfaces and structures in association with the proposed aboveground facilities would result in minor effects to groundwater resources due to the alteration of infiltration/recharge rates.

Based on the characteristics of the identified groundwater resources, KMLP's proposed construction methods and operations procedures, and its implementation of groundwater-related measures described in our Procedures, as well as the acceptance of our recommendations, we believe that impacts to groundwater resources resulting from construction and operation of the Project would be temporary and localized, and would not significantly affect overall groundwater quantity and quality.

4.3.2 Surface Water

This section identifies the waterbodies that would be affected by the Project, and describes them and the impacts to them resulting from construction and operation of the Project. All affected waterbodies, with the exception of Sabine Lake and the Calcaseiu River which are addressed individually in section 4.3.2.3, are addressed in the following sections.

4.3.2.1 Affected Environment

Construction of the proposed pipeline would require 310 waterbody crossings. Appendix G identifies each of these crossings, their location, the proposed crossing method, the width of crossing, the waterbody type, and the impairment status and significance to fisheries/potable water sources, if applicable.

In Louisiana, waterbodies have been designated by LDEQ which has developed a series of standards to maintain water quality, consistent with the associated goals of protecting public health, conserving fish and wildlife, and enhancing economic development, in accordance with a use(s) that characterizes the best intended use(s) of that waterbody. These designated uses include primary contact recreation; secondary contact recreation; fish and wildlife propagation; limited aquatic life and wildlife use; drinking water supply; oyster propagation; agriculture; outstanding natural resource waters; and no quality/use. With the exception of 12 waterbodies which account for 18 waterbody crossings, all of the identified waterbodies crossed by the proposed pipeline have been designated “no water quality/use.” The designated uses of the 12 waterbodies with uses other than “no water quality/use” are provided in table 4.3.2.1-1.

TABLE 4.3.2.1-1

Water Quality/Use Designations Other Than No Quality/Use

Waterbody Name	Designated Use[a]	Number of Crossings
Sabine Lake	ABCE	1
Sabine River	ABC	4
Burton Shell Slip	ABC	1
Black Bay Cutoff	ABC	1
GIWW	ABC	2
Vinton Drainage Canal	ABC	1
Bayou Choupique	ABC	1
Calcasieu River	ABCE	1
East Bayou Lacassine	ABCF	2
Gum Gully	AB	1
Bayou Nezpique	ABCF	1
Bayou des Cannes	ABCF	2

[a] Designated use codes for affected waterbodies: A - Primary Contact Recreation; B - Secondary Contact Recreation; C - Fish and Wildlife Propagation; E - Oyster Propagation; F – Agriculture.

The proposed pipeline would also cross 13 major waterbodies (16 waterbody crossings): Sabine Lake, Sabine River, Black Bay Cutoff, GIWW, Vinton Drainage Canal, Bayou Choupique, Calcasieu River, Calcasieu Tributary, Calcasieu Tributary (swamp), two unnamed waterbodies, Bayou Nezpique, and Tiger Point Gulley. Major waterbodies are those that are larger than 100 feet in width at the point of crossing. There is no official list of navigable waters in Louisiana, but numerous waterbodies that would be affected by the Project have been characterized as navigable, including Sabine Lake, Sabine River, Black Bay Cutoff, GIWW, and Calcasieu River.

Sensitive Waterbodies

Sensitive waterbodies generally include waterbodies that do not meet designated water quality standards; have been designated for intensified water quality management and improvement; contain threatened and endangered species or critical habitat; would be crossed less than three miles upstream of potable water intake structures; are classified as outstanding or exceptional quality waterbodies; are waters of particular ecological and recreational importance; are located in sensitive and protected watershed areas; have steep banks, potentially unstable soils, high-volume flows, and actively eroding banks; have associated important riparian areas; and are on or designated to be added to the Nationwide Rivers Inventory or a state river inventory.

Sensitive waterbodies that have identified water quality impairments are identified in table 4.3.2.1-2. Sensitive waterbodies containing EFH and commercial and/or recreational fisheries are addressed in section 4.6. All other sensitive waterbodies are addressed as appropriate in sections 4.5 – 4.8. As mentioned previously, Sabine Lake and the Calcasieu River are addressed in section 4.3.2.3.

TABLE 4.3.2.1-2

Sensitive Waterbodies Affected by the Proposed Project

Waterbody Name	MP of Crossing	Impairment
Vinton Drainage Canal	32.2 (Leg 1)	Turbidity
Bayou Choupique	44.3 (Leg 1)	Dissolved oxygen
East Bayou Lacassine	84.9 and 88.5 (Leg 1)	Dissolved oxygen
Bayou Nezpique	99.4 (Leg 1)	Nitrate/nitrite, dissolved oxygen, sedimentation/siltation, total fecal coliform, total phosphorus, total suspended solids (TSS), and turbidity
Bayou des Cannes	124.7 (Leg 1) and 1.57 (FGT Lateral)	Carbofuran, fipronil, mercury, nitrate/nitrite, dissolved oxygen, sedimentation/siltation, total fecal coliform, total phosphorus, TSS, and turbidity

Waterbody Crossing Methods

As described in section 2.3.1.3 and listed in appendix G, waterbody crossings would be conducted using conventional open-cut construction methods, flumes, boring techniques, and HDDs. Of the 310 waterbody crossings that would be required for construction of the proposed pipeline, 133 would be completed using open-cut methods, three would be completed using flumes, 147 would be completed using boring techniques, 24 would be completed using HDDs, and 3 would be completed using a combination of open-cut methods and HHDs.

Waterbody crossings that would be completed using HDDs are listed in table 4.3.2.1-3.

TABLE 4.3.2.1-3[a]

Features Crossed Using HDD Along the Kinder Morgan Louisiana Pipeline

Directional Drill Number	Approximate Entry MP	Approximate Exit MP	Length of Drill (feet)	Features Crossed
1	3.9	4.8	4,752	Big Forge Bayou; Wetlands; Southern Bank of Sabine Lake[b]
2	18.0	18.6	3,485	Northern Bank of Sabine Lake; Wetlands; Mouth of Sabine River[b,c]
3	18.6	19.4	4,171	Sabine River;[b,c] Wetlands
4	19.4	20.0	3,168	Sabine River;[b,c] Wetlands
5	21.2	22.1	4,963	Sabine River;[b,c] Wetlands
6	22.1	22.7	3,168	Sabine River;[b,c] Pipelines; Wetlands; Canal
7	23.4	24.0	2,640	Burton Shell Slip; Pipelines; Wetlands
8	25.3	26.0	4,066	Pipelines; Wetlands
9	26.0	26.8	4,066	Pipelines; Wetlands

TABLE 4.3.2.1-3[a] (cont'd)

Features Crossed Using HDD Along the Kinder Morgan Louisiana Pipeline

Directional Drill Number	Approximate Entry MP	Approximate Exit MP	Length of Drill (feet)	Features Crossed
10	30.4	31.5	5,808	Canal; Black Bay Cutoff;[b] GIWW;[b] Pipelines
11	31.5	32.4	5,069	Vinton Drainage Canal;[b] Wetlands; Pipelines
12	43.7	44.5	4,171	Bayou Choupique;[b] Wetlands
13	49.6	50.5	4,646	Calcasieu River;[b] Pond; Dredge Spoil Area
14	50.5	51.3	4,488	Canal; Calcasieu Tributary;[b] Marina
15	51.8	52.4	3,115	Industrial Area; Road
16	52.4	53.1	3,590	Calcasieu Tributary (swamp);[b] Forest; Unnamed Waterbody; Borrow Pit
17	77.7	78.4	3,960	Agricultural Waterbodies;[b,d] Interstate-10
18	99.0	99.8	3,907	Bayou Nezpique;[b] Wetlands

[a] Table includes three HDDs (Numbers 8, 9, and 15) not associated with a waterbody crossing.
[b] Waterbodies greater than 100-feet wide at the proposed crossing.
[c] Temporary construction areas limited to barges and flotation areas for HDD strings would extend into the Sabine River.
[d] HDD 14 crosses 7 different agricultural waterbodies, 2 of which are greater than 100-feet wide.

KMLP has proposed to file with the Secretary prior to construction site-specific construction plans for all areas disturbed by construction at each major waterbody crossing; however, the site-specific construction plans for the major waterbody crossings filed by KMLP in its application are incomplete; therefore, to fully assess the potential impacts associated with these crossings, **we recommend that:**

- **KMLP file with the Secretary a site-specific construction plan for the crossing of each waterbody proposed as a HDD crossing. These site-specific plans should include scaled drawings identifying all areas that would be disturbed by construction. KMLP should file these plans for review and written approval by the Director of the OEP along with the COE permit prior to construction across those waterbodies.**

With one exception, all major waterbodies would be crossed using HDDs. Tiger Point Gulley is the only major waterbody that KMLP has not proposed to cross using a HDD. However, the FWS, COE, and the LDWF have recommended that Tiger Point Gulley along with Bayou Barwick and Bayou des Cannes be crossed using HDDs to avoid and minimize impacts to these waterbodies and adjacent resources; therefore **we recommend that**:

- **KMLP evaluate the feasibility of using the HDD method to cross Tiger Point Gulley at MP 113.3 and Bayou Barwick at MP 109.2 along Leg 1 and Bayou des Cannes along the FGT Lateral at MP 1.57, and develop a site-specific construction plan for each of these crossings in coordination with FWS and LDWF that clearly identifies all construction work areas including the laydown area for the pipe string if the HDD method is determined to be feasible. KMLP should file the results of its evaluation, the site-**

specific construction plans, and any agreed-upon mitigation measures to minimize impacts on riparian areas and the associated forested wetlands. KMLP should file the above information with the Secretary for review and written approval by the Director of OEP prior to the close of the comment period on this draft EIS.

Additionally, the use of three new access roads would require the crossing of three waterbodies. Two of the new access roads, Access Roads 15 and 19 at MPs 52.3 and 61.4 of Leg 1, respectively, would cross roadside drainage ditches, and the third access road would cross a minor tributary of Bayou des Cannes (Access Road FGT-2 at MP 2.3 of the FGT Lateral). KMLP has stated that access road improvements would include grading, placement of gravel for stability, replacing or installing culverts, and clearing of overhead vegetation; however, it does not specify how these waterbodies would be crossed and the COE has indicated that drainage ditches in this region function as flowing waters (COE, 2006) and must be protected as waterbodies; therefore, **we recommend that:**

- **Prior to construction of Access Roads 15, 19, and FGT-2, KMLP reroute these access roads to avoid crossing drainage ditches at MPs 52.3 and 61.4 of Leg 1, and avoid crossing Bayou des Cannes Tributary at MP 2.3 of the FGT Lateral. KMLP should file with the Secretary the reroutes for these access roads, copies of the revised alignment sheets, and necessary environmental information for review and written approval by the Director of OEP.**

  If any of these access roads can not be rerouted, KMLP should provide:

  a. justification why rerouting is infeasible;
  b. documentation of consultation with COE, including proposed mitigation measures;
  c. construction plans for these access roads;
  d. copies of necessary permits/approvals; and
  e. landowner concurrences.

  KMLP should not use these access roads until the Director or OEP notifies KMLP in writing that it may proceed.

Minimization Measures

In order to minimize potential impacts to waterbodies resulting from the construction of the proposed pipeline, KMLP would implement the measures described in our Procedures, which include:

- a requirement to obtain all necessary permits from the COE and state agencies prior to construction and notify applicable state agencies at least 48 hours before commencing with instream trenching;
- use of EIs during construction;
- routing the proposed pipeline as close to perpendicular to the axis of the waterbody as practicable and minimize the number of individual crossings where waterbodies meander or have multiple channels;
- limiting the use of equipment within the waterbody to that necessary to construct the crossing, and utilize equipment bridges for passage of other construction equipment;
- placing spoil at least 10 feet away from the water's edge with installation of sediment barriers to prevent the flow of spoil or silt-laden water into the waterbody;

- completing all instream construction activity, including stabilization and re-contouring of banks, within 24 hours for minor waterbody crossings and 48 hours for intermediate waterbody crossings;
- using temporary erosion and sediment control measures such as sediment barriers and trench plugs; and
- restoration activities including restoration of preconstruction bank contours, installation of slope breakers, and revegetation of disturbed riparian areas.

The use of an HDD could result in an inadvertent release of drilling mud that could return to the surface or enter a waterbody. This inadvertent release is commonly referred to as a “frac-out.” To minimize the effects of potential frac-outs occurring during HDD operations, KMLP would conduct geotechnical evaluations prior to construction to determine the potential for a frac-out to occur at a proposed HDD crossing and adjust its crossing plan accordingly. Should a frac-out occur during HDD operations, KMLP would implement measures outlined in its HDD Contingency Plan which describes how inadvertent releases of drilling fluids would be prevented or mitigated if a release of drilling fluids were to occur. A draft of KMLP’s HDD Contingency Plan is provided in appendix I.

In addition to implementing these and other measures, KMLP would consult with state and federal resource agencies to finalize construction methods. As discussed in the beginning of section 2.3, KMLP would also develop and implement a SWPPP and SPRP to prevent and contain, if necessary, accidental equipment-related spills.

4.3.2.2 Impacts and Mitigation

Construction of the proposed pipeline through waterbodies using open-cut construction methods would result in several impacts to these waterbodies including changes to water quality and in-stream habitat. Construction activities including the clearing and grading of stream banks, in-stream trenching, trench dewatering, and backfilling of the in-stream trench would result in increased turbidity and sedimentation, decreased dissolved oxygen (DO) levels, modifications to aquatic habitat, and increased stream water temperatures. The removal of riparian vegetation associated with open-cut construction methods would also result in increased surface runoff, an increased erosion potential, and elevated water temperatures. In addition, the disturbance of unidentified contaminated soils and/or sediments could result in adverse impacts to water quality and aquatic resources. Operation of heavy equipment or other vehicles in and near surface waterbodies could also introduce chemical contaminants, such as fuels and lubricants, into surface waters or result in accidental spills during construction that would result in decreased water quality. The use of flumes during construction would result in impacts similar to those resulting from the use of open-cut construction methods; however, the use of flumes would significantly minimize these impacts especially the increases in turbidity and sedimentation commonly associated within pipeline crossings.

Construction of the proposed pipeline through waterbodies using bores and HDDs would also significantly reduce impacts to crossed waterbodies. However, the use of an HDD could result in drilling mud entering a waterbody due to a frac-out. A frac-out would result in increased turbidity and sedimentation, which would decrease water quality and in-stream habitat integrity. Because drilling mud is primarily composed of freshwater, a small release would likely dissipate and would not be expected to adversely affect water quality beyond a temporary increase in turbidity. In larger quantities, the release of drilling fluid could negatively affect fisheries and/or vegetation, although impacts would generally be less than those associated with an open-cut crossing.

Operation of the Project would not affect surface water resources.

Sensitive Waterbodies

Impacts to the Vinton Drainage Canal, Bayou Choupique, and Bayou Nezpique would be minimized by crossing these waterbodies using HDDs. As described above, the use of HDDs to cross these waterbodies would significantly reduce impacts to them. Impacts to Bayou des Cannes would be minimized by using a flume. Impacts to East Bayou Lacassine resulting from the two crossings of the waterbody would be minimized by using a flume at the crossing at MP 84.9. East Bayou Lacassine at MP 88.5 would be crossed by open-cut, but we do not believe impacts resulting from this crossing would significantly contribute to the water's DO impairment that has been created by adjacent agricultural operations.

Hydrostatic Testing

KMLP would hydrostatically test the pipeline after installation to ensure structural integrity in compliance with the DOT pipeline safety regulations identified in 49 CFR Part 192. The proposed hydrostatic test water sources, withdrawal locations, and estimated volumes of water required are identified in table 4.3.2.2-1.

KMLP has indicated that all hydrostatic test waters would be discharged overland at the original source, discharged directly to the original source, or managed in compliance with applicable NPDES permit conditions. As described in section 2.3.1.1, KMLP would use energy dissipation devices at all discharge points to reduce discharge velocities and thereby prevent or minimize associated erosion and sedimentation. Additionally, no chemical additives would be used in hydrostatic test water.

KMLP would minimize potential effects to waterbodies resulting from hydrostatic testing by implementing our Procedures, which include, but are not limited to the following measures:

- obtain and comply with all applicable water withdrawal permits and special-status stream permits;
- address the operation and fueling of any pumps located within 100 feet of waterbodies or wetlands in the Project-specific SPRP;
- maintain adequate flow rates in all source waterbodies to protect aquatic life and to provide for all downstream uses;
- screen all hydrostatic test water withdrawal intakes to prevent entrainment of fish and aquatic organisms; and
- regulate the discharge of hydrostatic test waters using energy dissipation devices to prevent erosion, scour, turbidity, or excessive streamflow.

With the implementation of our Procedures and the above measures, we believe that the surface water impacts associated with hydrostatic testing of the pipeline would be temporary.

TABLE 4.3.2.2-1

Hydrostatic Test Water Source and Discharge Locations

Pipeline	Withdrawal Source/Discharge	Approximate Withdrawal Location (MP)	Approximate Volume (gallons)[a]
Leg 1	Calcasieu River	49.6	18,837,000
Leg 1	Calcasieu River	49.6	31,384,000
Leg 1	Sabine Lake	4.8	684,000
Leg 1	Sabine Lake	18.0	502,000
Leg 1	Sabine River/GIWW	18.6	600,000
Leg 1	Sabine River/GIWW	20.0	456,000
Leg 1	Sabine River/GIWW	21.2	714,000
Leg 1	Sabine River/GIWW	22.1	456,000
Leg 1	Sabine River/GIWW	23.5	562,000
Leg 1	Sabine River/GIWW	23.9	365,000
Leg 1	Sabine River/GIWW	25.3	585,000
Leg 1	Sabine River/GIWW	26.8	585,000
Leg 1	Black Bayou Cutoff	30.6	836,000
Leg 1	GIWW	32.4	730,000
Leg 1	Bayou Choupique	43.4	600,000
Leg 1	Calcasieu River	49.6	707,000
Leg 1	LNG Terminal Channel	51.1	646,000
Leg 1	LNG Terminal Channel	51.1	448,000
Leg 1	LNG Terminal Channel	51.1	517,000
Leg 1	Louisiana Irrigation Canal	76.0	570,000
Leg 1	Bayou Nezpique	99.4	562,000
Leg 2	Sabine Pass	0.0	339,000
FGT Lateral	Bayou des Cannes	2.3	285,000

[a] HDD segments, which include all but the first two rows listed above for Leg 1, would be tested three times: (1) before installation; (2) after installation; and (3) with the entire pipeline system.

Based on the characteristics of the identified waterbodies, KMLP's proposed construction methods and operations procedures, its implementation of waterbody-related measures described in our Procedures, and our recommended measures, we believe that effects to surface waters resulting from construction and operation of the proposed project would be temporary and localized.

4.3.2.3 The Sabine Lake and Calcasieu River Crossings

Sabine Lake

Sabine Lake is an estuarine waterbody located on the Texas/Louisiana border and connected to the Gulf of Mexico via the Sabine Pass. The lake has an average depth of 2.0 feet and covers a surface area of approximately 94 square miles. The land surrounding Sabine Lake is covered, in large part, by sensitive wetland areas that include EFH and provide habitat for a diversity of wildlife. The lake itself has been designated as supporting primary and secondary contact recreation, fish and wildlife propagation, and oyster propagation. Additionally, Sabine Lake supports both commercial and recreational fisheries and is a public harvesting area for oysters. No water quality impairments or contaminated sediments are reported for Sabine Lake.

KMLP proposes to cross Sabine Lake via the HDD method at the lake's southern and northern shorelines and via the open-cut construction method requiring the use of spud barges across the lake's open water. Impacts to the southern bank of Sabine Lake, including riparian vegetation and nearshore oyster resources, would be avoided by using an HDD that would enter on land and exit within Sabine Lake at MP 4.8. From MP 4.8 to MP 17.9 of Leg 1, the open-cut construction method would be used. The crossing would be accomplished using a shallow draft spud barge with pipe supply barges connected in a line to form the lay barge spread. To accommodate vessel drafts, excavation of a floatation channel would be required in water depths of less than 8 feet. Where the floatation channel is needed, a 300-foot-wide construction right-of-way would also be required to accommodate the floatation channel, pipeline trench, and spoil pile. In water depths greater than 8 feet, the floatation channel would not be necessary and the construction right-of-way would be reduced to a width of 200 feet. The use of HDD would resume at MP 17.9 within Sabine Lake, exiting on land at MP 18.6, avoiding sensitive wetland habitats on the northern bank. A detailed description of the crossing methods through Sabine Lake is provided in section 2.3.1.3.

KMLP conducted a shallow hazards survey over a 3,000-foot corridor centered on the proposed pipeline route through Sabine Lake to identify the locations of foreign pipelines and obstructions that could affect construction, as well as the locations of any submerged cultural resources. At locations where potential obstructions or significant cultural resources were found, KMLP adjusted the centerline route for avoidance. Where adjustments of the pipeline were deemed infeasible, locations of potential obstructions or cultural resources would be further investigated and regulatory agencies consulted as discussed in section 4.10 of this draft EIS.

Major route alternatives and route variations were also considered. Three major route alternatives involved construction through Sabine Lake while two major route alternatives took a southern route, avoiding the lake altogether. As discussed in section 3.3, we did not consider the two southern routes to be environmentally preferable. Within Sabine Lake, the Blue Buck Point route variation was considered to potentially avoid marsh areas south of the lake. It was determined that although this route variation would cause fewer impacts to the marsh, it would cause greater impacts to oysters. Therefore, this route variation was not adopted (see section 3.4.1).

The use of the HDD crossing method at the northern and southern banks of Sabine Lake would avoid impacts to sensitive vegetation, EFH, and other wildlife habitat, while also avoiding shoreline erosion. Open-cut construction would adversely affect water quality during construction, causing sediment resuspension and related impacts in the water column as discussed in section 4.3.2.2. Impacts to oyster resources and fishes within Sabine Lake are discussed in section 4.6.3 and impacts to vessel traffic through spoil pile placement are discussed in section 4.8.3.2.

KMLP has proposed to allow refueling activities within Sabine Lake and the Sabine River. As discussed in section 4.4.1, we believe that this measure as well as an additional measure to allow certain extra workspaces within 50 feet of waterbodies is acceptable and would result in minimal effects to the environment. To minimize impacts to Sabine Lake during construction, KMLP would utilize BMPs developed with the construction contractor as part of the SWPPP prior to construction to address hazardous materials handling and storage, as well as spill prevention and response.

Calcasieu River

Calcasieu River is a freshwater river that drains a rural forest and bayou complex that connects to the estuarine Calcasieu Lake. The river has been designated as supporting primary and secondary contact recreation, fish and wildlife propagation, and oyster propagation. Additionally, the lake supports both commercial and recreational fisheries (see section 4.6.2.1). As described in section 4.6.2.2, the lower Calcasieu watershed contained areas of probable concern (APCs) in 1997; however, later surveys indicated that those APCs are no longer present, although some areas still contained contaminated sediments.

KMLP would install the pipeline across Calcasieu River between MP 49.6 and MP 51.1 of Leg 1. Back-to-back HDDs are proposed for the crossing of the main shipping channel of Calcasieu River and the major tributary that serves as a ship channel to the Trunkline LNG Terminal. The proposed route would cross under a marina on the east bank of the river and a COE dredge spoil area, and one of the HDD pull strings would lie across this dredge spoil area. KMLP is currently consulting with the COE regarding potential effects to the disposal area. Since these consultations are still ongoing, **we recommend that:**

- **Prior to construction, KMLP file the following environmental information with the Secretary for review and written approval by the Director of OEP:**
  - **a. site-specific construction plan for the HDD crossing of the Calcasieu River and marina between MP 49.6 and MP 51.1 along Leg 1; and**
  - **b. documentation of consultation with COE for the HDD crossing of the Calcasieu River and use of the COE dredge spoil area located at MP 50.0.**

Crossing the Calcasieu River by the HDD method would eliminate impacts from the resuspension of potentially contaminated sediments and the removal of riparian vegetation.

4.4 WETLANDS

4.4.1 Affected Environment

Wetlands are defined by the COE and the EPA as areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands provide a number of valuable functions including flood flow attenuation, sediment retention, nutrient retention, wildlife habitat, groundwater recharge and discharge, recreation, and erosion control.

KMLP conducted wetland delineations within the proposed pipeline construction right-of-way, as well as within the proposed locations for the pipe storage/contractor yards, access roads, aboveground facilities, and extra workspaces in accordance with the COE Wetland Delineation Manual (USACE 1987). In areas where land access has not yet been granted (approximately 8.3 miles along the proposed route), NWI maps and aerial photographs were used to determine the presence of wetlands.

A total of 352 wetlands, covering approximately 504.2 acres, would be affected by construction of the Project. The COE has yet to validate KMLP's wetland delineations; therefore, the acreage of wetlands affected by the Project may change. The location, wetland classification, and affected acreage for each wetland that would be affected by construction and operation of the Project are listed in appendix H, table H-2. Wetland vegetative species found along the pipeline route are listed in table 4.4.1-1 according to the wetland type. The FWS wetland Cowardin classification system (described in appendix H, table H-1) was used to classify the wetlands that would be affected by the Project (Cowardin et al. 1979). According to the Cowardin classification, the wetlands crossed by the Project are classified as:

- estuarine emergent (E2EM);
- estuarine scrub-shrub (E2SS);
- palustrine emergent (PEM);
- palustrine scrub-shrub (PSS); and
- palustrine forested (PFO).

Estuarine wetlands are tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the ocean, with ocean-derived water at least occasionally diluted by freshwater runoff from the land. The upstream and landward limit is where ocean-derived salts measure less than 0.5 parts per thousand (ppt) during the period of average annual low flow.

Palustrine wetlands are nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens with salinities less than 5 ppt. A palustrine system can exist directly adjacent to or within an estuarine system. (Osmond et al. 1995)

TABLE 4.4.1-1

Common Wetland Species Identified Within the KMLP Project Area

Common Name	Scientific Name	Common Name	Scientific Name
Estuarine Emergent Wetlands			
marsh elder	*Iva fructescens*	Cattail	*Typha latifolia*
black rush	*Juncus roemerianus*	Bulrush	*Scirpus litoralis*
salt meadow cordgrass	*Spartina patens*		
Estuarine Scrub-Shrub Wetlands			
wax-myrtle	*Myrica cerifera*	Cattail	*Typha latifolia*
marsh elder	*Iva fructescens*	Bulrush	*Scirpus litoralis*
riverhemp	*Sesbania sp.*	black rush	*Juncus roemerianus*
Chinese tallow	*Triadica sebifera*	salt meadow cordgrass	*Spartina patens*
Palustrine Emergent Wetlands			
alligatorweed	*Alternanthera philoxeroides*	Sedges	*Carex spp.* and *Cyperus spp.*
bushy bluestem	*Andropogon glomeratus*	Bermudagrass	*Cynodon sp.*
broomsedge bluestem	*Andropogon virginicus*	Spikesedges	*Eleocharis spp.*
spadeleaf	*Centella asiatica*	carolina geranium	*Geranium carolinianum*
pennyworts	*Hydrocotyle spp.*	soft rush	*Juncus effusus*
smartweeds	*Polygonum spp.*	Cattail	*Typha latifolia*
Palustrine Scrub-Shrub Wetlands			
sweetgum	*Liquidambar styraciflua*	saltwater false willow	*Baccharis angustifolia*
elderberry	*Sambucus sp.*	eastern baccharis	*Baccharis halimifolia*
Chinese tallow	*Triadica sebifera*	Buttonbush	*Cephalanthus occidentalis*
giant cane	*Arundinaria gigantea*	marsh elder	*Iva fructescens*
southern dewberry	*Rubus trivialis*	wax myrtle	*Myrica cerifera*
dwarf palmetto	*Sabal minor*	Cherokee rose	*Rosa laevigata*
Palustrine Forested Wetlands			
sweetgum	*Liquidambar styraciflua*	Chinese tallow	*Triadica sebifera*
water oak	*Quercus nigra*	poison ivy	*Toxicodendron radicans*
American elm	*Ulmus Americana*	Greenbriers	*Smilax spp.*
winged elm	*Ulmus alata*	Raspberries	*Rubus spp.*
hackberry	*Celtis sp.*	Violets	*Violaceae*
Chinese privet	*Ligustrum sinense*	bald cypress	*Taxodium distichum*
tupelo gum	*Nyssa aquatica*	swamp blackgum	*N. sylvatica* var. *biflora*
swamp red maple	*Acer rubrum* var. *drummondii*	black willow	*Salix nigra*
pumpkin ash	*Fraxinus profunda*	green ash	*Fraxinus pennsylvanica*
water elm	*Planera aquatica*	water locust	*Gleditsia aquatica*
Virginia willow	*Itea virginica*	Buttonbush	*Cephalanthus occidentalis*

Table 4.4.1-2 summarizes impacts to wetlands from construction and operation of the Project, including impacts from access roads, rights-of-way, pipe storage/contractor yards, extra workspaces, and aboveground facilities.

TABLE 4.4.1-2

Summary of Wetlands Affected by the KMLP Project

Wetland Type	Number of Wetlands Crossed	Estimated Crossing Length (miles)[a]	Construction Impacts (acres)[a,b]	Operation Impacts (acres)[a,c]
E2EM	27	6.5	89.3	47.1
E2SS	11	1.3	11.1	6.5
PEM	197	20.7	296.2	114.2
PSS	62	5.0	79.3	23.1
Subtotal of Non-Forested	297	33.5	475.9	190.9
PFO	55	3.4	28.3	14.9
Total Wetlands	352	36.9	504.2	205.8

E2EM = estuarine emergent
E2SS = estuarine scrub-shrub
PEM = palustrine emergent
PSS = palustrine scrub-shrub
PFO = palustrine forested

[a] Acreages shown do not account for the wetlands that would be crossed by the HDD construction method and would not be affected by construction or operation of the Project.

[b] Wetland impact calculations are based on a 125-foot-wide construction right-of-way in areas where the crossing distance is greater than 100 feet, and a 100-foot-wide construction right-of-way where the width of crossing is less than 100 feet.

[c] Operation impacts for the pipeline facilities are based on a 50-foot-wide, permanent right-of-way.

Temporary impacts to wetlands resulting from installation of all of the facilities including extra workspaces associated with the Project would include approximately 28.3 acres of forested wetlands and 475.9 acres of non-forested wetlands. The pipeline facilities would result in the conversion of 14.9 acres of forested wetlands within the operational right-of-way to emergent or scrub-shrub wetlands and permanent impact to 0.8 acres of E2EM, 1.3 acres of PEM, and 0.6 acres of PSS wetlands resulting from the installation and operation of aboveground facilities.

Prior-converted wetlands are wetlands that have been altered so that they no longer have potential to provide valuable wetland functions. Of the 504.2 acres of wetlands that would be impacted by construction of the Project, 182.8 acres have been classified as prior-converted.

KMLP has identified several locations where proposed extra workspaces are located entirely or partially within wetlands. The use of these extra workspaces would temporarily affect 50.2 acres of non-forested wetlands and 1.1 acres of forested wetlands during construction. Three of the 14 interconnect sites would be located in wetlands and impact 2.7 acres of non-forested wetlands. In addition, three of the 12 proposed pipe storage and contractor yards would be located in wetlands and impact 62.6 acres of non-forested wetlands. The Project would also require the construction of three new roads (Access Roads 2, 3, and 4-5) and improvement of seven existing access roads in wetlands (Access Roads 1, 4-1, 6, 7, 10-1, 13-1, and 16) for access to rights-of-way and workspaces that would impact 9.3 acres of non-forested wetlands and 0.1 acres of forested wetlands.

NOAA Fisheries Service (2006a) has indicated that aquatic and tidally influenced wetland habitats in the Project area have been designated as EFH for various species of fish and invertebrates. Construction through the first 50 miles of the pipeline route would impact approximately 99.5 acres of EFH wetlands along the northern and southern banks of Sabine Lake, Shell Island, the Sabine and Calcasieu Rivers, and the GIWW. KMLP has routed the pipeline through Sabine Lake to avoid/minimize impacts to EFH wetlands and it would install the pipeline using HDD at the north and south shores of Sabine Lake. KMLP would also minimize impacts to EFH wetlands by using a combination of HDD and open-cut methods along the Sabine River/GIWW, and by using low-ground-pressure equipment, board roads, and marsh buggies during construction activities in saturated estuarine areas. Additional discussion of EFH wetlands is provided in section 4.6.3.

Significant forested wetlands crossed by the Project include forested wetlands from MP 99.0 to 99.7, in the vicinity of Bayou Nezpique, and a forested wetland from MP 1.3 to 1.6 along the FGT Lateral in the vicinity of Bayou des Cannes. Bayou Nezpique would be crossed by HDD, avoiding impacts to approximately 1.6 acres of forested wetlands. The FGT Lateral would be collocated with an existing right-of-way through a large forested area. Although collocation is generally acceptable as a way to minimize impacts to an area, this particular area is a quality forested wetland that would be disrupted by the clearing of the right-of-way and by widening the right-of-way through the area. FWS, COE, and LDWF have requested HDD through this area to minimize impact to forested wetland. Therefore, in section 4.3.2.1, we are recommending that the FGT Lateral cross Bayou des Cannes and associated wetlands by HDD.

Wetland Construction Procedures

KMLP would use wetland construction methods described in section 2.3 of this draft EIS, and applicable permit conditions to avoid or minimize impacts to wetlands.

KMLP would cross numerous wetlands along the pipeline rights-of-way using the HDD method to avoid the need to clear or otherwise disturb about 7.0 acres of forested wetlands and 100.8 acres of non-forested wetlands. Use of HDD would minimize disturbance of the surface between the entry and exit points of the HDD. The disturbance would be limited to the deployment of telemetry cable. However, KMLP has not explained how it would clear the vegetation to facilitate deployment of telemetry cable. The COE has expressed concern that the mechanized clearing could result in greater impacts to wetland vegetation and prefers the use of hand clearing. Therefore, **we recommend that:**

- **KMLP use hand clearing methods for clearing vegetation in the path of HDDs in wetland areas.**

KMLP would also use the push-pull method and marsh buggies for construction through coastal estuarine herbaceous marsh that is tidally influenced and mostly submerged. This construction method, as described in section 2.3, is generally used in large wetland areas with suitable hydrology and topography (i.e., flooded or saturated soils and minimal local relief). Push-pull construction generally requires a narrower right-of-way and minimizes the operation of construction equipment within wetlands. This method offers environmental advantages over conventional wetland construction approaches. Because of the potential environmental advantages of the push-pull construction method, Item VI.B.2.c in our Procedures requires that this method be used where sufficient water is present in the trench and other site conditions allow. KMLP proposes to cross approximately 63.7 acres of wetland using the push-pull method. Locations where the push-pull (typical submerged marsh) construction method would be used are listed in appendix E.

In order to minimize construction-related impacts to wetlands, KMLP would implement measures outlined in our Procedures that include, but are not limited to, the following requirements:

- Construction equipment operating within the right-of-way would be limited to that equipment necessary for clearing, excavation, pipe installation, backfilling, and restoration activities. All nonessential equipment would use upland access roads to the maximum extent practicable.

- Equipment operating within saturated wetlands would be low-ground-weight equipment or would operate from timber or board mats.

- Temporary erosion and sedimentation control measures would be installed immediately after the initial disturbance of wetland soils and would be inspected and maintained regularly until final stabilization.

- Sedimentation controls would be installed across the construction right-of-way, as needed, within wetlands to contain trench spoil.

- Grading and pulling of tree stumps would be limited to the area directly over the trenchline unless additional grading or stump removal is required for worker safety.

- In unsaturated wetlands, the uppermost 12 inches of topsoil along the pipeline trench would be segregated from the underlying subsoil.

- Project-specific restoration plans would be developed based on consultations with appropriate land management or state agencies. The wetland restoration plan should include measures for re-establishing herbaceous and/or woody species, controlling the invasion and spread of undesirable exotic species, and measures for monitoring the success of the revegetation and weed control efforts.

- Monitoring of wetlands would be conducted for a minimum of three years post-construction to ensure the success of wetland revegetation. If revegetation is not successful after three years, a remedial revegetation plan would be developed and implemented.

Requested Alternative Measures to Our Procedures

KMLP has requested alternative measures to certain items in our Procedures. Items pertaining to wetlands and waterbodies are discussed below and summarized in table 4.4.1-3.

Item IV.A.1.d of our Procedures requires that all equipment be parked overnight and/or fueled at least 100 feet from a waterbody or in an upland area at least 100 feet from a wetland boundary unless the EI finds, in advance, no reasonable alternative, and appropriate steps are taken to prevent and provide for prompt cleanup of spills. Item IV.A.1.e requires that hazardous materials (e.g., chemicals, fuels, lubricants) not be stored within 100 feet of a wetland or waterbody unless the location is designated for such use by a government authority. KMLP has requested alternative measures to these requirements based on site-specific circumstances and proposed construction methods. We have reviewed the Project

TABLE 4.4.1-3

Acceptance or Denial of Requested Alternative Measures from our Procedures

MP	Applicable Item in our Procedures[a]	Reason for Request	Accepted/ Denied	Basis for Acceptance/Denial
Various	IV.A.1.d & e	Refueling activities in waterbodies	Accepted	This alternative measure is accepted for use only in Sabine Lake and the Sabine River as in-lake construction provides no practicable alternative to refueling from barges within the lake
Various	VI.A.3	A typical temporary construction right-of-way width of 125 feet in wetlands where the crossing length exceeds 100 feet and a right-of-way width of 100 feet in wetlands where the crossing length is less than 100 feet (see specific MP locations in appendix D)	Accepted only along Leg 1	This alternative measure is accepted because larger equipment and soil limitations require a larger right-of-way to assure a safe work site and space for spoil storage
28.24 of Leg 1 and 1.23 of the FGT Lateral	VI.A.6	Two aboveground facilities located within jurisdictional wetlands (see specific MP locations in appendix D)	Accepted	Locations of interconnects dictated by intersection of the proposed pipeline and existing pipelines and by the location of the Sabine Pass LNG Terminal
Various	VI.B.1.e	A portion of Access Roads 2 and 3 constructed in wetlands	Accepted	Access is required from the GIWW to reach the HDD workspace needed to minimize impacts to wetlands
Various	VI.B.1.a	Some extra workspaces located within 50 feet of wetland boundaries (see specific MP locations in appendix D)	Accepted	Accepted only for specific sites listed in appendix D based on lack of practicable locations with 50-foot setbacks; also some sites are to facilitate HDD or other methods designed to reduce impacts (see appendix D)
Various	V.B.2.a	Some extra workspaces located within 50 feet of water's edge (see specific MP locations in appendix D)	Accepted	Accepted only for specific sites listed in appendix D, Table D-3 based on lack of practicable locations with 50-foot setbacks; also some sites are to facilitate HDD or other methods designed to reduce impacts (see appendix D)

[a] Requirements specified in the referenced Procedure items are summarized below:
IV.A.1.d and e: Requires a 100-foot minimum setback from a waterbody or wetland for equipment parking, fueling, and hazardous materials storage;
VI.A.3: Limits construction right-of-way width in wetlands to 75 feet;
VI.A.6: Prohibits the location of aboveground facilities in wetlands except when in compliance with DOT;
VI.B.1.a: Requires a 50-foot setback from water's edge for all extra work areas (except where adjacent land is actively cultivated or rotated cropland or other disturbed land); and
VI.B.1.e: Prohibits the use of access roads in wetlands without Director approval unless those access roads are existing and require no modification or impact to wetlands.

and have determined that the alternative measures are justified within Sabine Lake and the Sabine River due to the use of spud barges during construction and a lack of practicable refueling options.

Item VI.A.3 of our Procedures requires that the construction right-of-way width in wetlands be limited to 75 feet. KMLP proposes to use a 125-foot construction right-of-way within wetlands where the crossing length would exceed 100 feet. KMLP states that the 125-foot right-of-way is necessary to accommodate installation of the 42-inch-diameter pipeline, due to the unstable and saturated soil conditions, larger pipe-installation equipment, wider ditches, and non-cohesive spoil piles during construction. KMLP also stresses the need for safe construction practices that meet OSHA requirements and minimize the environmental impact. Milepost locations where a 125-foot construction right-of-way is requested for wetland crossings are given in appendix D. We believe that the justification KMLP has provided is adequate and reasonable for areas where the push-pull method is not viable; therefore, we accept the request for a construction right-of-way of 125 feet at the specific milepost locations listed in appendix D.

Item VI.A.6 of our Procedures prohibits the location of aboveground facilities in any wetland, except where the location of such facilities outside of wetlands would prohibit compliance with DOT regulations. KMLP proposes to construct three aboveground facilities in wetlands:

- The NGPL Interconnect Site (MP 1.2) is an industrial wetland area within the Sabine Pass LNG Terminal where no available upland areas were identified in the vicinity.

- The Southwest Loop Delivery Point is proposed at MP 28.2, within the Black Bayou Hydrologic Restoration Project boundaries. KMLP states that the nearest upland area in this vicinity is located approximately 800 feet north of the proposed site, along the banks of the GIWW, and would require installation of the connecting pipeline under a major pipeline corridor.

- KMLP has stated that the TGTPL interconnect site (MP 87.5) is within a rice field.

We have reviewed the proposed locations for these interconnect sites and have determined that there are no practicable alternatives to locate these aboveground facilities outside of wetland areas. Therefore, we concur with KMLP.

Item VI.B.1.e of our Procedures states that the only access roads, other than the construction right-of-way, which can be used in wetlands without Director approval are those existing roads that can be used with no modification and no impact on the wetlands. Portions of Access Roads 2 and 3 would cross wetlands in order to provide access from the GIWW to the HDD workspaces for HDD equipment and construction access. The construction of these two access roads would temporarily impact approximately 0.9 acres of non-forested wetland, and the use of HDD at these two access points would avoid approximately 25.3 acres of wetlands as well as riparian areas and waterbodies. We believe that use of HDD would minimize impacts to wetlands; therefore, we accept the use of KMLP's alternative measure to construct portions of Access Roads 2 and 3 within wetlands. KMLP also proposes to construct a portion of Access Road 4-5 within wetlands, but has not provided any justification for such construction in wetlands. Therefore, **we recommend that:**

- **KMLP evaluate alternative routes for Access Road 4-5 or provide justification for the wetland impacts associated with its construction in wetlands. Any revision to the route of Access Road 4-5 should be shown on revised alignment sheets. KMLP should file with the Secretary results of its evaluation and copies of the revised alignment sheets for review and written approval by the Director of OEP prior to the close of the comment period on the draft EIS.**

Items VI.B.1.a and V.B.2 of our Procedures require that all extra workspaces such as staging areas and additional spoil storage areas be located at least 50 feet from water's edge or wetland boundaries, respectively, except where the adjacent upland consists of cropland or other disturbed land. KMLP proposes to locate 164 extra work areas within 50 feet of water's edge or wetland boundaries. A list of the proposed extra workspaces requiring alternative measures is in appendix D along with the milepost location and justification for each. The justifications provided by KMLP for these alternative measures are adequate; therefore, we accept the use of each of the extra workspaces listed in appendix D.

Wetland Restoration Projects

There are seven Coastal Wetland Planning, Protection, and Restoration Act (CWPPRA) projects in the Project vicinity; each of these projects is described in table 4.4.1-4. Only two of the seven CWPPRA projects would be crossed by the Project.

TABLE 4.4.1-4

The Coastal Wetlands Planning, Protection, and Restoration Act Projects in the Vicinity of the KMLP Project

Project Name	Location	Sponsor(s)	Purpose	Relationship to Project	Impact (acres)
Black Bayou Hydrologic Restoration Project (CS-27)	MP 22.3 - 30.7	NOAA Fisheries and LDNR	Restore coastal marsh habitat and slow the conversion of wetlands to shallow, open water	7.6-mile crossing	153.5
Perry Ridge Shore Protection Project (CS-24)	MP 30.8-32.2	NRCS and LDNR	Reduce erosion at the GIWW shoreline and at the spoil banks protecting nearby marshes	1.4-mile crossing	25.9
East Sabine Lake Hydrologic Restoration (CS-32)	MP 15	FWS, NRCS, and LDNR	Restore the hydrologic regime within the Sabine NWR	2.6 miles east of MP 15	No impact
Plowed Terraces Demonstration (CS-25)	MP 33	NRCS and LDNR	Construct earthen terraces in shallow open water to allow the establishment of emergent vegetation	1,000 feet south of MP 33	No impact
Perry Ridge West Bank Stabilization (CS-30)	MP 27	NRCS and LDNR	Construct riprap terraces along the GIWW to reduce wave fetch and allow the recovery of marshes	1,000 feet north of MP 27	No impact
Clear Marais Bank Protection (CS-22)	MP 40	COE and LDNR	Prevent further erosion to a levee preventing encroachment of the GIWW into marshes	1,000 feet north of MP 40	No impact
Black Bayou Culverts Hydrologic Restoration (CS-29)	MP 55	NRCS and LDNR	Prevent saltwater intrusion, excessive water levels, and erosion in areas near Calcasieu Lake	500 feet north of MP 55	No impact

Source: LaCoast 2006a,b.

Black Bayou Hydrologic Restoration Project

The Black Bayou Hydrologic Restoration Project, sponsored by NOAA Fisheries Service and LDNR, is a 25,529-acre wetland located in Cameron and Calcasieu Parishes, Louisiana. Bordered by the GIWW, Sabine Lake, Black Bayou, and Gum Cove Ridge, the restoration area consists of tidally influenced intermediate and brackish marshes. The goal of the Black Bayou Hydrologic Restoration Project is to restore coastal marsh habitat and to slow the conversion of wetlands to shallow, open water. The restoration projects are designed to limit the amount of saltwater intrusion into the surrounding marshes and reduce erosion caused by wave action from nearby boats and tides (LaCoast 2006a). The KMLP Project would traverse this restoration project area between MP 22.3 and MP 30.7. The Project would affect approximately 153.5 acres of the Black Bayou Hydrologic Restoration Project, much of which would be crossed by the HDD method. Of these 153.5 acres, 60.0 acres are comprised of nonforested wetlands and 2.8 acres of forested wetlands would be crossed by open-cut construction. During operations, 35.6 acres of non-forested and 1.8 acres of forested wetlands within the permanent right-of-way would be maintained in an herbaceous state. Because the objective of this project is to restore coastal marsh habitat and slow the conversion of wetlands to shallow open waters, impacts from the KMLP Project could temporarily delay any progress made in this restoration area.

NOAA Fisheries Service expressed concern that the pipeline construction in the Black Bayou Hydrologic Restoration Project would interfere with future construction and maintenance activities for rock structures at various locations (e.g., MPs 23.9 and 30.7) and near Burton Shell Slip at MP 23.8. They also stated that KMLP and NOAA Fisheries Service would need to enter into an agreement that would allow KMLP to access and maintain the pipeline in a manner that would not damage any rock structures within the Black Bayou Hydrologic Restoration Project. Because several existing pipelines stretch through the Black Bayou Hydrologic Restoration Project area, KMLP proposes to install its pipeline using two HDDs (MPs 25.3 to 26.8). We believe use of the HDD method of construction would minimize disturbance to these rock structures and minimize impact to restoration activities in the Black Bayou Hydrologic Restoration Project (see sections 2.3.1.3 and 4.3.2.1 for more discussion).

Perry Ridge Shore Protection Project

The crossing of the Perry Ridge Shore Protection Project, sponsored by the NRCS and LDNR, would traverse the restoration area between MP 30.8 and 32.2. The construction right-of-way through this area would affect approximately 25.9 acres of land, including approximately 18.5 acres of fresh-to-intermediate marsh and open water habitats. Operation of the Project would impact approximately 0.06 acres of similar habitat.

At the recommendation of various resource agencies, KMLP developed a pipeline route that avoids most of the Perry Ridge Shore Protection Project by staying on the southern bank of the GIWW until MP 30.7. In addition, most surface disturbance to the Perry Ridge Shore Protection Project would be avoided by installing the pipeline by two successive HDDs between MPs 30.4 and 32.4. Where conditions allow, approximately 0.2 miles of the pipeline within the Perry Ridge Shore Protection Project would be installed using the conventional method. The resulting impact to the Perry Ridge Shore Protection Project would be short-term, but would temporarily delay progress made within the protection area, in this case, affecting progress on the minimization of erosion along the GIWW and the associated impacts of that erosion to adjacent habitats.

Areas within the permanent right-of-way within the Perry Ridge Shore Protection Project and the Black Bayou Hydrologic Restoration Project would be maintained in an herbaceous state for the life of the KMLP Project. KMLP has stated that a site-specific construction and restoration plan for the Black Bayou Hydrologic Restoration Project and the Perry Ridge Shore Protection Project would be developed in cooperation with LDNR, NOAA Fisheries Service, and FWS. To ensure that this plan addresses agency concerns, **we recommend that:**

- **KMLP consult with LDNR, NOAA Fisheries Service, and FWS, and develop site-specific construction and restoration plans for crossing the Black Bayou Hydrologic Restoration Project and Perry Ridge Shore Protection Project. KMLP should file with the Secretary copies of its consultation, along with construction and restoration plans, for review and written approval by the Director of OEP prior to the completion of the final EIS.**

Conservation Reserve Program Lands

The CRP is a voluntary program, administered by the Farm Service Agency (FSA) and planned and implemented by the NRCS. The goal of the CRP is to reduce soil erosion, protect the Nation's ability to produce food and fiber, reduce sedimentation in streams and lakes, improve water quality, establish wildlife habitat, and enhance forest and wetland resources. It encourages farmers to convert highly erodible cropland or other environmentally sensitive areas to vegetative cover, such as native grasses, wildlife plantings, trees, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract (NRCS 2006b).

Within the Parishes crossed by the Project, Acadia, Evangeline, and Jefferson Davis are known to contain several CRP lands (FSA 2006a), but according to local FSA offices, CRP lands in Acadia and Evangeline Parishes are located at least 0.3 miles away from the Project and therefore no impacts are expected from construction (Haller 2006, USDA 2006). Consultations are ongoing with regard to CRP locations in Jefferson Davis Parish.

Should any CRP lands be crossed by the Project, the enrolled landowners would no longer be eligible to participate in the CRP and would lose the income provided by the NRCS. Additionally, KMLP would be required to obtain Compatible-Use Permits from the NRCS authorizing the crossing of any lands enrolled in the CRP. Therefore, **we recommend that:**

- **KMLP continue consultations with the FSA and NRCS to identify the extent and location of all CRP lands within Jefferson Davis Parish that would be affected by construction and operation of the Project. In addition, KMLP should file with the Secretary prior to construction, copies of its consultation and documentation of any stipulations or recommendations to avoid and minimize impacts to any CRP lands that would be affected.**

4.4.2 Impacts and Mitigation

The COE requires that all appropriate and practicable actions be taken to avoid or minimize wetland impacts, pursuant to its section 404(b)(1) guidelines, which restrict discharges of dredged or fill material where a less environmentally damaging and practicable alternative exists. All wetland crossings would be subject to review by the COE to ensure that wetland impacts are fully identified and appropriate wetland restoration and mitigation measures are implemented.

Construction Impacts

Construction activities have the potential to diminish the value of wetlands through clearing, trenching, spoil placement, equipment passage, and related construction disturbances. Wetland functions such as erosion control, buffering and flood flow attenuation, sediment retention, and nutrient retention would also be affected by construction. These effects would typically be greatest during and immediately following construction, resulting in a temporary impact. Clearing of wetland vegetation would result in both short- and long-term loss of wetland wildlife habitat and some wetland functions, with the duration of the impact varying by habitat type. Forested wetlands would require as much as 30 years or more to recover from clearing and would be subjected to more stages of succession, ensuring the slow, but continuous alteration of available habitat until the land has been restored to a pre-construction state. Impacts to scrub-shrub wetlands would be mostly short-term, as restoration would likely occur within three years. Emergent wetlands, which can restore rapidly, would typically experience only short-term impacts, and may re-establish in one or two growing seasons.

Excavation of the pipeline trench, installation of the pipe, and backfill of the trench would affect the rate and direction of water movement within wetlands. In addition, excavation activities may alter perched water tables by disturbing impermeable soil layers. This would adversely affect wetland hydrology and revegetation by creating soil conditions that might not support wetland communities and hydric vegetation at pre-construction levels. Failure to properly segregate soils during construction would result in mixed soil layers, which would alter biological components of the wetland and affect the reestablishment of native wetland vegetation. Temporary stockpiling of soil and the movement of heavy machinery across wetlands would lead to inadvertent compaction and furrowing of soils, which would alter natural hydrologic patterns, inhibit seed germination, and increase seedling mortality. Altered surface drainage patterns, stormwater runoff, runoff from the trench, accidental spills, and discharge of hydrostatic test water would also negatively affect water quality by increasing the potential for siltation and turbidity resulting from construction activities.

KMLP would minimize impacts to wetlands by implementing our Procedures, as modified with accepted alternative measures, as discussed above. In accordance with our Procedures, KMLP would install sediment barriers across the entire construction right-of-way, as needed, within wetlands as well as along the edge of the construction right-of-way, when adjacent to wetlands, in order to prevent sediment flow into wetlands. Additionally, energy dissipating devices would be used to discharge hydrostatic test water to further minimize sedimentation in wetlands. Section 2.3.1 describes the specialized pipeline construction procedures that KMLP would implement to minimize impacts to wetlands, including the use of the push-pull method through wetlands where possible. Within the construction right-of-way, KMLP would grade tree stumps, but would only remove them within 15 feet of the proposed pipeline, and install erosion control devices to minimize sediment flow into the wetland. KMLP would reduce the maintained portion of the permanent pipeline right-of-way to 10 feet in wetlands, rather then the 50-foot width proposed for uplands.

KMLP has stated that no shallow bedrock occurs at or near the surface of the pipeline route; therefore, no perched water tables are expected to be present. Soil segregation along the Project would occur in unsaturated wetlands but would not be practical in saturated and submerged wetlands. In unsaturated wetlands where rutting or mixing of the topsoil can occur, KMLP would use low-ground-pressure equipment or temporary board roads for passage through the area. If the crossing length of an unsaturated wetland would be less than 100 feet, the spoil would be moved to adjacent upland areas located within the right-of-way, avoiding soil disturbance in the wetland. Board mats would also be used for passage through saturated wetlands. KMLP has stated that it would also disc any over-compacted soils found after construction.

The proposed pipeline route is located adjacent to existing rights-of-way to the extent practical so that the construction right-of-way would overlap with existing permanent rights-of-way. The amount of overlap would be limited to 15 feet to minimize wetland impacts.

Of the 18 proposed HDDs, 17 would cross waterbodies and/or wetlands (table 4.3.2.1-3). Through the use of HDD, KMLP would avoid impacts to approximately 87.8 acres of herbaceous wetlands (E2EM and PEM), 13.0 acres of scrub-shrub wetlands (E2SS and PSS), and 7.0 acres of forested wetlands. This includes the extensive bottomland forest located in Jefferson Davis Parish near Bayou Nezpique. Additionally, KMLP would avoid impacts to wetlands along the shores of Sabine Lake by routing the proposed pipeline through the open water as opposed to along the shoreline, where sensitive wetlands occur.

KMLP has stated that all emergent and scrub-shrub wetlands impacted by construction would be restored to original contours, revegetated as appropriate, and monitored to ensure a successful recovery. Forested wetlands would be allowed to naturally revegetate with the exception of a 10-foot-wide corridor over the pipeline that would be maintained in an herbaceous state. Wetland recovery would be considered successful when native species cover at least 80 percent of the wetland.

Sensitive or Unique Wetlands

KMLP would minimize impacts to EFH wetlands by using a combination of HDD and open-cut construction methods along the Sabine River/GIWW, and by using low-ground-pressure equipment, board roads, and marsh buggies during construction activities in saturated estuarine areas. Wetlands designated as EFH are discussed in section 4.6.4 with regard to their importance as a habitat to federally managed fishes and invertebrates.

Bayou Nezpique would be crossed by HDD, avoiding impacts to approximately 7.0 acres of forested wetlands.

The FGT Lateral would be collocated with an existing right-of-way through a large forested area adjacent to Bayou des Cannes. Although collocation is generally acceptable as a way to minimize impacts, this particular area is considered a quality forested wetland that would be impacted by the widening of the existing right-of-way. Therefore, we are recommending in section 4.3.2.1 that KMLP evaluate the feasibility of the FGT Lateral to cross Bayou des Cannes and associated wetlands by HDD.

Operation Impacts

Operation of the pipeline would require 190.9 acres of non-forested wetlands to be maintained in an herbaceous state. Operation of the Southwest Loop Delivery Point and the NGPL and TGTPL interconnect sites would permanently convert 2.7 acres of non-forested wetlands to industrial land. Additionally, 14.9 acres of forested wetlands would be converted to herbaceous wetland for the life of the Project.

KMLP would maintain a 10-foot-wide strip centered over the pipeline in a herbaceous state. Additionally, trees that are within 15 feet of the pipeline and greater than 15 feet in height would be cut and removed. These activities would not affect PEM wetlands. However, mowing, clearing, and tree removal would affect PSS and PFO wetlands along the permanent right-of-way, causing constant disruption to natural successional growth and increasing the chance of invasion by non-native species. Functions associated with these wetland types would be altered because forested or scrub-shrub wetlands within the maintained portion of the permanent pipeline right-of-way would be permanently converted to an herbaceous state.

All emergent and scrub-shrub wetlands impacted by construction would be restored to pre-construction contours. KMLP would consult with the appropriate state and federal agencies to develop project-specific measures for re-establishing herbaceous and/or woody species. In accordance with our

Procedures, KMLP would monitor the recovery of wetlands for a minimum of three years post-construction to ensure the success of revegetation. If revegetation is not successful at the end of three years, a remedial revegetation plan would be developed and implemented in consultation with a professional wetland ecologist. The remedial revegetation plan would serve as a guide to actively revegetate the wetland with native wetland herbaceous and woody plant species. Revegetation efforts would be continued until revegetation was considered successful.

Wetland Protection Measures

We believe the implementation of our Procedures with the accepted alternative measures, along with the use of HDDs, existing access roads, mitigation, and avoidance of PFO wetlands to the extent practical, KMLP would have adequately avoided, minimized, and mitigated impacts to wetlands.

Avoidance

KMLP would avoid impacts to wetlands through the use of HDD crossing methods and the routing of the Project through less sensitive areas such as Sabine Lake in order to avoid the shoreline where sensitive EFH wetlands occur. Additional areas of avoidance include areas of collocation where the width of construction rights-of-way could be reduced by utilizing existing operational and maintained areas.

Minimization

KMLP would minimize impacts to wetlands through a variety of methods, including the use of:

- The Aquatic Resources Mitigation Plan (appendix H);
- BMPs to control erosion and sedimentation;
- Routing that avoids wetlands to the extent practical; and
- The push-pull construction method where feasible, which would avoid the need for access canal excavation.

Mitigation

KMLP would implement its Aquatic Resources Mitigation Plan to ensure that wetlands within the construction right-of-way would experience no net loss in functional value. Temporary impacts would be mitigated by full restoration, with the exception of forested wetlands within the permanent right-of-way, after construction has been completed. KMLP is evaluating wetland mitigation banking options (Dorsey 2007) and is developing its draft Aquatic Resources Mitigation Plan in consultation with COE, FWS, NOAA Fisheries Service, LDNR, and LDWF; therefore, **we recommend that:**

- **Prior to construction, KMLP file with the Secretary a copy of the finalized Aquatic Resources Mitigation Plan developed in consultation with COE, NOAA Fisheries Service, FWS, LDNR, and LDWF.**

4.5 VEGETATION

The vegetative communities that would be crossed by the Project can be generally grouped into uplands and wetlands. This section identifies and describes the vegetation types composing the two general vegetative communities and describes the impacts to these communities resulting from construction and operation of the Project. This section also addresses vegetation types of special concern, and exotic/invasive plant species. Section 4.4 addresses vegetation in wetlands.

4.5.1 Affected Environment

The upland vegetative community consists of several vegetation types: agricultural, upland forest, rangeland, and developed. The agricultural vegetation type consists of common crops and pasture grasses. The upland forest vegetation type consists of deciduous, evergreen, and mixed forests including managed pine forests. The rangeland vegetation type consists of common scrub-brush, herbaceous, and mixed vegetative species. The developed vegetative type consists of common grasses and shrubs associated with commercial, residential, and industrial lands as well as utility rights-of-way. The upland vegetative types crossed by the Project, as well as representative species occurring in each cover type, are listed in table 4.5.1-1.

TABLE 4.5.1-1

Upland Vegetation Types Crossed by the KMLP Project

Vegetation Cover Type	General Description	Common Species
Agricultural	Cropland and pasture	Rice (*Oryza sativa*), soybeans (*Glycine* spp.), corn (*Zea* spp.), sugar cane (*Saccharum officinarum*), turf grass, and sweet potatoes (*Ipomoea batatas*).
Upland Forest	Deciduous, evergreen, and mixed forests	Red Maple (*Acer rubrum*), Ironwood (*Carpinus carolinianum*), hickories (*Carya* spp.), Hackberry (*Celtis occidentalis*), Sugarberry (*C. laevigata*), Yaupon Holly (*Ilex vomitoria*), Chinese Privet (*Ligustrum sinense*, invasive non-native), Sweetgum (*Liquidambar styraciflua*), Red Mulberry (*Morus rubra*), Loblolly Pine (*Pinus taeda*), White Oak (*Quercus alba*), Water oak (*Q. nigra*), Live Oak (*Quercus virginiana*), Chinese Tallow (*Sapium sabiferum = Triadica sebifera*, invasive non-native), Winged Elm (*Ulmus alata*), American Elm (*Ulmus americana*), Japanese Honeysuckle (*Lonicera japonica*, invasive non-native), greenbriers (*Smilax* spp.), Poison Ivy (*Toxicodendron radicans*), sedges (*Carex* spp.), and Carolina Violet (*Viola villosa*).
Rangeland	Scrub-brush, herbaceous, and mixed rangelands	Giant Ragweed (*Ambrosia trifida*), sedges (*Carex* spp.), Bermudagrass (*Cynodon dactylon*), grasses in the genus *Paspalum*, Curly Dock (*Rumex crispus*), Chinese Tallow (invasive, non-native), Eastern Baccharis (*Baccharis halimifolia*), American Holly (*Ilex opaca*), Yaupon Holly, Marsh Elder (*Iva frutescens*), Chinese Privet (invasive non-native), Japanese Honeysuckle (invasive non-native), Osage Orange (*Maclura pomifera*), Virginia creeper (*Parthenocissus quinquefolia*), Smooth Sumac (*Rhus glabra*), Cherokee Rose (*Rosa laevigata*), Field Blackberry (*Rubus arvensis*) and other *Rubus* spp., Elderberry (*Sambucus canadensis*), Rattlebox (*Sesbania drummondii*), and Poison Ivy.
Developed	Commercial, industrial, residential, rights-of-way	Grasses and small shrubs.

Vegetation Types of Special Concern

Based on field surveys and consultations with LDWF, no critically imperiled plant species have been identified within 0.5 miles of the Project. Additionally, no unique communities or communities of special concern are located within 0.5 miles of the Project.

Several wetland and hydrologic restoration projects that have vegetative components occur in the vicinity of the Project and are addressed in sections 4.4 and 4.8.

4.5.2 Impacts and Mitigation

4.5.2.1 Primary Impact to Vegetative Cover Types

Construction of the Project, including the pipeline, aboveground facilities, access roads, pipe storage/contractor yards, and extra work spaces would require the clearing of 1,463.4 acres of agricultural land, 115.4 acres of upland forest, 134.4 acres of rangeland, and 130.2 acres of developed land.

Operation of the Project would require approximately 522.8 acres of upland vegetation, including 43.8 acres of upland forest, to be converted to permanently maintained pipeline right-of-way, aboveground facilities, or permanent access roads. Table 4.5.2.1-1 identifies the number of acres of vegetation temporarily and permanently impacted by construction and operation of the Project.

TABLE 4.5.2.1-1

Upland Vegetation Cover Types Affected by the KMLP Project

	Pipeline[a]		Ancillary Facilities[b]	
Vegetation Cover Type	Temporary Construction Impact (acres)	Permanent Operations Impact (acres)	Temporary Construction Impact (acres)	Permanent Operations Impact (acres)
Agricultural[c]	1,178.5	415.8	284.9	7.9
Upland Forest	114.9	43.8	0.6	0.0
Rangeland	95.0	28.3	39.3	0.5
Developed Land	56.4	18.5	73.7	8.1
Total	1,444.8	506.3	398.5	16.5

[a] Temporary construction acreages reflect a nominal 125-foot-wide construction right-of-way and temporary extra workspaces. The permanent operations acreages reflect a 50-foot-wide permanent easement that would be maintained in upland areas following construction.

[b] For the purpose of this table, ancillary facilities include acres affected for interconnect sites, access roads, pipe storage/contractor yards..

[c] The acres of agricultural land reported above differs from acreage reported in section 4.8. This is because section 4.8 includes in agricultural land a category of “other” which is land without vegetative cover. Land without vegetative cover is excluded from the analysis of vegetation.

The majority of construction-related clearing would be temporary and cleared vegetation would be able to return to natural conditions after construction, with the exception of the permanent pipeline right-of-way that would be maintained in an herbaceous state throughout the life of the Project. The loss of vegetation along the pipeline route would result in forest fragmentation and the loss or conversion of wildlife habitat. Other impacts resulting from the removal of vegetation include increased erosion, sediment runoff, altered soil chemistry, modified infiltration and groundwater recharge rates, and an increased susceptibility to colonization by invasive and/or exotic plant species. Additionally, the removal of trees on the right-of-way could expose formerly interior trees growing adjacent to the newly cleared areas to higher levels of wind, which may increase the risk of blow downs.

The severity of these impacts would depend on the specific vegetation type affected and the time that it takes the vegetation type to return to pre-construction conditions. Specifically, most impacts to agricultural lands and rangelands would be short term as these vegetation types would return to their herbaceous or shrub-covered status within one to three growing seasons after the completion of construction activities, cleanup, and restoration. Areas planted with field crops are typically disturbed by periodic agricultural practices and would be replanted in the next growing season. The clearing of upland forest would result in a long-term impact as upland forests can take up to 30 years or more to return to pre-construction conditions. Impacts to upland forested areas constitute the most significant change in vegetative strata, appearance, and habitat, as mature trees would be replaced for a period of years by herbaceous plants, shrubs, saplings, and other successional species. Impacts to previously developed lands such as industrial areas and linear transportation corridors would result in short-term impacts due to the existing maintained or disturbed condition.

In order to minimize impacts to affected vegetation types, KMLP would implement measures outlined in our Plan as described below and further discussed in section 2.3. Our Plan includes measures for minimizing erosion and enhancing revegetation in upland areas. To further minimize effects on vegetation, especially upland forests, KMLP proposed a pipeline route that would be collocated with existing rights-of-way to the extent practicable. Approximately 54 percent (73.7 miles) of the combined Leg 1, Leg 2, and FGT Lateral rights-of-way would be located adjacent to existing rights-of-way. By following existing rights-of-way, KMLP would avoid further segmentation of a relatively unfragmented forested area at MP 108.6, limiting the habitat disruption to a widening of the corridor that would need to be maintained. KMLP would also avoid impacts to many riparian areas located throughout the Project area through the use of HDD.

Based on the characteristics of the identified vegetation types, the expected impacts to vegetation and KMLP's described construction, restoration, and mitigation measures including the implementation of our Plan and Procedures, we believe that construction and operation of the Project would not significantly affect vegetation.

4.5.2.2 Exotic/Invasive Plant Species

Federal agencies are required to prevent the introduction and spread of invasive species, and to minimize the impacts that such species would cause by implementing feasible and prudent measures.

Invasive species are generally characterized by their hardiness and a relatively increased ability to reproduce and spread. Invasive species are also commonly exotic species which are non-native species of trees, shrubs, and flowering or non-flowering plants. Within the project area, exotic and invasive plant species out-compete native plant species and decrease the amount of available habitat for wildlife that depend on native plants for nesting and feeding (GBEP 2006). Exotic and invasive species found in the project area include the Chinese tallow tree (*Triadica sebifera*) and the Chinese privet (*Ligustrum sinese*).

The Chinese tallow tree is a small, rapidly growing tree found in every parish in Louisiana. The Chinese tallow tree is considered problematic in bottomlands, coastal prairies, and riparian areas. Until recently, the Chinese tallow was not considered a threat to upland forests because it grows poorly in the shade; however, its appearance in the understory of closed canopy forests and undisturbed sites has raised concerns about its potential to dominate gaps created by construction activities and operations maintenance and to prevent the regeneration of desirable plant species.

The Chinese privet plant is considered to be one of the worst forest invaders in the Southeast because of its ability to dominate the understory, midstory, and edges of forests and to impede regeneration of desirable plants, including canopy trees. The Chinese privet grows easily under a variety of soil and light conditions, is bothered by relatively few pests, and is difficult to remove once established.

The spread of any invasive species during construction and operation of the Project would displace native species and negatively alter the appearance, composition, and habitat value of the affected area.

In order to minimize the spread of exotic and invasive species, KMLP would implement related measures in our Plan and Procedures. Specifically, KMLP would monitor the success of revegetation and weed control efforts. Additionally, our Plan and Procedures require post-construction monitoring for the first and second growing seasons in uplands, and for three years in wetlands, to evaluate the success of revegetation. As part of this monitoring program, KMLP would be required to examine the right-of-way for the presence of invasive species. In areas not used for agriculture, restoration would be considered successful when the density and cover of non-nuisance vegetation is similar to adjacent undisturbed land. Similarly, wetland revegetation would be considered successful if the cover and destruction of herbaceous and/or woody species is at least 80 percent of the type, density, and distribution of the vegetation in adjacent areas that were not disturbed by construction.

KMLP has also developed an Invasive Species Control Plan as part of their draft Aquatic Resources Mitigation Plan (see appendix J) that would help control the spread of the Chinese tallow during construction and operation of the Project. In accordance with this plan, field personnel would be trained to identify Chinese tallow and would be registered to purchase and use regulated herbicides. Additionally, older trees would be controlled by mechanical cutting and chemical treatment while saplings would be removed by hand or machine. Each incidence of control activities would be documented and reported to the FERC and COE after the completion of the 3-year monitoring period.

Based on our consultations with federal and state agencies, we believe that the measures outlined in KMLP's Invasive Species Control Plan and those identified in our Plan and Procedures would be sufficient to control the spread of invasive species during construction and operation of the Project.

4.6 WILDLIFE AND AQUATIC RESOURCES

This section describes the existing wildlife, aquatic habitats, and biological communities along the Project route with emphasis on wetland habitat, unique or sensitive habitats, and the biological communities associated with those habitats. In addition, the discussion includes general and specific impacts that would occur during construction and operation, and the measures to avoid and minimize those impacts.

4.6.1 Terrestrial Wildlife Resources

A variety of habitat types would be crossed by the KMLP Project. These habitat types include agricultural lands, forested wetlands, non-forested wetlands, upland forests, rangeland, and developed land. Table 4.6.1-1 lists species commonly associated with these habitat types. Descriptions of the vegetation found in these habitats are provided in sections 4.4 and 4.5. Federal- and state-listed threatened and endangered species are discussed separately in section 4.7.

4.6.1.1 Affected Environment

Agricultural lands include actively harvested cropland, idle cropland, and open pasture. Within the Project area, the agricultural land is predominantly used for pasture, rice production, and crawfish farming (see section 4.8.3.1). Agricultural lands provide cover and foraging opportunities for wildlife species within the crops or pastures themselves, or within the small areas of natural vegetation, such as vegetation along streams or small forested patches, that sometimes occur within agricultural lands. Species found in these areas include those that prefer disturbed habitats and edge habitats between forested and open areas. Flooded rice fields and crawfish ponds provide important habitat for shorebirds, wading birds, and waterfowl. Wading birds and crustaceans are often found in irrigation ditches, while fencerows can serve as breeding areas for some song birds.

Detailed discussion of wetland habitats potentially impacted by the Project is provided in section 4.4. Forested wetlands in the project area include bottomland hardwood forests and cypress-tupelo-blackgum swamps which have been generally characterized as highly productive and providing an abundance of natural cover for numerous species. Bottomland hardwood forests are found along major waterbodies and are dominated by mature trees and shrubs. In general, bottomland forests provide high quality habitat, attracting a variety of birds, mammals, reptiles, and amphibians. Throughout their natural range, cypress-tupelo-blackgum swamps are forested, alluvial swamps growing on intermittently exposed soils. They are found along rivers, streams, and in back swamp depressions and swales. The vegetative community has low species diversity, but is generally co-dominated by bald cypress and tupelo gum. The undergrowth in these areas is generally sparse due to low light intensity and the long periods of soil inundation.

Non-forested wetlands include estuarine and palustrine wetlands. Estuarine wetlands include salt marsh, brackish marsh, intermediate marsh, and freshwater marsh. Changes in salinity can cause the wildlife and vegetative species to change as the marsh becomes more saline or fresh. Marshes are typically interspersed with small ponds and pools, providing habitats for a diverse assemblage of birds, mammals, fishes, and reptiles. These habitats are important breeding and feeding grounds for many recreationally and commercially important species such as fish, crustaceans, fur-bearers, and waterfowl. The coastal marshes in Louisiana are part of the Mississippi Flyway and provide wintering grounds for over 20 species of ducks and geese.

TABLE 4.6.1-1 **Habitats and Typical Non-Fish Wildlife Species Found within the Project Area**	
Habitat/Common Name (*Scientific Name*)	Habitat/Common Name (*Scientific Name*)
Agriculture eastern bluebirds (*Sialia sialis*) northern bobwhite (*Colinus virginianus*) rusty blackbird (*Euphagus carolinus*) white-tailed deer (*Odocoileus virginianus*) wood duck (*Aix sponsa*) woodcock (*Scolopax minor*)	**Forested Wetlands** black bear (*Ursus americanus*) blue jay (*Cyanocitta cristata*) box turtle (*Terrapene sp.*) Chuck Will's widow (*Caprimulgus carolinensis*) common raccoon (*Procyon spp.*) coral snake (*Micrurus fulvius*) eastern diamondback (*Crotalus adamanteus*) eastern gray squirrel (*Sciurus carolinensis*) mink (*Mustela vison*) mud turtle (*Kinosternon sp.*) northern cardinal (*Cardinalis cardinalis*) river otter (*Lutra canadensis*) striped skunk (*Mephitis mephitis*) vireos (*Vireo spp.*) western cottonmouth (*Agkistrodon piscivorus leucostoma*) white-tailed deer (*Odocoileus virginianus*) wild turkey (*Meleagris gallopavo*) wood duck (*Aix sponsa*) woodcock (*Scolopax minor*)
Non-Forested Wetlands alligators (*Alligator mississippiensis*) American bittern (*Botaurus lentiginosus*) American wigeon (*Anas Americana*) beaver (*Castor canadensis*) diamondback water snake (*Nerodia rhombifer*) eastern narrowmoth toad (*Gastrophryne carolinensis*) marsh hawk (*Circus cyaneus*) marsh rice rat (*Oryzomys palustris*) mink (*Mustela vison*) Missouri slider (*Pseudemys floridana hoyi*) muskrat (*Ondatra zibethicus*) nutria (*Myocastor coypus*) red-winged blackbird (*Agelaius phoeniceus*) river otter (*Lutra canadensis*) southeastern myotis (*Myotis austroriparius*) Wilson's snipe (*Gallinago gallinago*) Woodhouse's toad (*Bufo woodhousii*)	**Upland Forests** bobwhite (*Colinus sp.*) common raccoon (*Procyon sp.*) coyote (*Canis latrans*) flying squirrel (*Glaucomys sp.*) nine-banded armadillo (*Dasypus novemcinctus*) Virginia opossum (*Didelphis virginiana*) white-tailed deer (*Odocoileus virginianus*) wild turkey (*Meleagris gallopavo*)
Rangeland bobwhite (*Colinus sp.*) common raccoon (*Procyon spp.*) coyote (*Canis latrans*) flying squirrel (*Glaucomys sp.*) nine-banded armadillo (*Dasypus novemcinctus*) Virginia opossum (*Didelphis virginiana*) white-tailed deer (*Odocoileus virginianus*) wild turkey (*Meleagris gallopavo*)	**Developed Land** Species that utilize the vegetated areas of developed land are likely to include species that inhabit agricultural land, rangeland, and forest edge habitat.

Palustrine wetlands are inland freshwater marshes and swamps. Wildlife generally uses these areas for breeding and foraging. These wetlands also serve as habitats for migratory species. Emergent wetlands consist primarily of grasses. Scrub-shrub wetlands consist of saplings and low-lying vegetation.

Emergent and scrub-shrub wetlands supply breeding and foraging habitat, along with resting areas for migratory species.

Upland forests consist of deciduous forests, evergreen forests, and forests of mixed evergreen and deciduous trees. Upland forests provide both interior and edge habitats that often attract different species based on their habitat preferences. Interior forested habitats are secluded, wetter, and more stable whereas edge habitats are more volatile, experiencing more dramatic environmental change. They are sunnier, drier, and windier, and are more prone to disturbance (LandOwner Resource Center 2005).

Rangeland ecosystems are dominated by grasses, grass-like plants, forbs, or shrubs and other herbaceous species. Rangeland habitats are classified as shrub and brush, herbaceous, or mixed. Shrub and brush rangeland are dominated by woody vegetation. Herbaceous rangelands are dominated by naturally occurring grasses and or forbs, or are those lands that have been modified to include such vegetation as their natural cover. Mixed rangelands are those where more than one-third of the land is a mixture of herbaceous and shrub and brush rangeland species (NASA 1996).

Developed lands are generally a mixture of paved and/or graveled areas, but may contain vegetated strata as well. Species utilizing developed land may include species that inhabit other grassy or shrub-covered areas although these areas are not expected to be a primary habitat.

These terrestrial and aquatic habitats support various species of wild game. The American alligator, nutria, muskrat, river otter, raccoon, red swamp crawfish, red fox, and gray fox have an economic benefit for local trappers. Whitetail deer, fox squirrel, gray squirrel, swamp rabbit, eastern cottontail rabbit, waterfowl, northern bobwhite, eastern wild turkey, woodcock, rails, mourning dove, and Wilson's snipe are important recreational species in the area.

Unique or Sensitive Wildlife Habitats

The SNWR is a 124,511-acre coastal marsh administered by FWS. The primary objective of this NWR is to preserve a large area of coastal wetlands for wintering and migratory waterfowl, and it is known as an internationally important bird area. The SNWR is also a major nursery area for many estuarine-dependant marine species as well as home for alligators and other reptiles, mammals, and various species of wading, water, and marsh birds. Recreational activities available within the refuge include hunting, fishing, boating, and hiking (FWS no date a). The Project would not cross the SNWR, and at the closest point would pass approximately 0.25 miles from it.

The Lacassine National Wildlife Refuge (LNWR), also administered by the FWS, is nearly 35,000 acres, most of which is freshwater marsh habitat. The refuge preserves a major wintering site for waterfowl and provides habitat for nesting colonies of wading birds, alligators, mink, otter, and raccoon, among various other species. Threatened species such as the bald eagle and the Louisiana black bear have also been found residing in this refuge. The LNWR supports recreational activities such as hunting, fishing, bird-watching, and hiking (FWS no date b). The main unit of the LNWR would be approximately 15 miles southeast of the Project. The smaller Vidrine unit is the closest unit and the pipeline would be located approximately two miles southwest of this unit.

The Project would impact two tracts of land included in the CWPPRA program. This program was implemented to create, protect, and enhance wetlands in Louisiana. Impacts to these specific tracts of land are discussed in section 4.4.

In addition to specific tracts of sensitive land, forests and wetlands in Louisiana provide quality habitat for migratory waterfowl and colonial-nesting waterbirds, which are protected by the Migratory Bird Act.

Louisiana, including the Project area, is an important stopover for migratory birds along the Mississippi Flyway, which extends from Alaska and central Canada along the Mississippi River drainage into central and South America. Forests, including riparian habitat, provide important stopover habitat for migratory birds.

Colonial nesting birds share two general traits; they gather into large assemblages, called colonies, during the nesting season, and they obtain all or most of their food from the water. Colonial wading birds include the following: herons, egrets, night-herons, ibis, roseate spoonbills, anhingas, and/or cormorants. The Natural Heritage Program (NHP) of LDWF database indicates the presence of rookeries for the roseate spoonbill, a state-listed species of concern, and other colonial nesters in coastal Louisiana. The roseate spoonbill and other federal- and state-listed species are discussed in section 4.7.

4.6.1.2 Impacts and Mitigation

Construction Impacts

Construction of the Project, including the pipeline, aboveground facilities, extra workspaces, access roads, and pipe storage and contractor yards would temporarily affect approximately 2,417.9 (total construction impacts less the following land types: open water, beaches, and other) acres of upland and wetland habitat suitable for wildlife. Of that, 16.5 acres of upland and 2.7 acres of wetland habitats within the footprint of aboveground facilities and access roads would be permanently converted to industrial areas. Following construction, extra workspaces and non-forested portions of the permanent right-of-way would be allowed to revert to pre-construction conditions. Portions of the permanent right-of-way in forested lands would be maintained in an herbaceous state in accordance with our Plan and Procedures (and approved alternative measures) to facilitate pipeline maintenance. Approximately 14.9 acres of forested wetland and 40.6 acres of upland forest located within the permanent right-of-way would be converted to an herbaceous state for the life of the Project.

Impacts to wildlife species and habitats resulting from construction and operation of the Project would depend on the vegetation type affected, the mobility and habitat requirements of affected wildlife species as well as the amount of adjacent wildlife habitat. Specifically, construction activities including increased noise and habitat disruption would impact wildlife by displacing, stressing, injuring or leading to the mortality of wildlife. Species typically move away from inhospitable environments, utilizing nearby suitable habitats until the disruption has passed. Less mobile species may experience direct mortality from habitat clearing and the passing construction spreads if unable to escape the area. Disruption of any habitat type could cause alterations in the breeding, feeding, nesting, and rearing activities of species that actively use those habitats. Impacts to habitats are often related to the growth rates of the vegetation species found there.

Forested lands would require as much as 30 years or more to recover from clearing and would be subjected to more stages of succession, ensuring the slow, but continuous alteration of available habitat until the land has been restored to a pre-construction state. Impacts to wildlife from construction and operation in large forested tracts would be diverse and long-term or permanent. These impacts would include the loss of forest interior habitat, displacement of wildlife, inhibition of the migrations and foraging habits of forest interior species, invasion of non-native plant or animal species, and increased stress and mortality to local wildlife.

Although the Project would cross through several forested areas, few of these would be considered forest interior habitat. The exceptions occur at approximately MP 99.1 and MP 108.6. One bottomland forested area located in Jefferson Davis Parish begins at MP 99.1 and ends at MP 99.7. This forested habitat includes Bayou Nezpique, and this habitat would be avoided using HDD. Another relatively large forested tract begins at approximately MP 108.6 in Acadia Parish, stretching for slightly less than a mile. Although this forest is relatively large, the pipeline route follows an existing right-of-way. This limits the habitat disruption to widening of an existing corridor and would not increase fragmentation of interior forest habitat. Two additional forested areas of concern are located in Evangeline and Acadia Parishes. In Evangeline Parish, the pipeline would enter a large, relatively unfragmented forested area, associated with Tiger Point Gulley, crossing for approximately 0.4 miles. Although there are nearby rights-of-way transecting this area, the pipeline route would cause further fragmentation, decreasing its value as a wildlife habitat. In Acadia Parish, the FGT Lateral would be collocated with an existing right-of-way through a large forested area associated with Bayou des Cannes. Although collocation is generally acceptable as a way to minimize impacts to an area, this particular area provides quality wildlife habitat that would be disrupted by widening the right-of-way through quality forest habitat. Therefore, in section 4.3.2.1, we are recommending that KMLP consult with LDWF, FWS, and COE regarding the appropriate crossing methods and collocation through the forested areas near MP 113.1 of Leg 1 and MP 1.4 of the FGT Lateral.

KMLP has also proposed to use a total of 18 HDDs to cross a variety of habitats consisting mainly of waterbodies and wetlands. HDD crossing methods would reduce impacts to these streams as well as to the adjacent wetlands, riparian areas, and bottomland hardwood communities. KMLP has provided potential opportunities for the mitigation and/or compensation of wetland losses in the draft Aquatic Resources Mitigation Plan (appendix J), but is still finalizing the plan in consultation with the relevant agencies. Therefore, in section 4.4, we are recommending that prior to construction, KMLP develop an Aquatic Resources Mitigation Plan developed in consultation with and approved by the COE, NMFS, FWS, LDNR, and LDWF.

Operation Impacts

To minimize impacts on wildlife and wildlife habitats, the affected areas would be revegetated and maintained according to our Plan and Procedures. Routine maintenance would be periodically conducted to maintain the permanent right-of-way in an herbaceous state. Along cropland, pasture, and emergent wetlands, no routine maintenance would be necessary. However, in forested areas including forested wetlands, routine mowing would be conducted to allow inspection of the pipeline corridor. Our Plan does not allow routine vegetative maintenance to occur more frequently than every three years, except along a 10-foot-wide corridor centered over the pipeline that can be maintained annually.

Based on the characteristics of the affected wildlife habitats, the known habitat requirements of wildlife identified within proposed project areas, the anticipated impacts to wildlife and their habitats, KMLP's stated construction measures, and its adherence to our Plan and Procedures with modified alternative measures; we believe that construction and operation of the project would not significantly affect wildlife resources.

Waterbirds

The Project route could include suitable habitat for migratory waterfowl and nesting habitat for various species of colonial wading birds. Although the closest known wading bird nesting colony is approximately 1 mile from the footprint of the Project, the NHP of LDWF cautions that rookeries may move from year to year, potentially placing them closer to, or within, the Project right-of-way.

Noise and construction activities occurring in the vicinity of colonial waterbird rookeries have the potential to displace birds during active construction. In addition, displacement could result in the birds leaving the area. This displacement could disrupt breeding and nesting activities of the waterbirds within the Project area.

KMLP has stated that it would employ a qualified biologist to survey the work area during the 2007 nesting season, and again immediately prior to construction (in areas where construction occurred during the nesting season) to determine the presence of colonial waterbird rookeries. In accordance with recommendations given by FWS and the NHP of LDWF, the survey would notate any colony of wading birds (herons, egrets, night-herons, ibis, roseate spoonbills, anhinga, and/or cormorants) within 1,000 feet of the work area, as well as any colony of nesting gulls, terns, and/or black skimmers within 1,312 feet of the work area. KMLP would further consult with FWS and the NHP of LDWF in order to determine mitigation measures to minimize potential impacts to these nesting areas, should they be found.

4.6.2 Freshwater Aquatic Resources

This section discusses freshwater aquatic resources. Estuarine waterbodies are discussed in section 4.6.3. A table identifying all waterbodies crossed by the Project, as well as their width, state waterbody classification, crossing location, and crossing method is included as appendix G of this EIS.

4.6.2.1 Affected Environment

The Project would cross a total of 298 freshwater waterbodies, each of which supports warmwater fisheries. Aside from the potential utilization of the Calcasieu River by some estuarine species in seasons of high salinity, the Project would cross only freshwater aquatic habitats after entering Calcasieu Parish. Freshwater fishes common within affected waterbodies are listed in table 4.6.2.1-1.

TABLE 4.6.2.1-1

Freshwater Aquatic Species Occurring Within Waterbodies Crossed by the Proposed KMLP Project

	Common Name	Scientific Name
Fish	Gars	Lepisosteidae
	Bowfins	Amiidae
	Catfishes	Ictaluridae
	Eels	Anguillidae
	Carps and Minnows	Cyprinidae
	Sunfishes, Basses, and Crappies	Centrarchidae
	Creek Chubsucker	*Erimyzon oblongus*
	Inland Silverside	*Menidia beryllina*
	Red-eared Sunfish	*Lepomis microlophus*
	Swamp Darter	*Etheostoma fusiforme*
	Mosquitofish	*Gambusia affinis*
Crustaceans	Red Swamp Crawfish	*Procambarus clarkia*
	White River Crawfish	*Procambarus zonangulus*

Fisheries of special concern include areas containing exceptional recreational or commercial fisheries, specially designated streams or rivers, and waterbodies supporting rare or endangered aquatic species. Potential impacts to threatened and endangered species are discussed in section 4.7. No freshwater waterbodies that have been designated as fisheries of special concern would be crossed by the Project. However, eight waterbodies - the Black Bayou Cutoff, GIWW, Vinton Drainage Canal, Bayou Choupique, Calcasieu River, East Bayou Lacassine, Bayou Nezpique, and Bayou des Cannes - that would be crossed by the Project are designated to support fish and wildlife propagation. These waterbodies provide aquatic habitat, food, resting and reproductive opportunities, and/or travel corridors to aquatic species.

Commercial and Recreational Fisheries

Each of the waterbodies identified as supporting fish and wildlife propagation also supports recreational and/or commercial fisheries with crappie and catfish being the main catch. The Calcasieu River is further designated for oyster propagation. According to the LDWF, due to recent hurricane activity no recreational fishery is present in Bayou Lacassine. Although the Calcasieu River and the GIWW are considered primarily freshwater waterbodies, they do support a number of commercial estuarine species including brown and white shrimp, and recreational fisheries for spotted seatrout, red drum, and southern flounder.

Crawfish are also an important fishery within Louisiana, both recreationally and commercially. In the south, the fishery is dominated by just two species, the red swamp crawfish and the white river crawfish (LSU Ag Center 2006). Crawfish farming was the most valuable aquaculture crop in Louisiana for 2005; however, the wild-caught crawfish are preferred by many consumers due to its larger size. The volume of wild crawfish harvest is almost completely constrained by the timing and duration of the annual floodwater event in the Atchafalaya Basin (LSU Ag Center 2005). East of the Calcasieu River, significant numbers of crawfish farms occur along the route. See section 4.8 for a discussion on land use with regard to crawfish farms.

4.6.2.2 Impacts and Mitigation

Construction Impacts

The crossing methods proposed for each waterbody are identified in appendix G of this draft EIS. Depending on the construction method used, direct and indirect impacts could occur to the aquatic habitats and the species that utilize them. Open-cut and flume crossing methods would directly impact crossed waterbodies whereas the use of HDDs or bores would generally avoid impacts. As proposed, 56 percent of minor and intermediate waterbodies would be crossed by either HDD or bore; the remaining 44 percent would be crossed by open-cut or flume methods. Each of the 10 major waterbodies would be crossed by HDD.

Of the eight waterbodies supporting commercial and/or recreational fisheries, all but two would be crossed by HDD, avoiding impacts to the fisheries. The exceptions, Bayou des Cannes and Bayou Lacassine, would be crossed by flume and/or open-cut. Construction through the approximately 108 crawfish ponds along the route would be accomplished by typical upland construction methods, including clearing and trenching. KMLP has stated that it would try to schedule construction through these areas during times when the fields and ponds are not normally flooded, or negotiate with the landowners so that flooding of the crawfish ponds would be deferred for the season.

Pipeline construction using open-cut methods would cause an increase in the turbidity and sedimentation of a given waterbody. The suspension of sediments decreases the amount of light that penetrates through the water. With a decrease in light, photosynthetic organisms produce less oxygen, thereby decreasing the amount of DO available for uptake by fish and other aquatic species. Additionally, organic materials resuspended with the sediment can increase the BOD, further decreasing the available DO. During periods of low DO, fewer organisms can be supported in a particular area. Those individuals that are not displaced can experience stress, decreased food availability, and mortality. Sedimentation can also cause increased mortality to relatively immobile benthic organisms and fish eggs as they are covered by the falling sediment. Loss of these organisms can cause a decrease in the prey species available for various species of fish and aquatic organisms.

The flume crossing method would be used for three waterbody crossings; one crossing of East Bayou Lacassine (MP 84.9), and two crossings of Bayou des Cannes (MP 124.7 of Leg 1 and MP 1.6 of the FGT Lateral). The water in these streams would be routed so that trenching activities would be done in relatively dry conditions. This method would reduce the amount of turbidity and sedimentation associated with a conventional open-cut crossing. To further reduce the potential for impacts within Bayou des Cannes at the FGT Lateral crossing, we include a recommendation in section 4.3.2 that KMLP evaluate the feasibility of the FGT Lateral crossing Bayou des Cannes by HDD.

In both the open-cut and flume methods, removal of vegetation from riparian areas along the waterbodies would be necessary, causing an increase in surface runoff and erosion, contributing to the impacts mentioned above. Additionally, loss of riparian vegetation would result in a slight increase in water temperature from increased exposure to the sun.

Impacts of erosion would be minimized by use of our Procedures, which require the use of temporary and permanent erosion controls such as silt fences and slope breakers. Temporary erosion controls would be required immediately after the initial disturbance of the waterbody or adjacent upland area has occurred and would remain until either replaced by permanent erosion controls or restoration of the adjacent upland has been completed. Additionally, trees and shrubs would be allowed to reestablish themselves on the waterbody banks with the exception of a 10-foot-wide corridor that must be maintained in an herbaceous state, helping to curb both erosion and temperature elevation.

Our Procedures also require that minor and intermediate waterbodies generally be crossed in 24 and 48 hours, respectively, resulting in a limited period of elevated turbidity. The rapid construction through these waterbodies, along with the mitigation measures mentioned in our Plan and Procedures, would reduce the impacts of turbidity and sedimentation to fish and other aquatic species. Overall impacts to freshwater aquatic species would be localized and short-term as only a small area of a crossed waterbody would be affected.

KMLP proposes a total of 18 HDDs for pipeline installation across waterbodies (see table 4.3.2.1-3). An additional 147 crossings of intermediate and minor waterbodies would be made by horizontal bore, which like HDD, typically avoids habitat impacts. While HDD is the preferred crossing method for sensitive or important habitats because the method avoids or minimizes impacts to these areas, they are not without risk and can affect the habitat by release of drilling fluid or a frac-out. Frac-outs and releases of drilling fluid would increase turbidity and sedimentation, contributing to the impacts mentioned above. A draft HDD Contingency Plan is provided in appendix I and details the procedures KMLP would implement if release of drilling fluid or a frac-out occurred.

Hydrostatic testing of the pipeline would require the withdrawal of large volumes of water from certain waterbodies as listed in table 4.3.2.2-1 to test the structural integrity of the pipeline. Water would be withdrawn from eight freshwater waterbodies, three of which support recreational and/or commercial fisheries. Significant withdrawals of water from any one waterbody could cause a reduction in flow or an overall decrease in volume, disrupting microhabitats as the water level drops below the boundary that is normally inundated. The intake of water would cause the mortality of non-motile species, or species unable to avoid the flow field, as they are impinged upon the screen or entrained through it. Discharge of the test water could cause the erosion of stream banks and their vegetation or scouring of the waterbody bottom substrate. Erosion and scouring would increase the turbidity and sedimentation at the discharge point, causing stress to individuals and decreasing their ability to detect prey and predators. Increased turbidity, withdrawal of oxygen-rich waters, and discharge of the organic material created by the entrained individuals would decrease the amount of DO remaining in the waterbody. KMLP would prevent or limit these impacts from hydrostatic testing by implementing our Procedures which include measures that require the screening of intake hoses to prevent the entrainment of larger fish and maintaining adequate flow rates for the protection of aquatic life.

During construction, water pollutants also could be introduced into waterbodies by releases of fuel and oil spills from construction equipment, herbicides, and disturbance of contaminated sediments. The introduction of pollutants to aquatic species can cause acute or chronic toxicity, mortality, an increase in stress, and decreases in reproduction, growth, recruitment, and predator/prey detection abilities. As discussed in section 2.3, KMLP would develop and implement a project-specific SWPPP and SPRP that describes the containment and cleanup procedures that would be employed in the event of a spill or a leak of hazardous materials. To avoid contamination within waterbodies, KMLP has stated that BMPs addressing hazardous materials handling and storage, and spill prevention and response, would be developed as part of the SWPPP prior to construction. KMLP would also adhere to our Plan and Procedures.

Disturbance and resuspension of contaminated soils and sediments would result in adverse impacts to water quality and instream habitat. As indicated in the EPA's National Sediment Quality Survey report of 1997, the lower Calcasieu watershed contained APCs indicating that the areas would likely have adverse effects on aquatic and human life (EPA 1997). Later surveys indicated that those APCs are no longer present, although some areas still contained contaminated sediments (EPA 2004). KMLP has proposed the HDD crossing method for the Calcasieu River, which would avoid contact and disturbance of contaminated sediments. HDD frac-outs could impact local species through increased turbidity and sedimentation, but that would not cause chemical contamination in the affected waterbody. In case unidentified contaminated soils are discovered during construction, we are recommending in section 4.2.2.1 that KMLP develop a Plan for the Discovery and Management of Contaminated Soils and Groundwater. This plan would minimize the risk of adverse effects to aquatic species through the resuspendion of contaminated soils and sediments.

Operation Impacts

Impacts to fisheries and aquatic habitats resulting from maintenance of the permanent right-of-way would be relatively minor. Our Procedures require that a riparian strip at least 25 feet wide be allowed to revegetate to preconstruction conditions along all waterbodies, with the exception of the permanent right-of-way that may be permanently maintained in an herbaceous state to facilitate pipeline surveys. Contamination could occur during operations by spills from vehicles used to survey the pipeline route or from herbicide use to curb excessive growth along the pipeline right-of-way.

Our Procedures include measures to avoid using herbicides or pesticides within 100 feet of a waterbody (unless authorized by a land manager or state agency). In addition, the SWPPP, SPRP, and BMPs to be implemented by KMLP address hazardous materials handling and storage, and spill prevention, and response measures. Therefore, we believe that these measures would minimize adverse impacts on aquatic resources.

4.6.3 Marine Fishery Resources

4.6.3.1 Affected Environment

The Project would cross a total of 12 estuarine waterbodies, each of which contains warmwater fisheries. Of the 12 estuarine waterbody crossings, five are major waterbodies and seven are intermediate waterbodies. All but two of these waterbodies are perennial. A table identifying all waterbodies crossed by the Project, as well as their width, state waterbody classification, crossing location, and crossing method is included as appendix G of this draft EIS. Marine species common along the route are listed in table 4.6.3.1-1.

TABLE 4.6.3.1-1

Marine Species Occurring Within Waterbodies Crossed by the Proposed KMLP Project

	Common Name	Scientific Name
Fish	Sand Seatrout	*Cynocion arenarius*
	Threadfin Shad	*Dorosoma petenense*
	Gizzard Shad	*Dorosoma cepedianum*
	Bowfin	*Amia calva*
	Spotted Gar	*Lepisosteus oculatus*
	Southern Flounder	*Paralichthus lethostigma*
	Spanish Mackerel	*Scomberomorus maculatus*
	Black Drum	*Pogonias cromis*
	Red Drum	*Sciaenops occellatus*
	Atlantic Croaker	*Micropogonias undulates*
	Bay Anchovy	*Anchoa mitchilli*
	Spot	*Leiostomus xanthurus*
	Spotted Seatrout	*Cynoscion nebulosus*
	Sheepshead	*Archosargus probatocephalus*
	Gafftopsail Catfish	*Bagre marinus*
	Gulf Menhaden	*Brevoortia patronus*
Mollusks	Atlantic Rangia	*Rangia cuneata*
Crustaceans	Brown Shrimp	*Penaeus aztecus*
	White Shrimp	*Penaeus setiferus*
	Blue Crab	*Callinectes sapidus*

Fisheries of special concern within the estuarine systems of the Project area include Sabine Lake and the Sabine and Calcasieu Rivers, each of which contains EFH for various species of marine fishes. The Calcasieu River, although considered freshwater for the purposes of this draft EIS, is part of an estuarine system that also contains EFH for various species. Impacts to these waterbodies and the managed species that occur within them are discussed in detail in section 4.6.4. Three of the waterbodies that would be crossed by the Project are designated to support fish and wildlife propagation, and therefore potentially contain spawning locations for commercial and recreational fisheries. Additionally, LDWF (2006a) has indicated that adult paddlefish migrate up into Bayou Nezpique to spawn from January through April.

The commercial and recreational fisheries found within the estuaries crossed by the Project include oysters, shrimp, crab, and various fish. Sabine Lake is the major waterbody that supports these fisheries.

Sabine Lake

Sabine Lake is designated by the Louisiana Administrative Code (Title 33, Part 6) to support oyster propagation. The designation indicates that Sabine Lake supports economically important species of clams, oysters, mussels, or other mollusks. Eastern oysters are an important commercial species in Louisiana. In 2004, 55 percent of the landings of eastern oyster within the Gulf of Mexico came from Louisiana. Oysters require some hard substrate, or cultch, to settle on. They may eventually build large reefs, or may occur singly or in clumps on any manmade or natural structures with hard surface. Shell reefs also provide a habitat for a variety of species for foraging and cover. Impacts to oyster reefs or substrate suitable for settlement could decrease the socioeconomic and ecological value of these areas.

Sabine Lake is considered to be a public oyster seed ground and public oyster tonging area. Activities affecting productive public oyster areas require a CUP that can be obtained by the applicant after a water bottom assessment is provided to LDWF and approved. The LDWF requires that impacts to the water bottoms of the public oyster areas associated with construction activities be compensated. Compensation may be in the form of replacing impacted habitat using oyster cultch material (limestone, crushed concrete, oyster shell, etc.) or by making a payment directly to the Public Oyster Seed Ground Development Account (LDNR 2006).

KMLP conducted a bottom survey of Sabine Lake in March and April of 2006 to determine the extent of suitable habitat for oysters. The survey was conducted in compliance with guidelines developed by LDWF for sampling in oyster seed grounds, seed reservations, and tonging areas in order to characterize and quantify the different substrate types and to determine the presence, quantity, condition, and demography of oyster reefs within the area of interest. The survey corridor, approximately 3,000 feet wide and centered over the pipeline route, was subjected to a side scan sonar with sub-bottom profiling and then ground-truthed by manual poling. A ponar dredge was also used to collect samples and identify species in the surveyed areas.

From the results of this survey, the bottom substrate of Sabine Lake was broken into three main categories: Types I, II, and III, pertaining to the suitability as oyster substrate, and seven subcategories specifying the substrate type (see table 4.6.3.1-2). The assessment identified 522.8 acres of oyster reefs and cultch substrate (Types II and III) within the survey corridor. Current conditions within the survey

TABLE 4.6.3.1-2

Bottom Substrate Crossed by the KMLP Project within Sabine Lake

Substrate	Acreage within Survey Corridor	Percentage of Survey Corridor
Soft mud with buried shell (Type I)	4,552.2	87.9
Firm mud (Type II)	187.6	3.6
Soft mud with exposed scattered shell (Type II)	172.1	3.3
Moderately firm mud (Type II)	151.8	2.9
Soft mud (Type I)	105.5	2.0
Reef (Type III)	5.9	0.1
Exposed shell (Type III)	5.4	0.1

corridor result in 0.0 marketable sacks per acre of water bottom; however, seed and spat data indicate that 70.8 marketable sacks of oysters would be available in the future from the reef areas found within the survey corridor.

The mollusks or shells present were generally found within the bottom substrates designated as reef and exposed shell (Type III substrates), equating to a total area of 11.3 acres of bottom substrate suitable for or containing mollusks. The majority of the oyster resources were found at the southern shore of Sabine Lake, which would be avoided by the HDD construction method, although isolated patches occurred within the survey corridor out to approximately 3.5 miles from shore, the closest being approximately 500 feet away from the proposed pipeline right-of-way. The mollusk species noted most often along the corridor was the Atlantic rangia, an estuarine bivalve; only one eastern oyster was found during dredge sampling.

Sabine Lake also supports both recreational and commercial fisheries for shrimp, crab, and various fish. The Sabine River and Burton Shell Slip support only recreational fisheries, but the species would likely be the same as all three waterbodies are part of the same estuarine system. The LDWF marine fisheries manager described the fishery in Sabine Lake as including recreational fishing for spotted seatrout, red drum, black drum, and southern flounder (LDWF 2006a). Incidental catch may also include croaker and hardhead. The recreational fisheries of the Sabine River and the Burton Shell Slip would be expected to include the same species, although fishing effort may be lower, as all three waterbodies are part of the same estuarine system. The inshore fishing seasons are typically from mid-May to early-July and again from mid-August to December.

4.6.3.2 Impacts and Mitigation

Construction Impacts

The crossing methods proposed for each estuarine waterbody are identified in appendix G of this draft EIS. Depending on the construction method used, direct and indirect impacts could occur to the aquatic habitats and the species that utilize them. Open-cut methods would directly impact crossed waterbodies whereas the use of HDDs would generally avoid impacts. Of the waterbodies supporting marine fisheries – Sabine Lake, the Sabine River, and the Burton Shell Slip – the Burton Shell Slip would be crossed by HDD, avoiding impacts to the fisheries. The Sabine River would not be crossed by the pipeline route, but temporary extra workspaces would protrude into the river at four places with only minor, temporary effects. The crossing of Sabine River and Sabine Lake would be accomplished by a combination of HDD and open-cut methods, causing direct impacts to the waterbody and the species that utilize it. Crossing methods of Sabine Lake and the Sabine River are described in section 2.3.

General impacts to fishes and crustaceans through open-cut crossing methods and hydrostatic test water withdrawal and discharge include waterbody contamination, loss of habitat, and increased turbidity and sedimentation. These are described under section 4.6.2.2 on freshwater aquatic resources and are identical to impacts in estuarine environments.

As discussed in section 4.6.3.1, the southern portion of Sabine Lake supports the majority of oyster resources found along the pipeline route. Isolated patches of oyster resources also occur within 1,500 feet of the pipeline route, the closest being less than 500 feet away. As the majority of bottom substrate along the pipeline survey corridor is relatively soft bottom with no structure, the loss of any oyster resources would impact a variety of estuarine species that use the hard bottom area for foraging and cover. KMLP proposes to avoid impacts to the nearshore oyster resources by use of an HDD that would exit at MP 4.82 within the open water of Sabine Lake. Open-cut construction through Sabine Lake would require a 200- to 300-foot-wide construction right-of-way and require excavation of a pipe trench as well as a floatation channel for spud barges in waters less then 8 feet deep. These construction procedures would place spoil piles within 350 feet of oyster resources, increasing turbidity and sedimentation in the area.

Oyster resources occurring in the project area such as rangia are filter-feeders and require low levels of sedimentation and adequate water movement to supply them with food and remove wastes. Similar to other mollusks, oysters can tolerate thin layers of sediment or partial burial. Complete burial by gradual, natural sedimentation or dredge material disposal would cause mortality (Britton and Morton 1989).

The proposed construction through Sabine Lake would result in a temporary loss of soft bottom habitat due to the placement of the spoil piles, which would temporarily cover the habitat at that location. Due to the expanse of soft bottom habitat in Sabine Lake, mobile species utilizing this habitat would be expected to be temporarily displaced; however, less mobile species, such as the benthic invertebrates that utilize soft bottom habitat, would be smothered and experience mortality through placement of the spoil piles.

KMLP states that it will compensate LDWF for the disturbance of each bottom type within Sabine Lake that occurs as a direct result of pipeline construction. The LDWF indicated that compensation for impacts to public oyster seed grounds shall be in the form of planting cultch material (i.e., crushed concrete, limestone, oyster shell, etc.) at the rate of one cubic yard per acre of impacted area for barren, non-supportive areas of the seed grounds, 50 cubic yards for supportive areas, and 187 cubic yards for reef areas plus the value of any living oyster resources destroyed (LDWF 2005). KMLP reports that there are no active oyster leases along the proposed route. In addition, KMLP conducted an oyster survey and the proposed route would largely avoid oyster resources. The primary area along the proposed route with marketable oysters was near the HDD exit pit at MP 4.82. KMLP has agreed to compensate LDWF for oysters lost due to sedimentation on the reefs within 1,500 feet of this HDD exit pit based on existing information or pre- and post-construction surveys.

Operation Impacts

The operational impacts for marine fisheries resources would be the same as those discussed under freshwater aquatic resources in section 4.6.2.2.

Thus, there would be no significant impacts to marine fishery resources during construction or operation of the Project.

4.6.4 Essential Fish Habitat

EFH was defined by the MSA as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The MSA granted NOAA Fisheries Service legislative authority for fisheries regulation in the United States within a jurisdictional area between 3 and 200 miles offshore. NOAA Fisheries Service was also granted legislative authority to establish eight regional fishery management councils, each responsible for the proper management and harvest of finfish and shellfish resources within their respective geographic areas. The statute includes a mandate that federal agencies must consult with the Secretary of Commerce on all activities or proposed actions that are authorized, funded, or undertaken by the agency that might adversely affect EFH. NOAA Fisheries Service recommends consolidated EFH consultations with interagency coordination procedures required by other statutes such as NEPA or the ESA (50 CFR 600.920[e][I]) to reduce duplication and improve efficiency. The mandatory contents of an EFH Assessment are detailed in 50 CFR 600.920(e)(3).

The estuarine waters within the Project area are within the jurisdiction of the Gulf of Mexico Fishery Management Council (GMFMC), which has designated all estuarine habitat as EFH, including: emergent and mangrove wetlands; submerged aquatic vegetation (SAV); algal flats; mud, sand, shell, and rock substrates; and the water column. The GMFMC manages approximately 450 species within the Gulf, grouped into seven Fishery Management Plans (FMPs). Five of these FMPs (including the red drum, reef fish, coastal migratory pelagic, shrimp, and stone crab FMPs) have designated all estuarine systems on the Gulf coast as EFH. The estuarine systems crossed by the KMLP Project would include Sabine Lake and the Sabine and Calcasieu Rivers.

The EFH within Sabine Lake, Sabine River, and Calcasieu River include emergent wetlands, mud bottom substrate, shell reefs, and the water column itself. Estuarine emergent wetlands are among the most productive ecosystems on earth (Teal and Teal 1969, Odum et al. 1982). They are integral parts of the estuarine system, serving as nursery habitats for the larval stages of many fish and invertebrate species. Estuarine wetlands are also important in the removal of contaminants, and a buffer to reduce the erosion of inland areas. The mud bottom substrates of these waterbodies provide a habitat for various invertebrates, which in turn creates foraging habitat for other invertebrates and fishes. Shell reefs are generally composed of an upper zone consisting of live oysters and associated species, over a core of buried shell and mud (Bahr and Lancer 1981). This provides a structural complexity to the aquatic habitat that is used for feeding, breeding, and growth by a variety of species, managed or otherwise.

We have incorporated EFH consultations for the KMLP Project with the interagency coordination procedures required under NEPA. **For purposes of reviewing this Project under NEPA, FERC is the lead federal agency. As such, FERC requests that NOAA Fisheries Service consider this document as notification of initiation of EFH consultation. An assessment of potential effects of the Project is included below.**

4.6.4.1 Affected Federally Managed Species

Of the species with EFH designations in estuarine waterbodies, the brown and white shrimp, red drum, Gulf stone crab, and dog and lane snappers have EFH designations within the region of the Project (NOAA 2006b). NOAA Fisheries Service also indicated in written correspondence that waters in the Project area have been designated as EFH for the late juvenile, subadult, and adult stages of the bonnethead shark. Although none of these species is considered to be threatened or endangered, the red drum population is classified as overfished, or below the desired threshold, in the Gulf of Mexico. Table 4.6.4.1-1 lists the species and life stages within the EFH occurring in the Project area. Table 4.6.4.1-2 summarizes seasonal abundance data of each of the managed species that occur in the Project area.

Brown Shrimp

Brown shrimp are found in a range of habitats from estuaries to offshore depths of approximately 360 feet. Spawning occurs offshore with the pelagic larvae migrating to the estuaries and becoming bottom-oriented (GMFMC 2004). Postlarvae and juveniles are associated with shallow vegetated habitats, silty sand, and non-vegetated bottoms. The density of these stages are highest in marsh edge habitat and SAV, followed by tidal creeks, inner marsh, shallow open water, and oyster reefs (GMFMC 2004). Larvae initially consume planktonic algae and zooplankton, but become opportunistic as they age, feeding upon detritus, plants, and small fish and invertebrates (Darnell 1958, Perez-Farfante 1969).

TABLE 4.6.4.1-1

Summary of EFH Categories Potentially Used by Specific Life Stages of Federally Managed Species

	EFH Categories			
Species/Life Stage	**Water Column**	**Emergent Wetlands**	**Mud Bottom Substrates**	**Shell Reefs**
Brown Shrimp				
Larvae/Postlarvae	X	X	X	X
Juvenile		X	X	X
White Shrimp				
Larvae/Postlarvae	X	X	X	
Juvenile		X	X	
Red Drum				
Larvae/Postlarvae	X	X	X	
Juvenile		X	X	
Adult	X	X	X	X
Gulf Stone Crab				
Eggs			X	
Larvae/Postlarvae	X		X	X
Juvenile		X	X	X
Dog Snapper				
Juvenile		X		
Lane Snapper				
Larvae				
Juvenile			X	
Bonnethead Shark				
Late Juvenile	X			
Subadult	X			
Adult	X			

Source: NOAA 2006b.

White Shrimp

Similar to the brown shrimp, white shrimp habitats range from estuaries to offshore depths of approximately 130 feet. This species is known to spawn offshore and have pelagic larvae that migrate to the estuaries and become bottom-oriented. Postlarvae and juveniles generally utilize mud and peat bottoms with large amounts of detritus or vegetative cover (GMFMC 2004). Larvae of white shrimp also consume planktonic algae and zooplankton, but as juveniles have been reported to feed on sand, detritus, mollusk fragments, and small invertebrates (Darnell 1958).

TABLE 4.6.4.1-2

Relative Abundance of Managed Species within the Project Area

Species	Life Stage[a]	Relative Abundance: Low Salinity (March-May)	Increasing Salinity (June-July)	High Salinity (Aug-Oct)	Decreasing Salinity (Nov-Feb)
Brown Shrimp	Adult	C	C	C/R	R
	Juvenile	A	A	A	C
White Shrimp	Adult	C	C	HA	HA
	Juvenile	HA	HA	HA	HA
Red Drum	Adult	R	C/R	C/R	C/R
	Juvenile	C	C	C	C
Gulf Stone Crab	Adult	R	R	R	R
	Juvenile	R	R	R	R
Dog Snapper	Adult	NA	NA	NA	NA
	Juvenile	NA	NA	NA	NA
Lane Snapper	Adult	NA	NA	NA	NA
	Juvenile	NA	NA	NA	NA
Bonnethead Shark	Adult	NA	NA	NA	NA
	Juvenile	NA	NA	NA	NA

[a] Life stages for which EFH is mapped include only adults and juveniles.

[b] EFH habitat for this life stage is noted as reefs and submerged aquatic vegetation not occurring within the Project area.

C = Common, R = Rare, A=Abundant, HA = Highly Abundant, NA = Not Available

Source: NOAA 1998.

Red Drum

Red drum commonly occur in the Gulf of Mexico, from offshore waters to very shallow estuarine waters. They occur in virtually all of the Gulf's estuaries over a variety of substrates including seagrass, sand, mud, and oyster reefs. Spawning occurs in the mouths of bays, inlets, and on the Gulf side of the barrier islands, after which, larvae are transported into the estuaries. Estuarine wetlands are especially important EFH for larvae, juvenile, and subadult stages. Common prey species of red drum include several species that are also estuarine dependant such as shrimp, blue crab, striped mullet, and pinfish. Larval drum eat small prey species such as mysids and amphipods (GMFMC 2004).

Gulf Stone Crab

Adult stone crabs are benthic organisms that can be found on a variety of hard substrates and seagrass beds from the shoreline to depths of 200 feet (GMFMC 2004). Although larvae generally utilize the pelagic waters of the estuaries, all other life stages utilize sand/shell bottoms, oyster reefs, and/or soft bottom habitats (GMFMC 2003). Stone crabs are primarily carnivorous at each life stage, with larvae feeding primarily on plankton, juveniles on invertebrates and mollusks, and adults on mollusks, carrion, and other stone crabs. The species is basically dependant on the prey produced in the estuaries and seagrass beds where freshwater runoff results in higher phytoplankton productivity (GMFMC 2004).

Dog Snapper

Adult dog snapper may use submerged aquatic vegetation within estuaries as feeding areas, but generally occur within the coastal and offshore areas of the Gulf and are most commonly found on coral reefs (GMFMC 2004). Early juveniles, however, are found on shallow water seagrass beds of coastal waters and estuaries, as well as in estuarine emergent marshes, and may enter rivers (GMFMC 2003, GMFMC 2004). The region of the Project contains nursery habitat for early and late stage juveniles, which are known to utilize emergent marshes for growth (GMFMC 2003).

Lane Snapper

The lane snapper is demersal, occurring over all bottom types although it is most common in coral reef and sandy bottom areas. Nursery habitat includes mangrove and grassy estuarine areas in southern Texas and Florida as well as shallow areas with sandy and muddy bottoms off each of the Gulf states (GMFMC 2004). Early and late juvenile stages utilize sand/shell and soft bottom substrates in estuaries for feeding and growth (GMFMC 2003).

Bonnethead Shark

The bonnethead shark is the smallest member of the hammerhead family. It inhabits sandy or muddy bottoms of shallow coastal waters, feeding primarily on crabs, shrimp, mollusks, and small fishes (FWRI no date). This species is relatively resistant to overfishing due to a fast growth-rate, annual reproduction, and lack of a commercial fishery (NOAA 2006b).

4.6.4.2 Impacts and Mitigation

Sabine Lake, Sabine River, and Calcasieu River support EFH that includes emergent wetlands, mud bottom substrates, shell reefs, and water column habitats. The Calcasieu River would be crossed by HDD; thus, avoiding impacts to the EFH and the managed species that occur there. The Sabine River would not be crossed by the pipeline, but temporary extra workspaces associated with HDD operations would protrude into the river at four locations. These temporary extra workspaces would have a minor, temporary impact to EFH in the Sabine River. The crossing of Sabine Lake would be accomplished by a combination of HDD and open-cut methods, causing direct impacts to the lake and the species that utilize it.

Construction through the first 50 miles of the pipeline route would impact approximately 99.5 acres of EFH wetlands. Impacted areas are located at the northern and southern ends of Sabine Lake, on Shell Island, and along Sabine and Calcasieu Rivers and the GIWW. Disturbance of these habitats would temporarily reduce the amount of foraging habitat and cover available to these species. Disturbance of these wetlands would also temporarily decrease the habitat available for recruitment, leaving new recruits susceptible to increased predation as they search for alternative habitat or remain in open waters. The use of tracked vehicles through estuarine wetlands has the potential to permanently impact wetlands designated as EFH. In order to avoid permanent impacts, low-ground-pressure equipment or temporary board roads would be used. Marsh buggies would be used in saturated EFH wetlands where the use of board roads would not be practical (MP 1.5 to MP 3.9 and from MP 32.3 to MP 35.2).

The proposed construction through Sabine Lake would result in a temporary loss of soft bottom habitat due to the placement of the spoil piles, which would cover the habitat at that location. Due to the expanse of soft bottom habitat in Sabine Lake, the more mobile managed species utilizing this habitat would be expected to be temporarily displaced; however, less mobile stages of managed species that utilize soft bottom habitat could be smothered and experience mortality through placement of the spoil piles.

The southern portion of Sabine Lake supports the majority of oyster resources found along the pipeline route and would be avoided by HDD. Isolated patches of oyster resources also occur within 1,500 feet of the pipeline route, the closest being less than 500 feet away. As the majority of bottom substrate along the pipeline survey corridor is relatively soft bottom with no structure, the loss of any oyster resources would impact managed species for which shell reefs are considered EFH. KMLP would compensate LDWF for any oyster resources lost during pipeline construction as described in section 4.6.3.2.

Disturbance of the water column would occur in Sabine Lake during trenching activities. The managed species are mobile and would likely avoid the area during construction and return shortly after the completion of construction. The increased turbidity and sedimentation, disruption of wetlands, hydrostatic test water withdrawal, and other impacts from Project construction may displace or cause the mortality of prey species of managed species. Some of these species serve as prey for other fish species managed by NOAA Fisheries Service and the GMFMC. The wetlands within Sabine Lake also produce nutrients and detritus, important components of the aquatic food web, which contribute to the overall productivity of the Sabine estuary system as well as of the near-shore environments of the Gulf of Mexico.

KMLP states that it would implement a variety of mitigation measures in addition to following our Procedures in order to minimize impacts to aquatic habitats and the species that utilize them. These include:

- *Waterbody restoration*. KMLP would re-establish original contours and monitor affected waterbodies following construction, as well as restore any levees or barriers that were removed as part of the construction activities.

- *Erosion and sedimentation control*. KMLP would implement BMPs to control erosion and sediment as part of a project-specific SWPPP.

- *Riparian restoration*. Maintenance of the permanent right-of-way would be limited to a 10-foot-wide corridor, allowing the stream bank to revegetate to pre-construction conditions.

- *Contamination control*. Herbicides would not be used within 100 feet of any waterbody without the consent of the land manager or a state agency.

There would be no need for operation right-of-way clearing within Sabine Lake, Sabine River, and Calcasieu River, eliminating impacts to the EFH categories within it. Maintenance-related operational impacts to EFH would be limited to a 10-foot-wide right-of-way within estuarine wetlands. Trees in excess of 15 feet in height, should they occur within 15 feet of the pipeline right-of-way, may be cut and removed. The estuarine wetlands would be subjected to a site-specific monitoring plan based on recommendations given by NOAA Fisheries Service. With regard to these recommendations, and as stated in the draft Aquatic Resources Mitigation Plan (appendix J), monitoring would be primarily photographic in nature and would be taken from the ground at the work sites. These activities would take place pre-construction, immediately post-construction, and one growing season post-construction with photos of all work sites. The photos would be taken every 500 feet (with pictures taken in both directions) with the location recorded on GPS to allow a return to the exact site, and the exact location and direction of the photo would be recorded in a tabular form and referenced to an aerial photo documenting photo numbers.

4.6.4.3 Conclusions

We believe that the Project would have minimal impacts on EFH with implementation of our Procedures, a finalized Aquatic Resources Mitigation Plan developed in coordination with federal and state agencies, and the approved alternative measures to our Procedures (as discussed in this draft EIS). These measures would reduce the potential for unanticipated long-term impacts, and the resulting impacts of the Project would be insignificant and short term.

4.7 THREATENED AND ENDANGERED SPECIES

To comply with section 7 of the ESA, Kinder Morgan consulted with the FWS and NOAA Fisheries Service regarding the presence of federally listed or proposed threatened or endangered species and their critical habitats in the project area. Kinder Morgan, as the FERC's non-federal representative for the purposes of complying with the ESA, has been assisting the FERC in meeting its section 7 obligations by conducting informal consultation with the FWS and NOAA Fisheries Service. We also contacted and consulted with the FWS and NOAA Fisheries Service about which species under their respective jurisdictions would be potentially affected by the project. In addition to these consultations, Kinder Morgan consulted with the Natural Heritage Program (NHP) of LDWF to obtain a list of state-listed special status species in the project area.

4.7.1 Federally Listed Threatened and Endangered Species

The FWS and NOAA Fisheries Service have identified 12 federally listed threatened or endangered species in southern Louisiana that should be considered when determining the potential effects of the KMLP Project. According to FWS (2006a), the West Indian manatee, piping plover, Gulf sturgeon, and the green, leatherback, loggerhead, Kemp's ridley, and hawksbill sea turtles are not known to occur in the Project area and therefore no further consultation with FWS is required for these species unless the scope or location of the Project changes. NOAA Fisheries Service concurred that the Gulf sturgeon is rarely found as far west as the Project site and stated that neither the Gulf sturgeon nor the smalltooth sawfish (due to low area abundance) require further consultation (NOAA 2006c). The West Indian manatee, piping plover, Gulf sturgeon, and smalltooth sawfish have thus been eliminated from further consideration in this EIS. Although FWS has determined that no further consultation is needed regarding four of the five species of sea turtles, NOAA Fisheries Service has joint jurisdiction over the five species of sea turtles known to occur in the Gulf of Mexico and has requested that these species be assessed with regard to potential impacts from the Project. Each of the eight remaining species are discussed below and shown in table 4.7.1-1 with regard to their protected status and our determination of impact.

Sea Turtles

The only threatened or endangered reptiles known to exist in the Project area are sea turtles. NOAA Fisheries Service is generally responsible for marine threatened and endangered sea turtles and FWS is responsible for sea turtles that are coming ashore to nest. No critical habitat is designated for the green, hawksbill, loggerhead, Kemp's ridley, or leatherback sea turtles in the Project area.

Leatherback Sea Turtle

The leatherback sea turtle is primarily a pelagic species, although it will forage in coastal waters, and is distributed in temperate and tropical waters worldwide (NOAA and FWS 1992). It is the largest, deepest-diving, and widest-ranging sea turtle; the species has been federally listed as endangered since 1970 (FWS 2002a). Leatherbacks undergo extensive migrations from feeding grounds to nesting beaches (NOAA 2002a). Although southeast Florida only supports minor nesting colonies, the area represents the most significant nesting activity within the continental United States (NOAA no date), with the nesting period extending from March through July (FWS 2002a). Leatherback sea turtles feed primarily on jellyfish, but also on sea urchins, squid, crustaceans, tunicates, fish, blue-green algae, and floating seaweed (FWS 2002a). Significant threats to the species include incidental capture in fishing gear and harvest of adults and eggs (NOAA no date).

TABLE 4.7.1-1

Federally Listed Species Potentially Occurring in the KMLP Project Area

Species	Federal Status	State Status	Parish	Preferred Habitat	Determination
Reptiles					
Leatherback Sea Turtle (*Dermochelys coriacea*)	E	E	Cameron	Open sea and coastal waters. Prefer sandy beaches with deepwater approach for nesting.	Not likely to adversely affect
Loggerhead Sea Turtle (*Caretta caretta*)	T	T	Cameron	Tropical and temperate waters with temperatures above 10°C.	Not likely to adversely affect
Hawksbill Sea Turtle (*Eretmochelys imbricate*)	E	E	Cameron	Tropical and subtropical seas, including southern Florida and the northern Gulf of Mexico. Coral reefs, rocky outcrops, high energy shoals.	Not likely to adversely affect
Green Sea Turtle (*Chelonia mydas*)	T/E	T	Cameron	Lagoons, bays, inlets, shoals, and estuaries, as well as coral reefs, rocky outcrops, and high-energy beaches. Found throughout the Gulf of Mexico and adjoining beaches where the seawater temperature is above 25°C.	Not likely to adversely affect
Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)	E	E	Cameron	Shallow coastal waters, tidal rivers, estuaries, and seagrass beds with substrates of sand and mud.	Not likely to adversely affect
Birds					
Brown Pelican (*Pelecanus occidentalis*)	E	E	Cameron	Shallow coastal waters within 20 miles or less of the shoreline and in depths up to 80 feet. Breeds on small coastal islands and forages for fish along coastal and inland waterways.	Not likely to adversely affect
Bald Eagle (*Haliaeetus leucocephalus*)	T	E	Cameron, Calcasieu	Areas with abundant sources of large open waterways such as lakes, reservoirs, seacoasts, and large rivers. In addition to waterways, the availability of perches, usually tall trees or cliffs, adjacent to foraging and nesting areas. Occasional transient on rivers for foraging or feeding.	Not likely to adversely affect
Red-cockaded Woodpecker (*Picoides borealis)*	E	E	Calcasieu, Evangeline	Open pine forests with large, widely spaces trees. Nests in large, old pines (60+ years). Forages in pine or pine-hardwood stands that are greater than 30 years of age.	Determination pending

Loggerhead Sea Turtle

The loggerhead sea turtle is the most abundant sea turtle in the Gulf of Mexico, although it is still federally listed as threatened. Loggerhead turtles are a cosmopolitan species, inhabiting temperate and tropical waters in the estuaries and continental shelves of both hemispheres (NOAA 2002b). Within the eastern Gulf of Mexico, the species is usually found in water depths of less than 65 feet (Fritts et al. 1983; Lohoefener et al. 1990; Hildebrand 1982).

In the southeastern United States, females nest from late April through early September (NOAA and FWS 1991). Nesting occurs primarily on barrier islands adjacent to continental landmasses in warm-temperate and sub-tropical waters. Nest sites are typically located on open sandy beaches, above the mean high tide, and seaward of well-developed dunes. In Louisiana, this species has been found throughout the coastal region but nesting has only been recorded from the Chandeleur Islands, which is over 250 miles east of the potential habitat (Sabine Lake) within the Project area (LDWF 2005). Adults occupy a variety of habitats, ranging from turbid bays to clear waters of reefs, whereas subadults occur mainly in nearshore and estuarine waters. Hatchlings move directly to sea after hatching, and often float in masses of Sargassum. The loggerhead diet consists of a wide variety of benthic and pelagic food items, including conches, shellfish, horseshoe crabs, prawns and other crustacean, squid, sponges, jellyfish, basket stars, fish, and hatchling loggerheads. The most significant threats to the loggerhead populations are coastal development, commercial fisheries (especially shrimping), and pollution.

Hawksbill Sea Turtle

The hawksbill sea turtle is primarily coastal and is seldom seen in waters deeper than 65 feet (FWS 2002b). It inhabits rocky areas, coral reefs, lagoons, oceanic islands, shallow coastal areas, and narrow creeks and passes (FWS 2002b). Hawksbill sea turtles are found in tropical and subtropical waters in the Atlantic, Pacific, and Indian Oceans (FWS 2002b) and have been federally listed as endangered throughout their range since 1970 (FWS 2002b). The nesting season for this species generally occurs between April and November (FWS 2002b). Nesting occurs on undisturbed deep-sand beaches which range from high energy beaches to tiny pocket beaches several meters wide bounded by crevices of cliff walls. These beaches are normally low-energy, with woody vegetation near the waterline.

Hawksbill turtles are the least common sea turtle in the Gulf of Mexico (MMS 2002), although they have been recorded in waters of all the states along the Gulf of Mexico (NOAA and FWS 1991). Adults usually forage around coral reefs and other hard bottom habitats (NOAA 2002a), and primarily eat sponges (FWS 2002b). This diet and their dependence on hard bottom communities make the species especially vulnerable to deteriorating conditions on coral reefs. Due to the lack of suitable foraging habitat, there is low probability of this species occurring within the Project area.

Green Sea Turtle

The green sea turtle is generally listed as threatened with the exception being the breeding colony populations in Florida and on the Pacific Coast of Mexico, which are federally listed as endangered. This species nests in tropical and subtropical waters worldwide and inhabits shallow waters (except when migrating) inside reefs, bays, and inlets. Within the southeastern U.S., green turtles generally nest between June and September (FWS 2002c). Hatchlings eat a variety of plants and animals (FWS 2002c) and forage in areas such as coral reefs, emergent rocky bottom, *Sargassum* mats, lagoons, and bays (MMS 2001). The adults feed on seagrass and marine algae, including species of *Cymodocea*, *Thalassia*, and *Zostera* (FWS 2002c). Feeding grounds in the Gulf of Mexico include inshore south Texas waters, the upper west coast of Florida, and the northwestern coast of the Yucatan Peninsula in Mexico.

Incidental capture in fishing gear and, in some areas of the world, the harvest of eggs and adults affect the recovery of the green sea turtle population. Nesting within the Project area is highly unlikely, as green sea turtles prefer to nest on high energy beaches with deep sand and little organic content.

Kemp's Ridley Sea Turtle

The Kemp’s ridley sea turtle is an endangered species that occurs mainly in the coastal areas of the Gulf of Mexico and northwestern Atlantic Ocean. Nesting occurs mainly in Mexico from April to June, but Kemp’s ridley turtles also nest in small numbers along the Gulf coast. Juveniles and sub-adults occupy shallow, coastal regions and are commonly associated with crab-laden, sandy, or muddy water bottoms. Small turtles are generally found in nearshore areas of the Louisiana coast from May through October. Adults may be abundant near the mouth of the Mississippi River in the winter. Between the east Gulf coast of Texas and the Mississippi River Delta, Kemp’s ridleys can be found in nearshore waters, ocean sides of jetties, small boat passageways through jetties, and dredged and nondredged channels. They have been observed within both Sabine and Calcasieu Lakes. No sightings have been reported in the Project area Major threats to this species include over-exploitation on their nesting beaches, drowning in fishing nets, and pollution. (FWS 2006a).

Sea Turtle Impacts

Sea turtles are vulnerable to adverse impacts from many of the construction activities that would occur in Sabine Lake including: increased noise; pile driving; increased vessel traffic; and habitat degradation associated with trenching activities. Potential responses to noises generated during construction activities could cause avoidance behavior in sea turtles, as well as disorientation and behavioral disturbance. Pile-driving activities often involve loud, repetitive noises that could cause a temporary reduction in hearing sensitivity or a temporary threshold shift (TTS) in sea turtles.

Potential effects on sea turtles from construction of the Project could include avoidance of the area due to noise and activity, alteration or loss of habitat, effects on prey species composition and abundance, and changes in water quality. Increased traffic and project activities may result in the temporary displacement of sea turtles from foraging and resting habitats due to increased water turbidity. These impacts are expected to be temporary, localized and minor, and as such adverse impacts on foraging and nesting sea turtles is not expected.

Local noise levels would be increased due to passage and use of construction equipment. Pile-driving would be used only to situate the signs marking the spoil piles for boater safety.

Increased construction traffic in an area increases the likelihood of vessel/sea turtle interaction. Sea turtles can experience mortality and injury from collision with vessels. KMLP proposes to excavate both a trench through Sabine Lake for the pipeline and, in places where the water is less than eight feet deep, an excavation channel for the spud barges. Individuals coming into contact with construction equipment may be killed or injured. In a letter dated April 15, 2006, NOAA Fisheries Service provided their standard construction guidelines for projects occurring in areas inhabited by sea turtles, entitled “Sea Turtle and Smalltooth Sawfish Construction Conditions” and “Vessel Strike Avoidance Measures and Injured or Dead Species Reporting.” These measures are provided in appendix K. KMLP has stated that it would implement these guidelines during construction of the Project. With the implementation of these measures the construction of the Project is not likely to adversely affect sea turtles.

Birds

Brown Pelican

The brown pelicans is found along the Atlantic and Gulf of Mexico coasts, inshore to usually no more than 20 miles out from shore. They are federally listed as endangered in the U.S. except along the Atlantic coast, Alabama, and Florida where they have been delisted due to recovery (FWS 1995). Sand spits and offshore sand bars are used extensively as daily loafing and nocturnal roost areas. The preferred nesting sites are small coastal islands which provide protection from predators and sufficient elevation to prevent flooding of the nests (FWS 1995). In southwestern Louisiana, brown pelicans are currently known to nest on Rabbit Island in Calcasieu Lake. Although no brown pelican nesting sites are known to occur in the Project area, they may use the area and surrounding habitat for feeding and/or loafing. Brown pelicans feed in shallow estuarine waters (e.g., Sabine Lake) using sand spits and offshore sand bars as rest and roost areas (FWS 2006a). Brown pelican are asynchronous nesters. The nesting season can extend from January through October, although peak egg laying usually occurs in March or April and often through June (NPS 2006a). Major threats to this species include chemical pollutants, colony site erosion, disease, and human disturbance. There is no critical habitat listed for the brown pelican.

Brown pelicans are known to use the habitat types that occur within the Project vicinity and could use Sabine Lake for feeding and loafing. The known nesting colony on Rabbit Island in Calcasieu Lake is approximately 18 miles from the pipeline and would not be disturbed during construction or operation of the Project. Although feeding and loafing pelicans may be temporarily displaced by construction activities, we have determined that the Project is not likely to adversely affect the brown pelican.

Bald Eagle

The bald eagle nests in Louisiana from October through mid-May. Eagles typically nest in bald cypress trees near fresh to intermediate marshes or open water in the southeastern parishes. Areas with high numbers of nests include the Lake Verret Basin south to Houma, the southern marsh/ridge complex from Houma to Bayou Vista, the north shore of Lake Pontchartrain, and the Lake Salvador area. Eagles also winter and infrequently nest near large lakes in central, southwestern, and northern Louisiana (FWS 2006a). The population of bald eagles began declining prior to 1940 due to a decline in prey species, loss of habitat, direct killing, and later, from DDT use, but has recovered to the point that it is being proposed for delisting (FWS no date c). Currently the population is considered threatened throughout the continental U.S. and Alaska. No critical habitat has been designated for the bald eagle.

Breeding bald eagles occupy “territories” that they will typically defend against intrusion by other eagles, and that they are likely to return to each year. A territory may include one or more alternate nests that are built and maintained by the eagles, but may not be used for nesting in a given year. Potential nest trees within a nesting territory may, therefore, provide important alternative bald eagle nest sites. In forested areas, bald eagles often select the tallest trees with limbs strong enough to support a nest that may weigh more than 1,000 pounds. Nest sites typically include at least one perch with a clear view of the water or area where the eagles usually forage. Shoreline trees or snags located near large waterbodies provide the visibility and accessibility needed to locate aquatic prey (FWS 2006a).

Bald eagles are most vulnerable to disturbance during courtship, nest building, egg laying, incubation, and brooding (roughly the first 12 weeks of the nesting cycle). Disturbance during this critical period may lead to nest abandonment, cracked and chilled eggs, and exposure of small young to the elements. Human activity near a nest late in the nesting cycle may also cause flightless birds to jump from the nest tree, thus reducing their chance of survival (FWS 2006a). Although the general area of high nest occurrence would not be impacted by the Project, the pipeline route would cross numerous freshwater and intermediate marshes and open water areas along the first portion of Leg 1. Bald eagles nesting in these areas could be disturbed by passage of the construction spreads.

KMLP did not identify any bald eagle nests during field surveys conducted along the pipeline route. Should a bald eagle nest be encountered during construction and the construction workspace encroach within 1,500 feet of the nest, KMLP states that the Lafayette, Louisiana FWS office would be consulted to establish measures to mitigate potential impacts during the nesting season. During operation of the Project, KMLP has stated that no right-of-way maintenance would occur within 1,500 feet of a known bald eagle nests during the nesting season. Due to the absence of nests along the route, the consultation proposed for nests seen at a later date, and the elimination of right-of-way maintenance within 1,500 feet of known nests, we have determined that the construction and operation of the Project is not likely to adversely affect bald eagles.

Red-cockaded Woodpecker

The red-cockaded woodpecker (RCW) is federally listed as endangered. Historically, its range occurred from east Texas and Oklahoma to Florida, and north to New Jersey and Maryland. The populations have since been extirpated from Missouri, Maryland, Tennessee, Kentucky, and New Jersey, with the remaining populations fragmented (FWS 1983). The preferred habitat consists of longleaf pine although other species of southern pine are also used. The RCW excavates cavities in large (i.e., 10 inches or greater in diameter at breast height) living pines that are often suffering from red heart disease that causes the inner wood to become soft (FWS 2006a; FWS 1983). Nesting occurs in mature (greater than 60 years old) pine trees containing little hardwood understory or midstory (FWS 2006a); RCWs are intolerant of dense hardwood midstories resulting from fire suppression. The cavity trees and the foraging area within 200 feet of those trees are known as a cluster. Foraging habitat is defined as pine and pine-hardwood stands (i.e., 50 percent or more of the dominant trees are pines) over 30 years of age that are located contiguous to and within one-half mile of the cluster (FWS 2006a). The decline of the RCW is attributed primarily to the reduction of pine forest and to the encroachment of hardwood midstory due to fire suppression (FWS 1983). There is no critical habitat designated for this species.

KMLP has stated that if suitable habitat exists along the remaining portion of the pipeline route, all suitable nesting habitat within a 0.5-mile radius of the Project boundary would be surveyed by a qualified biologist for the presence of RCW clusters in accordance with the RCW recovery plan (FWS 2003) survey protocol, as requested by FWS (2006b). FWS has also requested that KMLP provide a determination of the age of pine stands along the pipeline route to determine if they are greater than 30 years of age. KMLP has been unable to obtain access from some landowners to complete surveys of all potentially suitable habitat areas for RCW. Landowners have the right to deny access to their property. However, if KMLP is issued a Certificate by the Commission, KMLP would have the authority to access the portions of the property within 0.5 mile of the project boundaries to complete any required surveys including RCW surveys.

At this time, FWS has not received a RCW survey report from KMLP confirming the locations and/or results of surveys or habitat assessments. For this reason, we do not have adequate information to allow for a complete review of potential Project impacts on this species. Therefore, **we recommend that:**

- **KMLP consult with the FWS to determine the need for and methodology of additional surveys for red cockaded woodpecker (RCW) along the pipeline route or provide concurrence from the FWS that the project is not likely to adversely affect the RCW. The results of consultation with the FWS, any additional survey reports, and FWS comments on the survey should be filed with the <u>Secretary as soon as they become</u>**

<u>available before the close of the comment period for this draft EIS</u>. Survey reports should include the following information:

a. name(s) and qualifications of the person(s) conducting the survey;

b. method(s) used to conduct the survey;

c. date(s) of the survey

d. area surveyed (include the mileposts surveyed); and

e. proposed mitigation that would substantially minimize or avoid the potential impacts.

4.7.2 State-Sensitive Species

The NHP of LDWF has identified the following 10 state species of concern that may occur in the Project area.

Birds

Roseate Spoonbill

The roseate spoonbill is considered rare in the state of Louisiana and is a species of special concern. It is found throughout the entire Gulf of Mexico coastline, south to Central America, South America, and the West Indies. From March through October, roseate spoonbills prefer the bays, marshes, and estuaries along the Gulf Coast, with the mating season beginning in March and ending in June. Nests are built in thick vegetation above water, and are well-built and deeply cupped. In winter, most roseate spoonbills migrate to Central and South America. (NPS 2006b)

The roseate spoonbill is a colonial wading bird and could experience nesting site disturbance by passage of the construction spreads. Although there are no known nesting sites in the project area, KMLP has stated that it would employ a qualified biologist to survey the proposed work area during the 2007 nesting season and immediately prior to construction scheduled during the nesting season to determine the presence of colonial waterbird rookeries. In accordance with recommendations given by FWS and the NHP of LDWF, the survey would notate any colony of wading birds, including the roseate spoonbill, within 1,000 feet of the work area. KMLP has stated that it would further consult with FWS and NHP of LDWF in order to determine mitigation measures to minimize potential impacts to these nesting areas, should they be found. Operational impacts to the roseate spoonbill would be limited to temporary displacement during maintenance of the permanent right-of-way.

Crested Caracara

The crested caracara is considered critically imperiled in Louisiana and is limited to the southwestern corner of the state. It is a vulture-sized bird that spends much of its time on the ground hunting snakes, rodents, and other available prey. Preferred habitat for this species includes mixed coastal prairie and marshes that have been recognized as ecologically significant and in need of conservation efforts, as well as open country habitat such as pasturelands, cultivated land, and semi-desert. Nesting occurs from late-December to early-April and the nests are typically located in trees, rock ledges, or on the ground in secluded areas. The species is non-migrating and the nests will often be reused from year to year. One of the main causes of decline is the loss of habitat due to development and agriculture, as well as illegal shooting and trapping (LDWF 2006b, c). The NHP of LDWF has recommended that KMLP use BMPs to minimize impacts to the coastal prairie and marsh habitats preferred by the crested caracara. While KMLP has not developed any project-specific BMPs for this purpose, it would implement our Plan and Procedures with accepted variances to minimize impacts to the general habitats used by the crested caracara. These measures include the minimization of erosion/sedimentation and impacts to wetlands as well as the restoration of uplands and wetlands. We also recommend that KMLP further consult with the NHP of LDWF to determine if any additional BMPs are needed for the protection of the crested caracara. Operational impacts to the crested caracara would be limited to temporary displacement during maintenance of the permanent right-of-way.

Crustaceans

Old Prairie Crawfish

The old prairie crawfish is considered very rare globally and is imperiled in Louisiana due to its restricted range. It has been noted in the Project vicinity, occurring in roadside ditches flooded by heavy rains or in complex burrows carved into the sandy-clay soils of roadside ditches, with a home range that does not exceed 82 feet. It is non-migratory and males are reproductively active during January, July, and August. Little else is known about the life history of this species. Threats to the old prairie crawfish include residential, commercial, and petroleum development. (LDWF 2006a, b)

Maintenance of the permanent right-of-way would not be required in the roadside ditches that the old prairie crawfish would utilize; therefore, no impacts would be expected to occur to this species during operational maintenance. However, roadside ditches, the preferred habitat for the old prairie crawfish, would be crossed numerous times during construction of the Project and could cause direct mortality of any individuals that are residing in that particular ditch. LDWF has recommended that habitat for this species be protected (LDWF 2006b, c). KMLP has not proposed any measures for the protection of the old prairie crawfish. Therefore, **we recommend that:**

- **KMLP consult with the NHP of LDWF and develop mitigation measures to protect the old prairie crawfish during construction through roadside ditches. KMLP should file with the Secretary copies of its consultation prior to construction.**

Plants

Several of Louisiana’s critically imperiled plant species and communities occur in the Project area. These include the saltflat-grass, wild coco, Oklahoma grass-pink, low nutrush, short-beaked baldsedge, Lindheimer’s bee-balm, and remnants of coastal prairie. Coastal prairies are considered critically imperiled in the state of Louisiana and imperiled globally. This prairie region of southwestern Louisiana was once very extensive (about 2.5 million acres) but today is limited to small remnant parcels. On the southern edge of its range, the community may occur on “islands” or “ridges” surrounded by marsh (LDWF 2006b). None of these critically imperiled species, however, are located within 0.5 miles of the Project. The nearest coastal prairie remnant community is located 0.6 miles away from the Project.

4.7.3 Conclusions and Recommendations

A variety of measures have been proposed by KMLP that would limit impacts on federal- and state-listed species, including implementation of our Plan and Procedures. These measures would reduce the loss of vegetated habitats, minimize impacts to water quality, and result in restoration of areas temporarily disturbed during construction. Additionally, KMLP has committed to implementing measures to avoid and minimize potential impacts to federally listed species as identified in NOAA Fisheries Service’ “Sea Turtle and Smalltooth Sawfish Construction Conditions” and “Vessel Strike Avoidance Measures and Injured or Dead Species Reporting.” Based on the information provided to date, we believe that except for RCW for which a determination is pending, the Project is not likely to adversely affect any federally listed threatened or endangered species.

We have not completed consultation with FWS and NOAA Fisheries Service. Therefore, **we recommend that:**

- **KMLP not begin construction activities until:**
  a. The FERC completes any necessary consultations with the FSW and NOAA Fisheries Service; and
  b. KMLP receives written notification from the Director of OEP that construction and/or implementation of conservation measures may begin.

4.8 LAND USE, RECREATION, AND VISUAL RESOURCES

In this section, we further identify and characterize the land requirements for construction and operation of the Project, describe the current land use or cover type of those lands (including special status lands), discuss how land needed for the Project would be acquired, evaluate visual resource impacts, and discuss the relevance of the Project to the Louisiana coastal zone management process. A detailed description of the pipeline facilities is provided in section 2.1.1 and facility maps are provided in appendix B.

4.8.1 Land Use

Table 4.8.1-1 summarizes the current land uses of the acreage that would be affected by construction and operation of the Project. Construction of the Project would affect a total of 3,030.7 acres, including 2,274.1 acres for construction rights-of-way, 291.5 acres for extra workspaces, 12.3 acres for aboveground facilities, 74.2 acres for access roads, and 378.7 acres for pipe storage and contractor yards. Of the 3,030.7 acres, about 821.7 acres would be maintained as permanent right-of-way and 19.2 acres permanently used for aboveground facilities and access roads. Of the acreage affected by construction, 1,472.1 acres (48.6 percent) would be agricultural land and 569.1 acres (18.8 percent) would be open water. The remaining land uses would include beaches, forest, developed land, open land, and other (including strip mines, quarries, and gravel pits) and would comprise approximately 989.5 acres (32.6 percent).

Following construction, all temporary workspaces would be allowed to revert to preconstruction condition. During operation, KMLP would maintain a 50-foot-wide permanent right-of-way, except where Leg 1 and Leg 2 are collocated it would maintain a 100-foot wide right-of-way. The permanent right-of-way and other facilities would encompass 427.0 acres of agricultural land (50.8 percent) and 107.0 acres of open water (12.7 percent), with the remaining 36.5 percent being composed of primarily forest, developed land, or open land.

KMLP has proposed a 125-foot-wide construction right-of way for Leg 1 when in upland terrain and for wetland crossings greater than 100 feet long. Further, as discussed in section 2.2.1, when working in saturated wetland crossings less than 100 feet long, rights-of-way would be 100-feet wide. In areas where Legs 1 and 2 are within 50 feet of each other, KMLP proposes a total combined right-of-way width of 155 feet. In addition, KMLP has proposed a 300-foot right-of-way when constructing in the open water of Sabine Lake with depths less than 8 feet. That right-of-way width would be reduced to 200-feet when water depths exceed 8 feet. Following construction, KMLP would generally maintain a 50-foot-wide permanent right-of-way centered over the pipeline.

Approximately 73.7 miles (54 percent) of the Project would parallel existing rights-of-way (table 4.8.1-2). To ensure safe distances are maintained between construction activity and in-service utilities and to avoid potentially negative impacts on adjacent pipelines, construction right-of-way overlap with existing rights-of-way would be limited to approximately 15 feet.

4.8.1.1 Temporary Extra Workspaces

As detailed in section 2.1.3, KMLP would use temporary extra workspaces at road crossings, railroad crossings, crossings of existing pipelines and utilities, wetland and waterbody crossings, and other areas where specialized construction techniques would be used. Approximately 291.5 acres would be affected by the use of temporary extra workspaces; 50.1 percent would be agricultural, 20.5 percent would be open water, and 22.5 percent would be open land. See appendix C for more details. Following

TABLE 4.8.1-1

Land Use Affected by Construction and Operation of the KMLP Project

	Agricultural (Acres)		Open Water (Acres)		Forest (Acres)		Developed Land (Acres)		Open Land (Acres)		Beaches (Acres)		Other (Acres)		Total (Acres)	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Leg 1																
Pipeline ROW	1,030.2	413.7	509.1	106.9	128.5	53.1	44.9	18.1	524.4	213.7	0.2	0.1	2.0	0.7	2,239.2	806.3
Workspaces	144.6	0.0	59.8	0.0	9.9	0.0	9.5	0.0	61.3	0.0	0.0	0.0	0.0	0.0	285.0	0.0
Aboveground Facilities[a]	7.5	7.5	0.0	0.0	0.0	0.0	0.0	0.0	1.9	1.9	0.0	0.0	0.0	0.0	9.4	9.4
Access Roads	0.1	0.1	0.0	0.0	0.6	0.0	70.9	6.4	1.0	0.0	0.0	0.0	0.0	0.0	72.6	6.4
P & C Yards	277.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	101.4	0.0	0.0	0.0	0.0	0.0	378.7	0.0
Leg 2																
Pipeline ROW	0.0	0.0	0.0	0.0	0.9	0.2	0.9	0.2	5.2	1.1	0.0	0.0	0.0	0.0	7.0	1.5
Workspaces	0.0	0.0	0.0	0.0	0.1	0.0	0.8	0.0	1.9	0.0	0.0	0.0	0.0	0.0	2.9	0.0
Aboveground Facilities[a]	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.7	0.8	0.8	0.0	0.0	0.0	0.0	2.6	2.6
FGT Lateral																
Pipeline ROW	10.9	5.4	0.2	0.1	10.6	5.4	0.3	0.1	5.9	2.9	0.0	0.0	0.0	0.0	27.9	13.9
Workspaces	1.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.3	0.0	0.0	0.0	0.0	0.0	3.6	0.0
Aboveground Facilities[a]	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
Access Roads	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.5	0.5	0.0	0.0	0.0	0.0	1.6	0.5
Total	1,472.1	427.0	569.1	107.0	150.6[b]	58.7[c]	130.2	26.6	706.6	221.0	0.2	0.1	2.0	0.7	3,030.7	840.9

[a] Represents areas affected outside of construction or permanent rights-of-way.

[b] This number includes 0.9 acres of Forested Wetland that KMLP reported as existing within the Sabine Pass LNG Terminal, but has since been cleared.

[c] This number includes 0.2 acres of Forested Wetland that KMLP reported as existing within the Sabine Pass LNG Terminal, but has since been cleared.

Notes: Due to rounding totals may not add up.

Agricultural includes cropland and pastureland.
Open Water includes estuaries and bays, lakes, streams, and canals.
Forest includes deciduous forest, evergreen forest, forested wetland, and mixed forestland.
Developed Land includes industrial, residential, and transportation/communication/utility right-of-way. Transportation/communication/utility right-of-way may include maintained wetlands and ditches.
Open Land includes rangeland, sandy (not beach) areas, transitional areas, and non-forested wetland.
Other includes strip mines, quarries, and gravel pits.

C= Construction; O = Operation; Pipeline ROW = Pipeline Rights-of-Way; Workspaces = Temporary Extra Workspaces; Facilities = Aboveground Facilities; P & C Yards = Pipe and Contractor Yards

TABLE 4.8.1-2

Existing Rights-of-Way Paralleled by the KMLP Project[a]

MP Begin	MP End	Approximate Length (Miles)	Existing Parallel Facility	Approximate Acreage
Leg 1 and 2				
0.8	1.9	1.1	NGPL Pipeline[b]	2.0
16.9	17.9	1.0	Foreign Pipeline	1.8
22.6	22.8	0.2	36” Colonial Pipeline	0.4
22.8	23.3	0.5	16” & 18” Sabine Pipeline	0.9
23.3	23.7	0.5	36” Colonial Pipeline	0.8
23.7	24.6	0.8	16” & 18” Sabine Pipeline	1.5
24.6	25.5	0.9	16” & 18” Sabine Pipeline	1.7
25.5	26.1	0.6	36” Colonial Pipeline	1.2
26.1	26.4	0.2	16” & 18” Sabine Pipeline	0.4
26.4	26.6	0.2	Shell Pipeline	0.3
26.6	30.1	3.5	Enterprise Sabine Pipeline	6.4
30.1	30.5	0.4	Strategic Pipeline	0.8
31.3	40.2	8.8	Enterprise Pipeline	16.1
44.3	45.3	1.0	4” Conoco Pipeline	1.7
56.1	59.8	3.6	30” Trunkline Pipeline	6.6
60.9	62.5	1.6	Gulf South Pipeline	2.9
66.2	72.5	6.3	16” Dynegy Pipeline	11.5
72.5	74.9	2.3	16” Texaco Petro-Chemical Pipeline	4.2
74.9	76.3	1.4	16” Texaco Petro-Chemical Pipeline	2.6
76.90	88.7	11.8	16” Texaco Petro-Chemical Pipeline	21.4
89.0	89.7	0.6	16” Texaco Petro-Chemical Pipeline	1.2
101.5	108.5	7.0	EHP Egan Pipeline	12.7
108.5	111.3	2.8	26” ANR Pipeline	5.1
112.0	112.4	0.5	30” ANR Pipeline	0.9
118.3	122.0	3.7	Targa Pipeline	6.7
122.0	131.9	9.9	30” Transco Pipeline	17.9
FGT Lateral				
0.0	0.1	0.1	26" ANR	0.1
0.1	2.3	2.2	24" FGT	4.1
	Total	73.7		133.9

[a] Construction right-of-way overlap with existing rights-of-way would be limited to approximately 15 feet.
[b] Represents the only existing right-of-way along that portion of the project where Legs 1 and 2 would parallel one another.

construction, all temporary extra workspaces would be allowed to revert to their preconstruction use and cover type.

4.8.1.2 Aboveground Facilities

KMLP would construct 14 aboveground facilities. Each of these facilities is an interconnect with an existing interstate or intrastate pipeline that would contain a mainline valve and a block valve. Typically, these facilities would be fenced and range in size from 0.3 to 1 acre (table 4.8.1.2-1). The total land requirements for the aboveground facilities would be 12.3 acres during construction and operation, the majority of which (63.4 percent) would be agricultural lands. All 12.3 acres would be permanently converted to commercial/industrial land use.

TABLE 4.8.1.2-1

Acres of Land Affected by Construction and Operation of the Aboveground Facilities

Pipeline Facility	MP	Land Disturbed During Construction (acres)	Land Required for Operation (acres)
Leg 1			
Southwest Loop Interconnect Site	28.2	0.92	0.92
Sabine Interconnect Site	61.4	0.92	0.92
TGTPL Interconnect Site	87.5	0.97	0.97
Trunkline Interconnect Site	91.5	0.94	0.94
TGT Interconnect Site	110.0	0.92	0.92
ANR #1 Interconnect Site	111.3	1.04	1.04
ANR #2 Interconnect Site	112.0	1.02	1.02
TET Interconnect Site	117.0	0.92	0.92
Transco Interconnect Site	122.1	0.80	0.80
CGT Interconnect Site	132.2	0.92	0.92
Leg 2			
NGPL Interconnect Site	1.2	0.84	0.84
Bridgeline Interconnect Site	N/A[a]	0.86	0.86
Southwest Loop Johnson's Bayou Delivery Point	N/A[a]	0.86	0.86
FGT Lateral			
FGT Interconnect Site	2.30	0.34	0.34
Total		**12.3**	**12.3**

[a] Located in Johnsons Bayou near the end of the existing UTOS system.

4.8.1.3 Access Roads

Appendix C lists the access roads, their location, modifications required, surface area potentially affected, and current land use of that area. Where feasible, KMLP would use existing public roadways, existing private roadways, and/or the pipeline right-of-way to gain access during construction and operation of the Project. KMLP has proposed the temporary use of 69 existing access roads of varying lengths. KMLP stated that 53 of the existing access roads, comprising a length of approximately 26.1 miles, would require modifications to support construction-related traffic and equipment. Modifications may include grading and/or placement of additional gravel on the existing surface. Where possible, board matting would be used instead of constructing new roads. However, 6 new roads totaling 0.7 miles would be constructed. In total, the construction access roads would disturb a total of 74.2 acres. Following construction, 5 roads encompassing 6.9 acres would be maintained as permanent access roads. The remaining access roads would revert to their preconstruction uses.

4.8.1.4 Pipe Storage and Contractor Yards

KMLP has proposed the use of 12 pipe storage and contractor yards, encompassing 378.7 acres, during construction. Approximately 73.2 percent of this land would be agricultural and 26.8 percent would be open land. The general locations of these facilities are depicted in appendices B and C. All yards would be leased. Depending upon the condition of these yards and their current use, some surface grading, drainage improvements, placement of surface materials, and internal roadways may be required. Upon completion of construction activities, the pipe storage and contractor yards would be returned to their preconstruction condition or as specified by landowner agreement.

4.8.2 Acquisition of Land through Easements and Eminent Domain

KMLP would obtain easements from landowners to construct and operate the pipeline and associated facilities. The easements would give the company the right to construct, operate, and maintain the pipeline and establish a permanent right-of-way. In return, the company would compensate the landowner for use of the land. Easement agreements between the company and the landowner typically specify compensation for loss of use during construction, loss of non-renewable or other resources, and allowable uses and restrictions on the permanent right-of-way after construction. These terms can include restrictions on the construction of aboveground structures, including house additions, garages, patios, pools, or any other object not easily removable from the right-of-way, or the planting and cultivating of trees and orchards.

KMLP could be granted the right of eminent domain (section 7(h) of the NGA and the procedures set forth under the Federal Rules of Civic Procedure [Rule 71A]) if easement agreements cannot be negotiated. Under these conditions, the landowner could receive compensation, but the compensation would be determined by the courts.

4.8.3 Land Use Impacts and Mitigation

4.8.3.1 Agricultural Areas

The 1,472.1 acres of agricultural land affected by the Project would primarily include pastureland, land used for rice production, and areas used for crawfish production. The primary impact in these areas would be short-term loss of production due to construction-related activities. About 7.9 acres of agricultural land occupied by the aboveground facilities would be permanently converted to developed land. Agricultural land within the pipeline right-of-way would be allowed to revert to pre-construction conditions following construction.

In accordance with our Plan, KMLP would implement special construction procedures in agricultural areas to minimize potential impacts. Topsoil would be removed and stockpiled separately from excavated subsoils and the natural flow patterns of all fields would be maintained by providing breaks in topsoil and subsoil stockpiles. KMLP would also work with landowners prior to construction to identify irrigation lines and drainage improvements in order to minimize construction-related impacts. In addition, crop yields would be monitored following construction to ensure that yields in areas affected by construction were similar to that in adjacent, undisturbed areas, as described in section 2.3. Finally, the owners of agricultural land would be compensated for the loss of agricultural production in accordance with the terms of landowner agreements. Therefore, we believe that impacts to agricultural land would be short term and offset by compensation agreed to during easement negotiations.

4.8.3.2 Open Water

Approximately 569.1 acres of open waters would be included in the construction right-of-way. The majority of that acreage would be in Sabine Lake (approximately 408.6 acres). Impacts to southern and northern shores of Sabine Lake would be avoided by use of HDD. Construction within the open-water portion of Sabine Lake would be conducted using shallow draft barges as described in section 2.3.1.3. This technique would require excavation of channels between existing navigation channels and the right-of-way and a channel along the right-of-way itself. To allow sufficient space for the storage of excavated spoil from the channels and pipe trenches, KMLP has requested a construction right-of-way width of 300 feet in water depths less than 8 feet and 200 feet in water depths greater than 8 feet.

To mitigate potential navigation impacts in Sabine Lake, KMLP has indicated that they would provide project-specific details to the U.S. Coast Guard such as the timing of and areas in which water-based construction would occur, as well as the types of vessels that would be utilized. In addition, spaces would be left between spoil piles and KMLP would install timber piles with navigational lights and warning signals to allow shallow draft vessels to pass over the open trench. KMLP would comply with all navigation rules and regulations in the Project vicinity. Following construction, acreage within both the construction and permanent right-of-way would revert to their previous use.

As discussed in section 4.6.3, Sabine Lake is a public oyster seed ground and public oyster tonging area in Louisiana. As such, KMLP has agreed to compensate LDWF for any construction-related impacts to oysters or shellfish in Sabine Lake.

Therefore, we believe that impacts related to the temporary utilization of open water for construction would be minor and short term.

4.8.3.3 Forest

The 150.6 acres of forest that would be affected by the Project include deciduous forest, evergreen forest, mixed forest, and forested wetland. There are no pine plantations or other silviculture crops within the 150.6 acres. As detailed in section 4.5.2, impacts to forested land would be minor but would persist for the life of the Project. A total of 58.7 acres of currently forested land would be converted to maintained pipeline right-of-way.

4.8.3.4 Developed Land

About 130.2 acres of developed land would be crossed by the Project, consisting of congested pipeline corridors, transportation corridors, a marina on the east bank of the Calcasieu River, and the southern edge of the Trunkline LNG facility. Standard upland construction methods would be used in most of these areas and measures included in our Plan would be incorporated to minimize impacts to such developed lands. From MP 51.8 to MP 52.4 (see table 4.3.2.1-3), KMLP proposes to HDD under the marina on the east bank of the Calcasieu River. However KMLP has not provided its site-specific construction plans. We are recommending in section 4.3.2.3 that KMLP file site-specific construction plans for this area.

4.8.3.5 Open Land, Beaches, and Other

The Project would affect 706.0 acres of open land, 0.2 acres of beaches, and 2.0 acres of other land uses within the construction right-of-way and temporary extra workspaces. In general, standard overland construction techniques would be used for installation of the pipeline and KMLP would use measures included in our Plan and Procedures to minimize impacts. Following construction, all open land, beach, and other acreage outside the permanent right-of-way would be allowed to revert to its preconstruction land use. The remaining 221.8 acres within the permanent right-of-way, primarily comprised of open land (221.0 acres), would be maintained as necessary for operation. With the use of our Plan and Procedures, impact to these areas would be minimal.

4.8.3.6 Residences and Planned Residential Developments

During pre-filing, a planned development called the South Forty Acre Subdivision was identified at approximately MP 114.0 of the Leg 1 route originally considered. As a result, KMLP modified the route to avoid this area as is further discussed in section 3.4.11 of this draft EIS). The currently proposed route would not impact any planned developments.

KMLP identified 14 structures within 50 feet of the construction right-of-way (table 4.8.3.6-1). None of these structures were identified as residences. However, 9 of the 14 structures have been generically identified as buildings. Therefore, **we recommend that:**

- **KMLP revise table 4.8.3.6-1 and explicitly identify all structures and residences within 50 feet of the construction work areas. KMLP should file the revised table with the Secretary prior to the close of the comment period on the draft EIS.**

To minimize potential disruptions to residential areas near construction work areas, KMLP would attempt to coordinate construction work schedules with affected landowners prior to starting construction. To further minimize impacts to residential areas within the vicinity of construction work areas, KMLP would implement the following measures on an as-needed basis:

- notify land owners of the need to remove fences and gates;
- install temporary safety fencing to control access and minimize the hazards associated with an open trench;
- notify affected landowners in advance of any scheduled disruption of household utilities and limit the duration of any interruption to the smallest time possible;
- repair any damages to residential property that result from construction activities or provide compensation at fair market value; and
- restore all areas disturbed by construction work areas to "as before or better" conditions.

As described in section 2.5, KMLP would be responsible for monitoring and ensuring compliance with all environmental mitigation measures required by the FERC Certificate. In fulfilling this responsibility, KMLP would be required to develop and implement an environmental complaint resolution procedure to provide landowners with clear and simple directions for identifying and resolving their environmental mitigation problems/concerns during construction of the Project and restoration of the right-of-way. In addition, in section 4.12 we are recommending that KMLP develop a noise mitigation and compliance plan for HDD in residential areas.

TABLE 4.8.3.6-1 Structures Within 50 Feet of the Construction Work Areas				
Structure	**MP**	**Parish**	**Distance from Pipeline Centerline (feet)**	**Distance from the Construction Work Area (feet)**
Building	38.3	Calcasieu	40	75
Barn	46.0	Calcasieu	25	100
Building	48.3	Calcasieu	0	100
Barn	48.4	Calcasieu	10	80
Building	51.1	Calcasieu	5	75
Building	51.1	Calcasieu	25	100
Building	52.2	Calcasieu	25	100
Building	52.2	Calcasieu	50	115
Cattle Loading Pen[a]	71.1	Calcasieu	0	20
Building	87.7	Jefferson Davis	10	85
Shed[a]	91.4	Jefferson Davis	0	5
Shed	121.6	Evangeline	50	125
Building	123.1	Evangeline	40	150
Building	123.2	Evangeline	25	175

[a] These structures, located entirely or partially within the construction workspace, would either be relocated or the landowner would be compensated accordingly.

With the implementation of above measures, impact to residential areas would be minimal and these impacts would generally be limited to the construction period.

4.8.3.7 Recreation and Special Use Areas

Recreation and special use areas in the vicinity of the Project are defined to include inshore open waters with recreational uses; National Wildlife Refuges; scenic byways; Wetland and Hydrologic Restoration Projects; Conservation Reserve and Wetland Reserve Program lands; FWS Conservation Easements; national or state scenic rivers; levee crossings; and hazardous waste sites. For a detailed discussion of the Black Bayou Hydrologic Restoration Project, the Perry Ridge Shore Protection Project, Conservation Reserve Program Lands, and FWS Conservation Easements, see section 4.4.

Inshore Open Waters

Inshore waters of Louisiana, including Sabine Lake, provide recreational boating and fishing opportunities as well as means of transit to areas where these activities are pursued. Section 4.8.3.2 above summarizes the proposed construction methods in Sabine Lake along with the precautions that would be taken to avoid impacts to navigation.

Assuming the construction spread occupies all of the approximate 13 miles of the pipeline route through Sabine Lake, at the maximum construction right-of-way width (300 feet), the decrease in the surface area of Sabine Lake available to recreational boaters would be less than 1 percent. This decrease in availability would be temporary, lasting only as long as the construction activities across Sabine Lake.

Based on these factors, impacts to recreation on inshore waters are considered to be minor and short term.

National Wildlife Refuges

Sabine National Wildlife Refuge

The SNWR occupies approximately 125,000 acres of marshes between Calcasieu and Sabine Lakes in southwest Louisiana. According to the FWS, the refuge provides habitat for migratory waterfowl and other birds, and was designated an "Internationally Important Bird Area" due to the abundant year-round populations of wading, water, and marsh birds. There are also large concentrations of alligators, muskrats, nutria, raptors, blue crabs, and shrimp. Approximately 280,000 people visit the area each year for a variety of recreational and educational activities such as hiking, fishing, boating, camping, and hunting (FWS no date a).

The pipeline route does not cross the SNWR; at its closest points, between MP 15.0 and 17.0, the SNWR would be approximately 0.25 miles from the pipeline. During construction, noise associated with the installation of the pipeline may disturb wildlife; however, noise-related impacts would be short term and minor. Given the distance between the SNWR and the Project, construction and operation of the Project would not impact the SNWR.

Lacassine National Wildlife Refuge

The Lacassine National Wildlife Refuge (LNWR) encompasses about 35,000 acres, mostly freshwater marsh habitat that functions as a wintering site for waterfowl. Nesting colonies of wading birds, alligators, and furbearers such as mink, otter, and raccoon are found on the refuge. Threatened and endangered species that have used the refuge include bald eagles, peregrine falcons, and Louisiana black bears. The refuge is also used for recreational purposes, hunting and fishing being two of the most popular recreational activities (FWS no date b).

The Project pipeline would not cross the Lacassine NWR. At its closest point, the pipeline would be approximately 2 miles southeast of the Vidrine Unit and more than 15 miles northwest of the main unit. Given this distance, construction and operation of the Project would not affect either unit of the LNWR.

Scenic Byways

The 180-mile Creole Nature Trail National Scenic Byway takes visitors through three different wildlife refuges and a bird sanctuary and offers drivers and their passengers a view of Louisiana's environment and wildlife. The roads that comprise the trail, SHs 82, 27, and 14, cut through the marshlands of southern Calcasieu and Cameron Parishes and then hug the coast of the Gulf of Mexico (MilebyMile 2006).

The Project would cross the Creole Nature Trail National Scenic Byway at three locations: SH 82 at MP 1.5; SH 27 at MP 47.8; and SH 14 at MP 64.7. The Project would cross these roadways using HDD or conventional boring construction methods, which would not require road closures or open cutting of the roadways. Impacts would be limited to potential short-term traffic disruptions associated with the construction equipment and alterations to the viewshed. Because KMLP would be required to maintain safe and accessible conditions at road crossings in accordance with our Plan, traffic disruptions would be minimal. See section 4.8.4 for a discussion of the minor visual impacts to the Byway.

4.8.3.8 Wetland Restoration and Mitigation Projects

Section 4.4 discusses the potential impacts to the Black Bayou Hydrologic Restoration Project and the Perry Ridge Shore Protection Project located in the Project vicinity. Section 4.4 also discusses the potential impacts to CRP lands.

There would be no impacts to WRP lands because there are no such lands located in parishes that would be crossed by the Project.

The FWS works with private landowners that voluntarily restore wetlands or other valuable wildlife habitats on their property by providing financial assistance from the federal government (FWS 2006b). If such properties are along the route, KMLP would need to obtain a Compatible-Use Determination and ascertain the need for any Special Use Permit in association with the crossing of the conservation easement. Based on the most recent database currently available, which has not been updated since 1996, FWS indicates that there are no conservation easements in the project area (FWS 2007). However, given the lack of updated information, FWS states that KMLP should conduct further consultation to determine if the Project could affect any conservation easements. Therefore, **we recommend that:**

- **KMLP consult with the FWS to determine if FWS conservation easement properties are crossed by the Project. KMLP should file with the Secretary documentation of its consultation with FWS, including any recommended mitigation measures, for review and written approval by the Director of OEP prior to construction.**

4.8.3.9 Natural and Scenic Rivers

The Louisiana Natural and Scenic Rivers System was establish to preserve, protect, develop, retain, and enhance the wilderness qualities, scenic beauty, and ecological regime of certain streams or segments thereof. The program was also intended to preserve aesthetic, scenic, recreational, ecological, and other natural and physical features and resources found along these streams or segments thereof (LDWF 2006a). The Project would not cross any Natural or Scenic River.

4.8.3.10 Hazardous Waste Sites

During the pre-filing process, KMLP identified a Class C landfill approximately 990 feet north of the originally considered route. Subsequently, KMLP rerouted the pipeline route to avoid this facility (this route variation is discussed further in section 3.4.4 of this draft EIS). KMLP has reviewed both LDEQ and EPA websites to identify any known hazardous waste sites within 0.25 miles of the Project right-of-way. None have been identified. No sites were identified during environmental surveys of the Project route.

In the unexpected event that construction of the Project encroaches on a contaminated area, KMLP would stop work, notify the appropriate state and federal agencies, and proceed in accordance with local, state, and federal regulations. As discussed in section 4.2.2.1, we are recommending that that KMLP develop a Plan for the Discovery and Management of Contaminated Soil and Groundwater. Development and implementation of this plan would ensure that any previously existing contamination that may be encountered during construction would be managed in accordance with applicable regulatory requirements.

4.8.4 Visual Resources

Visual resources refer to the composite of basic terrain, geologic features, hydrologic features, vegetative patterns, and anthropogenic features that influence the visual appeal an area may have for residents or visitors. The Project could alter existing visual resources in three ways: (1) construction activity and equipment may temporarily alter viewscapes; (2) construction and right-of-way maintenance would alter existing vegetation patterns; and (3) aboveground facilities would represent permanent alterations to the viewscape. The significance of these visual impacts would be primarily dependent upon the quality of the current viewshed, the degree of alteration of that view, the number of potential viewers, and the perspective of the viewer.

Most of the Project would extend through open water and primarily rural areas that consist of agricultural lands and open lands with scattered residences. There are several existing pipelines in the vicinity of the Project, and the KMLP pipeline would parallel some of these existing rights-of-way. Many areas along the Project are either inaccessible or do not provide long-range unobstructed views, but public viewpoints are present along some of the roadways in the area.

4.8.4.1 Pipeline Facilities

Construction and operation of the pipeline may affect visual resources by altering the terrain and vegetation patterns during construction or right-of-way maintenance. The landscape setting along the pipeline route is generally flat, and views of the construction activities may extend for some distance. However, the construction work areas would be restored as near as possible to preconstruction contours and revegetated. Once revegetation is complete, there would be no significant alteration of the landscape of the region.

As discussed in section 4.8.3.7, the pipeline would cross the Creole Nature Trail National Scenic Byway at three locations: SH 82 at MP 1.5; SH 27 at MP 47.8; and SH 14 at MP 64.7. While there are no federal or state regulations that protect the viewshed of the byway, it is an area that offers viewing opportunities for visitors and residents. KMLP would cross the Byway using HDD or conventional boring construction methods. Visual impacts would generally be temporary and minor, similar to those described above.

4.8.4.2 Aboveground Facilities

Aboveground facilities would be located within or immediately adjacent to the pipeline right-of-way. Most would either be constructed in areas whose existing viewsheds contain similar features, within existing utility rights-of-way or industrial facilities, or in areas where views would be screened by existing vegetation and/or topography. When not screened from view, aboveground facilities would appear as a small fenced area within a cleared right-of-way corridor or open field. The Transco Interconnect (MP 122.1) would be located near residences and would likely have a direct view of the site. Therefore, **we recommend that:**

- **KMLP develop a site-screening plan for the Transco Interconnect site (MP 122.1) and file that plan with the Secretary for review and written approval by the Director of OEP prior to construction.**

4.8.5 Coastal Zone Management

The CZMA provides states the authority to review any project within that state's coastal zone if it has a federally approved CZM program. Projects that require federal licenses or permits must draft a "consistency certification" to assure the project meets the state's CZM program standards.

Portions of the Project (MPs 0.0 to 23.1) fall within Louisiana's coastal zone, which is managed by the Coastal Management Division (CMD) of the LDNR. KMLP has consulted with the CMD and will prepare and submit a Coastal-Use Permit application to the CMD as part of the Joint Permit Application with the COE. Upon receipt and review of that document, LDNR will determine if the Project is consistent with Louisiana's coastal zone management program. A determination from the LDNR that the Project is consistent with the laws and rules of the CZM program must be received before we issue a notice to proceed. Therefore, **we recommend that:**

- **KMLP not begin construction on any facilities associated with the Project until it files with the Secretary a copy of the CZM Program consistency determination issued by the LDNR.**

4.9 SOCIOECONOMIC RESOURCES

4.9.1 Region of Influence

The Project would traverse five parishes in Louisiana (Cameron, Calcasieu, Jefferson Davis, Acadia, and Evangeline). For the purposes of our socioeconomic analysis, we define these parishes as the Project's region of influence. Although an extra workspace has also been identified in Orange County, Texas (see section 2.2), this county was not included in the region of influence because quantifiable socioeconomic impacts would not be expected to result from the 50-foot by 4,200-foot floating pre-fabrication site alongside Goat Island in this area (approximately MP 17.9 to 18.6).

4.9.2 Population

Table 4.9.2-1 reports populations and selected demographic characteristics for Louisiana and the five Parishes that would be traversed. Based on census data for the year 2000 (U.S. Census Bureau 2005a), the total population in these parishes is 321,341. Population levels were relatively stable between 2000 and 2005 with no parish having more than a 5 percent change in population over the five-year period.

TABLE 4.9.2-1

Population Conditions in the Vicinity of the Proposed Project

State/Parish	Population		Percent Change	Population Density	
	2000	2005		2000	2005
Louisiana	4,468,976	4,523,628	1.2%	102.6	103.8
Cameron Parish	9,991	9,558	-4.3%	7.6	7.3
Calcasieu Parish	183,577	185,419	1.0%	171.4	173.1
Jefferson Davis Parish	31,435	31,272	-0.5%	48.2	48.0
Acadia Parish	28,861	59,552	1.2%	89.8	90.9
Evangeline Parish	35,434	35,540	0.3%	53.3	53.5

Based on 601 relocating (231 non-local workers and 2.6 peps per HH)
0.21% pop change over project vicinity

Population densities in the region of influence range from a low of 7.3 persons per square mile in Cameron Parish to a high of 173.1 persons per square mile in Calcasieu Parish. These densities are relatively low compared to urban area densities that typically range from 3,000 to 6,000 persons per square mile (FERC 2003) but are consistent with an area that is predominately rural and agricultural.

Potential impacts to local populations from the Project would result from the influx of non-local workers for construction (temporary) and operation (permanent). As outlined in section 2.4. KMLP would make an effort to hire local workers where practical. This would mitigate any potential affects on population levels and or demographics.

Construction of the Project would occur between November 2007 and November 2008 (see table 4.9.2-2). The peak construction workforce is projected to be 385 workers. KMLP anticipates

TABLE 4.9.2-2

Estimated Workforce in the Vicinity of the Proposed Project

Project Component	Parish	Approximate Construction Dates		Estimated Workforce
Leg 1 Pipeline	See comment below	Nov 2007	Nov 2008	250
Leg 2 Pipeline	Cameron	Nov 2007	April 2008	19
FGT Lateral	Acadia	Sept 2008	Oct 2008	32
Southwest Loop Delivery Point	Calcasieu	March 2008	April 2008	18
Sabine Interconnect Site	Calcasieu	May 2008	June 2008	18
TGTPL Interconnect Site	Jefferson Davis	July 2008	Aug 2008	18
TLG Interconnect Site	Jefferson Davis	Sept 2008	Oct 2008	18
TGT Interconnect Site	Acadia	Aug 2008	Sept 2008	18
FGT Interconnect Site	Acadia	Oct 2008	Nov 2008	18
ANR Interconnect Site	Acadia	April 2008	May 2008	18
TET Interconnect Site	Evangeline	June 2008	July 2008	18
Transco Interconnect Site	Evangeline	Aug 2008	Sept 2008	18
CGT Interconnect Site	Evangeline	Oct 2008	Nov 2008	18
NGPL Interconnect Site	Cameron	Nov 2007	Dec 2007	18
Bridgeline Interconnect Site	Cameron	Jan 2008	Feb 2008	18
Southwest Loop Johnsons Bayou Delivery Point	Cameron	Jan 2008	Feb 2008	12

Leg 1, a 42-inch-diameter pipeline, would run 132 miles traversing five parishes in Louisiana (Cameron, Calcasieu, Jefferson Davis, Acadia, and Evangeline).

that about 60 percent (231 employees at the peak) of the construction workforce would be made up of non-local workers who would temporarily locate to the Project vicinity. Although the construction phase is relatively short, some families may accompany non-local workers. Based on the peak non-local workforce of 231 persons and applying the U.S. Census Bureau's 2000 statistic of 2.6 persons per household in Louisiana, as many as 601 people might temporarily relocate to the Project vicinity. If all workers were to reside in one parish at one time, moderate (up to 6 percent) population increases would occur. However, it is very unlikely that this would occur as KMLP has indicated that construction of the pipeline would entail the simultaneous activity of several individual construction spreads that would be distributed across the Project route. As such, workers would likely be distributed throughout the Project vicinity, resulting in negligible population and demographic alterations.

During operation, KMLP estimates that the Project would employ approximately four full-time equivalent workers. This would represent a negligible, long-term change in population.

4.9.3 Employment and Economy

The civilian labor force within the Project vicinity includes about 137,485 individuals. The major employment sector in four of the five Parishes is education, health and social services. The exception is in Cameron Parish where the major employment sectors are agriculture, forestry, fishing and hunting, and mining. On average, the parishes within the Project vicinity report slightly lower unemployment and per capita income than the state-level values reported for Louisiana (table 4.9.3-1).

TABLE 4.9.3-1

Employment Conditions in the Vicinity of the Proposed Project

State/Parish	Per Capita Income 1999	Civilian Labor Force 2000	Unemployment Rate (percent) 2000	Top Employment Industry 2000
Louisiana	$16,912	1,997,995	7.3	Educational, health, and social services
Cameron Parish	$15,348	4,384	4.6	Agriculture, forestry, fishing and hunting, and mining
Calcasieu Parish	$17,710	85,325	6.9	Educational, health, and social services
Jefferson Davis Parish	$13,398	12,597	7.9	Educational, health, and social services
Acadia Parish	$13,424	23,158	7.1	Educational, health, and social services
Evangeline Parish	$11,432	12,021	7.3	Educational, health, and social services

The actual workforce and proportion of local workers would depend on the capabilities of the contractor, available workforce, and maximized efficiencies. KMLP anticipates a total of 529 employment opportunities would be necessary to construct the pipeline and that the peak construction workforce at any given point in time would be 385 employees. As indicated in section 4.9.2, KMLP expects that 40 percent of the construction workforce would be hired from the local workforce (i.e., existing residents of the region of influence), and 60 percent would come from outside the region of influence. Additional jobs could also be created as a result of secondary activity associated with construction of the Project, as purchases made by non-local workers on food, clothing, lodging, gasoline, and entertainment will have a temporary, stimulatory effect on the local economy. These jobs would represent a temporary, moderate increase in employment opportunities in the region of influence.

During operation, four full-time equivalent positions would be created. Two of these positions would be stationed out the Sabine Pass LNG Terminal in Cameron Parish with the remaining serving as pipeline operators. These jobs would represent a negligible, permanent increase in the number of employment opportunities within the Project vicinity.

4.9.4 Housing

Tables 4.9.4-1 and 4.9.4-2 report selected housing statistics for Louisiana and the five parishes traversed by the pipeline. Table 4.9.4-1 reports total housing units, both occupied and unoccupied, median monthly rent rates and the rental vacancy rates. Table 4.9.4-2 provides further analysis of those units that are classified as unoccupied, or vacant, in 2000.

There are approximately 7,479 vacant rental units and units used for seasonal, recreational, or occasional use. Additional hotel or motel rooms supplement this potential housing stock. Four of the five parishes in the Project vicinity have rental vacancy rates that exceeded Louisiana’s rental vacancy rate of 9.3 percent in 2000. Median monthly rent is typically lower than the state average. In 2000 the number of unoccupied units ranged from a low of 1,522 in Evangeline Parish to a high of 7,382 in Calcasieu Parish.

TABLE 4.9.4-1

General Housing Conditions in the Vicinity of the Proposed Project

State/Parish	Total Housing Units	Total Occupied Units	Total Occupied Rental Units	Total Unoccupied Units	Median Monthly Rent	Rental Vacancy Rate (percent)
Louisiana	1,847,181	1,656,053	530,918	191,128	$466	9.3
Cameron Parish	5,336	3,592	536	1,744	$412	18.4
Calcasieu Parish	75,995	68,613	19,507	7,382	$465	14.1
Jefferson Davis Parish	12,842	11,480	2,883	1,344	$353	9.9
Acadia Parish	23,209	21,142	5,882	2,067	$332	9.9
Evangeline Parish	14,258	12,736	3,902	1,522	$289	6.4

TABLE 4.9.4-2

Unoccupied Housing Characteristics in the Vicinity of the Proposed Project

State/Parish	Vacant Rental Units	Units for Sale	Units Rented or Sold, Not Occupied	Vacant for Seasonal, Recreational, or Occasional Use	Vacant for Migrant Workers	Other Vacant	Total Unoccupied Units
Louisiana	54,485	18,097	18,144	39,578	525	60,599	
Cameron Parish	121	52	57	1,331	0	183	1,744
Calcasieu Parish	3,191	849	607	684	27	2,024	7,382
Jefferson Davis Parish	317	210	189	223	8	397	1,344
Acadia Parish	648	177	142	243	12	845	2,067
Evangeline Parish	267	149	83	472	3	548	1,522
Total	4,544	1,437	1,078	2,953	50	3,997	14,059

At its peak, construction of the Project would require about 231 non-local workers, as described in section 4.9.2. If each worker required his or her own housing unit, the non-local work force would occupy about 16.4 percent of the temporary housing within the region of influence. Thus, the temporary housing available within the region of influence would be capable of meeting this temporary and moderate increased demand for housing resulting from construction of the Project.

Housing demand for the four, permanent positions generated by operation of the Project would represent a permanent but negligible increase in housing demand.

4.9.5 Infrastructure and Public Services

Educational, medical, police, and fire protection employees in the counties and parishes traversed by the Project serve a population of approximately 320,000 people.

Construction of the Project could temporarily increase demand for medical, police, and fire protection associated with permit issuance, traffic control, and potential response to accidents during construction. KMLP would work with local law enforcement and emergency response agencies to coordinate effective emergency response for the Project during construction and operation (see section 4.13.1).

We note that construction would occur during the school year. However, due to the nature of the construction and its relatively short duration (about a year), non-local workers are not expected to be accompanied by substantial numbers of children.

Thus, any impact the provision of public services would be minor and temporary. The potential costs associated with this potential increase in demand would be offset by the Project-related increase in government revenues.

During operation, workers filling the four full time positions and their associated family members would represent a minor, permanent increase in the demand for the provision of public services. However, this increased demand would be offset by the Project-related increase in government revenues associated with operation.

4.9.6 Transportation and Traffic

4.9.6.1 Land Transportation

Potential short-term impacts to existing infrastructure would result from traffic delays due to deployment of equipment and construction personnel, and road crossings. The Project would primarily be accessed by SH 82, Route 27 and Interstate 10. Additional routes providing access to the pipeline off of Interstate 10 are SHs 397, 395, 385, 102, 101, 99, 97, 91, and 13. SHs 82 and 27 generally have light traffic levels given their rural location (FERC 2006b). Interstate 10 is subject to moderate levels of traffic with a 2001 average annual daily traffic count of 55,517 in the Lake Charles region (AA Roads 2006).

A substantial increase in road traffic associated with transportation of construction equipment and pipe to the Project vicinity would result in traffic delays. However, such delays would be temporary and short-term. Upon delivery of construction equipment and pipe to the respective laydown areas and road crossings, construction based traffic would be limited to the right of way.

Construction workers commuting to and from construction areas would likely have a minor impact on commuter traffic. Given the relatively short construction period, construction activities would utilize available daylight hours, resulting in off-peak hour commutes for workers. Further, construction workers would be dispersed across the pipeline right of way in five construction spreads, thus keeping disruptions in traffic to minor short-term impacts for any one location at any given time.

Construction of new access roads would be limited to less than three quarters of a mile in total length, occurring primarily in Calcasieu Parish. The Applicant has indicated that upon completion of the pipeline, newly constructed access roads would be removed, and the land restored to its original contours and use. Exceptions may occur where requested by individual landowners or where the access road is required for ongoing maintenance of the pipeline right-of-way. This represents a short-term, negligible impact to the current land uses.

KMLP indicates that most paved roads and railroads would be crossed using the boring or HDD method to mitigate traffic disruptions and direct surface impacts. Alternatively, unpaved roads and one abandoned railroad (approximate MP 74.9) would be crossed using the open cut method. This method can cause temporary traffic delays. However, through the use of adequate signs, safety barriers, and pre-established detours KMLP would minimize these interruptions to road traffic. During pipe installation at road crossings, which typical take only a day, construction practices include keeping one lane of traffic open where no reasonable detours are feasible or where construction takes place during peak traffic hours.

KMLP has indicated that it would repair any significant damage done to transportation infrastructure that is a direct result of pipeline construction. Thus, impacts to land transportation facilities are expected to be minor and short-term.

4.9.6.2 Marine Transportation

Construction of the pipeline would cross Sabine lake, the Intracoastal Waterway, and the Calcasieu River. Potential impacts would be temporary impacts to commercial and recreational boats resulting from the construction activities associated with water crossings, as described in sections 4.8.3.2 and 4.8.3.7. Impacts would be due to project-related marine traffic, including pipe and material delivery barges and construction barges. Project related impacts would primarily affect barges and smaller recreational vessels.

In order to mitigate these potential impacts in Sabine Lake (approximate MP 4.8 to MP 18.0), KMLP has indicated that the pipeline would be installed using barges with anchor spuds. This procedure would minimize impacts resulting from construction operations. Furthermore, the Applicant has indicated that prior to construction it will provide project specific details to the U.S. Coast Guard such as the timing of, and areas in which, water-based construction would occur, as well as the types of vessels that would be utilized. The U.S. Coast Guard will then disseminate this information in a Notice to Mariners. In addition, construction practices within Sabine Lake would entail leaving spaces between spoil piles for navigational purposes. To facilitate passage through these areas KMLP would install timber piles with navigational lights and warning signals. Finally, the Applicant has indicated it would comply with all navigation rules and regulations in the Project vicinity.

The pipeline would also cross the waters of the Intracoastal Waterway and Calcasieu River. These waters are important navigational channels for both commercial and recreational purposes. Leg one of the pipeline would cross the Intracoastal Waterway at several locations including approximate MP 18.6 to MP 18.7, MP19.01 to MP 19.7, MP 21.4 to MP 22.0, and MP 30.7 to MP 31.0 and the Calcasieu River at approximate MP 49.6 to MP 49.8. These crossings would be accomplished using the HDD method, which will avoid or minimize potential impacts on vessel traffic in these areas.

The operation of the pipeline in the waters of Sabine Lake, the Intracoastal Waterway, and Calcasieu River would not impact vessel traffic as the pipeline would be buried beneath the lake or river bottom. Thus, the pipeline would not impede vessel passage.

4.9.7 Government Tax Revenue

Tax revenue would be generated by the Project for the State of Louisiana and the respective parishes within the region of influence. KMLP has estimated annual taxes payable to local governments in the region of influence range from 1.1 million to 5.4 million. On average, operations-related taxes would represent approximately 2.0 percent of a parish's total revenues. Thus, operation of the Project would provide a permanent, minor increase in government revenues.

A portion of the estimated $65 million Project construction payroll would be spent locally for the purchase of housing, food, gasoline, and entertainment during construction by project employees. The exact amount spent would be dependent upon the proportion of the workforce that was local, the behavior of individual workers and the duration of their stay. In addition, KMLP has indicated that local suppliers would have the opportunity to submit proposals for Project-related work. To the extent that these local providers bid successfully, local expenditures during construction would increase. Construction-related expenditures made in Louisiana would be subject to Louisiana's state sales tax of 4 percent. This increase in sales tax would represent a minor, short-term increase in government revenues.

4.10 CULTURAL RESOURCES

Section 106 of the NHPA requires that the FERC take into account the effects of its undertakings (including the issuance of permits or certificates) on "historic properties," that is, properties listed on, or eligible for listing on, the NRHP. Section 106 also requires the FERC to provide the ACHP an opportunity to comment on the undertaking. KMLP, as a non-federal party, is assisting the FERC in meeting its obligations under section 106 and the implementing regulations in 36 CFR 800.

KMLP provided the Louisiana State Historic Preservation Office (SHPO) with a plan for identifying historic properties and involving Indian tribes. KMLP sent letters to Indian tribes summarizing the results of archaeological surveys and requesting information about these or other sites that may have religious and cultural significance. KMLP will provide the SHPO with detailed cultural resources survey reports and request concurrence on its evaluations of NRHP eligibility of identified properties. These consultation efforts are described in more detail below.

4.10.1 Consultation with Louisiana State Historic Preservation Officer

Consultation regarding the Project with the Louisiana SHPO was initiated in January 2006, when a cultural resource scope of work was submitted to the Louisiana SHPO. In February 2006, the SHPO accepted the proposed scope of work, including the definition of the area of potential effects (APE), proposed survey methodology, and Native American groups to be contacted. KMLP submitted State of Louisiana Site Record forms to the SHPO in September 2006. Once Louisiana site numbers are assigned, KMLP will incorporate these into the survey report and submit it for the SHPO's review and concurrence with eligibility evaluations.

4.10.2 Native American Consultation

KMLP submitted letters to the Alabama Coushatta Tribe of Texas, Caddo Nation, Chitimacha Tribe of Louisiana, Coushatta Tribe of Louisiana, Jena Band of Choctaw Indians, Mississippi Band of Choctaw Indians, Quapaw Tribe of Oklahoma, and Tunica-Biloxi Indians of Louisiana. Two letters were sent to representatives of these tribes, in April and August of 2006, informing them about the Project, the results of the initial cultural resources surveys, and requesting that they communicate any potential concerns they might have with respect to possible impacts to traditional cultural properties and historic properties.

The Caddo Nation responded that it knows of no traditional cultural properties in the potentially affected parishes. The Nation requested notification and copies of reports, should any cultural resources or archaeological sites be discovered. The Chitimacha Tribe of Louisiana responded that Acadia Parish is part of the Chitimacha homeland. Their records and oral traditions do not indicate the presence of a specific Chitimacha archaeological site or traditional cultural property in the immediate vicinity of the Project. The Chitimacha requested notification to begin consultation if archaeological remains representing a village site or burial site are discovered during construction. Responses have not yet been received from the other tribes.

4.10.3 Results of Cultural Resources Survey

KMLP conducted background cartographic, archival, and archeological review, as well as pedestrian survey and systematic shovel testing of the proposed pipeline corridor and ancillary facility locations. The investigation also included an assessment of all standing structures 50 years old or older that were located in the pipeline corridor, access roads, aboveground facilities, and pipe storage and contractor yards. The gathered information was used to assess NRHP eligibility of cultural resources.

A total of 122 miles of the pipeline were surveyed for cultural resources, consisting of 108.6 miles of terrestrial survey and 13.4 miles of underwater remote sensing. Ten interconnect sites that fell within the pipeline corridor were examined as part of the survey. Additionally, all 2.3 miles of the 24-inch FGT Lateral pipeline were surveyed, as well as 10 pipe storage and contractor yards, 66 access roads, the surface of four HDD locations, and 44 extra workspaces immediately adjacent to the construction right-of-way.

There remain 9.9 miles of the pipeline route, two pipe storage and contractor yards, four interconnect sites, and nine access road routes that have not been surveyed because permission from landowners to access these properties has not yet been obtained. KMLP has indicated that it will perform cultural resources surveys for the unsurveyed portions of the Project during subsequent investigations prior to construction. The surveys will include the inspection of the locations of three previously recorded archaeological sites that were not relocated during the initial survey, possibly because high water precluded thorough inspection.

In total, the survey identified 21 cultural resources within or adjacent to the APE: 11 locations where cultural materials were found on or under the ground, one submerged cultural resource, six historic standing structures, two previously recorded archaeological sites, and a single historic cemetery. KMLP archaeologists assessed all of these sites as ineligible for NRHP listing, and recommended no further work for these cultural resources. SHPO review of the survey report and concurrence with the eligibility assessments and recommendations is pending.

More specific information regarding the cultural resources survey results can be found in the sections below.

Pipeline Corridors

KMLP surveyed a 300-foot-wide corridor for the terrestrial portion of the pipeline route. A total of 15 cultural resources were discovered within the examined portion of the terrestrial section. In total, eight sites consisting of late nineteenth-century to early twentieth-century historic scatters, four early to mid-twentieth-century structures, and a single historic cemetery were encountered. Additionally, two previously recorded sites (16CM153 and 16CM154) between MP 4 and 5 were relocated and examined. Surveyors did not examine two previously recorded sites (16CM27 and 16CM59) between MPs 18 and 20 because HDD would avoid ground disturbance in these areas.

Because the pipeline corridor would be situated across an existing road from the cemetery, the historic cemetery would not be disturbed. KMLP proposes a HDD to avoid the two previously recorded archeological sites that were reexamined, as well as the two that were not reexamined.

KMLP surveyed a 3,000-foot-wide corridor extending through Sabine Lake for 13.4 miles. The underwater survey identified 15 targets for further analysis along the proposed pipeline route, only one of which was designated as a potential submerged cultural resource after consultation with archaeologists. This target (Target 6) is located more than 1,000 feet from the pipeline center. All other identified targets appear to represent either casually discarded or lost debris, or structures related to the oil and gas industry, and require no further action.

Gaps in data are present along the submerged pripeline route approximately 2,200 feet northeast of MP 6.0 near Tieline 401 and from approximately 900 feet north of MP 17 to landfall. Gaps are due primarily to the hazards of shallow water and the practical impossibility of operating remote sensing instruments in these waters. Significant underwater cultural resources are not anticipated in these shallow waters.

KMLP archaeologists recommend either avoidance of Target 6 or further investigation in consultation with regulatory authorities.

No cultural resources were identified within the current assessment of the FGT Lateral.

Pipe Storage/Contractor Yards

Of the 10 locations surveyed, a total of three cultural resource locations were encountered. Two consisted of late nineteenth-century to early twentieth-century historic scatters, and one was an early to mid-twentieth century historic standing structure.

Aboveground Facilities

No cultural resources were found on the 10 of the 14 interconnect sites surveyed.

Access Roads

KMLP anticipates that 75 temporary access roads would be required during construction. Cultural resource surveys have been completed for 66 of these routes, totaling 31.1 miles. The remaining nine access roads have not been surveyed because landowner permission has yet to be obtained. Two cultural resource locations were identified along access roads. One was a scatter of late nineteenth- to early twentieth-century historic materials, and one was an early to mid-twentieth century historic standing structure.

4.10.4 General Impacts and Mitigation

The results of cultural resources investigations to date have identified no properties eligible for the NRHP, and consequently no adverse effects to historic properties. The distance between the historic cemetery and pipeline trench is sufficient to avoid any ground disturbance to the cemetery. Pending SHPO review, KMLP has proposed avoidance or further investigations of one underwater target that may be a cultural resource. KMLP has also proposed to use HDD to avoid two previously recorded archaeological sites even though they are considered ineligible for the NRHP.

KMLP has not yet completed cultural resources surveys for about 9.9 miles of the pipeline route, two potential pipe storage and contractor yards, four interconnect sites, and nine access road routes because landowner permission for access has not yet been obtained. The completion of surveys and evaluations within these areas, as well as review and concurrence from the Louisiana SHPO regarding NRHP eligibility and project effects, would be required to complete the process of compliance with section 106 of NHPA.

Once cultural resources surveys and evaluations are complete, the FERC, in consultation with the Louisiana SHPO, would make determinations of NRHP eligibility and project effects. If any historic properties would be affected by the Project, we would seek ways to minimize or avoid adverse effects.

KMLP has indicated that it would conduct the additional surveys required along the pipeline route and file appropriate reports prior to construction. To ensure that the Commission's responsibilities under the NHPA and its implementing regulations are met, **we recommend that:**

- **KMLP defer construction and use of facilities and staging, storage, and temporary work areas and new or to be improved access until it files with the Secretary cultural resource reports, as appropriate, and the SHPO's comments; and the Director of OEP reviews and approves all reports and notifies KMLP in writing that it may proceed.**

  All material filed with the Commission containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "CONTAINS PRIVILEGED INFORMATION--DO NOT RELEASE."

4.10.5 Unanticipated Discovery Plan

As part of its application, KMLP provided its Unanticipated Discovery Plan to be used in the event that previously unidentified cultural resources such as archeological sites, historic features, or human remains are encountered during project construction. The Unanticipated Discovery Plan is acceptable.

4.11 CUMULATIVE IMPACTS

The CEQ (40 CFR 1508.7) defines a cumulative impact as "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." The purpose of this cumulative impacts analysis is to identify and describe cumulative impacts to environmental resources that would potentially result from the KMLP Project when added to the impacts of other projects. This cumulative impact analysis follows the methodology set forth in CEQ's guidance (CEQ 1997).

We defined the scope of the cumulative impact analysis by determining the environmental impact issues associated with the proposed action; establishing a geographic scope for the cumulative impacts project area; establishing the time frame for the analysis; and identifying other past, present, or future actions that have affected, or could affect, the resources of concern within the project area. Each of these factors is discussed in turn below.

With regard to the environmental impact issues to be evaluated, the scoping process conducted for the KMLP Project provided a useful means for determining the relevant cumulative impact issues associated with the KMLP Project and the surrounding area. We consulted with resource agencies and other interested parties to identify important environmental issues and resources within the project area, particularly those that could be affected by the KMLP Project. Through this process, we determined that water resources, wetlands, biological resources, and land use are especially important aspects of the affected environment from a cumulative impacts perspective. We also considered the cumulative effects of air quality, noise, socioeconomic, and shoreline erosion impacts.

With regard to the geographic scope of the analysis, we considered the area over which the KMLP Project would directly or indirectly impact water resources, wetlands, biological resources, air quality, and other elements of the human environment. According to the direct and indirect impact analysis conducted in this draft EIS, most of the Project's impacts would be localized, occurring in the immediate vicinity of the construction right-of-way. However, some impacts would extend beyond the construction right-of-way and temporary extra workspaces. Therefore, we used the boundaries of the watersheds crossed by the project to define the geographic area for the cumulative impacts analysis. Table 4.3.2.1-1 in section 4.3.2.1 of this draft EIS lists each watershed crossed by the KMLP Project,.

With regard to the timeframe for the cumulative impacts analysis, we considered the duration of impacts associated with the Project. The majority of the impacts to environmental resources resulting from the Project would occur during periods of active construction. Most impacts to environmental resources associated with other projects would also occur during periods of active construction with some long-term and permanent impacts resulting from changes in land use. Projects associated with the recovery efforts in the Gulf Coast Region are already under construction or will be in the immediate future. Since the environmental impacts of the KMLP Project and most other projects located within the project area would occur within the next five years or less, the temporal span for this cumulative impacts analysis includes a five-year time period, 2005 to 2010.

With regard to other past, present, or future actions to consider in this analysis, we included other actions based on their location in the project area and the likelihood that they would contribute impacts to environmental resources affected by the Project. Figure 4.11-1 shows existing and reasonably foreseeable gas pipeline and LNG projects in the cumulative impact analysis area. Consideration of past projects in a cumulative impacts analysis can assist in defining baseline conditions of the affected environment.

Non-Internet Public

DRAFT ENVIRONMENTAL IMPACT STATEMENT
KINDER MORGAN LOUISIANA PIPELINE PROJECT
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Figure 4.11-1 Existing, Approved, or Proposed Gas Pipeline and LNG Projects that Could Contribute to Cumulative Impacts

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However, agencies are not required to list or analyze the effects of individual past actions unless such information is necessary to describe the cumulative effect of all past actions combined (CEQ 2005). Baseline environmental conditions described in other sections of this draft EIS reflect the cumulative impacts of past projects. Table 4.11-1 lists ongoing and reasonably foreseeable future activities and projects that could contribute impacts to resources that would be affected by construction and operation of the KMLP Project within the same geographic area and a similar timeframe. Table 4.11-2 depicts the resources that would be affected by the construction and operation of the activities/projects listed in table 4.11-1. Construction and/or implementation schedules of future projects depend on factors such as economics, funding, and politics.

With the scope thus defined, the anticipated cumulative impacts of the Project and other projects and activities are discussed in the sections that follow. The analysis draws on table 4.11-3 which summarizes the cumulative impacts on waterbodies, wetlands, and forested areas resulting from the KMLP Project and other projects within the project area. These anticipated cumulative impacts are based on NEPA documentation, agency and public input, and best professional judgment.

4.11.1 Water Resources

Past and ongoing activities like agriculture, industrial operations, and the development of commercial, residential, energy, and transportation infrastructure have affected and will continue to affect water resources, wetlands, biological resources, and other elements of the environment within the project area. For example, Ruth (2006) reports that as much as 99% of the original prairies and grasslands in the Coastal Prairies Physiographic Province, which includes the project area, have been converted to agriculture.

Multiple projects in the area would result in 427 open-cut water body crossings and 23,064,684 cubic yards of required dredging. The KMLP Project accounts for 133 of the 427 (approximately 31%) open-cut waterbody crossings, but none of the required dredging. Impacts to water quality resulting from the KMLP Project and other projects would be temporary or short-term and minor, limited to the periods of construction within the water bodies. Most of the waterbodies crossed by the KMLP Project are not the same ones crossed by the other projects, and where the same waterbodies are crossed, the crossing points are usually miles apart.

The most significant cumulative impact would be associated with the combined crossing of Sabine Lake by both the Kinder Morgan pipeline and the Port Arthur pipeline. However, the construction schedule for these two projects would not overlap and the routes of these two pipelines across Sabine Lake are generally separated by more than 2.5 miles, although they would come within 1 mile of each other in the northernmost part of the lake. In both cases, the construction of the pipelines across Sabine Lake would result in temporary localized increases in turbidity, expected to be observed approximately 1,500 feet away from the construction activity and to dissipate in a few hours after the construction activity ceased. The increased turbidity would not result in long-term effects on water quality and the increased turbidity levels associated with the construction would not exceed naturally occurring levels during tropical storms.

Several projects included in the Long-Term Community Recovery Plan (Louisiana Speaks 2006) include construction activities that would cause similar impacts to water resources as those discussed above. Additionally, specific types of projects (e.g., roadways, buildings, parking lots, etc.) could also result in an increase in impervious cover that can reduce groundwater recharge and increase the volume and velocity of surface water runoff. Such projects can also indirectly introduce chemicals such as oil and grease into runoff that eventually enters surface water bodies and the aquatic environment. Other projects

TABLE 4.11-1

Existing, Approved, or Proposed Projects and Activities that Could Contribute to Cumulative Impacts with the KMLP Project

Activity/Project	Description	Timing/ Construction Schedule
Ongoing Activities/Projects		
Manufacturing/ Refining	Oil and gas extraction, processing, and transportation, both onshore and offshore.	Ongoing
Dredging	Maintenance dredging of various surface water bodies such as Sabine Lake, the Sabine River, the GIWW, and the Calcasieu Ship Channel.	Periodic
Recreation	Fishing, hunting, boating, and bird watching.	Ongoing
Shipping	Commercial ship traffic within waterbodies such as Sabine Lake, the Sabine River, the GIWW, and the Calcasieu Ship Channel.	Ongoing
Transportation Infrastructure	Construction and maintenance of roadway infrastructure like the repair of US Highway 82 damaged by the hurricanes. Projects include asphalt widening and overlays, bridge reconditioning, new bridge construction, intersection improvements, etc.	Ongoing
Utility Infrastructure	Construction and maintenance of new and existing utility infrastructure (e.g., powerlines).	Ongoing
Commercial and Residential Development	Business and housing construction projects like those associated with the reconstruction of Holly Beach.	Ongoing
Agriculture and Silviculture	Agricultural practices, including animal grazing, crawfish farming, rice farming, and pine plantations and associated management practices.	Ongoing
Environmental Restoration	Shoreline stabilization (e.g., Perry Ridge Shore Protection Project), hydrologic restoration (e.g., Black Bayou Hydrologic Restoration Project), and wetland mitigation banks (e.g., Gum Cove Mitigation Bank).	Ongoing
Louisiana Long-Term Community Recovery Plan Projects	In the aftermath of Hurricanes Katrina and Rita, federal and state efforts are culminating in plans and projects to help devastated parishes recover from the storms, and to be better prepared for future storms. Plans and projects vary from parish to parish, depending upon the most pressing needs in a given location.	Ongoing–Future
Sabine Pass LNG[a] Project	Construction of three LNG tanks along the Sabine Ship Channel with a nominal output of up to 2.6 Bcfd and a new 16-mile-long natural gas pipeline originating at the Sabine LNG Terminal and terminating near Johnsons Bayou in Cameron Parish, Louisiana.	2005-2007
Sabine Pass LNG[a] Project Expansion (Phase II)	Expansion of Sabine Pass LNG Project (Phase I) to include construction and operation of three additional LNG tanks to increase sendout output up to 4.0 Bcfd.	2006-2008
Golden Pass LNG[a] Project	Construction of up to five LNG storage tanks with a nominal output of 1 Bcfd for the first phase (three LNG tanks), increasing to 2 Bcfd in the second phase (five tanks) in Jefferson County, Texas, and about 122 miles of pipelines located in Jefferson, Orange, and Newton Counties, Texas, and Calcasieu Parish, Louisiana.	2006-2008
Trunkline LNG[a] Terminal Expansion	Expansion of an existing LNG terminal in Lake Charles, Louisiana. Includes an infrastructure enhancement project and a natural gas liquids extraction plant.	2005-2008

TABLE 4.11-1 (cont'd)

Existing, Approved, or Proposed Projects and Activities that Could Contribute to Cumulative Impacts with the KMLP Project

Activity/Project	Description	Timing/ Construction Schedule
Cameron (Hackberry) LNG Project	Construction and operation of an LNG terminal along the Calcasieu Ship Channel and associated 35.4-mile natural gas pipeline in Louisiana.	2005-2008
Liberty Gas Storage Project	Construction and operation of two natural gas storage caverns, four injection wells, and associated 24.6-mile pipeline in Louisiana.	2006-2007
Reasonably Foreseeable Future Activities/Projects		
Louisiana Long-Term Community Recovery Plan	See description for these projects under Ongoing Activities/Projects.	Ongoing–Future
Creole Trail Pipeline Segment 1 Amendment	Construction and operation of 18.1 miles of 42-inch-diameter high-pressure natural gas pipeline to interconnect the previously certificated Creole Trail and Sabine Pass pipeline systems in Cameron Parish, Louisiana.	2008-2009
Creole Trail LNG Project	Construction and operation of an LNG terminal at the mouth of the Calcasieu Ship Channel and an associated natural gas pipeline in Louisiana.	2007-2009
Cameron LNG Expansion Project	Expansion of Cameron (Hackberry) LNG Project (described above) to construct and operate one additional LNG storage tank and other modifications to increase sendout capacity to 2.65 Bcfd.	2007-2008
Port Arthur LNG[b] Project	Port Arthur LNG proposes to construct and operate an LNG terminal along the Sabine-Neches Canal and associated natural gas pipeline in Texas and Louisiana.	2007-2010
Starks Gas Storage[b] Pipeline Project	Construction of about 35.6 miles of 16-inch and 30-inch-diameter natural gas pipeline and about 1.9 miles of 10-inch-diameter brine pipeline in Calcasieu and Beauregard Parishes, Louisiana.	2006-2008

[a] Projects have been approved by the FERC and are under construction.
[b] Projects have been approved by the FERC but construction is pending.

TABLE 4.11-2

Resources of Concern that Could be Affected by Construction or Development of Existing, Approved, or Proposed Projects or Activities in the Vicinity of the KMLP Project

	Primary Environmental Impact									
Activity/Project	**Water Resources**	**Wetlands**	**Wildlife/Vegetation**	**Aquatic Resources**	**Recreation**	**Socioeconomics**	**Land Use**	**Ship Traffic**	**Transportation**	**Air Quality/Noise**
Present Projects or Activities										
Manufacturing/Refining	X			X		X	X	X	X	X
Dredging	X	X	X	X	X		X	X		X
Recreation	X		X		X	X			X	
Shipping	X			X				X	X	X
Transportation Infrastructure	X	X	X	X	X	X	X		X	X
Utility Infrastructure	X	X	X	X	X	X	X		X	
Commercial/Residential Development	X	X	X			X	X			X
Agriculture and Silviculture	X	X	X	X	X	X	X			
Environmental Restoration	X	X	X	X	X	X	X			
Louisiana Long-Term Community Recovery Plan Projects	X	X	X	X	X	X	X	X	X	X
Sabine Pass LNG Project	X	X	X	X	X	X	X	X	X	X
Sabine Pass LNG Project Expansion[a]	X	X						X	X	X
Golden Pass LNG Project	X	X	X	X	X	X	X	X	X	X
Trunkline LNG Terminal Expansion	X							X	X	X
Cameron (Hackberry) LNG Expansion Project	X	X	X	X	X	X	X	X	X	X
Liberty Gas Storage Project	X	X	X	X	X	X	X			
Reasonably Foreseeable Future Projects or Activities										
Louisiana Long-Term Community Recovery Plan	X	X	X	X	X	X	X	X	X	X
Creole Trail Pipeline Segment 1 Amendment	X	X	X	X	X	X	X			
Creole Trail LNG Project	X	X	X	X	X	X	X	X	X	X
Cameron LNG Expansion Project	X	X	X					X	X	X
Port Arthur LNG Project	X	X	X	X	X	X	X	X	X	X
Starks Gas Storage Pipeline Project	X	X	X	X	X	X	X			

[a] No other sources were considered regarding the Sabine Pass LNG Project Expansion because it would be within the same boundaries as the existing facility.

included in the Long-Term Community Recovery Plan include environmental restoration activities that would improve the quality of water resources within the project area.

4.11.2 Wetlands

From a wetlands perspective, the KMLP Project would be within the Western Gulf Coastal Plain ecoregion, which historically contained vast areas of freshwater and tidal wetlands, intermixed with upland prairie and forest. This ecoregion has undergone significant alterations in the last several decades. In particular, the area of freshwater wetlands has significantly decreased due to saltwater intrusion caused by development, dredging, channelization, land subsidence, and other factors (Ruth 2006). The presence and ongoing spread of non-native vegetation species have reduced the vegetative diversity and wildlife habitat quality of freshwater and tidal wetlands in this region.

The projects listed in table 4.11-3 would disturb a total of about 2,285 acres of wetlands during construction. The KMLP Project would disturb approximately 22% of the total wetlands impacted during construction. Including the KMLP Project, pipelines account for approximately 77% of the total acres of wetlands that would be disturbed during construction. To provide perspective, SNWR, which comprises a small portion of the project area, encompasses 124,511 acres of fresh, intermediate, and brackish marshes (FWS 2006c). The combined projects would result cumulatively in a short-term and minor impact associated with construction through emergent or scrub-shrub wetlands, which would revegetate quickly (generally within 1 to 3 years) after construction and right-of-way restoration. Construction through forested wetlands would contribute cumulatively to the long- term or permanent alteration of forested wetlands in southwest Louisiana and southeast Texas to shrub or emergent wetlands (although the KMLP Project would not contribute to wetland alteration in Texas).

The construction and operation of the Project, along with the other potential projects and activities, could result in a cumulative reduction in the amount of wetlands within the project area. However, mitigation for wetlands affected by the Project and the other projects listed would be required by the COE and could result in a net increase and/or improvement in the regional coastal marsh resource.

4.11.3 Biological Resources

When projects are constructed at or near the same time, the combination of construction activities could have a cumulative impact on vegetation, wildlife, and aquatic organisms living in the immediate area. Clearing, grading, and other construction activities associated with pipeline construction and other similar activities in the vicinity (e.g., road and transmission line construction, silvicultural practices) would result in the removal of vegetation, alteration of wildlife habitat, displacement of wildlife, and other secondary effects such as increased population stress, predation, forest fragmentation, and establishment of invasive plant species. Similarly, the construction of multiple large industrial projects at or near the same time can result in a significant amount of land clearing activities that could have a cumulative impact on forest resources in the immediate area of the projects. However, most of the large industrial sites proposed or currently under construction in the project area (e.g., LNG terminals) are largely devoid of large stands of trees other than Chinese Tallow, an invasive species.

About 598.9 miles of pipeline would be constructed for the projects listed in table 4.11-3 and would result in a total of about 9,074 acres of vegetation disturbance assuming a right-of-way width of 125 feet. The construction of the LNG terminals would add to the total area of vegetation disturbance. Although the total amount of vegetation that would be affected by the KMLP Project and other potential projects in the area may be considered substantial, much of this would occur in areas that have been previously disturbed by existing rights-of-way. Also, this disturbance, alteration, or loss of habitat would be relatively small compared to the abundance of similar resources in the project area, the majority of it would be allowed to return to pre-construction conditions.

TABLE 4.11-3

Cumulative Impacts to Environmental Resources Resulting from the Construction and Operation of Projects in the Vicinity of the KMLP Project

Project	Pipeline Length (miles)[b]	Number of Open-Cut Waterbody Crossings	Dredging Required (cubic yards)		Total Wetlands Disturbed During Construction (acres)		Forest Cleared (acres)[a]	
			Berth Area	Lake[c]	LNG Terminal	Pipeline	LNG Terminal	Pipeline
KMLP Project[d]								
Construction	135.5	133	NA	NA	NA	504.2	NA	150.6
Operations	NA	NA	NA	NA	NA	NA	NA	58.7
Cameron (Hackberry) LNG Project[e]								
Construction	35.4	97	4,900,000	NA	67.7	148.1	0.0	148.3
Operations	NA	NA	NA	NA	NA	NA	0.0	74.2
Cameron LNG Expansion[d]								
Construction	NA	0	20,000	NA	1.8	NA	0.0	0.0
Operations	NA	NA	NA	NA	NA	NA	0.0	0.0
Creole Trail Project[f]								
Construction	116.8	81	4,100,000	2,575,596	102.9	106.8	54.1	552.5
Operations	NA	NA	NA	NA	NA	NA	22.9	299.7
Creole Trail Segment 1 Pipeline Project[d]								
Construction	18.1	7	NA	NA	NA	216.9	NA	0.0
Operations	NA	NA	NA	NA	NA	NA	NA	0.0
Golden Pass LNG Project[e]								
Construction	122.4	54	5,700,000	NA	108.8	290.2	0.0	451.3
Operations	NA	NA	NA	NA	NA	NA	0.0	238.7
Liberty Pipeline Project[e]								
Construction	24.6	10	NA	NA	NA	40.9	NA	155.5
Operations	NA	NA	NA	NA	NA	NA	NA	82.4
Port Arthur LNG Project[f]								
Construction	73.0	34	820,000	310,088	82.5	308.3	0.0	201.0
Operations	NA	NA	NA	NA	NA	NA	0.0	87.2
Sabine Pass LNG and Pipeline Project[e]								
Construction	16.0	5	4,569,000	NA	56.4	99.4	0.7	2.3
Operations	NA	NA	NA	NA	NA	NA	0.7	0.8
Sabine Pass LNG Project Expansion								
Construction	NA	0	NA	NA	100.3	NA	0.0	0.0
Operations	NA	NA	NA	NA	NA	NA	0.0	0.0

TABLE 4.11-3 (cont'd)								
Cumulative Impacts to Environmental Resources Resulting from the Construction and Operation of Projects in the Vicinity of the KMLP Project								
Project	**Pipeline Length (miles)[b]**	**Number of Open-Cut Waterbody Crossings**	**Dredging Required (cubic yards)**		**Total Wetlands Disturbed During Construction (acres)**		**Forest Cleared (acres)[a]**	
			Berth Area	**Lake[c]**	**LNG Terminal**	**Pipeline**	**LNG Terminal**	**Pipeline**
Starks Gas Storage Pipeline Project[f]								
Construction	34.7	6	NA	NA	NA	49.8	NA	149.2
Operations	NA	NA	NA	NA	NA	NA	NA	90.3
Trunkline LNG Terminal Expansion[e]								
Construction	22.2	0	70,000	NA	0.0	NA	0.0	NA
Operations	NA	NA	NA	NA	NA	NA	0.0	NA
Cumulative Totals								
Construction	598.9	427	20,179,000	2,885,684	520.4	1764.6	54.8	1,810.7
Operations	NA	NA	NA	NA	NA	NA	23.6	932.0

[a] Includes forested wetlands.
[b] Includes mainlines, looplines, and laterals associated with the project.
[c] Dredging required in Sabine Lake (Port Arthur) and Calcasieu Lake (Creole Trail) for pipeline construction.
[d] Projects are currently under review by the FERC.
[e] Projects have been approved by the FERC and are under construction.
[f] Projects have been approved by the FERC but construction has not begun.
[g] Includes dual pipeline.

NA Not Applicable

Construction of the projects in table 4.11-3 would affect a total of about 1,865.5 acres of forested land (including forested wetlands), of which about 956 acres would be maintained in a non-forested condition during project operations. Some of these forest lands consist of stands of planted timber grown for commercial use. Landowners would be compensated for raw timber removed from construction work areas, and would be allowed to replant areas outside of the permanent right-of-way following completion of construction.

Although the total amount of forested land that would be affected by the KMLP Project and other potential projects in the project area may be considered substantial, the linear nature of the pipelines would not require clear cutting of large areas of timber. Additionally, where the pipelines would be parallel and adjacent to one another, additional forest impacts would be cumulative, but minimized by the overlapping rights-of-way. The loss of forested land in this area due to all of these projects would be relatively small compared to the abundance of similar resources in the project area.

4.11.4 Land Use, Recreation, and Visual Resources

Along the Project and other pipeline routes, most land uses would revert to prior uses following construction. Some land uses would be restricted or prohibited on the new permanent pipeline rights-of-way, to accommodate permanent aboveground structures and recurring maintenance activities.

Recreational activities, such as fishing, boating, and bird watching occur throughout the coastal marsh, Sabine Lake, and the Sabine River in the vicinity of the KMLP Project. Other projects included in this analysis would contribute to effects on users of Sabine Lake and the Sabine River and could negatively affect recreation, primarily during periods of active construction. The presence and movement of construction equipment, materials, and workers may be disruptive temporarily to users of the local recreation areas, particularly if more than one project is under construction at any one time in the project area. Recreation-related cumulative impacts are expected to be localized, short-term, and minor.

Construction and operation of the KMLP Project and other projects in the area may affect visual resources by altering the terrain and vegetation patterns during construction or right-of-way maintenance and through the installation of new aboveground facilities that change land use. However, the KMLP Project would result in minimal land use changes and would therefore not contribute significantly to adverse impacts on visual resources within the project area.

4.11.5 Socioeconomics

Present and reasonably foreseeable future projects and activities could cumulatively impact socioeconomic conditions in the project area. There may be both beneficial and detrimental effects on employment, housing, infrastructure, and public services. The Project would make a negligible contribution to these impacts.

Employment and Housing

In general, natural gas-related projects have a beneficial impact on local employment during the short construction period. Since the construction of the KMLP Project would overlap with the construction of other projects, the demand for workers could exceed the local supply of appropriately skilled labor. The increased demand for workers could reduce current unemployment and perhaps lead to higher wages for the duration of construction. Other indirect employment benefits could include temporary jobs in the local area (e.g., restaurants, motels, and convenience stores).

Damage caused by Hurricane Rita in 2005 increased the need for construction workers in the project area. Prior to the hurricane, the project area would have been able to accommodate temporary construction workers who preferred to live there. However, as a result of the hurricane, accommodating temporary construction workers is likely to be a regional priority for several years. Nevertheless, given the vacancy rates in the area and the number of hotel/motel rooms in larger population centers in the project area, construction crews should not encounter difficulties in finding temporary housing. The degree of cumulative impacts on housing resources would depend upon the number of other projects being constructed simultaneously and the season, specifically when construction coincides with periods of peak recreation and tourism activity. If construction occurs concurrently with other projects and during the peak recreation and tourism periods, temporary housing would still be available but may be more difficult to find and/or more expensive to secure. Regardless, these effects would be temporary, lasting only for the duration of construction, and there would be no long-term cumulative effect on housing.

Vehicular Traffic

Since the construction of the KMLP Project would overlap with the construction of other projects, there could be increased congestion on local roads during the construction period. Kinder Morgan plans to cross most paved roads and railroads using the boring or HDD method to mitigate traffic disruptions and direct surface impacts. Alternatively, unpaved roads and one abandoned railroad would be crossed using the open cut method. This method can cause temporary traffic delays. However, the use of adequate signs, safety barriers, and pre-established detours would minimize these interruptions to road traffic. Pipe installation at road crossings typically takes a day to complete and includes construction practices that keep one lane of traffic open where no reasonable detours are feasible or during peak traffic hours. To the extent that construction occurs simultaneously in a given area, traffic impacts would be localized and short-term.

Infrastructure and Public Services

The cumulative impact of the KMLP Project and other activities in the project area on infrastructure and public services would depend on the number of projects under construction at one time. The small incremental demands of several projects occurring at the same time could become difficult for police, fire, and emergency service personnel to address. This problem would be temporary, and occur only for the length of construction. No long-term effects on infrastructure and public services are expected.

Marine Traffic

Once completed, other projects within the project area would cause an increase in marine traffic. The KMLP Project would cross Sabine Lake, enter the mouth of the Sabine River, and cross the GIWW and the Calcasieu River. Construction would temporarily impact commercial and recreational boats in these areas due to project-related marine traffic, including pipe and material delivery barges and construction barges. Project-related impacts would primarily affect barges and smaller recreational vessels and would only occur during periods of active construction in these areas. These impacts would result in a negligible contribution to the cumulative impacts on marine traffic when added to impacts of other projects in the area.

4.11.6 Shoreline Erosion

Average coastal erosion rates are 4.2 meters per year in Louisiana and 1.8 meters per year along the northern Gulf of Mexico shoreline. The most serious erosion and land loss are occurring in the eastern part of the coastal area, east of Atchafalaya Bay (USGS 2003). Marine traffic and the potential for shoreline erosion would increase as a result of other projects in the project area. Marine vessels associated with the KMLP Project would include barges used for material delivery and construction. The use of these vessels would be limited to periods of active construction. The KMLP Project would add negligible, if any, impacts to eroding shorelines within the area.

4.11.7 Air Quality and Noise

Ambient air quality in the project area is acceptable. The parishes crossed by the Project are in attainment for all criteria pollutants.

Construction of the KMLP Project and other projects in the area would involve the use of heavy equipment that produces noise, air contaminants, and dust. Use of the access roads for maintenance of the pipeline and appurtenances would generate occasional, minor, and short-term increases in dust similar to that generated on other unpaved roads in the area. Construction of the KMLP Project and other projects in the project area would cause localized declines in ambient air quality.

During operations, the KMLP Project would result in fugitive emissions at the aboveground meter stations and block valves. Such emissions would be below any established regulatory thresholds and therefore would not require any type of permit. Other sources of air pollutants within the project area include new LNG terminals and ships using those terminals, refineries, etc. These sources emit PM_{10}, SO_2, NOx, CO, and VOCs. In turn, NOx and VOC emissions contribute to regional ozone concentrations. Ambient air quality could decline as a result of the operation of other projects located within the project area. However, a decline in ambient air quality would be minimal and the project area is anticipated to remain in attainment for all criteria pollutants.

Aside from noise associated with construction, pipeline projects do not typically result in elevated noise levels. Construction of the KMLP Project would increase sound levels in the vicinity of Project activities, and the sound levels would vary during the construction period, depending on the level of construction activity at any given time. Additional noise produced during construction of the KMLP Project and other projects could create short-term annoyances to nearby residences and could disrupt nesting birds and other wildlife in the project area. These noise impacts would be localized and would attenuate quickly as the distance from the noise source increases. Operation of the KMLP Project would not contribute to any increases in ambient noise levels within the project area.

4.11.8 Cumulative Impacts Conclusions

Environmental resources within the project area have experienced adverse impacts from oil and gas development, agriculture, silviculture, and a number of other human activities for decades. Human activity has resulted in a loss of ecologically significant habitat including coastal marsh and forested wetlands; introduced pesticides and other contaminants into surface water bodies and sediments; altered the hydrologic regime through channelization of surface water bodies and heavy groundwater withdrawals; and introduced invasive plants into the ecosystem. To mitigate the effects of these adverse impacts, many environmental restoration projects have been implemented within the project area (see section 4.8). Such projects have provided beneficial environmental effects such as restoring the functions and values of thousands of acres of wetlands and stabilizing eroding shorelines.

The KMLP Project and other projects and activities within the project area would cumulatively impact water resources, wetlands, biological resources, land use, air quality, and other environmental resources. However, we believe that impacts associated with the KMLP Project would be relatively minor, and we have included numerous recommendations in this draft EIS to further reduce the environmental impacts associated with the Project. The environmental impacts associated with the Project would be minimized by careful project routing, utilization of HDD techniques to avoid and minimize impacts to sensitive resources, and implementation of appropriate mitigation measures. Based on the analysis conducted in this draft EIS, the impacts of the KMLP Project, when added to the impacts of other projects and activities, would not be expected to alter any environmental resource beyond its ability to return to a near-baseline condition.

4.12 AIR QUALITY AND NOISE

4.12.1 Air Quality

4.12.1.1 Affected Environment

The region between Cameron Parish, Louisiana and Evangeline Parish, Louisiana is characteristic of subtropical regions, with short mild winters and warm humid summers. The Gulf of Mexico plays an important part in moderating the local weather by producing a pronounced sea breeze effect in the summer and tempering the effects of polar outbreaks. Tropical cyclones (hurricanes) are not unusual for the Project area.

The prevailing winds are generally from offshore to onshore from the south to south-southwest, except during winter months when passing cold fronts bring prevailing winds from the north to north-northeast. Wind speeds average 9 miles per hour throughout the year.

Rainfall in Saint Charles, Louisiana, located at approximately the midpoint of the pipeline route, averages 57.19 inches annually. June is the wettest month averaging 6.07 inches, and February is the driest month averaging 3.28 inches. The warmest months are July and August with an average high temperature of 91^{o}F and average low temperature of 74^{o}F. January is the coldest month with an average high temperature of 61^{o}F and average low temperature of 41^{o}F.

4.12.1.2 Regulatory Requirements

The Clean Air Act of 1970 (CAA) designates six pollutants as criteria pollutants for which the National Ambient Air Quality Standards (NAAQS) are promulgated. The NAAQS for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}), particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$), carbon monoxide (CO), ozone (O_3), and lead were set to protect human health (primary standards) and human welfare (secondary standards). State air quality standards cannot be less stringent than the NAAQS. Louisiana has adopted the NAAQS, as defined in 40 CFR 50; these standards are summarized in table 4.12.1.2-1. In addition to the NAAQS shown in table 4.12.1.2-1, Louisiana has adopted secondary CO standards that are equal to the primary NAAQS for CO. Areas where the ambient air quality is better than the NAAQS are designated as attainment areas and areas exceeding the NAAQS are designated non-attainment. The parishes in which the Project would be located are in attainment for all criteria pollutants.

The CAA, 42 USC 7401 et seq. amended in 1977 and 1990, is the basic federal statute governing air pollution. The provisions of the CAA that are potentially relevant to the Project include the following and are discussed further below:

- New source review (NSR);
- Prevention of significant deterioration (PSD);
- New source performance standards (NSPS);
- Maximum achievable control technology (MACT) standards; and
- Title V operating permits.

In addition, the Project would be subject to applicable Louisiana state regulations that are more stringent than federal regulations.

TABLE 4.12.1.2-1

National Ambient Air Quality Standards

Pollutant	Time Frame	Primary	Secondary
Particulate matter less than 10 microns in diameter	Annual[a]	50 μg/m3	50 μg/m3
	24-hour[b]	150 μg/m^3	150 μg/m^3
Particulate matter less than 2.5 microns in diameter	Annual[c]	15 μg/m^3	15 μg/m^3
	24-hour[d]	65 μg/m^3	65 μg/m^3
Sulfur dioxide	Annual	0.030 ppm (80 μg/m^3)	N/A
	24-hour[b]	0.014 ppm (365 μg/m^3)	N/A
	3-hour[b]	N/A	0.5 ppm (1,300 μg/m^3)
Carbon monoxide	8-hour[b]	9 ppm (10,000 μg/m^3)	None
	1-hour[b]	35 ppm (40,000 μg/m^3)	None
Nitrogen dioxide	Annual	0.053 ppm (100 μg/m^3)	0.053 ppm
Ozone	8-hour[e]	0.08 ppm (157 μg/m^3)	0.08 ppm
Lead	Quarterly	1.5 μg/m^3	1.5 μg/m^3

μg = Microgram(s).
m^3 = Cubic meter(s).
NA = Not applicable.
ppm = Part(s) per million.

[a] To attain this standard, the 3-year average of the weighted annual mean particulate matter less than 10 microns in diameter concentration at each monitor within an area must not exceed 50 μg/m^3.

[b] Not to be exceeded more than once per year.

[c] To attain this standard, the 3-year average of the weighted annual mean particulate matter less than 2.5 microns in diameter concentrations from single or multiple community-oriented monitors must not exceed 15 μg/m^3.

[d] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 μg/m^3.

[e] To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations, measured at each monitor within an area over each year, must not exceed 0.08 ppm.

New Source Review

NSR refers to the preconstruction permitting programs under Parts C and D of the CAA that must be satisfied before construction can begin on new major sources or major modifications to existing major sources. The PSD program is the NSR permitting program for sources located in attainment areas and in areas for which there is insufficient information to determine attainment status (unclassified areas). For sources located in non-attainment areas, the applicable permitting program is the Nonattainment New Source Review (NNSR) program. NNSR is required for major sources locating or expanding in non-attainment areas. Since the Project would be located in an attainment area, NNSR is not applicable to the Project.

Prevention of Significant Deterioration

The PSD review regulations apply to proposed new major sources or major modifications to existing major sources located in an attainment area. The PSD regulations (40 CFR 52.21) define a major source as any source type belonging to a list of named source categories that emit or have the potential to emit 100 tons per year (tpy) or more of any regulated pollutant. A major source under PSD also can be defined as any source not on the list of named source categories with the potential to emit such pollutants in amounts equal to or greater than 250 tpy. Modifications to existing major sources have lower emission thresholds, called significant emission increases; amounts over any of these thresholds trigger PSD review.

The PSD review evaluates existing ambient air quality and the potential impacts of the proposed source on ambient air quality (noting in particular whether the source would contribute to any violation of the NAAQS), and reviews the best available control technology (BACT) in order to minimize emissions. The PSD regulations contain restrictions on the degree of ambient air quality deterioration that would be allowed. These increments for criteria pollutants are based on the PSD review classification of the area. Air Quality Control Regions (AQCRs) are categorized as Class I, Class II, or Class III. Class I areas are designated specifically as pristine natural areas or areas of natural significance. Class III designations, intended for heavily industrialized zones, can be made only on request and must meet all requirements outlined in 40 CFR 51.166. The remainder of the United States is classified as Class II. The Project would be located in a Class II area. The nearest Class I area is the Breton National Wildlife Refuge located in the Gulf of Mexico east of New Orleans, Louisiana approximately 218 miles east of the Project.

The Project would not include facilities or operations included on the list of named source categories to which the 100-tpy trigger applies. The Project would have only negligible fugitive emissions and would not exceed emissions of 250 tpy of any criteria pollutant. Therefore, PSD permitting is not applicable to the Project.

New Source Performance Standards

NSPS regulations, which are codified at 40 CFR 60 and incorporated by reference in the Louisiana Administrative Code (LAC) 33.III.3303, establish requirements for new, modified, or reconstructed units in specific source categories. NSPS requirements include emission limits, monitoring, reporting, and record keeping. There are no NSPS requirements identified as potentially applicable to the Project.

Maximum Achievable Control Technology Standards

MACT standards are intended to reduce emissions of air toxics or hazardous air pollutants (HAPs) through installation of control equipment rather than enforcement of risk-based emission limits. Applicability is triggered if potential emissions are greater than 10 tpy of any single listed HAP or greater than 25 tpy combined total of listed HAPs. As potential HAP emissions resulting from the Project would be well below these thresholds, the MACT is not applicable. The Project would not have sources of HAP emissions so MACT is not applicable.

Title V Permitting

The Title V permit program, as described in 40 CFR 70, requires sources of air emissions with criteria pollutant emissions that reach or exceed major source levels to obtain federal operating permits. These permits list all applicable air regulations and include a compliance demonstration for each applicable requirement. The major source threshold level in attainment areas is 100 tpy of NO_x, SO_2, CO, PM_{10}, $PM_{2.5}$, and volatile organic compound (VOC). The Project would have only negligible fugitive emissions and would not exceed the 100-tpy criterion pollutant threshold. Therefore, the Project would not require a Title V permit.

State Regulations

In addition to the Federal regulations described above, Louisiana also has state air quality regulations. The LDEQ manages air quality issues in Louisiana. Subject to EPA approval, these agencies manage the statewide air permitting, compliance, and enforcement programs. The Project would be authorized under a LDEQ minor source permit or exemption.

LDEQ regulates emissions of particulate matter arising from unpaved streets, access roads, construction, and similar facilities through LAC33.III.1305, which requires application of water or dust retardant chemicals or paving of roadways. KMLP indicates that if fugitive dust becomes a problem, it would employ LDEQ required practices, such as water sprays, to control fugitive dust. Water sprays have provided sufficient control to ensure protection of air quality during construction of similar pipeline projects.

4.12.1.3 General Impacts and Mitigation

Construction Emissions

Construction of the pipeline and access roads would generate air emissions during grading, trenching, and backfilling, and while driving construction vehicles along unpaved areas. Use of existing roads would be maximized and facilities would be constructed adjacent to existing roads. New road construction would be limited to driveways from existing roads to new facilities. Where possible, permanent roadways would be avoided by installing temporary, removable wooden mats to protect the underlying surface. These activities could generate dust and particulate emissions from earth moving activities and construction equipment engine exhaust. Construction would be expected to cause a minor and temporary reduction in local ambient air quality as a result of fugitive dust and combustion emissions generated by construction equipment. Criteria pollutant emissions during the operation of the fossil-fueled construction equipment would occur from combustion products resulting from use of gasoline and diesel fuels, primarily NO_2, CO, VOCs, PM_{10}, small amounts of SO_2 and small amounts of HAPs (e.g., formaldehyde, benzene, toluene, and xylene) produced by the construction equipment engines. Impacts from construction equipment would be temporary, would be distributed along the length of the pipeline, and would be expected to result in an insignificant impact on air quality. Emissions of criteria pollutants during construction are shown in table 4.12.1.3-1.

TABLE 4.12.1.3-1

Emission from Construction Activities

NOx Emissions (tpy)	CO Emissions (tpy)	VOC Emissions (tpy)	PM_{10} Emissions (tpy)	SO_2 Emissions (tpy)
319.62	169.91	42.78	33.55	25.12

Operations Emissions

Heaters would be installed to raise the temperature of the transported gas at 14 interconnect sites. The capacities of the heaters would range from 10 MMBtu/hour to 70 MMBtu/hour. Emissions from the heaters were calculated based on AP-42 chapter 1.4 factors and for NO_x, CO, and VOC emission factors more conservative than AP-42 were used. Table 4.12.1.3-2 shows calculated emissions at each interconnect site. These sites will be permitted as minor sources as allowed under LAC 33 III:503(B).

TABLE 4.12.1.3-2 Emission from Heaters Located at Interconnect Sites					
Site	**NOx Emissions (tpy)**	**CO Emissions (tpy)**	**VOC Emissions (tpy)**	**PM_{10} Emissions (tpy)**	**SO_2 Emissions (tpy)**
MP 1.23	36.06	34.32	17.74	2.28	0.18
MP 2.30	7.73	7.36	3.80	0.49	0.04
MP 28.24	10.30	9.81	5.07	0.65	0.05
MP 61.35	5.15	4.90	2.53	0.33	0.03
MP 87.48	7.73	7.36	3.80	0.49	0.04
MP 91.45	7.73	7.36	3.80	0.49	0.04
MP 110.04	12.88	12.26	6.34	0.82	0.06
MP111.30	7.73	7.36	3.80	0.49	0.04
MP 112.02	10.30	9.81	5.07	0.65	0.05
MP 116.95	5.15	4.90	2.53	0.33	0.03
MP 122.08	10.30	9.81	5.07	0.65	0.05
MP 132 16	10.30	9.81	5.07	0.65	0.05
Bridgeline	7.73	7.36	3.80	0.49	0.04
SW Loop JB	7.73	7.36	3.80	0.49	0.04

Operation of the above ground meter stations and block valves would not result in substantial air emissions under normal operating conditions. Typically, only minor emissions of natural gas, called fugitive emissions, occur from small connections at meter station and valve sites. Because such emissions are very small, they are not regulated by permit or source-specific requirements. Use of the access roads for maintenance would generate occasional, minor, and short term increases in dust similar to that generated on other unpaved roads in the area. Use of these roads by maintenance and operation personnel would have a negligible effect on air quality. Overall, operation of the Project would not result in significant impacts to air quality.

4.12.2 Noise

Construction, modification, and operation of the Project would affect the local noise environment. The ambient sound level of a region is defined by the total noise generated within the specific environment, and is usually comprised of sounds emanating from natural and artificial sources. At any location, both the magnitude and frequency of environmental noise may vary considerably over the course of a day and throughout the week. This variation is caused in part by changing weather conditions and the effect of seasonal vegetative cover.

Two measurements used by some federal agencies to relate the time-varying quality of environmental noise to its known effects on people are the equivalent sound level (L_{eq}) and the day-night sound level (L_{dn}). The L_{eq} is an A-weighted sound level containing the same sound energy as the instantaneous sound levels measured over a specific time period. Noise levels are perceived differently, depending on length of exposure and time of day. The L_{dn} takes into account the duration and time the noise is encountered. Late night and early morning (10:00 pm to 7:00 am) noise exposures are penalized +10 decibels, to account for people’s greater sensitivity to sound during the nighttime hours.

In 1974, the EPA published its *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* This document provides information for state and local governments to use in developing their own ambient noise standards. The EPA has indicated that an L_{dn} of 55 decibels on the A-weighted scale (dBA) protects the public from indoor and outdoor activity interference. We have adopted this criterion and use it to evaluate the potential noise impact from operation of the compressor facilities.

Louisiana does not regulate noise at the state level, however individual parishes have specific noise control ordinances. Calcasieu Parish and Cameron Parish prohibit operating construction equipment within 165 feet of a Noise Sensitive Area (NSA) between sunset and sunrise Monday through Saturday, and 9 pm to 8 am Sundays and holidays. Operation of vehicles including offroad vehicles without a muffler is also prohibited. (Calcasieu Parish Ordinances 18, VII, 18-100 and Cameron Parish Ordinances 15, III, 15-32). Cameron Parish also prohibits operating machinery within 300 feet of a place of worship that causes loud sounds that will interfere with worship services (Cameron Parish Ordinances, 15, III, 15-33). Acadia Parish prohibits operating internal combustion engines and air compressors without a muffler and prohibits operation of construction equipment within 500 feet of a residential area from 10 pm to 7 am (Acadia Parish Ordinances, 13, V, 13-82 and 13-87).

4.12.2.1 Affected Environment

No compressor stations would be used for the Project, therefore no existing noise level surveys were performed. Existing noise levels in areas near Project facilities are expected to be similar to other pipeline projects in rural areas of Louisiana, which typically have ambient noise levels between 40 and 60 dBA depending on proximity to area roadways.

4.12.2.2 Impacts and Mitigation

Construction Noise

Construction of the Project is expected to be typical of other pipeline projects in terms of schedule, equipment used, and types of activities. Sound levels would increase in the vicinity of construction activities, and would vary depending on the construction phase. Pipeline construction generally would proceed at rates ranging from several hundred feet to one mile per day. However, due to the assembly-line method of construction, construction activities in any one area could last from several weeks to six months on an intermittent basis. Construction equipment would be operated as needed during those periods and would be maintained to manufacturers' specifications to minimize noise impacts.

Although individuals in the immediate vicinity of the construction activities could experience annoyance, the impact on the noise environment at any specific location along the route would be short term. Night-time noise levels would normally be unaffected since most construction would take place only during daylight hours. The possible exceptions would be at the HDD sites. At HDD locations, drilling equipment may operate on a 24-hour per day basis over a short period of time. Predicted noise impacts on NSAs near three HDD sites indicate that sound levels would exceed 55 dBA, as discussed below.

An HDD entry pit near MP 44.5 on the west side of John Brannon Road is close to three NSAs, which are residences built in 2006. These residences are more than 50 feet away, but are less than 165 feet from the proposed workspace. Given the Calcasieu Parish noise requirements defined above, KMLP has stated that it would request an exception from the Calcasieu Parish Police Jury to allow operation of the HDD equipment near MP 44.5 for 24 hours per day, and offer the residents temporary lodging at a nearby hotel for the duration of the HDD activities.

The other two sites of concern are an HDD exit pit at MP 49.6, which is located 400 feet from the nearest NSA, and the HDD entry pit at MP 99.8, which is located 500 feet from the nearest NSA. Predicted sound levels due to HDD operations at these two sites are 72 dBA and 70 dBA, respectively. There are no applicable noise ordinances at MP 49.6 in Calcasieu Parish because the distance from the HDD site to the NSA, which is a fishing camp, exceeds 165 feet. The HDD site at MP 99.8 is located in Acadia Parish and is within 500 feet of a residence. Acadia Parish Ordinance 13-87 prohibits operation of construction equipment within 500 feet of a residential area between 10 pm and 7 am. KMLP has not specified what mitigation measures it would take to comply with all applicable rules and regulations at these two HDD sites.

To ensure that no NSAs are exposed to excessive noise during drilling operations, **we recommend that:**

- **Prior to construction, KMLP file with the Secretary for review and written approval by the Director of OEP a noise mitigation and compliance plan for HDD operations at MP 44.5, MP 49.6, and MP 99.8. This plan should identify mitigation measures such as noise barriers, temporary housing, etc. to be implemented prior to the start of drilling operations to reduce noise from HDD activities to below 55 dBA at these NSAs.**

Operational Noise

During operation of the Project, the potential noise impacts would be limited to the vicinity of the new valve and metering stations. Principal noise sources would include gas flow through valves and metering equipment. Such gas flow noise is typically not noticeable more than a short distance from the equipment. Underground sections of the pipeline are not a substantial source of noise.

If the recommended mitigation at MP 44.5, MP 49.6, and MP 99.8 occurs, we believe that project-related noise impacts at the nearest NSAs would not be significant.

4.13 RELIABILITY AND SAFETY

The transportation of natural gas by pipeline involves some risk to the public in the event of an accident and subsequent release of gas. The greatest hazard is a fire or explosion following a major pipeline rupture.

Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is non-toxic but, possessing a slight inhalation hazard, is classified as a simple asphyxiate. If breathed in high concentration, oxygen deficiency can result in serious injury or death.

Methane has an ignition temperature of 1,000°F and is flammable at concentrations between 5.0 percent and 15.0 percent in air. Unconfined mixtures of methane in air are not explosive. However, a flammable concentration within an enclosed space in the presence of an ignition source can explode. Having a specific gravity of 0.55, it is buoyant at atmospheric temperatures and disperses rapidly in air.

In 2005, Hurricanes Rita and Katrina dramatically illustrated the susceptibility of southern Louisiana to the devastation that can be caused by major storms. Much of the aboveground utility infrastructure and offshore oil and gas facilities were seriously affected. Most of the onshore damage was caused by high winds, with some storm surge damage near the coast. The offshore damage was primarily a result of high winds, waves, and currents. Heavy rainfall also caused localized inshore flooding. The Project would be located onshore, eliminating the storm-related hazards found in the Gulf of Mexico. The pipeline would be buried at depths equal to or exceeding DOT requirements, eliminating concerns from wind or surface flooding. In areas where the soils are, or could become, saturated, including Sabine Lake, the pipeline would be concrete coated to eliminate positive buoyancy. High rainfall rates associated with hurricanes would increase the volume and velocity of stream flows, elevating the risk of erosion and scour and the resulting exposure of the pipeline. For this reason, the Project would be installed by HDD under major waterbodies, providing at least 20 feet of cover between the pipeline and the bottom of the channel; at least 5 feet of cover will be provided at minor waterbodies. Sabine Lake does not have the water depth or fetch to generate the size of waves that were observed in the Gulf of Mexico, but some increased wave action and movement of bottom sediments would occur during storms. The depth of cover over the Project would be increased to at least 4 feet in Sabine Lake as added protection against exposure. Aboveground facilities would be limited to meter stations, each of which could be isolated from the pipeline if damaged, eliminating the potential for substantial releases of natural gas. These aboveground facilities, as well as the pipeline, would be continuously monitored and could be shut down remotely in the event of an emergency. It is also likely that the Sabine Pass LNG Terminal would be shut down, or at least it would no longer receive ships, upon detection of an approaching storm, substantially reducing the amount of gas that would be delivered by the pipeline during the storm. Finally, the pipeline right-of-way would be inspected immediately following the passage of a storm to ensure the pipeline had not been exposed or otherwise damaged.

4.13.1 Safety Standards

The DOT is mandated to provide pipeline safety under Title 49, USC Chapter 601. The Pipeline and Hazardous Materials Safety Administration's (PHMSA's), Office of Pipeline Safety (OPS), administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards that set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. PHMSA ensures that people and the environment are protected from the risk of pipeline incidents. This work is shared with state agency partners and others at the federal, state, and local level. Section 5(a) of the Natural Gas Pipeline Safety Act (NGPSA) provides for a state agency to assume all aspects of the safety program for intrastate facilities by adopting and enforcing the federal standards, while Section 5(b) permits a state agency that does not qualify under Section 5(a) to perform certain inspection and monitoring functions. A state may also act as DOT's agent to inspect interstate facilities within its boundaries; however, the DOT is responsible for enforcement action. The majority of the states have either 5(a) certifications or 5(b) agreements, while nine states act as interstate agents. The DOT pipeline standards are published in Parts 190-199 of Title 49 of the CFR. Part 192 of 49 CFR specifically addresses natural gas pipeline safety issues.

Under a Memorandum of Understanding on Natural Gas Transportation Facilities (Memorandum) dated January 15, 1993 between DOT and the FERC, DOT has the exclusive authority to promulgate federal safety standards used in the transportation of natural gas. Section 157.14(a)(9)(vi) of the FERC's regulations require that an Applicant certify that it will design, install, inspect, test, construct, operate, replace, and maintain the facility for which a certificate is requested in accordance with federal safety standards and plans for maintenance and inspection, or shall certify that it has been granted a waiver of the requirements of the safety standards by DOT in accordance with Section 3(e) of the NGPSA. The FERC accepts this certification and does not impose additional safety standards other than the DOT standards. If the Commission becomes aware of an existing or potential safety problem, there is a provision in the Memorandum to promptly alert DOT. The Memorandum also provides for the referral of complaints and inquiries made by state and local governments and the general public involving safety matters related to pipelines under the Commission's jurisdiction.

The FERC also acts as a member of DOT's Technical Pipeline Safety Standards Committee, which determines if proposed safety regulations are reasonable, feasible, and practicable.

The pipeline and aboveground facilities associated with the Project must be designed, constructed, operated, and maintained in accordance with the DOT Minimum Federal Safety Standards in 49 CFR Part 192. These regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. Part 192 specifies material selection and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion.

Part 192 also defines area classifications, based on population density in the vicinity of the pipeline, and specifies more rigorous safety requirements for populated areas. The class location unit is an area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline. The four area classifications are defined as follows:

- Class 1 locations include 10 or fewer buildings intended for human occupancy;
- Class 2 locations include more than 10 but less than 46 buildings intended for human occupancy;
- Class 3 locations include 46 or more buildings intended for human occupancy or where the pipeline lies within 100 yards of any building, or small well-defined outside areas occupied by 20 or more people on at least 5 days in a week for 10 weeks in any 12-month period; and
- Class 4 locations where buildings with four or more stories aboveground are prevalent.

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. Pipelines constructed on land in Class 1 locations must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock. All pipelines installed in navigable rivers, streams, and harbors must have a minimum cover of 48 inches in soil or 24 inches in consolidated rock.

Class locations also specify the maximum distance to a sectionalizing block valve (e.g., 10.0 miles in Class 1, 7.5 miles in Class 2, 4.0 miles in Class 3, and 2.5 miles in Class 4). Pipe wall thickness and pipeline design pressures, hydrostatic test pressures, maximum allowable operating pressure (MAOP), inspection and testing of welds, and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas.

The Project would be designed to account for planned population development. Table 4.13.1-1 shows the area classifications for the Project.

TABLE 4.13.1-1

Area Classifications

Parish	MP Start	MP End	Area Classifications	Reasons for Class 2 or 3
Leg 1				
Cameron	0.00	1.5	3	Commercial/Industrial
Cameron	1.5	24.6	1	
Calcasieu	24.6	47.6	1	
Calcasieu	47.6	48.9	2	Houses
Calcasieu	48.9	50.5	1	
Calcasieu	50.5	51.3	3	Marina (HDD)
Calcasieu	51.3	51.8	1	
Calcasieu	51.8	52.4	3	Industrial (HDD)
Calcasieu	52.4	74.9	1	
Jefferson Davis	74.9	99.4	1	
Acadia	99.4	110.0	1	
Acadia	110.0	112.4	2	Houses/Industrial
Acadia	112.4	112.5	1	
Evangeline	112.5	121.4	1	
Evangeline	121.4	123.3	2	Houses
Evangeline	123.3	128.3	1	
Evangeline	128.3	129.9	2	Houses
Evangeline	129.9	132.1	1	
Leg 2				
Cameron	0.00	1.2	3	Commercial/Industrial
FGT Lateral				
Acadia	0.00	2.3	1	

If a subsequent increase in population density adjacent to the right-of-way indicates a change in Class location for a segment of pipeline, Sections 192.609 and 192.611 require that the pipeline operator confirm or revise the MAOP commensurate with the current Class location. If physical revisions are required, these revisions may be accomplished by reducing operating pressure, or replacing the segment with pipe of sufficient grade and wall thickness to comply with the DOT code requirements for the new Class location.

In 2002, Congress passed an act to strengthen the Nation's pipeline safety laws. The Pipeline Safety Improvement Act of 2002 (HR 3609) was passed by Congress on November 15, 2002, and signed into law by the President in December 2002. Gas transmission operators must develop and follow a written integrity management program that contains all the elements described in Section 192.911 and addresses the risks on each covered transmission pipeline segment. Specifically, the law establishes an integrity management program, which applies to all high-consequence areas (HCAs). DOT (68 FR 69778, 69 FR 18228, and 69 FR 29903) defines HCAs as they relate to the different class zones, potential impact circles, or areas containing an identified site as defined in Section 192.903 of the DOT regulations.

OPS published a series of rules from August 6, 2002 to May 26, 2004 (69 FR 29903) that define HCAs where a gas pipeline accident would do considerable harm to people and their property and requires an integrity management program to minimize the potential for an accident. This definition satisfies, in part, the Congressional mandate in 49 USC 60109 for OPS to prescribe standards that establish criteria for identifying each gas pipeline facility in a high-density population area.

The HCAs may be defined in one of two ways. In the first method an HCA includes:

- Current Class 3 and 4 locations;
- Any area in Class 1 or 2 where the potential impact radius[1] is greater than 660 feet and there are 20 or more buildings intended for human occupancy within the potential impact circle;[2] or
- Any area in Class 1 or 2 where the potential impact circle includes an identified site.[3]

In the second method, an HCA includes any area within a potential impact circle that contains:

- 20 or more buildings intended for human occupancy ; or
- An identified site.

Once a pipeline operator has determined the HCAs on its pipeline, it must apply the elements of its integrity management program to those segments of the pipeline within HCAs. The DOT regulations specify the requirements for the integrity management plan at Section 192.911. The HCAs have been determined based on the relationship of the pipeline centerline to other nearby structures and identified sites. Of the approximately 135.5 miles of pipeline route, KMLP has identified approximately 0.8 mile that would be classified as an HCA. The pipeline integrity management rule for HCAs requires inspection of the entire pipeline for HCAs every 7 years.

Part 192 prescribes the minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these activities. Under 192.615, each

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1 The potential impact is calculated as the product of 0.69 and the square root of the MAOP of the pipeline in psi multiplied by the pipeline diameter in inches. Based on an MAOP of 1,440 PSIG and a nominal diameter of 42 inches, the calculated potential impact radius for Leg 1 of the Project would be about 1,100 feet. The potential impact radius for Leg 2 and the 24-inch FGT Lateral would be 943 feet and 628 feet, respectively.

2 The potential impact circle is a circle of radius equal to the potential impact radius.

3 An identified site is an outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period; a building that is occupied by 20 or more persons on at least 5 days a week for any 10 weeks in any 12-month period; or a facility that is occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

pipeline operator must also establish an emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency. Key elements of the plan include procedures for:

- Receiving, identifying, and classifying emergency events, gas leakage, fires, explosions, and natural disasters;
- Establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;
- Emergency shutdown of system and safe restoration of service;
- Making personnel, equipment, tools, and materials available at the scene of an emergency;
- Protecting people first and then property, and making them safe from actual or potential hazards; and
- Safely restoring any service outage.

Each operator must establish and maintain liaison with appropriate fire, police, and public officials to identify the resources and responsibilities of each organization that may respond to a gas pipeline emergency, and coordinate mutual assistance in responding to emergencies. The operator must also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials. KMLP would provide the appropriate training to local emergency service personnel before the pipeline is placed in service. No additional specialized local fire protection equipment would be required to handle pipeline emergencies. KMLP would develop an Emergency Plan for the Project that incorporates these procedures as required by Part 192.

4.13.2 Pipeline Accident Data

Since February 9, 1970, 49 CFR Part 191 has required all operators of transmission and gathering systems to notify DOT of any reportable incident and to submit a report on form F7100.2 within 20 days. Reportable incidents are defined as any leaks that:

- Caused a death or personal injury requiring hospitalization;
- Required taking any segment of transmission line out of service;
- Resulted in gas ignition;
- Caused estimated damage to the property of the operator, or others, or both, of a total of $5,000 or more;
- Required immediate repair on a transmission line;
- Occurred while testing with gas or another medium; or
- In the judgment of the operator was significant, even though it did not meet the above criteria.

Since 1984, DOT has required operators to report within 20 days incidents that involve property damage of more than $50,000, injury requiring in-patient hospitalization, death, release of gas, or those considered significant by the operator. Table 4.13.2-1 presents a summary of incident data for the period

TABLE 4.13.2-1

Natural Gas Service Incidents by Cause

Cause	**Incidents per 1,000 miles of Pipeline (percentage) 1970-1984**		**1986-2005**	
Outside force	0.70	(53.8)	0.10	(38.5)
Corrosion	0.22	(16.9)	0.06	(23.1)
Construction or material defect	0.27	(20.8)	0.04	(15.4)
Other	0.11	(8.5)	0.06	(23.1)
Total	1.30	(100)	0.26	(100)

1970 to 1984, as well as more recent incident data for 1986 through 2005, recognizing the difference in reporting requirements. The 14.5-year period from 1970 through June 1984, which provides a larger universe of data and more basic report information than subsequent years, has been subject to detailed analysis, as discussed in the following sections (Jones et al. 1986).

During the 14.5-year period, 5,862 service incidents were reported over the more than 300,000 total miles of natural gas transmission and gathering systems nationwide. Service incidents, defined as failures that occur during pipeline operation, have remained fairly constant over this period with no clear upward or downward trend in annual totals. In addition, 2,013 test failures were reported. Correction of test failures removed defects from the pipeline before operation.

Additional insight into the nature of service incidents may be found by examining the primary factors that caused the failures. Table 4.13.2-1 provides a percentage distribution of the causal factors as well as the annual frequency of each factor per 1,000 miles of pipeline in service.

The dominant incident cause is outside forces, constituting 53.8 percent of all service incidents. Outside forces incidents result from the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geologic hazards; weather effects such as winds, storms, and thermal strains; and willful damage. Table 4.13.2-2 shows that human error in equipment usage was responsible for approximately 75 percent of outside forces incidents. Since April 1982, operators have been required to participate in "One Call" public utility programs in populated areas to minimize unauthorized excavation activities in the vicinity of pipelines. The "One Call" program is a service used by public utilities and some private sector companies (e.g., oil pipelines and cable television) to provide preconstruction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts. The 1986 through 2005 data show that the portion of incidents caused by outside forces has decreased to 38.5 percent.

The pipelines included in the data set in table 4.13.2-1 vary widely in terms of age, pipe diameter, and level of corrosion control. Each variable influences the incident frequency that may be expected for a specific segment of pipeline.

The frequency of service incidents is strongly dependent on pipeline age. While pipelines installed since 1950 exhibit a fairly constant level of service incident frequency, pipelines installed before that time have a significantly higher rate, partially due to corrosion. Older pipelines have a higher frequency of corrosion incidents, since corrosion is a time-dependent process. Further, new pipe generally uses more advanced coatings and cathodic protection to reduce corrosion potential.

TABLE 4.13.2-2 Outside Forces Incidents by Cause (1970-1984)	
Cause	**Percent**
Equipment operated by outside party	67.1
Equipment operated by or for operator	7.3
Earth movement	13.3
Weather	10.8
Other	1.5

Older pipelines have a higher frequency of outside forces incidents partly because their location may be less well known and less well marked than newer lines. In addition, the older pipelines contain a disproportionate number of smaller diameter pipelines, which have a greater rate of outside forces incidents. Small diameter pipelines are more easily crushed or broken by mechanical equipment or earth movements.

Table 4.13.2-3 clearly demonstrates the effectiveness of corrosion control in reducing the incidence of failures caused by external corrosion. The use of both an external protective coating and a cathodic protection system, required on all pipelines installed after July 1971, significantly reduces the rate of failure compared to unprotected or partially protected pipe. The data show that bare, cathodically protected pipe actually has a higher corrosion rate than unprotected pipe. This anomaly reflects the retrofitting of cathodic protection to actively corroding spots on pipes.

TABLE 4.13.2-3 External Corrosion by Level of Control (1970-1984)	
Corrosion Control	**Incidents per 1,000 miles per Year**
None-bare pipe	0.42
Cathodic protection only	0.97
Coated only	0.40
Coated and cathodic protection	0.11

4.13.3 Impact on Public Safety

The service incident data summarized in table 4.13.2-1 include pipeline failures of all magnitudes with widely varying consequences. Approximately two-thirds of the incidents were classified as leaks, and the remaining third classified as ruptures, implying a more serious failure.

Table 4.13.3-1 presents the average annual fatalities that occurred on natural gas transmission and gathering lines from 1970 to 2005. Fatalities between 1970 and June 1984 have been separated into employees and nonemployees, to better identify a fatality rate experienced by the general public. Of the total 5.0 nationwide average, fatalities among the public averaged 2.6 per year over this period. The simplified reporting requirements in effect after June 1984 do not differentiate between employees and nonemployees. However, the data show that the total annual average for the period 1984 through 2005

TABLE 4.13.3-1

Annual Average Fatalities - Natural Gas Transmission and Gathering Systems[a,b]

Year	Employees	Nonemployees	Total
1970-June 1984	2.4	2.6	5.0
1984-2005[c]	-	-	3.6
1984-2005[c]	-	-	2.8[d]

[a] 1970 through June 1984 – Jones et al,1986.
[b] Pipeline and Hazardous Materials Administration, 2005.
[c] Employee/nonemployee breakdown not available after June 1984.
[d] Without 18 offshore fatalities occurring in 1989 - 11 fatalities resulted from a fishing vessel striking an offshore pipeline and 7 fatalities resulted from explosion on an offshore production platform.

decreased to 3.6 fatalities per year. Subtracting two major offshore incidents in 1989, which do not reflect the risk to the onshore public, yields a total annual rate of 2.8 fatalities per year for this period.

The nationwide totals of accidental fatalities from various manmade and natural hazards are listed in table 4.13.3-2 in order to provide a relative measure of the industry-wide safety of natural gas pipelines. Direct comparisons between accident categories should be made cautiously, however, because individual exposures to hazards are not uniform among all categories. Nevertheless, the average 2.6 public fatalities per year is relatively small considering the more than 300,000 miles of transmission and gathering lines in service nationwide. Furthermore, the fatality rate is approximately two orders of magnitude (100 times) lower than the fatalities from natural hazards such as lightning, tornados, floods, earthquakes, etc.

TABLE 4.13.3-2

Nationwide Accidental Deaths[a]

Type of Accident	Fatalities
All accidents	90,523
Motor vehicles	43,649
Falls	14,985
Drowning	3,488
Poisoning	9,510
Fires and burns	3,791
Suffocation by ingested object	3,206
Tornado, flood, earthquake, etc. (1984-93 average)	181
All liquid and gas pipelines (1978-87 average)[b]	27
Gas transmission and gathering lines, nonemployees only (1970-84 average)[c]	2.6

[a] All data, unless otherwise noted, reflects 1996 statistics from the U.S. Department of Commerce, Bureau of the Census, "Statistical Abstract of the United States 118th Edition."
[b] U.S. Department of Transportation, "Annual Report on Pipeline Safety - Calendar Year 1987."
[c] Jones et al 1986.

The available data show that natural gas pipelines continue to be a safe, reliable means of energy transportation. Based on approximately 301,000 miles in service, the rate of public fatalities for the nationwide mix of transmission and gathering lines in service is 0.01 per year per 1,000 miles of pipeline. Using this rate, the KMLP Project might result in a public fatality every 738-plus years. This would represent a slight increase in risk to the nearby public.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF THE STAFF'S ENVIRONMENTAL ANALYSIS

We have determined that construction and operation of the KMLP Project would result in limited adverse environmental impacts. If the Project is constructed and operated in accordance with recommended mitigation measures, it would be an environmentally acceptable action. Our conclusion is based on information provided by KMLP and data developed from data requests; field investigations by Commission staff; literature research; alternatives analysis; comment from federal, state, and local agencies; and input from the public.

As part of our review, we developed measures that we believe would appropriately and reasonably avoid, minimize, or mitigate environmental impacts resulting from construction and operation of the Project. We are, therefore, recommending that our mitigation measures be attached as conditions to any authorization issued by the Commission.

5.1.1 Geology

Construction and operation of the Project would have minimal impact on geological resources. No bedrock blasting is anticipated for the Project. The Project would be located in a region with a low risk of seismic activity, soil liquefaction, landslide susceptibility, and subsidence. Oil and natural gas extraction is common in the project area, but construction and operation of the Project is not expected to have an impact on exploitable oil or natural gas resources. The Project pipeline would HDD under a current sand and gravel pit. KMLP reports that the owner of this pit intends to begin filling the pit and there would not be any further excavation. We are recommending that KMLP file documentation of its consultation with the owner of the borrow pit prior to the close of the comment period on the draft EIS.

KMLP proposed an alternative measure to item V.A.5 of our Plan, which requires land surfaces to be restored to pre-construction contours, unless such contours threaten the integrity of the pipeline. We are not approving this proposal because KMLP did not provide sufficient site-specific justification. However, if KMLP identifies a location where it cannot comply with item V.A.5, we are recommending that KMLP file with the Secretary any alternative measures that it would use to ensure pre-construction contours are restored without compromising pipeline integrity.

5.1.2 Soils

The Project would traverse a variety of soil types and conditions, and approximately 79 percent of the soils that would be affected by the proposed pipeline are classified as prime farmland. Construction activities associated with the Project, such as clearing, grading, trenching, and backfilling, would adversely affect soil resources by resulting in erosion, compaction, and the loss of soil productivity and fertility by mixing of topsoil and subsoil horizons and changing drainage patterns. KMLP would implement the mitigation measures contained in our Plan to control erosion, ensure successful revegetation, and minimize any potential adverse impacts to soil resources. In addition, potential soil impacts to rice fields and crawfish ponds would be mitigated by attempting to schedule construction during dry periods, re-installing and testing the underlying low-permeability layer needed to hold water, and other measures.

There are no known contaminated soils in the project area. In case contaminated soils are encountered, we are recommending that KMLP file a Plan for the Discovery and Management of Contaminated Soils and Groundwater. To further reduce the potential for contamination from an accidental release of petroleum hydrocarbons or other hazardous materials, we are recommending that KMLP develop and file a project-specific SWPPP and SPRP.

5.1.3 Water Resources

Groundwater

Construction and operation of the Project would not have a significant impact on groundwater resources in the project area, including the Chicot Aquifer. Based on current information, 28 wells would be located within 150 feet of the construction right-of-way, including eight domestic supply wells (two of which are either abandoned or plugged), two industrial wells, nine irrigation wells, four monitoring wells (all four are plugged), and five rig supply wells (three of which are plugged). Landowners in the general vicinity of the construction right-of-way would be notified about their ability to request well testing and monitoring. In case water quality or well yield is affected, we are recommending KMLP file a statement agreeing to provide a temporary water supply and well re-testing, and replacement of the potable water supply system if water capacity and quality cannot be restored.

The greatest potential for impact on groundwater would be from spills, leaks, or other releases of hazardous substances during project construction or operation. We are recommending KMLP develop and implement a project-specific SWPPP and SPRP that would conform to the guidelines in our Procedures to prevent and minimize accidental or inadvertent chemical spills. Based on land use activities in the project area, the potential exists for contaminated groundwater to occur in the area. We are recommending KMLP develop a Plan for the Discovery of Contaminated Soil and Groundwater that would specify measures for protecting the environment in the event an unanticipated encounters with contaminated groundwater. With the implementation of the proposed construction measures, our Plan and Procedures, and our recommendations, we believe that there would be no impacts on groundwater resources as a result of construction and operation of the Project.

Surface Water

The Project would cross a total of 310 waterbodies. To minimize impacts on these water bodies, KMLP would implement our Procedures, its project-specific SPRP and SWPPP, site-specific waterbody crossing plans (appendix G), and an HDD Contingency Plan (appendix I), as well as requirements in the permits issued by other federal and state agencies.

KMLP proposes to use the HDD crossing method in 18 locations to avoid impacts to 24 waterbodies (some HDDs would cross more than one waterbody). The use of the HDD method would avoid or minimize in-stream disturbance and impacts on aquatic resources. We are recommending that KMLP file a site-specific construction plan for each of these HDD crossings. In response to comments from FWS, COE, and LDWF, we are also recommending KMLP evaluate the feasibility of using the HDD method to cross the Tiger Point Gulley (MP 113.3) and Bayou Barwick (MP 109.2) along Leg 1, and Bayou des Cannes (MP 1.57) along the FGT Lateral to avoid impacts to adjacent riparian and wetland areas.

KMLP proposes to cross Sabine Lake by HDD at the lake's southern and northern shorelines and it would use the open-cut construction method with spud barges across the lake's open water. KMLP would use the open-cut construction method from MP 4.8 to MP 17.9 of Leg 1. The use of HDD would resume at MP 17.9 within Sabine Lake, exiting on land at MP 18.6, to avoid shoreline erosion. By implementing the HDD crossing method at the northern and southern banks of Sabine Lake, it would avoid impacts to the shoreline, oyster reefs, EFH wetlands, and aquatic resources. Open-cut construction would affect water quality during construction, causing sediment resuspension and related impacts in the water column. To minimize impacts, KMLP would utilize BMPs as part of the SWPPP to address hazardous materials handling and storage, as well as spill prevention and response.

KMLP would install the pipeline across Calcasieu River between MP 49.6 and MP 51.1 with a series of HDDs. One of the HDD pull strings would lie across a COE dredge spoil area. We are recommending KMLP complete consultation with COE regarding the related impacts and file documentation of its consultations with the Secretary prior to construction. Crossing the Calcasieu River by HDD would minimize impacts to the river and associated riparian vegetation.

KMLP proposed to construct/modify Access Roads 15, 19, and FGT-2 across drainage ditches, which according to the COE, qualify as flowing waters that must be protected. Therefore, we are recommending that KMLP evaluate the feasibility of rerouting these access roads to minimize impacts to the drainage ditches.

5.1.4 Wetlands

The Project would be constructed in areas of extensive estuarine and palustrine wetlands, affecting a total of 352 wetlands covering approximately 504.2 acres. Temporary impacts resulting from installation of the Project would include approximately 28.3 acres of forested wetlands and 475.9 acres of non-forested wetlands. These temporary impacts include 99.5 acres of EFH wetlands and 179.4 acres of two CWPPRA projects crossed by the pipeline. Operation of the pipeline facilities would result in the permanent conversion of 14.9 acres of forested wetlands to emergent or scrub-shrub wetlands. The COE has not yet verified the KMLP wetland delineation for the Project; therefore, the acreage of wetlands affected by the Project may change.

KMLP has requested the use of a 125-foot-wide construction right-of-way in wetlands where the crossing length is greater than 100 feet. KMLP has also requested that various access roads, extra work spaces, and interconnect sites be constructed within wetlands. We are approving the requested alternative measures based on soil stability issues, necessary access to HDD work spaces, and lack of practicable alternatives.

To minimize impacts to wetlands, KMLP would implement our Procedures, with accepted alternative measures, which include measures to minimize sediment runoff into wetlands and minimize impacts from construction equipment. Use of HDD construction methods along the pipeline route would avoid the need to clear or otherwise disturb 7.0 acres of forested wetlands and 100.8 acres of non-forested wetlands. We are also recommending that KMLP evaluate alternative routes for Access Road 4-5 to avoid impacts to wetlands.

KMLP would also implement its Aquatic Resources Mitigation Plan (see appendix J) to ensure no net loss of wetland functions and values. KMLP is still developing its draft Aquatic Resources Mitigation Plan in consultation with COE, FWS, NOAA Fisheries Service, and LDWF and we are recommending that the final Aquatic Resources Mitigation Plan be filed with the Secretary prior to construction.

5.1.5 Vegetation

Construction of the pipeline, aboveground facilities, access roads, pipe storage and contractor yards, and extra workspaces would require the clearing of 1,843.3 acres of upland vegetative lands, including 115.4 acres of upland forest. Upon completion of construction approximately 43.8 acres of upland forest would be converted to a permanent pipeline right-of-way and maintained in an herbaceous state. Additionally, 16.5 acres of upland vegetation would be permanently converted to aboveground facilities or permanent access roads.

KMLP has requested a construction right-of-way width for Leg 1 through upland habitats that would range from 125 feet to 165 feet, depending on construction methods; a construction right-of-way for the FGT Lateral through upland habitats that would range from 100 feet to 130 feet wide, depending on construction methods; and maintenance across the entire 50-foot-wide permanent right-of-way on an annual basis. We are only approving the use of a 125-foot-wide construction right-of-way for Leg 1 in uplands and a 100-foot-wide construction right-of-way for the FGT Lateral in uplands due to the large diameter of the pipe and local soil conditions, and to accommodate right-of-way topsoil segregation. We are denying the requested annual maintenance of the permanent right-of-way to avoid excessive and continuous disruption of upland habitats. Construction and operation of the Project would not significantly affect vegetation.

5.1.6 Wildlife and Aquatic Resources

Wildlife

The impact of construction and operation of the Project on wildlife would be the temporary alteration of wildlife habitat. Initial clearing and construction activities would result in the disruption of wildlife habitat. Once construction is completed, wildlife would re-occupy the temporarily disturbed habitat along the Project corridor. The areas disturbed by construction, excluding areas occupied by aboveground facilities, would be revegetated after construction has been completed. Although temporary and permanent impacts on food, cover, and water sources may occur, none of the species identified within the project area are specialized in such a way that construction of a pipeline would inhibit the overall fitness or reproductive viability of the populations as a whole. Many of the mammal, bird, reptile, and amphibian species are adaptive to changing habitat conditions and have the capability of temporarily expanding or shifting their home ranges to find alternative sources of food, water, and shelter until the right-of-way habitats become re-established. The impact on wildlife would be temporary and short-term. We believe, with the implementation of our Plan and Procedures and recommended measures, impact on wildlife would be minimal.

Approximately the first 50 miles of the Project consists of emergent marsh and coastal prairie/grassland that provide habitat for wintering waterfowl and rookeries. Given the abundant adjacent areas that can provide alternative habitat, we conclude that there would be no significant impact on migratory waterfowl. The Project route could include suitable nesting habitat for various species of colonial wading birds, including the roseate spoonbill. To avoid impacts to these species, KMLP has stated that they would employ a qualified biologist to survey the proposed work area during the 2007 nesting season, and again immediately prior to construction scheduled during the nesting season to determine the presence of colonial waterbird rookeries. KMLP would further consult with FWS and the NHP of LDWF in order to determine mitigation measures to minimize potential impacts to these nesting areas, should they be found.

Aquatic Resources

The pipeline would cross 310 waterbodies, including Sabine Lake, the GIWW, and Calcasieu River. Potential impacts on aquatic resources from project construction and operation include those associated with pipeline construction across waterbodies and through wetlands.

Impacts on fisheries resources resulting from pipeline construction activities at waterbody crossings may include sedimentation and turbidity, alteration or removal of instream and stream bank fish cover, introduction of water pollutants, or entrainment of small organisms during hydrostatic testing. Studies generally have indicated that pipeline construction through waterbodies results in temporary impacts on streams and rivers, and that there are no long-term effects on water temperature, pH, dissolved oxygen, benthic invertebrate populations, or fish populations. KMLP would implement the measures in our Procedures, which include the use of screening on intake hoses, to minimize entrainment or impingement of fish when withdrawing water for hydrostatic testing.

The primary impacts on aquatic resources would be associated with open-cut construction in Sabine Lake. This would include entrainment of organisms by construction machinery and increased turbidity due to the re-suspension of bottom sediments. Incidental take of benthic organisms due to entrainment during the offshore construction process would not be extensive enough to have a significant impact on the fishery resources of the area. The LDWF is mandated under Louisiana law to protect oyster resources. Sabine Lake contains a public tonging area for oysters, and was surveyed to determine the extent of oyster resources in the project area. Although no oyster reefs would be directly impacted by the construction of the Project, suitable substrate would be within the construction right-of-way and potentially lost. KMLP has stated that it would compensate LDWF for each bottom substrate directly impacted by pipeline construction and also for oysters lost due to sedimentation on the reefs within 1,500 feet of the HDD exit pit at MP 4.82.

Direct spills of petroleum or other toxic products into waterbodies during construction could be harmful to aquatic organisms, depending on the type, quantity, and concentration of the spill. To reduce the potential for direct surface water contamination, KMLP would develop and implement the procedures in a project-specific SWPPP and SPRP. KMLP requested an alternative measure to items IV.A.1.d and e of our Procedures to allow refueling and storage of hazardous materials near a waterbody. We are approving this measure only for construction in Sabine Lake and the Sabine River, where there is no practicable alternative to refueling from barges.

Post-construction or operational impacts of the pipeline would be minimal. Restoration of the vegetation along the pipeline construction work areas would minimize erosion potential relative to waterbodies. Minimal impact on fisheries is expected from maintenance mowing or manual removal of woody vegetation in the vicinity of the pipeline right-of-way as maintenance would be in accordance with our Plan and Procedures.

Essential Fish Habitat

Construction of the Project is not expected to have a significant impact on EFH. Impacts on EFH from the construction of the Project are associated with loss or alteration of habitat. These impacts can be further divided into those that result in temporary or permanent effects on EFH and species. The primary impact of construction and operation of the Project would be the alteration and, to a lesser extent, direct loss of habitat types that could function as EFH for the various species.

NOAA Fisheries Service identified aquatic and tidally influenced wetland habitats in the project area as designated EFH for postlarval, juvenile, and subadult life stages of two species of shellfish (brown and white shrimp); postlarval, juvenile, and subadult life stages of red drum; and the late juvenile, subadult, and adult life stages of bonnethead shark. Construction through the first 50 miles of the proposed pipeline route would impact approximately 99.5 acres of EFH wetlands along the northern and southern banks of Sabine Lake, Shell Island, the Sabine and Calcasieu Rivers, and the GIWW.

Construction through Sabine Lake would result in a temporary loss of soft bottom habitat due to the excavation of the floatation channel and pipe trench, as well as the placement of the spoil piles, which would cover the habitat at that location. These activities would also cause an increase in turbidity and sedimentation. Managed mobile species utilizing soft bottoms or the water column would be temporarily displaced; however, less mobile stages of managed species that utilize soft bottom habitat could be smothered and experience mortality through placement of the spoil pile. Oyster reefs do not occur within the construction right-of-way for the pipeline in Sabine Lake. Impacts to these oyster reefs would be limited to increased turbidity and sedimentation.

Operation of the pipeline facilities would have minimal impacts on EFH since the pipeline would be buried and the existing EFH would become reestablished in the construction corridor. KMLP proposes to monitor the created or restored tidal wetlands annually for at least 3 years and to consult with appropriate agencies if monitoring indicates poor plant survival or insufficient coverage. Monitoring protocols were developed in consultation with NOAA Fisheries Service and are included in the draft Aquatic Resources Mitigation Plan (appendix J).

5.1.7 Threatened and Endangered Species

Agency consultations resulted in the identification of 12 federally listed threatened or endangered species that potentially occur in the project area. These include: five sea turtles (the green, leatherback, loggerhead, Kemp's ridley, and hawksbill sea turtles); one marine mammal (the West Indian manatee); four bird species (the bald eagle, brown pelican, RCW, and piping plover), and two fish species (the Gulf sturgeon and smalltooth sawfish).

The FWS stated that the Project would not affect the West Indian manatee, four bird species, the two fish species, and four of the five sea turtle species. NOAA Fisheries Service has joint jurisdiction over the Gulf sturgeon, smalltooth sawfish, and the five species of sea turtle. NOAA Fisheries Service agreed that the project would not affect the Gulf sturgeon or smalltooth sawfish, and requested that Project impacts be assessed for the five species of sea turtles.

The construction impacts to sea turtles would include noise disturbance, alteration or loss of habitat, effects on prey species, and changes in water quality. These impacts are expected to be temporary, localized, and minor. KMLP would implement NOAA Fisheries Service's "Sea Turtle and Smalltooth Sawfish Construction Conditions" and "Vessel Strike Avoidance Measures and Injured or Dead Species Reporting" guidelines (see appendix K).

KMLP has not completed surveys for RCW due to lack of access to certain private properties. Therefore, we are recommending that KMLP consult further with the FWS to identify the need for additional RCW field surveys and file documentation of its consultation, including any survey reports and FWS comments on the surveys, as soon as they become available.

NHP of LDWF has identified 10 state-listed species of concern that may occur in the project area. Seven species of plants were eliminated from concern because none of them are located within 0.5 miles of the Project. However, the Roseate Spoonbill (colonial waterbirds), Crested Caracara, and Old Prairie Crawfish, may be located in the project area. KMLP has committed to engaging a qualified biologist to perform surveys during the 2007 nesting season and immediately prior to construction to determine the presence or absence of colonial waterbird nesting areas. If any nesting areas are found, KMLP would consult further with FWS and the NHP of LDWF to determine mitigation measures and BMPs to minimize potential impacts to the Roseate Spoonbill and Crested Caracara. KMLP also would implement our Plan and Procedures, which include measures to minimize impacts to the general habitats used by these species. These measures would reduce the loss of vegetated habitats, minimize impacts to water quality, and result in restoration of areas temporarily disturbed during construction. In its letter, LDWF requested that measures be taken to protect Old Prairie Crawfish habitat, including roadside ditches. We are recommending KMLP file documentation of consultations with LDWF to develop mitigation measures for the crossing of roadside ditches.

We have not completed consultation with the FWS and NOAA Fisheries Service. Therefore, we are recommending that KMLP not begin construction activities until we complete any necessary consultations with the FWS and NOAA Fisheries Service, and KMLP receives written notification from the Director of OEP that construction and/or implementation of conservation measures may begin.

5.1.8 Land Use, Recreation, and Visual Resources

Construction of the Project would affect approximately 3,030.7 acres of land, including 2,274.1 acres for the pipeline construction right-of-way; 12.3 acres for the aboveground facilities; and 744.4 acres for extra workspaces, pipe storage and contractor yards, and access roads. Agricultural land comprises about 49 percent of the project area and about 19 percent is open water. Beaches, forestland, developed land, open land, and other land (including strip mines, quarries, and gravel pits) account for the remaining 32 percent of this acreage. Following construction, all affected areas outside the permanent pipeline right-of-way and aboveground facility sites would be restored and allowed to revert to preconstruction conditions and uses. During operation of the Project, the permanent pipeline right-of-way would consist of approximately 822 acres, and the aboveground facility sites and permanent access roads would permanently convert about 19 acres to developed land.

KMLP identified 14 structures within 50 feet of the construction right-of-way. None of these structures were identified as residences. However, 9 of the 14 structures have been generically identified as "buildings." We are recommending that KMLP revise table 4.8.3.6-1 in this draft EIS to explicitly identify all structures within 50 feet of the construction work area and file this information with the Secretary prior to the end of this draft EIS comment period.

The Project would potentially affect several recreational and special interest areas, including CRP lands administered by the NRCS and FSA; FWS-administered conservation easement areas; two wetland and hydrologic restoration projects, the Black Bayou Hydrologic Restoration Project sponsored by NOAA Fisheries Service and the LDNR and the Perry Ridge Shore Protection Project sponsored by NRCS and the LDNR; and one scenic by-way, the Creole Nature Trail. According to local FSA offices, the Project would not cross any CRP lands with the possible exception of such lands in Jefferson Davis Parish, where consultations are still ongoing. Therefore, we are recommending that KMLP continue consultations with FSA and NRCS to identify the extent and location of any CRP lands within Jefferson Davis Parish that would be affected by the project. We are also recommending that KMLP consult with FWS to determine if FWS conservation easement properties are crossed by the Project. In addition, we are recommending that KMLP consult with LDNR, NOAA Fisheries Service, and FWS, and develop site-specific construction and restoration plans for crossing the Black Bayou Hydrologic Restoration Project and the Perry Ridge Shore Protection Project.

Commercial and recreational activities, such as boating, fishing, and oyster harvesting would potentially be impacted by pipeline installation through Sabine Lake. KMLP would utilize special construction methods and sequencing to help mitigate such impacts, as well as provide project-specific details to the U.S. Coast Guard.

No known hazardous waste sites occur within 0.25 miles of the Project right-of-way. We are including a recommendation for KMLP to develop a Plan for the Discovery and Management of Contaminated Soils and Groundwater that identifies the procedures that would be implemented during construction to identify, test, treat, and dispose of such materials, if found, in accordance with the appropriate state and federal regulations.

The Project would cross numerous foreign pipelines. The KMLP pipeline would be installed by horizontal bore under most single pipelines, but in areas where foreign pipelines are highly congested or near waterbodies or wetlands, HDD would be used. To ensure KMLP's plans for HDDs under foreign pipelines are complete, we are recommending that KMLP file a site-specific construction plan for the crossing of foreign pipeline corridors between MP 25.3 and MP 26.8.

Visual resources along the Project route would not be adversely affected. There are several existing pipelines in the vicinity of the Project, and the KMLP pipeline would parallel some of these existing rights-of-way. Many areas along the Project are either inaccessible or do not provide long-range unobstructed views, but public viewpoints are present along some of the roadways in the area. The Transco interconnect site would be within 0.5 mile of several residences that would likely have a direct view. Therefore, we are recommending that KMLP develop and file a site-screening plan for this facility prior to construction.

Portions of the Project lie within Louisiana's coastal zone that is managed by the CMD of the LDNR. KMLP has consulted with the CMD and is in the process of preparing and filing a Coastal Use Permit application as part of the Joint Permit Application with the COE. Upon receipt and review of that document, CMD will determine if the Project is consistent with Louisiana's Coastal Zone Management Program. We are recommending that KMLP file a copy of the CZMP consistency determination issued by the LDNR before construction begins.

5.1.9 Socioeconomics

Construction of the Project would not have a significant impact on local populations, housing, employment, or the provision of community services. Construction of the Project would temporarily increase the demand for public services such as emergency response, medical, and traffic control but these effects would be offset by increases in local government revenues. Operation of the project would have stimulatory effects on local spending, employment, and government revenues but such effects would be minor.

5.1.10 Cultural Resources

KMLP consulted with the Louisiana SHPO and performed cultural resource investigations for the APE for the proposed pipeline corridor and ancillary facilities. A total of 15 cultural resources were discovered within the terrestrial portion of the pipeline route and five additional cultural resource locations were identified at ancillary sites. None of the properties identified to date have been determined eligible for the NHRP, though KMLP proposed to use HDDs to avoid four previously recorded sites along the pipeline corridor.

Underwater surveying of Sabine Lake revealed 15 targets along the proposed pipeline corridor. However, only one of these identified targets was designated as a potential submerged cultural resource after consultation with archaeologists. KMLP would either avoid this site or complete further investigation in consultation with regulatory authorities. Gaps in data are present along the proposed submerged route due to difficulty in obtaining sensory data in shallow waters, but significant underwater cultural resources are not anticipated in these shallow waters.

Present evidence suggests that no historic properties eligible for the NRHP would be affected by the construction of the project. However, surveys have not been conducted for about 9.9 miles of the proposed pipeline route and a few ancillary facilities where permission from landowners is pending, and the Louisiana SHPO's comments are awaited.

In order to assure that the ACHP would have the opportunity to comment on any historic properties that might be identified by these studies, we are recommending that KMLP not be allowed to construct any facilities, use any staging, storage, or temporary work areas, or use any access roads, until it files the survey reports, required treatment plans, and the SHPO comments with the Commission, and is given written authorization to proceed by the Director of the OEP.

5.1.11 Cumulative Impacts

We identified three types of past, present, and reasonably foreseeable future projects that would potentially result in a cumulative impact when considered with the proposed Project. These include other natural gas transmission pipelines in the area, nonjurisdictional facilities associated with the Project, and transportation and other infrastructure projects in the vicinity of the proposed pipeline route. The potential impacts associated with these projects that are most likely to be cumulatively significant are related to wetlands and waterbodies, vegetation and wildlife, federally and state-listed endangered and threatened species, land use, air quality, and noise. We believe that, overall, impacts associated with the Project would be relatively minor, and we included recommendations in this draft EIS to further reduce the environmental impacts associated with the Project. Similarly, each of the projects considered in our analysis has been or would be designed to avoid or minimize impacts to sensitive environmental resources. Additionally, it is anticipated that any significant unavoidable impacts to sensitive resources resulting from these projects would be mitigated. Consequently, only a small cumulative effect is anticipated when the impacts of the KMLP Project are added to past, present, or reasonably foreseeable future projects in the area.

5.1.12 Air Quality and Noise

Construction of the Project is expected to have short-term minor impacts on air quality from fugitive dust and emissions from construction equipment. Operation of the Project is expected to have long-term minor impacts on air quality from emissions from heaters installed at interconnect locations.

Construction activities are expected to have a short-term minor impact on the noise environment provided that mitigation measures are employed during HDD operations. Recommended mitigation measures include the development of a noise mitigation and compliance plan that would address potential mitigation measures such as sound barriers or temporary housing to ensure the NSAs at MPs 44.5, 49.6, and 99.8 are not exposed to noise greater than 55 dBA. Operation of the project is not expected to have an impact on the noise environment.

5.1.13 Reliability and Safety

The proposed Project would be designed, constructed, operated, and maintained to meet or exceed all DOT safety standards for natural gas pipelines. Following construction, KMLP would also initiate a pipeline integrity management plan to ensure public safety during operation. The Project would result in only a slight increase in risk to the nearby public.

5.1.14 Alternatives

We evaluated the no action or postponed action alternatives, which would involve not building or deferring construction of the proposed Project facilities. While the no action or postponed action alternative would eliminate the short- and long-term environmental impacts identified in this draft EIS, 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.

We evaluated system alternatives, including alternatives involving the approved Sabine Pass Pipeline, to examine whether other existing or proposed natural gas pipeline systems would meet the proposed Project objectives while offering an environmental advantage over the Project. 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. We identified two proposed pipeline systems that, with significant additional construction and adaptation, could 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. Based on our analysis, however, we do not believe that the system alternatives offer substantial environmental benefits relative to the proposed action.

We also evaluated four major route alternatives to the Project route. However, none of these would offer significant environmental advantages over the proposed route, and we eliminated them from further consideration. Lastly, we considered route variations to resolve or reduce construction impacts to localized, specific resources. We evaluated a total of 15 route variations and considered their associated environmental consequences as part of our environmental analysis of the Project. Variations that lessened environmental impacts were adopted by KMLP as part of the proposed Project route.

In summary, with KMLP's proposed mitigation and our recommendations, the proposed route is environmentally least damaging and we are recommending use of the proposed route as the preferred alternative.

5.2 FERC STAFF'S RECOMMENDED MITIGATION

If the Commission issues a Certificate for the proposed Project, we recommend that the Commission's Order include the following specific conditions. We believe that these measures would further mitigate the environmental impacts associated with the construction and operation of the Project:

1. KMLP shall follow the construction procedures and mitigation measures described in its application, supplemental filings (including responses to staff information requests), and as identified in the EIS, unless modified by the Order. KMLP must:
   a. request any modification to these procedures, measures, or conditions in a filing with the Secretary;
   b. justify each modification relative to site-specific conditions;
   c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and
   d. receive approval in writing from the Director of OEP **before using that modification**.

2. The Director of OEP has delegated authority to take whatever steps are necessary to ensure the protection of life, health, property, and the environment during construction and operation of the project. This authority shall allow:
   a. the modification of conditions of the Order; and
   b. design and implementation of any additional measures deemed necessary (including stop work authority) to assure continued compliance with the intent of the environmental

conditions as well as the avoidance or mitigation of adverse environmental impact resulting from project construction and operation.

3. **Prior to any construction**, KMLP shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, environmental inspectors (EIs), and contractor personnel will be informed of the EIs' authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs **before** becoming involved with construction and restoration activities.

4. The authorized facility locations shall be as shown in the EIS, as supplemented by filed alignment sheets, and shall include all of the staff's recommended facility locations. **As soon as they are available, and before the start of construction**, KMLP shall file with the Secretary any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

   KMLP's exercise of eminent domain authority granted under Natural Gas Act (NGA) section 7(h) in any condemnation proceedings related to the Order must be consistent with these authorized facilities and locations. KMLP's right of eminent domain granted under NGA section 7(h) does not authorize it to increase the size of its natural gas pipeline to accommodate future needs or to acquire a right-of-way for a pipeline to transport a commodity other than natural gas.

5. KMLP shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, pipe storage yards, new access roads, and other areas that would be used or disturbed and have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, and documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps/sheets/aerial photographs. Each area must be approved in writing by the Director of OEP **before construction** in or near that area.

   This requirement does not apply to extra workspace allowed by the *Upland Erosion Control, Revegetation, and Maintenance Plan,* minor field realignments per landowner needs and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.

   Examples of alterations requiring approval include all route realignments and facility location changes resulting from:

   a. implementation of cultural resources mitigation measures;
   b. implementation of endangered, threatened, or special concern species mitigation measures;
   c. recommendations by state regulatory authorities; and
   d. agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

6. **Within 60 days of the acceptance of this certificate** and **prior to construction**, KMLP shall file an initial Implementation Plan with the Secretary for review and written approval by the Director of OEP describing how KMLP would implement the mitigation measures required by the Order. KMLP must file revisions to the plan as schedules change. The plan shall identify:

   a. how KMLP will incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to onsite construction and inspection personnel;
   b. the number of EIs assigned per spread, and how the company will ensure that sufficient personnel are available to implement the environmental mitigation;
   c. company personnel, including EIs and contractors, who will receive copies of the appropriate material;
   d. the training and instructions KMLP will give to all personnel involved with construction and restoration (initial and refresher training as the project progresses and personnel change), with the opportunity for OEP staff to participate in the training session;
   e. the company personnel (if known) and specific portion of KMLP's organization having responsibility for compliance;
   f. the procedures (including use of contract penalties) KMLP will follow if noncompliance occurs; and
   g. for each discrete facility, a Gantt or PERT chart (or similar project scheduling diagram), and dates for:
      (1) the completion of all required surveys and reports;
      (2) the mitigation training of onsite personnel;
      (3) the start of construction; and
      (4) the start and completion of restoration.

7. KMLP shall develop and implement an environmental complaint resolution procedure. The procedure shall provide landowners with clear and simple directions for identifying and resolving their environmental mitigation problems/concerns during construction of the Project and restoration of the right-of-way. **Prior to construction**, KMLP shall mail the complaint procedures to each landowner whose property would be crossed by the Project.

   a. In its letter to affected landowners, KMLP shall:
      (1) provide a local contact that the landowners should call first with their concerns; the letter should indicate how soon a landowner should expect a response;
      (2) instruct the landowners that, if they are not satisfied with the response, they should call KMLP’s Hotline; the letter should indicate how soon to expect a response; and
      (3) instruct the landowners that, if they are still not satisfied with the response from KMLP’s Hotline, they should contact the Commission's Enforcement Hotline at (888) 889-8030.
   b. In addition, KMLP shall include in its weekly status report a copy of a table that contains the following information for each problem/concern:
      (1) the date of the call;
      (2) the identification number from the certificated alignment sheets of the affected property;
      (3) the description of the problem/concern; and
      (4) an explanation of how and when the problem was resolved, will be resolved, or why it has not been resolved.

8. KMLP shall employ a team of EIs (at least two per construction spread). The EIs shall be:
   a. responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or other authorizing documents;
   b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 6 above) and any other authorizing document;
   c. empowered to order correction of acts that violate the environmental conditions of the Order, and any other authorizing document;
   d. a full-time position, separate from all other activity inspectors;
   e. responsible for documenting compliance with the environmental conditions of the Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and
   f. responsible for maintaining status reports.

9. KMLP shall file updated status reports prepared by the EI with the Secretary on a weekly basis **until all construction and restoration activities are complete**. On request, these status reports will also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include:
   a. the current construction status of the Project, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally sensitive areas;
   b. a listing of all problems encountered and each instance of noncompliance observed by the EIs during the reporting period (both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other federal, state, or local agencies);
   c. corrective actions implemented in response to all instances of noncompliance, and their cost;
   d. the effectiveness of all corrective actions implemented;
   e. a description of any landowner/resident complaints which may relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns; and
   f. copies of any correspondence received by KMLP from other federal, state or local permitting agencies concerning instances of noncompliance, and KMLP's response.

10. KMLP must receive written authorization from the Director of OEP **before commencing service of the Project**. Such authorization will only be granted following a determination that rehabilitation and restoration of the right-of-way and other areas affected by the Project are proceeding satisfactorily.

11. **Within 30 days of placing the certificated facilities in service**, KMLP shall file an affirmative statement with the Secretary, certified by a senior company official:
    a. that the facilities have been constructed in compliance with all applicable conditions, and that continuing activities will be consistent with all applicable conditions; or
    b. identifying which of the certificate conditions KMLP has complied with or will comply with. This statement shall also identify any areas affected by the Project where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.

12. KMLP shall limit its nominal construction right-of-way width for Leg 1 and the FGT Lateral in upland areas to 125 feet and 100 feet, respectively. If additional right-of-way width is necessary, KMLP shall file with the Secretary a site-specific construction plan and written justification for any additional right-of-way width for review and written approval by the Director of OEP **prior to construction**. (page 2-9)

13. KMLP shall file its project-specific SWPPP, including an ES&C Plan and SPRP, with the Secretary for review and written approval by the Director of OEP **prior to construction**. (page 2-10)

14. KMLP shall file with the Secretary a site-specific construction plan for the crossing of foreign pipeline corridors between MP 25.3 and MP 26.8. These site-specific plans shall include scaled drawings identifying all areas that would be disturbed by construction. KMLP shall file these plans for review and written approval by the Director of OEP **prior to construction**. (page 2-40)

15. **Prior to the close of comment period on the draft EIS,** KMLP shall file with the Secretary a letter from the owner of the borrow pit at MP 52.7 addressing the existing and future use of this resource. (page 4-6)

16. KMLP shall restore the contours in accordance with the requirements of item V.A.5 of our Plan. If KMLP identifies a location(s) where it can not implement item V.A.5 of our Plan, KMLP shall file with the Secretary for review and written approval by the Director of OEP, any alternative measures that it would use to ensure preconstruction contours are restored without compromising pipeline integrity. (page 4-8)

17. **Prior to construction**, KMLP shall file with the Secretary for review and written approval by the Director of OEP, a Plan for the Discovery and Management of Contaminated Soils and Groundwater. (page 4-14)

18. **Prior to construction**, KMLP shall file with the Secretary a statement that if water quality or yield were found to be impaired due to the Project, KMLP would provide a temporary water supply and re-test the well within 30 days. In addition, KMLP shall replace any potable water supply system that it damages during construction and cannot repair to its former capacity and quality. KMLP shall identify in its report to the Secretary all potable water supply systems damaged by construction and how they were repaired. (page 4-19)

19. KMLP shall file with the Secretary a site-specific construction plan for the crossing of each waterbody proposed as a HDD crossing. These site-specific plans shall include scaled drawings identifying all areas that would be disturbed by construction. KMLP shall file these plans for review and written approval by the Director of the OEP along with the COE permit **prior to construction** across those waterbodies. (page 4-22)

20. KMLP shall evaluate the feasibility of using the HDD method to cross Tiger Point Gulley at MP 113.3 and Bayou Barwick at MP 109.2 along Leg 1 and Bayou des Cannes along the FGT Lateral at MP 1.57, and develop a site-specific construction plan for each of these crossings in coordination with FWS and LDWF that clearly identifies all construction work areas including the laydown area for the pipe string if the HDD method is determined to be feasible. KMLP shall file the results of its evaluation, the site-specific construction plans, and any agreed-upon mitigation measures to minimize impacts on riparian areas and the

associated forested wetlands with the Secretary for review and written approval by the Director of OEP **prior to the close of the comment period on the draft EIS.** (page 4-22)

21. **Prior to construction** of Access Roads 15, 19, and FGT-2, KMLP shall evaluate the feasibility to reroute these access roads to avoid crossing drainage ditches at MPs 52.3 and 61.4 of Leg 1, and avoid crossing Bayou des Cannes Tributary at MP 2.3 of the FGT Lateral. KMLP shall file with the Secretary the reroutes for these access roads, copies of the revised alignment sheets, and necessary environmental information for review and written approval by the Director of OEP.

    If any of these access roads can not be rerouted, KMLP shall provide:

    a. justification why rerouting is infeasible;
    b. documentation of consultation with COE, including proposed mitigation measures;
    c. construction plans for these access roads;
    d. copies of necessary permits/approvals; and
    e. landowner concurrences.

    KMLP shall not use/construct these access roads **until** the Director or OEP notifies KMLP in writing that it may proceed. (page 4-23)

22. **Prior to construction**, KMLP shall file the following environmental information with the Secretary for review and written approval by the Director of OEP:

    a. site-specific construction plan for the HDD crossing of the Calcasieu River and marina between MP 49.6 and MP 51.1 along Leg 1; and
    b. documentation of consultation with COE for the HDD crossing of the Calcasieu River and the use of COE dredge spoil area located at MP 50.0. (page 4-28)

23. KMLP shall use hand clearing methods for clearing vegetation in the path of HDDs in wetland areas. (page 4-32)

24. KMLP shall evaluate alternative routes for Access Road 4-5 or provide justification for the wetland impacts associated with its construction in wetlands. Any revision to the route of Access Road 4-5 shall be shown on revised alignment sheets. KMLP shall file with the Secretary results of its evaluation and copies of the revised alignment sheets for review and written approval by the Director of OEP **prior to construction**. (page 4-35)

25. KMLP shall consult with LDNR, NOAA Fisheries Service, and FWS, and develop site-specific construction and restoration plans for crossing the Black Bayou Hydrologic Restoration Project and Perry Ridge Shore Protection Project. KMLP shall file with the Secretary copies of its consultation, along with construction and restoration plans, for review and written approval by the Director of OEP **prior to the completion of the final EIS**. (page 4-37)

26. KMLP shall continue consultations with the FSA and NRCS to identify the extent and location of all CRP lands within Jefferson Davis Parish that would be affected by construction and operation of the Project. In addition, KMLP shall file with the Secretary **prior to construction**, copies of its consultation and documentation of any stipulations or recommendations to avoid and minimize impacts to any CRP lands that would be affected. (page 4-38)

27. **Prior to construction**, KMLP shall file with the Secretary a copy of the finalized Aquatic Resources Mitigation Plan developed in consultation with COE, NOAA Fisheries Service, FWS, LDNR, and LDWF. (page 4-41)

28. KMLP shall consult with the FWS to determine the need for and methodology of additional surveys for RCW along the pipeline route or provide concurrence from the FWS that the Project is not likely to adversely affect the RCW. The results of consultation with the FWS, any additional survey reports, and FWS comments on the survey shall be filed with the Secretary **as soon as they become available before close of the comment period on the draft EIS**. Survey reports shall include the following information:

    a. name(s) and qualifications of the person(s) conducting the survey;
    b. method(s) used to conduct the survey;
    c. date(s) of the survey;
    d. area surveyed (include the mileposts surveyed); and
    e. proposed mitigation that would substantially minimize or avoid the potential impacts. (page 4-70)

29. KMLP shall consult with the NHP of LDWF and develop mitigation measures to protect the old prairie crawfish during construction through roadside ditches. KMLP shall file with the Secretary copies of its consultation **prior to construction**. (page 4-72)

30. KMLP shall not begin construction activities **until**:

    a. the FERC completes any necessary consultations with the FWS and NOAA Fisheries Service; and
    b. KMLP receives written notification from the Director of OEP that construction and/or implementation of conservation measures may begin. (page 4-73)

31. KMLP shall revise table 4.8.3.6-1 of the draft EIS and explicitly identify all structures and residences within 50 feet of the construction work areas. KMLP shall file the revised table with the Secretary **prior to the close of the comment period on the draft EIS**. (page 4-80)

32. KMLP shall consult with the FWS to determine if FWS conservation easement properties are crossed by the Project. KMLP shall file with the Secretary documentation of its consultation with FWS, including any recommended mitigation measures, for review and written approval by the Director of OEP **prior to construction**. (page 4-83)

33. KMLP shall develop a site-screening plan for the Transco Interconnect site (MP 122.1) and file that plan with the Secretary for review and written approval by the Director of OEP **prior to the close of the comment period on the draft EIS**. (page 4-85)

34. KMLP shall not begin construction on any facilities associated with the KMLP Project **until** it files with the Secretary a copy of the CZM Program consistency determination issued by the LDNR. (page 4-85)

35. KMLP shall defer construction and use of facilities and staging, storage, and temporary work areas and new or to be improved access **until** it files with the Secretary cultural resource reports, as appropriate, and the SHPO's comments; and the Director of OEP reviews and approves all reports and notifies KMLP in writing that it may proceed.

All material filed with the Commission containing **<u>location, character, and ownership information</u>** about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "**<u>CONTAINS PRIVILEGED INFORMATION—DO NOT RELEASE</u>**." (page 4-96)

36. **Prior to construction,** KMLP shall file with the Secretary for review and written approval by the Director of OEP a noise mitigation and compliance plan for HDD operations at MP 44.5, MP 49.6, and MP 99.8. This plan shall identify mitigation measures such as noise barriers, temporary housing, etc. to be implemented prior to the start of drilling operations to reduce noise from HDD activities to below 55 dBA at NSAs. (page 4-115)

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APPENDIX A

DISTRIBUTION LIST

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DRAFT EIS DISTRIBUTION LIST

Federal Agencies

Army Corps of Engineers
New Orleans District
Ronnie Duke
James Little
Department of Agriculture
Natural Resources Conservation Service
Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA), CS-24, Perry Ridge Shore Protection
CWPPRA, CS-25, Plowed Terraces Demonstration
CWPPRA, CS-27, Black Bayou Hydrologic Restoration Program
CWPPRA, CS-30, Perry Ridge West Bank Stabilization
CWPPRA, CS-32, East Sabine Lake Hydrologic Restoration
Department of Commerce
National Oceanic and Atmospheric Administration, National Marine Fisheries Services
John Foret
Richard Hartman
Kelly Shotts
Department of Energy
Energy Information Administration
Barbara Mariner-Volpe, Gas Fields
Department of the Interior
Fish and Wildlife Service
Cameron Prairie National Wildlife Refuge, Lake Charles, LA
Sabine National Wildlife Refuge, Bell City, LA
Kelly Perky
Brigette Firmin, Lafayette, LA
Angela Trahan, Lafayette, LA
Environmental Protection Agency
Barbara Keeler
Rob Lawrence

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Representative Rodney Alexander
Representative Charles Boustany

Senator Mary Landrieu
Senator David Vitter

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Representative Don Cravins, Jr.

Representative Mickey Frith
Representative Brett Geymann
Representative Elcie Guillory
Representative Mickey J. Guillory
Representative Ronnie Johns
Representative Chuck Kleckley
Representative Eric LaFleur
Representative Dan Morrish
Representative Gil Pinac

Senator James David Cain
Senator Donald Cravins
Senator Nick Gautreaux
Senator Don Hines
Senator Willie L. Mount
Senator Gerald Theunissen

Native American Tribes

Earl Barbry, Jr., Tunica-Biloxi Indians of Louisiana, Marksville, LA
Robert Cast, Caddo Nation, Binger, OK
Phillip Martin, Mississippi Band of Choctaw Indians, Philadelphia, MS
Christine Norris, Jena Band of Choctaw Indians, Jena, LA
Lovelin Poncho, Coushatta Tribe of Louisiana, Elton, LA
Debbie Thomas, Alabama Coushatta Tribe of Texas, Livingston, TX
Kimberly Walden, Chitimacha Tribe of Louisiana, Charenton, LA
Carrie Wilson, Quapaw Tribe of Oklahoma, Quapaw, OK

State Agencies

Louisiana

Agriculture Finance Authority
  Commissioner of Agriculture
Department of Culture, Recreation, and Tourism
  Duke Rivet
  Rachel Watson
Department of Natural Resources
  Coastal Management Division
    Ontario James
    Chris Melton
Department of Transportation and Development
  Leslie Mix
  Dale Touchet, District 03
Department of Wildlife and Fisheries
  Kyle Balkum
  Rick Kasprzak, Artificial Reef Program Supervisor
  Venise Ortego
Geological Services
  John Johnston

Office of Conservation
    Clear Marias Field
        James Welsh
State Land Office
    Sonya Boudreaux
    John Evans

County/Parish Agencies

Acadia Parish
    Acadia/Evangeline Fire Protection District
    Acadia Fire Protection District No. 3
    Acadia Parish Police Jury
    Acadia Parish School Board
    Robert T. Barousse, Acadia Parish Clerk of Court
    Russell L. Benoit, Acadia Parish Assessor
    Thomas Benoit, Acadia Parish Police Jury, District 7
    A.J. Broussard, Acadia Parish Police Jury, District 2
    Cecelia Broussard, Acadia Parish Police Jury, District 4
    A.J. Credeur, Acadia Parish Police Jury, District 6
    John W. Humble, Sr., Acadia Parish Police Jury Vice President, District 3
    Marietta W. James, Acadia Parish School Board Superintendent
    Katry Martin, Acadia Parish Police Jury, Secretary-Treasurer
    Wayne Melancon, Acadia Parish Sheriff
    Felton Moreau, Acadia Parish Police Jury President, District 8
    Jimmie Pellerin, Acadia Parish Police Jury, District 5
    Alton Stevenson, Acadia Parish Police Jury, District 1

Calcasieu Parish
    Francis Andrepont, Calcasieu Parish Police Jury, District 13
    Guy Brame, Calcasieu Parish Police Jury, District 8
    Calcasieu Parish Sheriff's Department Substation
    Calcasieu Police Jury
    Calcasieu Sherriff's Prison
    Brent Clement, Calcasieu Parish Police Jury, District 12
    Richard Cole, Jr., Calcasieu Parish Assessor
    Calvin Collins, Calcasieu Parish Police Jury, District 2
    Mike Danahay, Calcasieu Parish Police Jury, District 15
    Elizabeth Griffin, Calcasieu Parish Police Jury, District 3
    Kevin Guidry, Calcasieu Parish Police Jury, District 9
    Tony Guillory, Calcasieu Parish Police Jury, District 4
    Horace Lynn Jones, II, Calcasieu Parish Clerk of Court
    Chris Landry, Calcasieu Parish Police Jury, District 7
    Charles S. Mackey, Calcasieu Parish Police Jury, District 5
    Don Manuel, Calcasieu Parish Police Jury, District 1
    Hal McMillin, Calcasieu Parish Police Jury, District 14
    Cornelius Moon, Calcasieu Parish Police Jury, District 6
    Wayne Savoy, Calcasieu Parish School Board Superintendent
    Tony Stelly, Calcasieu Parish Police Jury, District 10
    Sandy Treme, Calcasieu Parish Police Jury, District 11

Jimmy Vickers, Calcasieu Parish Planning and Development Director
West Calcasieu Managing Board, Southland Field

Cameron Parish

Carl E. Broussard, Cameron Parish Clerk of Court
Doug Chance, Cameron Parish School Board Superintendent
Douaine Conner, Cameron Parish Police Jury, District 4
R.E. Conner, Cameron Parish Assessor
James Doxey, Cameron Parish Police Jury, District 6
Darryl Farque, Cameron Parish Police Jury, District 7
Magnus McGee, Cameron Parish Police Jury, District 1
Charles Precht, III, Cameron Parish Police Jury, District 3
Scott Trahan, Cameron Parish Police Jury, District 5
Steve Trahan, Cameron Parish Police Jury, District 2

Evangeline Parish

Mitchell Ardoin, Evangeline Parish Police Jury, District 3
Dirk Deville, Evangeline Parish Assessor
Ronald Doucet, Evangeline Parish Police Jury, District 8
Evangeline Parish Police Jury
Rayford J. Fontenot, Evangeline Parish School Board Superintendent
Sidney Fontenot, Evangeline Parish Police Jury, District 2
William Guidry, Evangeline Parish Police Jury, District 7
Hill Johnson, Evangeline Parish Police Jury, District 4
Walter Lee, Evangeline Parish Clerk of Court
“Bob” Manuel, Evangeline Parish Police Jury, District 5
Davis Manuel, Evangeline Parish Police Jury, District 1
Wayne Morein, Evangeline Parish Sheriff
Eric Soileau, Evangeline Parish Police Jury, District 6
Richard Thomas, Evangeline Parish Police Jury, District 9
Dale Touchet, Department of Transportation and Development, District 3

Jefferson Davis Parish

Melton Alfred, Jefferson Davis Parish Police Jury, District 3
Robert J. Broussard, Jefferson Davis Parish Police Jury, District 8
Don Davis, Jefferson Davis Parish Police Jury, District 10
Carlton L. Duhon, Jefferson Davis Parish Clerk of Court
Bradley Eastman, Jefferson Davis Parish Police Jury, District 4
Steve Eastman, Jefferson Davis Parish Police Jury, District 7
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Pierre J. Galley, Jefferson Davis Parish Police Jury, District 13
Johnny Guinn, Jefferson Davis Parish Police Jury, District 5
Jefferson Davis Parish Police Jury
Jefferson Davis Sherriff’s Office
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Harry B. Levy, Jefferson Davis Parish Police Jury, District 6
John P. Marceaux, Jefferson Davis Parish Police Jury, District 2
Tommy L. Smith, Jefferson Davis Parish School Board Superintendent

Bill Wild, Jefferson Davis Parish Police Jury, District 12
Donald Woods, Jefferson Davis Parish Police Jury President, District 1

St. Landry Parish

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Dexter Q. Brown, St. Landry Parish Council, District 10
Ronald Buschel, St. Landry Parish Council, District 5
Gary Courville, St. Landry Parish Council, District 13
Ronald Dugas, St. Landry Parish Council, District 8
Rhyn Duplechain, St. Landry Parish Assessor
Huey Dupre, St. Landry Parish Council, District 4
Hurlin Dupre, St. Landry Parish Council, District 6
James Eaglin, St. Landry Parish Council, District 2
William Gil, St. Landry Parish Council, District 12
Albert Hollier, St. Landry Parish Council, District 7
Charles Jagneaux, St. Landry Parish Clerk of Court
Donald Menard, St. Landry Parish, President
Keith O. Miller, St. Landry Parish Council, District 11
Pat Miller, St. Landry Parish Council, District 3
Larry Moreau, St. Landry Parish, School Board Superintendent
Howard Zerangue, St. Landry Parish Sheriff

Town Agencies

Chaderick Hebert, Town of Arnaudville Alderman, Arnaudville, LA
Elsie H. Lagrange, Town of Arnaudville Alderman, Arnaudville, LA
Ricky J. Lagrange, Town of Arnaudville Alderman, Arnaudville, LA
Remi Olivier, Town of Arnaudville Alderman, Arnaudville, LA
Kathy M. Richard, Mayor, Town of Arnaudville, Arnaudville, LA
John Ray Taylor, Town of Arnaudville Alderman, Arnaudville, LA

Basile Police Station, Basile, LA
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Berline Boone, Mayor, Town of Basile, Basile, LA
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Ronnie Denette, Town of Basile Alderman, At Large, Basile, LA
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Susan Menard, Mayor, Village of Cankton, Cankton, LA
Gladys Myers Soileau, Village of Cankton Alderman, Cankton, LA

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Chataignier Volunteer Fire Department, Chataignier, LA
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Town of Elton, Elton, LA
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Cameron Parish Library, Cameron, LA
Acadia Parish Churchpoint Branch Library, Churchpoint, LA
Acadia Parish Library, Crowley, LA
Acadia Parish Evangeline Branch Library, Evangeline, LA
Acadia Parish Iota Branch Library, Iota, LA
Calcasieu Parish Iowa Branch Library, Iowa, LA
Jefferson Davis Parish Library, Jennings, LA
Jennings Carnegie Public Library, Jennings, LA
Calcasieu Parish Public Library, Lake Charles, LA
Evangeline Parish Mamou Branch Library, Mamou, LA
Calcasieu Parish Sulphur Branch Library, Sulphur, LA
Evangeline Parish Library, Ville Platte, LA

Jefferson County Library, Beaumont, TX
Orange Public Library, Orange, TX

Media

Basile Weekly, Basile, LA
Church Point News, Church Point, LA
Crowley Post-Signal, Crowley, LA
KSIG-AM, Crowley, LA
Barry Thompson, KAJN-FM, Crowley, LA
Cameron Parish Pilot, DeQuincy, LA
DeQuincy News, DeQuincy, LA
Eunice News, Eunice, LA
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KEUN-AM/KJJB-FM, Eunice, LA
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John Sherman and Susan Fallis, Lafayette, LA
Dawn Ismarie Herrington, Lafayette, LA
James P. Herrington, Lafayette, LA
Hilary Memorial Trust, Lafayette, LA
Harriet M. Landry, Lafayette, LA
Douglas R. & Janice H. Matte, Lafayette, LA
Mary Leonise Broussard Perrin, Lafayette, LA
Joseph B. Powell, Lafayette, LA
James N. Prather, Lafayette, LA
Riceland Petro Company, Lafayette, LA
Shannon E. Stefanski, Lafayette, LA
R. Allen Benoit, Lake Arthur, LA
Warner D. Miller, Lake Arthur, LA
Leona B. Sonnier, Lake Arthur, LA
3N75 Trust, Lake Charles, LA

Arrozal, L.L.C., Lake Charles, LA
Patricia Baggett, Lake Charles, LA
Belarbor Timber L.L.C., Lake Charles, LA
Bel-Krause Properties, Lake Charles, LA
Murphy Bellard and Gregory Rosette, Lake Charles, LA
Bennett Oil Corporation, Lake Charles, LA
Harold H. Born, Lake Charles, LA
Sara Lou Greathouse Brasher, Lake Charles, LA
Caltrax, Inc., Lake Charles, LA
Edward M. Carmouche, Jr., Lake Charles, LA
Clark Real Estate Enterprises, Inc., Lake Charles, LA
Claudia Bard Trust, Lake Charles, LA
Katherine K. Blake Trust, Lake Charles, LA
James Ray Clooney, III, Lake Charles, LA
Coastal Conservation Association, Lake Charles, LA
Barbara Coatney, Lake Charles, LA
Oscar Colletta, Lake Charles, LA
Francis Coltrin, Lake Charles, LA
William A. Coltrin, Lake Charles, LA
Mary Ellen Aucoin Comier, Lake Charles, LA
C.O. Noble Heirs, Lake Charles, LA
Joseph K. Cooper, Lake Charles, LA
Clarence Richmond Corley, Jr., DDS, Lake Charles, LA
Fay Craft, Lake Charles, LA
Neil R. Crain, Lake Charles, LA
Nancy S. Crowe, Lake Charles, LA
Cypress of Iowa, LLC, Lake Charles, LA
Simon David Davidson and Sonya Jean Harris, Lake Charles, LA
Dolores McClelland Duplechin, Lake Charles, LA
East Ridge Baptist Church, Lake Charles, LA
Edwin Heirs, Inc., Lake Charles, LA
Rena Marie Faulk, Lake Charles, LA
Carol Lavonne Taylor Fraser & Ronald Dale Taylor, Lake Charles, LA
Phillip Anthony Gayle, Lake Charles, LA
W.J. Gayle and Sons, Inc., Lake Charles, LA
Carol M. Gerard, Lake Charles, LA
Matilda G. Gray, Lake Charles, LA
Opal Gray Trust, Lake Charles, LA
Matilda Geddings Gray Trust, Lake Charles, LA
Arlen L. Greathouse, Lake Charles, LA
Carroll L. Greathouse, Lake Charles, LA
Laurence Ray Greathouse, Lake Charles, LA
Greathouse Living Trust of 1998, Lake Charles, LA
Richard D. Griffith, Lake Charles, LA
C.E. Guidry, Lake Charles, LA
L.R. Henry Estate, Lake Charles, LA
Allan C. House, Lake Charles, LA
Kerry A. House, Lake Charles, LA
Ernest C. Hunt, Jr., Lake Charles, LA
JAPER, INC., Lake Charles, LA
JATS Real Estate LLC, Lake Charles, LA

J. S. Broussard Farms, LLC, Lake Charles, LA
King Minerals, LLC, Lake Charles, LA
Robert Sere Kleinschmidt, Lake Charles, LA
Gary G. Klumpp, Lake Charles, LA
Mary A. Kohnke, Lake Charles, LA
LA Farm and Livestock Co., Inc., Lake Charles, LA
Lisa Ann Lacomb, Lake Charles, LA
Zoe B. Lassman, Lake Charles, LA
William B. Lawton, L.P., Lake Charles, LA
Louis Milton LeBleu, Lake Charles, LA
Janet S. Leboeuf, Lake Charles, LA
Lejeune Family Trust, Lake Charles, LA
LMD Investments Ltd. Partnership, Lake Charles, LA
Louisiana Farm and Livestock Company, Inc., Lake Charles, LA
Louisiana State University Agricultural Center, Lake Charles, LA
Ernest Lawrence Lowery, Jr., Lake Charles, LA
Sue N. McCardle, Lake Charles, LA
Merlin Joseph McFarlain, Jr., Lake Charles, LA
McNeese State University, Lake Charles, LA
Olan Menard, Lake Charles, LA
Warner D. Miller, Lake Arthur, LA
Randall Moorehead, Lake Charles, LA
North American Land Co. LLC, Lake Charles, LA
James Nunez, Lake Charles, LA
Leo Pierre Olivier, Jr., Lake Charles, LA
Open A-1 Ranch, Inc., Lake Charles, LA
Joseph D. Painter, Lake Charles, LA
PBA Properties, L.L.C., Lake Charles, LA
Powell Land Holdings, LLC, Lake Charles, LA
Prairie Land Company, Lake Charles, LA
R.L.P. Land Enterprises, Inc., Lake Charles, LA
Clint Simien Estate, Lake Charles, LA
Leona B. Sonnier, Lake Arthur, LA
Gordon E. Steen, Lake Charles, LA
Todd A. Stein, Lake Charles, LA
Stream Family Ltd. Partnership, Lake Charles, LA
Stream Land Title Co. Inc., Lake Charles, LA
Thomas Randolph Swayzee III, Ed. Trust, Lake Charles, LA
Sweetlake Land & Oil, LLC, Lake Charles, LA
Thomas Cecil Steen, Jr., Lake Charles, LA
TLC Trust, Lake Charles, LA
Ricky Tommasi P&E, LLC, Lake Charles, LA
Tower Land Company, Inc., Lake Charles, LA
Raymond Wayne Vincent, Lake Charles, LA
White Lake Preservation, Inc., Lake Charles, LA
Willis Noland Testamentary Trust, Lake Charles, LA
Wise Land and Title Co. Inc., Lake Charles, LA
WKT Properties, Lake Charles, LA
Evelyn Elaine Young Schultz, Lake Charles, LA
Donald A. Young, Lake Charles, LA
Merrill B. Ardoin, Mamou, LA

Murphy P. Decou, Mamou, LA
Kerney J. Doucet, Mamou, LA
Jason R. Fontenot, Mamou, LA
Ozeman J. Fontenot, Mamou, LA
Billy Fusilier & John H. McClelland, Jr., Mamou, LA
Bruce & Gladys Guillory Farms LLC, Mamou, LA
Raymond E. Landreneau, Mamou, LA
Clifton W. Lemoine, Mamou, LA
Michael S. Manuel, Mamou, LA
Tiqua J. Manuel, Mamou, LA
Clancy D. Moliter, Mamou, LA
Kathrine T. Ortego, Mamou, LA
Charles Reed & Wesley Reed, Mamou, LA
Wiston C. Reed, Mamou, LA
Shannon Blake Richard, Mamou, LA
David Chad West, Mamou, LA
Harry L. West, Mamou, LA
Errol J. Young, Mamou, LA
Robert C. Waltrip, Mandeville, LA
Rodney Douglas Vincent, Metairie, LA
Thibodeaux Land Co., Midland, LA
James L. Negley, Monroe, LA
George L. Winter, Monroe, LA
Garbarino Trust #1, New Orleans, LA
Helena Houssiere, New Orleans, LA
Showalter A. Knight, Jr., New Orleans, LA
Timothy W. Giles, Oakdale, LA
Rex Odoin, Oakdale, LA
E.M. Boagni Heirs, Opelousas, LA
N.H. Hirsch Trust for Wienstien Children, Opelousas, LA
Opelousas St. Landry Realty Co., Inc., Opelousas, LA
Katherine Tolladay-Gingher, Prescott-Valley, LA
Carolyn Bruner Trust, Rayne, LA
Randall K. & Martha M.B. Johnson, Rayne, LA
Freddie Miller, Rayne, LA
Johnny R. & Judith A.G. Miller, Rayne, LA
Rodie Ann F. Thibodeaux, Rayne, LA
E. Norman Garbarino, Jr., Roanoke, LA
Eva Garbarino, Jr., Roanoke, LA
Chris B. & Yvone H. Krielow, Roanoke, LA
James M. Lessard, Roanoke, LA
James E. Clark, Shreveport, LA
Donner Properties, Shreveport, LA
Jerry Scott Lewis, Shreveport, LA
Leatha C. Monk, Shreveport, LA
Cameron B. Barr, Slidell, LA
Shirley R. Richert, Slidell, LA
Edward B. Baty, Sulphur, LA
Steven & Angela D. Belshe, Sulphur, LA
Philip Benoit, Sulphur, LA
Margaret B. Black, Sulphur, LA

Lynwood Burkhalter, Sulphur, LA
Dennis Clyde Carruth, Sulphur, LA
C.E. Beckenstein Living Trust, Sulphur, LA
Judith Clifton Bennett, Sulphur, LA
Kenneth Len and Theresa Diana Broussard, Sulphur, LA
Robert E. Broussard & Sarah O. Broussard, Sulphur, LA
David Chreitien, Sulphur, LA
Rita Sarver Clement, Sulphur, LA
George G. Corbello, Sr. & Mary Ruth Corbello, Sulphur, LA
Richard S. Dowden, Sulphur, LA
Paul Drounette, Jr., Sulphur, LA
Sam P. Dugas, Sulphur, LA
Matthew D Duhon, Sulphur, LA
Michael A Farque, Sulphur, LA
Barbara Marie Bahnsen Ford, Sulphur, LA
Global Industries, Ltd., Sulphur, LA
Mary S. Granger, Sulphur, LA
J. Lawton Company, Sulphur, LA
J.E. Trust, Sulphur, LA
Alton Joseph and Marlene Manuel, Sulphur, LA
Llewellyn Edward Kyle, Jr. and Jerlene, Sulphur, LA
Estelle Walker Lovejoy, Sulphur, LA
Alton J. Manuel, Sulphur, LA
David L, Miller, Sulphur, LA
Mark L. Mitchell, Sulphur, LA
Robert E. Moss, Jr., Sulphur, LA
Palermo Co., Sulphur, LA
Arthur Planchard, Sulphur, LA
Phillip Quinn, Sulphur, LA
Barry E. Russell, Sulphur, LA
James Monroe Stark, Jr. & Kala Stark, Sulphur, LA
Raymond J. Stein, Sulphur, LA
Todd Anthony Stein, Sulphur, LA
Agnes Gary Stutes, Sulphur, LA
Brenda Sue Sumpter, Sulphur, LA
Roger Allen Sumpter, Sulphur, LA
Winnie L. Sumpter, Sulphur, LA
Winnie Marie Vincent Sumpter, Sulphur, LA
Thomas-Perkins LLC, Sulphur, LA
John Rudy Trahan, Sulphur, LA
Robert Lee Trajan, Jr., Sulphur, LA
James Calvin Vallette, Sulphur, LA
Steven K. Vallette, Sulphur, LA
Martha Ann Clifton Vasquez, Sulphur, LA
Terry Lee Veillon, Sulphur, LA
Charles W. Vincent, Sulphur, LA
W. L. Vincent, LP, Sulphur, LA
Linda L. West, Sulphur, LA
Marion L. West, Sulphur, LA
Rupert Elton West, Sulphur, LA
James T. Williams, Sulphur, LA

Margaret L. Williams, Sulphur, LA
Cephus Mitchell Estate, Ventress, LA
Cephus R. Duhon, Ventress, LA
Darryl Wayne Attales, Ville Platte, LA
Joseph M. Belleau, Ville Platte, LA
Lawrence E. Buller, Ville Platte, LA
Lucas Buller, Ville Platte, LA
Harold L. Charlie, Ville Platte, LA
Haudry Douget, Ville Platte, LA
Charles Dupre, Ville Platte, LA
Christopher J. Fontenot, Ville Platte, LA
James V. Fontenot, Ville Platte, LA
Donald W. Fuselier, Ville Platte, LA
Margaret Theresa P. Johnson, Ville Platte, LA
Johnson Living Trust, Ville Platte, LA
Mary P. Ortego, Ville Platte, LA
Willie E. Oslen, Ville Platte, LA
Adam T. Reed, Ville Platte, LA
Claude Rozas Farm, Inc., Ville Platte, LA
J.D. Solieau & Leroy Solieau, Ville Platte, LA
Joseph L. Soileau, Ville Platte, LA
Jeffery Viznat, Ville Platte, LA
John Thomas Lagrone, Vinton, LA
Gale A. Leger, Vinton, LA
Costanza Brothers Partnership, Washington, LA
Benoit Farms, Inc., Welsh, LA
Christine B. Benoit, Welsh, LA
Delores Conner, Welsh, LA
Diamond-W. Inc., Welsh, LA
Diamond W Ranch, Welsh, LA
Timothy & Lisa Duplechain, Welsh, LA
E. Richard Farms, Inc., Welsh, LA
Fear Farms, Inc., Welsh, LA
Sue C. Hebert, Welsh, LA
Elizabeth Meche, et al, Welsh, LA
Ella M. Meche, Welsh, LA
Jeffry J. Meche, Welsh, LA
Kenneth R. Menard, Welsh, LA
Wayne G. Phenice, Welsh, LA
Robert B. Ramagos, Welsh, LA
John T. Richard, Welsh, LA
Thomas J. Sr. & Mary D. Schexnider, Welsh, LA
Turf Grass Farms, Inc. & EKS, Inc., Welsh, LA
Mayo Realty Co. Inc., Westlake, LA
T.F. Monroe Heirs, Westlake, LA

Jennie S. Pearson, Frederick, MD
Barbara Jean Stevenson Levine, Potomac, MD

Sally L. Hammett, Carriere, MS
Jane M. Tyner, Starkville, MS

Smith Family Trust, Raleigh, NC

Union Pacific Railroad, Omaha, NE

S.A. Mayo Estate, Brooklyn, NY
Natalie R. Murphy, Camillus, NY
Thomas Barr, IV, Sag Harbor, NY

Ivolee Nash, Bethany, OK
Justin William Darphin, Carney, OK
Leboueuf Land and Investments, LLC, Idabel, OK
Renee Tuthill Trusts, Tulsa, OK

Elazabeth Burkhalter, Clarksville, TN

Andree H. Macaluso, Austin, TX
Joan Donaldson Watkins, Austin, TX
Carl W. Winters, Austin, TX
Gerald M. Tate Revocable Trust, Baytown, TX
David W. and Laura Blacksher, Bridge City, TX
Albin J. and Michelle Judice, Bridge City, TX
Larry J. Louellen Judice, Bridge City, TX
Paul M. and Debbie Roy, Bridge City, TX
Winnie L. Hebert, Canyon Lake, TX
Barbara Alice G. Bounds, Carthage, TX
Winifred Vetha Adkins Hutchinson, Dallas, TX
RR-Northern Burlington-Santa Fe, Fort Worth, TX
Richard E. and Joanna Jones, Grove, TX
Tillman Sylvester, Highlands, TX
Tillman Sylvester Living Trust, Highlands, TX
Amoco Production Company, BP Amoco Production Company, Houston, TX
Frank M. Brown, Houston, TX
Malloy B. Brown, Houston, TX
Karen Gwen Hill Carnes, Houston, TX
Clarence L. Cooper, Houston, TX
H.D. Cox Estate, Houston, TX
Domatti Family Living Trust, Houston, TX
Nanette Clooney Edwards, Houston, TX
Mildred M. Farley, Houston, TX
Florida Gas Transmission Company, Property Tax Department, Houston, TX
Byng Hall, Houston, TX
Earl W. Horne Jr., Houston, TX
Charles R. Houssier, III, Houston, TX
Dorothy C. Kerr, Houston, TX
Henry Little Estate, Jeanne Jard, Houston, TX
Callie Attales Martin, Houston, TX
Propylene Pipeline Partnership LP, Houston TX
John C. Russell, Houston, TX
Sabine Pipeline LLC, Houston, TX
TEPI, Chevron Texaco, Houston, TX

Transco Gas Pipeline Corp., Houston, TX
Vintage Petroleum Inc., Houston, TX
Charles M. Welch, Houston, TX
William L. Welch, Houston, TX
S.A. Fairchild Heirs, Jasper, TX
John B. Daigle Estate, Kerrville, TX
Roy H. Donaldson, Jr., et al, Kerrville, TX
Brenda E. Bell Roberts, Kerrville, TX
J.C. Tracy Estate, Lake Jackson, TX
Clyde Kilpatrick, Matagorda, TX
Eunice R. Beckenstein, Orange, TX
David B. Brown, Orange, TX
E.W. Brown, Jr., Orange, TX
Michael Slade Brown, Orange, TX
Lee Ann Coulter, Orange, TX
Barbara Lucille Brown Ewing, Orange, TX
Mary Robbins Brown Jones, Orange, TX
John S. Brown LA Trust, Orange, TX
R.E. Odom, Orange, TX
Joe V. Duhon, Pearland, TX
C.C.C. Holding Company, Plano, TX
Lady Ellen Clark, San Antonio, TX
Elaine Clooney Whitehead, San Antonio, TX
E.W. Brown, IV, Seabrook, TX
Robert E. Houssiere, Seguin, TX
Mary Henderson, Silsbee, TX
Marjorie W. Fann, Spring, TX
C.L. Beckenstein, Jr., Land & Royalty Trust, Stafford, TX
J.H. Minton, Tyler, TX
Elmer L. Ellender, Vidor, TX

John F. Hennessey, Carlsborg, WA
Linn M. Gassaway, Poulsbo, WA

Lehman Farms, LLC, New Berlin, WI

Ellen L. Thewis, Cartigny, Switzerland

APPENDIX B

FACILITY LOCATION MAPS

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Non-Internet Public

DRAFT ENVIRONMENTAL IMPACT STATEMENT
KINDER MORGAN LOUISIANA PIPELINE PROJECT
Docket No. CP06-449-000

Pages B-1 to B-27
Maps

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APPENDIX C

LAND REQUIREMENTS FOR EXTRA WORKSPACES, ACCESS ROADS, AND PIPE STORAGE AND CONTRACTOR YARDS

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TABLE C-1

Extra Workspaces

ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
Leg 1 and Leg 2						
637	Cameron	0.00	0.02	Staging Area, Tie-In & Fabrication Area	0.4	Transportation, Communications, and Utilities
					0.6	Industrial
					0.2	Nonforested Wetland
638	Cameron	0.01	0.04	Fabrication Area & P.I.	0.1	Industrial
					0.1	Nonforested Wetland
639	Cameron	0.09	0.12	Waterbody Crossing	0.2	Nonforested Wetland
640	Cameron	0.09	0.12	Waterbody Crossing	0.2	Nonforested Wetland
641	Cameron	0.21	0.24	Waterbody Crossing & P.I.	0.2	Industrial
642	Cameron	0.27	0.29	Waterbody Crossing	0.1	Forested Wetland
643	Cameron	0.52	0.60	Fabrication Area, Access & P.I.	0.3	Nonforested Wetland
					0.1	Transportation, Communications, and Utilities
644	Cameron	0.54	0.57	Fabrication Area & P.I.	0.3	Nonforested Wetland
					0.1	Transportation, Communications, and Utilities
645	Cameron	0.85	0.95	Foreign Line Crossing, Crossover & P.I.	0.6	Nonforested Wetland
647	Cameron	0.95	1.02	Fabrication Area, P.I. & Crossover	0.1	Nonforested Wetland
					0.3	Mixed Urban or Built-up Land
646	Cameron	0.99	1.02	P.I.	0.2	Mixed Urban or Built-up Land
648	Cameron	1.00	1.07	Road Crossing & Foreign Line Crossing	0.1	Nonforested Wetland
649	Cameron	1.07	1.15	Road Crossing, Fabrication Area, Access & P.I.	0.3	Nonforested Wetland
					0.1	Transportation, Communications, and Utilities
					0.1	Mixed Urban or Built-up Land

TABLE C-1 Extra Workspaces						
ID	**Parish[a]**	**MP Begin**	**MP End**	**Purpose**	**Acreage of Workspace**	**Land Use Type**
650	Cameron	1.16	1.27	Fabrication Area, Foreign Line Crossing, P.I. & Road Crossing	0.1	Industrial
					0.4	Nonforested Wetland
					0.0	Transportation, Communications, and Utilities
651	Cameron	1.23	1.31	Road Crossing, Staging Area & Fabrication Area	0.1	Transportation, Communications, and Utilities
					0.9	Nonforested Wetland
					0.1	Industrial
652	Cameron	1.34	1.44	Road Crossing, Foreign Line Crossing, Access & Fabrication Area	0.4	Nonforested Wetland
					0.1	Deciduous Forest Land
653	Cameron	1.37	1.42	Road Crossing & Foreign Line Crossing	0.3	Nonforested Wetland
655	Cameron	1.44	1.51	Road Crossing & Fabrication Area	0.3	Nonforested Wetland
654	Cameron	1.46	1.50	Road Crossing	0.1	Deciduous Forest Land
					0.2	Nonforested Wetland
25 HDD	Cameron	3.89	3.94	HDD Site -Entry Hole	1.1	Nonforested Wetland
24 HDD	Cameron	4.82	4.87	HDD Site -Exit Hole	2.1	Lakes
537	Cameron	5.54	5.81	Pull String	1.5	Lakes
536	Cameron	17.15	17.89	Pull String	4.1	Lakes
23 HDD	Cameron	17.86	17.97	HDD Site -Exit Hole	5.7	Lakes
670	Orange County, TX	17.92	18.18	Fabricate Pull String	4.8	Bays and Estuaries
535	Orange County, TX	18.09	18.56	Pull String	7.2	Bays and Estuaries
535	Cameron	18.51	18.57	Pull String	0.5	Bays and Estuaries

TABLE C-1

Extra Workspaces

ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
22 HDD	Cameron	18.55	18.66	HDD Site -Entry & Exit Hole	0.0	Shrub and Brush Rangeland
					2.9	Bays and Estuaries
21 HDD	Cameron	19.36	19.5	HDD Site -Entry Holes	4.0	Bays and Estuaries
20 HDD	Cameron	20.00	20.04	HDD Site -Exit Hole	1.1	Deciduous Forest Land
534	Cameron	20.00	20.04	HDD & Work Corridor Access	1.3	Bays and Estuaries
					0.1	Deciduous Forest Land
557	Cameron	20.04	20.98	Pull String	0.0	Deciduous Forest Land
					5.7	Bays and Estuaries
531	Cameron	20.90	21.04	Pull String Access	0.4	Bays and Estuaries
					0.5	Nonforested Wetland
532	Cameron	21.02	21.07	P.I.	0.1	Nonforested Wetland
					0.1	Shrub and Brush Rangeland
19 HDD	Cameron	21.14	21.19	HDD Site -Exit Hole	0.5	Nonforested Wetland
					0.6	Shrub and Brush Rangeland
574	Cameron	21.14	21.19	HDD & Work Corridor Access	0.2	Nonforested Wetland
					1.1	Bays and Estuaries
					0.1	Shrub and Brush Rangeland
577	Cameron	21.68	22.11	Pull String	3.8	Nonforested Wetland
575	Cameron	22.05	22.17	HDD & Work Corridor Access	1.7	Bays and Estuaries
576	Cameron	22.08	22.14	Access	0.1	Bays and Estuaries
					0.2	Forested Wetland
18 HDD	Cameron	22.08	22.14	HDD Site -Entry Hole	0.1	Forested Wetland
					1.1	Nonforested Wetland

TABLE C-1

Extra Workspaces

ID	Parish[a]	MP		Purpose	Acreage of Workspace	Land Use Type
		Begin	End			
26 HDD	Cameron	22.69	22.74	HDD Site -Entry Holes	1.1	Nonforested Wetland
578	Cameron	22.69	22.74	HDD & Work Corridor Access	1.2	Bays and Estuaries
					0.5	Nonforested Wetland
27 HDD	Cameron	23.43	23.49	HDD Site -Exit & Entry Hole	1.4	Shrub and Brush Rangeland
579	Cameron	23.44	23.48	HDD & Work Corridor Access	0.4	Shrub and Brush Rangeland
					1.7	Bays and Estuaries
580	Cameron	23.48	23.56	Pull String	0.1	Bays and Estuaries
					0.9	Shrub and Brush Rangeland
581	Cameron	23.82	23.86	Access	0.9	Streams and Canals
					0.1	Nonforested Wetland
582	Cameron	23.86	24.48	Pull String	3.7	Bays and Estuaries
28 HDD	Cameron	23.91	23.96	HDD Site -Exit Hole	0.9	Shrub and Brush Rangeland
					0.2	Nonforested Wetland
530	Cameron	24.21	24.26	Foreign Line Crossing	0.3	Nonforested Wetland
582	Calcasieu	24.47	24.59	Pull String	0.9	Bays and Estuaries
529	Cameron	24.57	24.62	P.I.	0.2	Nonforested Wetland
29 HDD	Calcasieu	25.22	25.28	HDD Site -Exit Hole	0.7	Nonforested Wetland
					0.4	Deciduous Forest Land
583	Calcasieu	25.80	25.86	HDD Access & Loading Area	0.7	Streams and Canals
584	Calcasieu	25.80	25.83	Access & Loading Area	0.2	Deciduous Forest Land
					0.1	Transportation, Communications, and Utilities
					0.0	Streams and Canals
30 HDD	Calcasieu	26.00	26.05	HDD Site -Entry Holes	1.4	Deciduous Forest Land

TABLE C-1

Extra Workspaces

ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
31 HDD	Calcasieu	26.78	26.83	HDD Site -Exit Hole	0.0	Cropland and Pasture
					1.1	Deciduous Forest Land
585	Calcasieu	27.58	27.64	Access & Loading Area	0.7	Streams and Canals
586	Calcasieu	27.58	27.60	Access & Loading Area	0.0	Streams and Canals
					0.1	Transportation, Communications, and Utilities
					0.3	Shrub and Brush Rangeland
587	Calcasieu	27.81	27.86	Foreign Line Crossing	0.1	Nonforested Wetland
					0.1	Cropland and Pasture
					0.0	Transportation, Communications, and Utilities
					0.1	Forested Wetland
					0.1	Deciduous Forest Land
588	Calcasieu	28.26	28.33	Foreign Line Crossing	0.1	Cropland and Pasture
					0.3	Nonforested Wetland
					0.1	Deciduous Forest Land
					0.1	Forested Wetland
523	Cameron	29.46	29.90	Pull String	0.4	Nonforested Wetland
					2.5	Bays and Estuaries
523	Calcasieu	29.88	30.33	Pull String	2.0	Bays and Estuaries
					0.9	Nonforested Wetland
16 HDD	Calcasieu	30.32	30.38	HDD Site -Exit Hole	1.1	Nonforested Wetland
522	Calcasieu	31.37	31.43	Work Corridor Access	0.7	Streams and Canals
521	Calcasieu	31.39	31.42	Loading & Unloading Area	0.1	Streams and Canals
					0.1	Deciduous Forest Land

TABLE C-1

Extra Workspaces

ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
15 HDD	Calcasieu	31.43	31.50	HDD Site -Entry Holes	1.8	Nonforested Wetland
13 HDD	Calcasieu	32.41	32.46	HDD Site -Exit Hole	1.1	Nonforested Wetland
518	Calcasieu	32.43	32.50	Work Corridor Access	0.6	Streams and Canals
					0.1	Deciduous Forest Land
517	Calcasieu	32.45	32.49	Loading & Unloading Area	0.2	Deciduous Forest Land
514	Calcasieu	35.15	35.19	Fabrication Area, Access & P.I.	0.7	Nonforested Wetland
513	Calcasieu	36.17	36.21	Waterbody Crossing & Fabrication Area	0.2	Cropland and Pasture
512	Calcasieu	36.24	36.28	Waterbody Crossing & Access	0.2	Cropland and Pasture
511	Calcasieu	36.50	36.60	Waterbody Crossing, Road Crossing, Foreign Line Crossing, Fabrication Area & Access	0.5	Cropland and Pasture
					0.1	Nonforested Wetland
					0.1	Transportation, Communications, and Utilities
510	Calcasieu	37.29	37.36	Waterbody Crossing & Access	0.3	Cropland and Pasture
					0.0	Nonforested Wetland
509	Calcasieu	37.84	37.87	Waterbody Crossing	0.1	Nonforested Wetland
508	Calcasieu	37.89	37.98	Road Crossing, Waterbody Crossing, Fabrication Area, Access & Truck Turnaround	1.0	Nonforested Wetland
					0.0	Streams and Canals
					0.1	Transportation, Communications, and Utilities
507	Calcasieu	37.98	38.01	Waterbody Crossing & Road Crossing	0.2	Nonforested Wetland
506	Calcasieu	38.11	38.23	Drag Section	0.7	Nonforested Wetland
505	Calcasieu	38.34	38.40	Waterbody Crossing, Road Crossing & Access	0.0	Nonforested Wetland
503	Calcasieu	38.86	38.90	Waterbody Crossing	0.1	Nonforested Wetland
					0.1	Cropland and Pasture
504	Calcasieu	38.94	38.96	Waterbody Crossing	0.1	Nonforested Wetland
					0.0	Cropland and Pasture
					0.6	Cropland and Pasture

TABLE C-1 Extra Workspaces						
ID	Parish[a]	MP		Purpose	Acreage of Workspace	Land Use Type
		Begin	End			
502	Calcasieu	39.06	39.14	Waterbody Crossing, Road Crossing & Access	0.1	Nonforested Wetland
					0.2	Cropland and Pasture
					0.0	Streams and Canals
					0.1	Transportation, Communications, and Utilities
501	Calcasieu	39.44	39.46	Waterbody Crossing	0.1	Cropland and Pasture
500	Calcasieu	39.47	39.49	Waterbody Crossing	0.1	Cropland and Pasture
589	Calcasieu	39.82	40.04	Pull Section & Access	1.4	Cropland and Pasture
499	Calcasieu	39.90	39.98	Access & Waterbody Crossing	0.4	Cropland and Pasture
					0.0	Nonforested Wetland
498	Calcasieu	40.02	40.09	Waterbody Crossing, Truck Turnaround, P.I. & Foreign Line Crossing	0.5	Cropland and Pasture
593	Calcasieu	40.29	40.33	Waterbody Crossing, Truck Turnaround & Foreign Line Crossing	0.0	Nonforested Wetland
					0.3	Cropland and Pasture
590	Calcasieu	40.29	40.35	Foreign Line Crossing & P.I.	0.0	Nonforested Wetland
					0.2	Cropland and Pasture
592	Calcasieu	40.37	40.46	Foreign Line Crossing & Fabrication Area	0.6	Cropland and Pasture
591	Calcasieu	40.43	40.47	Access & P.I.	0.1	Cropland and Pasture
492	Calcasieu	41.40	41.45	Waterbody Crossing & Fabrication Area	0.3	Cropland and Pasture
491	Calcasieu	41.42	41.44	Waterbody Crossing	0.1	Cropland and Pasture
490	Calcasieu	41.47	41.49	Waterbody Crossing	0.1	Cropland and Pasture
617	Calcasieu	41.76	41.81	Fabrication Area & P.I.	0.3	Cropland and Pasture
594	Calcasieu	41.90	41.96	Fabrication Area & P.I.	0.3	Cropland and Pasture
489	Calcasieu	41.97	42.01	Staging Area	0.1	Transportation, Communications, and Utilities

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Extra Workspaces

ID	Parish[a]	MP		Purpose	Acreage of Workspace	Land Use Type
		Begin	End			
					0.8	Cropland and Pasture
663	Calcasieu	42.01	42.08	Fabrication Area & P.I.	0.4	Cropland and Pasture
657	Calcasieu	42.18	42.21	Fabrication Area & P.I.	0.2	Cropland and Pasture
658	Calcasieu	42.18	42.22	Waterbody Crossing & P.I.	0.1	Cropland and Pasture
488	Calcasieu	42.45	42.47	Waterbody Crossing	0.1	Cropland and Pasture
487	Calcasieu	42.48	42.50	Waterbody Crossing	0.1	Cropland and Pasture
659	Calcasieu	42.72	42.76	Waterbody Crossing	0.2	Nonforested Wetland
					0.0	Cropland and Pasture
660	Calcasieu	42.79	42.81	Road Crossing & Waterbody Crossing	0.1	Cropland and Pasture
597	Calcasieu	43.13	43.67	Pull String	4.7	Cropland and Pasture
					0.1	Streams and Canals
661	Calcasieu	43.16	43.20	Waterbody Crossing & Fabrication Area	0.3	Cropland and Pasture
662	Calcasieu	43.22	43.25	Waterbody Crossing	0.2	Cropland and Pasture
596	Calcasieu	43.59	43.66	Fabrication Area, P.I. & Truck Turnaround	0.9	Cropland and Pasture
595	Calcasieu	43.60	43.67	Access	0.2	Cropland and Pasture
11 HDD	Calcasieu	43.65	43.72	HDD Site -Exit Hole	1.3	Cropland and Pasture
32 HDD	Calcasieu	44.45	44.51	HDD Site -Entry Hole	1.4	Cropland and Pasture
598	Calcasieu	44.51	44.54	Truck Turnaround & Fabrication Area	0.9	Cropland and Pasture
599	Calcasieu	45.25	45.27	Fabrication Area & P.I.	0.0	Streams and Canals
					0.2	Cropland and Pasture
476	Calcasieu	45.52	45.53	Waterbody Crossing	0.1	Nonforested Wetland
475	Calcasieu	45.52	45.54	Waterbody Crossing	0.1	Nonforested Wetland
473	Calcasieu	45.56	45.58	Waterbody Crossing	0.1	Nonforested Wetland

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Extra Workspaces

ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
474	Calcasieu	45.56	45.58	Waterbody Crossing	0.1	Nonforested Wetland
471	Calcasieu	45.76	45.79	Waterbody Crossing & P.I.	0.2	Nonforested Wetland
472	Calcasieu	45.76	45.80	Waterbody Crossing, Fabrication Area, Truck Turnaround & P.I.	0.9	Nonforested Wetland
470	Calcasieu	45.87	45.90	Waterbody Crossing	0.1	Herbaceous Rangeland
469	Calcasieu	45.88	45.93	Waterbody Crossing & Truck Turnaround	0.1	Nonforested Wetland
					0.5	Herbaceous Rangeland
468	Calcasieu	45.93	45.96	Fabrication Area & Waterbody Crossing	0.2	Herbaceous Rangeland
467	Calcasieu	46.19	46.26	Access	0.4	Nonforested Wetland
					0.0	Transportation, Communications, and Utilities
					0.0	Streams and Canals
466	Calcasieu	46.65	46.67	Waterbody Crossing	0.1	Nonforested Wetland
465	Calcasieu	46.66	46.68	Waterbody Crossing	0.1	Nonforested Wetland
464	Calcasieu	46.69	46.71	Waterbody Crossing	0.1	Nonforested Wetland
463	Calcasieu	46.70	46.73	Waterbody Crossing	0.1	Nonforested Wetland
460	Calcasieu	46.93	46.98	Waterbody Crossing, Access & Staging Area	0.8	Nonforested Wetland
					0.1	Streams and Canals
					0.0	Transportation, Communications, and Utilities
462	Calcasieu	46.94	46.96	Waterbody Crossing	0.1	Nonforested Wetland
459	Calcasieu	46.96	47.01	Waterbody Crossing & Access	0.2	Nonforested Wetland
					0.0	Streams and Canals
					0.1	Transportation, Communications, and Utilities

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Extra Workspaces

ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
461	Calcasieu	46.97	47.00	Waterbody Crossing & Access	0.0	Transportation, Communications, and Utilities
					0.1	Nonforested Wetland
458	Calcasieu	47.03	47.05	Waterbody Crossing	0.1	Nonforested Wetland
558	Calcasieu	47.03	47.05	Waterbody Crossing	0.1	Nonforested Wetland
457	Calcasieu	47.33	47.35	Waterbody Crossing	0.1	Nonforested Wetland
456	Calcasieu	47.33	47.35	Waterbody Crossing	0.1	Nonforested Wetland
454	Calcasieu	47.37	47.39	Waterbody Crossing	0.0	Nonforested Wetland
					0.1	Herbaceous Rangeland
455	Calcasieu	47.37	47.39	Waterbody Crossing	0.0	Nonforested Wetland
					0.1	Herbaceous Rangeland
453	Calcasieu	47.69	47.74	Road Crossing & Fabrication Area	0.3	Nonforested Wetland
452	Calcasieu	47.72	47.75	Road Crossing	0.1	Nonforested Wetland
450	Calcasieu	47.76	47.87	Road Crossing, Fabrication Area & P.I.	0.3	Nonforested Wetland
451	Calcasieu	47.77	47.87	Road Crossing & P.I.	0.3	Nonforested Wetland
448	Calcasieu	48.23	48.30	P.I.	0.1	Cropland and Pasture
					0.0	Nonforested Wetland
					0.1	Residential
449	Calcasieu	48.24	48.29	P.I.	0.2	Cropland and Pasture
447	Calcasieu	48.42	48.49	P.I.	0.1	Residential
					0.1	Cropland and Pasture
446	Calcasieu	48.46	48.50	P.I.	0.1	Cropland and Pasture
562	Calcasieu	49.45	49.51	Access	0.3	Cropland and Pasture
					0.0	Transportation, Communications, and Utilities

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Extra Workspaces

ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
10 HDD	Calcasieu	49.52	49.58	HDD Site -Exit Hole	1.1	Cropland and Pasture
444	Calcasieu	49.69	49.72	Equipment Area	0.2	Nonforested Wetland
443	Calcasieu	49.71	50.44	Pull String	4.7	Nonforested Wetland
9 HDD	Calcasieu	50.42	50.5	HDD Site -Entry & Exit Hole	1.9	Nonforested Wetland
442	Calcasieu	51.18	51.19	Equipment Area & Access	0.1	Industrial
441	Calcasieu	51.19	51.28	Pull String	0.6	Industrial
8 HDD	Calcasieu	51.28	51.33	HDD Site -Entry Hole	1.4	Industrial
440	Calcasieu	51.33	51.37	Truck Turnaround	0.9	Industrial
439	Calcasieu	51.37	51.53	Pull String	0.4	Industrial
438	Calcasieu	51.71	51.74	Staging Area	0.9	Industrial
7 HDD	Calcasieu	51.74	51.79	HDD Site -Exit Hole	1.1	Industrial
					0.1	Transportation, Communications, and Utilities
6 HDD	Calcasieu	52.35	52.41	HDD Site -Entry Holes	1.3	Evergreen Forest Land
					0.1	Forested Wetland
5 HDD	Calcasieu	53.04	53.08	HDD Site -Exit Hole	0.1	Streams and Canals
					1.0	Cropland and Pasture
436	Calcasieu	53.48	53.52	Road Crossing, Staging Area & Fabrication Area	0.9	Cropland and Pasture
435	Calcasieu	53.53	53.56	Road Crossing	0.2	Forested Wetland
434	Calcasieu	53.70	53.72	Waterbody Crossing	0.1	Cropland and Pasture
433	Calcasieu	53.73	53.75	Waterbody Crossing	0.1	Cropland and Pasture
432	Calcasieu	53.96	53.98	Waterbody Crossing	0.1	Nonforested Wetland
431	Calcasieu	54.04	54.08	Waterbody Crossing & Truck Turnaround	0.2	Cropland and Pasture

TABLE C-1 Extra Workspaces						
ID	Parish[a]	MP		Purpose	Acreage of Workspace	Land Use Type
		Begin	End			
430	Calcasieu	54.06	54.12	Waterbody Crossing, Fabrication Area & Truck Turnaround	0.1	Streams and Canals
					0.1	Cropland and Pasture
671	Calcasieu	54.14	54.18	Foreign Line Crossing	0.0	Streams and Canals
					0.1	Cropland and Pasture
672	Calcasieu	54.16	54.21	Foreign Line Crossing	0.1	Cropland and Pasture
429	Calcasieu	54.50	54.53	Road Crossing & Fabrication Area	0.2	Cropland and Pasture
427	Calcasieu	54.54	54.57	Road Crossing	0.1	Cropland and Pasture
428	Calcasieu	54.54	54.57	Road Crossing	0.1	Cropland and Pasture
425	Calcasieu	55.04	55.08	Waterbody Crossing, Truck Turnaround & Fabrication Area	0.8	Cropland and Pasture
426	Calcasieu	55.04	55.11	Waterbody Crossing & Truck Turnaround	0.2	Cropland and Pasture
424	Calcasieu	55.51	55.54	Road Crossing	0.2	Cropland and Pasture
422	Calcasieu	55.55	55.58	Road Crossing	0.1	Transitional Areas
423	Calcasieu	55.55	55.58	Road Crossing	0.1	Transitional Areas
421	Calcasieu	55.70	55.76	Waterbody Crossing & Fabrication Area	0.3	Transitional Areas
420	Calcasieu	55.73	55.75	Waterbody Crossing	0.1	Transitional Areas
418	Calcasieu	55.80	55.82	Waterbody Crossing	0.1	Cropland and Pasture
419	Calcasieu	55.81	55.83	Waterbody Crossing	0.1	Cropland and Pasture
417	Calcasieu	55.96	56.00	Spread Flop	0.1	Cropland and Pasture
					0.3	Herbaceous Rangeland
415	Calcasieu	55.97	56.02	Spread Flop	0.2	Herbaceous Rangeland
					0.1	Cropland and Pasture
673	Calcasieu	56.31	56.34	Waterbody Crossing, Foreign Line Crossing, Fabrication Area & Truck Turnaround	0.9	Herbaceous Rangeland

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Extra Workspaces

ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
413	Calcasieu	56.62	56.65	Road Crossing	0.2	Herbaceous Rangeland
412	Calcasieu	56.67	56.70	Road Crossing, Staging Area & Fabrication Area	0.0	Nonforested Wetland
					0.9	Cropland and Pasture
563	Calcasieu	56.70	56.94	Waterbody Crossing & P.I.	0.7	Cropland and Pasture
					0.0	Streams and Canals
410	Calcasieu	57.62	57.66	Road Crossing & Fabrication Area	0.2	Cropland and Pasture
409	Calcasieu	57.66	57.70	Road Crossing	0.2	Herbaceous Rangeland
					0.0	Forested Wetland
408	Calcasieu	57.85	57.92	Road Crossing & Fabrication Area	0.1	Herbaceous Rangeland
					0.3	Forested Wetland
407	Calcasieu	57.92	57.96	Road Crossing	0.2	Cropland and Pasture
406	Calcasieu	58.35	58.42	Fabrication Area & P.I.	0.3	Cropland and Pasture
405	Calcasieu	58.51	58.55	Waterbody Crossing & Fabrication Area	0.2	Cropland and Pasture
404	Calcasieu	58.58	58.60	Waterbody Crossing	0.1	Cropland and Pasture
					0.1	Cropland and Pasture
403	Calcasieu	59.01	59.06	Road Crossing & Fabrication Area	0.3	Cropland and Pasture
402	Calcasieu	59.07	59.10	Road Crossing	0.2	Cropland and Pasture
401	Calcasieu	59.66	59.73	Fabrication Area, Spread Flop & Foreign Line Crossing	0.7	Nonforested Wetland
					0.1	Transportation, Communications, and Utilities
400	Calcasieu	59.70	59.77	Foreign Line Crossing & P.I.	0.3	Nonforested Wetland
399	Calcasieu	59.96	60.01	Fabrication Area & P.I.	0.1	Nonforested Wetland
392	Calcasieu	60.01	60.05	Waterbody Crossing, Fabrication Area, Access & P.I.	0.7	Nonforested Wetland

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Extra Workspaces

ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
391	Calcasieu	60.06	60.08	Waterbody Crossing	0.1	Nonforested Wetland
390	Calcasieu	60.07	60.14	Waterbody Crossing, Fabrication Area & Access	0.8	Nonforested Wetland
386	Calcasieu	60.19	60.21	Road Crossing	0.1	Nonforested Wetland
					0.0	Cropland and Pasture
387	Calcasieu	60.19	60.21	Road Crossing	0.1	Nonforested Wetland
					0.0	Cropland and Pasture
388	Calcasieu	60.23	60.25	Road Crossing	0.1	Cropland and Pasture
389	Calcasieu	60.23	60.25	Road Crossing	0.1	Cropland and Pasture
383	Calcasieu	60.37	60.39	Waterbody Crossing	0.1	Cropland and Pasture
384	Calcasieu	60.37	60.39	Waterbody Crossing	0.1	Cropland and Pasture
382	Calcasieu	60.42	60.46	Waterbody Crossing, Fabrication Area, Access & Truck Turnaround	0.9	Cropland and Pasture
64	Calcasieu	60.65	60.76	Fabrication Area & P.I.	0.4	Cropland and Pasture
556	Calcasieu	60.81	60.86	Foreign Line Crossing	0.3	Cropland and Pasture
381	Calcasieu	60.92	60.95	Road Crossing & Waterbody Crossing	0.2	Cropland and Pasture
62	Calcasieu	60.97	60.99	Road Crossing, Fabrication Area & P.I.	0.3	Nonforested Wetland
					0.0	Cropland and Pasture
674	Calcasieu	61.28	61.33	Foreign Line Crossing	0.3	Cropland and Pasture
59	Calcasieu	61.45	61.50	Road Crossing & Fabrication Area	0.3	Cropland and Pasture
58	Calcasieu	61.52	61.55	Road Crossing	0.2	Cropland and Pasture
380	Calcasieu	61.94	61.97	Waterbody Crossing & Truck Turnaround	0.4	Cropland and Pasture
379	Calcasieu	61.98	62.04	Waterbody Crossing, Fabrication Area & Access	0.4	Cropland and Pasture
57	Calcasieu	62.45	62.56	Fabrication Area & P.I.	0.4	Cropland and Pasture

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Extra Workspaces

ID	Parish[a]	MP		Purpose	Acreage of Workspace	Land Use Type
		Begin	End			
398	Calcasieu	63.00	63.02	Waterbody Crossing	0.1	Nonforested Wetland
					0.0	Cropland and Pasture
397	Calcasieu	63.03	63.05	Waterbody Crossing	0.0	Cropland and Pasture
					0.1	Nonforested Wetland
396	Calcasieu	63.22	63.24	Waterbody Crossing	0.1	Nonforested Wetland
					0.0	Cropland and Pasture
395	Calcasieu	63.26	63.28	Waterbody Crossing	0.1	Cropland and Pasture
373	Calcasieu	63.45	63.48	Road Crossing & Waterbody Crossing	0.2	Cropland and Pasture
376	Calcasieu	63.50	63.54	Road Crossing, Fabrication Area & Waterbody Crossing	0.3	Cropland and Pasture
371	Calcasieu	64.19	64.23	Waterbody Crossing & Truck Turnaround	0.2	Cropland and Pasture
675	Calcasieu	64.22	64.26	Waterbody Crossing & Access	0.2	Cropland and Pasture
370	Calcasieu	64.25	64.32	Waterbody Crossing & Fabrication Area	0.4	Cropland and Pasture
676	Calcasieu	64.45	64.49	Foreign Line Crossing	0.1	Cropland and Pasture
					0.2	Transportation, Communications, and Utilities
					0.1	Evergreen Forest Land
42	Calcasieu	64.67	64.71	Road Crossing	0.2	Evergreen Forest Land
43	Calcasieu	64.72	64.77	Staging Area, Road Crossing & Fabrication Area	0.0	Streams and Canals
				Staging Area, Road Crossing & Fabrication Area	0.9	Cropland and Pasture
369	Calcasieu	65.33	65.35	Waterbody Crossing	0.1	Cropland and Pasture
368	Calcasieu	65.37	65.39	Waterbody Crossing	0.1	Cropland and Pasture
616	Calcasieu	65.45	65.50	Foreign Line Crossing	0.3	Cropland and Pasture

TABLE C-1 Extra Workspaces						
ID	Parish[a]	MP		Purpose	Acreage of Workspace	Land Use Type
		Begin	End			
365	Calcasieu	65.94	65.97	Road Crossing	0.2	Cropland and Pasture
367	Calcasieu	65.99	66.00	Road Crossing & Waterbody Crossing	0.1	Herbaceous Rangeland
366	Calcasieu	66.02	66.04	Waterbody Crossing	0.1	Cropland and Pasture
364	Calcasieu	66.18	66.24	Truck Turnaround & Foreign Line Crossing	0.6	Cropland and Pasture
363	Calcasieu	66.25	66.31	Road Crossing, Waterbody Crossing, Foreign Line Crossing, Fabrication Area & P.I.	1.3	Cropland and Pasture
362	Calcasieu	66.33	66.41	Road Crossing & Fabrication Area	0.5	Nonforested Wetland
361	Calcasieu	66.67	66.69	Waterbody Crossing	0.1	Nonforested Wetland
360	Calcasieu	66.70	66.72	Waterbody Crossing	0.1	Nonforested Wetland
359	Calcasieu	66.83	66.87	Railroad Crossing, Waterbody Crossing, Truck Turnaround & Fabrication Area	0.5	Nonforested Wetland
315	Calcasieu	67.03	67.09	Railroad Crossing, Waterbody Crossing & Truck Turnaround	0.5	Nonforested Wetland
					0.0	Mixed Rangeland
316	Calcasieu	67.09	67.15	Waterbody Crossing & Fabrication Area	0.2	Nonforested Wetland
					0.1	Forested Wetland
317	Calcasieu	67.17	67.19	Waterbody Crossing	0.1	Nonforested Wetland
318	Calcasieu	67.26	67.28	Waterbody Crossing	0.1	Nonforested Wetland
319	Calcasieu	67.29	67.37	Waterbody Crossing & Access	0.4	Nonforested Wetland
					0.0	Herbaceous Rangeland
320	Calcasieu	67.38	67.44	Waterbody Crossing, Fabrication Area & Access	0.0	Cropland and Pasture
					0.3	Nonforested Wetland
321	Calcasieu	67.53	67.59	Road Crossing & Fabrication Area	0.3	Nonforested Wetland

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Extra Workspaces

ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
322	Calcasieu	67.62	67.65	Road Crossing	0.1	Shrub and Brush Rangeland
					0.1	Nonforested Wetland
323	Calcasieu	67.96	68.03	Waterbody Crossing, Fabrication Area & Truck Turnaround	0.8	Herbaceous Rangeland
324	Calcasieu	68.07	68.11	Waterbody Crossing & Truck Turnaround	0.4	Cropland and Pasture
					0.1	Herbaceous Rangeland
325	Calcasieu	68.30	68.33	Road Crossing & Waterbody Crossing	0.2	Herbaceous Rangeland
326	Calcasieu	68.34	68.35	Road Crossing & Waterbody Crossing	0.1	Deciduous Forest Land
327	Calcasieu	68.36	68.52	Road Crossing, Waterbody Crossing & Fabrication Area	0.9	Cropland and Pasture
328	Calcasieu	68.52	68.59	Road Crossing, Railroad Crossing, Waterbody Crossing & Truck Turnaround	0.7	Cropland and Pasture
329	Calcasieu	68.70	68.75	Road Crossing, Railroad Crossing & Waterbody Crossing	0.5	Herbaceous Rangeland
330	Calcasieu	68.97	69.07	Waterbody Crossing, Fabrication Area & Truck Turnaround	0.8	Herbaceous Rangeland
					0.1	Nonforested Wetland
					0.1	Cropland and Pasture
331	Calcasieu	69.08	69.10	Waterbody Crossing	0.1	Cropland and Pasture
334	Calcasieu	69.15	69.22	Waterbody Crossing & Truck Turnaround	1.1	Cropland and Pasture
335	Calcasieu	69.36	69.41	Road Crossing, Fabrication Area & P.I.	0.3	Cropland and Pasture
336	Calcasieu	69.42	69.43	Road Crossing & Waterbody Crossing	0.1	Herbaceous Rangeland
337	Calcasieu	69.45	69.50	Waterbody Crossing, Fabrication Area & Access	0.4	Cropland and Pasture
338	Calcasieu	69.83	69.90	Waterbody Crossing, Fabrication Area, Foreign Line Crossing & Truck Turnaround	0.7	Cropland and Pasture

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Extra Workspaces

ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
339	Calcasieu	69.94	69.99	Waterbody Crossing, Fabrication Area, P.I. & Access	0.2	Cropland and Pasture
340	Calcasieu	70.28	70.30	Waterbody Crossing & Access	0.1	Cropland and Pasture
341	Calcasieu	70.32	70.37	Waterbody Crossing, Fabrication Area, Access & Foreign Line Crossing	0.4	Cropland and Pasture
342	Calcasieu	70.63	70.68	Waterbody Crossing, Fabrication Area & Access	0.4	Cropland and Pasture
					0.0	Streams and Canals
343	Calcasieu	70.72	70.74	Waterbody Crossing	0.1	Nonforested Wetland
344	Calcasieu	71.62	71.63	Waterbody Crossing	0.0	Cropland and Pasture
346	Calcasieu	71.67	71.76	Waterbody Crossing & Fabrication Area	0.5	Cropland and Pasture
345	Calcasieu	71.76	71.83	Waterbody Crossing & Truck Turnaround	1.2	Cropland and Pasture
347	Calcasieu	71.85	71.92	Waterbody Crossing, Fabrication Area & Truck Turnaround	1.2	Nonforested Wetland
56	Calcasieu	72.52	72.61	Fabrication Area, Foreign Line Crossing & P.I.	0.6	Nonforested Wetland
348	Calcasieu	72.69	72.72	Road Crossing	0.1	Nonforested Wetland
					0.0	Cropland and Pasture
					0.0	Streams and Canals
349	Calcasieu	72.74	72.84	Road Crossing, Waterbody Crossing & Fabrication Area	0.5	Nonforested Wetland
					0.1	Cropland and Pasture
350	Calcasieu	72.87	72.98	Road Crossing, Waterbody Crossing & Fabrication Area	0.6	Nonforested Wetland
261	Calcasieu	73.77	73.80	Road Crossing	0.1	Nonforested Wetland
					0.1	Cropland and Pasture
					0.0	Streams and Canals
262	Calcasieu	73.82	73.88	Road Crossing & Fabrication Area	0.4	Herbaceous Rangeland

TABLE C-1 Extra Workspaces						
		MP				
ID	Parish[a]	Begin	End	Purpose	Acreage of Workspace	Land Use Type
555	Calcasieu	73.98	74.03	Foreign Line Crossing	0.3	Herbaceous Rangeland
264	Calcasieu	74.71	74.79	Airstrip Crossing & Fabrication Area	0.5	Cropland and Pasture
263	Calcasieu	74.79	74.84	Airstrip Crossing, Waterbody Crossing, Fabrication Area & Truck Turnaround	1.1	Cropland and Pasture
265	Jefferson Davis	74.92	74.97	Railroad Crossing, Waterbody Crossing, Fabrication Area & P.I.	0.2	Nonforested Wetland
266	Jefferson Davis	75.21	75.25	Road Crossing	0.2	Nonforested Wetland
266	Jefferson Davis	75.23	75.26	Road Crossing	0.1	Cropland and Pasture
267	Jefferson Davis	75.30	75.34	Road Crossing & Staging Area	0.9	Cropland and Pasture
268	Jefferson Davis	75.34	75.37	Fabrication Area	0.2	Cropland and Pasture
554	Jefferson Davis	75.50	75.55	Foreign Line Crossing	0.3	Cropland and Pasture
553	Jefferson Davis	75.60	75.65	Foreign Line Crossing	0.3	Cropland and Pasture
270	Jefferson Davis	75.83	75.95	Foreign Line Crossing, Fabrication Area & P.I.	0.8	Cropland and Pasture
269	Jefferson Davis	75.95	75.99	Waterbody Crossing, P.I. & Truck Turnaround	0.9	Cropland and Pasture
271	Jefferson Davis	76.11	76.14	Waterbody Crossing, P.I. & Truck Turnaround	1.0	Cropland and Pasture
272	Jefferson Davis	76.14	76.35	Waterbody Crossing & Fabrication Area	1.3	Cropland and Pasture
677	Jefferson Davis	76.22	76.27	Foreign Line Crossing	0.3	Cropland and Pasture
274	Jefferson Davis	76.66	76.82	Railroad Crossing, P.I. & Fabrication Area	1.4	Cropland and Pasture
275	Jefferson Davis	76.70	76.82	Railroad Crossing, P.I. & Access	0.8	Cropland and Pasture

TABLE C-1 Extra Workspaces						
ID	Parish[a]	MP		Purpose	Acreage of Workspace	Land Use Type
		Begin	End			
276	Jefferson Davis	76.85	76.93	Foreign Line Crossing, Railroad Crossing, P.I. & Fabrication Area	0.9	Cropland and Pasture
277	Jefferson Davis	76.86	76.95	Foreign Line Crossing, P.I. & Railroad Crossing	0.3	Cropland and Pasture
279	Jefferson Davis	76.90	76.96	HDD Pullstring	0.6	Cropland and Pasture
278	Jefferson Davis	76.94	77.00	Foreign Line Crossing, P.I., Fabrication Area & Truck Turnaround	1.3	Cropland and Pasture
280	Jefferson Davis	77.10	77.15	Foreign Line Crossing	0.3	Nonforested Wetland
285	Jefferson Davis	77.52	77.54	Access, P.I. & Fabrication Area	0.1	Other Agricultural Land
286	Jefferson Davis	77.52	77.61	P.I.	0.3	Cropland and Pasture
285	Jefferson Davis	77.54	77.61	Access, P.I. & Fabrication Area	0.3	Cropland and Pasture
4 HDD	Jefferson Davis	77.61	77.66	HDD Site -Exit Hole	1.1	Cropland and Pasture
287	Jefferson Davis	78.33	78.38	Staging Area	1.1	Cropland and Pasture
3 HDD	Jefferson Davis	78.39	78.43	HDD Site -Entry Hole	1.1	Cropland and Pasture
288	Jefferson Davis	78.69	78.71	Waterbody Crossing	0.1	Cropland and Pasture
289	Jefferson Davis	78.73	78.77	Waterbody Crossing & Fabrication Area	0.2	Cropland and Pasture
290	Jefferson Davis	78.96	78.98	Waterbody Crossing	0.1	Nonforested Wetland
291	Jefferson Davis	79.00	79.02	Waterbody Crossing & Fabrication Area	0.2	Cropland and Pasture
292	Jefferson Davis	79.40	79.45	Road Crossing & Foreign Line Crossing	0.3	Cropland and Pasture

TABLE C-1 Extra Workspaces						
ID	**Parish[a]**	**MP**		**Purpose**	**Acreage of Workspace**	**Land Use Type**
		Begin	**End**			
293	Jefferson Davis	79.53	79.59	Road Crossing & Fabrication Area	0.4	Cropland and Pasture
294	Jefferson Davis	79.89	79.94	Waterbody Crossing & Truck Turnaround	0.7	Cropland and Pasture
295	Jefferson Davis	79.96	80.03	Waterbody Crossing & Fabrication Area	0.4	Cropland and Pasture
615	Jefferson Davis	80.15	80.19	Foreign Line Crossing	0.3	Cropland and Pasture
296	Jefferson Davis	80.31	80.39	Waterbody Crossing & Access	0.5	Cropland and Pasture
297	Jefferson Davis	80.41	80.47	Waterbody Crossing & Fabrication Area	0.4	Cropland and Pasture
298	Jefferson Davis	80.68	80.71	Waterbody Crossing & Access	0.2	Cropland and Pasture
299	Jefferson Davis	80.72	80.84	Waterbody Crossing, Foreign Line Crossing, Fabrication Area & Access	0.7	Cropland and Pasture
300	Jefferson Davis	80.84	80.89	Truck Turnaround, Foreign Line Crossing & Waterbody Crossing	1.1	Cropland and Pasture
301	Jefferson Davis	80.91	80.97	Truck Turnaround, Foreign Line Crossing & Waterbody Crossing	1.1	Cropland and Pasture
314	Jefferson Davis	80.97	81.01	Waterbody Crossing & Fabrication Area	0.2	Cropland and Pasture
302	Jefferson Davis	81.23	81.28	Access	0.3	Cropland and Pasture
303	Jefferson Davis	81.68	81.75	Truck Turnaround, Waterbody Crossing & Road Crossing	0.8	Cropland and Pasture
304	Jefferson Davis	81.84	81.92	Road Crossing, Waterbody Crossing & Fabrication Area	0.5	Cropland and Pasture
305	Jefferson Davis	82.24	82.28	Road Crossing	0.2	Cropland and Pasture
306	Jefferson Davis	82.31	82.36	Road Crossing & Fabrication Area	0.3	Nonforested Wetland

TABLE C-1						
Extra Workspaces						
ID	Parish[a]	MP		Purpose	Acreage of Workspace	Land Use Type
		Begin	End			
307	Jefferson Davis	82.74	82.77	Waterbody Crossing	0.2	Nonforested Wetland
308	Jefferson Davis	82.78	82.82	Waterbody Crossing	0.2	Nonforested Wetland
309	Jefferson Davis	82.96	82.99	Road Crossing	0.2	Nonforested Wetland
310	Jefferson Davis	83.00	83.04	Road Crossing	0.2	Cropland and Pasture
311	Jefferson Davis	84.20	84.24	Road Crossing	0.2	Nonforested Wetland
312	Jefferson Davis	84.24	84.31	Waterbody Crossing, Fabrication Area & Road Crossing	0.1	Herbaceous Rangeland
					0.3	Nonforested Wetland
136	Jefferson Davis	84.32	84.40	Road Crossing, Waterbody Crossing & Fabrication Area	0.0	Cropland and Pasture
					0.4	Nonforested Wetland
					0.1	Herbaceous Rangeland
135	Jefferson Davis	84.43	84.48	Road Crossing & Fabrication Area	0.3	Cropland and Pasture
137	Jefferson Davis	84.66	84.70	Waterbody Crossing	0.2	Cropland and Pasture
138	Jefferson Davis	84.70	84.75	Waterbody Crossing & Fabrication Area	0.3	Cropland and Pasture
356	Jefferson Davis	84.90	84.93	Waterbody Crossing	0.2	Cropland and Pasture
140	Jefferson Davis	84.97	85.03	Waterbody Crossing & Fabrication Area	0.3	Cropland and Pasture
564	Jefferson Davis	85.36	85.41	Access	0.3	Cropland and Pasture
573	Jefferson Davis	86.08	86.13	Foreign Line Crossing	0.3	Cropland and Pasture

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Extra Workspaces

ID	Parish[a]	MP		Purpose	Acreage of Workspace	Land Use Type
		Begin	End			
142	Jefferson Davis	86.47	86.53	Road Crossing & Staging Area	0.8	Cropland and Pasture
143	Jefferson Davis	86.58	86.66	Road Crossing & Fabrication Area	0.5	Cropland and Pasture
614	Jefferson Davis	87.14	87.19	Foreign Line Crossing	0.3	Cropland and Pasture
613	Jefferson Davis	87.43	87.46	Foreign Line Crossing	0.2	Nonforested Wetland
144	Jefferson Davis	87.67	87.71	Road Crossing	0.1	Nonforested Wetland
					0.1	Cropland and Pasture
					0.0	Transportation, Communications, and Utilities
					0.0	Streams and Canals
146	Jefferson Davis	87.76	87.78	Fabrication Area	0.1	Cropland and Pasture
147	Jefferson Davis	88.45	88.48	Waterbody Crossing	0.1	Cropland and Pasture
148	Jefferson Davis	88.50	88.52	Waterbody Crossing	0.1	Cropland and Pasture
149	Jefferson Davis	88.58	88.65	Fabrication Area & P.I.	0.4	Cropland and Pasture
150	Jefferson Davis	88.75	88.78	Road Crossing	0.1	Cropland and Pasture
151	Jefferson Davis	88.77	88.80	Road Crossing	0.1	Cropland and Pasture
152	Jefferson Davis	88.79	88.88	Road Crossing, Fabrication Area & P.I.	0.3	Cropland and Pasture
153	Jefferson Davis	88.81	88.88	Waterbody Crossing & P.I.	0.2	Cropland and Pasture
154	Jefferson Davis	88.89	88.92	Road Crossing	0.1	Cropland and Pasture

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Extra Workspaces

ID	Parish[a]	MP		Purpose	Acreage of Workspace	Land Use Type
		Begin	End			
155	Jefferson Davis	88.89	88.92	Road Crossing	0.1	Cropland and Pasture
156	Jefferson Davis	89.94	89.97	Road Crossing	0.1	Cropland and Pasture
158	Jefferson Davis	89.94	89.97	Road Crossing	0.1	Cropland and Pasture
157	Jefferson Davis	89.98	90.01	Road Crossing	0.1	Cropland and Pasture
159	Jefferson Davis	89.98	90.01	Road Crossing	0.1	Cropland and Pasture
163	Jefferson Davis	90.54	90.56	Waterbody Crossing & Foreign Line Crossing	0.1	Cropland and Pasture
161	Jefferson Davis	90.55	90.57	Waterbody Crossing & Foreign Line Crossing	0.1	Cropland and Pasture
164	Jefferson Davis	90.57	90.59	Waterbody Crossing & Foreign Line Crossing	0.1	Cropland and Pasture
162	Jefferson Davis	90.58	90.62	Waterbody Crossing & Fabrication Area	0.1	Cropland and Pasture
168	Jefferson Davis	90.98	91.00	Road Crossing	0.1	Cropland and Pasture
165	Jefferson Davis	90.98	91.01	Road Crossing	0.1	Cropland and Pasture
167	Jefferson Davis	91.01	91.04	Road Crossing	0.1	Cropland and Pasture
166	Jefferson Davis	91.02	91.05	Road Crossing	0.1	Cropland and Pasture
699	Jefferson Davis	91.06	91.11	Foreign Line Crossing	0.1	Cropland and Pasture
700	Jefferson Davis	91.06	91.11	Foreign Line Crossing	0.1	Cropland and Pasture
612	Jefferson Davis	91.29	91.38	Fabrication Area, Waterbody Crossing & Foreign Line Crossing	0.6	Cropland and Pasture

TABLE C-1 Extra Workspaces						
ID	**Parish[a]**	**MP**		**Purpose**	**Acreage of Workspace**	**Land Use Type**
		Begin	**End**			
678	Jefferson Davis	91.34	91.38	Waterbody Crossing & Foreign Line Crossing	0.2	Cropland and Pasture
169	Jefferson Davis	91.61	91.63	Waterbody Crossing	0.1	Cropland and Pasture
171	Jefferson Davis	91.62	91.64	Waterbody Crossing	0.1	Cropland and Pasture
172	Jefferson Davis	91.65	91.67	Waterbody Crossing	0.1	Cropland and Pasture
170	Jefferson Davis	91.65	91.68	Waterbody Crossing & Fabrication Area	0.2	Cropland and Pasture
175	Jefferson Davis	92.00	92.03	Road Crossing	0.1	Cropland and Pasture
					0.0	Streams and Canals
173	Jefferson Davis	92.01	92.04	Road Crossing	0.1	Cropland and Pasture
					0.0	Streams and Canals
174	Jefferson Davis	92.04	92.07	Road Crossing	0.1	Herbaceous Rangeland
176	Jefferson Davis	92.05	92.11	Road Crossing & Fabrication Area	0.3	Herbaceous Rangeland
178	Jefferson Davis	92.13	92.16	Waterbody Crossing	0.1	Herbaceous Rangeland
177	Jefferson Davis	92.15	92.18	Waterbody Crossing	0.1	Herbaceous Rangeland
180	Jefferson Davis	92.20	92.23	Waterbody Crossing	0.1	Nonforested Wetland
179	Jefferson Davis	92.22	92.26	Waterbody Crossing & Fabrication Area	0.2	Nonforested Wetland
183	Jefferson Davis	93.02	93.08	Road Crossing & Spread Flop	0.3	Cropland and Pasture
					0.0	Streams and Canals
					0.1	Transportation, Communications, and Utilities

TABLE C-1 Extra Workspaces						
ID	Parish[a]	MP		Purpose	Acreage of Workspace	Land Use Type
		Begin	End			
181	Jefferson Davis	93.04	93.09	Road Crossing & Staging Area	1.0	Cropland and Pasture
182	Jefferson Davis	93.08	93.14	Road Crossing & Spread Flop	0.3	Cropland and Pasture
					0.0	Streams and Canals
					0.1	Transportation, Communications, and Utilities
184	Jefferson Davis	93.08	93.14	Road Crossing, Staging Area & Fabrication Area	0.0	Streams and Canals
					0.7	Cropland and Pasture
185	Jefferson Davis	93.64	93.70	Fabrication Area & P.I.	0.3	Cropland and Pasture
188	Jefferson Davis	94.06	94.09	Waterbody Crossing	0.2	Cropland and Pasture
187	Jefferson Davis	94.11	94.17	Road Crossing & Waterbody Crossing	0.3	Cropland and Pasture
186	Jefferson Davis	94.18	94.21	Road Crossing	0.2	Cropland and Pasture
189	Jefferson Davis	94.61	94.67	Waterbody Crossing, Fabrication Area & Truck Turnaround	0.7	Cropland and Pasture
681	Jefferson Davis	94.72	94.76	Waterbody Crossing & Access	0.1	Cropland and Pasture
190	Jefferson Davis	94.72	94.78	Waterbody Crossing & Fabrication Area	0.3	Cropland and Pasture
682	Jefferson Davis	94.94	94.97	Access	0.1	Cropland and Pasture
191	Jefferson Davis	95.07	95.10	Waterbody Crossing	0.2	Cropland and Pasture
683	Jefferson Davis	95.07	95.10	Waterbody Crossing & Access	0.1	Cropland and Pasture

TABLE C-1 Extra Workspaces						
ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
192	Jefferson Davis	95.14	95.33	Road Crossing, Fabrication Area, Waterbody Crossing, Spread Flop & P.I.	1.0	Cropland and Pasture
					0.1	Transportation, Communications, and Utilities
					0.0	Streams and Canals
679	Jefferson Davis	95.20	95.27	Road Crossing, Access & Spread Flop	0.3	Cropland and Pasture
					0.1	Transportation, Communications, and Utilities
					0.0	Streams and Canals
680	Jefferson Davis	95.26	95.33	Road Crossing, Spread Flop, Fabrication Area & P.I.	0.4	Cropland and Pasture
684	Jefferson Davis	95.54	95.62	Fabrication Area & P.I.	0.4	Cropland and Pasture
685	Jefferson Davis	95.55	95.60	P.I.	0.2	Cropland and Pasture
686	Jefferson Davis	95.80	95.83	Access	0.2	Cropland and Pasture
687	Jefferson Davis	96.14	96.19	Foreign Line Crossing	0.3	Cropland and Pasture
688	Jefferson Davis	96.31	96.34	Road Crossing & Fabrication Area	0.2	Cropland and Pasture
690	Jefferson Davis	96.38	96.41	Road Crossing & Waterbody Crossing	0.2	Cropland and Pasture
689	Jefferson Davis	96.38	96.43	Waterbody Crossing, Fabrication Area, Road Crossing, & Access	0.3	Cropland and Pasture
701	Jefferson Davis	97.30	97.36	Road Crossing & Fabrication Area	0.3	Cropland and Pasture
550	Jefferson Davis	97.33	97.36	Road Crossing	0.1	Cropland and Pasture
547	Jefferson Davis	97.38	97.41	Road Crossing	0.1	Cropland and Pasture

TABLE C-1 Extra Workspaces						
ID	**Parish[a]**	**MP**		**Purpose**	**Acreage of Workspace**	**Land Use Type**
		Begin	**End**			
548	Jefferson Davis	97.38	97.41	Road Crossing	0.1	Cropland and Pasture
691	Jefferson Davis	97.59	97.62	Road Crossing	0.2	Cropland and Pasture
692	Jefferson Davis	97.60	97.64	Road Crossing	0.2	Cropland and Pasture
					0.1	Other Agricultural Land
693	Jefferson Davis	97.72	97.78	Access	0.3	Cropland and Pasture
					0.1	Deciduous Forest Land
546	Jefferson Davis	97.75	97.81	P.I.	0.2	Cropland and Pasture
694	Jefferson Davis	97.80	97.87	Fabrication Area & P.I.	0.4	Cropland and Pasture
203	Jefferson Davis	98.82	98.94	Fabrication Area & Access	0.7	Cropland and Pasture
205	Jefferson Davis	98.94	99.03	Truck Turnaround	1.1	Cropland and Pasture
2 HDD	Jefferson Davis	98.98	99.03	HDD Site -Exit Hole	1.1	Cropland and Pasture
1 HDD	Acadia	99.76	99.81	HDD Site -Entry Hole	1.1	Cropland and Pasture
209	Acadia	99.76	99.88	Fabrication Area & Truck Turnaround	1.3	Cropland and Pasture
210	Acadia	99.81	99.87	P.I.	0.2	Cropland and Pasture
208	Acadia	100.01	100.07	Access	0.3	Cropland and Pasture
					0.1	Streams and Canals
40	Acadia	100.39	100.42	Road Crossing	0.1	Other Agricultural Land
38	Acadia	100.40	100.43	Road Crossing	0.1	Cropland and Pasture
					0.1	Other Agricultural Land
39	Acadia	100.43	100.46	Road Crossing	0.1	Cropland and Pasture
37	Acadia	100.44	100.47	Road Crossing	0.1	Cropland and Pasture

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Extra Workspaces

ID	Parish[a]	MP		Purpose	Acreage of Workspace	Land Use Type
		Begin	End			
35	Acadia	100.72	100.74	Waterbody Crossing	0.1	Cropland and Pasture
36	Acadia	100.72	100.74	Waterbody Crossing	0.1	Cropland and Pasture
34	Acadia	100.75	100.77	Waterbody Crossing	0.2	Cropland and Pasture
571	Acadia	100.87	100.93	Access	0.3	Cropland and Pasture
211	Acadia	101.08	101.12	Waterbody Crossing & Truck Turnaround	0.9	Cropland and Pasture
213	Acadia	101.22	101.24	Waterbody Crossing	0.1	Cropland and Pasture
212	Acadia	101.23	101.26	Waterbody Crossing, Truck Turnaround & Fabrication Area	0.9	Cropland and Pasture
216	Acadia	101.45	101.56	Road Crossing, Staging Area & Pull Section	0.9	Cropland and Pasture
214	Acadia	101.46	101.49	Road Crossing	0.2	Cropland and Pasture
215	Acadia	101.51	101.52	P.I. & Road Crossing	0.1	Cropland and Pasture
217	Acadia	101.51	101.60	Fabrication Area, P.I. & Road Crossing	0.6	Cropland and Pasture
218	Acadia	102.31	102.34	Road Crossing	0.2	Cropland and Pasture
219	Acadia	102.36	102.40	Road Crossing & Fabrication Area	0.2	Cropland and Pasture
220	Acadia	102.80	102.82	Waterbody Crossing	0.1	Cropland and Pasture
221	Acadia	102.85	102.91	Waterbody Crossing & Fabrication Area	0.3	Cropland and Pasture
222	Acadia	103.13	103.16	Waterbody Crossing	0.1	Cropland and Pasture
223	Acadia	103.17	103.21	Waterbody Crossing & Fabrication Area	0.2	Cropland and Pasture
224	Acadia	104.16	104.21	Road Crossing	0.2	Cropland and Pasture
225	Acadia	104.22	104.28	Road Crossing & Waterbody Crossing	0.3	Cropland and Pasture
226	Acadia	104.29	104.32	Waterbody Crossing	0.2	Cropland and Pasture
227	Acadia	104.55	104.61	Access	0.3	Cropland and Pasture

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Extra Workspaces

ID	Parish[a]	MP		Purpose	Acreage of Workspace	Land Use Type
		Begin	End			
229	Acadia	104.70	104.72	Waterbody Crossing	0.1	Cropland and Pasture
230	Acadia	104.73	104.75	Waterbody Crossing	0.1	Cropland and Pasture
231	Acadia	105.07	105.09	Waterbody Crossing	0.1	Cropland and Pasture
232	Acadia	105.14	105.17	Waterbody Crossing	0.1	Cropland and Pasture
233	Acadia	105.23	105.27	Waterbody Crossing & Fabrication Area	0.3	Cropland and Pasture
570	Acadia	105.27	105.36	Fabrication Area & P.I.	0.2	Cropland and Pasture
234	Acadia	105.56	105.59	Road Crossing	0.2	Cropland and Pasture
235	Acadia	105.60	105.68	Road Crossing, Fabrication Area & P.I.	0.6	Cropland and Pasture
236	Acadia	106.15	106.19	Road Crossing	0.2	Cropland and Pasture
237	Acadia	106.19	106.23	Road Crossing	0.2	Cropland and Pasture
238	Acadia	106.58	106.68	Road Crossing, Fabrication Area & Foreign Line Crossing	0.6	Cropland and Pasture
239	Acadia	106.70	106.75	Road Crossing	0.2	Cropland and Pasture
240	Acadia	106.77	106.81	Road Crossing	0.2	Cropland and Pasture
241	Acadia	106.81	106.85	Road Crossing	0.2	Cropland and Pasture
					0.1	Other Agricultural Land
242	Acadia	107.22	107.27	Foreign Line Crossing	0.1	Cropland and Pasture
					0.2	Shrub and Brush Rangeland
243	Acadia	107.37	107.40	Road Crossing & Fabrication Area	0.2	Cropland and Pasture
245	Acadia	107.56	107.58	Waterbody Crossing	0.2	Cropland and Pasture
246	Acadia	107.84	107.89	Truck Turnaround, Waterbody Crossing & Fabrication Area	1.0	Cropland and Pasture
247	Acadia	107.94	107.98	Truck Turnaround, Waterbody Crossing, Fabrication Area & P.I.	0.9	Cropland and Pasture
248	Acadia	108.05	108.07	Waterbody Crossing	0.1	Cropland and Pasture

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Extra Workspaces

ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
249	Acadia	108.10	108.15	Waterbody Crossing & Foreign Line Crossing	0.3	Cropland and Pasture
251	Acadia	108.15	108.21	Staging Area & Access	1.2	Cropland and Pasture
544	Acadia	108.39	108.51	Foreign Line Crossing, P.I. & Fabrication Area	0.7	Cropland and Pasture
543	Acadia	108.54	108.59	Foreign Line Crossing & Fabrication Area	0.3	Cropland and Pasture
					0.0	Mixed Forest Land
611	Acadia	109.00	109.04	Foreign Line Crossing	0.3	Mixed Forest Land
696	Acadia	109.64	109.69	Access	0.3	Cropland and Pasture
697	Acadia	110.00	110.02	Fabrication Area	0.3	Cropland and Pasture
542	Acadia	110.09	110.25	Fabrication Area Access, P.I., & Foreign Line Crossing	0.9	Cropland and Pasture
					0.1	Streams and Canals
569	Acadia	110.32	110.38	Staging Area	1.1	Cropland and Pasture
					0.1	Transportation, Communications, and Utilities
255	Acadia	110.32	110.45	Road Crossing & Fabrication Area	1.0	Cropland and Pasture
669	Acadia	110.60	110.79	Foreign Line Crossing, Fabrication Area & Tie-In	1.1	Cropland and Pasture
256	Acadia	111.19	111.22	Road Crossing	0.1	Cropland and Pasture
258	Acadia	111.21	111.24	Road Crossing	0.1	Cropland and Pasture
259	Acadia	111.25	111.36	Road Crossing & Foreign Line Crossing	0.3	Cropland and Pasture
541	Acadia	111.26	111.32	Road Crossing & Foreign Line Crossing	0.4	Cropland and Pasture
313	Acadia	111.45	111.50	Foreign Line Crossing & P.I.	0.3	Cropland and Pasture
87	Acadia	112.36	112.47	Road Crossing, Fabrication Area & P.I.	0.5	Evergreen Forest Land

TABLE C-1

Extra Workspaces

ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
87	Evangeline	112.47	112.51	Road Crossing, Fabrication Area & P.I.	0.1	Evergreen Forest Land
					0.2	Cropland and Pasture
93	Evangeline	112.91	112.94	Access	0.2	Cropland and Pasture
355	Evangeline	113.09	113.13	Truck Turnaround, Fabrication Area & P.I.	0.9	Cropland and Pasture
					0.0	Mixed Forest Land
90	Evangeline	113.09	113.14	P.I.	0.2	Cropland and Pasture
					0.0	Evergreen Forest Land
53	Evangeline	113.41	113.61	Railroad Crossing & Foreign Line Crossing	0.5	Mixed Forest Land
					0.1	Herbaceous Rangeland
54	Evangeline	113.52	113.57	Railroad Crossing & Foreign Line Crossing	0.1	Mixed Forest Land
					0.1	Herbaceous Rangeland
94	Evangeline	113.63	113.69	Truck Turnaround, Fabrication Area, Railroad Crossing & P.I.	1.1	Cropland and Pasture
55	Evangeline	113.65	113.74	Railroad Crossing, Foreign Line Crossing & P.I.	0.0	Mixed Forest Land
				Railroad Crossing, Foreign Line Crossing & P.I.	0.2	Cropland and Pasture
95	Evangeline	113.69	113.77	Railroad Crossing & P.I.	0.2	Cropland and Pasture
32	Evangeline	114.78	114.82	Staging Area, Fabrication Area & P.I.	0.9	Cropland and Pasture
97	Evangeline	114.80	114.87	Road Crossing & P.I.	0.1	Cropland and Pasture
					0.1	Residential
31	Evangeline	114.84	114.88	Road Crossing	0.1	Cropland and Pasture
30	Evangeline	114.89	114.92	Road Crossing	0.0	Cropland and Pasture
					0.1	Nonforested Wetland

TABLE C-1

Extra Workspaces

ID	Parish[a]	MP		Purpose	Acreage of Workspace	Land Use Type
		Begin	End			
96	Evangeline	114.89	114.92	Road Crossing	0.0	Cropland and Pasture
					0.1	Nonforested Wetland
354	Evangeline	115.25	115.34	Fabrication Area & P.I.	0.3	Herbaceous Rangeland
50	Evangeline	115.26	115.33	P.I.	0.2	Herbaceous Rangeland
99	Evangeline	115.64	115.70	Road Crossing & Fabrication Area	0.2	Herbaceous Rangeland
98	Evangeline	115.67	115.70	Road Crossing	0.1	Herbaceous Rangeland
100	Evangeline	115.71	115.76	Road Crossing, Fabrication Area & P.I.	0.5	Cropland and Pasture
101	Evangeline	115.72	115.75	Road Crossing & P.I.	0.2	Cropland and Pasture
111	Evangeline	116.33	116.36	Road Crossing	0.1	Cropland and Pasture
112	Evangeline	116.36	116.39	Road Crossing	0.1	Cropland and Pasture
110	Evangeline	116.37	116.41	Road Crossing	0.1	Cropland and Pasture
113	Evangeline	116.40	116.44	Road Crossing	0.1	Cropland and Pasture
108	Evangeline	116.51	116.54	Road Crossing	0.1	Cropland and Pasture
107	Evangeline	116.54	116.57	Road Crossing	0.1	Cropland and Pasture
109	Evangeline	116.56	116.59	Road Crossing	0.1	Cropland and Pasture
106	Evangeline	116.58	116.61	Road Crossing	0.1	Cropland and Pasture
104	Evangeline	116.69	116.73	Road Crossing	0.1	Cropland and Pasture
105	Evangeline	116.72	116.76	Road Crossing	0.1	Cropland and Pasture
102	Evangeline	116.74	116.77	Road Crossing	0.1	Cropland and Pasture
103	Evangeline	116.77	116.83	Road Crossing & Fabrication Area	0.3	Cropland and Pasture
567	Evangeline	116.94	116.99	Foreign Line Crossing	0.3	Cropland and Pasture
568	Evangeline	116.97	117.02	Foreign Line Crossing	0.3	Cropland and Pasture
29	Evangeline	117.19	117.27	Road Crossing & P.I.	0.2	Cropland and Pasture

TABLE C-1

Extra Workspaces

ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
27	Evangeline	117.20	117.27	Road Crossing, Fabrication Area & P.I.	0.2	Cropland and Pasture
26	Evangeline	117.28	117.31	Road Crossing	0.1	Cropland and Pasture
28	Evangeline	117.28	117.31	Road Crossing	0.1	Cropland and Pasture
115	Evangeline	117.99	118.07	Waterbody Crossing & Fabrication Area	0.5	Cropland and Pasture
114	Evangeline	118.27	118.36	Fabrication Area, Access & P.I.	0.5	Evergreen Forest Land
					0.1	Transportation, Communications, and Utilities
120	Evangeline	118.82	118.84	Waterbody Crossing	0.1	Nonforested Wetland
					0.0	Forested Wetland
119	Evangeline	118.85	118.87	Waterbody Crossing	0.1	Deciduous Forest Land
					0.1	Shrub and Brush Rangeland
117	Evangeline	119.25	119.27	Waterbody Crossing	0.1	Cropland and Pasture
116	Evangeline	119.28	119.30	Waterbody Crossing	0.1	Cropland and Pasture
24	Evangeline	119.47	119.53	Access	0.3	Cropland and Pasture
					0.1	Transportation, Communications, and Utilities
23	Evangeline	119.70	119.74	Road Crossing	0.2	Cropland and Pasture
22	Evangeline	119.74	119.78	Road Crossing	0.2	Cropland and Pasture
129	Evangeline	120.12	120.17	Truck Turnaround & Waterbody Crossing	1.1	Cropland and Pasture
130	Evangeline	120.20	120.24	Truck Turnaround, Fabrication Area & Waterbody Crossing	0.9	Cropland and Pasture
131	Evangeline	120.35	120.42	Fabrication Area, Road Crossing, & Foreign Line Crossing	1.3	Cropland and Pasture
					0.0	Streams and Canals
121	Evangeline	120.47	120.54	Fabrication Area, Road Crossing & Foreign Line Crossing	0.6	Cropland and Pasture

TABLE C-1 Extra Workspaces						
ID	Parish[a]	MP		Purpose	Acreage of Workspace	Land Use Type
		Begin	End			
21	Evangeline	120.60	120.68	P.I.	0.5	Cropland and Pasture
19	Evangeline	120.74	120.77	Road Crossing	0.2	Cropland and Pasture
					0.1	Streams and Canals
20	Evangeline	120.78	120.82	Road Crossing	0.2	Cropland and Pasture
123	Evangeline	121.45	121.48	Waterbody Crossing	0.1	Cropland and Pasture
122	Evangeline	121.49	121.52	Waterbody Crossing	0.1	Cropland and Pasture
124	Evangeline	121.83	121.85	Waterbody Crossing	0.1	Cropland and Pasture
18	Evangeline	121.86	122.06	Spread Flop, Fabrication Area, P.I., Road Crossing & Waterbody Crossing	1.1	Cropland and Pasture
125	Evangeline	121.95	122.09	Spread Flop, Road Crossing, Fabrication Area & P.I.	0.6	Cropland and Pasture
664	Evangeline	122.06	122.10	Foreign Line Crossing & Fabrication Area	0.3	Cropland and Pasture
665	Evangeline	122.18	122.25	Fabrication Area & Foreign Line Crossing	0.4	Cropland and Pasture
666	Evangeline	123.07	123.12	Road Crossing	0.2	Cropland and Pasture
126	Evangeline	123.13	123.22	Spread Flop, Fabrication Area, Foreign Line Crossing, P.I. & Road Crossing	0.6	Cropland and Pasture
16	Evangeline	123.16	123.28	Spread Flop, Fabrication Area, Foreign Line Crossing, P.I. & Road Crossing	0.5	Cropland and Pasture
					0.2	Residential
127	Evangeline	123.66	123.70	Road Crossing	0.2	Shrub and Brush Rangeland
128	Evangeline	123.70	123.74	Road Crossing	0.2	Cropland and Pasture
698	Evangeline	124.75	124.84	Waterbody Crossing & Fabrication Area	0.5	Cropland and Pasture
566	Evangeline	125.00	125.05	Staging Area	1.7	Cropland and Pasture
540	Evangeline	125.81	125.84	Road Crossing	0.2	Cropland and Pasture
539	Evangeline	125.85	125.88	Road Crossing	0.2	Cropland and Pasture

TABLE C-1

Extra Workspaces

ID	Parish[a]	MP Begin	MP End	Purpose	Acreage of Workspace	Land Use Type
14	Evangeline	126.19	126.24	Road Crossing	0.2	Cropland and Pasture
351	Evangeline	126.25	126.38	Road Crossing & Fabrication Area	0.7	Cropland and Pasture
15	Evangeline	126.39	126.42	Road Crossing	0.2	Cropland and Pasture
13	Evangeline	127.65	127.70	Road Crossing & Access	0.5	Cropland and Pasture
12	Evangeline	127.71	127.74	Road Crossing & Access	0.2	Cropland and Pasture
565	Evangeline	128.04	128.12	Access	0.3	Cropland and Pasture
					0.1	Streams and Canals
					0.1	Transportation, Communications, and Utilities
9	Evangeline	128.34	128.39	P.I.	0.2	Cropland and Pasture
10	Evangeline	128.45	128.51	Road Crossing & Fabrication Area	0.4	Cropland and Pasture
11	Evangeline	128.53	128.57	Road Crossing	0.2	Cropland and Pasture
600	Evangeline	129.54	129.60	Road Crossing, Foreign Line Crossing, P.I. & Fabrication Area	0.5	Cropland and Pasture
601	Evangeline	129.69	129.79	Topsoil Segregation	0.2	Residential
602	Evangeline	129.71	129.84	Fabrication Area & P.I.	0.7	Residential
603	Evangeline	129.99	130.05	Waterbody Crossing & Fabrication Area	0.3	Cropland and Pasture
604	Evangeline	130.12	130.15	Waterbody Crossing	0.1	Cropland and Pasture
605	Evangeline	130.55	130.60	Road Crossing & Fabrication Area	0.3	Cropland and Pasture
606	Evangeline	130.61	130.64	Road Crossing	0.2	Cropland and Pasture
607	Evangeline	130.75	130.78	Waterbody Crossing	0.1	Cropland and Pasture
608	Evangeline	130.80	130.86	Waterbody Crossing & Fabrication Area	0.4	Cropland and Pasture
609	Evangeline	131.67	131.70	Road Crossing	0.2	Cropland and Pasture
610	Evangeline	131.70	131.75	Staging Area & Road Crossing	1.0	Cropland and Pasture
667	Evangeline	131.88	131.92	P.I.	0.2	Cropland and Pasture

TABLE C-1						
Extra Workspaces						
ID	**Parish[a]**	**MP**		**Purpose**	**Acreage of Workspace**	**Land Use Type**
		Begin	**End**			
668	Evangeline	132.11	132.15	Fabrication Area	0.3	Cropland and Pasture
FGT Lateral						
-	Acadia	0.00	0.04	Tie-In & Fabrication Area	0.2	Cropland and Pasture
-	Acadia	0.11	0.13	Waterbody Crossing	0.1	Cropland and Pasture
-	Acadia	0.14	0.16	Waterbody Crossing	0.1	Cropland and Pasture
-	Acadia	0.47	0.50	Road Crossing	0.2	Cropland and Pasture
-	Acadia	0.51	0.54	Road Crossing	0.2	Cropland and Pasture
-	Acadia	1.18	1.26	Waterbody Crossing, Fabrication Area & Access	0.7	Shrub and Brush Rangeland
					0.1	Transportation, Communications, and Utilities
					0.1	Nonforested Wetland
-	Acadia	1.66	1.78	Waterbody Crossing, Fabrication Area & Truck Turnaround	1.4	Herbaceous Rangeland
-	Acadia	2.16	2.21	P.I.	0.3	Cropland and Pasture
-	Acadia	2.28	2.30	Fabrication Area & P.I.	0.1	Cropland and Pasture
					0.0	Herbaceous Rangeland
Total					**292.2**	

[a] All are parishes in Louisiana, except for # extra workspaces in Orange County, TX.

TABLE C-2

Land Requirements for Access Roads

Access Road No.	Parish	Approx. MP	Status	Use (Permanent or Temporary)	Approx. Length (feet)	Average Width (feet)	Surface Type	Condition	Proposed Improvement or Modification	Land Affected During Const. (acres)	Current Land Use
1	Cameron	3.89	Existing	Temporary	12,626	33	Gravel	Unknown	Add gravel and maintain	8.6	Transportation, Communications, Utilities
2	Calcasieu	31.40	New	Temporary	704	50	New	Unknown	Construct with gravel and maintain	0.4	Deciduous Forest Land
										0.4	Non-forested Wetland
3	Calcasieu	32.45	New	Temporary	524	50	New	Unknown	Construct with gravel and maintain	0.2	Deciduous Forest Land
										0.4	Non-forested Wetland
4	Calcasieu	37.13	Existing	Temporary	4,037	25	Paved	Good	Maintain	2.3	Transportation, Communications, Utilities
4-1	Calcasieu	37.32	Existing	Temporary	3,956	27	Dirt	Fair	Add gravel and maintain	2.4	Transportation, Communications, Utilities
4-2	Calcasieu	36.54	Existing	Temporary	8,861	22	Paved	Good	Maintain	4.9	Transportation, Communications, Utilities
4-3	Calcasieu	36.29	Existing	Temporary	1,170	32	Gravel	Fair	Add gravel and maintain	0.84	Transportation, Communications, Utilities
4-4	Calcasieu	35.20	Existing	Temporary	6,567	18	Gravel	Fair	Add gravel and maintain	2.26	Transportation, Communications, Utilities
4-5	Calcasieu	35.15	New	Temporary	309	14	New	Unknown	Construct with gravel and maintain	0.06	Cropland and Pasture
										0.04	Non-forested wetland
4-6	Calcasieu	36.39	Existing	Temporary	24	24	Dirt	Unknown	Add gravel and maintain	0.01	Transportation, Communications, Utilities
5	Calcasieu	38.36	Existing	Temporary	5,564	19	Dirt	Good	Add gravel and maintain	2.54	Transportation, Communications, Utilities
5-1	Calcasieu	37.98	Existing	Temporary	2,727	22	Dirt	Fair	Add gravel and maintain	1.25	Transportation, Communications, Utilities

TABLE C-2

Land Requirements for Access Roads

Access Road No.	Parish	Approx. MP	Status	Use (Permanent or Temporary)	Approx. Length (feet)	Average Width (feet)	Surface Type	Condition	Proposed Improvement or Modification	Land Affected During Const. (acres)	Current Land Use
6	Calcasieu	39.10	Existing	Temporary	3,565	12	Dirt	Good	Add gravel and maintain	1.00	Transportation, Communications, Utilities
7	Calcasieu	40.18	Existing	Temporary	2,517	12	Dirt	Good	Add gravel and maintain	0.7	Transportation, Communications, Utilities
7-1	Calcasieu	39.96	Existing	Temporary	2,399	12	Dirt	Unknown	Add gravel and maintain	0.6	Transportation, Communications, Utilities
7-2	Calcasieu	40.44	Existing	Temporary	2,238	22	Dirt	Unknown	Add gravel and maintain	1.1	Transportation, Communications, Utilities
8	Calcasieu	42.48	Existing	Temporary	17	16	Dirt	Good	Add gravel and maintain	0.0	Transportation, Communications, Utilities
9	Calcasieu	42.79	Existing	Temporary	39	18	Dirt	Good	Add gravel and maintain	0.0	Transportation, Communications, Utilities
10	Calcasieu	46.49	Existing	Temporary	1,227	15	Dirt	Unknown	Add gravel and maintain	0.4	Transportation, Communications, Utilities
10-1	Calcasieu	46.23	Existing	Temporary	1,406	14	Dirt	Unknown	Add gravel and maintain	0.5	Transportation, Communications, Utilities
11	Calcasieu	46.98	Existing	Temporary	1,518	16	Gravel	Unknown	Maintain	0.5	Transportation, Communications, Utilities
12	Calcasieu	49.47	Existing	Temporary	380	15	Dirt	Good	Add gravel and maintain	0.1	Transportation, Communications, Utilities
13	Calcasieu	50.31	Existing	Temporary	10,499	18	Dirt	Fair	Add gravel and maintain	5.1	Transportation, Communications, Utilities
13-1	Calcasieu	50.31	Existing	Temporary	2,049	30	Dirt	Unknown	Add gravel and maintain	1.5	Transportation, Communications, Utilities
14	Calcasieu	51.18	Existing	Temporary	1,229	12	Dirt	Fair	Add gravel and maintain	0.4	Transportation, Communications, Utilities
15	Calcasieu	52.34	New	Temporary	100	15	New	Unknown	Construct with gravel and maintain	0.1	Evergreen Forest

TABLE C-2

Land Requirements for Access Roads

Access Road No.	Parish	Approx. MP	Status	Use (Permanent or Temporary)	Approx. Length (feet)	Average Width (feet)	Surface Type	Condition	Proposed Improvement or Modification	Land Affected During Const. (acres)	Current Land Use
16	Calcasieu	53.61	Existing	Temporary	2,470	12	Gravel	Fair	Add gravel and maintain	0.7	Transportation, Communications, Utilities
17	Calcasieu	60.05	Existing	Temporary	1,411	19	Dirt	Unknown	Add gravel and maintain	0.6	Transportation, Communications, Utilities
18	Calcasieu	60.42	Existing	Temporary	1,211	12	Dirt	Unknown	Add gravel and maintain	0.3	Transportation, Communications, Utilities
19	Calcasieu	61.37	New	Permanent	110	20	New	Unknown	Construct with gravel and maintain	0.1	Cropland and Pasture
20	Calcasieu	61.98	Existing	Temporary	58	16	Dirt	Unknown	Add gravel and maintain	0.0	Transportation, Communications, Utilities
21	Calcasieu	64.31	Existing	Temporary	86	23	Dirt	Unknown	Add gravel and maintain	0.1	Transportation, Communications, Utilities
22	Calcasieu	65.98	Existing	Temporary	137	23	Dirt	Unknown	Add gravel and maintain	0.1	Transportation, Communications, Utilities
23	Calcasieu	67.36	Existing	Temporary	553	15	Dirt	Unknown	Add gravel and maintain	0.2	Transportation, Communications, Utilities
24	Calcasieu	67.38	Existing	Temporary	479	15	Dirt	Unknown	Add gravel and maintain	0.2	Transportation, Communications, Utilities
25	Calcasieu	69.44	Existing	Temporary	592	19	Dirt	Unknown	Add gravel and maintain	0.2	Transportation, Communications, Utilities
26	Calcasieu	69.94	Existing	Temporary	6,504	12	Dirt	Unknown	Add gravel and maintain	1.8	Transportation, Communications, Utilities
26-1	Calcasieu	70.32	Existing	Temporary	1,851	11	Dirt	Unknown	Add gravel and maintain	0.5	Transportation, Communications, Utilities
26-2	Calcasieu	70.39	Existing	Temporary	1,964	18	Dirt	Unknown	Add gravel and maintain	0.6	Transportation, Communications, Utilities
26-3	Calcasieu	70.68	Existing	Temporary	71	22	Dirt	Unknown	Add gravel and maintain	0.1	Transportation, Communications, Utilities

TABLE C-2

Land Requirements for Access Roads

Access Road No.	Parish	Approx. MP	Status	Use (Permanent or Temporary)	Approx. Length (feet)	Average Width (feet)	Surface Type	Condition	Proposed Improvement or Modification	Land Affected During Const. (acres)	Current Land Use
27	Calcasieu	71.81	Existing	Temporary	3,963	10	Dirt	Unknown	Add gravel and maintain	0.9	Transportation, Communications, Utilities
28	Jefferson Davis	75.98	Existing	Temporary	1,784	12	Dirt	Unknown	Add gravel and maintain	0.5	Transportation, Communications, Utilities
29	Jefferson Davis	76.05	Existing	Temporary	1,700	18	Dirt	Unknown	Add gravel and maintain	0.7	Transportation, Communications, Utilities
30	Jefferson Davis	76.82	Existing	Temporary	3,844	20	Dirt	Unknown	Add gravel and maintain	1.8	Transportation, Communications, Utilities
31	Jefferson Davis	77.54	Existing	Temporary	1,307	10	Dirt	Unknown	Add gravel and maintain	0.3	Transportation, Communications, Utilities
32	Jefferson Davis	80.31	Existing	Temporary	3,653	9	Dirt	Fair	Add gravel and maintain	0.7	Transportation, Communications, Utilities
33	Jefferson Davis	80.72	Existing	Temporary	4,236	18	Dirt	Unknown	Add gravel and maintain	1.7	Transportation, Communications, Utilities
33-1	Jefferson Davis	80.73	Existing	Temporary	1,574	29	Dirt	Unknown	Add gravel and maintain	1.0	Transportation, Communications, Utilities
34	Jefferson Davis	81.25	Existing	Temporary	3,882	19	Dirt	Unknown	Add gravel and maintain	1.2	Transportation, Communications, Utilities
34-1	Jefferson Davis	80.91	Existing	Temporary	3,344	11	Dirt	Unknown	Add gravel and maintain	0.8	Transportation, Communications, Utilities
35	Jefferson Davis	85.37	Existing	Temporary	2,259	14	Dirt	Unknown	Add gravel and maintain	0.7	Transportation, Communications, Utilities
36	Jefferson Davis	97.60	Existing	Temporary	3,445	12	Dirt	Unknown	Add gravel and maintain	1.0	Transportation, Communications, Utilities
36-1	Jefferson Davis	97.74	Existing	Temporary	743	14	Dirt	Unknown	Add gravel and maintain	0.2	Transportation, Communications, Utilities
37	Jefferson Davis	98.86	Existing	Temporary	5,289	26	Dirt	Unknown	Add gravel and maintain	2.8	Transportation, Communications, Utilities

TABLE C-2

Land Requirements for Access Roads

Access Road No.	Parish	Approx. MP	Status	Use (Permanent or Temporary)	Approx. Length (feet)	Average Width (feet)	Surface Type	Condition	Proposed Improvement or Modification	Land Affected During Const. (acres)	Current Land Use
38	Acadia	100.05	Existing	Temporary	2,769	15	Dirt	Fair	Add gravel and maintain	0.9	Transportation, Communications, Utilities
39	Acadia	100.90	Existing	Temporary	1,291	11	Dirt	Unknown	Add gravel and maintain	0.3	Transportation, Communications, Utilities
41	Acadia	109.68	Existing	Temporary	4,166	15	Gravel	Good	Maintain	1.2	Transportation, Communications, Utilities
41-1	Acadia	110.06	Existing	Temporary	680	9	Dirt	Good	Maintain	0.1	Transportation, Communications, Utilities
42	Acadia	112.93	Existing	Temporary	1,143	11	Dirt	Poor	Add gravel and maintain	0.3	Transportation, Communications, Utilities
43	Acadia	114.35	Existing	Temporary	2,492	14	Gravel	Good	Add gravel and maintain	0.6	Transportation, Communications, Utilities
44	Evangeline	118.35	Existing	Temporary	784	12	Gravel	Good	Maintain	0.2	Transportation, Communications, Utilities
45	Evangeline	119.50	Existing	Temporary	880	10	Dirt	Good	Maintain	0.2	Transportation, Communications, Utilities
46	Evangeline	124.61	Existing	Temporary	1,197	12	Dirt	Fair	Add gravel and maintain	0.3	Transportation, Communications, Utilities
47	Evangeline	127.73	Existing	Temporary	2,752	15	Gravel	Good	Maintain	0.8	Transportation, Communications, Utilities
48	Evangeline	128.10	Existing	Temporary	1,467	12	Dirt	Fair	Maintain	0.4	Transportation, Communications, Utilities
49	Calcasieu	25.81	Existing	Temporary	1,017	18	Dirt	Poor	Add gravel and maintain	0.4	Transportation, Communications, Utilities
50	Calcasieu	27.59	Existing	Temporary	2,247	20	Dirt	Poor	Add gravel and maintain	1.0	Transportation, Communications, Utilities
51	Calcasieu	41.98	Existing	Temporary	1,431	19	Gravel	Good	Maintain	0.7	Transportation, Communications, Utilities

TABLE C-2

Land Requirements for Access Roads

Access Road No.	Parish	Approx. MP	Status	Use (Permanent or Temporary)	Approx. Length (feet)	Average Width (feet)	Surface Type	Condition	Proposed Improvement or Modification	Land Affected During Const. (acres)	Current Land Use
52	Acadia	112.02	Existing	Permanent	2,046	12	Dirt	Poor	Add gravel and maintain	0.6	Transportation, Communications, Utilities
FGT-1	Acadia	1.25	Existing	Temporary	4,812	20	Dirt	Fair	Add gravel and maintain	1.1	Transportation, Communications, Utilities
FGT-2	Acadia	2.30	New	Permanent	1,927	12	New	Unknown	Construct with gravel and maintain	0.5	Herbaceous Rangeland
L1	Cameron	0.00	Existing	Permanent	7,723	30	Gravel	Good	Maintain	4.4	Transportation, Communications, Utilities
L2	Cameron	0.53	Existing	Temporary	67	33	Gravel	Good	Maintain	0.1	Transportation, Communications, Utilities
L3	Cameron	0.23	Existing	Temporary	203	20	Gravel	Good	Maintain	0.1	Transportation, Communications, Utilities
L4	Cameron	1.11	Existing	Permanent	2,154	30	Gravel	Good	Maintain	1.4	Transportation, Communications, Utilities
Total										**66.0**	

TABLE C-3

Land Requirements for Pipe Storage and Contractor Yards

Yard No.	Approx. Milepost	Parish	Land Affected During Construction (acres)	Current Land Use	Location	Proposed Improvement or Modification
1	36.51	Calcasieu	38.8	Non-forested Wetland	Off Gulf Intracoastal Waterway	Grading, add road base (Geotech lining and gravel), and construct pipe supports (dirt berms)
2	47.96	Calcasieu	9.2	Cropland and Pasture	Highway 27 and Burton Shipyard Road	Grading, add road base (Geotech lining and gravel), and construct pipe supports (dirt berms)
			19.9	Non-forested Wetland		
3	46.86	Calcasieu	14.5	Cropland and Pasture	Intersection of Highway 27 and Highway 108	Grading, add road base (Geotech lining and gravel), and construct pipe supports (dirt berms)
4	64.55	Calcasieu	14.6	Cropland and Pasture	Southeast corner of the intersection of Highway 397 and Highway 14	Grading, add road base (Geotech lining and gravel), and construct pipe supports (dirt berms)
			4.0	Non-forested Wetland		
5	64.87	Calcasieu	38.8	Cropland and Pasture	Northwest corner of the intersection of Highway 397 and Highway 14	Grading, add road base (Geotech lining and gravel), and construct pipe supports (dirt berms)
6	78.85	Jefferson Davis	38.8	Herbaceous Rangeland	Intersection of Highway 101 and I-10 frontage road	Grading, add road base (Geotech lining and gravel), and construct pipe supports (dirt berms)
7	85.89	Jefferson Davis	29.8	Cropland and Pasture	Intersection of Highway 99 and Cormier Village Road	Grading, add road base (Geotech lining and gravel), and construct pipe supports (dirt berms)

TABLE C-3

Land Requirements for Pipe Storage and Contractor Yards

Yard No.	Approx. Milepost	Parish	Land Affected During Construction (acres)	Current Land Use	Location	Proposed Improvement or Modification
8	96.46	Jefferson Davis	20.9	Cropland and Pasture	Northeast corner of the intersection of Highway 26 and Lantz Road	Grading, add road base (Geotech lining and gravel), and construct pipe supports (dirt berms)
9	96.52	Jefferson Davis	32.1	Cropland and Pasture	Southeast corner of the intersection of Highway 26 and Highway 102	Grading, add road base (Geotech lining and gravel), and construct pipe supports (dirt berms)
10	112.79	Evangeline	35.8	Cropland and Pasture	Morning Glory Road	Grading, add road base (Geotech lining and gravel), and construct pipe supports (dirt berms)
11	115.30	Evangeline	62.5	Cropland and Pasture	North side of Highway 190 on west side of Eunice	Grading, add road base (Geotech lining and gravel), and construct pipe supports (dirt berms)
12	120.79	Evangeline	18.6	Cropland and Pasture	Corner of Highway 13 and Highway 374	Grading, add road base (Geotech lining and gravel), and construct pipe supports (dirt berms)
			0.4	Other Agricultural Land		
Total			**378.7**			

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APPENDIX D

LOCATIONS OF REQUESTED ALTERNATIVE MEASURES

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TABLE D-1 Pipeline Segments with a Temporary ROW Width of 125 Feet			
Milepost		**Parish**	**Upland or Wetland Area**
Begin	**End**		
1.01	1.12	Cameron	Upland
1.12	1.15	Cameron	Wetland
1.15	1.36	Cameron	Upland
1.36	1.42	Cameron	Wetland
1.42	1.47	Cameron	Upland
1.47	1.48	Cameron	Wetland
1.48	1.51	Cameron	Upland
20.04	20.21	Cameron	Upland
20.21	20.23	Cameron	Wetland
20.23	20.30	Cameron	Upland
20.30	20.31	Cameron	Wetland
20.31	20.38	Cameron	Upland
20.38	20.39	Cameron	Wetland
20.39	20.57	Cameron	Upland
20.57	20.65	Cameron	Wetland
20.65	20.77	Cameron	Upland
20.77	20.78	Cameron	Wetland
20.78	20.80	Cameron	Upland
20.80	20.81	Cameron	Wetland
20.81	20.84	Cameron	Upland
20.84	20.87	Cameron	Wetland
20.87	20.91	Cameron	Upland
20.91	20.97	Cameron	Wetland

TABLE D-1 Pipeline Segments with a Temporary ROW Width of 125 Feet			
Milepost		Parish	Upland or Wetland Area
Begin	End		
20.97	20.99	Cameron	Upland
20.99	21.04	Cameron	Wetland
21.04	21.07	Cameron	Upland
21.07	21.10	Cameron	Wetland
21.10	21.12	Cameron	Upland
21.12	21.14	Cameron	Wetland
23.96	23.97	Cameron	Upland
23.97	24.02	Cameron	Wetland
24.02	24.06	Cameron	Upland
24.06	24.08	Cameron	Wetland
24.08	24.14	Cameron	Upland
24.14	24.25	Cameron	Wetland
24.25	24.28	Cameron	Upland
24.28	24.56	Cameron	Wetland
24.56	24.63	Cameron	Upland
24.63	24.87	Calcasieu	Wetland
24.87	24.89	Calcasieu	Upland
24.89	25.23	Calcasieu	Wetland
26.83	27.03	Calcasieu	Upland
27.03	27.42	Calcasieu	Wetland
27.42	27.55	Calcasieu	Upland
27.55	27.83	Calcasieu	Wetland
27.83	27.84	Calcasieu	Upland

TABLE D-1 Pipeline Segments with a Temporary ROW Width of 125 Feet			
Milepost		**Parish**	**Upland or Wetland Area**
Begin	**End**		
27.84	27.85	Calcasieu	Wetland
27.85	27.88	Calcasieu	Upland
27.88	28.31	Calcasieu	Wetland
28.31	28.32	Calcasieu	Upland
28.32	30.04	Calcasieu	Wetland
30.04	30.09	Calcasieu	Upland
30.09	30.33	Calcasieu	Wetland
35.15	35.64	Calcasieu	Wetland
35.64	35.72	Calcasieu	Upland
35.72	35.74	Calcasieu	Wetland
35.74	35.88	Calcasieu	Upland
35.88	35.89	Calcasieu	Wetland
35.89	35.91	Calcasieu	Upland
35.91	35.92	Calcasieu	Wetland
35.92	35.94	Calcasieu	Upland
35.94	35.99	Calcasieu	Wetland
35.99	36.57	Calcasieu	Upland
36.57	36.59	Calcasieu	Wetland
36.59	36.70	Calcasieu	Upland
36.70	36.71	Calcasieu	Wetland
36.71	36.87	Calcasieu	Upland
36.87	36.88	Calcasieu	Wetland
36.88	36.89	Calcasieu	Upland

TABLE D-1 Pipeline Segments with a Temporary ROW Width of 125 Feet			
Milepost		**Parish**	**Upland or Wetland Area**
Begin	**End**		
36.89	36.94	Calcasieu	Wetland
36.94	37.12	Calcasieu	Upland
37.12	37.17	Calcasieu	Wetland
37.17	37.29	Calcasieu	Upland
37.29	37.32	Calcasieu	Wetland
37.32	37.33	Calcasieu	Upland
37.33	37.34	Calcasieu	Wetland
37.34	37.36	Calcasieu	Upland
37.36	37.37	Calcasieu	Wetland
37.37	37.43	Calcasieu	Upland
37.43	37.44	Calcasieu	Wetland
37.44	37.49	Calcasieu	Upland
37.49	37.50	Calcasieu	Wetland
37.50	37.51	Calcasieu	Upland
37.51	37.56	Calcasieu	Wetland
37.56	37.57	Calcasieu	Upland
37.57	37.58	Calcasieu	Wetland
37.58	37.61	Calcasieu	Upland
37.61	37.62	Calcasieu	Wetland
37.62	37.63	Calcasieu	Upland
37.63	37.88	Calcasieu	Wetland
37.88	37.89	Calcasieu	Upland

TABLE D-1 Pipeline Segments with a Temporary ROW Width of 125 Feet			
Milepost		Parish	Upland or Wetland Area
Begin	End		
37.89	37.96	Calcasieu	Wetland
37.96	37.97	Calcasieu	Upland
37.97	38.23	Calcasieu	Wetland
38.34	38.35	Calcasieu	Wetland
38.35	38.40	Calcasieu	Upland
38.40	38.44	Calcasieu	Wetland
38.44	38.45	Calcasieu	Upland
38.45	38.46	Calcasieu	Wetland
38.46	38.47	Calcasieu	Upland
38.48	38.51	Calcasieu	Wetland
38.51	38.54	Calcasieu	Upland
38.54	38.56	Calcasieu	Wetland
38.56	38.57	Calcasieu	Upland
38.57	38.61	Calcasieu	Wetland
38.61	38.66	Calcasieu	Upland
38.66	38.69	Calcasieu	Wetland
38.69	38.70	Calcasieu	Upland
38.70	38.73	Calcasieu	Wetland
38.73	38.74	Calcasieu	Upland
38.74	38.78	Calcasieu	Wetland
38.78	38.79	Calcasieu	Upland
38.79	38.83	Calcasieu	Wetland
38.83	38.84	Calcasieu	Upland

TABLE D-1 Pipeline Segments with a Temporary ROW Width of 125 Feet			
Milepost		**Parish**	**Upland or Wetland Area**
Begin	**End**		
38.84	38.89	Calcasieu	Wetland
38.89	38.90	Calcasieu	Upland
38.90	38.92	Calcasieu	Wetland
38.92	38.94	Calcasieu	Upland
38.94	39.06	Calcasieu	Wetland
39.06	39.10	Calcasieu	Upland
39.10	39.20	Calcasieu	Wetland
39.20	39.45	Calcasieu	Upland
39.45	39.46	Calcasieu	Wetland
39.46	39.65	Calcasieu	Upland
39.65	39.66	Calcasieu	Wetland
39.66	39.67	Calcasieu	Upland
39.67	39.80	Calcasieu	Wetland
39.80	40.12	Calcasieu	Upland
40.12	40.17	Calcasieu	Wetland
40.17	40.19	Calcasieu	Upland
40.19	40.24	Calcasieu	Wetland
40.24	40.25	Calcasieu	Upland
40.25	40.29	Calcasieu	Wetland
40.29	42.74	Calcasieu	Upland
42.74	42.76	Calcasieu	Wetland
42.76	43.00	Calcasieu	Upland

TABLE D-1 Pipeline Segments with a Temporary ROW Width of 125 Feet			
Milepost		**Parish**	**Upland or Wetland Area**
Begin	**End**		
43.00	43.10	Calcasieu	Wetland
43.10	43.42	Calcasieu	Upland
43.42	43.43	Calcasieu	Wetland
43.43	43.66	Calcasieu	Upland
44.54	44.57	Calcasieu	Upland
44.57	44.96	Calcasieu	Wetland
44.96	45.36	Calcasieu	Upland
45.36	45.86	Calcasieu	Wetland
45.86	45.87	Calcasieu	Upland
45.87	45.88	Calcasieu	Wetland
45.88	46.05	Calcasieu	Upland
46.05	46.68	Calcasieu	Wetland
46.68	46.69	Calcasieu	Upland
46.69	46.96	Calcasieu	Wetland
46.96	46.97	Calcasieu	Upland
46.97	47.01	Calcasieu	Wetland
47.01	47.02	Calcasieu	Upland
47.02	47.38	Calcasieu	Wetland
47.38	47.48	Calcasieu	Upland
47.48	47.51	Calcasieu	Wetland
47.51	47.54	Calcasieu	Upland
47.54	47.75	Calcasieu	Wetland
47.75	47.76	Calcasieu	Upland

TABLE D-1 Pipeline Segments with a Temporary ROW Width of 125 Feet			
Milepost		**Parish**	**Upland or Wetland Area**
Begin	**End**		
47.76	48.06	Calcasieu	Wetland
48.06	48.14	Calcasieu	Upland
48.14	48.23	Calcasieu	Wetland
48.23	48.35	Calcasieu	Upland
48.35	48.46	Calcasieu	Wetland
48.46	48.63	Calcasieu	Upland
48.63	48.66	Calcasieu	Wetland
48.66	48.71	Calcasieu	Upland
48.71	48.90	Calcasieu	Wetland
48.90	49.12	Calcasieu	Upland
49.12	49.13	Calcasieu	Wetland
49.13	49.33	Calcasieu	Upland
49.33	49.34	Calcasieu	Wetland
49.34	49.40	Calcasieu	Upland
49.40	49.42	Calcasieu	Wetland
49.42	49.53	Calcasieu	Upland
51.33	51.74	Calcasieu	Upland
53.08	53.53	Calcasieu	Upland
53.53	53.60	Calcasieu	Wetland
53.60	53.91	Calcasieu	Upland
53.91	54.02	Calcasieu	Wetland
54.02	54.91	Calcasieu	Upland
54.91	55.03	Calcasieu	Wetland

TABLE D-1 Pipeline Segments with a Temporary ROW Width of 125 Feet			
Milepost		Parish	Upland or Wetland Area
Begin	End		
55.03	55.15	Calcasieu	Upland
55.15	55.18	Calcasieu	Wetland
55.18	55.79	Calcasieu	Upland
55.79	55.80	Calcasieu	Wetland
55.80	55.96	Calcasieu	Upland
56.00	56.54	Calcasieu	Upland
56.54	56.55	Calcasieu	Wetland
56.55	57.15	Calcasieu	Upland
57.15	57.23	Calcasieu	Wetland
57.23	57.73	Calcasieu	Upland
57.73	57.92	Calcasieu	Wetland
57.92	58.57	Calcasieu	Upland
58.57	58.59	Calcasieu	Wetland
58.59	59.65	Calcasieu	Upland
59.65	60.02	Calcasieu	Wetland
60.02	60.06	Calcasieu	Upland
60.06	60.21	Calcasieu	Wetland
60.21	60.98	Calcasieu	Upland
60.98	61.26	Calcasieu	Wetland
61.26	62.65	Calcasieu	Upland
62.65	63.02	Calcasieu	Wetland
63.02	63.04	Calcasieu	Upland
63.04	63.23	Calcasieu	Wetland

TABLE D-1 Pipeline Segments with a Temporary ROW Width of 125 Feet			
Milepost		Parish	Upland or Wetland Area
Begin	End		
63.23	66.32	Calcasieu	Upland
66.32	66.68	Calcasieu	Wetland
66.68	66.69	Calcasieu	Upland
66.69	66.91	Calcasieu	Wetland
66.91	66.95	Calcasieu	Upland
66.95	67.36	Calcasieu	Wetland
67.36	67.37	Calcasieu	Upland
67.37	67.62	Calcasieu	Wetland
67.62	67.69	Calcasieu	Upland
67.69	67.82	Calcasieu	Wetland
67.82	68.33	Calcasieu	Upland
68.33	68.34	Calcasieu	Wetland
68.34	68.91	Calcasieu	Upland
68.91	68.98	Calcasieu	Wetland
68.98	69.03	Calcasieu	Upland
69.03	69.06	Calcasieu	Wetland
69.06	69.91	Calcasieu	Upland
69.91	69.93	Calcasieu	Wetland
69.93	70.69	Calcasieu	Upland
70.69	70.85	Calcasieu	Wetland
70.85	71.60	Calcasieu	Upland
71.60	71.66	Calcasieu	Wetland
71.66	71.82	Calcasieu	Upland

TABLE D-1 Pipeline Segments with a Temporary ROW Width of 125 Feet			
Milepost		Parish	Upland or Wetland Area
Begin	End		
71.82	72.16	Calcasieu	Wetland
72.16	72.19	Calcasieu	Upland
72.19	72.71	Calcasieu	Wetland
72.71	72.73	Calcasieu	Upland
72.73	72.86	Calcasieu	Wetland
72.86	72.92	Calcasieu	Upland
72.92	73.02	Calcasieu	Wetland
73.02	73.06	Calcasieu	Upland
73.06	73.26	Calcasieu	Wetland
73.26	73.28	Calcasieu	Upland
73.28	73.29	Calcasieu	Wetland
73.29	73.30	Calcasieu	Upland
73.30	73.79	Calcasieu	Wetland
73.79	73.81	Calcasieu	Upland
73.81	73.84	Calcasieu	Wetland
73.84	74.89	Calcasieu	Upland
74.89	74.99	Jefferson Davis	Wetland
74.99	75.00	Jefferson Davis	Upland
75.00	75.02	Jefferson Davis	Wetland
75.02	75.06	Jefferson Davis	Upland
75.06	75.28	Jefferson Davis	Wetland
75.28	76.84	Jefferson Davis	Upland
76.84	76.85	Jefferson Davis	Wetland

TABLE D-1 Pipeline Segments with a Temporary ROW Width of 125 Feet			
Milepost		**Parish**	**Upland or Wetland Area**
Begin	**End**		
76.85	77.00	Jefferson Davis	Upland
77.00	77.26	Jefferson Davis	Wetland
77.26	77.61	Jefferson Davis	Upland
78.43	78.94	Jefferson Davis	Upland
78.94	78.99	Jefferson Davis	Wetland
78.99	79.97	Jefferson Davis	Upland
79.97	79.98	Jefferson Davis	Wetland
79.98	82.34	Jefferson Davis	Upland
82.34	82.98	Jefferson Davis	Wetland
82.98	83.38	Jefferson Davis	Upland
83.38	84.22	Jefferson Davis	Wetland
84.22	84.24	Jefferson Davis	Upland
84.24	84.33	Jefferson Davis	Wetland
84.33	84.34	Jefferson Davis	Upland
84.34	84.43	Jefferson Davis	Wetland
84.43	87.41	Jefferson Davis	Upland
87.41	87.68	Jefferson Davis	Wetland
87.68	89.20	Jefferson Davis	Upland
89.20	89.40	Jefferson Davis	Wetland
89.40	92.20	Jefferson Davis	Upland
92.20	92.25	Jefferson Davis	Wetland
92.25	97.44	Jefferson Davis	Upland
97.44	97.48	Jefferson Davis	Wetland

TABLE D-1 Pipeline Segments with a Temporary ROW Width of 125 Feet			
Milepost		Parish	Upland or Wetland Area
Begin	End		
97.48	97.52	Jefferson Davis	Upland
97.52	98.42	Jefferson Davis	Upland
98.42	98.56	Jefferson Davis	Wetland
98.56	98.57	Jefferson Davis	Upland
98.57	98.98	Jefferson Davis	Upland
99.81	103.44	Acadia	Upland
103.44	103.51	Acadia	Wetland
103.51	107.27	Acadia	Upland
107.27	107.29	Acadia	Wetland
107.29	107.92	Acadia	Upland
107.92	107.94	Acadia	Wetland
107.94	108.71	Acadia	Upland
108.71	108.72	Acadia	Wetland
108.72	109.14	Acadia	Upland
109.14	109.25	Acadia	Wetland
109.25	109.26	Acadia	Upland
109.26	109.33	Acadia	Wetland
109.33	110.65	Acadia	Upland
110.65	110.68	Acadia	Wetland
110.68	113.52	Acadia and Evangeline	Upland
113.52	113.54	Evangeline	Wetland
113.54	113.60	Evangeline	Upland
113.60	113.61	Evangeline	Wetland

TABLE D-1 Pipeline Segments with a Temporary ROW Width of 125 Feet			
Milepost		Parish	Upland or Wetland Area
Begin	End		
113.61	114.90	Evangeline	Upland
114.90	114.92	Evangeline	Wetland
114.92	115.06	Evangeline	Upland
115.06	115.22	Evangeline	Wetland
115.22	117.84	Evangeline	Upland
117.84	117.85	Evangeline	Wetland
117.85	117.93	Evangeline	Upland
117.93	117.95	Evangeline	Wetland
117.95	117.98	Evangeline	Upland
117.98	117.99	Evangeline	Wetland
117.99	118.69	Evangeline	Upland
118.69	118.84	Evangeline	Wetland
118.84	118.85	Evangeline	Upland
118.85	118.86	Evangeline	Wetland
118.86	119.00	Evangeline	Upland
119.00	119.01	Evangeline	Wetland
119.01	122.10	Evangeline	Upland
122.16	123.40	Evangeline	Upland
123.40	123.41	Evangeline	Wetland
123.41	124.56	Evangeline	Upland
124.56	124.59	Evangeline	Wetland
124.59	129.12	Evangeline	Upland
129.12	129.14	Evangeline	Wetland

TABLE D-1 Pipeline Segments with a Temporary ROW Width of 125 Feet			
Milepost		**Parish**	**Upland or Wetland Area**
Begin	**End**		
129.14	129.61	Evangeline	Upland
129.67	132.15	Evangeline	Upland

TABLE D-2 Wetlands Affected by Aboveground Facilities						
Facility	**Approx. MP**	**Facility Size (acres)**	**Permanent Impacts**			
			Cowardin Class	**Habitat description**	**NRCS Class[1]**	**Size (acres)**
Leg 1 and Leg 2						
Southwest Loop Delivery Point	28.24	0.9	PEM1C	Herbaceous Wetland	N	0.3
			PSS1C	Scrub Shrub Wetland	N	0.6
TGTPL Interconnect Site	87.48	1.0	PEM1C	Herbaceous Wetland	PC	1.0
NGPL Interconnect	1.23	0.8	E2EM1P5	Herbaceous Wetland	N	0.8
FGT Lateral						
The FGT Interconnect on proposed FGT Lateral will not affect any Wetlands						

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands

EWS ID	Parish	Milepost		EWS Purpose	Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures
		Begin	End		
Leg 1 and Leg 2					
637	Cameron	0.00	0.02	Staging Area, Tie-In & Fabrication Area	EWS is needed for installation of launchers and mainline valves; the location of the beginning of the 42" and 36" pipelines is defined relative to the Sabine Pas LNG Terminal. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.
638	Cameron	0.01	0.04	Fabrication Area & P.I.	EWS is needed to support work in EWS 637 and to facilitate installation of 42" and 36" PIs.
639	Cameron	0.09	0.12	Waterbody Crossing	EWS is needed to support installation of 36" canal crossing. EWS located to achieve 50' setback from waterbody, but only by location of EWS in wetland area. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
640	Cameron	0.09	0.12	Waterbody Crossing	EWS is needed to support installation of 42" canal crossing. EWS located to achieve 50' setback from waterbody, but only by location of EWS in wetland area. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.
641	Cameron	0.21	0.24	Waterbody Crossing & P.I.	EWS is needed to facilitate installation of 42" and 36" PIs and to support installation of 42" and 36" canal crossings. EWS located to achieve 50' setback from waterbody, but only by location of EWS within 50' of wetland area. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.
642	Cameron	0.27	0.29	Waterbody Crossing	EWS is needed to support installation of or 42" and 36" canal crossings. EWS located to achieve 50' setback from waterbody, but only by location of EWS partially in wetland area. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
643	Cameron	0.52	0.60	Fabrication Area, Access & P.I.	EWS is needed to facilitate installation of 42" PI. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal; location of EWS within wetland area cannot be reasonably avoided. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.
644	Cameron	0.54	0.57	Fabrication Area & P.I.	EWS is needed to facilitate installation of 36" PI. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal; location of EWS within wetland area cannot be reasonably avoided. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.
645	Cameron	0.85	0.95	Foreign Line Crossing, Crossover & P.I.	EWS is needed to support installation of 36" PI and crossover of existing foreign lines. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal; location of EWS within wetland area cannot be reasonably avoided. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.
647	Cameron	0.95	1.02	Fabrication Area, P.I. & Crossover	EWS is needed to support installation of 36" PI and crossover of existing foreign lines. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal; location of EWS partially within wetland area cannot be reasonably avoided. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
648	Cameron	1.00	1.07	Road Crossing & Foreign Line Crossing	EWS is needed to support installation of 36" crossing of an existing road and an existing foreign line. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal; location of EWS within wetland area cannot be reasonably avoided. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.
649	Cameron	1.07	1.15	Road Crossing, Fabrication Area, Access & P.I.	EWS is needed to support installation of 36" PI, crossing of an existing road and approach to NGPL Interconnect. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal; location of EWS partially within wetland area cannot be reasonably avoided at this complex location. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.
650	Cameron	1.16	1.27	Fabrication Area, Foreign Line Crossing, P.I. & Road Crossing	EWS is needed to support installation of 42" PI and crossing of an existing road site. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal; location of EWS partially within wetland area cannot be reasonably avoided at this location. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
651	Cameron	1.23	1.31	Road Crossing, Staging Area & Fabrication Area	EWS is needed to support installation of 42" crossing of an existing road site and installation of NGPL Interconnect. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal; location of EWS partially within wetland area cannot be reasonably avoided at this location. The configuration of the terminal site in large part defines the layout of the pipeline corridor and aboveground facilities in the plant site.
652	Cameron	1.34	1.44	Road Crossing, Foreign Line Crossing, Access & Fabrication Area	EWS is needed to support installation of 42" at foreign line crossings and a crossing of existing plant roads. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal; location of EWS within wetland area cannot be reasonably avoided at this location. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.
653	Cameron	1.37	1.42	Road Crossing & Foreign Line Crossing	EWS is needed to support installation of 42" at foreign line crossings and a crossing of existing plant roads. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal; location of EWS partially within wetland area cannot be reasonably avoided at this location. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
655	Cameron	1.44	1.51	Road Crossing & Fabrication Area	EWS is needed to support installation of 42” at an existing plant road and the Hwy. 82 crossing. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal; location of EWS partially within wetland area cannot be reasonably avoided at this location. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.
654	Cameron	1.46	1.50	Road Crossing	EWS is needed to support installation of 42” at an existing plant road and the Hwy. 82 crossing. Wetlands and waterbodies dominate the area of the Sabine Pass LNG Terminal; location of EWS within wetland area cannot be reasonably avoided at this location. The configuration of the terminal site in large part defines the layout of the pipeline corridor in the plant site.
25 HDD	Cameron	3.89	3.94	HDD Site - Entry Hole	EWS is needed to support 42” HDD installation at shoreline of Sabine Lake. HDD entry EWS cannot avoid wetlands or at this location; wetlands and waterbodies dominate the area in the vicinity of Sabine Lake. The reduction in shoreline impacts provided by HDD installation easily offsets the EWS location in this previously disturbed wetland.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
24 HDD	Cameron	4.82	4.87	HDD Site - Exit Hole	EWS is needed to support 42" HDD installation exit location and must be located in Sabine Lake. The reduction in shoreline impacts provided by HDD installation easily offsets dredging and other temporary HDD-related impacts in the lake.
537	Cameron	5.54	5.81	Pull String	EWS is needed for fabrication of the 42" HDD pullback string and must be located in Sabine Lake. The reduction in shoreline impacts provided by HDD installation easily offsets the EWS location in the lake; pullback string fabrication will have few impacts on lake bottom or water quality.
536	Cameron	17.15	17.89	Pull String	EWS is needed for fabrication of the 42" HDD pullback string and must be located in Sabine Lake. The reduction in shoreline impacts provided by HDD installation easily offsets the EWS location in the lake; pullback string fabrication will have few impacts on lake bottom or water quality.
23 HDD	Cameron	17.86	17.97	HDD Site - Exit Hole	EWS is needed to support 42" HDD installation exit for shoreline crossing and to facilitate tie-in of lake and HDD segments. EWS must be located in Sabine Lake. The reduction in shoreline impacts provided by HDD installation easily offsets dredging and other temporary HDD-related impacts in the lake.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
670	Orange County	17.92	18.18	Fabricate Pull String	EWS is needed for fabrication of the 42" HDD pullback strings and must be located in Sabine Lake. The reduction in shoreline impacts provided by HDD installation easily offsets the EWS location in the lake; pullback string fabrication will have few impacts on lake bottom or water quality.
535	Orange County	18.09	18.56	Pull String	EWS is needed for fabrication and line-up of the 42" HDD pullback string and must be located in Sabine Lake. The reduction in shoreline/bank impacts provided by HDD installations easily offsets the EWS location in the lake; pullback string fabrication will have few impacts on lake bottom or water quality.
535	Cameron	18.51	18.57	Pull String	EWS is needed for fabrication and line-up of the 42" HDD pullback string and must be located in the Sabine River. The reduction in shoreline/bank impacts provided by HDD installations easily offsets the EWS location in the river; pullback string fabrication will have few impacts on river banks, bottom, or water quality.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
22 HDD	Cameron	18.55	18.66	HDD Site - Entry & Exit Hole	EWS supporting 42" HDD installation entry and exit points in Sabine River avoids impacts to shorelines and adjacent wetlands; the reduction in shoreline and wetland impacts provided by HDD installations easily offsets dredging and other temporary HDD-related impacts in the river. Further, the EWS area has been subject to previous disturbance by dredging operations for the GIWW. Wetlands and waterbodies dominate the area in the vicinity of the Sabine Lake and the Sabine River.
21 HDD	Cameron	19.36	19.50	HDD Site - Entry Holes	EWS supporting 42" HDD installation entry points in Sabine River avoids impacts to shorelines and adjacent wetlands; the reduction in shoreline and wetland impacts provided by HDD installations easily offsets dredging and other temporary HDD-related impacts in the river.
20 HDD	Cameron	20.00	20.04	HDD Site - Exit Hole	EWS supporting 42" HDD exit located in upland adjacent to Sabine River. To facilitate line-up of pullback string, 50' setback from waterbody is not practical. Further, access to HDD exit EWS must be supported by barge. The reduction in shoreline impacts provided by HDD installation easily offsets dredging and other temporary HDD-related impacts in the river bottom. Barge support of construction operations on the bank of the Sabine River greatly reduces impacts by eliminating the need for temporary access road construction.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
534	Cameron	20.00	20.04	HDD & Work Corridor Access	EWS is needed to provide access to 42" HDD exit located in EWS 20 HDD. Further, access to HDD exit EWS and adjacent onshore construction corridor supported by barge from the Sabine River greatly reduces construction impacts by eliminating the need for temporary access road construction.
557	Cameron	20.04	20.98	Pull String	EWS is needed for fabrication and line-up of the 42" HDD pullback strings and must be located in the Sabine River. The reduction in bank impacts provided by HDD installations easily offsets the EWS location in the river; pullback string fabrication will have few impacts on river banks, bottom or water quality.
531	Cameron	20.90	21.04	Pull String Access	EWS is needed to access HDD pullback string in EWS 557and must be located in wetlands adjacent to Sabine River; 50' setback from waterbodies and wetlands is not possible at this location. HDD installation will greatly reduce impacts to riverbank immediately east of this location.
532	Cameron	21.02	21.07	P.I.	EWS is needed to facilitate installation of PI at bend in the riverbank and cannot fully avoid wetlands adjacent to Sabine River. PI will also provide correct alignment for HDD exit in EWS 19 HDD.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands

EWS ID	Parish	Milepost		EWS Purpose	Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures
		Begin	End		
19 HDD	Cameron	21.14	21.19	HDD Site - Exit Hole	EWS supporting 42” HDD exit partially located in upland adjacent to Sabine River. To facilitate line-up of pullback string, 50’ setback from waterbody is not practical. Further, access to HDD exit EWS must be supported by barge from EWS 574.
574	Cameron	21.14	21.19	HDD & Work Corridor Access	EWS is needed to provide access to 42” HDD exit located in EWS 19 HDD. Further, access to HDD exit EWS and adjacent onshore construction corridor supported by barge from the Sabine River greatly reduces construction impacts by eliminating the need for temporary access road construction.
577	Cameron	21.68	22.11	Pull String	EWS is needed for fabrication of 42” HDD pullback string and must align with HDD exit in EWS 18 HDD. Due to alignment at bend in the river the EWS cannot avoid wetlands south of the river. The reduction in bank impacts provided by HDD installations easily offsets the temporary impacts of EWS on emergent wetlands.
575	Cameron	22.05	22.17	HDD & Work Corridor Access	EWS in the Sabine River is needed to provide access to 42” HDD entry and exit located in EWS 18 HDD. Further, access to HDD entry/exit EWS by barge from the Sabine River greatly reduces construction impacts by eliminating the need for temporary access road construction.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
576	Cameron	22.08	22.14	Access	EWS on the bank of the Sabine River is needed to connect EWS 575 with EWS 18 HDD. The access EWS cannot avoid wetlands on the river bank, however, access to HDD entry/exit EWS by barge from the Sabine River greatly offsets wetland impacts by reducing overall construction impacts by eliminating the need for temporary access road construction.
18 HDD	Cameron	22.08	22.14	HDD Site – Entry/Exit Holes	EWS supporting 42" HDD exit partially located in upland adjacent to Sabine River. Access to HDD EWS must be supported by barge from EWS 575 and 576.
26 HDD	Cameron	22.69	22.74	HDD Site - Entry Holes	EWS supporting 42" HDD exit partially located in upland adjacent to Sabine River. Access to HDD EWS must be supported by barge from EWS 578.
578	Cameron	22.69	22.74	HDD & Work Corridor Access	EWS in and on the bank of the Sabine River is needed to support EWS 26 HDD. The river access EWS cannot avoid wetlands on the river bank, however, access to HDD entry EWS by barge from the Sabine River greatly offsets wetland impacts by reducing overall construction impacts by eliminating the need for temporary access road construction.
27 HDD	Cameron	23.43	23.49	HDD Site - Exit & Entry Hole	EWS supporting 42" HDD entry and exit located in upland adjacent to Sabine River. Access to HDD EWS must be supported by barge from EWS 579.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	Parish	Milepost		EWS Purpose	Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures
		Begin	End		
579	Cameron	23.44	23.48	HDD & Work Corridor Access	EWS in and on the bank of the Sabine River is needed to support EWS 27 HDD. The river access EWS avoids wetlands on the river bank, but cannot be setback 50' from the waterbody. However, access to HDD entry EWS by barge from the Sabine River greatly offsets waterbody and wetland impacts by eliminating the need for temporary access road construction.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
580	Cameron	23.48	23.56	Pull String Access	EWS is needed to access HDD pullback string from EWS 582 and is located in upland adjacent to Sabine River; 50' setback from the river is not practical since the purpose of this EWS is to access floated pullback string.
581	Cameron	23.82	23.86	Access	EWS is needed to provide access to 42" HDD exit located in EWS 28 HDD. Further, access to HDD exit EWS and adjacent onshore construction corridor supported by barge from the Sabine River and the Burton Shell Slip greatly reduces construction impacts by eliminating the need for temporary access road construction.
582	Cameron	23.86	24.48	Pull String	EWS is needed for fabrication of the 42" HDD pullback string and must be located in the Sabine River. The reduction in bank impacts provided by HDD installations easily offsets the EWS location in the river; pullback string fabrication will have few impacts on river banks, bottom or water quality. (Continues into Calcasieu Parish.)

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
28 HDD	Cameron	23.91	23.96	HDD Site - Exit Hole	EWS supporting 42" HDD exit partially located in upland adjacent to Sabine River and Burton Shell Canal. Access to HDD EWS must be supported by barge from EWS 581.
530	Cameron	24.21	24.26	Foreign Line Crossing	EWS needed to support 42" installation at foreign line crossing located in wetland area adjacent to Sabine River; no other location of EWS is practical considering the proximity of multiple foreign lines.
582	Calcasieu	24.47	24.59	Pull String	(Continuation of EWS from Cameron Parish.) EWS is needed for fabrication of the 42" HDD pullback string and must be located in the Sabine River. The reduction in bank impacts provided by HDD installations easily offsets the EWS location in the river; pullback string fabrication will have few impacts on river banks, bottom, or water quality.
529	Cameron	24.57	24.62	P.I.	EWS is needed to facilitate installation of PI at bend in the riverbank and cannot fully avoid wetlands adjacent to Sabine River/GIWW; no other location of EWS is practical considering the proximity of multiple foreign lines.
29 HDD	Calcasieu	25.22	25.28	HDD Site - Exit Hole	EWS supporting 42" HDD exit partially located in upland adjacent to Sabine River/GIWW. Access to HDD EWS must be supported by barge from EWS 583.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
583	Calcasieu	25.80	25.86	HDD Access & Loading Area	EWS in the GIWW is needed to provide access to 42" HDD exit located in EWS 29 HDD and HDD entries in EWS 30 HDD. Access to HDD entries/exits EWS by barge from the GIWW greatly reduces construction impacts by eliminating the need for temporary access road construction.
584	Calcasieu	25.80	25.83	Access & Loading Area	EWS on the bank of the GIWW is needed to support EWS 29 HDD and EWS 30 HDD by providing access to EWS 583 in the GIWW. The GIWW access to EWS avoids wetlands on the GIWW bank, but cannot be setback 50' from the waterbody. However, access to HDD EWS by barge from the GIWW greatly offsets waterbody and wetland impacts by eliminating the need for temporary access road construction.
30 HDD	Calcasieu	26.00	26.05	HDD Site - Entry Holes	EWS supporting 42" HDD entries is located in upland adjacent to GIWW. Access to HDD EWS must be supported by barge from EWS 583.
31 HDD	Calcasieu	26.78	26.83	HDD Site - Exit Hole	EWS supporting 42" HDD exit is located in upland adjacent to GIWW. Access to HDD EWS must be supported by barge from EWS 585 and EWS 586.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	Parish	Milepost		EWS Purpose	Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures
		Begin	End		
585	Calcasieu	27.58	27.64	Access & Loading Area	EWS in the GIWW is needed to provide access to 42" HDD exit located in EWS 30 HDD. Access to HDD exit EWS and onshore construction corridor by barge from the GIWW greatly reduces construction impacts by eliminating the need for temporary access road construction.
586	Calcasieu	27.58	27.60	Access & Loading Area	EWS on the bank of the GIWW is needed to support EWS 31 HDD and onshore construction corridor by providing access to EWS 585 in the GIWW. The GIWW access to EWS avoids wetlands on the river bank, but cannot be setback 50' from the waterbody. However, access to HDD EWS and onshore construction corridor by barge from the GIWW greatly offsets waterbody and wetland impacts by eliminating the need for temporary access road construction.
587	Calcasieu	27.81	27.86	Foreign Line Crossing	EWS needed to support 42" installation at foreign line crossing partially located in wetland areas; no other location of EWS is practical considering the surrounding wetland areas and proximity of multiple foreign lines and electric transmission lines.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
588	Calcasieu	28.26	28.33	Foreign Line Crossing	EWS needed to support installation of the Southwest Loop Interconnect and the 42" foreign line crossing partially located in wetland areas; no other location of EWS is practical considering the surrounding wetland areas and proximity of multiple foreign lines and electric transmission lines.
523	Cameron, Calcasieu	29.46	29.90	Pull String	EWS is needed for fabrication of the 42" HDD pullback string for GIWW and Black Bay Cutoff crossings. Fabrication EWS must be located in wetland and shallow waterbody to provide proper alignment for pullback. The reduction in impacts to the channel and banks of the GIWW and the Black Bay Cutoff provided by HDD installation easily offsets the temporary wetland impacts of the fabrication EWS.
16 HDD	Calcasieu	30.32	30.38	HDD Site - Exit Hole	EWS supporting 42" HDD exit is located in wetland adjacent to GIWW. Access to HDD EWS must be supported by barge from EWS 585 and EWS 586.
522	Calcasieu	31.37	31.43	Work Corridor Access	EWS in the GIWW is needed to provide access to 42" HDD entries located in EWS 15 HDD. Access to HDD entries EWS by barge from the GIWW greatly reduces construction impacts by eliminating the need for temporary access road construction.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	Parish	Milepost		EWS Purpose	Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures
		Begin	End		
521	Calcasieu	31.39	31.42	Loading & Unloading Area	EWS on the bank of the GIWW is needed to support EWS 15 HDD by providing access to EWS 522 in the GIWW. The GIWW access to EWS cannot avoid wetlands adjacent to the GIWW bank, and cannot be setback 50' from the waterbody. However, access to HDD EWS by barge from the GIWW greatly offsets waterbody and wetland impacts by eliminating the need for temporary access road construction.
15 HDD	Calcasieu	31.43	31.50	HDD Site - Entry Holes	EWS supporting 42" HDD entries is located in wetland adjacent to GIWW. Access to HDD EWS must be supported by barge from EWS 521 and EWS 522. No other location of the EWS is practical considering the surrounding wetland areas and proximity of multiple foreign lines and electric transmission lines.
13 HDD	Calcasieu	32.41	32.46	HDD Site - Exit Hole	EWS supporting 42" HDD exit is located in wetland adjacent to GIWW. Access to HDD EWS must be supported by barge from EWS 517 and EWS 518. No other location of the EWS is practical considering the surrounding wetland areas and proximity of multiple foreign lines and electric transmission lines.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
518	Calcasieu	32.43	32.50	Work Corridor Access	EWS in the GIWW is needed to provide access to 42" HDD exit located in EWS 13 HDD and onshore construction corridor. Access to HDD EWS and onshore construction corridor by barge from the GIWW greatly reduces construction impacts by eliminating the need for temporary access road construction.
517	Calcasieu	32.45	32.49	Loading & Unloading Area	EWS on the bank of the GIWW is needed to support EWS 13 HDD and onshore construction corridor by providing access to EWS 518 in the GIWW. The GIWW access to EWS avoids wetlands on the river bank, but cannot be setback 50' from the waterbody. However, access to HDD EWS and onshore construction corridor by barge from the GIWW greatly offsets waterbody and wetland impacts by eliminating the need for temporary access road construction.
514	Calcasieu	35.15	35.19	Fabrication Area, Access & P.I.	EWS needed to support 42" installation at ditch crossing and PIs; EWS must be located in wetland areas; no other location of EWS is practical considering the surrounding wetland areas and proximity of foreign line and electric transmission lines.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
511	Calcasieu	36.50	36.60	Waterbody Crossing, Road Crossing, Foreign Line Crossing, Fabrication Area & Access	EWS needed to support 42" installation at road, ditch, and foreign line crossings; EWS must be partially located in wetland areas; no other location of EWS is practical considering the close proximity of the road, waterbody, foreign line, and parallel foreign line.
510	Calcasieu	37.29	37.36	Waterbody Crossing & Access	EWS needed to support 42" installation at ditch and foreign line crossings; EWS is located within 50' of the waterbody and wetland areas; however, no other location for the EWS is practical considering the close proximity the waterbody, foreign line, parallel foreign line, and other wetland areas.
509	Calcasieu	37.84	37.87	Waterbody Crossing	EWS needed to support 42" installation at canal crossings; EWS is setback 50' of the waterbody but is located in wetland area; however, no other location for the EWS is practical considering the proximity of other wetland areas.
508	Calcasieu	37.89	37.98	Road Crossing, Waterbody Crossing, Fabrication Area, Access & Truck Turnaround	EWS needed to support 42" installation at canal and road crossings and truck turnaround; EWS is located in wetland area; however, no other location for the EWS is practical considering the proximity of other wetland areas.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
507	Calcasieu	37.98	38.01	Waterbody Crossing & Road Crossing	EWS needed to support 42” installation at road and ditch crossing; EWS is setback 50’ from the waterbody but is located in wetland area; however, no other location for the EWS is practical considering the proximity of other wetland areas.
506	Calcasieu	38.11	38.23	Drag Section	EWS needed to support fabrication of 42” drag section for installation in reduced ROW adjacent to occupied structure. EWS is setback from structures, but is located in wetland area; however, no other location for the EWS is practical considering the proximity of other wetland areas.
505	Calcasieu	38.34	38.40	Waterbody Crossing, Road Crossing & Access	EWS needed to support 42” installation at road and ditch crossing; EWS is located within 50’ of wetland and ditch; however, no other location for the EWS is practical considering the proximity of other wetland areas.
503	Calcasieu	38.86	38.90	Waterbody Crossing	EWS needed to support 42” installation at ditch crossing; EWS is located within 50’ of ditch and in wetland area; however, no other location for the EWS is practical considering the proximity of other wetland areas.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
504	Calcasieu	38.94	38.96	Waterbody Crossing	EWS needed to support 42" installation at ditch crossing; EWS is located within 50' of ditch and in wetland area; however, no other location for the EWS is practical considering the proximity of other wetland areas.
502	Calcasieu	39.06	39.14	Waterbody Crossing, Road Crossing & Access	EWS needed to support 42" installation at road and ditch crossing; EWS is located within 50' of wetland and ditch; however, no other location for the EWS is practical considering the proximity of other wetland areas.
501	Calcasieu	39.44	39.46	Waterbody Crossing	EWS needed to support 42" installation at ditch crossing; EWS is located within 50' of wetland and ditch; however, no other location for the EWS is practical considering the characteristics of the waterbody and the proximity of other wetland areas.
500	Calcasieu	39.47	39.49	Waterbody Crossing	EWS needed to support 42" installation at ditch crossing; EWS is located within 50' of wetland and ditch; however, no other location for the EWS is practical considering the characteristics of the waterbody and the proximity of other wetland areas.
589	Calcasieu	39.82	40.04	Crossing Section & Access	EWS needed for fabrication of pipe section for crossings of multiple foreign lines and two irrigation canals. No other location for the EWS is practical considering the alignment for the complex traverse.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
499	Calcasieu	39.90	39.98	Access & Waterbody Crossing	EWS needed to support 42" installation at ditch and road crossing; EWS is located within 50' of the ditch; however, no other location for the EWS is practical considering the characteristics of the waterbody and the proximity of other wetland areas.
593	Calcasieu	40.29	40.33	Waterbody Crossing, Truck Turnaround & Foreign Line Crossing	EWS needed to support 42" installation at crossings of multiple foreign lines and two irrigation canals; EWS is located within 50' wetland area; however, no other location for the EWS is practical considering length and complexity of the traverse.
590	Calcasieu	40.29	40.35	Foreign Line Crossing & P.I.	EWS needed to support 42" installation at crossings of multiple foreign lines and two irrigation canals; EWS is located within 50' wetland area; however, no other location for the EWS is practical considering length and complexity of the traverse.
490	Calcasieu	41.47	41.49	Waterbody Crossing	EWS needed to support 42" installation at ditch crossing; EWS is located within 50' of the ditch; however, no other location for the EWS is practical considering the characteristics of the waterbody and the proximity of other wetland areas.
488	Calcasieu	42.45	42.47	Waterbody Crossing	EWS needed to support 42" installation at ditch crossing; EWS is located within 50' of the ditch; however, no other location for the EWS is practical considering the characteristics of the waterbody.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
487	Calcasieu	42.48	42.50	Waterbody Crossing	EWS needed to support 42" installation at ditch crossing; EWS is located within 50' of the ditch; however, no other location for the EWS is practical considering the characteristics of the waterbody.
659	Calcasieu	42.72	42.76	Waterbody Crossing	EWS needed to support 42" installation at ditch crossing; EWS is setback 50' from the ditch, but is located in a wetland area; however, no other location for the EWS is practical considering the characteristics of the waterbody and other proximity of other wetlands.
597	Calcasieu	43.13	43.67	Pull String	EWS is needed for fabrication of the 42" HDD pullback string for Bayou Choupique crossing. Fabrication EWS is located in non-wetland area (upland or converted farmland) but will cross one or more irrigation canals. The fabrication EWS provides proper alignment for pullback through HDD exit in EWS 11 HDD. The pull string EWS may cross one or more irrigation canals or drainage ditches. The reduction in impacts to the channel and wetlands associated with Bayou Choupique provided by HDD installation easily offsets the temporary impacts of the fabrication EWS.
662	Calcasieu	43.22	43.25	Waterbody Crossing	EWS needed to support 42" installation at ditch crossing; EWS is located within 50' of the ditch; however, no other location for the EWS is practical considering the characteristics of the waterbody.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
11 HDD	Calcasieu	43.65	43.72	HDD Site - Exit Hole	EWS supporting 42” HDD exit is located in non-wetland area (upland or prior-converted cropland, included for reference only, no alternative measure requested). Pull string fabrication in EWS 597.
32 HDD	Calcasieu	44.45	44.51	HDD Site - Entry Hole	EWS supporting 42” HDD entry is located in non-wetland area (upland or prior-converted cropland, included for reference only, no alternative measure requested). Pull string fabrication in EWS 597.
476	Calcasieu	45.52	45.53	Waterbody Crossing	EWS needed to support 42” installation at waterbody crossing. EWS is setback 50’ from waterbody, but is located within 50’ of wetland area; however, no other location for the EWS is practical considering the characteristics of the waterbody and adjacent wetlands.
475	Calcasieu	45.52	45.54	Waterbody Crossing	EWS needed to support 42” installation at waterbody crossing. EWS is setback 50’ from waterbody, but is located within 50’ of wetland area; however, no other location for the EWS is practical considering the characteristics of the waterbody and adjacent wetlands.
473	Calcasieu	45.56	45.58	Waterbody Crossing	EWS needed to support 42” installation at waterbody crossing. EWS is setback 50’ from waterbody, but is located in wetland area; however, no other location for the EWS is practical considering the characteristics of the waterbody and proximity of adjacent wetlands.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
474	Calcasieu	45.56	45.58	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is located in wetland area; however, no other location for the EWS is practical considering the characteristics of the waterbody and proximity of adjacent wetlands.
471	Calcasieu	45.76	45.79	Waterbody Crossing & P.I.	EWS needed to support 42" installation at waterbody crossing and PI. EWS is not setback 50' from waterbody, and is located in wetland area; however, no other location for the EWS is practical considering the characteristics of the waterbody and proximity of adjacent wetlands.
472	Calcasieu	45.76	45.80	Waterbody Crossing, Fabrication Area, Truck Turnaround & P.I.	EWS needed to support 42" installation at waterbody crossing, PI and truck turning. EWS is not setback 50' from waterbody, and is located in wetland area; however, no other location for the EWS is practical considering the characteristics of the waterbody and proximity of adjacent wetlands.
470	Calcasieu	45.87	45.90	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is located within 50' of wetland adjacent to the waterbody. Setback from the waterbody is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
469	Calcasieu	45.88	45.93	Waterbody Crossing & Truck Turnaround	EWS needed to support 42" installation at waterbody crossing and to allow truck turning. EWS is setback 50' from waterbody, but is located within 50' of wetland adjacent to the waterbody. Setback from the waterbody is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.
467	Calcasieu	46.19	46.26	Access	EWS needed for truck access to ROW; EWS is partially located in wetland area. No other location for the EWS is practical considering the proximity and characteristics of adjacent wetlands in the vicinity of the access road.
464	Calcasieu	46.69	46.71	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is located in wetland area; however, no other location for the EWS is practical considering the characteristics of the waterbody and proximity of adjacent wetlands.
463	Calcasieu	46.70	46.73	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is located in wetland area; however, no other location for the EWS is practical considering the characteristics of the waterbody and proximity of adjacent wetlands.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	Parish	Milepost		EWS Purpose	Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures
		Begin	End		
460	Calcasieu	46.93	46.98	Waterbody Crossing, Access & Staging Area	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is located in wetland area; however, no other location for the EWS is practical considering the proximity of adjacent wetlands.
462	Calcasieu	46.94	46.96	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is located in wetland area; however, no other location for the EWS is practical considering the proximity of adjacent wetlands.
459	Calcasieu	46.96	47.01	Waterbody Crossing & Access	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is located in wetland area; however, no other location for the EWS is practical considering the proximity of adjacent wetlands and the location of the access road and waterbody.
461	Calcasieu	46.97	47.00	Waterbody Crossing & Access	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is located in wetland area; however, no other location for the EWS is practical considering the proximity of adjacent wetlands and the location of the access road and waterbody.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	Parish	Milepost		EWS Purpose	Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures
		Begin	End		
457	Calcasieu	47.33	47.35	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is partially located in wetland area; however, no other location for the EWS is practical considering the proximity of adjacent wetlands.
456	Calcasieu	47.33	47.35	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is partially located in wetland area; however, no other location for the EWS is practical considering the proximity of adjacent wetlands.
454	Calcasieu	47.37	47.39	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is located within 50' of wetland adjacent to the waterbody. Setback from the waterbody is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.
455	Calcasieu	47.37	47.39	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is located within 50' of wetland adjacent to the waterbody. Setback from the waterbody is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands

EWS ID	Parish	Milepost		EWS Purpose	Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures
		Begin	End		
450	Calcasieu	47.76	47.87	Road Crossing, Fabrication Area & P.I.	EWS needed to support 42" installation at Hwy 27 crossing and PI. EWS is located in wetland area; however, no other location for the EWS is practical considering the proximity of adjacent wetlands.
451	Calcasieu	47.77	47.87	Road Crossing & P.I.	EWS needed to support 42" installation at Hwy 27 crossing and PI. EWS is located in wetland area; however, no other location for the EWS is practical considering the proximity of adjacent wetlands.
447	Calcasieu	48.42	48.49	P.I.	EWS needed to support PI. EWS is located within 50' of in wetland area; however, the location of the PI and EWS is determined by residential, waterbody, and wetland features in the vicinity.
446	Calcasieu	48.46	48.50	P.I.	EWS needed to support PI. EWS is located within 50' of wetland area; however, the location of the PI and EWS is determined by residential, waterbody, and wetland features in the vicinity.
10 HDD	Calcasieu	49.52	49.58	HDD Site - Exit Hole	EWS supporting 42" HDD exit is located in upland area adjacent to Calcasieu River (included for reference only, no alternative measure requested). Pullback is to EWS 9 HDD. Pull string fabrication in construction corridor.
444	Calcasieu	49.69	49.72	Equipment Area	EWS is need for equipment staging associated with pull string fabrication in EWS 443.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
443	Calcasieu	49.71	50.44	Pull String	EWS is needed for fabrication of the 42" HDD pullback string for Calcasieu River/ LNG Channel crossings. Pullback will be to EWS 8 HDD. Fabrication EWS must be located in wetlands and dredged material disposal areas adjacent to the Calcasieu River to provide proper alignment for pullback. The reduction in impacts to the channel and banks of the river and LNG Terminal channel provided by HDD installation easily offsets the temporary wetland impacts of the fabrication EWS.
9 HDD	Calcasieu	50.42	50.5	HDD Site - Entry & Exit Hole	EWS supporting 42" HDD entry and exit is located in wetland adjacent to Calcasieu River. The reduction in impacts to the channel and banks of the Calcasieu River and LNG Terminal channel provided by HDD installation easily offsets the temporary wetland impacts of HDD entry and exit construction activity. Access is from the north along dredge material disposal area.
441	Calcasieu	51.19	51.28	Pull String	EWS is needed for fabrication of the 42" HDD pullback string. Pullback will be to EWS 6 HDD. EWS 441 located entirely in upland area (included for information only, no alternative measure requested). HDD will eliminate wetland impacts between EWS 7 HDD and EWS 6 HSS along Henry Puglt Blvd.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
8 HDD	Calcasieu	51.28	51.33	HDD Site - Entry Hole	EWS supporting 42” HDD entry is located in upland area on west side of Calcasieu River. Access by Henry Puglet Blvd (included for information only, no alternative measure requested).
7 HDD	Calcasieu	51.74	51.79	HDD Site - Exit Hole	EWS supporting 42” HDD exit is located in upland area on west side of Calcasieu River. Access by Henry Puglet Blvd (included for information only, no alternative measure requested).
6 HDD	Calcasieu	52.35	52.41	HDD Site - Entry Holes	EWS supporting 42” HDD entries is partially located in wetland adjacent to Calcasieu River. The reduction in impacts to wetlands provided by HDD installation easily offsets the temporary wetland impacts of HDD entry construction activity. Access is from the west on Hwy 384.
5 HDD	Calcasieu	53.04	53.08	HDD Site - Exit Hole	EWS supporting 42” HDD exit is located adjacent to wetland area on construction corridor. Access to the EWS 5 HDD from Joel LeDoux Road will be matted as need to prevent impacts to wetland area. The reduction in impacts to wetlands provided by HDD installation easily offsets the temporary wetland impacts of access to EWS 5 HDD or from HDD exit construction activity. Pull string will be fabricated in construction corridor east of EWS 5 HDD.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
435	Calcasieu	53.53	53.56	Road Crossing	EWS needed to support 42" installation at road crossing. EWS is located in wetland area; however, no other location for the EWS is practical considering the proximity of adjacent wetlands.
432	Calcasieu	53.96	53.98	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is located within wetland area. However, no other location for the EWS is practical considering the proximity of adjacent wetlands.
425	Calcasieu	55.04	55.08	Waterbody Crossing, Truck Turnaround & Fabrication Area	EWS needed to support 42" installation at waterbody crossing and for truck turning. EWS is setback 50' from waterbody, but is not setback 50' from wetland area. EWS is located as close as possible to waterbody crossing without entering wetland area. Relocating EWS to east would encroach on another adjacent wetland area.
426	Calcasieu	55.04	55.11	Waterbody Crossing & Truck Turnaround	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is not setback 50' from wetland area. EWS is located as close possible to waterbody crossing without entering wetland area. Relocating EWS to east would encroach on another adjacent wetland area.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
419	Calcasieu	55.81	55.83	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is not set back 50' from wetland adjacent to the waterbody. Setback from the waterbody is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.
412	Calcasieu	56.67	56.70	Road Crossing, Staging Area & Fabrication Area	EWS needed to support Hwy 385 crossing must be close to the highway. The small wetland inclusion is probably associated with the highway drainage ditch and would be isolated from the EWS by vegetated strip or silt fence.
409	Calcasieu	57.66	57.70	Road Crossing	EWS needed to support 42" installation at Lincoln Road crossing. EWS is located partially in wetland area; however, no other location for the EWS is practical considering the proximity of adjacent wetlands.
408	Calcasieu	57.85	57.92	Road Crossing & Fabrication Area	EWS needed to support 42" installation at Great House Road crossing. EWS is located partially in wetland area; however, no other location for the EWS is practical considering the proximity of adjacent wetlands.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
401	Calcasieu	59.66	59.73	Fabrication Area, Spread Flop & Foreign Line Crossing	EWS needed to support construction parallel to channelized Black Bayou, PI, foreign line crossing, and change in working side (spread flop). EWS is not setback 50' from waterbody, but standard erosion and sedimentation features will isolate construction corridor from the waterbody. Temporary impacts of pipeline construction will likely be less than those associated with cultivation at this location.
62	Calcasieu	60.97	60.99	Road Crossing, Fabrication Area & P.I.	EWS needed to support road crossing construction, foreign line crossing, and PI. EWS is located in previously cultivated wetland area. Relocation of the EWS is not practical since the construction corridor is designed to parallel existing features such roads, canals, pipelines, etc. Temporary impacts of pipeline construction will likely be less than those associated with previous cultivation at this location.
361	Calcasieu	66.67	66.69	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is not set back 50' from wetland adjacent to the waterbody. Setback from the waterbody is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands

EWS ID	Parish	Milepost		EWS Purpose	Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures
		Begin	End		
360	Calcasieu	66.70	66.72	Waterbody Crossing	EWS needed to support 42” installation at waterbody crossing. EWS is setback 50’ from waterbody, but is not set back 50’ from wetland adjacent to the waterbody. Setback from the waterbody is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.
315	Calcasieu	67.03	67.09	Railroad Crossing, Waterbody Crossing & Truck Turnaround	EWS needed to support 42” installation at waterbody crossing, adjacent to railroad and to provide truck turning. EWS is located in wetland area; however, no other location for the EWS is practical considering the proximity of adjacent wetlands.
316	Calcasieu	67.09	67.15	Waterbody Crossing & Fabrication Area	EWS needed to support 42” installation at waterbody crossing. EWS is setback 50’ from waterbody, but is not set back 50’ from wetland adjacent to the waterbody; however, no other location for the EWS is practical considering the proximity of adjacent wetlands.
317	Calcasieu	67.17	67.19	Waterbody Crossing	EWS needed to support 42” installation at waterbody crossing. EWS is setback 50’ from waterbody, but is not set back 50’ from wetland adjacent to the waterbody; however, no other location for the EWS is practical considering the proximity of adjacent wetlands.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
318	Calcasieu	67.26	67.28	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is not set back 50' from wetland adjacent to the waterbody; however, no other location for the EWS is practical considering the proximity of adjacent wetlands.
319	Calcasieu	67.29	67.37	Waterbody Crossing & Access	EWS needed to support 42" installation at waterbody crossing. EWS is setback 50' from waterbody, but is not set back 50' from wetland adjacent to the waterbody; however, no other location for the EWS is practical considering the proximity of adjacent wetlands.
322	Calcasieu	67.62	67.65	Road Crossing	EWS needed to support 42" installation at road crossing. EWS is not set back 50' from fallow agricultural wetland located adjacent to road; however, no other location for the EWS is practical considering the proximity of adjacent wetlands.
325	Calcasieu	68.30	68.33	Road Crossing & Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is not set back 50' from waterbody and wetland located adjacent to waterbody; however, no other location for the EWS is practical considering the characteristics of the waterbody and adjacent wetlands.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
326	Calcasieu	68.34	68.35	Road Crossing & Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is not set back 50' from waterbody and wetland located adjacent to waterbody; however, no other location for the EWS is practical considering the characteristics of the waterbody and adjacent wetlands.
330	Calcasieu	68.97	69.07	Waterbody Crossing, Fabrication Area & Truck Turnaround	EWS needed to support 42" installation at waterbody crossing and to provide truck turning. EWS is set back 50' from waterbody but is partially located in a wetland area; however, no other location for the EWS is practical considering the characteristics and proximity of adjacent wetlands.
338	Calcasieu	69.83	69.90	Waterbody Crossing, Fabrication Area, Foreign Line Crossing & Truck Turnaround	EWS needed to support 42" installation at waterbody and foreign line crossing and to provide truck turning. EWS is not set back 50' from waterbody and wetland located adjacent to waterbody; however, no other location for the EWS is practical considering location of the foreign line and the characteristics of the waterbody and adjacent wetlands.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
342	Calcasieu	70.63	70.68	Waterbody Crossing, Fabrication Area & Access	EWS needed to support 42” installation at waterbody crossing. EWS is not set back 50’ from waterbody; however, no other location for the EWS is practical considering characteristics of the waterbody and need for field road access located adjacent to waterbody.
343	Calcasieu	70.72	70.74	Waterbody Crossing	EWS needed to support 42” installation at waterbody crossing. EWS is setback 50’ from waterbody, but is located in fallow agricultural wetland adjacent to waterbody; however, no other location for the EWS is practical considering the proximity of adjacent fallow agricultural wetlands.
350	Calcasieu	72.87	72.98	Road Crossing, Waterbody Crossing & Fabrication Area	EWS needed to support 42” installation at road and waterbody crossing. EWS is setback 50’ from waterbody, but is located in fallow agricultural wetland adjacent to road; however, no other location for the EWS is practical considering the proximity of adjacent fallow agricultural wetlands.
261	Calcasieu	73.77	73.80	Road Crossing	EWS needed to support 42” installation at road crossing. EWS is located in fallow agricultural wetland adjacent to road; however, no other location for the EWS is practical considering the proximity of adjacent fallow agricultural wetlands.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
262	Calcasieu	73.82	73.88	Road Crossing & Fabrication Area	EWS needed to support installation of 42" MLV and crossing of Thompson Road is not setback 50' from wetland area. Installation is located in fallow agricultural wetland; however, no other location for the EWS is practical considering the proximity of adjacent fallow agricultural wetlands and the need to locate MLV adjacent to road access point.
265	Jefferson Davis	74.92	74.97	Railroad Crossing, Waterbody Crossing, Fabrication Area & P.I.	EWS needed to support 42" installation at railroad (inactive) and waterbody crossings. EWS is not set back 50' from waterbodies and wetlands located adjacent to waterbodies; however, no other location for the EWS is practical considering location of the railroad and the location and characteristics of the waterbodies and adjacent wetlands.
2 HDD	Jefferson Davis	98.98	99.03	HDD Site - Exit Hole	EWS supporting 42" HDD exit for Bayou Nezpique crossing is located in non-wetland area (upland or prior-converted cropland, included for reference only, no alternative measure requested). Pull string fabrication in construction corridor.
1 HDD	Acadia	99.76	99.81	HDD Site – Entry Hole	EWS supporting 42" HDD entry for Bayou Nezpique crossing is located in non-wetland area (upland or prior-converted cropland, included for reference only, no alternative measure requested).

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
35	Acadia	100.72	100.74	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is not setback 50' from waterbody. However, considering the characteristics of the waterbody, setback from the waterbody is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.
36	Acadia	100.72	100.74	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is not setback 50' from waterbody. However, considering the characteristics of the waterbody, setback from the waterbody is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.
34	Acadia	100.75	100.77	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is not setback 50' from waterbody. However, considering the characteristics of the waterbody, setback from the waterbody is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	Parish	Milepost		EWS Purpose	Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures
		Begin	End		
226	Acadia	104.29	104.32	Waterbody Crossing	EWS needed to support 42” installation at waterbody crossing. EWS is not setback 50’ from waterbody. However, considering the characteristics of the waterbody, setback from the waterbody is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.
229	Acadia	104.70	104.72	Waterbody Crossing	EWS needed to support 42” installation at waterbody crossing. EWS is not setback 50’ from waterbody. However, considering the characteristics of the waterbody, setback from the waterbody is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.
230	Acadia	104.73	104.75	Waterbody Crossing	EWS needed to support 42” installation at waterbody crossing. EWS is not setback 50’ from waterbody. However, considering the characteristics of the waterbody, setback from the waterbody is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
53	Evangeline	113.41	113.61	Railroad Crossing & Foreign Line Crossing	EWS needed to support 42” installation at foreign line crossing. EWS is not setback 50’ from isolated wetland on foreign line ROW and adjacent to railroad. However, considering the characteristics of the isolated wetlands, relocation of the EWS (and the proposed pipeline) is not practical since it would result in increased clearing in forested area.
120	Evangeline	118.82	118.84	Waterbody Crossing	EWS needed to support 42” installation at waterbody crossing. EWS is not set back 50’ from waterbody and wetland located adjacent to waterbody; however, no other location for the EWS is practical considering proximity of other adjacent wetland and forested areas. EWS location is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.
119	Evangeline	118.85	118.87	Waterbody Crossing	EWS needed to support 42” installation at waterbody crossing. EWS is not set back 50’ from waterbody and wetland located adjacent to waterbody; however, no other location for the EWS is practical considering proximity of other adjacent wetland and forested areas. EWS location is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.

Table D-3 Rationale for Extra Workspaces Within 50 feet of Waterbodies and Wetlands					
EWS ID	**Parish**	**Milepost**		**EWS Purpose**	**Rationale for Alternative Measures from Wetland and Waterbody Construction and Mitigation Procedures**
		Begin	**End**		
124	Evangeline	121.83	121.85	Waterbody Crossing	EWS needed to support 42" installation at waterbody crossing. EWS is not setback 50' from waterbody. However, considering the characteristics of the waterbody, setback from the waterbody is sufficient to provide protection while minimizing distance for soil/spoil transfer and storage; this will expedite installation of the crossing segment.
FGT Lateral					
-	Acadia	1.18	1.26	Waterbody Crossing, Fabrication Area & Access	EWS needed to support 24" installation at Bayou des Cannes crossing. EWS is partially located in wetland area; however, EWS is set back from riparian forested areas. No other location for the EWS is practical considering location of an existing access road to the EWS.

APPENDIX E

PIPELINE CONSTRUCTION METHODS BY MILEPOST

Pipeline Construction Methods by Milepost

The anticipated primary construction methods that will be used along the KMLP Project are listed by milepost in the following tables (minor construction methods, such as road, railroad, and pipeline crossings are not listed). The construction method numbers used in the table correspond to the construction method descriptions as follows:

- Typical Submerged Marsh (Push-Pull);
- Typical HDD Waterbody Crossing;
- Typical Inland Open Water <8' Depth;
- Saturated Wetland Crossing without Topsoil Segregation;
- Typical Cross Section with 42" Pipe Adjacent to Foreign Pipeline without Topsoil Segregation;
- Upland without Topsoil Segregation;
- Typical Cross Section with 24" Pipe Adjacent to Foreign Pipeline without Topsoil Segregation;
- Unsaturated Wetland Crossing with Topsoil Segregation;
- 42" Typical Cross Section with Full Width Topsoil Segregation;
- Typical Cross Section with 42" Pipe Adjacent to Foreign Pipe with Ditch Plus Spoil Side Topsoil Segregation;
- 42" & 36" Typical Cross Section without Topsoil Segregation;
- 36" Typical Cross Section without Topsoil Segregation; and
- Inland Open Water ≥8' Depth.

TABLE E-1 Pipeline Construction Method by Milepost			
Milepost		Primary Construction Method Description	Figure Number
Begin	End		
0.00	0.92	42” & 36” Typical Cross Section without Topsoil Segregation (LNG Terminal)	2.3.1.1-6
0.92	1.51	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
1.51	3.93	Typical Submerged Marsh (Push-Pull)	2.3.1.2-5
3.93	4.83	Typical HDD Waterbody Crossing	2.3.1.3-1
4.83	9.93	Typical Inland Open Water <8’ Depth	2.3.1.3-4
9.93	11.94	Typical Inland Open Water ≥8’ Depth	2.3.1.3-5
11.94	12.21	Typical Inland Open Water <8’ Depth	2.3.1.3-4
12.21	13.50	Typical Inland Open Water ≥8’ Depth	2.3.1.3-5
13.50	13.82	Typical Inland Open Water <8’ Depth	2.3.1.3-4
13.82	14.23	Typical Inland Open Water ≥8’ Depth	2.3.1.3-5
14.23	17.96	Typical Inland Open Water <8’ Depth	2.3.1.3-4
17.96	18.62	Typical HDD Waterbody Crossing	2.3.1.3-1
18.62	19.41	Typical HDD Waterbody Crossing	2.3.1.3-1
19.41	20.01	Typical HDD Waterbody Crossing	2.3.1.3-1
20.01	20.57	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
20.57	21.17	Saturated Wetland Crossing without Topsoil Segregation	2.3.1.2-3 and 2.3.1.2-4
21.17	22.11	Typical HDD Waterbody Crossing	2.3.1.3-1
22.11	22.71	Typical HDD Waterbody Crossing	2.3.1.3-1
22.71	23.45	Typical HDD Waterbody Crossing	2.3.1.3-1
23.45	23.95	Typical HDD Waterbody Crossing	2.3.1.3-1

TABLE E-1 Pipeline Construction Method by Milepost			
Milepost		Primary Construction Method Description	Figure Number
Begin	End		
23.95	25.26	Saturated Wetland Crossing without Topsoil Segregation	2.3.1.2-3 and 2.3.1.2-4
25.26	26.03	Typical HDD Waterbody Crossing	2.3.1.3-1
26.03	26.80	Typical HDD Waterbody Crossing	2.3.1.3-1
26.80	30.36	Saturated Wetland Crossing without Topsoil Segregation	2.3.1.2-3 and 2.3.1.2-4
30.36	31.46	Typical HDD Waterbody Crossing	2.3.1.3-1
31.46	32.42	Typical HDD Waterbody Crossing	2.3.1.3-1
32.42	35.15	Typical Submerged Marsh (Push-Pull)	2.3.1.2-5
35.15	35.64	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
35.64	37.40	Typical Cross Section with 42” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
37.40	38.59	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
38.59	37.24	Typical Cross Section with 42” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
37.24	39.10	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
39.10	40.29	Typical Cross Section with 42” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
40.29	42.50	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
42.50	42.72	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
42.72	43.36	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2

TABLE E-1 Pipeline Construction Method by Milepost			
Milepost		Primary Construction Method Description	Figure Number
Begin	End		
43.36	43.44	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
43.44	43.69	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
43.69	44.48	Typical HDD Waterbody Crossing	2.3.1.3-1
44.48	44.82	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
44.82	45.00	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
45.00	45.55	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
45.55	46.23	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
46.23	46.70	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
46.70	47.00	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
47.00	47.76	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
47.76	48.04	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
48.04	48.70	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
48.70	49.15	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
49.15	49.57	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
49.57	50.45	Typical HDD Waterbody Crossing	2.3.1.3-1
50.45	51.30	Typical HDD Waterbody Crossing	2.3.1.3-1
51.30	51.78	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2

TABLE E-1 Pipeline Construction Method by Milepost			
Milepost		Primary Construction Method Description	Figure Number
Begin	End		
51.78	52.37	Typical HDD Waterbody Crossing	2.3.1.3-1
52.37	53.05	Typical HDD Waterbody Crossing	2.3.1.3-1
53.05	53.52	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
53.52	53.60	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
53.60	53.90	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
53.90	54.02	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
54.02	54.91	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
54.91	55.03	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
55.03	56.06	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
56.06	57.64	Typical Cross Section with 42” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
57.64	57.94	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
57.94	59.73	Typical Cross Section with 42” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
59.73	61.00	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
61.00	62.70	Typical Cross Section with 42” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
62.70	66.27	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2

TABLE E-1 Pipeline Construction Method by Milepost			
Milepost		Primary Construction Method Description	Figure Number
Begin	End		
66.27	66.95	Typical Cross Section with 42” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
66.95	67.37	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
65.37	72.91	Typical Cross Section with 42” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
72.91	73.85	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
73.85	76.20	Typical Cross Section with 42” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
76.20	76.98	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
76.98	77.65	Typical Cross Section with 42” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
77.65	78.40	Typical HDD Waterbody Crossing	2.3.1.3-1
78.40	88.61	Typical Cross Section with 42” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
88.61	89.08	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
89.08	89.20	Typical Cross Section with 42” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
89.20	89.40	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
89.40	89.58	Typical Cross Section with 42” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
89.58	99.02	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2

TABLE E-1 Pipeline Construction Method by Milepost			
Milepost		Primary Construction Method Description	Figure Number
Begin	End		
99.02	99.76	Typical HDD Waterbody Crossing	2.3.1.3-1
99.76	101.52	42" Typical Cross Section without Topsoil Segregation	2.3.1.1-2
101.52	105.73	Typical Cross Section with 42" Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
105.73	106.97	42" Typical Cross Section without Topsoil Segregation	2.3.1.1-2
106.97	109.14	Typical Cross Section with 42" Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
109.14	109.36	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
109.36	101.14	Typical Cross Section with 42" Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
101.14	112.01	42" Typical Cross Section without Topsoil Segregation	2.3.1.1-2
112.01	112.42	Typical Cross Section with 42" Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
112.42	118.30	42" Typical Cross Section without Topsoil Segregation	2.3.1.1-2
118.30	118.68	Typical Cross Section with 42" Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
118.68	118.86	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
118.86	121.95	Typical Cross Section with 42" Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
121.95	122.06	42" Typical Cross Section without Topsoil Segregation	2.3.1.1-2

TABLE E-1 Pipeline Construction Method by Milepost			
Milepost		**Primary Construction Method Description**	**Figure Number**
Begin	**End**		
122.06	129.57	Typical Cross Section with 42” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
129.57	129.69	42” Typical Cross Section without Topsoil Segregation	2.3.1.1-2
129.69	129.80	Typical Inland Open Water ≥8’ Depth	2.3.1.3-5
129.80	132.16	Typical Cross Section with 42” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-3
0.00	0.92	42” & 36” Typical Cross Section without Topsoil Segregation (LNG Terminal)	2.3.1.1-6
0.92	1.22	36” Typical Cross Section without Topsoil Segregation (LNG Terminal)	2.3.1.1-7
0.00	0.77	Typical Cross Section with 24” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-8
0.77	1.57	Unsaturated Wetland Crossing with Topsoil Segregation	2.3.1.2-1 and 2.3.1.2-2
1.57	2.30	Typical Cross Section with 24” Pipe Adjacent to Foreign Pipeline without Topsoil Segregation	2.3.1.1-8

APPENDIX F

ROUTE VARIATION MAPS

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Non-Internet Public

DRAFT ENVIRONMENTAL IMPACT STATEMENT
KINDER MORGAN LOUISIANA PIPELINE PROJECT
Docket No. CP06-449-000

Pages F-1 to F-13
Maps

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APPENDIX G

WATERBODY CROSSINGS

TABLE G-1

Surface Waterbodies Crossed by the Kinder Morgan Louisiana Pipeline Project

Waterbody (WB)	Approx. MP	Waterbody Type[a]	Crossing Distance (Feet)	Water Quality/ Use[b]	Suspected Existing Impairment[c]	Significance to Fisheries/Potable Water Source[c,d]	Crossing Method
LEG 1 AND LEG 2							
Canal	0.08	I	12.3	n	No impairment reported	None	Open Cut
Waterbody	0.24	I	30.1	n	No impairment reported	None	Open Cut
Canal	1.73	P	24.6	n	No impairment reported	None	Open Cut
Canal	3.47	P	36.6	n	No impairment reported	None	Open Cut
Big Forge Bayou	3.99	P	77.9	n	No impairment reported	None	HDD
Sabine Lake[e]	11.07	P	71205.2	ABCE	No impairment reported	Commercial and recreational fisheries	HDD/Open Cut
Sabine River[e]	18.55	P	1074.2	ABC	No impairment reported	Recreational fishery	HDD/Open Cut
Sabine River[e]	19.54	P	3651.6	ABC	No impairment reported	Recreational fishery	HDD/Open Cut
Sabine River[e]	21.92	P	3165.1	ABC	No impairment reported	Recreational fishery	HDD
Sabine River[e]	22.49	P	333.4	ABC	No impairment reported	Recreational fishery	HDD
Canal	22.60	P	59.6	n	No impairment reported	None	HDD
Burton Shell Slip	23.83	P	99.7	ABC	No impairment reported	Recreational fishery	HDD
Canal	30.39	P	37.2	n	No impairment reported	None	HDD
Black Bay Cutoff[e]	30.61	P	167.2	ABC	No impairment reported	Recreational fishery	HDD
Intracoastal Waterway[e]	30.69	P	1729.4	ABC	No impairment reported	Recreational and commercial fisheries	HDD
Intracoastal Waterway	31.05	P	94.4	ABC	No impairment reported	Recreational and commercial fisheries	HDD
Vinton Drainage Canal[e]	32.21	P	242.1	ABC	Turbidity (5)	Recreational fishery	HDD
Waterbody	35.14	P	46.2	n	No impairment reported	None	Open Cut
Waterbody	35.70	P	24.4	n	No impairment reported	None	Open Cut
Waterbody	36.21	P	42.8	n	No impairment reported	None	Open Cut

TABLE G-1

Surface Waterbodies Crossed by the Kinder Morgan Louisiana Pipeline Project

Waterbody (WB)	Approx. MP	Waterbody Type[a]	Crossing Distance (Feet)	Water Quality/ Use[b]	Suspected Existing Impairment[c]	Significance to Fisheries/Potable Water Source[c,d]	Crossing Method
Canal	37.88	P	57.7	n	No impairment reported	None	Open Cut
Waterbody[f]	37.96	I	48.5	n	No impairment reported	None	Open Cut
Waterbody[f]	38.93	I	28.8	n	No impairment reported	None	Open Cut
Waterbody[f]	39.07	I	16.8	n	No impairment reported	None	Open Cut
Canal[f]	39.09	I	25.7	n	No impairment reported	None	Open Cut
Canal	40.17	P	37.9	n	No impairment reported	None	Open Cut
Canal	40.24	P	35.9	n	No impairment reported	None	Open Cut
Canal	41.46	P	33.2	n	No impairment reported	None	Open Cut
Canal	42.77	P	35.9	n	No impairment reported	None	Open Cut
Canal	43.21	P	42.2	n	No impairment reported	None	Open Cut
Bayou Choupique[e]	44.32	P	154.3	ABC	Dissolved Oxygen (4a)	Recreational fishery. Not supporting Fish and Wildlife Propagation use designation	HDD
Waterbody	45.55	P	20.9	n	No impairment reported	None	Open Cut
Waterbody	45.86	P	30.9	n	No impairment reported	None	Open Cut
Waterbody	46.68	P	29.9	n	No impairment reported	None	Open Cut
Waterbody	47.01	P	43.5	n	No impairment reported	None	Bore
Drain	47.36	I	22.9	n	No impairment reported	None	Open Cut
Waterbody[f]	47.75	I	19.1	n	No impairment reported	None	Bore
Waterbody[f]	47.76	I	16.7	n	No impairment reported	None	Bore
Canal[f]	48.11	I	19.0	n	No impairment reported	None	Open Cut
Waterbody[f]	48.26	I	17.4	n	No impairment reported	None	Open Cut
Waterbody[f]	48.32	I	10.5	n	No impairment reported	None	Bore

TABLE G-1

Surface Waterbodies Crossed by the Kinder Morgan Louisiana Pipeline Project

Waterbody (WB)	Approx. MP	Waterbody Type[a]	Crossing Distance (Feet)	Water Quality/ Use[b]	Suspected Existing Impairment[c]	Significance to Fisheries/Potable Water Source[c,d]	Crossing Method
Waterbody[f]	48.33	I	7.0	n	No impairment reported	None	Bore
Calcasieu River[e]	49.63	P	1099.8	ABCE	No impairment reported (USEPA [2004] listed the Calcasieu River as an area of probable concern regarding sediment contamination in 1997, but not in 2004 -- see Section 2.2.1.)	Recreational and commercial fisheries. Not supporting Fish and Wildlife Propagation use designation	HDD
Pond	49.89	P	92.4	n	No impairment reported	None	HDD
Canal	50.72	P	59.1	n	No impairment reported	None	HDD
Calcasieu Tributary[e]	50.84	P	1326.9	n	No impairment reported	None	HDD
Calcasieu Tributary (swamp)[e]	52.57	I	230.9	n	No impairment reported	None	HDD
Waterbody	53.02	P	17.6	n	No impairment reported	None	HDD
Waterbody	53.34	P	22.4	n	No impairment reported	None	Open Cut
Waterbody[f]	53.52	I	10.0	n	No impairment reported	None	Bore
Waterbody	53.60	P	25.4	n	No impairment reported	None	Open Cut
Waterbody	53.72	I	24.2	n	No impairment reported	None	Open Cut
Waterbody	54.02	P	47.1	n	No impairment reported	None	Open Cut
Waterbody[f]	54.53	I	11.2	n	No impairment reported	None	Bore
Waterbody[f]	54.54	I	12.3	n	No impairment reported	None	Bore
Coulee Hippolyte Trib.	54.94	P	37.7	n	No impairment reported	None	Open Cut
Waterbody[f]	55.54	I	11.2	n	No impairment reported	None	Bore
Waterbody[f]	55.54	I	16.5	n	No impairment reported	None	Bore
Coulee Hippolyte Trib.	55.77	P	29.0	n	No impairment reported	None	Open Cut
Coulee Hippolyte	56.26	P	84.0	n	No impairment reported	None	Open Cut

TABLE G-1

Surface Waterbodies Crossed by the Kinder Morgan Louisiana Pipeline Project

Waterbody (WB)	Approx. MP	Waterbody Type[a]	Crossing Distance (Feet)	Water Quality/ Use[b]	Suspected Existing Impairment[c]	Significance to Fisheries/Potable Water Source[c,d]	Crossing Method
Waterbody[f]	56.65	I	14.7	n	No impairment reported	None	Bore
Waterbody[f]	56.66	I	17.6	n	No impairment reported	None	Bore
Canal[f]	56.91	P	23.7	n	No impairment reported	None	Open Cut
Waterbody[f]	57.63	I	19.5	n	No impairment reported	None	Bore
Waterbody[f]	57.64	I	22.1	n	No impairment reported	None	Bore
Waterbody[f]	57.93	I	18.4	n	No impairment reported	None	Bore
Waterbody[f]	59.06	I	11.3	n	No impairment reported	None	Bore
Waterbody[f]	59.07	I	11.3	n	No impairment reported	None	Bore
Waterbody	59.56	P	21.9	n	No impairment reported	None	Open Cut
Black Bayou	60.03	P	49.9	n	No impairment reported	None	Open Cut
Waterbody[f]	60.05	I	22.4	n	No impairment reported	None	Open Cut
Waterbody[f]	60.22	I	9.6	n	No impairment reported	None	Bore
Waterbody[f]	60.22	I	10.9	n	No impairment reported	None	Bore
Waterbody	60.40	P	54.8	n	No impairment reported	None	Open Cut
Canal[f]	60.95	I	29.6	n	No impairment reported	None	Bore
Waterbody[f]	60.96	I	10.4	n	No impairment reported	None	Bore
Waterbody[f]	60.97	I	12.9	n	No impairment reported	None	Bore
Waterbody[f]	61.27	I	9.4	n	No impairment reported	None	Open Cut
Waterbody[f]	61.50	I	9.3	n	No impairment reported	None	Bore
Waterbody[f]	61.51	I	6.5	n	No impairment reported	None	Bore
Waterbody	61.96	P	54.2	n	No impairment reported	None	Open Cut
Waterbody	62.64	P	16.5	n	No impairment reported	None	Open Cut
Waterbody	63.02	P	36.3	n	No impairment reported	None	Open Cut

TABLE G-1

Surface Waterbodies Crossed by the Kinder Morgan Louisiana Pipeline Project

Waterbody (WB)	Approx. MP	Waterbody Type[a]	Crossing Distance (Feet)	Water Quality/ Use[b]	Suspected Existing Impairment[c]	Significance to Fisheries/Potable Water Source[c,d]	Crossing Method
Waterbody	63.24	P	44.1	n	No impairment reported	None	Open Cut
Waterbody	63.48	P	33.4	n	No impairment reported	None	Bore
Waterbody[f]	63.49	I	8.5	n	No impairment reported	None	Bore
Canal	64.26	P	98.7	n	No impairment reported	None	Open Cut
Waterbody	64.69	I	25.0	n	No impairment reported	None	Bore
Waterbody	64.71	P	12.6	n	No impairment reported	None	Bore
Waterbody	65.35	P	39.2	n	No impairment reported	None	Open Cut
Waterbody[f]	65.97	I	26.9	n	No impairment reported	None	Bore
Waterbody[f]	65.98	I	29.7	n	No impairment reported	None	Bore
Canal	66.00	P	34.1	n	No impairment reported	None	Bore
Waterbody[f]	66.31	I	20.9	n	No impairment reported	None	Bore
Waterbody[f]	66.93	I	6.5	n	No impairment reported	None	Bore
Waterbody[f]	66.95	I	11.1	n	No impairment reported	None	Bore
Waterbody[f]	67.64	I	33.7	n	No impairment reported	None	Bore
Waterbody[f]	67.66	I	25.8	n	No impairment reported	None	Bore
Waterbody	68.08	P	27.4	n	No impairment reported	None	Open Cut
Waterbody[f]	68.35	I	14.5	n	No impairment reported	None	Bore
Waterbody[f]	68.35	I	11.2	n	No impairment reported	None	Bore
Waterbody[f]	68.62	I	31.7	n	No impairment reported	None	Bore
Waterbody[f]	68.64	I	46.1	n	No impairment reported	None	Bore
Waterbody[f]	68.70	I	21.6	n	No impairment reported	None	Bore
Waterbody[f]	68.71	I	24.5	n	No impairment reported	None	Bore
Waterbody[f]	69.07	I	14.5	n	No impairment reported	None	Open Cut

TABLE G-1

Surface Waterbodies Crossed by the Kinder Morgan Louisiana Pipeline Project

Waterbody (WB)	Approx. MP	Waterbody Type[a]	Crossing Distance (Feet)	Water Quality/ Use[b]	Suspected Existing Impairment[c]	Significance to Fisheries/Potable Water Source[c,d]	Crossing Method
Waterbody[f]	69.08	I	47.5	n	No impairment reported	None	Open Cut
Waterbody	69.41	P	11.6	n	No impairment reported	None	Bore
Waterbody	69.41	P	14.0	n	No impairment reported	None	Bore
Waterbody	69.43	P	36.2	n	No impairment reported	None	Bore
West Fork English Bayou	70.30	P	40.3	n	No impairment reported	None	Open Cut
Waterbody	70.68	P	47.1	n	No impairment reported	None	Open Cut
Waterbody[f]	71.04	I	9.7	n	No impairment reported	None	Bore
Waterbody[f]	71.05	I	8.7	n	No impairment reported	None	Bore
Waterbody	71.60	P	24.2	n	No impairment reported	None	Open Cut
Waterbody	71.68	P	56.6	n	No impairment reported	None	Open Cut
East Fork English Bayou	71.80	P	61.0	n	No impairment reported	None	Open Cut
Waterbody	72.71	P	12.9	n	No impairment reported	None	Bore
Waterbody	72.72	P	17.9	n	No impairment reported	None	Bore
Waterbody	72.88	P	83.2	n	No impairment reported	None	Bore
Waterbody	72.92	P	28.0	n	No impairment reported	None	Bore
Waterbody	73.02	P	31.2	n	No impairment reported	None	Open Cut
Waterbody	73.27	P	9.6	n	No impairment reported	None	Open Cut
Waterbody[f]	73.79	I	9.9	n	No impairment reported	None	Bore
Waterbody[f]	73.80	I	5.7	n	No impairment reported	None	Bore
Waterbody[f]	75.29	I	43.6	n	No impairment reported	None	Bore
Waterbody[f]	75.31	I	21.5	n	No impairment reported	None	Bore
Canal	75.99	P	10.0	n	No impairment reported	None	Open Cut
Louisiana Irrigation Canal	76.00	P	77.2	n	No impairment reported	None	Open Cut

TABLE G-1

Surface Waterbodies Crossed by the Kinder Morgan Louisiana Pipeline Project

Waterbody (WB)	Approx. MP	Waterbody Type[a]	Crossing Distance (Feet)	Water Quality/ Use[b]	Suspected Existing Impairment[c]	Significance to Fisheries/Potable Water Source[c,d]	Crossing Method
Canal	76.05	P	25.9	n	No impairment reported	None	Open Cut
Waterbody	77.26	P	33.5	n	No impairment reported	None	Open Cut
Waterbody[f]	78.06	I	39.5	n	No impairment reported	None	HDD
Waterbody[f]	78.09	I	66.4	n	No impairment reported	None	HDD
Waterbody[f]	78.12	I	126.3	n	No impairment reported	None	HDD
Waterbody[f]	78.16	I	118.1	n	No impairment reported	None	HDD
Waterbody[f]	78.20	I	44.8	n	No impairment reported	None	HDD
Waterbody[f]	78.36	I	6.1	n	No impairment reported	None	HDD
Waterbody[f]	78.37	I	5.6	n	No impairment reported	None	HDD
Waterbody	78.72	P	19.8	n	No impairment reported	None	Open Cut
Waterbody	78.99	P	11.2	n	No impairment reported	None	Open Cut
Waterbody	80.38	P	36.1	n	No impairment reported	None	Open Cut
Waterbody	80.73	P	29.8	n	No impairment reported	None	Open Cut
Waterbody[f]	80.91	I	19.0	n	No impairment reported	None	Open Cut
Waterbody	80.92	P	44.2	n	No impairment reported	None	Open Cut
Waterbody[f]	81.80	I	6.6	n	No impairment reported	None	Bore
Canal	81.83	P	40.6	n	No impairment reported	None	Bore
Waterbody[f]	82.32	I	13.1	n	No impairment reported	None	Bore
Waterbody[f]	82.33	I	29.2	n	No impairment reported	None	Bore
Waterbody[f]	82.98	I	5.0	n	No impairment reported	None	Bore
Waterbody[f]	82.99	I	11.5	n	No impairment reported	None	Bore
Waterbody[f]	84.22	I	15.6	n	No impairment reported	None	Bore
Waterbody	84.23	P	12.2	n	No impairment reported	None	Bore

TABLE G-1

Surface Waterbodies Crossed by the Kinder Morgan Louisiana Pipeline Project

Waterbody (WB)	Approx. MP	Waterbody Type[a]	Crossing Distance (Feet)	Water Quality/ Use[b]	Suspected Existing Impairment[c]	Significance to Fisheries/Potable Water Source[c,d]	Crossing Method
Canal	84.33	P	43.7	n	No impairment reported	None	Open Cut
Waterbody[f]	84.43	I	15.6	n	No impairment reported	None	Bore
Waterbody[f]	84.45	I	21.0	n	No impairment reported	None	Bore
Canal	84.69	P	23.1	n	No impairment reported	None	Open Cut
East Bayou Lacassine	84.94	P	7.5	ABCF	Dissolved oxygen (4a)	Recreational fishery	Flume
Waterbody[f]	86.54	I	38.4	n	No impairment reported	None	Bore
Waterbody[f]	86.55	I	13.8	n	No impairment reported	None	Bore
Waterbody[f]	86.57	I	26.5	n	No impairment reported	None	Bore
Waterbody[f]	86.58	I	36.5	n	No impairment reported	None	Bore
Waterbody[f]	87.69	I	7.8	n	No impairment reported	None	Bore
Waterbody[f]	87.70	I	6.9	n	No impairment reported	None	Bore
East Bayou Lacassine	88.49	P	31.6	ABCF	Dissolved oxygen (4a)	Recreational fishery	Open Cut
Waterbody[f]	88.79	I	5.9	n	No impairment reported	None	Bore
Waterbody[f]	88.80	I	9.6	n	No impairment reported	None	Bore
Waterbody[f]	88.88	I	5.8	n	No impairment reported	None	Bore
Waterbody[f]	88.89	I	5.8	n	No impairment reported	None	Bore
Gum Gully	89.19	P	25.6	AB	No impairment reported	None	Open Cut
Canal	89.60	P	25.3	n	No impairment reported	None	Open Cut
Waterbody[f]	89.97	I	8.5	n	No impairment reported	None	Bore
Waterbody[f]	89.98	I	7.9	n	No impairment reported	None	Bore
Canal	90.56	P	31.6	n	No impairment reported	None	Open Cut
Waterbody[f]	91.01	I	6.9	n	No impairment reported	None	Bore
Waterbody[f]	91.01	I	8.2	n	No impairment reported	None	Bore

TABLE G-1

Surface Waterbodies Crossed by the Kinder Morgan Louisiana Pipeline Project

Waterbody (WB)	Approx. MP	Waterbody Type[a]	Crossing Distance (Feet)	Water Quality/ Use[b]	Suspected Existing Impairment[c]	Significance to Fisheries/Potable Water Source[c,d]	Crossing Method
Canal	91.39	P	13.0	n	No impairment reported	None	Open Cut
Canal	91.64	P	20.6	n	No impairment reported	None	Open Cut
Waterbody[f]	92.03	I	22.1	n	No impairment reported	None	Bore
Waterbody[f]	92.04	I	13.8	n	No impairment reported	None	Bore
Canal	92.18	P	30.8	n	No impairment reported	None	Open Cut
Canal	92.64	P	12.5	n	No impairment reported	None	Open Cut
Waterbody[f]	93.08	I	8.7	n	No impairment reported	None	Bore
Waterbody[f]	93.08	I	5.0	n	No impairment reported	None	Bore
Canal	93.63	P	13.2	n	No impairment reported	None	Open Cut
Canal	94.09	P	26.8	n	No impairment reported	None	Open Cut
Waterbody[f]	94.18	I	13.1	n	No impairment reported	None	Bore
West Bayou Grand Marais	94.68	P	51.0	n	No impairment reported	None	Open Cut
Waterbody[f]	94.97	I	15.5	n	No impairment reported	None	Open Cut
West Bayou Grand Marais Trib.	95.12	P	27.9	n	No impairment reported	None	Open Cut
Waterbody[f]	95.24	I	10.0	n	No impairment reported	None	Bore
Canal	96.37	P	25.6	n	No impairment reported	None	Bore
Waterbody[f]	97.36	I	18.2	n	No impairment reported	None	Bore
Waterbody[f]	97.37	I	13.3	n	No impairment reported	None	Bore
Bayou Nezpique Tributary	97.45	P	15.7	n	No impairment reported	None	Open Cut
Bayou Nezpique[e]	99.38	P	146.0	ABCF	nitrate/nitrite, dissolved oxygen, sedimentation/ siltation, total fecal coliform, total phosphorus, TSS, turbidity (all 4a)	Recreational fishery. Not supporting Fish and Wildlife Propagation use designation	HDD
Waterbody[f]	100.05	I	23.0	n	No impairment reported	None	Open Cut

TABLE G-1

Surface Waterbodies Crossed by the Kinder Morgan Louisiana Pipeline Project

Waterbody (WB)	Approx. MP	Waterbody Type[a]	Crossing Distance (Feet)	Water Quality/ Use[b]	Suspected Existing Impairment[c]	Significance to Fisheries/Potable Water Source[c,d]	Crossing Method
Waterbody[f]	100.40	I	9.3	n	No impairment reported	None	Bore
Waterbody	100.43	P	6.4	n	No impairment reported	None	Bore
Waterbody[f]	100.74	I	19.9	n	No impairment reported	None	Open Cut
Bayou Nezpique Trib.	101.19	P	17.1	n	No impairment reported	None	Open Cut
Waterbody[f]	101.49	I	27.4	n	No impairment reported	None	Bore
Waterbody[f]	101.50	I	20.7	n	No impairment reported	None	Bore
Waterbody[f]	102.08	I	13.5	n	No impairment reported	None	Open Cut
Waterbody[f]	102.35	I	4.4	n	No impairment reported	None	Bore
Waterbody[f]	102.36	I	26.1	n	No impairment reported	None	Bore
Canal[f]	102.66	I	17.4	n	No impairment reported	None	Open Cut
Canal	102.80	P	23.6	n	No impairment reported	None	Open Cut
Canal	103.03	P	12.6	n	No impairment reported	None	Open Cut
Canal[f]	103.43	I	17.7	n	No impairment reported	None	Open Cut
Waterbody[f]	103.66	I	26.8	n	No impairment reported	None	Open Cut
Canal	103.97	P	14.9	n	No impairment reported	None	Open Cut
Canal[f]	104.16	I	25.9	n	No impairment reported	None	Bore
Waterbody[f]	104.18	I	26.5	n	No impairment reported	None	Bore
Bayou Des Cannes Trib.	104.30	P	31.6	n	No impairment reported	None	Open Cut
Bayou Des Cannes Trib.	104.73	P	27.9	n	No impairment reported	None	Open Cut
Canal[f]	104.92	I	20.7	n	No impairment reported	None	Open Cut
Bayou Des Cannes Trib.	105.08	P	36.8	n	No impairment reported	None	Open Cut
Bayou Des Cannes Trib.	105.21	P	27.5	n	No impairment reported	None	Open Cut
Waterbody[f]	105.59	I	15.8	n	No impairment reported	None	Bore

TABLE G-1

Surface Waterbodies Crossed by the Kinder Morgan Louisiana Pipeline Project

Waterbody (WB)	Approx. MP	Waterbody Type[a]	Crossing Distance (Feet)	Water Quality/ Use[b]	Suspected Existing Impairment[c]	Significance to Fisheries/Potable Water Source[c,d]	Crossing Method
Waterbody[f]	105.60	I	7.1	n	No impairment reported	None	Bore
Waterbody	105.89	P	38.0	n	No impairment reported	None	Open Cut
Waterbody[f]	106.20	I	8.5	n	No impairment reported	None	Bore
Waterbody[f]	106.21	I	10.8	n	No impairment reported	None	Bore
Waterbody	106.65	P	18.1	n	No impairment reported	None	Bore
Waterbody[f]	106.67	I	11.5	n	No impairment reported	None	Bore
Waterbody[f]	106.82	I	14.7	n	No impairment reported	None	Bore
Waterbody	106.83	P	14.0	n	No impairment reported	None	Bore
Waterbody	107.37	I	20.1	n	No impairment reported	None	Bore
Bayou Des Cannes Trib.	107.55	P	15.7	n	No impairment reported	None	Open Cut
Bayou Des Cannes Trib.[f]	107.56	P	55.2	n	No impairment reported	None	Open Cut
Bayou Des Cannes Trib.	107.92	P	18.4	n	No impairment reported	None	Open Cut
Bayou Des Cannes Trib.	108.07	P	18.9	n	No impairment reported	None	Open Cut
Bayou Barwick Trib.	108.68	I	27.5	n	No impairment reported	None	Open Cut
Bayou Barwick	109.22	P	30.1	n	No impairment reported	None	Open Cut
Bayou Barwick[f]	109.25	P	51.8	n	No impairment reported	None	Open Cut
Canal[f]	110.17	I	71.5	n	No impairment reported	None	Open Cut
Canal[f]	110.94	I	20.0	n	No impairment reported	None	Open Cut
Waterbody[f]	111.23	P	12.6	n	No impairment reported	None	Bore
Waterbody[f]	111.24	P	16.1	n	No impairment reported	None	Bore
Canal[f]	111.52	I	11.1	n	No impairment reported	None	Open Cut
Tiger Point Gulley Trib.	112.15	P	13.1	n	No impairment reported	None	Open Cut
Tiger Point Gulley	113.27	P	177.7	n	No impairment reported	None	Open Cut

TABLE G-1

Surface Waterbodies Crossed by the Kinder Morgan Louisiana Pipeline Project

Waterbody (WB)	Approx. MP	Waterbody Type[a]	Crossing Distance (Feet)	Water Quality/ Use[b]	Suspected Existing Impairment[c]	Significance to Fisheries/Potable Water Source[c,d]	Crossing Method
Waterbody[f]	113.62	I	31.2	n	No impairment reported	None	Bore
Waterbody[f]	114.23	I	94.9	n	No impairment reported	None	Open Cut
Waterbody[f]	114.29	I	59.0	n	No impairment reported	None	Open Cut
Canal[f]	114.55	I	37.0	n	No impairment reported	None	Open Cut
Waterbody[f]	114.86	I	8.6	n	No impairment reported	None	Bore
Waterbody[f]	114.87	I	10.2	n	No impairment reported	None	Bore
Waterbody[f]	114.88	I	6.5	n	No impairment reported	None	Bore
Waterbody[f]	114.89	I	5.7	n	No impairment reported	None	Bore
Waterbody[f]	115.70	I	18.8	n	No impairment reported	None	Bore
Waterbody[f]	115.71	I	16.1	n	No impairment reported	None	Bore
Waterbody[f]	116.38	I	15.9	n	No impairment reported	None	Bore
Waterbody[f]	116.39	I	19.0	n	No impairment reported	None	Bore
Waterbody[f]	116.55	I	19.6	n	No impairment reported	None	Bore
Waterbody[f]	116.56	I	16.9	n	No impairment reported	None	Bore
Waterbody[f]	116.75	I	16.8	n	No impairment reported	None	Bore
Waterbody[f]	116.76	I	15.5	n	No impairment reported	None	Bore
Waterbody[f]	117.27	I	10.6	n	No impairment reported	None	Bore
Waterbody[f]	117.28	I	7.3	n	No impairment reported	None	Bore
Waterbody[f]	118.06	I	11.3	n	No impairment reported	None	Open Cut
Bayou Des Cannes Trib.	119.28	I	23.8	n	No impairment reported	None	Open Cut
Waterbody[f]	119.75	I	9.1	n	No impairment reported	None	Bore
Waterbody[f]	119.76	I	12.4	n	No impairment reported	None	Bore
Bayou Duralde Trib.	120.19	I	24.4	n	No impairment reported	None	Open Cut

TABLE G-1

Surface Waterbodies Crossed by the Kinder Morgan Louisiana Pipeline Project

Waterbody (WB)	Approx. MP	Waterbody Type[a]	Crossing Distance (Feet)	Water Quality/ Use[b]	Suspected Existing Impairment[c]	Significance to Fisheries/Potable Water Source[c,d]	Crossing Method
Waterbody[f]	120.43	I	28.9	n	No impairment reported	None	Bore
Waterbody[f]	120.75	I	22.9	n	No impairment reported	None	Bore
Waterbody[f]	120.76	I	23.3	n	No impairment reported	None	Bore
Bayou Des Cannes Trib.	121.47	I	44.6	n	No impairment reported	None	Open Cut
Bayou Des Cannes Trib.	121.86	I	22.1	n	No impairment reported	None	Open Cut
Waterbody[f]	122.09	I	11.4	n	No impairment reported	None	Bore
Waterbody[f]	122.10	I	3.6	n	No impairment reported	None	Bore
Canal[f]	122.36	I	22.4	n	No impairment reported	None	Open Cut
Waterbody[f]	123.13	I	9.1	n	No impairment reported	None	Bore
Waterbody[f]	123.13	I	7.5	n	No impairment reported	None	Bore
Waterbody[f]	123.69	I	6.3	n	No impairment reported	None	Bore
Waterbody[f]	123.70	I	6.5	n	No impairment reported	None	Bore
Canal[f]	124.07	I	33.9	n	No impairment reported	None	Open Cut
Bayou Des Cannes Trib.	124.16	I	14.5	n	No impairment reported	None	Open Cut
Bayou Des Cannes Trib.	124.16	I	8.3	n	No impairment reported	None	Open Cut
Bayou Des Cannes Trib.	124.18	I	12.9	n	No impairment reported	None	Open Cut
Bayou Des Cannes	124.71	P	56.2	ABCF	Carbofuran, Fipronil, mercury, nitrate/nitrite, dissolved oxygen, sedimentation/siltation, total fecal coliform, total phosphorus, TSS, turbidity (all 4a)	Recreational fishery. Not supporting Fish and Wildlife Propagation use designation	Flume
Waterbody[f]	126.30	I	30.1	n	No impairment reported	None	Bore
Waterbody[f]	126.31	I	33.8	n	No impairment reported	None	Bore
Waterbody[f]	126.38	I	12.9	n	No impairment reported	None	Bore

TABLE G-1 Surface Waterbodies Crossed by the Kinder Morgan Louisiana Pipeline Project							
Waterbody (WB)	**Approx. MP**	**Waterbody Type[a]**	**Crossing Distance (Feet)**	**Water Quality/ Use[b]**	**Suspected Existing Impairment[c]**	**Significance to Fisheries/Potable Water Source[c,d]**	**Crossing Method**
Waterbody[f]	126.38	I	16.8	n	No impairment reported	None	Bore
Waterbody[f]	127.35	I	12.6	n	No impairment reported	None	Open Cut
Waterbody[f]	127.72	I	15.7	n	No impairment reported	None	Open Cut
Waterbody[f]	127.72	I	11.2	n	No impairment reported	None	Open Cut
Waterbody[f]	128.09	I	9.1	n	No impairment reported	None	Open Cut
Waterbody[f]	128.10	I	16.1	n	No impairment reported	None	Open Cut
Waterbody[f]	128.50	I	21.3	n	No impairment reported	None	Bore
Waterbody[f]	128.51	I	26.8	n	No impairment reported	None	Bore
Bayou Des Cannes Trib.	129.19	I	25.9	n	No impairment reported	None	Open Cut
Canal[f]	129.31	I	26.3	n	No impairment reported	None	Open Cut
Waterbody[f]	129.42	I	9.3	n	No impairment reported	None	Bore
Waterbody[f]	129.60	I	12.9	n	No impairment reported	None	Bore
Bayou Marron Trib.	130.10	P	15.1	n	No impairment reported	None	Open Cut
Waterbody[f]	130.60	I	21.9	n	No impairment reported	None	Bore
Waterbody[f]	130.61	I	24.5	n	No impairment reported	None	Bore
Bayou Marron Trib.	130.80	P	18.9	n	No impairment reported	None	Open Cut
Waterbody[f]	131.70	I	16.7	n	No impairment reported	None	Bore
Waterbody[f]	131.71	I	18.2	n	No impairment reported	None	Bore
FGT LATERAL							
Canal	0.13	P	19.2	n	No impairment reported	None	Open Cut
Waterbody[f]	0.50	I	8.6	n	No impairment reported	None	Bore
Waterbody[f]	0.51	I	5.9	n	No impairment reported	None	Bore
Waterbody[f]	1.38	I	63.6	n	No impairment reported	None	Open Cut

TABLE G-1

Surface Waterbodies Crossed by the Kinder Morgan Louisiana Pipeline Project

Waterbody (WB)	Approx. MP	Waterbody Type[a]	Crossing Distance (Feet)	Water Quality/ Use[b]	Suspected Existing Impairment[c]	Significance to Fisheries/Potable Water Source[c,d]	Crossing Method
Bayou Des Cannes	1.57	P	60.5	ABCF	Carbofuran, Fipronil, mercury, nitrate/nitrite, dissolved oxygen, sedimentation/siltation, total fecal coliform, total phosphorus, TSS, turbidity (all 4a)	Recreational fishery. Not supporting Fish and Wildlife Propagation use designation	Flume
Bayou Des Cannes Trib.	1.95	I	8.7	n	No impairment reported	None	Open Cut
ACCESS ROADS[d]							
Bayou Des Cannes Trib	FGT-2	I	8.5	n	No impairment reported	None	Open Cut

[a] Designated use codes for Waterbody Types: I – Intermittent; P - Perennial

[b] Designated use codes for waterbodies: A – Primary Contact Recreation; B - Secondary Contact Recreation; C – Fish and Wildlife Propagation; L – Limited Aquatic Life and Wildlife Use; D – Drinking Water Supply; E – Oyster Propagation; F – Agriculture; G – Outstanding Natural Resource Waters; n – No Quality/Use. Source: Louisiana Administrative Code, Title 33, Part IX, Table 3, December 2005.

[c] Number in parentheses () indicates Louisiana 2004 303(d) list IR category. Source: Louisiana Department of Environmental Quality (LDEQ), Water Quality Integrated Report (Section 305 (b) and 303 (d) Reports), 2004.

[d] All fisheries resources are warmwater fisheries. None of the surface waterbodies listed are utilized as a potable water source.

[e] Waterbody greater than 100 feet in width.

f Indicates bar ditches and functionally equivalent water features that were not included in the milepost band at the top of the preliminary alignment sheets for clarity (i.e., to avoid clutter).

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APPENDIX H

AFFECTED WETLANDS

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Table H-1 provides a description of the codes used in the Cowardin Classification System. Wetlands crossed by the Project are identified in table H-2 by Cowardin wetland codes and unique wetland ID. Table H-2 includes extra workspaces in the areas crossed by the pipelines. Wetlands affected by pipe storage yards, access roads, and aboveground facilities are listed at the end of the table.

TABLE H-1

Cowardin Classification System

SYSTEM	SUBSYSTEM	CLASS	SUBCLASS
E=ESTUARINE	1=SUBTIDAL	RB=Rock Bottom	1=Bedrock
			2=Rubble
		UB=Unconsolidated Bottom	1=Cobble-Gravel
			2=Sand
			3=Mud
			4=Organic
		AB=Aquatic Bed	1=Algal
			3=Rooted Vascular
			4=Floating Vascular
			5=Unknown Submergent
			6=Unknown Surface
		RF=Reef	2=Mollusc
			3=Worm
		OW=Open Water/Unknown Bottom	(used on older maps)
	2=INTERTIDAL	AB=Aquatic Bed	1=Algal
			3=Rooted Vascular
			4=Floating Vascular
			5=Unknown Submergent
			6=Unknown Surface
		RF=Reef	2=Mollusc
		SB=Streambed	3=Cobble-Gravel
			4=Sand
			5=Mud
			6=Organic
		RS=Rocky Shore	1=Bedrock
			2=Rubble
		US=Unconsolidated Shore	1=Cobble-Gravel
			2=Sand
			3=Mud
			4=Organic

TABLE H-1 **Cowardin Classification System**			
SYSTEM	**SUBSYSTEM**	**CLASS**	**SUBCLASS**
		EM=Emergent	1=Persistent
			2=Nonpersistent
		SS=Scrub-Shrub	1=Broad-Leaved Deciduous
			2=Needle-Leaved Deciduous
			3=Broad-Leaved Evergreen
			4=Needle-Leaved Evergreen
			5=Dead
			6=Indeterminate Deciduous
			7=Indeterminate Evergreen
		FO=Forested	1=Broad-Leaved Deciduous
			2=Needle-Leaved Deciduous
			3=Broad-Leaved Evergreen
			4=Needle-Leaved Evergreen
			5=Dead
			6=Indeterminate Deciduous
			7=Indeterminate Evergreen
P=PALUSTRINE		RB=Rock Bottom	1=Bedrock
			2=Rubble
		UB=Unconsolidated Bottom	1=Cobble-Gravel
			2=Sand
			3=Mud
			4=Organic
		AB=Aquatic Bed	1=Algal
			2=Aquatic Moss
			3=Rooted Vascular
			4=Floating Vascular
			5=Unknown Submergent
			6=Unknown Surface
		US=Unconsolidated Shore	1=Cobble-Gravel
			2=Sand
			3=Mud
			4=Organic
			5=Vegetated
		ML=Moss-Lichen	1=Moss
			2=Lichen
		EM=Emergent	1=Persistent
			2=Nonpersistent

TABLE H-1

Cowardin Classification System

SYSTEM	SUBSYSTEM	CLASS	SUBCLASS
		SS=Scrub-Shrub	1=Broad-Leaved Deciduous
			2=Needle-Leaved Deciduous
			3=Broad-Leaved Evergreen
			4=Needle-Leaved Evergreen
			5=Dead
			6=Indeterminate Deciduous
			7=Indeterminate Evergreen
		FO=Forested	1=Broad-Leaved Deciduous
			2=Needle-Leaved Deciduous
			3=Broad-Leaved Evergreen
			4=Needle-Leaved Evergreen
			5=Dead
			6=Indeterminate Deciduous
			7=Indeterminate Evergreen
		OW=Open Water/Unknown Bottom	(used on older maps)
MODIFIERS			
WATER REGIME	Non-Tidal	A=Temporarily Flooded	
		B=Saturated	
		C=Seasonally Flooded	
		D=Seasonally Flooded/Well Drained	
		E=Seasonally Flooded/Saturated	
		F=Semipermanently Flooded	
		G=Intermittently Exposed	
		H=Permanently Flooded	
		J=Intermittently Flooded	
		K=Artificially Flooded	
		W=Intermittently Flooded/Temporary (used on older maps)	
		Y=Saturated/Semipermanent/Seasonal (used on older maps)	
		Z=Intermittently Exposed/Permanent (used on older maps)	
		U=Unknown	
	Tidal	K=Artificially Flooded	
		L=Subtidal	
		M=Irregularly Exposed	
		N=Regularly Flooded	

TABLE H-1

Cowardin Classification System

SYSTEM	SUBSYSTEM	CLASS	SUBCLASS
		P=Irregularly Flooded	
		*S=Temporary-Tidal	
		*R=Seasonal-Tidal	
		*T=Semipermanent-Tidal	
		*V=Permanent-Tidal	
		U=Unknown	
		*These water regimes are only used in tidally influenced, freshwater systems.	
WATER CHEMISTRY	Coastal Halinity	1=Hyperhaline	
		2=Euhaline	
		3=Mixohaline (Brackish)	
		4-Polyhaline	
		5=Mesohaline	
		6=Oligohaline	
		0=Fresh	
	Inland Salinity	7=Hypersaline	
		8=Eusaline	
		9=Mixosaline	
		0=Fresh	

TABLE H-2 Wetlands That Would Be Affected By The Project							
Milepost		**Wetland ID**	**Cowardin Class**	**EFH Wetland?**	**Prior Converted?**	**Acres Affected During Construction (Temporary)**	**Acres Affected During Operations (Permanent)**
Begin	**End**						
Leg 1 and Leg 2 and Associated Extra Workspaces							
Cameron Parish							
0.00	0.08	7016	PEM1A	No	No	1.5	0.8
0.08	0.18	7001	PEM1A	No	No	2.1	1.1
0.17	0.22	7000	PFO1/4	No	No	0.7	0.4
0.24	0.39	7002	PFO1/4	No	No	1.9	1.3
0.30	0.56	7003	PEM1A	No	No	4.4	2.5
0.54	1.07	7004	PEM1A	No	No	9.6	5.3
1.03	1.13	7005	PEM1A	No	No	1.1	0.3
1.12	1.16	7007	PEM1A	No	No	0.5	0.2
1.15	1.19	7006	PEM1A	No	No	0.5	0.2
1.16	1.26	7007	PEM1A	No	No	0.5	-
1.23	1.30	7006	PEM1A	No	No	0.9	-
1.34	1.42	7008	PEM1A	No	No	1.7	0
1.44	1.51	7010	PEM1A	No	No	0.6	0
1.46	1.50	7009	PEM1A	No	No	0.3	0
1.51	1.73	7011	PEM1A	No	No	2.6	1
1.73	2.03	7012	PEM1A	No	No	3.4	1
2.01	3.47	3032	E2EM1P5	No	No	17.7	8
3.48	3.94	3032	E2EM1P5	No	No	6.1	3
3.94	4.00	3032	E2EM1P5	No	No	0.9	-
3.99	4.49	3032	E2EM1P5	No	No	8.5	2
4.52	4.55	3032	E2EM1P5	No	No	0.2	0

TABLE H-2

Wetlands That Would Be Affected By The Project

Milepost		Wetland ID	Cowardin Class	EFH Wetland?	Prior Converted?	Acres Affected During Construction (Temporary)	Acres Affected During Operations (Permanent)
Begin	End						
18.05	18.53	3034	E2EM1P5	No	No	8.4	2
18.56	18.57	3034	E2EM1P5	No	No	0.0	-
18.68	18.77	3034	E2EM1P5	No	No	0.4	0
18.76	19.04	1101,1101A	E2EM1P5	No	No	4.5	1
19.07	19.07	1101B	E2EM1P5	No	No	0.0	-
19.67	19.73	1102A	E2EM1P5	No	No	0.2	0
19.73	19.80	1102	E2EM1P5	No	No	1.1	0
19.85	19.89	1103	PSS1C	No	No	0.4	0
20.14	20.15	1104	PSS1C	No	No	0.0	-
20.21	20.24	1105	PSS1C	No	No	0.3	0
20.29	20.31	2089	PSS1C	No	No	0.1	0
20.38	20.39	2090	PSS1C	No	No	0.1	0
20.57	20.65	2093	PSS1C	No	No	1.1	0
20.65	20.66	2093A	PSS1C	No	No	0.1	0
20.66	20.87	2093A	PSS1C	No	No	1.7	0
20.91	20.97	2093B	PSS1C	No	No	0.9	0
20.94	21.05	2093B	PSS1C	No	No	1.3	0

TABLE H-2

Wetlands That Would Be Affected By The Project

Milepost		Wetland ID	Cowardin Class	EFH Wetland?	Prior Converted?	Acres Affected During Construction (Temporary)	Acres Affected During Operations (Permanent)
Begin	End						
21.06	21.10	2095	PSS1C	No	No	0.3	0
21.11	21.16	2095	PSS1C	No	No	0.9	0
21.17	21.18	2095A	E2SS1P5	No	No	0.2	-
21.18	21.52	2095A	E2SS1P5	No	No	3.9	1
21.18	21.18	2095A	E2SS1P5	No	No	0.0	-
21.98	22.08	2096	E2SS1P5	No	No	0.8	0
22.08	22.25	2096	E2SS1P5	No	No	1.7	0
22.00	22.07	2096A	E2EM1P5	No	No	0.4	0
22.08	22.14	2096B	PFO1As	No	No	0.2	-
22.08	22.12	2096A	E2EM1P5	No	No	0.3	0
22.11	22.12	2096D	E2EM1P5	No	No	0.3	0
22.12	22.23	2096D	E2EM1P5	No	No	0.6	
22.16	22.21	2096B	PFO1As	No	No	0.1	-
22.24	22.27	2097	PSS1C	No	No	0.4	0
22.26	22.32	2096	E2SS1P5	No	No	0.6	0
22.30	22.30	2096D	E2EM1P5	No	No	0.0	-
22.35	22.43	2096	E2SS1P5	No	No	0.7	0
22.37	22.39	2096D	E2EM1P5	No	No	0.1	-
22.42	22.45	2100	PEM1C	No	No	0.2	0

TABLE H-2

Wetlands That Would Be Affected By The Project

Milepost		Wetland ID	Cowardin Class	EFH Wetland?	Prior Converted?	Acres Affected During Construction (Temporary)	Acres Affected During Operations (Permanent)
Begin	End						
22.44	22.47	2096	E2SS1P5	No	No	0.3	0
22.47	22.50	2101	PEM1C	No	No	0.3	0
22.50	22.51	2096	E2SS1P5	No	No	0.0	-
22.56	22.57	2102A	E2EM1P5	No	No	0.0	-
22.58	22.61	2102A	E2EM1P5	No	No	0.1	0
22.61	22.65	4024/3036	E2EM1P5	No	No	0.5	0
22.64	22.68	4024a/3038	PSS1A	No	No	0.6	0
22.67	22.69	4024/3036	E2EM1P5	No	No	0.2	0
22.69	22.74	4024/3036	E2EM1P5	No	No	0.6	-
22.69	22.75	4044/3039	PSS1A	No	No	1.1	0
22.74	22.79	4024/3036	E2EM1P5	No	No	0.6	0
22.76	22.83	4024c	PSS1A	No	No	0.5	0
22.78	22.79	3035	PSS1C	No	No	0.0	-
22.94	22.97	4025/3033A	E2EM1P5	No	No	0.3	0
22.95	23.00	4025	PSS1A	No	No	0.5	0
22.97	23.41	4025/3033A	E2EM1P5	No	No	6.2	2
23.03	23.04	4025	PSS1A	No	No	0.1	-
23.11	23.11	4025	PSS1A	No	No	0.0	-
23.27	23.39	4025	PSS1A	No	No	1.5	0.6
23.40	23.42	4025	PSS1A	No	No	0.2	0.1

TABLE H-2 **Wetlands That Would Be Affected By The Project**							
Milepost		**Wetland ID**	**Cowardin Class**	**EFH Wetland?**	**Prior Converted?**	**Acres Affected During Construction (Temporary)**	**Acres Affected During Operations (Permanent)**
Begin	**End**						
23.57	23.83	3033	E2EM1P5	No	No	1.7	0.5
23.86	23.92	2103	E2EM1P5	No	No	0.8	0.3
23.92	24.02	2103	E2EM1P5	No	No	1.1	0.3
24.05	24.11	2103	E2EM1P5	No	No	0.5	0.1
24.13	24.56	2103	E2EM1P5	No	No	6.4	2.4
24.56	24.64	2103B	E2SS1P5	No	No	0.3	0.0
24.56	24.62	2103A	E2EM1P6	No	No	0.2	-
24.63	24.72	2103A	E2EM1P6	No	No	0.2	-
25.24	25.24	2103A	E2EM1P6	No	No	0.0	-
Total						**122.8**	**48.7**
Calcasieu Parish							
24.62	24.64	2103B	E2SS1P5	No	No	0.1	0.1
24.64	25.26	2103A	E2EM1P6	No	No	8.9	3.4
25.23	25.36	2104A	E2SS1P5	No	No	0.5	0.1
25.26	25.27	4027/2104/2106	E2EM1P6	No	No	0.1	-
25.27	25.34	4027/2104/2106	E2EM1P6	No	No	0.2	-
25.37	25.40	2104A	E2SS1P5	No	No	0.1	-
25.41	25.41	2104A	E2SS1P5	No	No	0.0	-
25.46	25.54	2104A	E2SS1P5	No	No	0.2	-
25.48	25.53	2105	E2EM1P6	No	No	0.3	0.2
25.55	25.57	2104A	E2SS1P5	No	No	0.0	-
25.57	25.98	4027/2104/2106	E2EM1P6	No	No	5.4	1.7
26.34	26.41	2109	PSS1C	No	No	0.3	0.1
26.42	26.45	2108	PSS1C	No	No	0.1	-
26.51	26.58	4027/2104/2106	E2EM1P6	No	No	0.1	-
26.57	26.61	4028	PSS1A	No	No	0.2	0.0
26.70	26.77	4028	PSS1A	No	No	0.7	0.3
26.72	26.75	4029	PEM1A	No	No	0.1	-
27.03	27.43	2110	E2SS1P6	No	No	5.0	2.1
27.03	27.19	2111A	PEM1As	No	No	0.2	0.0
27.32	27.34	2111	PEM1C	No	No	0.1	0.0
27.44	27.52	2112	PSS1/3R	No	No	0.7	0.1
27.54	27.83	2112	PSS1/3R	No	No	3.7	1.4
27.56	27.63	2113B	PEM1C	No	No	0.1	0.1
27.63	27.65	2113B	PEM1C	No	No	0.0	-
27.70	27.78	2113A	PEM1C	No	No	0.1	0.1
27.80	27.82	2113	PEM1C	No	No	0.1	0.0

TABLE H-2 Wetlands That Would Be Affected By The Project							
Milepost		**Wetland ID**	**Cowardin Class**	**EFH Wetland?**	**Prior Converted?**	**Acres Affected During Construction (Temporary)**	**Acres Affected During Operations (Permanent)**
Begin	**End**						
27.84	27.85	2114	PSS1C	No	No	0.2	0.1
27.86	27.89	2115	PEM1C	No	No	0.1	-
27.88	28.24	2114	PSS1C	No	No	4.6	1.9
28.14	28.32	2116	PEM1C	No	No	0.8	0.5
28.27	28.32	2117	PEM1C	No	No	0.6	0.1
28.32	28.40	2118	E2SS1P6	No	No	1.1	0.4
28.39	28.47	2120	E2EM1P6	No	No	0.1	0.1
28.39	28.65	2119	E2EM1P6	No	No	3.3	1.5
28.48	30.05	2120	E2EM1P6	No	No	16.4	6.0
29.04	29.06	2124	E2SS1P6	No	No	0.1	0.0
29.14	29.42	2125	E2SS1P6	No	No	1.4	0.2
29.18	29.48	2126	PFO1As	No	No	2.4	1.6
29.34	29.39	2120	E2EM1P6	No	No	0.1	-
29.44	29.51	2125	E2SS1P6	No	No	0.5	0.2
29.46	29.53	6040	E2EM1P6	No	No	0.4	-
29.81	29.86	2127	PFO1/4	No	No	0.4	0.2
29.86	29.90	2128	PSS1C	No	No	0.3	0.2
30.04	30.05	2129	E2SS1P6	No	No	0.1	0.0
30.07	30.11	2129	E2SS1P6	No	No	0.2	0.1
30.08	30.38	2120	E2EM1P6	No	No	5.4	1.7
30.38	30.40	2120	E2EM1P6	No	No	0.3	-
30.12	30.15	2120	E2EM1P6	No	No	0.1	-
30.39	30.60	2120C	E2EM1P6	No	No	3.5	1.2
30.65	30.72	2121	E2EM1P6	No	No	0.4	0.1
30.66	30.70	2122	E2SS1P6	No	No	0.1	0.1
30.72	30.74	2122A	PSS1C	No	No	0.1	0.0
31.19	32.21	4030/2087/2087A	PEM1A	No	No	18.2	5.9
31.19	31.26	2088	E2SS3P6	No	No	0.2	0.1
32.27	32.41	4031/2085	PEM1C	No	No	2.4	5.1
32.41	33.14	4031/2085	PEM1C	No	No	9.4	-
33.13	34.80	2084	PEM1C	No	No	19.2	9.7
33.13	33.22	2083	PFO1A	No	No	0.7	0.3
33.24	33.28	2083	PFO1A	No	No	0.4	0.2
34.80	34.87	1100	PSS1Cs	No	No	0.7	0.4
34.85	34.92	1099	PFO1C	No	No	0.7	0.3
34.86	35.07	1097B	PEM1C	No	No	0.2	0.0
34.92	34.99	1099	PEM1C	No	No	0.9	0.5

TABLE H-2

Wetlands That Would Be Affected By The Project

Milepost		Wetland ID	Cowardin Class	EFH Wetland?	Prior Converted?	Acres Affected During Construction (Temporary)	Acres Affected During Operations (Permanent)
Begin	End						
34.99	35.15	1098	PFO1C	No	No	1.7	0.9
35.12	35.15	1097B	PEM1C	No	No	0.0	-
35.15	35.64	1097	PEM1Cs	No	No	5.1	2.2
35.35	35.43	1096	PFO1A	No	No	0.9	0.3
35.42	35.65	1095	PFO1A	No	No	1.6	0.4
35.72	35.74	1094	PEM1C	No	No	0.1	0.1
35.73	35.75	1093	PFO1C	No	No	0.0	-
35.87	35.90	1092B	PEM1A	No	No	0.2	0.1
35.91	35.92	1092A	PEM1A	No	No	0.1	0.1
35.93	36.03	1092	PEM1A	No	No	1.1	0.3
36.17	36.20	1091	PEM1A	No	No	0.1	0.1
36.53	36.54	1090	PEM1A	No	No	0.1	0.0
36.54	36.56	1088	PEM1A	No	No	0.2	0.1
36.54	36.55	1089	PEM1A	No	No	0.0	0.0
36.57	36.59	1087	PEM1A	No	No	0.1	0.1
36.70	36.71	1086I	PEM1A	No	No	0.1	0.0
36.73	36.74	1086H	PEM1A	No	No	0.1	0.1
36.84	36.85	1086F	PEM1A	No	No	0.1	0.0
36.86	36.96	1086E	PEM1A	No	No	0.9	0.3
37.00	37.03	1086D	PEM1A	No	No	0.2	-
37.07	37.09	1086C	PEM1A	No	No	0.1	0.1
37.08	37.11	1086B	PEM1A	No	No	0.1	0.0
37.12	37.18	1086	PEM1A	No	No	0.8	0.3
37.23	37.24	1081	PEM1A	No	No	0.1	0.1
37.28	37.33	1080	PEM1A	No	No	0.3	0.2
37.32	37.34	1079	PEM1A	No	No	0.1	0.0
37.36	37.38	2075	PEM1A	No	No	0.2	0.1
37.39	37.40	2076	PEM1A	No	No	0.0	-
37.40	37.72	2077	PSS1A	No	No	3.1	0.7
37.43	37.44	2077A	PEM1A	No	No	0.0	0.0
37.49	37.50	2077B	PEM1A	No	No	0.1	0.1
37.51	37.56	2077C	PEM1A	No	No	0.2	0.2
37.57	37.58	2077D	PEM1A	No	No	0.0	0.0
37.61	37.63	2077E	PEM1A	No	No	0.1	0.1
37.63	37.71	2077F	PEM1A	No	No	0.3	0.3
37.71	37.88	2078	PEM1A	No	No	2.5	1.0
37.88	37.96	2078A	PEM1Ah	No	No	1.4	0.4

TABLE H-2

Wetlands That Would Be Affected By The Project

Milepost		Wetland ID	Cowardin Class	EFH Wetland?	Prior Converted?	Acres Affected During Construction (Temporary)	Acres Affected During Operations (Permanent)
Begin	End						
37.93	37.98	2078B	PSS1A	No	No	0.8	0.1
37.97	38.24	2079	PEM1A	No	No	4.9	1.6
38.31	38.35	2080	PEM1A	No	No	0.2	0.2
38.32	38.34	2080A	PFO1A	No	No	0.1	0.0
38.34	38.34	2081	PEM1A	No	No	0.0	-
38.34	38.34	2081	PSS1A	No	No	0.0	-
38.35	38.39	2081A	PSS1A	No	No	0.1	0.1
38.40	38.52	2082	PEM1A	No	No	1.4	0.6
38.54	38.62	2082A	PEM1A	No	No	0.7	0.4
38.65	38.92	4005	PEM1A	No	No	3.4	1.3
38.92	38.95	6001	PSS1A	No	No	0.1	0.0
38.94	39.08	4001	PEM1A	No	No	2.0	0.7
39.08	39.11	4017	PEM1A	No	No	0.1	0.1
39.10	39.20	4018	PEM1A	No	No	1.0	0.5
39.44	39.46	4019	PEM1A	No	No	0.1	0.0
39.45	39.47	4020	PEM1A	No	No	0.1	0.1
39.64	39.68	4021	PEM1A	No	No	0.3	0.1
39.66	39.81	4022	PEM1A	No	No	1.8	0.8
39.92	39.94	4023	PEM1C	No	No	0.1	0.0
40.12	40.18	5029	PEM1A	No	No	0.9	0.3
40.19	40.24	5030	PEM1A	No	No	0.6	0.3
40.19	40.20	5030	PSS1A	No	No	0.1	0.1
40.24	40.25	5030a	PSS1A	No	No	0.1	0.1
40.25	40.26	5033	PEM1A	No	No	0.1	0.1
40.26	40.27	5032	PEM1A	No	No	0.1	0.1
40.27	40.29	5031	PSS1A	No	No	0.3	0.1
42.71	42.76	5007	PEM1A	No	No	0.7	0.1
42.79	43.10	5005	PEM1A	No	No	0.8	0.8
43.42	43.43	5003	PEM1A	No	No	0.1	0.0
43.79	44.32	5002	PEM1A	No	No	9.1	3.1
44.34	44.39	5002	PEM1A	No	No	0.8	0.3
44.56	44.77	5001	PEM1A	No	No	3.0	1.2
44.75	44.76	5001	PSS1A	No	No	0.0	-
44.76	44.96	5001	PSS1A	No	No	2.8	1.2
45.36	45.54	2027	PEM1C	Yes	Yes	2.8	1.1
45.53	45.55	2026	PFO1R	No	No	0.2	0.1
45.55	45.60	2027A	PEM1C	No	No	0.8	0.3

TABLE H-2

Wetlands That Would Be Affected By The Project

Milepost		Wetland ID	Cowardin Class	EFH Wetland?	Prior Converted?	Acres Affected During Construction (Temporary)	Acres Affected During Operations (Permanent)
Begin	End						
45.59	45.78	2059	PSS1C	No	No	2.7	1.0
45.76	45.87	2027B	E2EM1P6	No	No	2.1	0.6
45.76	45.80	7017	PSS1C	No	No	0.4	-
45.86	45.89	2027B	E2EM1P6	No	No	0.3	0.1
45.99	46.00	2030	E2EM1P6	No	No	0.1	0.0
46.05	46.23	2030	E2EM1P6	No	No	2.7	1.0
46.23	46.49	2031	E2EM1P6	Yes	Yes	3.9	1.5
46.49	46.69	2031A	E2EM1P6	Yes	Yes	3.0	1.1
46.68	46.70	2032	PSS1C	Yes	Yes	0.1	0.1
46.69	46.98	2031B	PEM1C	No	No	5.1	1.6
46.69	46.69	2032	PSS1C	Yes	Yes	0.0	-
46.97	47.02	2031C	PEM1C	No	No	0.9	0.2
47.02	47.35	2033	PEM1R	Yes	Yes	5.1	2.0
47.34	47.36	2034	PSS1S	No	No	0.2	0.1
47.36	47.38	2033A	PEM1C	Yes	Yes	0.1	0.1
47.36	47.37	2034A	PSS1S	No	No	0.1	0.1
47.48	47.51	2035	PEM1C	Yes	Yes	0.4	0.2
47.54	47.75	2036	PEM1C	Yes	Yes	3.5	1.3
47.76	47.84	2037A	PEM1C	No	No	1.7	0.5
47.84	48.05	2037B	PEM1C	No	No	3.2	1.2
48.04	48.10	4003a	PEM1A	No	No	0.2	0.1
48.10	48.11	4003a	PEM1A	No	No	0.0	-
48.13	48.19	4003b	PEM1A	Yes	Yes	0.7	0.3
48.19	48.25	4003c	PEM1A	Yes	Yes	0.6	0.2
48.35	48.46	4004	PFO1A	No	No	0.8	0.6
48.57	48.58	4005a	PEM1A	No	No	0.1	0.1
48.62	48.68	4008	PEM1A	No	No	0.4	0.0
48.63	48.66	4006	PEM1A	No	No	0.1	0.1
48.63	48.67	4007	PFO1A	No	No	0.1	0.1
48.70	48.71	4009	PFO1A	No	No	0.1	0.0
48.71	48.91	4010	PFO1A	No	No	1.9	1.0
49.12	49.14	4011	PSS1A	No	No	0.1	0.1
49.32	49.34	4013	PSS1A	No	No	0.1	0.1
49.39	49.43	4015	PSS1A	No	No	0.3	0.2
49.69	49.81	6045	PSS1As	No	No	0.7	-
49.78	50.32	6044	PEM1Chs	No	No	3.4	-
49.84	49.91	6003	PEM1A	No	No	1.0	0.3

TABLE H-2

Wetlands That Would Be Affected By The Project

Milepost		Wetland ID	Cowardin Class	EFH Wetland?	Prior Converted?	Acres Affected During Construction (Temporary)	Acres Affected During Operations (Permanent)
Begin	End						
49.92	50.34	5015	PEM1A	No	No	7.5	2.5
50.34	50.42	5016	PEM1A	No	No	1.4	2.2
50.42	50.70	5016	PEM1A	No	No	5.8	-
50.70	50.73	6035	PSS1A	No	No	0.4	0.1
52.09	52.11	5017	PSS1A	No	No	0.0	-
52.12	52.18	5018	PEM1A	No	No	0.2	0.0
52.18	52.31	5018	PEM1A	No	No	0.2	0.1
52.38	52.38	5021	PFO1A	No	No	0.0	-
52.39	52.41	5022	PFO1A	No	No	0.1	-
52.51	52.52	5023	PFO1A	No	No	0.1	0.0
52.61	52.63	5026	PEM1A	No	No	0.1	0.1
52.77	52.78	5027	PFO1A	No	No	0.1	0.0
53.02	53.03	6024	PFO1A	No	No	0.2	0.1
53.53	53.60	6021	PFO1A	No	No	1.3	0.4
53.89	54.03	6036	PSS1A	No	No	1.8	0.6
54.90	54.94	6025\5104	PEM1T	No	No	0.4	0.2
54.94	54.97	6026	PEM1T	No	No	0.3	0.1
54.96	55.04	6050	PSS1A	No	No	1.1	0.4
55.14	55.18	6051	PSS1A	No	No	0.4	0.2
55.78	55.80	1049	PFO1A	No	No	0.1	0.1
55.91	55.96	1050	PEM1C	No	No	0.2	0.0
56.10	56.13	1051	PFO1A	No	No	0.2	0.0
56.14	56.17	1051	PFO1A	No	No	0.1	0.0
56.27	56.29	1052	PFO1A	No	No	0.1	-
56.51	56.51	1054	PEM1C	No	No	0.0	-
56.53	56.58	1054	PEM1C	No	No	0.4	0.1
56.67	56.67	1056	PEM1C	No	No	0.0	-
57.13	57.24	5034/1057	PEM1C	Yes	Yes	1.2	0.5
57.25	57.26	1058	PEM1C	Yes	Yes	0.1	0.0
57.59	57.63	1059	PEM1C	No	No	0.1	0.0
57.69	57.70	1043	PFO1A	No	No	0.0	-
57.70	57.91	1043	PFO1A	No	No	1.8	0.1
57.73	57.92	1043	PEM1C	No	No	1.2	1.0
58.56	58.59	5010	PSS1A	No	No	0.2	0.1
59.64	60.05	1046	PEM1C	Yes	Yes	7.5	2.2
60.05	60.21	1047	PEM1C	Yes	Yes	3.4	0.9
60.97	60.98	1048A	PEM1C	No	No	0.3	-

TABLE H-2

Wetlands That Would Be Affected By The Project

Milepost		Wetland ID	Cowardin Class	EFH Wetland?	Prior Converted?	Acres Affected During Construction (Temporary)	Acres Affected During Operations (Permanent)
Begin	End						
60.98	61.26	1048B	PEM1C	Yes	Yes	4.4	1.7
62.65	63.02	1024A	PEM1C	Yes	Yes	5.8	2.3
63.04	63.23	1024B	PEM1C	Yes	Yes	3.1	1.2
66.32	66.69	2060	PEM1C	Yes	Yes	6.1	2.2
66.68	66.70	2059	PFO1/4	No	No	0.1	0.1
66.69	66.91	2058	PSS1C	Yes	Yes	3.8	1.3
66.70	66.70	2059	PFO1/4	No	No	0.0	-
66.95	67.15	2056	PSS1C	No	No	3.1	1.1
67.13	67.17	2055	PFO1A	No	No	0.5	0.2
67.16	67.28	2053	PSS1C	No	No	1.9	0.6
67.16	67.17	2054	PFO1A	No	No	0.1	0.1
67.28	67.36	5019	PEM1A	No	No	1.6	0.5
67.37	67.38	5020	PEM1A	No	No	0.1	0.1
67.38	67.62	1028	PEM1C	Yes	Yes	4.1	1.4
67.65	67.82	1064	PEM1C	No	No	0.8	0.3
67.68	67.81	1064	PSS1C	No	No	1.4	0.4
67.81	67.82	1064	PEM1C	No	No	0.0	0.0
67.81	67.82	1064	PSS1C	No	No	0.1	0.1
68.33	68.34	1074	PFO1A	No	No	0.1	0.1
68.91	68.99	1033/2061	PEM1C	No	No	0.8	0.4
69.02	69.07	1033/2061	PEM1C	No	No	0.2	0.1
69.91	69.94	2063A	PEM1C	No	No	0.3	0.1
69.92	69.92	2063B	PEM1C	No	No	0.0	0.0
69.93	69.95	2063C	PSS1C	Yes	Yes	0.1	0.0
70.69	70.85	2066\1032	PEM1C	Yes	Yes	2.5	1.0
71.06	71.10	2069	PEM1C	Yes	Yes	0.1	0.0
71.60	71.68	1035/2068	PEM1C	Yes	Yes	0.6	0.4
71.82	72.17	1037	PSS1C	Yes	Yes	6.2	2.1
72.18	72.72	1038	PEM1C	Yes	Yes	8.7	3.1
72.73	72.87	1039	PEM1C	Yes	Yes	2.2	0.8
72.87	73.03	2070	PEM1C	No	No	2.2	0.6
73.02	73.26	1040/2071	PEM1C	No	No	3.1	1.2
73.28	73.29	2072	PEM1C	No	No	0.0	0.0
73.29	73.79	1041	PEM1C	No	No	7.6	3.0
73.80	73.83	1042	PEM1A	No	No	0.3	0.2
73.83	73.88	1042	PEM1A	No	No	0.1	0.0
73.83	73.84	2074	PEM1C	No	No	0.1	0.1

TABLE H-2

Wetlands That Would Be Affected By The Project

Milepost		Wetland ID	Cowardin Class	EFH Wetland?	Prior Converted?	Acres Affected During Construction (Temporary)	Acres Affected During Operations (Permanent)
Begin	End						
Total						**342.6**	**127.7**
Jefferson Davis Parish							
74.87	74.91	2073	PEM1C	No	No	0.1	0.0
74.88	75.02	1078B	PEM1C	Yes	Yes	1.6	0.6
74.97	75.08	1078A	PEM1C	No	No	0.2	0.1
74.98	75.29	1078	PEM1C	Yes	Yes	4.0	1.4
75.99	76.00	1077	PSS1C	No	No	0.0	0.0
76.02	76.02	1076	PFO1A	No	No	0.1	0.0
76.03	76.04	1076	PFO1A	No	No	0.1	0.0
76.82	76.83	3014	PSS1C	No	No	0.1	0.1
76.84	76.85	5013	PEM1A	No	No	0.1	0.0
76.99	77.26	3015/1075	PEM1C	Yes	Yes	4.2	1.6
78.32	78.33	3019	PEM1C	Yes	Yes	0.1	-
78.93	78.99	6038	PSS1C	Yes	Yes	0.9	0.3
79.95	79.99	3020	PEM1C	Yes	Yes	0.1	0.1
80.39	80.41	1020	PEM1C	Yes	Yes	0.0	0.0
81.82	81.82	1060	PEM1C	Yes	Yes	0.0	-
82.31	82.42	1061	PEM1C	Yes	Yes	1.5	0.4
82.41	82.99	2018	PEM1C	Yes	Yes	9.2	3.5
83.35	84.24	2019	PEM1C	Yes	Yes	13.1	5.1
84.24	84.33	2020A	PEM1C	Yes	Yes	1.5	0.5
84.32	84.45	2020B	PEM1C	Yes	Yes	1.6	0.6
87.40	87.70	3052	PEM1C	Yes	Yes	4.2	1.7
89.20	89.41	2013	PSS1C	No	No	3.1	1.2
92.20	92.26	1019	PEM1C	Yes	Yes	1.1	0.3
94.61	94.68	2014	PFO1A	No	No	0.1	0.1
98.42	98.56	4016	PEM1A	No	No	1.9	0.8
99.04	99.09	1082	PFO1A	No	No	0.3	0.1
99.07	99.10	1082	PFO1A	No	No	0.1	-
99.12	99.12	1083	PFO1A	No	No	0.0	0.0
99.13	99.17	1084	PFO1A	No	No	0.3	0.2

TABLE H-2 Wetlands That Would Be Affected By The Project							
Milepost		**Wetland ID**	**Cowardin Class**	**EFH Wetland?**	**Prior Converted?**	**Acres Affected During Construction (Temporary)**	**Acres Affected During Operations (Permanent)**
Begin	**End**						
99.29	99.37	1085	PFO1/2C	No	No	1.0	0.3
99.38	99.38	1085	PFO1/2C	No	No	0.0	-
Total						**50.6**	**19.0**
Acadia Parish							
99.39	99.67	1059	PFO1/2C	No	No	4.8	1.6
99.67	99.69	1059	PFO1/2C	No	No	0.1	0.1
100.42	100.42	1012	PEM1C	No	No	0.1	-
103.15	103.16	1006	PEM1C	No	No	0.1	0.1
103.43	103.52	1005	PFO1A	No	No	0.9	0.5
105.90	105.94	3006	PFO1A	No	No	0.1	0.1
107.26	107.31	3007	PSS1C	No	No	0.1	0.1
107.90	107.91	3009	PEM1C	No	No	0.0	0.0
107.91	107.95	3010	PFO1A	No	No	0.3	0.1
108.06	108.08	3010B	PFO1A	No	No	0.1	0.0
108.07	108.10	3010B	PFO1A	No	No	0.1	-
108.71	108.72	3011	PEM1C	No	No	0.0	0.0
109.13	109.22	3012	PFO1A	No	No	0.9	0.4
109.22	109.36	2005	PFO1A	No	No	1.4	0.6
109.24	109.27	3012	PFO1A	No	No	0.1	-
109.25	109.30	2006	PEM1C	No	No	0.1	0.0
110.64	110.68	3021	PEM1C	Yes	Yes	0.2	0.2
112.06	112.07	1061	PFO1A	Yes	Yes	0.0	0.0
Total						**9.4**	**3.8**
Evangeline Parish							
112.63	112.68	1016	PEM1C	Yes	Yes	0.1	0.1
112.70	112.89	1016	PSS1C	Yes	Yes	0.1	-
113.28	113.30	1017	PFO1A	No	No	0.0	0.0
113.52	113.54	1018	PEM1C	No	No	0.1	0.1
113.58	113.62	3013	PSS1C	No	No	0.1	0.1
114.90	114.92	2012	PEM1C	Yes	Yes	0.5	0.1
115.02	115.04	2012	PEM1C	Yes	Yes	0.1	0.0
115.06	115.22	2011	PEM1C	Yes	Yes	2.5	1.0
115.43	115.43	2010	PEM1C	Yes	Yes	0.1	0.0
117.84	117.86	2003	PFO1A	No	No	0.1	0.0
117.90	117.93	2003	PFO1A	No	No	0.1	0.1
117.91	117.94	2003	PFO1A	No	No	0.1	
117.92	117.95	2003	PFO1A	No	No	0.2	

TABLE H-2 Wetlands That Would Be Affected By The Project							
Milepost		**Wetland ID**	**Cowardin Class**	**EFH Wetland?**	**Prior Converted?**	**Acres Affected During Construction (Temporary)**	**Acres Affected During Operations (Permanent)**
Begin	**End**						
117.97	118.00	2004	PFO1A	No	No	0.2	0.1
118.17	118.21	2002	PFO1A	No	No	0.2	0.1
118.18	118.20	2002A	PFO1A	No	No	0.1	0.0
118.68	118.84	1007	PSS1C	No	No	2.3	0.9
118.84	118.86	1008	PFO1A	No	No	0.1	0.1
118.90	118.92	1009	PSS1C	No	No	0.1	-
118.97	119.02	1010	PFO1A	No	No	0.3	0.1
119.04	119.07	1011	PEM1C	No	No	0.1	0.1
120.43	120.44	3004	PEM1C	Yes	Yes	0.0	-
120.44	120.46	3004	PEM1C	Yes	Yes	0.1	0.0
123.40	123.41	1004	PEM1C	Yes	Yes	0.0	0.0
124.56	124.60	1001	PFO1A	No	No	0.5	0.2
124.66	124.67	1000	PFO1A	No	No	0.0	0.0
129.11	129.14	2001	PEM1C	No	No	0.3	0.1
Total						**8.4**	**3.2**
Total Leg 1 and 2						**533.8**	**202.4**
FGT Lateral and Associated Extra Workspaces							
Acadia Parish							
0.76	0.79	3022A/5012	PEM1A	No	No	0.0	-
0.76	0.81	3023A/5011	PFO1A	No	No	0.3	0.2
1.25	1.37	3024	PSS1A	No	No	1.5	0.7
1.25	1.38	3022	PEM1A	No	No	0.0	-
1.36	1.37	3025	PFO1A	No	No	0.1	0.1
1.37	1.40	3027B	PFO1A	No	No	0.2	0.1
1.38	1.58	3022B	PEM1A	No	No	0.0	-
1.38	1.58	3025	PFO1A	No	No	2.1	1.1
1.59	1.60	1066	PEM1A	No	No	0.0	0.0
1.81	1.85	1067	PEM1A	No	No	0.1	0.1
1.84	1.85	1067	PSS1A	No	No	0.1	0.1
1.94	1.95	1068	PEM1A	No	No	0.0	0.0
2.03	2.03	1069	PEM1A	No	No	0.0	-
2.06	2.06	1070	PEM1A	No	No	0.0	0.0
2.10	2.11	1071	PEM1A	No	No	0.0	0.0
2.10	2.12	1073	PSS1A	No	No	0.1	0.0
2.11	2.12	1072	PEM1A	No	No	0.0	-
2.12	2.13	1072	PEM1A	No	No	0.0	-
Total						**4.5**	**2.4**

TABLE H-2 Wetlands That Would Be Affected By The Project							
Milepost		**Wetland ID**	**Cowardin Class**	**EFH Wetland?**	**Prior Converted?**	**Acres Affected During Construction (Temporary)**	**Acres Affected During Operations (Permanent)**
Begin	**End**						
Access Roads							
1		3032	E2EM1P5	No	No	8.3	-
2		4030/2087/2087A	PEM1A	No	No	0.4	-
3		4031/2085	PEM1C	No	No	0.2	-
3		7015	PEM1A	No	No	0.2	-
6		4017	PEM1A	No	No	0.0	-
7		5030	PSS1A	No	No	0.0	-
16		6021	PFO1A	No	No	0.1	-
4-1		1079	PEM1A	No	No	0.0	-
4-5		1097	PEM1Cs	No	No	0.0	-
4-5		4032	PEM1A	No	No	0.1	-
10-1		2031	E2EM1P6	Yes	Yes	0.0	-
13-1		3049	PEM1C	No	No	0.0	-
Total						**9.3**	**-**
Pipe Yards							
1		6042	PSS1C	No	No	19.8	-
1		6043	PEM1A	No	No	19.0	-
2		4033	PEM1A	No	No	19.9	-
4		5032a	PEM1A	No	No	4.0	-
Total						**62.7**	**-**
Aboveground Facilities							
Southwest Loop Delivery Point		2115	PEM1C	No	No	0.3	0.3
		2114	PSS1C	No	No	0.6	0.6
TGTPL Interconnect Site		3052	PEM1C	Yes	Yes	1.0	1.0
NGPL Interconnect		7006	E2EM1P5			0.8	0.8
Total						**2.7**	**2.7**

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APPENDIX I

DRAFT HORIZONTAL DIRECTIONAL DRILLING CONTINGENCY PLAN

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1. Introduction

The scope of the proposed Kinder Morgan (KM) Louisiana Pipeline project includes the installation of 132.2 miles of 42-inch diameter pipeline referred to as Leg 1, 1.2 miles of 36-inch diameter pipeline referred to as Leg 2, and 2.3 miles of 24-inch referred to as the FGT Lateral. Evaluation of the proposed pipeline right-of-way (ROW) has identified potential impacts to several features that could be mitigated by crossing using horizontal directional drilling (HDD) instead of conventional pipe installation methods, such as the open cut method. These features include wetlands, water bodies, canals, and some roads. HDD crossings have been identified only in Leg 1 of the Project. As described in Resource Report 1, HDD method provides minimal planned disturbance of the surface between the entry and exit points of the HDD. Within Resource Reports 1 and 2, Tables 1-10, 1-12 and 2-2 identify proposed HDD crossings by milepost. Some of these milepost sections contain multiple consecutive (i.e., back-to-back) HDD crossings. Table 1 presented in this contingency plan summarizes the HDD crossings for the KM Louisiana Pipeline project.

Table 1 Summary of HDD Crossings by Milepost

Milepost		Alternative HDD Location Relative to Original Borehole	Alternative Construction Method(s) (In Order of Attempted Application)
Begin	End		
3.93	4.83	50-foot offset	1. Conventional (open cut) water/land lay
17.96	18.62	50-foot offset	1. Reroute to shorten and re-drill
			2. Conventional (open cut) water lay around Shell Island
18.62	19.41	50-foot offset	1. Relocate entry hole to shorten and re-drill, conventional water lay to next HDD
19.41	20.01	50-foot offset	1. Relocate entry hole to shorten and re-drill, conventional water lay from previous HDD
			2. Open cut
21.17	22.11	50-foot offset	1. Relocate entry hole to shorten and re-drill, conventional water/land lay to next HDD

Table 1 Summary of HDD Crossings by Milepost

Milepost		Alternative HDD Location Relative to Original Borehole	Alternative Construction Method(s) (In Order of Attempted Application)
Begin	End		
22.11	22.71	50-foot offset	1. Relocate exit hole to shorten and re-drill, conventional land lay to previous HDD
			2. Conventional (open cut) water/land lay
22.71	23.45	50-foot offset	1. Relocate exit hole to shorten and re-drill, conventional land lay to next HDD
23.45	23.95	50-foot offset	1. Relocate entry hole to shorten and re-drill, conventional land lay to previous HDD
25.26	26.03	50-foot offset	1. Relocate entry hole to shorten and re-drill, conventional land lay to next HDD
26.03	26.80	50-foot offset	1. Relocate entry hole to shorten and re-drill, conventional land lay to previous HDD
30.36	31.46	50-foot offset	1. Relocate entry hole to shorten and re-drill, marsh-buggy construction to next HDD
31.46	32.42	50-foot offset	1. Relocate entry hole to shorten and re-drill, marsh-buggy construction to previous HDD
			2. Marsh-buggy construction and conventional open cut (wet) waterbody crossing
43.69	44.48	50-foot offset	1. Conventional land lay and open cut (wet) waterbody crossing
49.57	50.45	50-foot offset	1. Relocate entry hole to shorten and re-drill, conventional land lay to next HDD
50.45	51.30	50-foot offset	1. Relocate exit hole to shorten and re-drill, conventional land lay to previous HDD
51.78	52.37	50-foot offset	1. Conventional (open cut) land lay

Table 1 Summary of HDD Crossings by Milepost			
Milepost		**Alternative HDD Location Relative to Original Borehole**	**Alternative Construction Method(s) (In Order of Attempted Application)**
Begin	**End**		
52.37	53.05	50-foot offset	1. Relocate exit hole to shorten and re-drill, conventional land lay and horizontal bore road remainder
			2. Conventional land lay and open cut (wet) waterbody crossing
77.65	78.40	50-foot offset	1. Relocate exit hole to shorten and re-drill, conventional upland construction remainder
			2. Horizontal bore highway, conventional upland construction remainder
99.02	99.76	50-foot offset	1. Relocate entry or exit hole to shorten and re-drill, conventional upland construction remainder

HDD has been used to successfully install pipelines in soils similar to those underlying the KM Louisiana Pipeline ROW and in similar conditions. Pipelines up to 42 inches in diameter are commonly installed by HDD today. Experienced HDD contractors will be utilized for the installation of the HDDs on the KM Louisiana Pipeline Project. The combination of experience and historical HDD success in the southern Louisiana area strongly suggests that the HDD method will be successful for this Project. In addition, HDD feasibility will be further evaluated using geotechnical data collected from soil borings to be collected at the individual crossings. This soils data will also be used to design the HDD parameters (e.g., entry and exit angles, depth of drill, depth of cover, mud mixture specifications, pullback load requirements) specific for each crossing.

Although not anticipated for this Project, there is always a potential for failure of any HDD pipeline crossing. This contingency plan identifies typical modes of failure associated with HDD installations, including frac-out or loss of drilling fluid (Section 5). Mitigation and/or remedial procedures are identified for these typical issues.

In the event that the mitigation and/or remedial procedures do not result in a successful HDD crossing, this contingency plan presents a decision process to evaluate the continuation of the HDD method or the adoption of alternative pipeline design or installation methods. Generally, if the HDD fails at the original HDD location, KMLP will attempt to move to a second, immediately adjacent (50-foot offset), HDD location. However, the KM Louisiana Pipeline project ROW is, at some locations, narrowly situated between subsurface obstructions, such as other pipelines, or surface obstructions, such as rivers and canals. Consequently, a second HDD location may not always be available. The anticipated presence or absence of a second HDD location offset by 50 feet is identified in Table 1. In the event that HDD method fails at the first and, if available, the second HDD location, an alternative design and/or construction method is suggested in Table 1. A typical alternative design for a long HDD would be to shorten the HDD length, reducing the stress on the equipment and borehole, and completing the distance with a more conventional construction method. When identifying the alternative method, KMLP considered engineering restrictions, ROW restrictions, and potential environmental impacts.

Pre-construction approval of these procedures should expedite the response time for alternative decisions, ensure that appropriate actions are taken that have been pre-approved by the agencies, and minimize adverse environmental impacts that may arise as a result of frac-outs. HDD installations are typically a 24-hour per day, 7 days per week operation, and the objective is to complete each drill in a timely manner with the least adverse impacts to the environment.

2. HDD Technique

There are three major processes associated with the HDD installation of a pipeline crossing: installation of a pilot hole; incremental reaming of the pilot hole followed by swabbing the borehole; and pipe pullback. This section discusses each of these steps.

2.1. Pilot Hole Installation Process

The pilot hole is drilled along a predetermined alignment in which the entry and exit points are located using traditional survey methods. The drill path is monitored by an electronics package housed in the non-rotating pilot drill string near the cutting head. Where possible, a TruTracker® survey system is used to survey the location of the drill path. A wire coil on the surface creates a magnetic field that is detected by the electronic housing. Data from the electronic housing is evaluated by the HDD Operator and adjustments are made to the drill pathway.

Initially, the pilot hole, generally a 9-7/8-inch diameter bore, is installed beneath the proposed crossing using a jetting assembly in non-consolidated sediments, such as those anticipated along the proposed KM Louisiana Pipeline ROW, or a downhole displacement mud motor connected to a tri-cone rotary bit in consolidated sediments. Drilling fluid, pumped through the annulus of the drill stem, performs multiple functions. It aids the mud motor or jetting assembly in cutting the soil, lubricates the drill stem, suspends and carries the drilled cuttings to the surface and forms a wall cake on the interior of the borehole to maintain the integrity of the borehole.

Installation of the pilot hole is closely monitored to provide data necessary to complete the crossing. These data, including the expected penetration rate and geotechnical strata confirmation, are used by the HDD Operator to plan the reaming process

2.2. Reaming and Swabbing Processes

Beginning at the exit point of the crossing, a reamer is attached to the drill stem and passed through the pilot hole to the entry point. For each section of drill stem removed from the entry point of the crossing, a section of drill stem is attached to the reamer and successive sections of drill stem at the exit point. This newly attached drill stem is used to guide the equipment during the return pass of the reamer from the entry side back to the exit side of the crossing. Several passes of a 24-inch reamer are used to initially enlarge the pilot hole from 9-7/8 inches to 24 inches. Once completed, incrementally larger reamers are passed through the borehole until the pilot hole has been enlarged to the final diameter appropriate for insertion of the pipe.

The HDD borehole is then swabbed to clean out remaining soil cuttings and prepare the borehole for the pipe. A swab is constructed by welding caps onto a section of pipe the same diameter as that to be installed in the borehole. The swab is connected to the drill stem and the drilling rig pulls the swab through the borehole. Again, for each section of drill stem removed at the entry side of the crossing, a section of drill stem is attached to the swab and successive sections of drill stem at the exit side. Depending on the borehole, more than one swab may be required to clean the borehole. At completion, the swab will be removed from the exit side of the crossing so that the drill stem can be attached to the prefabricated 42-inch pipe laid out at the exit side of the borehole.

2.3. Pullback Process

After the reaming and swabbing processes have enlarged the borehole to a diameter sufficiently large enough to allow the insertion of the prefabricated pipe, a reinforced pullhead is attached to the leading end of the pre-fabricated pipe segment in preparation for the pullback process. The pullhead is connected by way of a swivel head to the drill stem at the exit side of the crossing. Using the drilling rig, the pipe is pulled through the borehole to the entry side of the crossing. Since the air-filled pipe will float in the drilling fluids, a calculated volume of water is added to the pipe sufficient to maintain a neutral buoyancy while pulling the pipe.

3. Potential Modes of HDD Failure

The potential for failure exists during each process described in Section 2. These modes of failure are detailed in the following discussions. In addition, loss of drilling fluids or frac-out can occur, typically during the pilot hole installation process. Failure due to frac-outs and procedures to handle frac-outs are described in Section 5.

3.1. Failure Modes during Pilot Hole Installation Process

The equipment associated with the pilot hole installation process is subject to a large amount of stress. If the equipment has not been maintained appropriately, the equipment could break. While HDD surface equipment is easily accessed for repair, the equipment is very specialized. Equipment that fails down hole must be retrieved in order to be repaired or to continue installation of the pilot hole.

During the pilot hole installation, the borehole can collapse on the drill stem pipe if sufficient bentonite cake is not maintained on the walls of the hole, or if stratum containing highly fractured rock, glacial till, noncohesive material, or cobbles is encountered. If the pilot hole collapses, the torque required to rotate or advance the drill pipe increases due to additional friction from the collapsed material. This increased friction can freeze the drill pipe in the borehole. Usage of additional torque and tension in an attempt to free the equipment can shear or twist the drill pipe into pieces. Multiple changes in strata or excessively long drill lengths contribute to the probability of this type of failure.

During pilot hole installation, the horizontal position of the hole is located using TruTracker®. When the HDD is below a water body or wetland area that does not allow positioning of the surface cable necessary to operate the TruTracker® system, the pilot hole may deviate from the designed path. The potential for this failure mode increases during long drill lengths. In addition, metal objects located near the pilot hole pathway can interfere with the magnetic field generated by the surface cables resulting in inaccurate TruTracker® locations.

3.2. Failure Modes during Reaming and Swabbing Processes

Caving of the borehole can be a result of insufficient bentonite cake on the walls. This failure type is exacerbated during the reaming process. During each pass, a large volume of drilling fluid is jetted through the reamer. In nonconsolidated soils, the jetting energy can carve out caverns causing the hole to become unstable and cave. The caved material may prevent recirculation of the drilling fluids causing a build up of cuttings in the base of the hole.

In addition to the problem of the caved material obstructing the borehole, both soil collapsed from the borehole and cuttings built up due to poor recirculation of drilling fluids increase the friction on the drill pipe. The increased friction could increase the potential for pipe failure by shearing or twisting into pieces and consequently for the equipment to become lost in the hole.

3.3. Failure Modes during Pullback Process

Failure during the pullback process is identified by pipe refusal in either direction. This may be due to an insufficiently reamed or swabbed borehole, caving due to lack of good bentonite cake on the walls, increased friction on the pipe wall due to positive or negative buoyancy, increased friction on the wall of the pipe due to an excessively long run, or deterioration of the borehole due to a time lag while the pipe lays idle.

4. HDD Failure Mitigation

Generally, the modes of failure identified in Section 3 can be avoided or mitigated prior to complete failure of the HDD technique.

4.1. Mitigation during Pilot Hole Installation Process

KMLP will implement procedures to avoid failure well before commencement of construction. Soil samples collected from borings located near the crossings will be evaluated to verify the subsurface geology and to identify a soil layer depth and type that will minimize the potential for caving during pilot hole installation. A drilling contractor will be identified with experience in HDD installations in similar geology and of similar design to the Project. Proper selection of equipment and well maintained equipment will minimize the potential for equipment failure during the drilling process.

The drilling fluid characteristics will be monitored to minimize the potential for caving due to insufficient mud cake on the borehole wall. Cuttings will be monitored to ensure that circulation has not failed. If the HDD Operator identifies increased stress on the drilling equipment due to poor cuttings return or partial collapse of the pilot hole, he can adjust the drilling fluid consistency or decrease the drilling rate to allow the drilling fluid more time to penetrate the borehole wall and to transport the cuttings from the annulus to the surface. In the event that a decrease in drilling fluid or cutting return is noted, the

HDD Operator can also partially pull out of the boring to ream out the pilot hole and flush the collected cuttings before they completely plug the borehole. These preventive methods minimize stress on the drilling equipment and decrease the potential for equipment failure.

If the pilot hole deviates from the designed pathway, the HDD Operator can correct the pilot hole prior to returning to the surface or if the deviation is significant, he can pull back, grouting the abandoned section of the pilot hole with bentonite, correct the pathway and re-drill that section of the pilot hole so that the pilot hole exits at the correct location.

4.2. Mitigation during Reaming and Swabbing Processes

During the pilot hole installation, the HDD Operator will monitor soil cuttings, rate of advancement, and torque on the drill bit to help identify the characteristics of the underlying strata. Referring to this information, he can adjust pump pressure as he reams the pilot hole to minimize the potential for caving due to high jetting pressure while also adjusting the rate of advancement to maximize the opportunity for the cuttings to exit the borehole. However, if caving does occur, the HDD Operator will remove the reamer and re-attach the drill bit to re-drill the pilot hole. The reaming process can be re-started adjusting for the location of the cave-in as needed.

4.3. Mitigation during Pullback Process

Equipment selection is again very important in the pullback process. The drilling rig must have sufficient power to not only pull the weight of the longest section of pipeline through the borehole but to overcome potential resistance associated with minor cave-ins during the pullback process. KMLP will ensure that the pipe is prefabricated, tested, and ready to be pulled at the completion of the swabbing process. This will decrease the potential for lag time and decrease the likelihood of caving associated with extended lag time.

Knowing the density of the drilling fluids and the weight of the pipe, the volume of water needed to maintain neutral buoyancy will be calculated and gradually added to the pipe as it enters the borehole. The HDD Operator will monitor the drilling equipment for an increase in tension that signifies increased friction on the pipe and possible imminent refusal. At that time, pulling is halted and the buoyancy is adjusted or, if necessary, the pipeline can be removed and the borehole reamed and swabbed.

If the pipeline does become stuck during the pullback process, the HDD Operator can attach an air hammer to the end of the pipeline segment and either hammer the pipeline past the obstruction and through the borehole or hammer the pipeline back towards the exit side, freeing the pipe from the obstruction allowing the drilling rig to again move the pipeline.

5. Frac-Out Failure and Mitigation

This section establishes the procedures for preventing, monitoring, and responding to frac-outs of drilling fluids that may occur during the HDDs. The intent of this section is to set forth a plan of the actions to be taken, under various conditions and for various sizes of frac-outs, should frac-outs occur. There are duplications between the mitigation methods described in Section 4 and in this section; however, since frac-out occurrences are relatively common during HDD, the duplications were permitted in order to make this section as complete as possible.

5.1. Frac-out Definition

For the purposes of this procedure, a “frac-out” shall be defined as the unintentional or inadvertent loss of drilling fluids from the HDD borehole to the ground surface, other than at the borehole entry or exit points. Loss of drilling fluids to the subsurface geological formation may result in an apparent reduction in the return of fluids and cuttings, but will not be considered a frac-out under this plan unless drilling fluids are observed in surface waters or at the ground surface.

5.2. Drilling Fluid Characteristics

“Drilling fluids” (often referred to as “drilling mud”) to be used on this Project will be a mixture of liquids (mostly fresh water) and solids used in a circulating system in the drilling process for the removal of soil cuttings from the borehole, while filling the void left by the cuttings, lubricating and cooling the drill string, and sealing the borehole wall to eliminate fluid loss and maintain borehole stability.

Relatively small proportions of approved “additives,” identified in Table 2, may be mixed with the drilling fluids. These additives will modify the physical and chemical properties of the drilling fluids in order to improve drilling performance or in response to a frac-out. The additives will be used when deemed necessary and appropriate by the On-Site Mud Engineer, approved by the HDD Superintendent, and in the concentrations recommended by the manufacturers and the On-Site Mud Engineer. Other additives may be added to the list by the Mud Engineer, if approved by KMLP.

Table 2 Approved Drilling Fluid Additives

Additive	Manufacturer	Description	Purpose or Use	Approximate and Typical Concentration (% by volume)
Pargel 220®	Parchem Mining & Waterwell, a division of Smith/Schlumberger Company	A naturally occurring Wyoming bentonite clay with low sand content	Lubrication, stabilization of the borehole walls, and the suspension and removal of soil cuttings from the borehole	3.6
Polypac R®	A business unit of M-I L.L.C.	100 percent carboxymethylcellulose sodium salt, a polyanionic cellulose polymer	To control fluid loss and increase the viscosity of the drilling fluid	0.02
Soda Ash	A business unit of M-I L.L.C.	100 percent sodium carbonate	To increase the pH of the drilling fluids to precipitate calcium	0.06
Ringfree®	A business unit of M-I L.L.C.	60 to 100 percent acrylic polymer	To eliminate or cut mud bridging and free up borehole circulation; helps free stuck pipe because it dissolves sticky clays.	0.02 (as a single 60-gallon slug)
FSF Polyswell®	A business unit of M-I L.L.C.	100 percent acrylamide polymer or copolymer	Primarily as a lost circulation material.	0.02
My-Lo-Jel®	A business unit of M-I L.L.C.	100 percent pre-gelantized starch	Fluid loss agent and viscosifier.	0.02

Refer to the Material Safety Data Sheets (MSDS) in Appendix A for more details on the physical, chemical, and environmental characteristics of these non-toxic additives. KMLP must approve the use of any additional additives that the HDD Contractor may deem necessary to resolve specific drilling difficulties, prior to their use.

5.3. Potential Environmental Impacts from Frac-outs

5.3.1. Frac-outs to Water

Drilling fluids released from an HDD frac-out directly into a surface water body at the mud line will be dissipated by the natural currents or blended with the existing solids, primarily clay, suspended in the water column. The solids in the drilling fluids are also primarily clay, but at low concentrations (no more than 5 percent by volume). Inadvertent discharges of the nontoxic drilling fluids may result in a very localized and transient increase in suspended solids concentrations, but these increases pose no significant threat to public health and safety or to aquatic resources. If an underwater frac-out is located in the existing turbid conditions, containment and recovery of the drilling fluids would be impractical due to mixing with the surface water. Frac-outs under water are a greater impediment to the successful completion of an HDD, due to lost circulation, than they are a significant impact on the environment. In the event of a frac-out, the HDD Contractor will employ measures described herein to regain proper circulation in order to complete the borehole, which in turn should reduce or eliminate the frac-out to surface water. As directed by KMLP in consultation with the regulatory agency representative, containment may be attempted if sensitive resources, such as oyster beds or marsh, are threatened and conditions permit.

5.3.2. Frac-outs to Marsh

Several of the HDDs will cross under salt and brackish marsh; in fact, many of the HDDs are being performed in order to eliminate direct impacts to marsh from conventional pipe installation by trenching. Because of the low concentration (less than 5 percent) of solids in the drilling fluids, and the natural tendency of the fluid to seek a uniform elevation equal to the water level in the marsh, a measurable or permanent increase in any ground surface elevation is not likely. If the drilling fluid has a particularly high viscosity and the tide is low, a temporary rise might be visible, but this will quickly dissipate. On the other hand, the settlement of fines, if of sufficient volume, in the marsh may suffocate existing vegetation or affect surface hydrology. Efforts by the HDD Contractor to contain and recover frac-out fluids in marsh will also cause disturbance of the marsh surface and vegetation by equipment and personnel, and depending upon its location, such disturbance could offset the benefit gained in removing the released fluids. Because it is difficult to predict the net effect of a frac-out and attempts to recover the fluids, any frac-outs to the marsh must be evaluated on a case-by-case basis and an appropriate level of response mounted as described herein.

5.3.3. Frac-outs to Uplands

Uplands crossed by HDD on this project are limited to some road and railroad crossings including the I-10 HDD crossing. Environmental impacts will be limited to possible surface runoff of fines into adjacent surface waters. Typically the upland crossings are readily accessible by conventional construction equipment, so the HDD Contractor will perform containment and recovery of drilling fluids utilizing Containment and Recovery Equipment listed in Appendix B.

5.4. Frac-out Prevention

The first and most effective step in limiting the potential environmental impacts of HDD frac-outs is to prevent frac-outs from occurring in the first place. This can be accomplished in the conservative design of the HDD profile, as well as by observing preventative procedures during the actual HDD crossing.

5.4.1. Design

Precautionary measures incorporated into the design of the proposed HDDs to minimize the possibility of frac-outs, include:

a) Geotechnical Investigations

The soils strata targeted for the majority of the length of each borehole will be selected based on physical properties most conducive to producing a successful boring. These strata and their properties will be identified in pre-construction geotechnical investigations conducted along the length of each proposed HDD installation.

b) Depth of Cover

The proposed depth of cover will be maintained at a minimum of 20 feet (and in most cases, significantly more) below waterbodies and marsh, except in the initial and final 100 feet (+/-) where the borings enter and exit the ground. Since the possibility of a frac-out may increase as depth of cover decreases, the initial and terminal 100-foot sections of each HDD will be located in either upland areas or in open water, and have been purposely kept out of marsh areas, where possible.

5.4.2. Construction

The HDD Contractor will employ reasonable measures during drilling activities to prevent or minimize the occurrence of frac-outs, including as a minimum:

a) On-site Mud Engineer

A full-time, qualified, mud engineer will be on site. The On-site Mud Engineer will continuously monitor the drilling fluid circulation and returns, and ensure that the fluids handling equipment is operating within expected and optimum parameters (i.e. pressures, flow rates, etc.) for the soils conditions observed.

The On-site Mud Engineer will continuously monitor returned cuttings for soils type, and will modify the drilling fluid properties (i.e. viscosity, density, etc.) with the appropriate additives, as he deems necessary to account for changes in soil conditions.

b) Controlled Drill Head Advance

Where possible at the beginning of a drill, the drill head will be initially advanced with minimum drilling fluid pressure to minimize frac-outs in the relatively shallow depths.

The HDD Operator will advance the drill head at a pace that permits soils cuttings sufficient time to be flushed from the borehole by the drilling fluids. This prevents plugging and thereby maintains down-hole pressures at an acceptable level. The maximum rate of advance will be set, and periodically adjusted, by the HDD Operator, based on consultation with the On-site Mud Engineer, and as subsurface conditions change. If plugging occurs (i.e. return flow is diminished relative to fluid pumping rate), the rate of advance will be reduced, stopped, or reversed, as appropriate, until the plug has been cleared.

c) Minimum Pump Pressure

Drilling fluid pump pressure will be maintained at no more than the minimum necessary to maintain good circulation and to keep the borehole clear of cuttings. In the event a reduction in circulation is observed, at the discretion of the On-site Mud Engineer, adjustments to drilling fluid properties (i.e., density, viscosity, etc.), rate of drill head advance, and reaming diameter will be considered before pump pressure is increased.

5.5. Monitoring for Frac-outs

The HDD Operator will ensure that HDD operations are monitored for the occurrence of frac-outs using each of the following methods, where appropriate:

5.5.1. Pump Pressure

The drilling fluid pump discharge pressure shall be continuously monitored by the On-site Mud Engineer and recorded on a field data log prior to each joint connection. Significant changes or fluctuations in pressure may indicate the possibility of a frac-out, requiring immediate response.

5.5.2. Circulation Rate

The On-site Mud Engineer shall continuously monitor the flow rate of drilling fluid circulation and the volume of returns and record the data prior to each joint connection or following a change in return rate. Differences between the pumping rate and the rate of returns may indicate a frac-out.

5.5.3. Ground Surface Inspection

The HDD Operator shall assign one person to visually inspect the ground surface in uplands and marsh along the progress of the HDD for indications of escaping drilling fluids. Where possible, without trespassing outside the approved workspace or entering marsh (i.e., from a boat adjacent to the marsh), the inspection will cover a corridor approximately 500 feet wide, centered on the drill. Inspections shall be made relative to the rate of advance of the drill head, but an inspection pass shall be made at least once every hour while pumping drilling fluids. Any indications of a frac-out shall be reported immediately to the HDD Operator. If operating parameters (i.e., fluctuations in fluid pressure or returns) indicate the possibility of a frac-out, the surface inspection shall become continuous (daylight only) until the location of the suspected frac-out is found, the drill is completed, or measures to remedy the frac-out using additives or other operational adjustments have been successful. Daylight continuous monitoring will supplement the monitoring of operating parameters. Reasonable efforts will be made to locate the point of frac-out, if possible, in order to assess environmental damage, if any.

Inspections on uplands may be made on foot or from an appropriate vehicle. Inspections in marsh may be made on foot or from a boat in adjacent waters, depending on the potential for negative impacts to marsh by the inspection activities. Site-specific marsh inspection methods shall be reviewed and approved by the On-site KMLP Environmental Monitor, following consultation with the regulatory agency representative, if present.

5.5.4. Surface Water Inspection

The HDD Operator shall assign an individual to visually inspect the waterbodies under which the HDD is crossing for turbidity plumes that might indicate a frac-out is occurring. Inspection passes shall be made at least once every hour while pumping. Any indication of a frac-out shall be reported immediately to the HDD Operator. If operating parameters indicate the possibility of a frac-out under water, the water inspection shall become continuous (daylight only) until the location of the suspected frac-out is found, the drill is completed, or measures to remedy the frac-out using additives or other operations adjustments have been successful. Inspections shall be made by boat, or from an elevated position on land with an unobstructed line-of-sight to the water body (binoculars are recommended). Inspection boats shall be positioned and operated so as not to interfere with the ability to observe a plume or create a prop-induced plume (i.e. down-current from the drill centerline).

5.5.5. Special Safety Considerations

Monitoring in water or marsh at night or in fog will require special safety precautions and equipment considerations, including Coast Guard-approved navigation lights on all vessels, two men in each boat, continuous communication with the onshore crew or the drill barge, and portable lights of sufficient power to effectively monitor the area. No continuous nighttime monitoring will be allowed. Monitoring in water or marsh will be discontinued whenever conditions render the activity unsafe. At such time, the HDD Operator will determine, subject to KMLP approval, if drilling can safely continue while monitoring for frac-outs based solely on pump pressure and drilling fluids returns.

5.5.6. Notifications

Upon first indication of a frac-out, the HDD Operator shall notify the On-site KMLP Environmental Monitor. Upon confirmation of a frac-out, the On-site KMLP Environmental Monitor will notify the appropriate regulatory agencies, and the HDD Operator shall notify the affected landowner(s).

5.6. Initial Response to a Frac-out

The HDD Contractor's initial response to a potential frac-out shall be in accordance with the flow diagram provided in Figure 1, and as described in further detail below.

- Upon first indication of a potential frac-out, the HDD Operator shall reduce drilling fluid circulating pressure, continue rotation of the drill string, and continue to advance the drill head in an attempt to stop or substantially reduce the frac-out rate.

- If the frac-out is initially or subsequently confirmed by an observed release of fluids to the surface or an observed turbidity plume in water, the HDD Operator will attempt to advance the drill head past the known point of the frac-out.

- Concurrently, the On-site Mud Engineer may inject pre-approved additives, in concentrations recommended by the manufacturer and as calculated by the On-site Mud Engineer, into the drilling fluid mixture in an additional attempt to control the release.

- If the release of drilling fluids continues unabated at a rate that threatens to expand to more than 0.1 acres of marsh habitat, or at a rate otherwise deemed excessive by the On-site KMLP Environmental Monitor (in consultation with the regulatory agency representative, if present), or completion of the drill is in jeopardy due to failure to remove cuttings from the borehole, advancement of the drill will be temporarily suspended.

- The Drill Operator may continue to rotate the drill string in the borehole and circulate fluids at a pressure that does not result in continued fluid release at the frac-out point, in order to keep the borehole open.

- If the frac-out is to marsh, the HDD Operator shall request that the On-site KMLP Environmental Monitor proceed to the analysis for containment and recovery described in Section 5.7.2 below, before continuing with the drill.

- If the frac-out is to uplands, the HDD Operator may continue advancing the drill, provided the released fluids are contained and removed (as described in Section 5.7.3 below), and after confirmation that cuttings are being returned at a sufficient rate to ensure successful completion of the borehole. The On-site Mud Engineer shall make adjustments to the drilling fluid properties to plug the frac-out or reduce the volume of fluids being released.

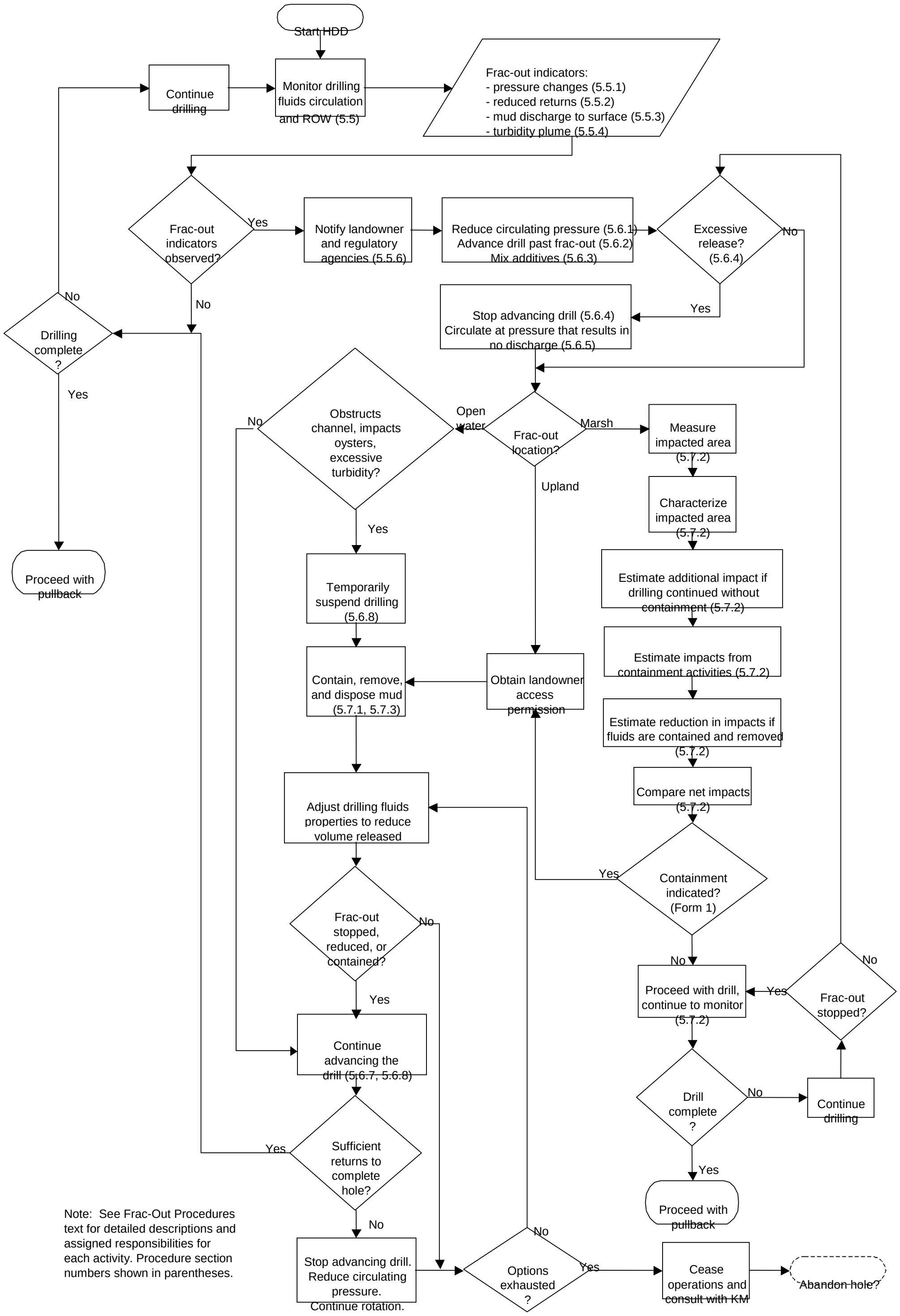

Figure 1. HDD Frac-out Flow Chart

- The HDD Operator may also continue to advance the drill if the release is to open water, the release does not obstruct a navigation channel, directly impact oyster resources, or accumulate in marsh and the cuttings are being returned at a sufficient rate to ensure successful completion of the borehole. The On-site Mud Engineer shall make adjustments to the drilling fluid properties to plug the frac-out or reduce the volume of fluids being released. If, however, the On-site KMLP Environmental Monitor (in consultation with the regulatory agency representative, if present) deems the resulting turbidity plume to be excessive, the HDD Operator shall temporarily suspend drilling until necessary corrective measures are successfully implemented.

- The On-site Mud Engineer shall record all parameters being tracked at the time of frac-out, including fluid circulating pressure, fluid mixture composition, fluid viscosity, location and depth of the drill head, location of the frac-out, rate of drill advance, and time of day. The HDD Operator shall keep a running log of all activities associated with the attempts to control the frac-out.

5.7. Containment and Removal

Containment and removal of drilling fluid releases to the surface from a frac-out shall be performed where practical and where there will be a net benefit in the reduction of total environmental impacts.

5.7.1. To Surface Waters

Containment and removal of drilling fluids released to surface waters as a result of a frac-out is generally impractical and ineffective because of dilution in the water column, and dispersion due to tides and currents. If, however, the On-site KMLP Environmental Monitor (in consultation with the regulatory agency representative, if present) considers the resulting plume excessive, or the plume may directly and negatively impact oyster resources or adjacent marsh, the HDD Operator shall implement the following containment measures.

- Depending upon the depth of water and surface conditions, floating silt booms, anchored in place, shall be placed over the location of the frac-out. The purpose of the containment is to confine the suspended solids until some observable degree of settlement can occur. Removal of the diluted drilling fluids is not anticipated, unless dictated by unusual circumstances, and subject to KMLP approval.

- The containment shall remain in place until the frac-out stops, and settlement renders the turbidity inside the containment similar to the adjacent waters based on visual inspection (Secchi disk), or the threat to the sensitive resource has passed (e.g. reversal of tidal currents).

- Any containment structure placed in open water shall be clearly marked as an obstruction in accordance with Coast Guard regulations, with special consideration given to the type of marine traffic observed in the area.

5.7.2. In Marsh

Containment and removal of released drilling fluids from a frac-out to marsh shall be performed when there is a net benefit in the reduction of impacts, as determined by the following actions.

- Upon confirmation of a frac-out in marsh, the HDD Operator shall assist the On-site KMLP Environmental Monitor in measuring the area directly affected by the released drilling fluids. The area affected may be estimated from a distance, if access to the affected area for measurement would result in additional unacceptable negative impacts.

- The On-site KMLP Environmental Monitor (a qualified wetlands biologist) will characterize the type of impact (e.g., temporary, permanent, vegetation only, change in surface hydrology) caused by the released fluids. The On-site KMLP Environmental Monitor will seek concurrence from the regulatory agency representative, if present.

- The HDD Operator and the On-site KMLP Environmental Monitor shall jointly estimate the additional area, if any, likely to be affected if the drilling were to proceed and the drilling fluids were not contained and removed.

- In consultation with the HDD Operator, the On-site KMLP Environmental Monitor will estimate and characterize the additional impacts to marsh likely to occur as a result of accessing the affected area for containment and removal of the drilling fluids.

- The On-site KMLP Environmental Monitor will estimate any reduction in impacts that might be achieved if the released fluids were removed.

- The total actual impacts, plus the estimated impacts from continuation of an uncontained release, shall be compared to the total actual impacts, plus the estimated impacts from accessing the area for containment and removal, less the estimated reduction in impacts as a result of recovery of the fluids. (Use Form 1 for guidance.) When making this comparison, some consideration and judgment should be given to the types of impacts, and value of the resources affected, if dissimilar. The action resulting in the least total impacts will generally be selected, unless there are mitigating circumstances, or as otherwise instructed by the regulatory agency representative, if present.

- If the decision is to forgo containment and proceed with the drill, the On-site KMLP Environmental Monitor will continue to observe the location of the frac-out. If the impacts continue to increase, the On-site KMLP Environmental Monitor will periodically repeat the comparison described above, until such time as containment and removal are justified, or the drill is complete.

- In the event of excessive and uncontrolled discharges of drilling fluids to marsh, KMLP and the HDD Operator shall determine a course of action. The frac-out shall be successfully plugged through adjustments in mud mixture or drilling techniques, or the released fluids shall be contained and recovered from the marsh with minimal and acceptable levels of impact. [NOTE: No containment or recovery activities will be allowed in the marsh without agency approval.] If this cannot be achieved, the borehole shall be abandoned.

- Prior to commencement of any HDD, the HDD Operator shall ensure that appropriate equipment is available at each HDD location to contain and recover drilling fluid flow from frac-outs into marsh. (See checklist in Appendix B.)

- If it is determined (as described above) that the released drilling fluid is to be contained and recovered, the HDD Operator shall direct the placement of the equipment at the obvious point or points of frac-out and transfer the contained fluids to a hopper barge or frac tank for reuse or disposal.

Form 1. Marsh Frac-out Impacts Comparison

Drilling Fluids Containment vs. No Containment (to be completed by On-site KMLP Environmental Monitor)

HDD No.:		**Date:**				
Frac-out Location:	**X=**		**Y=**		**Distance from Entry Point (ft) =**	

Description	**Impact Characterization**			
	Area (Acres)	**Vegetation**	**Surface Hydrology**	**Comments**
No Containment or Recovery Option:				
Actual marsh area impacted by drilling fluids		☐ Temp ☐ Perm ☐ None	☐ Temp ☐ Perm ☐ None	
Plus estimated additional area impacted if drill proceeds (consider all reduction measures, such as drill head advancing past frac-out, frac-out control additives, reduced pump pressure, etc.)		☐ Temp ☐ Perm ☐ None	☐ Temp ☐ Perm ☐ None	
Subtotal No Containment or Recovery				
Containment and Recovery Option:				
Actual marsh area impacted by drilling fluids		☐ Temp ☐ Perm ☐ None	☐ Temp ☐ Perm ☐ None	
Plus estimated impacts from accessing area for containment and recovery		☐ Temp ☐ Perm ☐ None	☐ Temp ☐ Perm ☐ None	
Less estimated reduction in impacts by removing drilling fluids		☐ Temp ☐ Perm ☐ None	☐ Temp ☐ Perm ☐ None	
Subtotal Containment and Recovery				
Option Selected: ☐ Least total acreage impacted ☐ Other, explain:				

Construction (To Be Determined): ____________ KMLP: ____________ Agency: ____________

- All access to the marsh shall be done in such a manner as to cause the least impacts to the marsh vegetation and surface hydrology, and only with agency approval. Because of site-specific variables, such as distance from open water, surface hydrologic conditions, and vegetation cover, the selection of the most appropriate access method (e.g., using shallow draft boats, airboats, or on foot) must be made on a case-by-case basis, subject to approval by the On-site KMLP Environmental Monitor. The least number of personnel and equipment necessary to accomplish the task safely and in a timely manner shall be deployed into the marsh as described above.

- Following containment and removal, the HDD Operator shall continue to monitor this location for additional releases, and the remainder of the drill for new frac-outs, as the drill progresses.

- Whether or not containment and recovery is performed, all impacts to marsh from frac-outs will be measured, assessed, and recorded by the On-site KMLP Environmental Monitor, with assistance from the HDD Operator, for determination of any mitigation or restoration measures that may be necessary, as described below.

- Upon completion of the boring, the HDD Operator shall ensure that all containment and recovery equipment, tools, supplies, materials, wastes, and debris are removed from the marsh.

5.7.3. On Uplands

- The HDD Operator shall utilize as necessary, the appropriate combination of sand bags, hay bales, silt fence, pumps, hoses, and frac tanks that will most effectively contain and remove drilling fluids from upland areas (see checklist in Appendix B). The HDD Superintendent shall make the determination of the equipment and materials to be used, with approval of the On-site KMLP Environmental Monitor.

- The HDD Operator shall instruct the recovery crew to pump the contained and recovered fluids to frac tanks on site for reuse, if the On-site Mud Engineer determines the fluids are reusable. Otherwise, the fluids will be transported off site for disposal. (See HDD procedures for instructions on proper transportation and disposal of drilling fluids.)

- KMLP will obtain landowner permission prior to accessing any upland sites for fluids containment and removal operations, except in an emergency where inaction would pose an imminent threat to human health, sensitive environment, or property.

5.8. Impacts Assessment

Whether or not the drilling fluids have been successfully contained and removed, the On-site KMLP Environmental Monitor will fully characterize the environmental impacts from any release of drilling fluids following completion of the HDD, including the areal extent of the plume, the area affected by any recovery efforts, the type of marsh and vegetation impacted, changes to marsh elevation and hydrology, and whether the impacts are permanent or temporary. The On-site KMLP Environmental Monitor will seek concurrence of his assessment with the regulatory agency representative, if present.

The HDD Operator will provide an assistant and a boat (if necessary) to assist the On-site KMLP Environmental Monitor in completing this assessment.

A report of the assessment will be provided to the regulatory agency representative for determination of any further action.

6. Definition of HDD Failure and Abandonment Criteria

In the event the mitigation methods identified in Sections 4 and 5 are implemented with unsatisfactory results, KMLP will employ the following criteria to determine if the HDD method has failed and should be abandoned. If it is determined that HDD has failed, the alternative crossing method (or methods) identified in Table 1 will be utilized to complete the installation of the pipe.

6.1. Criteria for Pilot Hole Failure

Generally, breakdown of the HDD equipment is not considered to be acceptable criteria for an HDD failure. If surface HDD equipment, such as the HDD rig, breaks, it is the responsibility of the HDD Contractor to repair the equipment within 7 days. If the HDD Contractor can not repair the equipment within that time period, a second HDD Contractor may be identified and the HDD crossing will be re-started.

If, according to the HDD Operator, subsurface conditions are such that additional attempts at completing the HDD crossing would likely result in continued equipment failure, and, in the HDD Operator’s option, the HDD method will not be successful, KMLP and the agency will discuss the possibility of abandoning the HDD method.

If drilling equipment breaks in the boring and cannot be retrieved, the HDD Operator will attempt to drill around the downhole equipment. If the HDD Operator cannot advance the pilot hole, the HDD equipment will be moved to the second, immediately adjacent, HDD location, if available (see Table 1), and the HDD Operator will attempt to re-drill the pilot hole. If a second HDD location is not available, the HDD as designed will have failed, and KMLP will advance to the alternative crossing method (see Table 1).

If, after adjusting the drilling fluids, the initial pilot hole collapses on the downhole equipment or there is a frac-out that meets conditions of failure identified in Section 5, the HDD Operator and the On-site KMLP Environmental Monitor will determine if the pilot hole can be redesigned to utilize a different subsurface strata and attempt a second installation of the pilot hole at the original HDD location.

If the pilot hole can be redesigned but not installed at the original HDD location or if the pilot hole can not be redesigned, the HDD equipment will be moved to the second adjacent location, if available (see Table 1), and a pilot hole installation attempt will be completed at the second, adjacent HDD location. If the attempt fails at the second HDD location, KMLP may consider the HDD as designed a failure. If a second adjacent HDD location is not available, the HDD as designed may be considered a failure.

Failure of the pilot hole installation due to deviation from the designed pathway is not anticipated. If the pilot hole deviates from the designed pathway, the HDD operator will back out of the borehole, grout the incorrect pathway and re-drill the pilot hole, correcting for the pathway deviation as needed.

Once HDD has been determined to have failed, the HDD Contractor will demobilize its equipment from the site after approval from KMLP and the crossing will be completed using the alternative method.

6.2. Criteria for Reaming and Swabbing Failure

If, following the collapse of the opened borehole or due to stresses on the equipment, the reamer equipment fails and part or the entire reamer is lost downhole, the HDD Contractor will be allowed 7 working days to attempt to retrieve the equipment from the hole and then return to the HDD crossing installation. If the HDD Contractor cannot retrieve the lost equipment, this is an unsuccessful attempt at opening the completed pilot hole due to equipment failure. If possible, a new pilot hole will be redesigned and installed at the first HDD location or if available, installed at the second adjacent HDD location. If neither of these two options can be implemented, HDD may be considered a failure due to equipment failure.

If the borehole collapses during the reaming process and the reaming equipment is retrieved, the pilot hole will be re-drilled at the original location and the pilot hole opening re-attempted. If, there is a second unsuccessful attempt at opening the pilot hole, the HDD Operator and the On-site KMLP Environmental Monitor will determine if the pilot hole can be redesigned and installed at the original location. If not, the HDD equipment will be moved to the second adjacent HDD location, if available (see Table 1), and the HDD Operator will attempt pilot hole installation and conditioning. If there are two unsuccessful attempts at opening the pilot hole at the second HDD location, HDD may be considered a failure. If there is not a second adjacent HDD location, the HDD as designed may be considered a failure.

Once HDD has been determined to have failed, the HDD Contractor will demobilize its equipment from the site after approval from KMLP and the crossing will be completed using the alternative method.

6.3. Criteria for Pullback Failure

If during the pull back process the pipe becomes stuck in the borehole, the HDD Operator will attempt to remove the pipe. If the pipe can be removed, the hole will be reconditioned and a second attempt to pullback the pipe will be completed. If during the second attempt to pullback the pipe, the pipe again becomes stuck, the HDD Operator will attempt to remove the pipe. If the pipe can be removed, the HDD Operator and the On-site KMLP Environmental Monitor will determine if a third attempt at the original location is warranted or if a new pilot hole should be drilled and opened at the second adjacent HDD location, if available (see Table 1). If a third attempt to pull the pipe at the original location fails, the HDD equipment will be moved to the second adjacent HDD location, if available (see Table 1) and a new pilot hole will be installed and opened. If a second HDD location is not available, HDD may be considered a failure.

If the crossing is moved to the second HDD location, three attempts to pullback the pipe, in which the pipe becomes stuck but can be retrieved, will be completed before HDD may be considered a failure.

If during the pullback process the pipe becomes stuck and cannot be retrieved from the borehole, the pipe will be abandoned in place. If a second HDD location is available, a new pilot hole will be installed and conditioned. A maximum of three attempts at the second location to pullback the pipe will be completed before HDD may be considered a failure. If a second location is not available, then HDD may be considered a failure.

Once HDD has been determined to have failed, the HDD Contractor will demobilize its equipment from the site after approval from KMLP and the crossing will be completed using the alternative method.

7. KMLP/Agency Communication

The On-site KMLP Environmental Monitor will prepare documentation in the form of daily progress reports, as-built information, and a description of the events leading up to the HDD failure. This documentation will be presented to the appropriate agencies notifying them of the HDD failure and KMLP's schedule for implementing the approved alternative crossing method. Pre-approval of the alternative crossing method will allow KMLP to proceed in a timely manner to begin implementation of the alternative method without additional agency approval or acknowledgement of the receipt of the failure documentation.

Appendix A – MSDS Sheets for Drill Additives

MATERIAL SAFETY DATA SHEET

Trade Name: RINGFREE **MSDS NO.** 12003

Revision Date: 10/09/2001

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Trade Name:	**RINGFREE**		
Synonyms:	None	**HMIS Rating**	
Chemical Family:	Not Determined	**Health:**	1
Product Use:	Oil well drilling fluid additive.	**Flammability:**	1
UN/NA PIN No:	Not Regulated	**Reactivity:**	0
WHMIS Class:	Non-Controlled	**PPE:**	J

Emergency Telephone (24 hr.): 281-561-1600

Supplied by a Business Unit of:
M-I L.L.C.
5950 North Course Drive
Houston, TX 77072
Phone: (281) 561-1509
Fax: (281) 561-7240

Contact Person:	Sam Hoskin - Manager, Occupational Health
Revision Date:	10/09/2001
Revision Number:	1
MSDS Status:	Approved

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient/CAS	Wt. %
Acrylic Polymer NONE	60-100

Ingredient Comments: No comments.

3. HAZARDS IDENTIFICATION

Emergency Overview: CAUTION! MAY CAUSE EYE, SKIN, AND RESIRATORY TRACT IRRITATION. Avoid contact with eyes, skin and clothing. Avoid breathing airborne product. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.
This product is a/an Colorless to light yellow liquid

Potential Health Effects:
Acute Effects

Eye Contact:	May irritate eyes.
Inhalation:	May be irritating to the respiratory tract if inhaled.
Ingestion:	May cause gastric distress, nausea and vomiting if ingested.
Skin Contact:	May be irritating to the skin.

Chronic Effects

Sensitization: Not determined.

Carcinogenicity:

Principle Routes of Exposure: Inhalation. Dermal - skin. Eyes.

Target Organ Effects: Respiratory System. Lungs. Skin. Eyes.

Signs and Symptoms: None known from occupational exposure.

Medical Conditions Aggravated By Exposure:
None known from occupational exposure.

Environmental Effects and Hazards:
Environmental effects have not been determined.

4. FIRST AID MEASURES

Eye Contact: In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion: If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.

Inhalation: Remove person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, get immediate medical attention.

Skin Contact: Wash skin thoroughly with soap and water. Remove contaminated clothing. Get medical attention if any discomfort continues.

General Notes: Persons seeking medical attention should carry a copy of this MSDS with them.

Notes To Physician: None known.

5. FIRE FIGHTING MEASURES

Flammable Properties

Flash Point: °F N/A °C N/A

Flash Point Method: Not Determined

Flammable Limits in Air - Lower (%): Not Determined

Flammable Limits in Air - Upper (%): Not Determined

Autoignition Temperature: °F Not Determined °C Not Determined

Flammability Class: Not determined.

Other Flammable Properties: Not determined.

Extinguishing Media: Carbon dioxide Dry chemical Foam Water mist

Protection Of Fire-Fighters:

Special Fire-Fighting Procedures: Wear approved positive-pressure self-contained breathing apparatus and protective clothing.

Hazardous Combustion Products: Carbon monoxide. Carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Use personal protective equipment identified in Section 8.

Spill Procedures: Absorb in vermiculite, dry sand or earth and place into containers. Rinse area with water. Dike far ahead of larger spills for later disposal.

Environmental Precautions: Do not allow to enter sewer or surface and subsurface waters.

7. HANDLING AND STORAGE

Handling: Use in a well ventilated area to prevent irritation by vapors. Wear full protective clothing for prolonged exposure and/or high concentrations. Eye wash and emergency shower must be available at the work place. Wash hands often and change clothing when needed.

Storage: Store at room temperature in dry, well ventilated area. Keep in original container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limits

Ingredient/CAS	Wt. %	ACGIH TLV TWA	ACGIH TLV STEL	ACGIH TLV Ceiling:	ACGIH Skin	OSHA PEL TWA	OSHA PELs Ceiling:	OSHA PELs Skin	Notes
Acrylic Polymer NONE	60-100	Not Listed	Not Listed	Not Listed	Not Listed	Not Listed	Not Listed	Not Listed	(1)

Notes: (1) Control as Particulates Not Otherwise Regulated (PNOR); PEL: 5 mg/m3 resp; TLV: 3 mg/3m resp;

Engineering Controls: Local exhaust ventilation as necessary to maintain exposures to within applicable limits.

Personal Protection Equipment

Eye/Face Protection: Wear chemical safety goggles where eye exposure is reasonably probable.

Skin Protection: Wear appropriate clothing to prevent repeat or prolonged skin contact.

Respiratory Protection: If exposed to particulates/aerosols:
Use at least a NIOSH-approved N95 half-mask disposable particulate respirator. In work environments containing oil mist/aerosol use at least a NIOSH-approved P95 half-mask disposable or reuseable particulate respirator.
If exposed to organic vapors:
Use a NIOSH/MSHA-approved organic vapor respirator. CCROV: CCR with organic vapor cartridge.

General Hygiene Considerations: Wash promptly with soap and water if skin becomes contaminated. Change work clothing daily if there is any possability of contamination.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Not determined.
Color:	Light Yellow
Odor:	Mild
Physical State:	Liquid
pH Value, Conc. Sol.:	Not Determined
pH Value Diluted Sol.:	7.25
Vapor Pressure:	Not Determined
Vapor Density (Air=1):	Not Determined
Boiling Point (°F):	194 - 212
Melting/Freezing Point:	Not determined.
Solubility in Water Description:	Not Determined
Solubility:	Soluble in Water
Density/Specific Gravity:	1.27
Evaporation Rate:	Not Determined
Odor Threshold Lower:	NA
Odor Threshold Upper:	Unknown

10. STABILITY AND REACTIVITY

Chemical Stability:	Stable
Conditions to Avoid:	Heat.
Materials to Avoid:	Strong oxidizing agents.
Hazardous Decomposition Products:	Oxides of carbon
Hazardous Polymerization:	Will not occur

11. TOXICOLOGICAL INFORMATION

Toxicological Data

Ingredient/CAS	Wt. %	Route	Species	Dose	Duration	Effect	Source
Acrylic Polymer NONE	60-100	N/D	N/D				N/D

Toxicological Information: No toxicological data is available for this product.

12. ECOLOGICAL INFORMATION

Ecotoxicological Data

Ingredient/CAS	Wt. %	Species	Concentration	Duration	Source
Acrylic Polymer NONE	60-100	N/D		N/D	N/D

Chemical Fate Data

Biodegration: Not determined.

Bioaccumulation: Not determined
Octanol/Water Partition Coefficient: None Known

Ecological Information: No ecological information is available for this product.

13. DISPOSAL CONSIDERATIONS

Waste Classification: Not determined.

Waste Management: This product does not meet the criteria of a hazardous waste if discarded in its purchased form. Under RCRA, it is the reponsibility of the user to determine at the time of disposal, whether the product meets RCRA criteria for the hazardous waste. This is because product uses, transformations, mixtures, processes, etc., may render the resulting materials hazardous. Empty container retain residues. All labeled precautions must be observed.

Disposal Method: Recover and reclaim or recycle, if practical. Should this product become a waste, dispose of in a permitted industrial landfill. Ensure that the containers are empty by the RCRA criteria prior to disposal in a permitted industrial landfill.

14. TRANSPORT INFORMATION

U.S. DOT

Proper Shipping Name:	Not Regulated
Hazard Class:	None
Subsidiary Harzard:	None
UN/NA Number:	Not Regulated
DOT Packing Group:	None
Packaging Authorizations:	None
Product RQ:	Not determined.
Emergency Response Guide No.:	Not determined.

TDG (Canada):

Proper Shipping Name:	Not Regulated
Hazard Class:	Not regulated.
Subsidiary Hazard:	None
UN/NA PIN No:	Not Regulated
Packing Group:	None

IMDG:

Proper Shipping Name:	Not Regulated
Hazard Class:	Not regulated.
Subsidiary Hazard:	None
UN No.:	Not Regulated
Packing Group:	None
EMS No.:	None
Marine Pollutant:	None

ICAO/IATA:

Proper Shipping Name:	Not Regulated
Hazard Class:	Not regulated.
Subsidiary Hazard:	None
UN No.:	Not Regulated
Packing Group:	None

15. REGULATORY INFORMATION

US Federal Regulations

SARA 311/312:

SARA 311/312 Hazard Catagories: Immediate (acute) health hazard;

Acrylic Polymer 60-100 **NONE**

SARA 313	Not Listed
CERCLA	Not Listed
SARA 302 / TPQs	Not Listed

State Regulations

State Comments: Proposition 65: This product does not contain chemicals considered by the State of California's Safe Drinking Water and Toxic Enforcement Act of 1986 as causing cancer or reproductive toxicity, and for which warnings are now required.

Acrylic Polymer 60-100 **NONE**

California Prop. 65 Cancer list	Not Listed
California Prop. 65 Developmental Toxicity	Not Listed
California Prop. 65 Reproductive Female	Not Listed
California Prop. 65 Reproductive Male	Not Listed

International Inventories

TSCA - Sect. 8(b) Inventory	This product complies with TSCA.
Canada - Domestic Substances Inventory	This product complies with Canadian DSL.
Canada - Non-Domestic Substances Inventory	This product does not comply with Canadian NDSL.

Canadian Regulations

Controlled Products Regulations Statement: This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS Class: Non-Controlled

16. OTHER INFORMATION

Notes: N/D = Not Determined; N/A = Not Applicable

Information Sources:

OSHA Permissible Exposure Limits, 29 CFR 1910, Subpart Z, Sections 1910.1000, Air Contaminates. ACGIH Threshold Limit Values and Biological Exposure Indices for Chemical Substances and Physical Agents (Latest edition). Sax´s Dangerous Properties of Industrial Materials, 9th ed., Lewis, R.J. Sr., (ed), VNR, New York, New York, (1997). IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans, Silica, Some Silicates, Coal Dust, and para-Aramid Fibrils, Vol. 68, World Health Organization, Lyon, France, 1997. Product information provided by the commercial vendor(s).

Trade Name: RINGFREE **MSDS NO.** 12003

Revision Date: 10/09/2001

The following has been revised since the last issue of this MSDS:
Nothing has been revised.

Disclaimer:

MATERIAL SAFETY DATA SHEET

Trade Name: PARGEL 220 **MSDS NO.** 12034

Revision Date: 12/17/2001

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Trade Name: **PARGEL 220**

Synonyms: Bentonite
Chemical Family: Naturally occuring mineral
Product Use: Oil well drilling fluid additive.
UN/NA PIN No: Not Regulated
WHMIS Class: D2A

HMIS Rating
Health: *1
Flammability: 1
Reactivity: 0
PPE: J

Emergency Telephone (24 hr.): 281-561-1600

Supplied by a Business Unit of:
M-I L.L.C.
5950 North Course Drive
Houston, TX 77072
Phone: (281) 561-1509
Fax: (281) 561-7240

Contact Person: Sam Hoskin - Manager, Occupational Health
Revision Date: 12/17/2001
Revision Number: 1
MSDS Status: Approved

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient/CAS	Wt. %
Bentonite 1302-78-9	70 - 95
Silica, crystalline, quartz 14808-60-7	2 - 15
Silica, crystalline, Cristobalite 14464-46-1	2 - 12
Silica, crystalline, Tridymite 15468-32-3	1 - 5
Gypsum 13397-24-5	0 - 1

Ingredient Comments: No comments.

3. HAZARDS IDENTIFICATION

Emergency Overview: CAUTION! MAY CAUSE EYE, SKIN, AND RESIRATORY TRACT IRRITATION. Avoid contact with eyes, skin and clothing. Avoid breathing airborne product. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. This product is a/an tan to gray powder. Slippery when wet. No significant immediate hazards for emergency response personnel are known.

Potential Health Effects:
Acute Effects

Eye Contact:	May be irritating to the eyes.
Inhalation:	May be irritating to the respiratory tract if inhaled.
Ingestion:	May cause gastric distress, nausea and vomiting if ingested.
Skin Contact:	May be irritating to the skin.

Chronic Effects

Sensitization: Not determined.

Carcinogenicity:

Cancer Comments: ATTENTION! CANCER HAZARD. CONTAINS CRYSTALLINE SILICA WHICH CAN CAUSE CANCER. Risk of cancer depends on duration and level of exposure. IARC Monographs, Vol. 68, 1997, concludes that there is sufficient evidence that inhaled crystalline silica in the form of quartz or cristobalite from occupational sources causes cancer in humans. IARC Classification Group I.

Silica, crystalline, quartz 2 - 15 **14808-60-7**

IARC:	Listed
OSHA:	Listed
NTP:	Listed

Silica, crystalline, Cristobalite 2 - 12 **14464-46-1**

IARC:	Listed
OSHA:	Listed
NTP:	Listed

Silica, crystalline, Tridymite 1 - 5 **15468-32-3**

IARC:	Listed
OSHA:	Listed
NTP:	Listed
Target Organ Effects:	Respiratory System. Lungs. Skin. Eyes.
Signs and Symptoms:	Particulates may cause mechanical irritation to the eyes, nose, throat and lungs. Particulate inhalation may lead to pulmonary fibrosis, chronic bronchitis, emphysema and bronchial asthma. Dermatitis and asthma may result from short contact periods.

Medical Conditions Aggravated By Exposure:
Respiratory conditions.

Environmental Effects and Hazards:
Environmental effects have not been determined.

4. FIRST AID MEASURES

Eye Contact:	Promptly wash eyes with lots of water while lifting eye lids. Continue to rinse for at least 15 minutes. Get medical attention if any discomfort continues.
Ingestion:	Drink a couple of glasses of water or milk. Do not give victim anything to drink if he is unconscious. Get medical attention.

Appendix B – Containment and Recovery Equipment Checklist

Silt fence	500 feet
Hay bales	50 bales
Small pumps	2
Flex-line (2”) pump hose	200 feet
Aluminum boats	2
Shovels	6

APPENDIX J

DRAFT AQUATIC RESOURCE MITIGATION PLAN

NOTE TO REVIEWERS: This is a preliminary draft of the Aquatic Resources Mitigation Plan and is incomplete. It is being revised and will be improved in future versions of the EIS.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ACRONYMS

Banking Guidance	Federal Guidance on the Establishment, Use and Operation of Mitigation Banks
CGT	Columbia Gulf Transmission
CUP	Coastal Use Permit
CWA	Clean Water Act
Dth	decatherms
FAC	Facultative (wetland indicator status)
FACU	Facultative Upland (wetland indicator status)
FACW	Facultative Wetland (wetland indicator status)
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FGDC	Federal Geographic Data Committee
FGT	Florida Gas Transmission
GIS	Geographic Information System
GPS	Global Positioning System
KM	Kinder Morgan
KMLP	Kinder Morgan Louisiana Pipeline, LLC
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Deportment of Natural Resources
LDWF	Louisiana Department of Wildlife and Fisheries
LNG	Liquefied Natural Gas
MBRT	Mitigation Banking Review Team
MP	Milepost
NGPL	Natural Gas Pipeline Company of America
NI	No Indicator (wetland indicator status)

LIST OF ACRONYMS (CONTINUED)

NL	not-listed (regarding wetland indicator status)
NMFS	National Marine Fisheries Service
OBL	Obligate Wetland (wetland indicator status)
Plan	FERC's Upland Erosion Control, Revegetation and Maintenance Plan (FERC 2003b)
Procedures	FERC's Wetland and Waterbody Construction and Mitigation Procedures (FERC 2003a)
Psig	pounds per square inch gauge
SE-EPPC	Southeast Exotic Pest Plant Council
UPL	Obligate Upland (wetland indicator status)
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 PROJECT DESCRIPTION

The Kinder Morgan (KM) Louisiana Pipeline will consist of three pipelines and associated pipeline support facilities, including pig launchers and receivers, and metering equipment. The three pipelines are described as follows:

- Leg 1 will consist of approximately 132 miles of 42-inch diameter pipeline commencing at a receipt point within the proposed Sabine Pass LNG Terminal and continuing to a point of interconnection with an existing Columbia Gulf Transmission (CGT) interstate pipeline in Evangeline Parish, Louisiana. The proposed route of Leg 1 is in Cameron, Calcasieu, Jefferson Davis, Acadia, and Evangeline Parishes, Louisiana.
- Leg 2 will consist of approximately 1.2 miles of 36-inch diameter pipeline, commencing at a receipt point within the Sabine Pass LNG Terminal and continuing to a point of interconnection with the existing Natural Gas Pipeline Company of America (NGPL) pipeline just south of Highway 82. The proposed route of Leg 2 is entirely in Cameron Parish, Louisiana.
- The Florida Gas Transmission (FGT) Lateral will consist of approximately 2.3 miles of 24-inch diameter lateral pipeline, extending eastward from Leg 1 at approximately Milepost (MP) 110.60, to the existing FGT Compressor Station 7. The proposed route of the FGT Lateral is entirely in Acadia Parish, Louisiana.

More details concerning the proposed routes can be found in Resource Report 1 – General Project Description.

2.0 DESCRIPTION OF AFFECTED AQUATIC RESOURCES

An aquatic resource determination was conducted on approximately 3,031 acres along the proposed KM Louisiana Pipeline and construction footprint. The proposed construction footprint includes work areas, permanent and temporary access roads, pipe yards, and interconnects. Emergent wetlands, scrub/shrub wetlands, and forested wetlands were identified during this determination. Wetland acreages have not been verified by the U.S. Army Corps of Engineers (USACE) and will likely change. The proposed project will affect approximately 4 miles of linear waterbodies, including bayous, rivers, canals, tributaries, and roadside drainages and an approximately 13.5-mile section of open water in Sabine Lake.

The underwater aquatic resource surveys did not identify any submerged aquatic vegetation or live oysters along the approximately 13.5-mile section of the route that crosses Sabine Lake. The bottom substrates found during sampling of a 3,000-foot wide corridor included soft mud with buried shell (4,552.2 acres, 87.9%), firm mud (187.6 acres, 3.6%), soft mud with exposed scattered shell (172.1 acres, 3.3%), moderately firm mud (151.8 acres, 2.9%), soft mud (105.5 acres, 2.0%), reef (5.9 acres, 1%), and exposed shell (5.4 acres, 1%). Within this 3,000 foot corridor, over 99% of the water bottom contained no evidence of live and/or recently dead oysters. The greatest density of live oysters in the study area was located within the substrates defined as exposed shell and reef. However, the pipeline route crosses mostly soft mud and firm mud; it does not cross the exposed shell and reef substrate types (see the Sabine Lake Engineering, Shallow Hazard, and Oyster Survey Reports in Appendix 2-A of Resource Report 2 – Water Use and Quality).

This document addresses the wetlands and waterbodies potentially impacted by the project. KMLP has taken measures to reduce the potential effects to wetlands by:

- Optimizing the construction ROW design to avoid and minimize filling of wetlands;
- Routing of the KM Louisiana Pipeline to avoid wetlands; and
- Selecting construction techniques that minimize wetland impacts.

The acreage of jurisdictional wetlands affected by the proposed pipeline project has not been determined by the USACE. However, once the wetland delineation report has been finalized it will be submitted to the USACE, New Orleans District for a jurisdictional determination. Table 1 shows the acreage by Cowardin Classification and wetland category (habitat description) as determined during field studies conducted during January - July 2006.

Table 1 – Summary of Wetland Acreage Impacted by the Project [1]					
Cowardin Classification	Habitat Description	Area Within ROW		Acreage Mitigated by HDD	Permanent Impacts (acres)[2]
		Construction Workspace (acres)	Operations ROW (acres)		
Leg 1 and Leg 2					
E2EM	Herbaceous Wetland	119.6	43.6	46.5	0.0
PEM	Herbaceous Wetland	183.7	72.9	41.3	0.0
E2SS	Scrub Shrub Wetland	18.0	6.5	7.0	0.0
PSS	Scrub Shrub Wetland	52.0	18.0	6.0	0.0
PFO	Forested Wetland	32.3	13.4	7.0	25.3
FGT Lateral					
PEM	Herbaceous Wetland	0.2	0.1	0.0	0.0
PSS	Scrub Shrub Wetland	1.6	0.8	0.0	0.0
PFO	Forested Wetland	2.8	1.4	0.0	2.8
Access Roads					
E2EM	Herbaceous Wetland	8.4	0.0	0.0	0.0
PEM	Herbaceous Wetland	0.9	0.0	0.0	0.0
PSS	Scrub Shrub Wetland	0.0	0.0	0.0	0.0
PFO	Forested Wetland	0.1	0.0	0.0	0.1
Pipe Yards					
PEM	Herbaceous	42.8	0.0	0.0	0.0

Table 1 – Summary of Wetland Acreage Impacted by the Project [1]					
Cowardin Classification	Habitat Description	Area Within ROW		Acreage Mitigated by HDD	Permanent Impacts (acres)[2]
		Construction Workspace (acres)	Operations ROW (acres)		
	Wetland				
PSS	Scrub Shrub Wetland	19.8	0.0	0.0	0.0
Aboveground Facilities					
PEM	Herbaceous Wetland	1.3	1.3	0.0	1.3
PSS	Scrub Shrub Wetland	0.6	0.6	0.0	0.6
E2EM	Herbaceous Wetland	0.8	0.8	0.0	0.8

[1] Wetland acreages have not been verified by the USACE.

2.1 Wetland Types

Existing Conditions

Wetlands are defined as “those areas inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances support, a prevalence of vegetation typically adapted to life in saturated soil conditions” (33 CFR Part 328). Wetlands are protected from alteration or destruction by Federal and State regulations. At the Federal level, wetlands are protected under Section 404 of the Clean Water Act. Under Section 404, the USACE has the authority to regulate the discharge of dredged or fill materials into waters and adjacent wetlands of the United States. The State of Louisiana administers a regulatory program within the jurisdiction of their Coastal Zone. Any activity affecting the Coastal Zone must obtain a Coastal Use Permit (CUP) to ensure that the activity is consistent with the Louisiana Coastal Resources Program. The KM Louisiana Pipeline falls within the coastal zone boundary for Louisiana within the parishes of Calcasieu and Cameron. KMLP will utilize the joint permit application that has been developed between the Louisiana Department of Natural Resources (LDNR) and the USACE to obtain both the CUP and USACE Section 404 permit. The Louisiana Department of Environmental

Quality (LDEQ), Office of Environmental Services exerts the authority to protect aquatic resources under Section 401 of the Clean Water Act, which requires that the LDEQ conduct a Section 401 certification review of USACE Section 404 permit applications to determine if a proposed discharge would comply with State water quality standards. This Aquatic Resource Mitigation Plan was developed in accordance with the USACE Regulatory Guidance Letter No. 02-2 dated December 24, 2002.

The KM Louisiana Pipeline lies within the Western Gulf Coastal Plain Level III ecoregion. The principal distinguishing characteristics of the Western Gulf Coastal Plain are its relatively flat topography and mainly grassland potential natural vegetation. Inland from this region, the plains are older, more irregular, and have mostly forest vegetation in the Louisiana portion or savanna-type vegetation potentials to the west in Texas. Largely because of its flat topography and fertile soils, a higher percentage of the land is in cropland than in bordering ecological regions. Rice and soybeans are the principal crops. Urban and industrial land uses have expanded greatly in recent decades in some parts of the region, and oil and gas production is common (Daigle et al. 2006).

Wetland delineation was conducted in areas with landowner/manager permission in accordance with methods defined in the USACE Wetlands Delineation Manual (USACE, 1987). Table 1 lists the delineated wetland types impacted by the KMLP Pipeline. The data reflected in Table 1 were generated from field surveys and for areas where land access was denied or the route was adjusted, aerial photography interpretation delineated wetland areas. Wetlands are defined by the presence of three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology. Topography and soil characteristics along the pipeline corridor dictate the presence of those parameters, and therefore dictate the presence, type, and extent of wetlands along the construction ROW.

The Cowardin system further classifies these wetland types according to their flooding regime, which ranges from temporarily or irregularly flooded to seasonally flooded or permanently flooded (see Resource Report 2 – Water Use and Quality). The Cowardin system of wetland classification (Cowardin, et al., 1979) was used to classify the wetlands into several wetland types which are described in Table 2.

Table 2 – Habitat Description.			
Vegetation Type	**Cowardin Classification**	**Wetland Type**	**Habitat Description**
Herbaceous Wetland	Estruarine Interdial Emergent (E2EM)	Coastal Emergent Marsh	Consists of brackish, intermediate, and fresh marshes. Includes smooth cordgrass, black rush, salt meadow cordgrass, cattail, and bulrush.
	Palustrine Emergent Wetland (PEM)	Typical Palustrine Emergent Wetland	Includes natural palustrine wetlands and man-made wetlands in existing ROWs and other disturbed sites. Includes a wide variety of emergent species, such as cattail, rushes, bulrush, arrowhead, etc.
		Herbaceous Agriculture Wetland	Herbaceous wetlands that have developed on agricultural lands. Typically found in fallow rice fields or wet cattle pastures.
Scrub Shrub Wetland	Estruarine Interdial Scrub-Shrub (E2SS)	Coastal Scrub-Shrub Wetlands	Consists within brackish, intermediate, and fresh marshes. Includes wax-myrtle, *Iva fructescens*, *Sesbania*, smooth cordgrass, black rush, salt meadow cordgrass, cattail, and bulrush.
	Palustrine Scrub-Shrub Wetland (PSS)	Typical Palustrine Scrub-Shrub Wetland	Generally includes sites in various stages of regrowth from timber harvest, fallow fields/pasture, or some other disturbance. Species include water oak, red maple, Chinese tallow, bramble, etc.
		Scrub Shrub Agriculture Wetland	Scrub shrub wetlands that have developed on agricultural lands. Typically found in fallow rice fields or wet cattle pastures.
Forested Wetland	Palustrine Forested Wetland (PFO)	Bottomland Hardwood Wetland	Dominated by water oak, willow oak, green ash, and other hydrophytic hardwood species. Invasive species such as Chinese tallow are commonly found as dominants in these systems.
		Swamp	Normally associated with riparian zones and dominated by bald cypress, water tupelo, and water elm.

The following sections describe the wetland categories listed above, and Table 3 lists representative species for each of the wetland category.

Coastal Emergent Marsh

The coastal emergent marsh consists of three primary marsh communities: brackish marsh (5-10 parts per thousand salinity), intermediate marsh (0.5-3.5 parts per thousand salinity), and coastal fresh marsh (<0.5 parts per thousand salinity; Stutzenbaker, 1999). Coastal emergent marsh is restricted primarily to areas along the KM Louisiana Pipeline south of the Intracoastal Waterway.

Brackish marsh communities are tidal brackish marshes typically with smooth cordgrass shoreline fringes and saltmeadow cordgrass dominating just inshore. The saltmeadow cordgrass marsh often includes some or all of the following species: common reed, hog cane, chairmaker's bulrush, saltmarsh bulrush, cattail, eastern baccharis, marshelder, and sea-ox-eye daisy. The intermediate marsh includes the above listed species, with increasing dominance by black rush and saltmarsh bulrush in the intertidal zone. Other commonly occurring species within the intermediate marsh communities include hog cane, chairmaker's bulrush, California bulrush, and cattail.

The coastal fresh marsh community occurs in tidal and non-tidal areas on the coastal plain with a salinity range of 0-0.5 parts per thousand (Stutzenbaker,1999). This habitat intergrades with the intermediate marsh along tidally influenced canals and bayous that exchange with more saline water bodies such as the GIWW. A large section of coastal fresh marsh, with exception of upland levees and open water areas, occurs north of the GIWW. Intermediate marsh species occur more commonly along canals and bayous in close proximity to the GIWW. Salt meadow cordgrass is the dominant plant species in this community with rice cutgrass, yellow bristle grass, cattail, California bulrush, fall panicum, saltmarsh bulrush, Olney bulrush, rattlebox, bigpod sesbania, seedbox, swamp smartweed, white waterlily, lotus, pennywort, and watergrass also occurring. Big Hill Bayou and most of the canals are bordered by bands of fresh marsh species such as common reed, giant cutgrass, cattail, dwarf spikerush, and California bulrush.

Typical Palustrine Emergent Wetland

This community classification includes natural, as well as man-made wetlands resulting from hydrologic modifications. Herbaceous wetlands occur within existing ROWs and cattle grazing pastures which are temporarily to seasonally flooded. These areas are common and vary in size from <0.01 acre to >1 acre. Many of the herbaceous species listed in the coastal emergent marsh section (above) are represented in this community in varying combinations and dominance. Commonly encountered plant species in this habitat include Gulf coast spikerush, dwarf spikerush, slender spikerush, soft-stem rush, pine barren flatsedge, green flatsedge, rusty flatsedge, bushy bluestem, dallisgrass, dotted smartweed, water primrose, swamp smartweed, and maidencane.

Herbaceous Agricultural Wetlands

This habitat is typically associated with active rice or crawfish production. These communities are similar to other palustrine emergent wetlands. Jungle rice, smart weed, and various spike rushes are normally the dominant vegetation.

Coastal Scrub/Shrub Wetlands

Coastal scrub/shrub marsh communities, associated with coastal emergent marsh, are often dominated by saltmeadow cordgrass and shrubby species including wax-myrtle, *Iva fructescens*, marshelder, sea-ox-eye daisy, Carolina wolf-berry, rattlebox, and common reed.

Typical Palustrine Scrub/Shrub Wetlands

This classification represents several community variations. The most common variation includes many of the plants listed in the emergent wetland section above, but also includes shrubby species such as bramble, marshelder, saplings (usually water oak, red maple, and sweetgum) and/or Chinese tallow. Other areas with the scrub/shrub wetland classification are sites in various states of regrowth in areas of disturbance. These areas often contain mixes of scrub/shrub sapling species listed above, pine, waxmyrtle, and other plants common to the surrounding area.

Scrub Shrub Agricultural Wetlands

This habitat includes wetlands that have developed in fallow rice fields and wet cattle pastures. Vegetation types are similar in community structure to other scrub shrub wetlands, and are typically dominated by sesbania, Chinese tallow, and black willow.

Bottomland Hardwood Wetlands

Bottomland hardwood wetland communities occur along the larger streams and rivers and are characterized by overcup oak, laurel oak, willow oak, green ash, sweetgum, American hornbeam, deciduous holly, cedar elm, Texas sugarberry, red maple, and hawthorn. Shrub species commonly associated with this community include the above listed species and indigo bush, swamp cyrilla, poison ivy, Drummond sesbania, dogwood, and Sebastian bush. Common woody vines include wooly Dutchman’s pipe, American buckwheat vine, common greenbrier, supplejack, cross vine, Virginia creeper, sweet grape, and Kentucky wisteria. Some of the local variations in bottomland hardwood communities within the project area might include American hornbeam, water oak, blackgum, and sweetgum on ridges between sloughs and swamps, with Carolina ash, red maple, American snowbell, and laurel oak dominating on flats between ridges. Some flats support extensive populations of dwarf palmetto.

Species dominance in the bottomland hardwood wetland communities is highly varied, from highly vegetatively diverse communities to much less complex stands of overstory species like red maple or sweetgum.

Swamp

Cypress tupelo swamp communities are restricted primarily to wetlands associated with the banks and islands of the larger rivers and bayous in the area (e.g., in the Bayou Nezpique and the Bayou Des Cannes riparian zones). The most extensive swamp communities occur in association with bottomland hardwood wetlands. Cypress tupelo swamp communities often include some or all of the following species: bald cypress, water tupelo, swamp privet, water elm, Carolina ash, water locust, and common buttonbush. Other commonly encountered species include summersweet clethra, water willow, scarlet rosemallow, corkwood, sweetbells leucothoe, possumhaw viburnum, cupseed, and decumaria vine. Swamp community composition variations include wetlands dominated by sweetgum and/or red maple.

Table 3 – Representative Plant Species by Wetland Type

Wetland Plant Species	Stratum	Indicator Status[1]
Agrostis sp.	Herbaceous	-
Agrostis stolonifera	Herbaceous	FACW
Alternanthera philoxeroides	Herbaceous	OBL
Althaea officinalis	Herbaceous	NI
Ambrosia altissima	Herbaceous	FACU
Ambrosia trifida	Herbaceous	FAC
Andropogon glomeratus	Herbaceous	FACW+
Andropogon virginicus	Herbaceous	FAC-
Arundinaria gigantea	Herbaceous	FACW

Table 3 – Representative Plant Species by Wetland Type		
Wetland Plant Species	**Stratum**	**Indicator Status[1]**
Aster dumosus	Herbaceous	FAC
Aster laevis	Herbaceous	UPL
Aster paludosus	Herbaceous	FACW
Axonopus affinis	Herbaceous	FACW+
Axonopus fissifolius	Herbaceous	FACW-
Bacopa monnieri	Herbaceous	OBL
Care sp.	Herbaceous	-
Centella asiatica	Herbaceous	FACW
Centella erecta	Herbaceous	FACW
Chasmanthium latifolium	Herbaceous	FAC-
Circium vulgare	Herbaceous	FAC
Cladium mariscus	Herbaceous	OBL
Cynodon dactylon	Herbaceous	FACU
Cyperus articulatus	Herbaceous	OBL
Cyperus sp.	Herbaceous	-
Cyperus virens	Herbaceous	FACW+
Dichanthelium acuminatum	Herbaceous	FAC
Dichanthelium scoparia	Herbaceous	FACW
Digitaria ciliaris	Herbaceous	NI
Distichlis spicata	Herbaceous	FACW+
Eleocharis equisetoides	Herbaceous	FAC
Eleocharis baldwnii	Herbaceous	OBL
Eleocharis ovata	Herbaceous	OBL

Table 3 – Representative Plant Species by Wetland Type		
Wetland Plant Species	**Stratum**	**Indicator Status[1]**
Eleocharis palustris	Herbaceous	OBL
Eleocharis parvula	Herbaceous	OBL
Eleocharis vivipara	Herbaceous	OBL
Eupatorium capillifolium	Herbaceous	FACU
Eupatorium compositifolium	Herbaceous	FAC-
Fragaria virginiana	Herbaceous	FAC-
Frimbristylis sp.	Herbaceous	FAC
Gallium trifidium	Herbaceous	NI
Geranium carolinianum	Herbaceous	NL
Gnaphalium chilense	Herbaceous	FAC-
Hibiscus aculeatus	Herbaceous	FACW
Hydrocotyle bonariensis	Herbaceous	FACW
Hydrocotyle umbellata	Herbaceous	OBL
Hygrophila polysperma	Herbaceous	OBL
Iris prismatica	Herbaceous	OBL
Iris virginica	Herbaceous	OBL
Juncus effuses	Herbaceous	FACW+
Juncus interior	Herbaceous	FACU
Juncus roemerianus	Herbaceous	OBL
Ludwigia repens	Herbaceous	OBL
Lygodium japonica	Herbaceous	FAC
Nothoscordum bivalve	Herbaceous	FAC
Osmunda regalis	Herbaceous	OBL

Table 3 – Representative Plant Species by Wetland Type		
Wetland Plant Species	**Stratum**	**Indicator Status[1]**
Panicum repens	Herbaceous	FACW-
Paspalum setaceum	Herbaceous	FAC
Paspalum sp.	Herbaceous	-
Paspalum urvillei	Herbaceous	FAC
Phalaris angusta	Herbaceous	FACW+
Phragmities australis	Herbaceous	FACW
Phyla notiflora	Herbaceous	FACW
Plantago cordata	Herbaceous	OBL
Plantago major	Herbaceous	FAC+
Poa annua	Herbaceous	FAC
Polygonum amphibium	Herbaceous	OBL
Polygonum hydropiperodies	Herbaceous	OBL
Polygonum pensylvaniaicum	Herbaceous	FACW
Polygonum punctatum	Herbaceous	FACW+
Polypogon monspeliensis	Herbaceous	FACW
Pontederia cordata	Herbaceous	OBL
Potomogeten sp.	Herbaceous	OBL
Ptilimnium capillaceum	Herbaceous	FAC
Ptilimnium sp.	Herbaceous	-
Ranunculus acris	Herbaceous	FAC
Ranunculus alterniflora	Herbaceous	OBL
Ranunculus marginata	Herbaceous	FAC
Ranunculus muricatus	Herbaceous	FACW

Table 3 – Representative Plant Species by Wetland Type		
Wetland Plant Species	**Stratum**	**Indicator Status[1]**
Ranunculus parviflorus	Herbaceous	FAC
Rhynchospora sp.	Herbaceous	-
Rumex crispus	Herbaceous	FAC
Sabal minor	Herbaceous	FACW
Saccharum alopecuroides	Herbaceous	FAC
Saccharum giganteum	Herbaceous	FACW
Sagitaria latifoila	Herbaceous	OBL
Sagittaria graminea	Herbaceous	OBL
Sagittaria latifolia	Herbaceous	FAC-OBL
Sanguinaria canadensis	Herbaceous	NI
Schoenoplectus californicus	Herbaceous	OBL
Schoenoplectus pungens	Herbaceous	OBL
Scirpus pungens	Herbaceous	OBL
Scirpus tabernaemontani	Herbaceous	OBL
Senecio glabellus	Herbaceous	FACW+
Senecio vulgaris	Herbaceous	FACU
Setaria glauca	Herbaceous	FAC
Solidago canadensis	Herbaceous	FACU
Solidago sp.	Herbaceous	-
Sorghum halepense	Herbaceous	OBL
Spartina cynosuroidies	Herbaceous	OBL
Spartina patens	Herbaceous	FAC
Sporobolus indicus	Herbaceous	FACU+

Table 3 – Representative Plant Species by Wetland Type		
Wetland Plant Species	**Stratum**	**Indicator Status[1]**
Trasescantia hirsutiflora	Herbaceous	NL
Trifolium repens	Herbaceous	FACU
Typha latifolia	Herbaceous	OBL
Typha sp.	Herbaceous	OBL
Verbena brasilinsis	Herbaceous	FAC-
Verbena hastata	Herbaceous	FAC
Vicia ludovicidana	Herbaceous	FACU
Vicia sativa	Herbaceous	FACU
Viola peditifida	Herbaceous	FACU
Zizanium aquatica	Herbaceous	OBL
Acer rubrum	Sapling	FAC
Celtis laevigata	Sapling	FACW
Fraxinus pennsylvanica	Sapling	FACW
Ligustrum sinense	Sapling	FAC
Liquidambar styracifola	Sapling	FAC+
Pinus taeda	Sapling	FAC
Quercus nigra	Sapling	FAC
Quercus phellos	Sapling	FACW-
Salix nigra	Sapling	OBL
Sambucus canadensis	Sapling	FACW-
Sapium sebiferum	Sapling	FAC
Ulmus americana	Sapling	FACW
Baccharis angustifolia	Shrub	FACW+

Table 3 – Representative Plant Species by Wetland Type		
Wetland Plant Species	**Stratum**	**Indicator Status[1]**
Baccharis halimifolia	Shrub	FAC
Cephalanthus occidentalis	Shrub	OBL
Halesia diptera	Shrub	FAC
Ilex vomitoria	Shrub	FAC
Iva frutescens	Shrub	FACW
Ligustrum sinense	Shrub	FAC
Ligustrum vulgare	Shrub	UPL
Myrica cerifera	Shrub	FAC+
Rosa laevaigata	Shrub	NL
Rubus strigosis	Shrub	FAC
Rubus trivialis	Shrub	FAC
Sabal minor	Shrub	FACW
Sambucus canadensis	Shrub	FACW-
Sasbania drummondii	Shrub	FACW
Viburnum dentatum	Shrub	FAC
Acer rubrum	Tree	FAC
Carpinus caroliniana	Tree	FAC
Celtis laevigata	Tree	FACW
Crataegus mollis	Tree	FAC
Crataegus viridis	Tree	FACW
Fraxinus pennsylvanica	Tree	FACW
Gleditsia triacanthus	Tree	FAC-
Ilex decidua	Tree	FACW-

Table 3 – Representative Plant Species by Wetland Type		
Wetland Plant Species	**Stratum**	**Indicator Status[1]**
Liquidambar styraciflua	Tree	FAC+
Nyssa sylvatica	Tree	FACW
Pinus taeda	Tree	FAC
Planaera aquatica	Tree	OBL
Quercus lyrata	Tree	OBL
Quercus nigra	Tree	FAC
Quercus phellos	Tree	FACW-
Quercus virginiana	Tree	FACU+
Salix nigra	Tree	FAC
Sapium sebiferum	Tree	FAC
Taxicodium disticium	Tree	OBL
Ulmus Americana	Tree	FACW
Vitis rotundifolia	Vine	FAC
Aeschynomene indica	Vine	FACW
Ampelopsis arborea	Vine	FAC
Berchemia scandens	Vine	FACW
Lonicera japonica	Vine	FAC
Mikania scandens	Vine	FACW+
Smilax rotundafolia	Vine	FAC
Smilax sp.	Vine	-
Toxicodendron radicans	Vine	FAC

[1] Indicator Statuses (Resource Management Group, Inc. 1994): FAC = Facultative (equally likely to occur in wetlands and non-wetlands, 34%-66% probability); FACU = Facultative Upland (67% - 99% probability to occur in non-wetlands, 1%-33% probability in wetlands); FACW = Facultative Wetland (estimated 67% - 99% probability to occur in wetlands); NI = No Indicator (insufficient information available to determine an indicator status); NL = not-listed (may be because, OBL = Obligate Wetland (occurs with an estimated 99%

probability in wetlands); and UPL = Obligate Upland (>99% probability of occurring in nonwetlands in this region; may occur in wetlands in other regions). If a species doesn't occur in wetlands in any region, it is not included in Resource Management Group, Inc. (1994).

3.0 MITIGATION APPROACH

Table 1 outlines the approximate delineated acreage of each wetland community expected to be: ·

- Temporarily affected during construction and restored which would not result in a permanent loss of habitat; and
- Permanently (i.e., for at least the life of the project) affected by construction and operation of the pipeline.

Temporary impacts include pipeline construction through waterbodies, coastal emergent marsh, herbaceous wetland (palustrine emergent), and scrub/shrub wetlands and temporarily disturbed construction areas (e.g., laydown areas, staging areas). These areas will be graded and restored to pre-construction conditions, as applicable. Wetlands in temporarily affected sites will be allowed to revegetate, restoring wetland function. Permanent impacts include pipeline interconnect sites, permanent access roads, and the removal of forested wetlands. Where possible, construction techniques like horizontal directional drilling (HDD) will be implemented to avoid and/or minimize impacts. In addition, extensive use of HDD technology to avoid impacts to watercourses or sensitive areas and alternative pipeline routes involving additional mileage (discussed in Resource Report 10) were evaluated to minimize impacts.

3.1 Mitigation for Temporary Impacts

KMLP proposes to mitigate areas of temporary impact through restoration of the affected areas at a 1:1 ratio according to the FERC (2003a) Wetland and Waterbody Construction and Mitigation Procedures (Procedures). These procedures, and the proposed mitigation implementation plans, include:

- Trench breakers will be installed to prevent the pipeline from draining wetlands;
- A permanent slope breaker will be installed at the base of slopes for gradients steeper than five percent;
- No fertilizer, lime, or mulch will be applied to wetlands, unless instructed in writing by the appropriate state agency;

- KMLP will consult with the appropriate state agency to develop a project specific wetland restoration plan;
- Until a project-specific management plan is implemented, KMLP will revegetate construction ROW utilizing seed mixes, application rates, and planting dates obtained from the local soil conservation authority [in upland areas];
- KMLP will ensure that disturbed wetland areas are successfully revegetate with wetland herbaceous or woody species; and
- KMLP will remove temporary sediment barriers between wetlands and uplands once uplands have been stabilized.

In addition, although the proposed KM Louisiana Pipeline does not expect to impact any oyster habitat, KMLP will compensate the state of Louisiana according to the Louisiana Department of Wildlife and Fisheries (LDWF) established compensation rates for impacts to water bottoms on public oyster seed grounds, public oyster seed reservations, and public oyster tonging areas (LDWF 2003).

3.2 Mitigation for Permanent Impacts

Construction of the KM Louisiana Pipeline will permanently affect approximately 30.9 acres of wetlands based on environmental surveys (Table 1). However, this acreage estimate is not based on USACE jurisdictional determinations and is not considered final. Once the survey information is verified by the USACE, KMLP will implement a mitigation plan that outlines mitigation components in detail. Mitigation options being considered include wetland creation and restoration projects, wetland preservation, in-lieu-fee mitigation, and mitigation banking. KMLP does not expect to permanently impact any oyster habitat.

3.3 Goals and Objectives

The goal of wetland mitigation is to ensure no net loss of wetland functional value for the wetlands affected by the proposed Project. For the proposed project, this goal will be accomplished through:

- Wetland creation and restoration project(s);
- Wetland preservation;
- Mitigation banking;

- In-lieu-fee mitigation; or
- A combination of some or all of these options.

4.0 WETLAND ACREAGE REQUIRING MITIGATION

Table 1 provides an approximation of acreage requiring mitigation. USACE jurisdictional determination for the pipeline and terminal has not been completed, and the values listed in Table 1 do not necessarily reflect the actual jurisdictional wetlands, as verified by the USACE, that will require mitigation.

5.0 MITIGATION OPTIONS

The KMLP Draft Aquatic Resource Mitigation Plan explores four mitigation options to mitigate for permanent wetland impacts:

- Wetland restoration;
- Wetland preservation;
- Mitigation banking; and
- In-lieu-fee mitigation.

KMLP is currently exploring these options and will not finalize the mitigation components until the wetland types and acreages identified during the wetland delineation have been verified and approved by the USACE.

5.1 Wetland Creation and Restoration

KMLP is currently exploring several possibilities for wetland creation and restoration. A representative of the U.S. Fish and Wildlife Service (USFWS), Sabine National Wildlife Refuge has been contacted to determine whether there are potential wetland creation or restoration sites within or near the refuge (Voros 2006). The Sabine National Wildlife Refuge is directly adjacent to Leg 1 of the KM Louisiana Pipeline and would be an ideal location for mitigating wetland impacts associated with this project. In addition to the USFWS, private lands along the route are currently being identified that may serve as potential wetland creation or restoration sites. It is the goal of KMLP to identify wetland creation and restoration sites that are in-kind and as close as possible to the actual wetlands being mitigated.

Several Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) projects were identified in the vicinity of the proposed project (see Resource Report 8 –

Land Use, Recreation, and Aesthetics). KMLP investigated whether it could work with any of these projects to achieve its mitigation goals. It was discovered that the organization of these projects precludes the use of additional funds once the projects have been initiated (Clark 2006).

5.2 Mitigation Banking

In 1995, the Federal Guidance on the Establishment, Use and Operation of Mitigation Banks (Banking Guidance) was issued. Consistent with that guidance, KMLP may purchase mitigation credits from an approved bank. Mitigation banking instruments are reviewed and approved by an interagency Mitigation Banking Review Team (MBRT). The MBRT ensures that the banking instrument appropriately addresses the physical and legal characteristics of the bank and how the bank will be established and operated (e.g., classes of wetlands and/or other aquatic resources proposed for inclusion in the bank, geographic service area where credits may be sold, wetland classes or other aquatic resource impacts suitable for compensation, methods for determining credits and debits). The bank sponsor is responsible for the operation and maintenance of the bank during its operational life, as well as the long-term management and ecological success of the wetlands and/or other aquatic resources, and must provide financial assurances (USEPA 2000).

KMLP has initiated contact with the USACE, New Orleans District to determine if any of the mitigation banks listed on their website would be in the vicinity of the project and have available mitigation credits (Barlow 2006; Breaux 2006). KMLP also has contacted USFWS in Lafayette, Louisiana to investigate mitigation banking opportunities (Holland 2006).

5.3 Wetland Preservation

The USACE and U.S. Environmental Protection Agency (USEPA) agree that if on-site compensatory mitigation is not practicable, off-site compensatory mitigation should be undertaken in the same geographic area if practicable (i.e., in close proximity and, to the extent possible, the same watershed). They have also agreed that generally, in-kind compensatory mitigation is preferable to out-of-kind and that mitigation banking may be an acceptable form of compensatory mitigation. The agencies recognize the general preference for restoration over other forms of mitigation, given the increased chance for ecological success (USEPA 2000). However, if wetland creation, restoration, or mitigation banking options are not available within an acceptable distance from the project, wetland preservation may be a desirable alternative. In many areas, certain wetland types are becoming fragmented to the point that they eventually cannot perform as functional wetlands or serve as a viable habitat for wetland species. In these cases, where the destruction of a particular wetland type is imminent based on current trends, preservation may be as ecologically beneficial as the other compensatory mitigation options discussed.

KMLP has discussed wetland preservation opportunities with LDWF (Myers 2006) and is in the process of exploring possibilities with conservation organizations including The Nature Conservancy and Sierra Club. KMLP also has discussed the role that The Trust for Public Land may play in facilitating this process (Schmidt 2006). The Trust for Public Land is a non-profit organization that acts as an intermediary between willing sellers and typically a public entity to purchase land for public use.

5.4 In-lieu-fee Mitigation

In-lieu-fee, fee mitigation, or other similar arrangements, wherein funds are paid to a natural resource management entity for implementation of either specific or general wetland or other aquatic resource development project, are not considered to meet the definition of mitigation banking because they do not typically provide compensatory mitigation in advance of project impacts. Moreover, such arrangements do not typically provide a clear timetable for the initiation of mitigation efforts. The USACE, in consultation with the other agencies, may find circumstances where such arrangements are appropriate so long as they meet the requirements that would otherwise apply to an offsite, prospective mitigation effort and provide adequate assurances of success and timely implementation. In such cases, a formal agreement between the sponsor and the agencies, similar to a mitigation bank, is necessary to define the conditions under which its use is considered appropriate. In-lieu-fee agreements may be used to compensate for impacts authorized by a USACE individual permit if the in-lieu-fee arrangement is developed, reviewed, and approved using the process established for mitigation banks in the Banking Guidance. MBRTs should review applications from such in-lieu-fee sponsors to ensure that such agreements are consistent with the Banking Guidance (USEPA 2000).

KMLP will only consider in-lieu-fee mitigation if compensatory mitigation, mitigation banking, or wetland preservation are not practicable for mitigating wetland impacts associated with this project.

5.5 Location(s) for Mitigation Efforts

Mitigation options selected will be located in the Sabine Lake, Lower Sabine, Lower Calcasieu, Upper Calcasieu, Mermentau, and Mermentau Headwaters watersheds. This rationale complements the goal of Section 404(b)(1) guidelines of no net loss of function and value.

5.6 Mitigation Acreage Considerations

Wetland acreages requiring mitigation will be quantified and presented by habitat type following USACE determination of the wetland locations identified during the field studies.

6.0 PIPELINE MONITORING PLAN

6.1 Temporary Impacts

Monitoring the success of the wetland restoration for temporarily affected wetlands will be conducted for three years or until the revegetation is considered to be successful as described in FERC's Procedures (FERC 2003a). Revegetation shall be considered successful if the herbaceous and/or woody species is at least 80 percent areal coverage of native wetland vegetation. KMLP, and/or its agents, will conduct monitoring in these areas.

6.2 Additional Monitoring Plans

Areas within the pipeline construction corridor and associated work areas will be restored to pre-project contours. Pre- and post-construction elevation surveys will be conducted. Elevation survey results will be submitted to the USACE within 90 days after completion of pipeline installation. Additional soil from off site may be brought into areas containing highly organic soils susceptible to high erosion rates.

Aerial photography with Geographic Information System (GIS) analysis will be used to monitor the entire pipeline construction corridor and an additional 200- meter buffer zone (100 meters paralleling each side of the construction corridor). The following GIS/Remote Sensing method and standard will be used: The pipeline corridor will be monitored by pre- and post-construction aerial photography (taken 12 months after construction completion to allow for vegetative regrowth) at a scale of 1:4800 or 1 inch to 400 feet. GIS and Remote Sensing techniques will be used to conduct an analysis of change to determine the amount of vegetated marsh impacted by pipeline construction activities.

Monitoring reports will be submitted that include at a minimum: (1) a pre-project GIS analysis assessing the existing emergent marsh to open water ratio, in acres, within the permitted corridor (which includes the construction corridor and the 200 meter buffer zone); (2) a post-project GIS analysis assessing the emergent marsh to open water ratio, in acres, within the permitted corridor (which includes the construction corridor and the 200-meter buffer zone); (3) Ortho corrected imagery covering the construction corridor and buffer zone, maximum of 6-inch pixel size and Color Infra-red imagery, about 2 meter spatial accuracy; and (4) all vector deliverables to be in Arcview Shapefile format with Federal Geographic Data Committee (FGDC) compliant metadata and all raster imagery in GeoTIFF format with FGDC compliant metadata. A binary classification system will be used consisting of open water and vegetated areas. The classified data will meet or exceed 90 percent attribute accuracy as determined by industry standard and verified by statistically valid ground truth sampling techniques; this may include Global Positioning System based ground surveys. Monitoring reports will be submitted to the USACE, detailing the results from the pre- and post-GIS analysis and the above referenced data sets, within 90 days after completion of the 12-month interval between the pre- and post-construction analysis.

In addition, pursuant to NMFS (2006) recommendations, monitoring of wetlands considered to be Essential Fish Habitat (EFH) will document project impacts as follows:

- The monitoring primarily would be photographic in nature, with photos being taken from on the ground at work sites;
- It would occur pre-construction, immediately post-construction, and one growing season post-construction with photos of all work sites; and
- Photos would be taken every 500 feet (pictures taken in both directions) with the location recorded on GPS to allow a return to the exact site, and the exact location and direction of the photo being recorded in a tabular form and referenced to an aerial photo documenting photo numbers.

Wetlands considered EFH are listed in Table 3-1 in Resource Report 3 - Fish, Wildlife and Vegetation.

7.0 MAINTENANCE AND CONTINGENCY PLAN

7.1 Maintenance

Maintenance to address temporary impacts as well as long-term vegetation management of the pipeline ROW will be conducted by KMLP according to the FERC regulations summarized below.

- Vegetative maintenance will not be conducted over the entire width of the ROW in wetlands. Rather a corridor centered on the pipeline and up to 10 feet wide will be maintained in an herbaceous state. Trees within 15 feet of the pipeline greater than 15 feet in height may be cut and removed from the permanent ROW in accordance with the FERC guidelines in order to protect the integrity of the pipeline operations over time (FERC 2003a).
- Herbicides will not be used within 100 feet of a wetland unless directed to do so by the appropriate state agency (FERC 2003a).

Variances from FERC's Upland Erosion Control, Revegetation and Maintenance Plan (Plan) (FERC 2003b) and Procedures (FERC 2003a) that KMLP has requested be considered are described in Resource Report 2 – Water Use and Quality.

7.2 Contingency Plan

If revegetation success is not achieved after three years, the area along the pipeline ROW that has not revegetated will have the topography checked by a land survey to determine if long-term surface grading impacts remain from construction. Proper grade will be restored if necessary, and the area will be revegetated and monitored for another year, as before. If revegetation is not successful after an additional year of monitoring, a supplemental planting will be conducted.

7.3 Invasive Species Control Plan

7.3.1 Introduction

Chinese Tallow, a noxious invasive species of tree commonly found throughout the Project area (USGS 2000; USDA 2006), is likely to become established in the disturbed area of the ROW following restoration, if not controlled. As part of its Implementation Plan, KMLP will prepare a plan for the control of Chinese Tallow and other invasive species, if identified. Control of invasive species would allow native species to become re-established. The plan would be initiated after right-of-way restoration and in consultation with landowners. Key elements of the plan would include:

- Training field personnel in the identification and control of the Chinese Tallow Tree;
- Providing field personnel with the applicable registration for the purchase of regulated herbicides and training in their proper handling and application;
- Controlling the spread of older Chinese Tallow Trees by mechanical cutting and chemical treatment;
- Removing young Chinese Tallow Tree saplings by hand or machine; and
- Documenting and reporting control activities and the volumes of herbicide used.

7.3.2 Logistics

Field personnel qualifications

Invasive plant control field personnel will be trained to identify Chinese tallow and other invasive species, and perform the prescribed mechanical and chemical treatment procedures. Additionally, these individuals will have the applicable training and registration to purchase, handle, and apply regulated herbicides used for control. An accompanying safety and health plan will be developed and implemented in conjunction with this control plan.

Site access

After initial restoration is completed along the pipeline ROW, pipe yards and extra workspaces, KMLP will contact the affected landowners and/or managers to gain permission to initiate the Chinese tallow and other invasive species control on their property.

7.3.3 Chinese Tallow Control

The Chinese tallow control plan requires mechanical (cutting and hand pulling) and potentially chemical treatment to effectively manage while providing the opportunity for native and other preferred species to establish after pipeline construction is completed.

Chinese tallow mechanical cutting

Field personnel will cut any remaining Chinese tallow trees found within the former construction areas at ground level with power equipment or manual saws (SE-EPPC 2005). Debris will be gathered and transported to an approved offsite disposal facility.

Chinese tallow chemical treatment

As cutting older trees leads to stump and root suckering, cutting will not provide satisfactory control unless stumps are treated with chemicals (LSU 2005). It is common practice to use diesel or another oil as an application medium for several herbicides; however, KMLP will not use diesel or another oil since the pipeline route has a significant acreage of wetlands and open-water habitats. For cut stumps, one of the following chemical applications will be used:

- *Glyphosate (common trade names include Ranger,® Rodeo,® and Roundup Ultra,®)*: Horizontally cut stems at or near ground level. Immediately apply a 50 percent solution of glyphosate and water to the cut stump, covering the outer 20 percent of the stump (SE-EPPC 2005). Since glyphosate is nonselective, it is very important to protect the surrounding desirable plants. Thus, a sponge or similar discrete application method will be used to apply the glyphosate solution. Also, the water mixed with glyphosate must be free of dirt as this herbicide binds tightly to soil clay and organic matter; otherwise the effectiveness of the application is reduced.
- *Triclopyr (common trade names include Remedy® and Grandstand®)*: Horizontally cut stems at or near ground level. Immediately apply a 50 percent solution of triclopyr and water to the cut stump, covering the outer 20 percent of the stump (SE-EPPC 2005). In areas where desirable grasses are growing under and around Chinese tallow, SE-EPPC (2005) reports that triclopyr can be used without non-target damage.

Chinese tallow sapling control

Chinese tallow is effectively controlled by removal of young seedlings; hand or machine pulling of seedlings and saplings provides excellent control (LSU 2005). Plants should be pulled as soon as they are large enough to grasp, but before they produce seeds. Seedlings are best pulled after a rain when the soil is loose. The entire root must be removed since broken fragments may resprout (SE-EPPC 2005).

Chinese tallow control frequency

As Chinese tallow is a successful invasive species, there is always a potential for the plant to establish. However, the goal of this control program is to allow native and other desirable plants sufficient opportunity to establish along the construction ROW and other extra workspaces. Therefore, KMLP will control Chinese tallow growth in areas of the construction ROW for 3 years after completion of the pipeline system. The following describes the control procedures to be used for a given year.

Year 0 (during construction demobilization): Cutting including off-site debris disposal followed with chemical treatment as described above will be conducted during construction demobilization. KMLP will record the herbicide(s) volume used during this effort.

Year 1 (late-summer): Reports indicate that spring herbicide application may not be successful, and that to translocate (i.e., transporting the herbicide into the root system by natural circulation within the plant) the herbicide into the plant most effectively, late summer to early fall applications should be employed (TNC 2005). KMLP will apply chemical (herbicide) treatment to stumps and roots exhibiting sprouts. Also, saplings will be removed by pulling as described above. KMLP will record the herbicide(s) volume used during this effort.

Year 2 (late-summer): KMLP will apply chemical (herbicide) treatment to stumps and roots exhibiting sprouts. Also, saplings will be removed by pulling as described above. KMLP will record the herbicide(s) volume used during this effort.

Year 3 (late-summer): KMLP will apply chemical (herbicide) treatment to stumps and roots exhibiting sprouts. Also, saplings will be removed by pulling as described above. KMLP will record the herbicide(s) volume used during this effort. KMLP will present a report to the USACE and FERC documenting the control activities conducted since construction demobilization, including the volume by year of herbicide(s) used.

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APPENDIX K

SEATURTLE CONSTRUCTION GUIDELINES

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Vessel Strike Avoidance Measures and Injured or Dead Protected Species Reporting
National Marine Fisheries Service, Southeast Region

Background

The National Marine Fisheries Service (NMFS) has determined that collisions with vessels can injure or kill protected species (e.g., endangered and threatened species, and marine mammals). The following standard measures must be implemented to reduce the risk associated with vessel strikes or disturbance of these protected species to discountable levels. NMFS should be contacted to identify any additional conservation and recovery issues of concern.

Protected Species Identification Training

Vessel crews should use an Atlantic and Gulf of Mexico reference guide that helps identify the species of marine mammals and sea turtles that might be encountered in U.S. waters of the Atlantic Ocean, including the Caribbean and Gulf of Mexico. Additional training should be provided regarding information and resources available regarding federal laws and regulations for protected species, ship strike information, critical habitat, migratory routes and seasonal abundance, and recent sightings of protected species.

Vessel Strike Avoidance

The following measures must be taken in order to avoid causing injury or death to marine mammals and sea turtles:

1. Vessel operators and crews must maintain a vigilant watch for marine mammals and sea turtles to avoid striking sighted protected species.

2. When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel.

3. When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible.

4. When small cetaceans are sighted while a vessel is underway (e.g., bow-riding), attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.

5. Reduce vessel speed to 10 knots or less when mother/calf pairs, groups, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity; therefore, prudent precautionary measures should always be exercised. The vessel should attempt to route around the animals, maintaining a minimum distance of 100 yards whenever possible.

6. Whales may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.

NMFS Southeast Region vessel strike avoidance guidance updated May 5, 2006.

Additional Requirements for the North Atlantic Right Whale

1. If a sighted whale is believed to be a North Atlantic right whale, federal regulation requires a minimum distance of 500 yards be maintained from the animal (50 CFR 224.103 (c)).

2. Vessels entering North Atlantic right whale critical habitat are required to report into the Mandatory Ship Reporting System.

3. Mariners should check with various communication media for general information regarding avoiding ship strikes and specific information regarding North Atlantic right whale sighting locations. These include NOAA weather radio, U.S. Coast Guard NAVTEX broadcasts, and Notices to Mariners.

Injured or Dead Protected Species Reporting

Vessel crews must report sightings of any injured or dead protected species immediately, regardless of whether the injury or death is caused by your vessel.

Report marine mammals to the Southeast U.S. Stranding Hotline: 305-862-2850
Report sea turtles to the NMFS Southeast Regional Office: 727-824-5312

In addition, if the injury or death was caused by a collision with your vessel, you must notify the [ACTION AGENCY NAME] immediately of the strike by email (email and/or phone number contact information provided by the Action Agency). The report should include the following information:

a. the time, date, and location (latitude/longitude) of the incident;

b. the name and type of the vessel involved;

c. the vessel's speed during the incident;

d. a description of the incident;

e. water depth;

f. environmental conditions (e.g., wind speed and direction, sea state, cloud cover, and visibility);

g. the species identification or description of the animal, if possible; and

h. the fate of the animal.

If a [ACTION AGENCY NAME]-related industry activity is responsible for the injury or death, the responsible parties should remain available to assist the respective salvage and stranding network as needed.

NMFS Southeast Region vessel strike avoidance guidance updated May 5, 2006.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006
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National Marine Fisheries Service
Recommendations for the Contents of
Biological Assessments and Biological Evaluations

When preparing a Biological Assessment (BA) or Biological Evaluation (BE), keep in mind that the people who read or review this document may not be familiar with the project area or what is proposed by the project. Therefore your BA or BE should present a clear line of reasoning that explains the proposed project and how you determined the effects of the project on each threatened or endangered species, or critical habitat, in the project area. Try to avoid technical jargon not readily understandable to people outside your agency or area of expertise. Remember, this is a **public document**. Some things to consider and, if appropriate, to include in your BA or BE, follow.

1. What is the difference between a Biological Evaluation and a Biological Assessment?

By regulation, a Biological Assessment is prepared for "major construction activities" — defined as "a construction project (or other undertaking having similar physical effects) which is a major Federal action significantly affecting the quality of the human environment (as referred to in the National Environmental Policy Act of 1969 (NEPA) [(42 U.S.C. 4332(2)(C)])." A BA is required if listed species or critical habitat may be present in the action area. A BA also may be recommended for other activities to ensure the agency's early involvement and increase the chances for resolution during informal consultation. Recommended contents for a BA are described in 50 CFR 402.12(f).

Biological Evaluation is a generic term for all other types of analyses in support of consultations. Although agencies are not required to prepare a Biological Assessment for non-major construction activities, **if a listed species or critical habitat is likely to be affected, the agency must provide the Service with an evaluation on the likely effects of the action.** Often this information is referred to as a BE. The Service uses this documentation along with any other available information to decide if concurrence with the agency's determination is warranted. Recommended contents are the same as for a BA, as referenced above.

The BAs and BEs should not be confused with Environmental Assessments (EA) or Environmental Impact Statements (EIS) which may be required for NEPA projects. These EAs and EISs are designed to provide an analysis of multiple possible alternative actions on a variety of environmental, cultural, and social resources, and often use different definitions or standards. However, if an EA or EIS contains the information otherwise found in a BE or BA regarding the project and the potential impacts to listed species, it may be submitted in lieu of a BE or BA.

2. What are you proposing to do?

Describe the project. A project description will vary, depending on the complexity of the project. For example, describing the construction or removal of a fixed aid-to-navigation in the Intracoastal Waterway, or the abandonment/dismantling of an oil-producing-platform may be relatively simple, but describing a the extent and amplitude of potential impacts of military training exercises involving different military assets, combinations of weaponry, locations, and seasons would necessarily be more detailed and complex. Include figures and tables if they will help others understand your proposed action and its relationship with the species' habitat.

How are you (or the project proponent) planning on carrying out the project? What tools or methods may be used? How will the site be accessed? When will the project begin, and how long will it last?

Describe the "action area" (all areas to be affected directly or indirectly by the Federal action and not merely the immediate areas involved in the action [50 CFR 402.02]). Always include a map (topographic maps are particularly helpful). Provide photographs including aerials, if available. Describe the project area (i.e., topography, vegetation, condition/trend).

Describe current management or activities relevant to the project area. How will your project change the area?

Supporting documents are very helpful. If you have a blasting plan, best management practices document, sawfish/sea turtle/sturgeon conservation construction guidelines, research proposal, NEPA or other planning document or any other documents regarding the project, attach them to the BA or BE.

3. What threatened or endangered species, or critical habitat, may occur in the project area?

A request for a species list may be submitted to the Service, or the Federal action agency or its designated representative may develop the list. If you have information to develop your own lists, the Service should be contacted periodically to ensure that changes in species' status or additions/deletions to the list are included. Sources of biological information on federally-protected sea turtles, sturgeon, Gulf sturgeon (and Gulf sturgeon critical habitat), and other listed species and candidate species can be found at the following website addresses: NMFS Southeast Regional Office, Protected Resources Division (http://sero.nmfs.noaa.gov/pr/protres.htm); NMFS Office of Protected Resources (http://www.nmfs.noaa.gov/pr/species); U.S. Fish and Wildlife Service (http://noflorida.fws.gov/SeaTurtles/seaturtle-info.htm); http://www.nmfs.noaa.gov/pr/; http://www.sad.usace.army.mil/protected%20resources/turtles.htm; http://endangered.fws.gov/wildlife.html#Species; the Ocean Conservancy (http://www.cmc-ocean.org/main.php3); the Caribbean Conservation Corporation (http://www.cccturtle.org/); Florida Fish and Wildlife Conservation Commission (http://floridaconservation.org/psm/turtles/turtle.htm); http://www.turtles.org; http://www/seaturtle.org; http://alabama.fws.gov/gs/; http://obis.env.duke.edu/data/sp_profiles.php; www.mote.org/~colins/Sawfish/SawfishHomePage.html; www.floridasawfish.com; http://www.flmnh.ufl.edu/fish/Sharks/sawfish/srt/srt.htm; www.flmnh.ufl.edu/fish/sharks/InNews/sawprop.htm; also, from members of the public or academic community, and from books and various informational booklets. Due to budget constraints and staff shortages, we are only able to provide general, state-wide, or country-wide (territory-wide) species lists.

Use your familiarity with the project area when you develop your species lists. Sometimes a species may occur in the larger regional area near your project, but the habitat necessary to support the species is not in the project area (including areas that may be beyond the immediate project boundaries, but within the area of influence of the project. If, for example, you know that the specific habitat type used by a species does not occur in the project area, it does not need to appear on the species list for the project. However, documentation of your reasoning is helpful for Service biologists or anyone else that may review the document.

4. Have you surveyed for species that are known to occur or have potential habitat in the proposed project area?

The "not known to occur here" approach is a common flaw in many BA/BEs. The operative word here is "known." Unless adequate surveys have been conducted or adequate information sources have been referenced, this statement is difficult to interpret. It begs the questions "Have you looked?" and "How have you looked?" Always reference your information sources.

Include a clear description of your survey methods so the reader can have confidence in your results. Answer such questions as:

How intensive was the survey? Did you look for suitable habitat or did you look for individuals? Did the survey cover the entire project area or only part of it? Include maps of areas surveyed if appropriate.

Who did the surveys and when? Was the survey done during the time of year/day when the plant is growing or when the animal can be found (its active period)? Did the survey follow accepted protocols?

If you are not sure how to do a good survey for the species, the Service recommends contacting species experts. Specialized training is required before you can obtain a permit to survey for some species.

Remember that your evaluation of potential impacts from a project does not end if the species is/are not found in the project area. You must still evaluate what effects would be expected to the habitat, even if it is not known to be occupied, because impacts to habitat that may result indirectly in death or injury to individuals of listed species would constitute "take".

5. Provide background information on the threatened or endangered species in the project area.

Describe the species in terms of overall range and population status. How many populations are known? How many occur in the project area? What part of the population will be affected by this project? Will the population's viability be affected? What is the current habitat condition and population size and status? Describe related items of past management for the species, such as stocking programs, habitat improvements, or loss of habitat or individuals caused by previous projects.

6. **How will the project affect the threatened or endangered species or critical habitat that occur in the project area?**

If you believe the project will not affect the species, explain why. Effects analyses must include evaluating whether adverse impacts to species' habitats, whether designated or not, could indirectly harm or kill listed species.

If you think the project may affect the species, explain what the effects might be. The Endangered Species Act requires you consider <u>all</u> effects when determining if an action funded, permitted, or carried out by a Federal agency may affect listed species. Effects you must consider include direct, indirect, and cumulative effects. Effects include those caused by interrelated and interdependent actions, not just the proposed action. Direct effects are those caused by the action and occur at the same time and place as the action. Indirect effects are caused by the action and are later in time but are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no significant independent utility apart from the action under consideration. Interrelated or interdependent actions can include actions under the jurisdiction of other federal agencies, state agencies, or private parties. Cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal actions subject to consultation.

Describe measures that have or will be taken to avoid or eliminate adverse effects or enhance beneficial effects to the species. Refer to conversations you had with species experts to achieve these results.

Consider recovery potential if the project area contains historic range for a species.

Evaluate impacts to designated critical habitat areas by reviewing any project effects to the physical or biological features essential to the conservation of the species.

7. What is your decision? The Federal action agency must make a determination of effect.

Quite frequently, effect determinations are not necessarily *wrong;* they simply are not justified in the assessment. The assessment should lead the reviewer through a discussion of effects to a logical, well-supported conclusion. Do not assume that the Service biologist is familiar with the project and/or its location and that there is no need to fully explain the impact the project may have on listed species. If there is little or no connection or rationale provided to lead the reader from the project description to the effect determination, we cannot assume conditions that are not presented in the assessment. Decisions must be justified biologically. The responsibility for making and supporting the determination of effect falls on the Federal action agency; however, the Service cannot merely "rubber stamp" the action agency's determination and may ask the agency to revisit its decision or provide more data if the conclusion is not adequately supported by biological information.

You have three choices for each listed species or area of critical habitat:

1. "No effect" is the appropriate conclusion when a listed species will not be affected, either because the species will not be present or because the project does not have any elements with the potential to affect the species. "No effect" does not include a *small* effect or an effect that is *unlikely* to occur: if effects are insignificant (in size) or discountable (extremely unlikely), a "may affect, but not likely to adversely affect" determination is appropriate. A "no effect" determination does **not** require written concurrence from the Service and ends ESA consultation requirements unless the project is subsequently modified in such manner that effects may ensue.

2. "May affect - is not likely to adversely affect" (NLAA) means that all effects are either beneficial, insignificant, or discountable. Beneficial effects have concurrent positive effects without any adverse effects to the species or habitat (i.e., there cannot be "balancing," wherein the benefits of the project would be expected to outweigh the adverse effects - see #3 below). Insignificant effects relate to the magnitude or extent of the impact (i.e., they must be small and would not rise to the level of a take of a species). Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur. A "NLAA" determination by the action agency requires **written** concurrence from the Service.

3. "May affect - is likely to adversely affect" means that all adverse effects cannot be avoided. A combination of beneficial and adverse effects is still "likely to adversely affect," even if the net effect is neutral or positive. Adverse effects do not qualify as discountable simply because we are not certain they will occur. The probability of occurrence must be extremely small to achieve discountability. Likewise, adverse effects do not meet the definition of insignificant because they are less than major. If the adverse effect can be detected in any way or if it can be meaningfully articulated in a discussion of the results, then it is not insignificant, it is likely to adversely affect. This requires formal consultation with the Service.

A fourth finding is possible for proposed species or proposed critical habitat:

4. "Is likely to jeopardize/destroy or adversely modify proposed species/critical habitat" is the appropriate

conclusion when the action agency identifies situations in which the proposed action is likely to jeopardize a species proposed for listing, or destroy or adversely modify critical habitat proposed for designation. If this conclusion is reached, conference is required.

List the species experts you contacted when preparing the BE or BA but avoid statements that place the responsibility for the decision of "may affect" or "no effect" on the shoulders of the species experts. Remember, this decision is made by the Federal action agency.

Provide supporting documentation, especially any agency reports or data that may not be available to the Service. Include a list of literature cited.

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Arizona Ecological Services Field Office

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National Marine Fisheries Service
Protected Resources Division
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St. Petersburg, FL 33701
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OUTLINE EXAMPLE FOR A
BIOLOGICAL ASSESSMENT OR BIOLOGICAL EVALUATION

Cover Letter - **VERY IMPORTANT** - Include purpose of consultation, project title, and consultation number (if available). A determination needs to be made for each species and for each area of critical habitat. You have three options: 1) a "no effect" determination; 2) request concurrence with an "is not likely to adversely affect" determination; 3) make a "may affect, is likely to adversely affect" determination, and request "formal" consultation. If proposed species or critical habitat are included, state whether the project is likely to result in jeopardy to proposed species, or the destruction or adverse modification of proposed critical habitat. If the critical habitat is divided into units, specify which critical habitat unit(s) will be affected.

Attached to Cover Letter: Biological Assessment or Biological Evaluation document, broken down as follows:

Title: e.g., BA (or BE) for "Project X"; date prepared, and by whom.

A. Project Description - Describe the proposed action and the action area. Be specific and quantify whenever possible.

For Each Species:
1. Description of affected environment (quantify whenever possible)
2. Description of species biology
3. Describe current conditions for each species
    a. Range-wide
    b. In the project area
    c. Cumulative effects of State and private actions in the project area
    d. Other consultations of the Federal action agency in the area to date
4. Describe critical habitat (if applicable)
5. Fully describe effects of proposed action on each species and/or critical habitat, and species' response to the proposed action.
    a. Direct effects
    b. Indirect effects
    c. Interrelated and interdependent actions
    d. Potential incidental take resulting from project activities

Factors to be considered/included/discussed when analyzing the effects of the proposed action on each species and/or critical habitat include: 1) Proximity of the action to the species, management units, or designated critical habitat units; 2) geographic area(s) where the disturbance/action occurs); timing (relationship to sensitive periods of a species' lifecycle; 3) duration (the effects of a proposed action on listed species or critical habitat depend largely on the duration of its effects); 4) disturbance frequency (the mean number of events per unit of time affects a species differently depending on its recovery rate); 5) disturbance intensity (the effect of the disturbance on a population or species as a function of the population or species' state after the disturbance); 6) disturbance severity (the effect of a disturbance on a population or species or habitat as a function of recovery rate – i.e., how long will it take to recover)

6. Conservation Measures (protective measures to avoid or minimize effects for each species)
7. Conclusions (effects determination for each species and critical habitat)
8. Literature Cited
9. Lists of Contacts Made/Preparers
10. Maps/Photographs

Guidance on Preparing an Initiation Package for Endangered Species Consultation

This document is intended to provide general guidance on the type and detail of information that should be provided to initiate consultation with U.S. Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS). This is not intended to be an exhaustive document as specific projects may require more or less information in order to initiate consultation. Also, note that this contains guidance on the information required to <u>initiate</u> formal consultation procedures with USFWS and/or NMFS. Additional information needs may be identified during consultation. Texts in italics below are examples. Normal text is guidance. A glossary of terms is appended.

INTRODUCTION

Here is an example of introductory language:

The purpose of this initiation package is to review the proposed [project name] in sufficient detail to determine to what extent the proposed action may affect any of the threatened, endangered, proposed species and designated or proposed critical habitats listed below. In addition, the following information is provided to comply with statutory requirements to use the best scientific and commercial information available when assessing the risks posed to listed and/or proposed species and designated and/or proposed critical habitat by proposed federal actions. This initiation package is prepared in accordance with legal requirements set forth under regulations implementing Section 7 of the Endangered Species Act (50 CFR 402; 16 U.S.C. 1536 (c)).

Threatened, Endangered, Proposed Threatened or Proposed Endangered Species

Example language:

The following listed and proposed species may be affected by the proposed action:

common name (Scientific name) ***T***

common name (Scientific name) ***E***

common name (Scientific name) ***PT***

common name (Scientific name) ***PE***

This list should include all of the species from the species lists you obtained from USFWS and NMFS. If it doesn't, include a brief explanation here and a more detailed explanation in your record to help USFWS, NMFS and future staff understand your thought process for excluding a species from consideration.

Critical Habitat

Example language:

The action addressed within this document falls within Critical Habitat for [identify species].

CONSULTATION TO DATE

"Consultation" under the ESA consists of discussions between the action agency, the applicant (if any), and USFWS and/or NMFS. It is the sharing of information about the proposed action and related actions, the species and environments affected, and means of achieving project purposes while conserving the species and their habitats. Under the ESA, consultation can be either informal or formal. Both processes are similar, but informal consultation may result in formal consultation if there is a likelihood of unavoidable take. Formal consultation has statutory timeframes and other requirements (such as the submission of the information in this package and a written biological opinion by USFWS or NMFS).

Summarize any consultation that has occurred thus far. Identify when consultation was requested (if not concurrent with this document). Be sure to summarize meetings, site visits and correspondence that were important to the decision-making process.

DESCRIPTION OF THE PROPOSED ACTION

The purpose of this section is to provide a clear and concise description of the proposed activity and any interrelated or interdependent actions.

The following information is necessary for the consultation process on an action:

1. The action agency proposing the action.

2. The authority(ies) the action agency will use to undertake, approve, or fund the action.

3. The applicant, if any.

4. The action to be authorized, funded, or carried out.

5. The location of the action.

5. When the action will occur, and how long it will last.

6. How the action will be carried out

7. The purpose of the action.

8. Any interrelated or interdependent actions, or that none exist to the best of your knowledge.

Describe and specify: **WHO** is going to do the action and under what authority, include the name and office of the action agency and the name and address of the applicant; **WHAT** the project or action is; **WHERE** the project is (refer to attached maps); **WHEN** the action is going to take place, including time line and implementation schedules; **HOW** the action will be accomplished, including the various activities that comprise the whole action, the methods, and the types of equipment used; **WHY** the action is proposed, including its purpose and need; and **WHAT OTHER** interrelated and interdependent actions are known. This combination of actions are what is being consulted on for the 7(a)(2) analysis.

Include a clear description of all conservation measures and project mitigation such as avoidance measures, seasonal restrictions, compensation, restoration/creation (on-site and in-kind, off-site and in-kind, on-site and out-of-kind, off-site and out-of-kind), and use of mitigation or conservation banks.

Here are some examples of commonly overlooked items to include in your project description:

Type of project

Project location

Project footprint

Avoidance areas

Start and end times

Construction access

Staging/laydown areas

Construction equipment and techniques

Habitat status on site

Habitat between work areas and endangered species locations

Permanent vs. temporary impacts

Surrounding land-use

Hydrology and drainage patterns

Duration of "temporary" impacts

Prevailing winds and expected seasonal shifts

Restoration areas

Conservation measures

Compensation and set-asides

Bank ratios and amounts

Mitigation: what kind and who is responsible?

Dust, erosion, and sedimentation controls

Whether the project is growth-inducing or facilitates growth

Whether the project is part of a larger project or plan

What permits will need to be obtained

Action Area

Describe all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. This includes any interrelated and interdependent actions. Remember that the action area is not based simply on the Federal action and should not be limited to the location of the Federal action. The same applies to the applicant's action. The action area is defined by measurable or detectable changes in land, air and water, or to other measurable factors that may elicit a response in the species or critical habitat.

To determine the action area, we recommend that you first break the action down into its components (*e.g.*, vegetation clearing, construction of cofferdams, storage areas, borrow areas, operations, maintenance, etc.,) to assess the potential impacts resulting from each component.

Determine the impacts that are expected to result from each component. For example, instream actions may mobilize sediments that travel downstream as increased turbidity and then settle out as sediments on the stream substrate. Sound levels from machinery may be detectable hundreds of feet, thousands of feet, or even miles away. Use these distances when delineating the extent of your action area. Note: don't forget to subsequently reconstruct the action to assess the combined stressors of the components. You may find that some stressors are synergistically minimized or avoided, whereas other stressors may increase.

Finally, describe the action area, including features and habitat types. Include photographs and an area map as well as a vicinity map. The vicinity map for terrestrial projects should be at a 1:24,000 scale with the USGS quad name included.

SPECIES ACCOUNTS AND STATUS OF THE SPECIES IN THE ACTION AREA

Provide local information on affected individuals and populations, such as presence, numbers, life history, etc. Identify which threats to the species' persistence identified at the time of listing are likely to be present in the action area. Identify any additional threats that are likely to be present in the action area.

If the species has a distribution that is constrained by limiting factors, identify where in the action area factors are present that could support the species and where they are absent or limiting. For example, if a species is limited to a narrow thermal range and a narrow humidity range, show where in the action area the temperatures are sufficient to support the species, where the humidity is sufficient to support the species, and where those areas overlap.

Include aspects of the species' biology that relate to the impact of the action, such as sensitivity to or tolerance of: noise, light, heat, cold, inundation, smoke, sediments, dust, etc. For example, if the species is sensitive to loud sounds or vibration, and your project involves loud tools or equipment, reference that aspect of their biology. Include citations for all sources of information

Describe habitat use in terms of breeding, feeding, and sheltering. Describe habitat condition and habitat designations such as: critical habitat (provide unit name or number, if applicable), essential habitat, important habitat, recovery area, recovery unit (provide unit name or number, if applicable). Also discuss habitat use patterns, including seasonal use and migration (if relevant), and identify habitat needs.

Identify and quantify the listed-species habitat remaining in the action area. GIS layers are useful here, as are land ownership patterns--especially local land trusts and open space designations.

Identify any recovery plan implementation that is occurring in the action area, especially priority one action items from recovery plans.

Include survey information. For all monitoring and survey reports, please clearly identify how it was done, when, where, and by whom. If survey protocols were followed, reference the name and date of the protocol. If survey protocols were modified, provide an explanation of how the surveying occurred and the reasoning for modifying the protocol.

Keep it relevant. It is unnecessary to discuss biology that is totally unrelated to project impacts--*e.g.*, discussion of pelage color, teat number, and number of digits fore and aft when the project is a seasonal wetland establishment.

Utilize the best scientific and commercial information available. Use and cite recent publications/journal articles/agency data and technical reports. Include local information, relative to the action area, views of recognized experts, results from recent studies, and information on life history, population dynamics, trends and distribution. Reference field notes, unpublished data, research in progress, etc.

Things to consider:

Existing threats to species

Fragmentation

Urban growth area

Drainage patterns

Information on local sightings and populations

Population trends

Home range and dispersal

Sensitivity of endangered species to: dust, noise, head, desiccation, etc.

Trap stress/mortality

Predators

ENVIRONMENTAL BASELINE AND CUMULATIVE EFFECTS

Provide information on past, present and future state, local, private, or tribal activities in the action area: specifically, the positive or negative impacts those activities have had on the species or habitat in the area in terms of abundance, reproduction, distribution, diversity, and habitat quality or function. Include the impacts of past and present federal actions as well. Don't forget to describe the impacts of past existence and operation of the action under consultation (for continuing actions).

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area. Future Federal actions that are unrelated (*i.e.,* not interrelated or interdependent) to the proposed action are not considered in this analysis because they will be subject to separate consultation pursuant to section 7 of the Act. (Note: Cumulative effects under ESA are ***not*** the same as the definition under NEPA. Be careful not to mix them up.) Describe the impacts of these cumulative effects in terms of abundance, reproduction, distribution, diversity, and habitat quality or function.

Present all known and relative effects to population, *e.g.*, fish stocking, fishing, hunting, other recreation, illegal collecting, private wells, development, grazing, local trust programs, etc. Include impacts to the listed and proposed species in the area that you know are occurring and that are unrelated to your action-- *e.g.*, road kills from off-road vehicle use, poaching, trespass, etc.

EFFECTS OF THE ACTION

The purpose of this section is to document your analysis of the potential impacts the proposed action will have on species and/or critical habitats. This analysis has two possible conclusions for listed species and designated critical habitat:

(1) May Affect, Not Likely to Adversely Affect – the appropriate conclusion when effects on a listed species are expected to be *discountable*, *insignificant*, or completely *beneficial*.

Beneficial effects – contemporaneous positive effects without any adverse effects

Insignificant effects – relate to the size of the impact and should never reach the scale where take would occur.

Discountable effects – those that are extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.

(2) May Affect, Likely to Adversely Affect – the appropriate finding if *any* adverse effect may occur to listed species or critical habitat as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial.

A finding of "may affect" is the primary trigger for initiating section 7 consultation. Further analysis leads to one of the two conclusions above. In the case of a determination that an action is "not likely to adversely affect" a species or critical habitat, you can request USFWS and/or NMFS concurrence with this determination and consultation can be concluded upon receipt of our concurrence. Determinations of "likely to adversely affect" require further consultation between the action agency and USFWS and NMFS. These consultations typically lead to the preparation of a biological opinion, although they can also lead to incorporation of additional protective measures that render the project "not likely to adversely affect" listed species or designated critical habitat. Any actions that are likely to result in the incidental take of a listed species are automatically considered "likely to adversely affect."

In the case of proposed species or proposed critical habitat, the possible conclusions are:

<u>Species</u>

Likely to Jeopardize the Continued Existence

Not Likely to Jeopardize the Continued Existence

Critical Habitat

Likely to Destroy or Adversely Modify

Not Likely to Destroy or Adversely Modify

The effects analysis includes assessment of:

Direct and indirect effects (stressors) of Federal action

Direct and indirect effects (stressors) of applicant's action

Direct and indirect effects (stressors) of interrelated or interdependent actions

Direct and indirect effects (stressors) of conservation and minimization measures

Remember: Direct and indirect effects under ESA are **not** the same as direct and indirect effects under NEPA. Be careful not to mix them up. Under ESA, direct effects are those that are caused by the action(s) and occur at the time of the action(s), and indirect effects are those that are caused by the action(s) and are later in time, but are still reasonably certain to occur.

Based on the various components of your action that you used to determine the extent of the action area, this analysis assesses the potential stressors resulting from each component and predicts the likely responses species and critical habitat will have. Note: don't forget to subsequently reconstruct the action to assess the combined stressors of the components. You may find that some stressors are synergistically minimized or avoided, whereas other stressors may increase.

Describe the stressors that are expected to result from each component. For example, instream actions may mobilize sediments that travel downstream as increased turbidity and then settle out as sediments on the stream substrate. Sound levels from machinery may be detectable hundreds of feet, thousands of feet, or even miles away. Describe these stressors in terms of their intensity, frequency, and duration.

Once you have determined the expected stressors resulting from an activity, the next step is to assess the overlap between those stressors and individuals of the species or components of critical habitat. The purpose of determining this overlap is to accurately and completely assess the potential exposure of species and habitat to the stressors resulting from the action. This exposure is the necessary precursor to any possible response those species and habitat may have. Your conclusions of "not likely to adverse affect" or "likely to adversely affect" are based in large part on this response.

To determine exposure, here is a basic set of questions you might answer:

- What are the specific stressors causing the exposure
- Where the exposure to the stressors would occur
- When the exposure to stressors would occur
- How long the exposure to stressors would occur
- What is the frequency of exposure to stressor
- What is the intensity of exposure to stressor
- How many individuals would be exposed
- Which populations those individuals represent
- What life stage would be exposed

For critical habitat, the questions would be similar but would focus on constituent elements of critical habitat.

Remember that exposure to a stressor is not always direct. For example, in some cases individuals of a species may be directly exposed to the sediment mobilized during construction. However, in other cases, individuals of the species would be exposed indirectly when sediment mobilized during construction settles out in downstream areas, rendering those areas unusable for later spawning or foraging.

Here are some examples of stressors you should address:

Exposure to abiotic factors affecting land, air, or water

Exposure to biotic factors affecting species behavior

Spatial or temporal changes in primary constituent elements of critical habitat

Loss or gain of habitat–direct and indirect

Fragmentation of habitat

Loss or gain of forage and/or foraging potential

Loss or gain of shelter/cover

Loss or gain of access through adjacent habitat/loss of corridors

Once you have determined that a species or critical habitat will be exposed to an action, the next step is to determine the potential response or range of responses the exposed individuals or components of critical habitat will have to those levels and types of exposure.

This is where the use of the best scientific and commercial information available becomes crucial. Your analysis must take this information into consideration and the resulting document must reflect the use of this information and your reasoning and inference based on that information. Bear in mind that this analysis may not be the final word on the expected responses as further consultation with USFWS or NMFS may refine this analysis.

Be sure to describe the expected responses clearly and focus your analysis towards determining if any of the possible responses will result in the death or injury of individuals, reduced reproductive success or capacity, or the temporary or permanent blockage or destruction of biologically significant habitats (*e.g.*, foraging, spawning, or lekking grounds; migratory corridors, etc.,). Any of these above responses are likely to qualify as adverse effects. If the available information indicates that no observable response is expected from the levels and types of exposure, the action may be unlikely to adversely affect a species or critical habitat. However, remember that no observable response may actually mask an invisible internal response such as increased stress hormone levels, elevated heart rate, etc. Depending on the fitness of the exposed individual and the surrounding environment (including other threats), these "invisible" responses may lead to more serious consequences. We recommend working with your NMFS or USFWS contact to determine the appropriate conclusion.

Don't forget to consider:

Individual responses based on the species biology and sensitivity to exposure

The combined effects of existing threats and new exposure

The combined effects of limiting factors and new exposure

Disrupted reproduction and/or loss of reproduction

Exposure and response of species and critical habitat to interrelated and interdependent actions

Understanding and avoiding the common flaws in developing an effect determination will save you considerable time. These common flaws are: the "Displacement" Approach (*i.e.*, the species will move out of the way; there are plenty of places for them to go); the "Not Known to Occur Here" Approach (*i.e.*, looking at survey results, or lack of results, instead of the Recovery Plan for the species); the "We'll Tell You Later" Approach (*i.e.*, if we find any, then we'll let you know and that is when we will consult); or the "Leap of Faith" Approach (*i.e.*, the agency wants the USFWS or NMFS to accept a determination based on trust, rather than the best scientific and commercially available information.). Sticking to flawed determinations will cost everyone time, money, and aggravation.

Analysis of alternate actions

This analysis is required for actions that involve preparation of an EIS. For all other actions, a summary of alternatives discussed in other environmental documents is useful.

OTHER RELEVANT INFORMATION

Provide any other relevant available information the action, the affected listed species, or critical habitat. This could include local research, studies on the species that have preliminary results, and scientific and commercial information on aspects of the project.

CONCLUSION

This is where you put your overall effect determination after you have analyzed the exposure and response of species and habitat to the stressors resulting from the proposed action and interrelated or interdependent actions. Effect determinations must be based on a sound reasoning from exposure to response and must be consistent with types of actions in the project description, the biology in the species accounts, the habitat status and condition, changes to the existing environment, and the best scientific and commercial information available.

Again, the two potential conclusions for **listed species** are:

Not likely to adversely affect species

Likely to adversely affect species

The two potential conclusions for **designated critical habitat** are:

Not likely to adversely affect critical habitat

Likely to adversely affect critical habitat

The two potential conclusions for **proposed species** are:

Not likely to jeopardize species

Likely to adversely jeopardize species

The potential conclusions for **proposed critical habitat** are, under informal and formal consultation respectively:

Not likely to adversely affect species

Likely to adversely affect species

Not likely to destroy or adversely modify critical habitat

Likely to destroy or adversely modify critical habitat

Include the basis for the conclusion, such as discussion of any specific measures or features of the project that support the conclusion and discussion of species expected response, status, biology, or baseline conditions that also support conclusion.

If you make a "no effect" determination, it doesn't need to be in the assessment, but you might have to defend it. Keep the documentation for your administrative record.

LIST OF DOCUMENTS

Provide a list of the documents that have bearing on the project or the consultation, this includes relevant reports, including any environmental impact statements, environmental assessment, or biological assessment prepared for the project. Include all planning documents as well as the documents prepared in conformance with state environmental laws

IMPORTANT NOTE: Each of these documents must be provided with the initiation package consultation for the Services to be able to proceed with formal consultation.

LITERATURE CITED

We are all charged with using the best scientific and commercial information available. To demonstrate you did this, it is a good idea to keep copies of search requests in your record. If you used a personal communication as a reference, include the contact information (name, address, phone number, affiliation) in your record.

LIST OF CONTACTS/CONTRIBUTORS/PREPARERS

Please include contact information for contributors and preparers as well as local experts contacted for species or habitat information.

GLOSSARY

Action Area - all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.

Beneficial Effects – contemporaneous positive effects without any adverse effects.

Cumulative Effects – are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur in the action area of the Federal action subject to consultation.

Discountable Effects – those that are extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.

Effects of the Action – refers to the direct and *indirect effects* of an action on the species or critical habitat, together with the effects of other activities that are *interrelated* or *interdependent* with that action, that will be added to the environmental baseline.

Environmental Baseline – includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions that are contemporaneous with the consultation in process.

Indirect Effects - Indirect effects are those that are caused by the action(s) and are later in time, but are still reasonably certain to occur.

Insignificant Effects – relate to the size of the impact and should never reach the scale where take would occur.

Interdependent Actions - Interdependent actions are those that have no significant independent utility apart from the action that is under consideration, *i.e.* other actions would not occur "but for" this action.

Interrelated Actions - Interrelated actions are those that are part of a larger action and depend on the larger action for their justification, *i.e.* this action would not occur "but for" a larger action.

Likely to Jeopardize the Continued Existence of – to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.

May Affect, Likely to Adversely Affect – the appropriate finding if any adverse effect may occur to listed species or critical habitat as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. Requires that a biological opinion be prepared by the Service.

May Affect, Not Likely to Adversely Affect – the appropriate conclusion when effects on a listed species are expected to be *discountable, insignificant*, or completely *beneficial*. Requires written concurrence from the Service.

No Effect – the appropriate conclusion when a listed species will not be affected, either because the species will not be present or because the project does not have any elements with the potential to affect the species. A "no effect" determination does **not** require written concurrence from the Service and ends ESA consultation requirements. Action agency should document their reasoning for this conclusion in their file.

APPENDIX L

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APPENDIX M

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APPENDIX N

SUBJECT INDEX

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