

## **Appendix A**

### **Environmental Synopsis for the Lake Charles CCS Project**

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**ENVIRONMENTAL SYNOPSIS**  
**Industrial Carbon Capture & Sequestration (ICCS)**  
**Technology Area I**  
**DE-FOA-0000015**

**January 2011**

**National Energy Technology Laboratory**  
**U.S. Department of Energy**  
**Morgantown, West Virginia**

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## INTRODUCTION

The U.S. Department of Energy (DOE or the Department) prepared this Environmental Synopsis pursuant to the Department's responsibilities under section 216 of DOE's National Environmental Policy Act (NEPA) Implementing Procedures set forth in 10 CFR Part 1021. This synopsis summarizes the consideration given to environmental factors and records that the relevant environmental consequences of reasonable alternatives were evaluated in the process of selecting awardees seeking financial assistance under Technology Area 1 of the Industrial Carbon Capture and Sequestration (ICCS) program. In addition to financial and technical elements, DOE considered relevant environmental factors and consequences of the projects proposed to DOE in response to the funding opportunity announcement (FOA). DOE initially selected 12 applicants seeking financial assistance under Technology Area 1 and provided cost-shared funding for project definition activities; DOE then selected three of the initial twelve awardees for continued funding beyond project definition, pending completion of project-specific NEPA reviews. As required by section 216, this synopsis does not contain business, confidential, trade secret or other information that statutes or regulations would prohibit DOE from disclosing. It also does not contain data or other information that may in any way reveal the identity of the offerors.<sup>1</sup>

## BACKGROUND

The ICCS program is a cost-shared collaboration between the government and industry to increase investment in clean industrial technologies and carbon capture and sequestration (CCS) projects. In contrast to other federally funded activities, these projects are not federal projects; instead, they are private projects seeking federal financial assistance. Under the ICCS funding opportunity, industry proposes projects that meet their needs and those of their customers while furthering the national goals and objectives of DOE. The successful development of advanced technologies and innovative concepts that reduce emissions of carbon dioxide into the atmosphere is a key objective of the nation's effort to help mitigate the effects of climate change.

Awardees under this FOA would receive assistance using funds appropriated by the American Recovery and Reinvestment Act of 2009, Public Law 111-5, (Recovery Act). The Recovery Act's purposes are to stimulate the economy and to create and retain jobs. Accordingly, special consideration was given to projects that promote and enhance job creation, preservation and economic recovery, in an expeditious manner. In accordance with the Recovery Act, and Section 703 of Public Law 110-140, DOE's two specific objectives were identified in the FOA as (1) Technology Area 1 – *Large-Scale Industrial CCS Projects from Industrial Sources*; and (2) Technology Area 2 – *Innovative Concepts for Beneficial CO<sub>2</sub> Use*. This synopsis specifically deals with the review process conducted for applications under Technology Area 1.

The applications reviewed under this FOA were initially selected for a first phase funding in October 2009 as the first of a two phase process for final awards of financial assistance. Under Phase I of the review process for Technology Area 1, DOE selected 12 projects related to the capture of CO<sub>2</sub> from industrial sources for geological storage or enhanced oil recovery (EOR). During Phase I, DOE provided cost shared funding for applicants to conduct project definition activities (e.g. preliminary design and permitting) and to prepare information that would assist the Department in performing its obligations pursuant to NEPA. Near the end of Phase I, awardees were given an opportunity to submit renewal applications for Phase II awards that would provide financial assistance for detailed design, construction and demonstration of the proposed technologies. DOE received eight renewal applications from the 12 projects selected under Phase I.

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<sup>1</sup> The three awardees selected for continued financial assistance are identified in this synopsis and information on these proposed projects will be available on the DOE National Energy Technology Laboratory web site at <http://www.netl.doe.gov/technologies/iccs/index.html>.

Applications under the ICCS program were evaluated against specific programmatic criteria:

- Technology merit, technical plan, and site suitability;
- Project organization and project management plan;
- Commercial potential;
- Funding plan;
- Financial condition and capacity of proposed funding sources;
- Financial commitment to meet cost-sharing requirements.

These criteria represented the total evaluation scoring. However, the selection official also considered the results of the environmental evaluation and the applicant's budget information and financial management system, as well as program policy factors, in making selections.

As a federal agency, DOE must comply with NEPA (42 U.S.C. §§ 4321 *et seq.*) by considering potential environmental issues associated with its actions prior to deciding whether to undertake these actions. The environmental review of applications received in response to the ICCS FOA was conducted pursuant to Council on Environmental Quality Regulations (40 Code of Federal Regulations (CFR) Parts 1500 - 1508) and DOE's NEPA Implementing Procedures (10 CFR Part 1021), which provide directions specific to NEPA in the context of procurement and financial assistance actions.

## **PURPOSE AND NEED**

The purpose and need for DOE's selections of awardees under the ICCS Program are to satisfy the responsibility Congress imposed on the Department to carry out a program to demonstrate technologies for the large-scale capture of CO<sub>2</sub> from industrial sources. Technology Area 1 under the FOA focused on the demonstration of advanced technologies that capture and sequester carbon dioxide emissions from industrial sources into underground formations or put the CO<sub>2</sub> to beneficial use in a manner that permanently prevents the CO<sub>2</sub> from entering the atmosphere, including the expansion of CO<sub>2</sub> use in EOR, while providing information on the cost and feasibility of deployment of sequestration technologies. Therefore, under the FOA, DOE sought projects with technologies that have progressed beyond the research and development stage to a point of readiness for operation at a scale that, if successful, could be readily replicated and deployed into commercial practice within the industry.

The industrial technologies proposed could produce heat, fuels, chemicals, hydrogen or other useful products with or without production of electricity. Thus, industrial sources could include cement plants, chemical plants, refineries, steel and aluminum plants, manufacturing facilities, and power plants using opportunity fuels (petroleum coke, municipal waste, etc.). DOE sought projects at a sufficient scale to show the potential for market penetration upon successful demonstration of the technology, and be integrated with commercial plant operation. DOE also allowed for leading-edge technologies not currently deployed in the utility marketplace or CO<sub>2</sub> injection industry, as opposed to new applications of commercial technologies or incremental improvements of commercial technologies or previously demonstrated technologies. DOE's specific technical objectives included demonstrating:

- Projects that capture and sequester amounts of CO<sub>2</sub> approaching or exceeding a target of one million tons per plant per year;
- Projects with large-scale CCS that include integration of CO<sub>2</sub> capture, transportation and sequestration with comprehensive MVA;
- Geological sequestration in multiple geological settings as a means to evaluate costs, operational processes, and technical performance;
- CO<sub>2</sub> capture technologies that are integrated within existing or new industrial facilities;

- Projects capable of operating technologies that make progress toward the capture and sequestration of seventy-five percent of CO<sub>2</sub> from the treated stream, comprising at least ten percent of CO<sub>2</sub> by volume that would otherwise be emitted to the atmosphere; and
- Projects at a sufficient scale to show the potential for market penetration;

## ALTERNATIVES

DOE received eight Phase II renewal applications out of the twelve projects selected for Phase I in ICCS Technology Area 1, all of which were determined to have met the mandatory eligibility requirements listed in the FOA. The applications proposed projects located in eight states: California, Illinois, Kansas, Louisiana, Michigan, Mississippi, Texas, and Washington. The criteria for evaluating Phase II applications under ICCS Technology Area 1 were published in the FOA. Technical and financial evaluations represented the total evaluation scoring; however, the environmental evaluation, which was not point-scored, entered into the evaluation and selection process. Each applicant was required to complete and submit a standard environmental information volume for each site or alternative site included in its application.

The evaluations of the applications focused on the technical description of the proposed project, financial plans and budgets, potential environmental impacts, and other information that the applicants submitted. Following reviews by technical, environmental, and financial panels and a comprehensive assessment by a merit review board, a DOE official selected those applications that best met DOE's purpose and need. By broadly soliciting proposals to meet the programmatic purpose and need for DOE action and by evaluating the potential environmental impacts associated with each proposal before selecting applicants, DOE considered a reasonable range of alternatives for meeting its purpose and need.

Applications were divided into two broad categories:

- Group 1: Addition of Carbon Capture Equipment at an Existing and Operating Facility; and
- Group 2: Addition of Carbon Capture Equipment at a Planned or Yet-to-Be Constructed Facility.

DOE received five applications for existing and operating facilities (Group 1) and three applications for planned or yet-to-be constructed facilities (Group 2).

## ENVIRONMENTAL REVIEW

DOE assembled environmental review teams to assess all applications that met the mandatory requirements. The review teams considered 20 resource areas that could potentially be impacted by the technologies and sites proposed under ICCS Technology Area 1. These resource areas consisted of:

- Aesthetics
- Air Quality
- Biological Resources
- Climate
- Community Services
- Cultural Resources
- Environmental Justice
- Floodplains
- Geology
- Ground Water
- Human Health and Safety
- Land Use
- Noise
- Socioeconomics
- Soils
- Surface Water
- Transportation and Traffic
- Utilities
- Wastes and Materials
- Wetlands

The review teams were composed of environmental professionals with experience evaluating the impacts of industrial facilities, power plants, and energy-related projects in the resource areas considered by DOE. The review teams considered the information provided as part of each application, which included narrative text, worksheets, and the environmental information volumes for the sites proposed by the applicant. In addition, reviewers independently verified the information provided to the extent practicable using available sources commonly consulted in the preparation of NEPA documents, and conducted preliminary analyses to identify the potential range of impacts that would be associated with each application. Reviewers identified both direct and indirect potential impacts to the resource areas mentioned above, as well as short-term impacts that might occur during construction and start-up, and long-term impacts that might occur over the expected operational life of the proposed project and beyond. The reviewers also considered any mitigation measures proposed by the applicant and any reasonably available mitigation measures that may not have been proposed.

Reviewers assessed the potential for environmental issues and impacts using the following characterizations:

- **Beneficial** – Expected to have a net beneficial effect on the resource in comparison to baseline conditions.
- **None (negligible)** – Immeasurable or negligible in consequence (not expected to change baseline conditions).
- **Low** – Measurable or noticeable but of minimal consequence (barely discernable change in baseline conditions).
- **Moderate** – Adverse and considerable in consequence but moderate and not expected to reach a level of significance (discernable, but not drastic, alteration of baseline conditions).
- **High** – Adverse and potentially significant in severity (anticipated substantial changes or effects on baseline conditions that might not be mitigable).

For cases in which an application failed to provide sufficient information to support a determination among the above characterizations, the reviewers assigned one of the following characterizations:

- **Limited Concern** – The potential for substantial adverse impacts would be negligible to low based on background information about the resource area with respect to the geographic location of the project.
- **Elevated Concern** – The potential for substantial adverse impacts would be moderate to high based on background information about the resource area with respect to the geographic location of the project.

### **Applications in Response to the FOA**

Based on the technologies and sites proposed, none of the applications were deemed to have a high potential for adverse impacts in eighteen of the twenty resource areas. However, one application was considered to have potential for high adverse impacts to floodplains, with another having high potential for health and safety concerns. The following impacts by resource area were considered in the selection of candidates for award:

**Aesthetics** –Low to moderate impacts would be expected for one facility. This site would be located within view of a residential area; however, it would be located where a previous facility stood that posed similar aesthetic issues, leading to little relative change. Low impacts were projected for all remaining sites. Temporary impacts could result at one site due to construction of a CO<sub>2</sub> pipeline near a National Historic Trail.

**Air Quality** – Moderate impacts would be expected for five projects, with three of them having elevated concerns due to new sources of criteria pollutants from planned or yet-to-be constructed plants. The other

two facilities with expected moderate impacts would add new energy-generating systems to their plants as part of the project. Low impacts were anticipated for the remaining three projects. Concerns included increases in emissions of volatile organic compounds from four sites, increases in NO<sub>x</sub> emissions from two sites, and increase in PM<sub>2.5</sub> and SO<sub>2</sub> emissions at one site. Temporary impacts from fugitive dust and combustion equipment were expected from all sites as a result of construction activities.

**Biological Resources** – Moderate impacts would be expected for four projects due to plant construction and land clearing activities. Impacts to aquatic species and habitat would be a concern for two projects as a result of process water intake, water discharge, and potential for accidental chemical release. Low impacts would be expected for the remaining sites.

**Climate** – Beneficial impacts would be expected for all projects as a result of greenhouse gas emissions reductions.

**Community Services** – Low impacts would be expected for all but one project, which would involve a new power plant. Generally, projects anticipating a larger temporary workforce during construction would be expected to place a higher demand on community services – particularly in smaller, more rural communities where currently existing community services are more limited.

**Cultural Resources** – Moderate impacts would be expected for two projects due to their proximity to multiple sites eligible for the National Register of Historic Places and other cultural resources. Low impacts would be expected for the remaining six projects. Potential impacts would include tribal concerns over pipeline routes. Impacts would vary with the extent of known tribal claims and their proximity to the proposed project or pipeline route.

**Environmental Justice** – Moderate impacts would be expected for one project due to the potential for disproportionate effects on minorities if an accidental release of hazardous chemical were to occur. Low impacts would be expected for the remaining projects, typically a function of lesser concentrations of low income and minority populations in surrounding areas.

**Floodplains** – Moderate to high impacts would be expected for three projects due to siting of the CO<sub>2</sub> capture facilities partially or totally within floodplains, and there would be limited concern for one site for which the floodplains are not delineated. Low to no impacts would be expected for the remaining proposed facilities. Low to moderate potential impacts during pipeline construction or pipeline routing would be expected for all but one project for which there are no floodplains within the proposed route. Floodplains would be impacted by any activity that modifies the available flood storage within the designated area; however, long-term potential impacts on the corridors would be minimal provided the surface contours are returned to preconstruction conditions.

**Geology** – Moderate impacts would be expected at one project due to sequestration within a rock formation largely untested for storage effectiveness. One project alternative presents elevated concern as it has potential for caprock fracture combined with abnormally high levels of hydrogen sulfide (H<sub>2</sub>S) in the formation water. The potential for low to moderate impacts exists for all applications, either from CO<sub>2</sub> injection into saline aquifers or use for enhanced oil recovery.

**Ground Water** – Low impacts would be expected for all projects. Impacts could include displacement of saline waters in reservoirs targeted for CO<sub>2</sub> injection or loss of CO<sub>2</sub> containment should injection pressures exceed appropriate thresholds.

**Human Health and Safety** – Low to moderate impacts would be expected for all projects due to hazards associated with construction. The level of risk is generally related to the size and complexity of the planned construction. There could also be a risk to human health and safety from loss of containment of CO<sub>2</sub> during transport and injection. This risk is present for all applications and generally varies from low to moderate with distance and is influenced by population density along the CO<sub>2</sub> transport route. Shorter routes through sparsely populated areas were considered to have a lower risk than longer routes through

regions of higher population. Low to moderate potential impacts could also be expected resulting from hazards associated with use, storage, and transport of ammonia for the CO<sub>2</sub> capture process. One project has a high potential impact due to the proximity of CO<sub>2</sub> pipelines to seismic faults and potential fracturing.

**Land Use** – Low impacts would be expected for all projects.

**Noise** – Moderate temporary impacts would be expected during construction of the pipeline routes for two projects that would pass near sensitive receptors. Long-term impacts during operations would be expected to be low for all projects.

**Socioeconomics** – Beneficial impacts would be expected for all projects. All projects would provide some additional employment as a result of construction, operations, and multiplier effects. Most employment opportunities would be in the local area.

**Soils** – Low impacts would be expected for projects located on previously disturbed land or within proximity to other industrial facilities. Moderate impacts would be expected for those projects with disturbances to prime farmland soils. One project would be located on a brownfield site, requiring additional remediation.

**Surface Water** – Moderate impacts would be expected for four projects due to proposed pipeline crossings of numerous streams and other water bodies, including one project where the pipeline crosses a major river. Moderate impacts would also be expected for two of the projects due to increased water demand. Low impacts would be expected for the remaining four projects. Increased sediment and nutrient loadings associated with increased stormwater runoff would be a concern for all projects.

**Transportation and Traffic** – Low impacts would be expected for all projects. Temporary impacts from construction are likely; however, operations would not be expected to result in any long-term traffic problems.

**Utilities** – Moderate impacts would be expected for five projects, associated with the supply of electricity for the CO<sub>2</sub> capture and compression systems. Low impacts would be expected for the remaining three projects.

**Wastes and Materials** – Low to moderate impacts would be expected for all projects due to required materials used and waste generated during operations of the CO<sub>2</sub> capture facilities, and wastes generated during construction, typically proportional to the size of the project.

**Wetlands** – Low impacts would be expected for all projects but one, which would have moderate impacts from more extensive wetland clearing as a result of CO<sub>2</sub> pipeline construction and ROW clearing.

## CONCLUSION

The alternatives available to DOE from applications received in response to the FOA for ICCS Technology Area I provided reasonable alternatives for accomplishing the Department's purpose and need to satisfy the responsibility Congress imposed on the Department to carry out a program to demonstrate technologies for the large-scale capture of CO<sub>2</sub> from industrial sources. The alternatives available to DOE would also meet the Department's goal of demonstrating advanced technologies that capture CO<sub>2</sub> emissions from industrial sources and either sequester the CO<sub>2</sub> in underground formations or put the CO<sub>2</sub> to beneficial use that permanently prevents it from entering the atmosphere. An environmental review was part of the evaluation process of these applications. DOE prepared a critique containing information from this environmental review. That critique, summarized here, contained summary as well as project-specific environmental information. The critique was made available to, and considered by, the selection official before selections for financial assistance were made.

DOE determined that selecting three applications in response to the FOA Technology Area 1 would meet the Department's purpose and need. DOE selected three projects for awards of financial assistance:

- Archer Daniels Midland Company (Decatur, IL) – project location in Decatur, IL. CO<sub>2</sub> capture from biofuels production and sequestration in the Mt. Simon sandstone formation; DOE determined that an environmental assessment is the appropriate level of environmental review for the proposed project.
- Air Products & Chemicals, Inc. (Allentown, PA) – project location in Port Arthur, TX. CO<sub>2</sub> capture from steam methane reforming process and transport to the Denbury Green Pipeline for use in EOR; DOE determined that an environmental assessment is the appropriate level of environmental review for the proposed project.
- Leucadia Energy, LLC (New York, NY) – project location in Lake Charles, LA. CO<sub>2</sub> capture from flue gas from yet-to-be constructed petroleum coke gasification plant and transport to the Denbury Green Pipeline for use in EOR; DOE determined that an environmental impact statement is the appropriate level of environmental review for the proposed project.

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## **APPENDIX B**

### **US ARMY CORPS OF ENGINEERS PERMITS ISSUED TO THE PORT OF LAKE CHARLES FOR THE GASIFICATION SITE**

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REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS  
P.O. BOX 60267  
NEW ORLEANS, LOUISIANA 70160-0267

May 30, 2008

*LC Logan*  
*file*  
*Shuman*

Real Estate Division  
Management, Disposal and Control Branch

Lake Charles Harbor & Terminal District  
Post Office Box 3753  
Lake Charles, Louisiana 70602

Gentlemen:

Enclosed for your records is a fully executed copy of Department of the Army Consent No. DACW29-9-08-43, which permits clearing, grubbing, and grading an area, depositing fill material and constructing a bulkhead for a coke gasification plant, within our Calcasieu River and Pass Channel Improvement Project, in Calcasieu Parish, Louisiana.

Your cooperation regarding this matter is greatly appreciated.

Sincerely,

*Linda C. LaBure*  
Linda C. LaBure  
Chief, Real Estate Division

Enclosure



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DEPARTMENT OF THE ARMY  
CONSENT TO CROSS U. S. GOVERNMENT EASEMENT  
AT  
CALCASIEU RIVER & PASS CHANNEL IMPROVEMENT PROJECT  
CALCASIEU PARISH, LOUISIANA

**KNOW ALL MEN BY THESE PRESENTS:**

That the consent of the United States is hereby granted to **Lake Charles Harbor & Terminal District**, hereinafter designated as grantee, to use, control, operate, and/or otherwise clear, grub and grade an area, deposit fill material and construct a bulkhead for a coke gasification plant, herein referred to as a "structures", across, over and under the lands where the United States has acquired perpetual channel and spoil disposal easements, identified as Tract Nos. 90 E-2 and 159E, within our Calcasieu River and Pass Project; and which is recorded in Deed Book of Conveyance No. 812, File No. 878180, Page 577, dated April 26, 1962 and File No. 1039993, dated October 13, 1966, respectively in the records of Calcasieu Parish, Louisiana. The approximate right-of-way for said structure for the purpose of this consent is specifically identified as Parcel in yellow, located as shown on Exhibit "A" attached hereto and made a part hereof and described as follows:

**The installation and/or activity will be located on U.S. Government Tract Nos. 90 E-2 and 159E, Section 17, Township 10 South, Range 9 West, Calcasieu Parish, Louisiana.**

This consent is granted subject to the following conditions:

1. That it is understood that this consent is effective only insofar as the property rights of the United States in the land to be occupied are concerned, and that it does not relieve the grantee from the necessity of obtaining grants from the owners of the fee and/or other interests therein.
2. That the proposed construction authorized herein shall not be commenced until appropriate rights shall have been obtained by the grantee from the record owners and encumbrances of the fee title to the lands involved.
3. That the exercise of the privileges hereby consented to shall be without cost or expense to the Department of the Army, under the general supervision and subject to the approval of the officer having immediate jurisdiction over the property, hereinafter referred to as "said officer," and subject to such regulations as may be prescribed by the District Commander, New Orleans District, from time to time, including, but not limited to, the specific conditions, requirements and specifications set forth in Exhibit "B" attached hereto and made a part hereof.

4. That the grantee shall supervise and maintain the said structure (or activity) and cause it to be inspected at reasonable intervals, and shall immediately repair any damage found therein as a result of such inspection, or when requested by said officer to repair any defects. Upon completion of the installation of said structure (or activity) or the making of any repairs thereto, the premises shall be restored immediately by the grantee, at the grantee's own expense, to the same condition as that in which they existed prior to the commencement of such work, to the satisfaction of said officer.

5. That any property of the United States damaged or destroyed by the grantee incident to the exercise of the privileges herein granted shall be promptly repaired or replaced by the grantee to the satisfaction of the said officer, or in lieu of such repair or replacement, the grantee shall, if so required by the said officer and at his option, pay to the United States money in an amount sufficient to compensate for the loss sustained by the United States by reason of damage to or destruction of Government property.

6. That the United States shall not be responsible for damages to property or injuries to persons which may arise from or be incident to the exercise of the privileges herein granted, or for damages to the property of the grantee, or for damages to the property or injuries to the person of the grantee, or the persons of grantee's officers, agents, servants, or employees or others who may be on said premises at their invitation or the invitation of one of them arising from governmental activities on or in the vicinity of the said premises, and the grantee shall hold the United States harmless from any and all such claims.

7. That this consent is effective only as to the following rights of the United States in the lands hereinabove described.

8. That the United States shall in no case be liable for any damage or injury to the construction herein authorized which may be caused by any action of the Government, under the rights obtained in its easements, either hidden or known, or that may result from future operations under taken by the Government, and no claim or right to compensation shall accrue from such damage or injury, and if further operations of the United States require the alteration or removal of the structure (or activity) herein authorized, the grantee shall, upon due notice from the Chief of Engineers, Department of Army, alter or remove said structure (or activity) without expense to the Government and subject to the supervision and approval of the officer having jurisdiction over the property and no claim for damages shall be made against the United States on account of such alterations or removal.

9. That construction and/or operation maintenance and use of said structure (or activity) incident to the exercise of the privileges hereby granted shall be in such a manner as not to conflict with the rights of the Government, nor to interfere with the operations by the Government under such rights, nor to endanger lives and safety of the public.

10. That this consent may be terminated by the Secretary of the Army upon reasonable notice to the grantee if the Secretary of the Army shall determine that installation to which consent is hereby granted interferes with the use of said land or any part thereof by the United States, and this consent may be annulled and forfeited by the declaration of the Secretary of the Army for failure to comply with any and all of the provisions and conditions of this consent, or for nonuse for a period of two years, or for abandonment.

11. That upon the relinquishment, termination, revocation, forfeiture or annulment of the consent herein granted, the grantee shall vacate the premises, remove all property of the grantee therefrom, and restore the premises to a condition satisfactory to the officers having immediate jurisdiction over the property. If the grantee shall fail or neglect to remove said property and so restore the premises, then, at the option of the Secretary of the Army, the said property shall either become the property of the United States without compensation therefor, or the Secretary of the Army may cause it to be removed and the premises to be so restored at the expense of the grantee, and no claim for damages against the United States, or its officers or agents, shall be created by or made on account of such removal and restoration.

12. That the terms and conditions of this consent shall extend to and be binding upon the heirs, successors and assigns of the grantee. Without prior written approval by said District Commander, the grantee of this Consent shall neither transfer nor assign the rights granted herein, or any part thereof.

13. That the grantee within the limits of his respective legal powers shall comply with all Federal, interstate, state and/or local governmental regulations, conditions or instructions for the protection of the environment and all other matters as they relate to real property interests granted herein.

14. That the grantee shall not remove or disturb, or cause or permit to be removed or disturbed, any historical, archeological, architectural or other cultural artifacts, relics, vestiges, remains or objects of antiquity. In the event such items are discovered on the premises, the grantee shall immediately notify the District Commander, New Orleans District, and the site and the material shall be protected by the grantee from further disturbance until a professional examination of them can be made or until clearance to proceed is authorized by the District Commander.

15. Except as otherwise specifically provided, any reference herein to "Secretary", "District Commander", "Installation Commander", or "said officer" shall include their duly authorized representatives. Any reference to "grantee" shall include assignees, transferees and their duly authorized representatives.

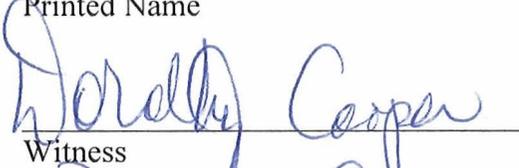
16. Merger clause. Prior to the execution of this consent, the following conditions were deleted: **None**; changed: **None**; or added: **None**.

This consent is not subject to Title 10, U.S.C., Section 2662.

In Witness Whereof, I have hereunto set my hand, by authority of the Secretary of the Army this 30<sup>th</sup> day of May, 2008.

  
Witness

LINDA G. THOMPSON  
Printed Name

  
Witness

Dorothy Cooper  
Printed Name

  
**LINDA C. LABURE**  
Chief, Real Estate Division  
U.S. Army Corps of Engineers  
New Orleans District

THIS CONSENT is also executed by the grantee this 28<sup>th</sup> day of May  
2008.

LAKE CHARLES HARBOR & TERMINAL DISTRICT

Linda S. Manuel  
Witness

LINDA S. MANUEL  
Printed Name

Sharon Edwards  
Witness

SHARON EDWARDS  
Printed Name

R. Adam McBride  
Typed Name: R. ADAM McBRIDE  
Title: PORT DIRECTOR

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**CERTIFICATE OF AUTHORITY**

I, MICHAEL K. DEES, do hereby certify that I am the principle legal officer of **Lake Charles Harbor and Terminal District (LCHTD)** and that **LCHTD** is a legally constituted public body with full authority and legal capability to adhere and comply with the terms and conditions of **Consent No. DACW29-9-08-43** and subsequent amendments thereto, to construct and maintain a new drainage pump station and appurtenant structures in connection with the Gulf Intracoastal Waterway: Bourg Canal to Bayou Chene Project, and that the persons who executed **Consent No. DACW29-9-08-43**, on behalf of **LCHTD** has acted within their statutory authority.

IN WITNESS WHEREOF, I have made and executed this certification on this 15<sup>th</sup> day of May, 2008.

Signed:   
Printed name: MICHAEL K. DEES  
Title: General Counsel

ACKNOWLEDGMENT

STATE OF LOUISIANA

COUNTY/PARISH OF CALCASIEU

On this 28th day of May, 2009, before me appeared R. ADAM McBRIDE,  
to me personally known, who, being by me duly sworn, did say that he is the PORT DIRECTOR  
of Lake Charles Harbor and Terminal District (LCHTD) and that the Consent was signed on behalf  
of LCHTD, by authority duly and legally granted and bestowed upon him, and that  
HE acknowledged the Consent to be the free act and deed of LCHTD  
and LCHTD has no seal.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

Signed: [Signature]

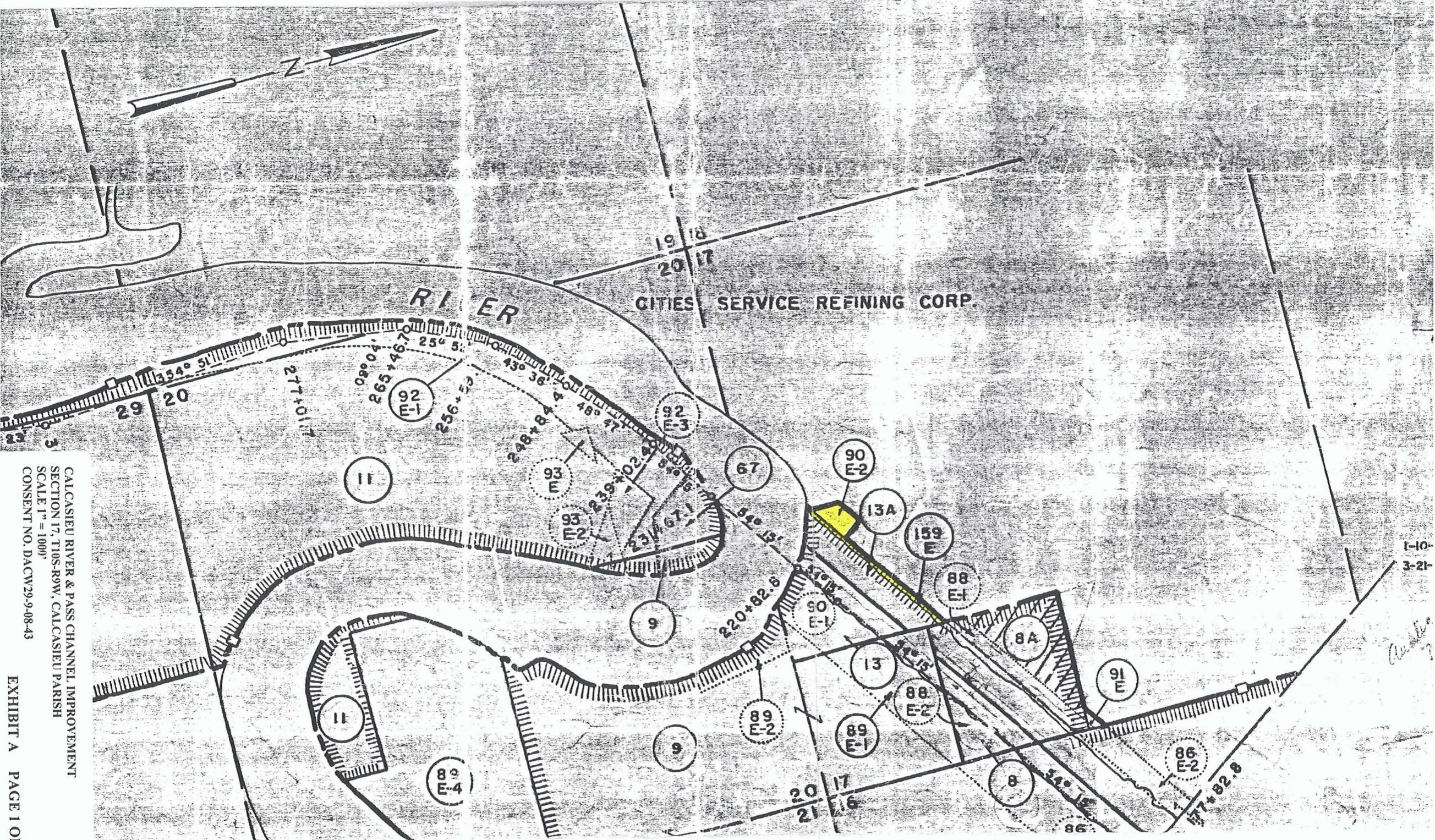
Printed Name: MICHAEL K DEES  
Notary Public  
State of Louisiana  
Parish of CALCASIEU

My Commission Expires: upon my death

Bar Association Number: \_\_\_\_\_

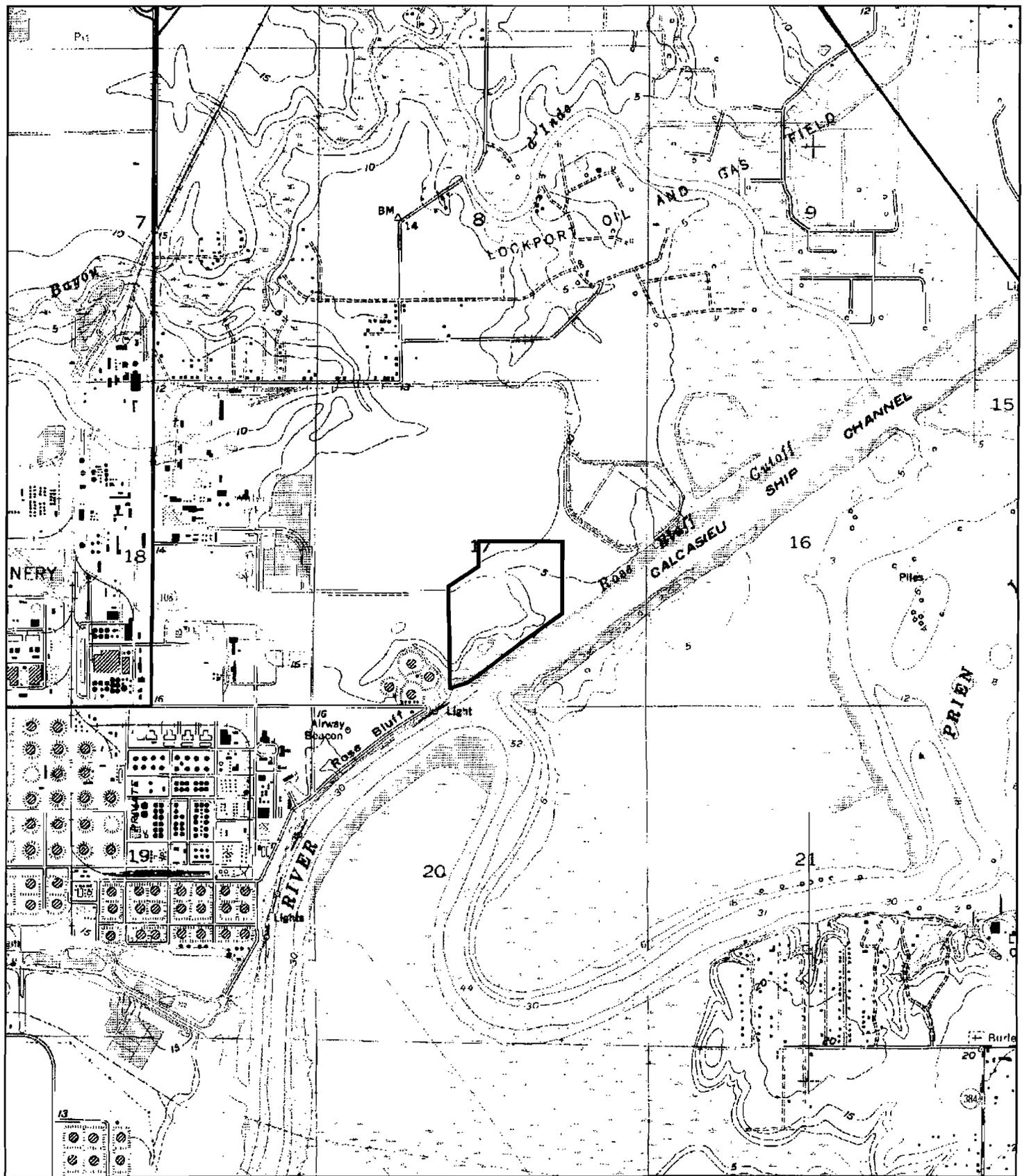


**MICHAEL K. DEES**  
**LOUISIANA BAR NO. 04796**  
**NOTARY PUBLIC NO. 2630**  
**STATE OF LOUISIANA**  
**PARISH OF CALCASIEU**  
**MY COMMISSION IS FOR LIFE**



CALCASIEU RIVER & PASS CHANNEL IMPROVEMENT  
SECTION 17, T10S-R9W, CALCASIEU PARISH  
SCALE 1" = 1000'  
CONSENT NO. DACW-29-9-08-43

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 PROJECT LOCATION



ARABIE  
ENVIRONMENTAL  
SOLUTIONS

**FIGURE 1 OF 4  
SITE LOCATION MAP**

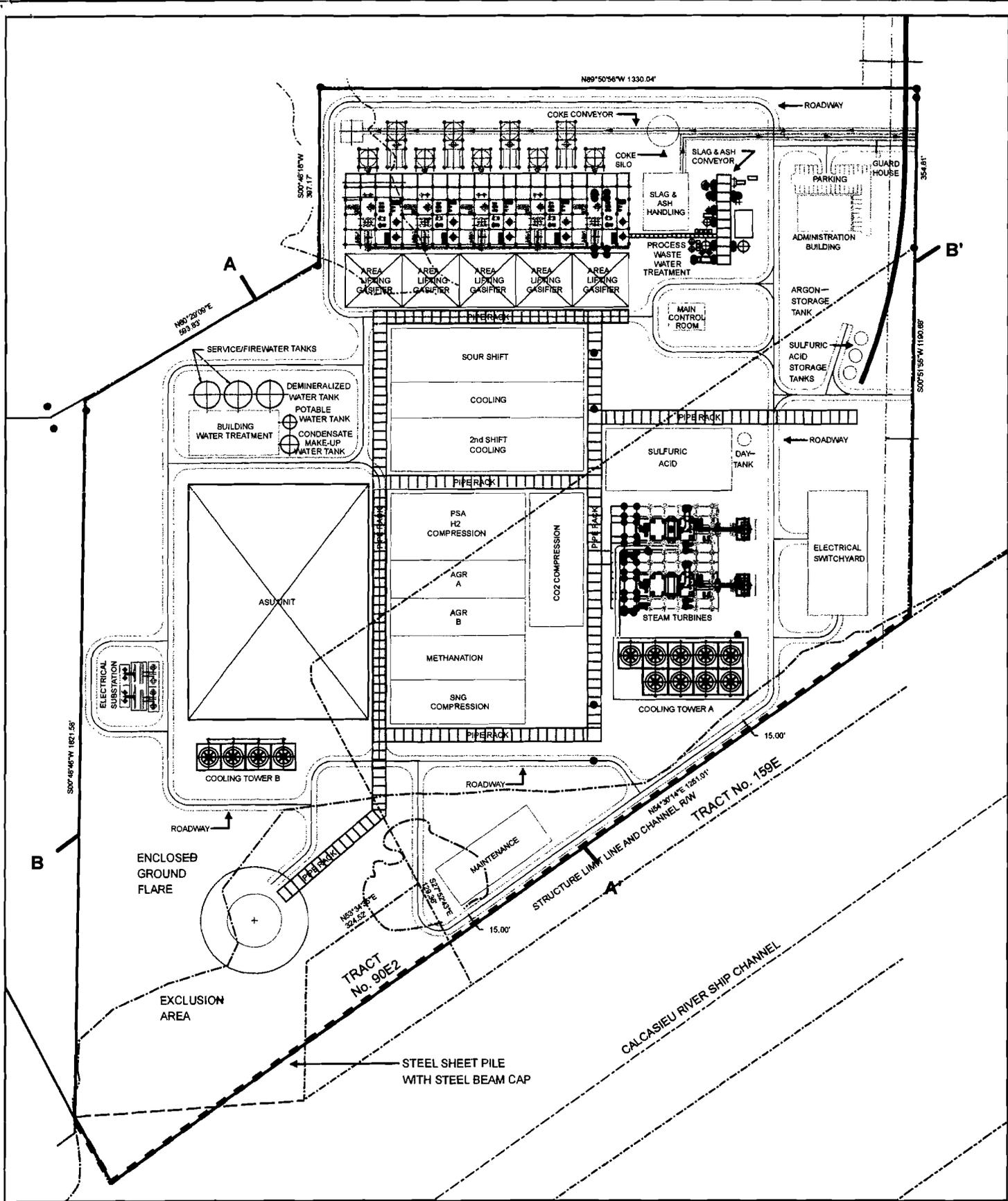
PERMIT APPLICATION  
LAKE CHARLES HARBOR AND TERMINAL DISTRICT  
LAKE CHARLES COGEN SITE  
WESTLAKE, LOUISIANA

Drawn By:	RSK	Checked By:	RRB
Date:	09/18/2007	Drawing No.:	10779-1

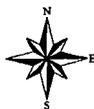
CONSENT NO. DACW29-9-08-43

EXHIBIT B

PAGE 1 OF 4



APPROXIMATE SCALE



CONSENT NO. DACW29-9-08-43

EXHIBIT B

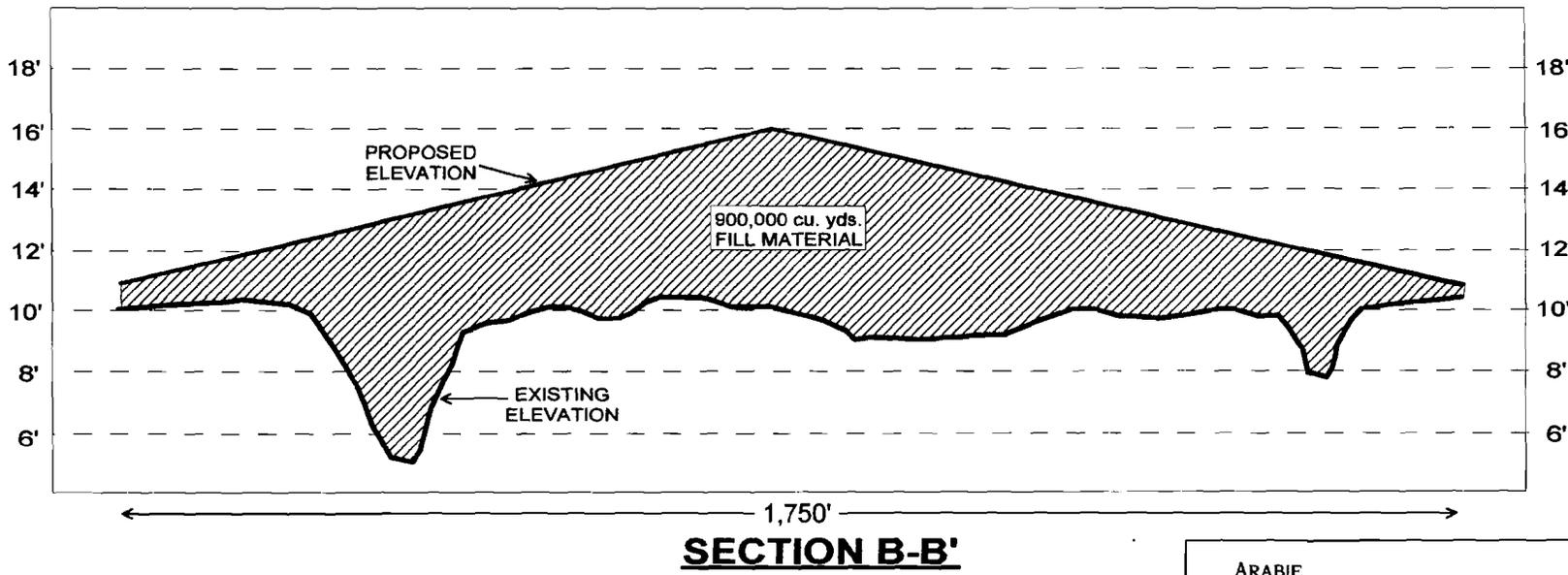
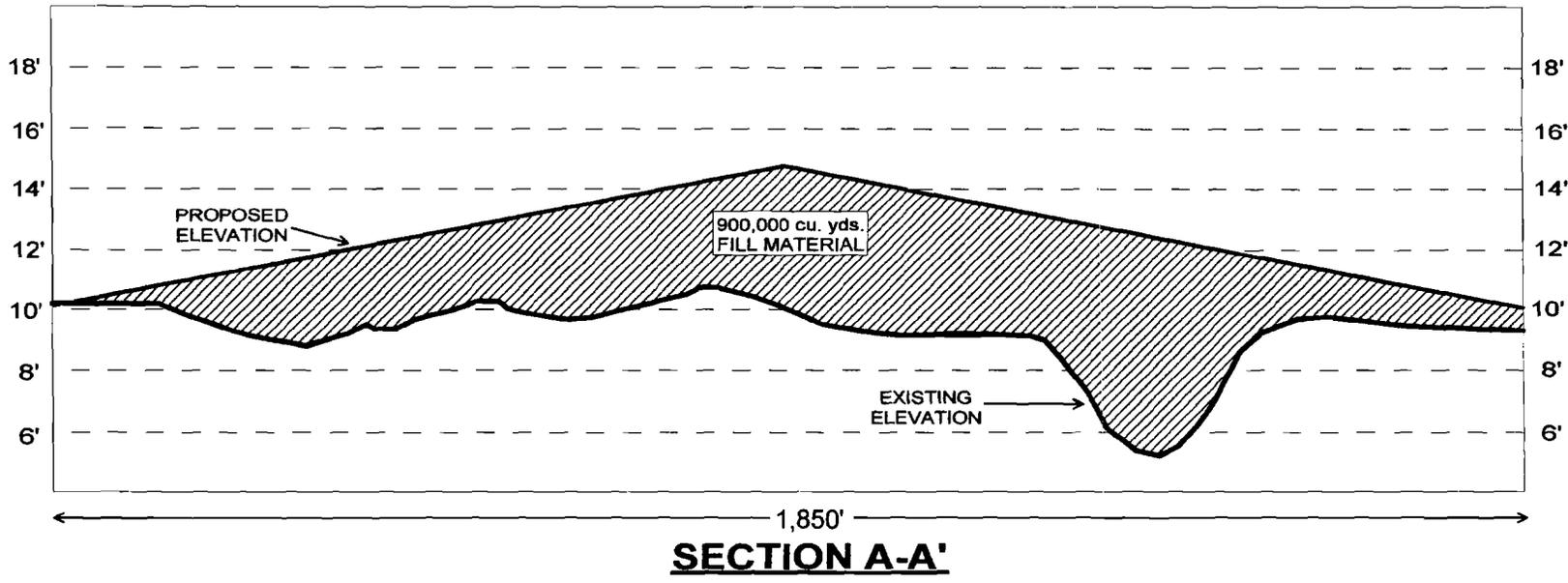
PAGE 2 OF 4

ARABIE ENVIRONMENTAL SOLUTIONS

**FIGURE 2 OF 4  
SITE DIAGRAM**

PERMIT APPLICATION  
LAKE CHARLES HARBOR AND TERMINAL DISTRICT  
LAKE CHARLES COGEN SITE  
WESTLAKE, LOUISIANA

Drawn By:	RSK	Checked By:	RRB
Date:	09/18/2007	Drawing No.:	10779-2



 FILL MATERIAL

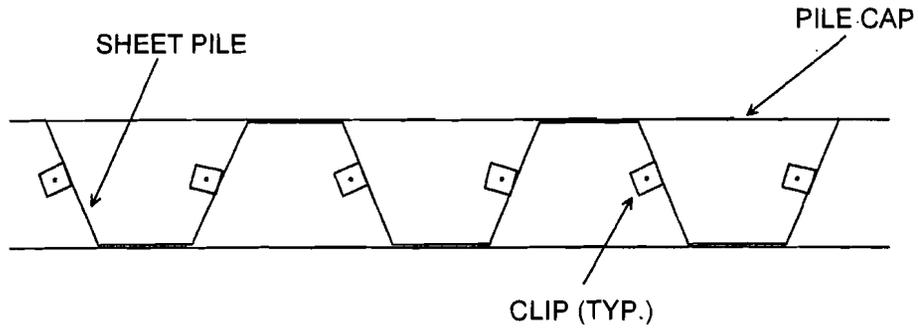
NOTES: 1) SLOPE OF PROPOSED ELEVATION = 0.5%  
 2) FILL MATERIAL WILL RESULT IN A MEAN RISE IN ELEVATION OF +/- 8'.

NOT TO SCALE  
 DIMENSIONS AS NOTED

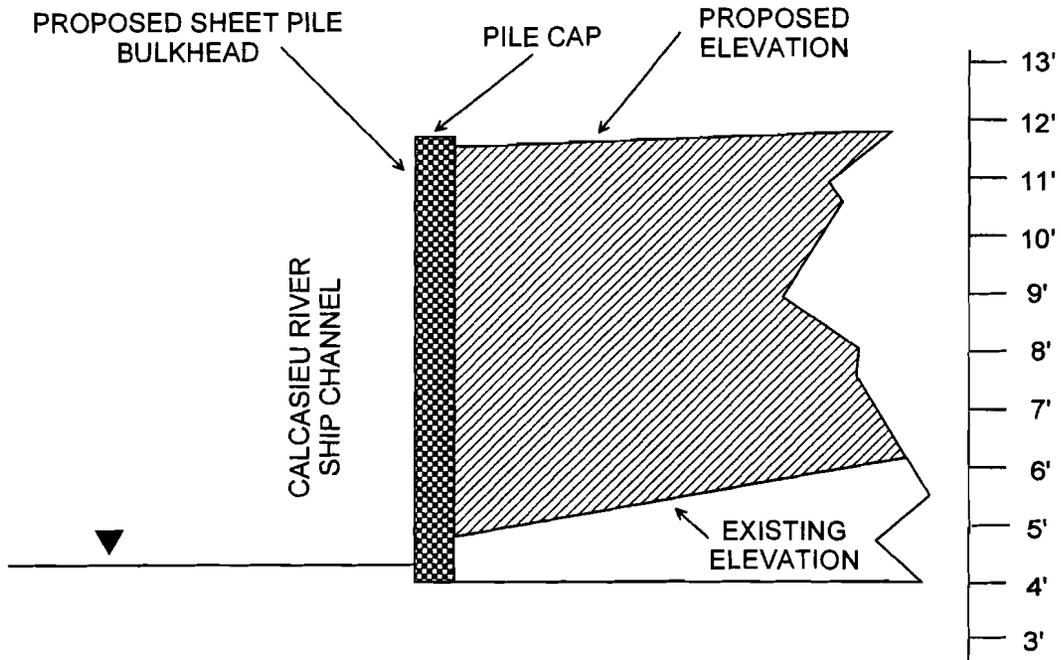
ARABIE ENVIRONMENTAL SOLUTIONS

**FIGURE 3 OF 4  
 CROSS SECTIONS**  
 PERMIT APPLICATION  
 LAKE CHARLES HARBOR AND TERMINAL DISTRICT  
 LAKE CHARLES COGEN SITE  
 WESTLAKE, LOUISIANA

Drawn By: <i>RSK</i>	Checked By: <i>RRB</i>
Date: <i>09/20/2007</i>	Drawing No: <i>10779-3</i>



**PLAN VIEW FOR SHEET PILE BULKHEAD**



**CROSS SECTIONAL VIEW OF SHEET PILE BULKHEAD**

CONSENT NO. DACW29-9-08-43

EXHIBIT B

PAGE 4 OF 4

 FILL MATERIAL

NOTE: Max Water Levels = +1.2'  
Min Water Levels = -1.2'

NOT TO SCALE

ARABIE  
ENVIRONMENTAL  
SOLUTIONS

**FIGURE 4 OF 4  
BULKHEAD CROSS SECTIONS**

PERMIT APPLICATION  
LAKE CHARLES HARBOR AND TERMINAL DISTRICT  
LAKE CHARLES COGEN SITE  
WESTLAKE, LOUISIANA

Drawn By: <b>RSK</b>	Checked By: <b>RRB</b>
Date: <b>09/28/2007</b>	Drawing No: <b>10779-4</b>



DEPARTMENT OF THE ARMY

NEW ORLEANS DISTRICT, CORPS OF ENGINEERS

P. O. BOX 60267

NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO  
ATTENTION OF:

AUG 18 2008

Operations Division  
Western Evaluation Section

SUBJECT: MVN-1998-03311-WY

Lake Charles Harbor & Terminal District  
Post Office Box 3753  
Lake Charles, Louisiana 70602

Gentlemen:

Revised drawings enclosed in six sheets, furnished with your Department of the Army application dated September 28, 2007, requesting authorization to perform construction operations to include clearing, excavating, grading, and placing fill and installing and maintaining a shoreline protection bulkhead, all as required to implement a coke gasification plant at Lake Charles, Louisiana, in Calcasieu Parish, are approved and will supersede the plans for the work authorized by the Secretary of the Army in a permit dated January 24, 2000.

A copy of this approval must be conspicuously displayed at the site of work.

The time limit for completion of this work is extended to August 30, 2013.

The following conditions are added to the permit:

1. Your use of the permitted activity must not interfere with the public's right to free navigation on all navigable waters of the United States.
2. The permittee is aware that unless lighted and marked the proposed excavation equipment and production facilities may present a hazard to recreation and/or commercial navigation in the area. Therefore, proper lighting and marking of these facilities and equipment to insure avoidance by these entities is required. Adequate lighting and marking will be installed, at the expense of the permittee, in relation to the facilities and equipment as necessary and customary unless otherwise prescribed by the U.S. Coast Guard, through regulations and other guidelines.

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RECEIPT FOR COLLECTION VOUCHER

DATE: 8/11/08

RECEIVED FROM: Archie Environmental Solutions Inc

THE SUM OF One Hundred DOLLARS/AND  $\frac{xx}{100}$  CENTS

(\$ 100.00 ) FOR THE FOLLOWING:

	AMOUNT
PERMITTEE: <u>Lake Charles Harbor &amp; Terminal</u>	100.00
PERMIT NUMBER: <u>MVN 1998-03311-WY</u>	
CHECK NUMBER: <u>2722</u> DATED: <u>8/5/08</u>	
<b>TOTAL AMOUNT:</b>	<u>100.00</u>

RECEIVED BY: *Joe C. [Signature]*  
Office Automation Clerk

8/11/08  
Date

3. You must install and maintain, at your expense, any safety lights, signs, and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, on your authorized facilities.

4. If the proposed project, or future maintenance work, involves the use of floating construction equipment (barge mounted cranes, barge mounted pile driving equipment, floating dredge equipment, dredge discharge pipelines, etc.) in the waterway, you are advised to notify the U.S. Coast Guard, Marine Safety Office, Waterways Management Section so that a Notice to Mariners, if required, may be prepared. Notification, with a copy of the permit and drawings, should be mailed to the Commander (oan), Eighth Coast Guard District, ATTN: Marine Information Branch, 501 Magazine Street, New Orleans, Louisiana 70130-3396, about one month prior to commencement of work. Telephone inquiries can be directed to (504) 589-6277.

5. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

6. Many local governing bodies have instituted laws and/or ordinances in order to regulate dredge and/or fill activities in floodplains to assure maintenance of floodwater storage capacity and avoid disruption of drainage patterns that may affect surrounding properties. Your project involves dredging and/or placement of fill, therefore, you must contact the local municipal and/or parish governing body regarding potential impacts to floodplains and compliance of your proposed activities with local floodplain ordinances, regulations or permits.

**7. Our Real Estate Division has indicated that your project is located in an area over which the federal government holds a real estate interest. No work may be performed under this permit until a real estate instrument has been issued by our Real Estate Division. If you require further information regarding the Real Estate instrument, call (504) 862-1956.**

If the structure or work authorized is not completed on or before the date herein specified, this authorization, if not previously revoked or specifically further extended, will cease and become null and void.

We ask that you utilize the following link to complete and submit a Customer Service Survey: <http://per2.nwp.usace.army.mil/survey.html>. The New Orleans District Regulatory Branch is committed to improving our service to you and would like your honest opinions of how we are doing. If you do not have internet access you may request a hard copy of the Customer Service Survey by calling (504) 862-2257. Your input is important to us, thank you for your time.

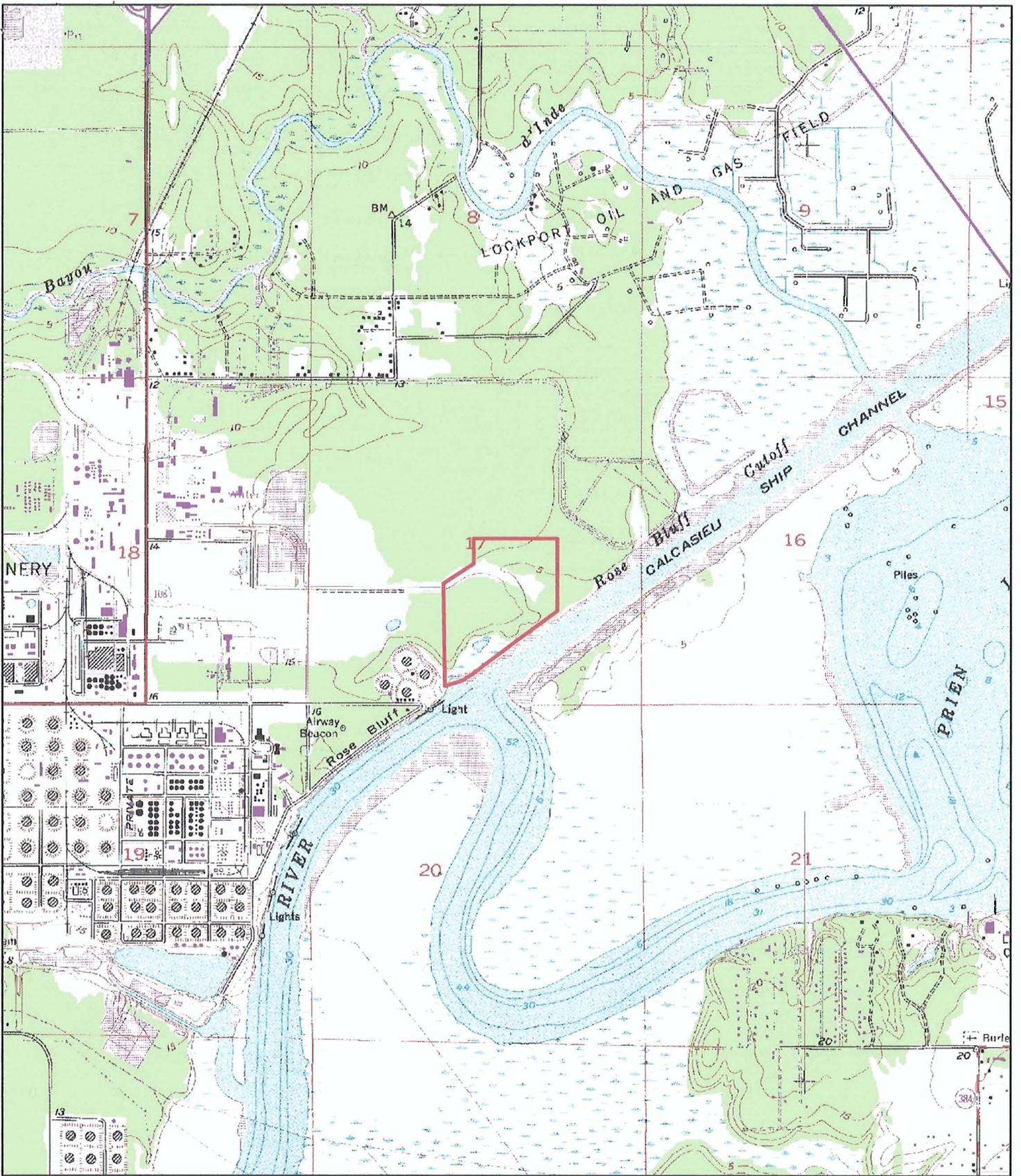
BY AUTHORITY OF THE SECRETARY OF THE ARMY:

A handwritten signature in cursive script that reads "Pete Serio".

Pete J. Serio  
Chief Regulatory Branch  
for  
Alvin B. Lee  
Colonel, US Army  
District Commander

Enclosures

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 PROJECT LOCATION



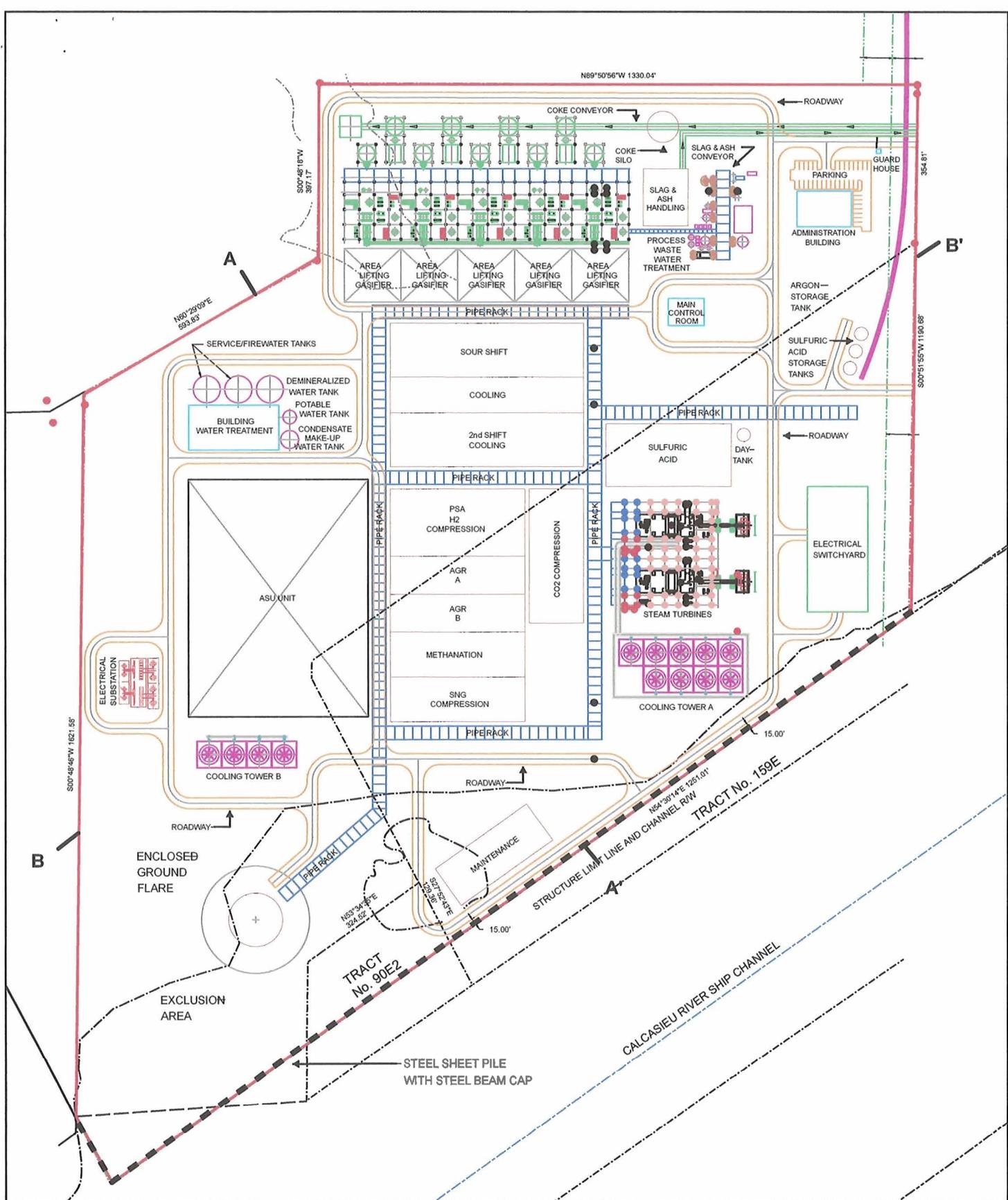
ARABIE  
ENVIRONMENTAL  
SOLUTIONS

**FIGURE 1 OF 4  
SITE LOCATION MAP**

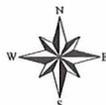
PERMIT APPLICATION  
LAKE CHARLES HARBOR AND TERMINAL DISTRICT  
LAKE CHARLES COGEN SITE  
WESTLAKE, LOUISIANA

Drawn By: RSK	Checked By: RRB
Date: 09/18/2007	Drawing No.: 10779-1

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APPROXIMATE SCALE  
1" = 300'



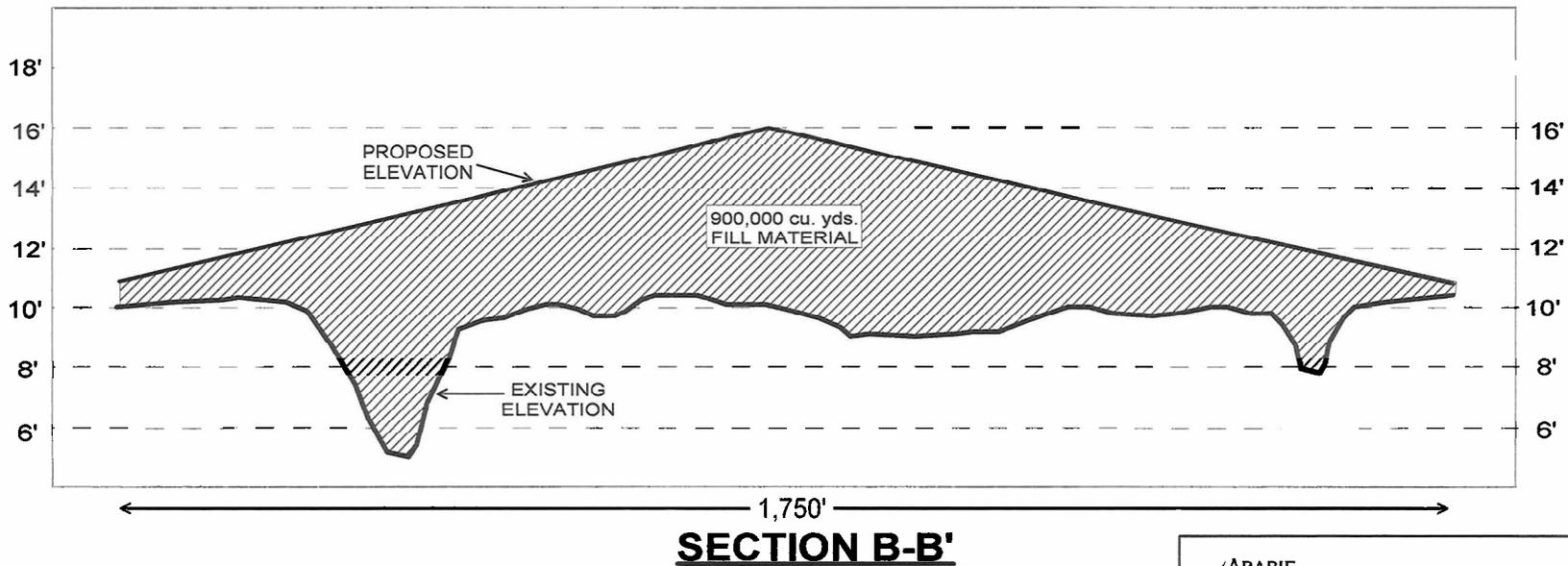
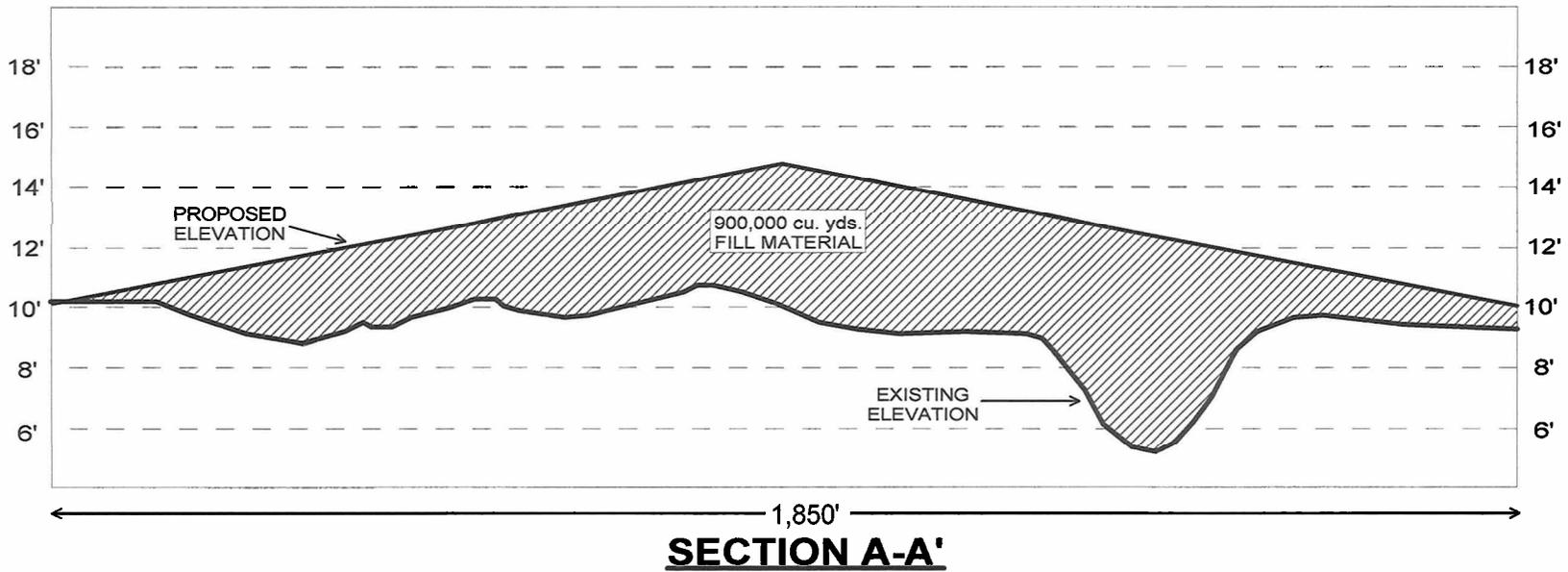
ARABIE  
ENVIRONMENTAL  
SOLUTIONS

**FIGURE 2 OF 4  
SITE DIAGRAM**

PERMIT APPLICATION  
LAKE CHARLES HARBOR AND TERMINAL DISTRICT  
LAKE CHARLES COGEN SITE  
WESTLAKE, LOUISIANA

Drawn By:	RSK	Checked By:	RRB
Date:	09/18/2007	Drawing No.:	10779-2

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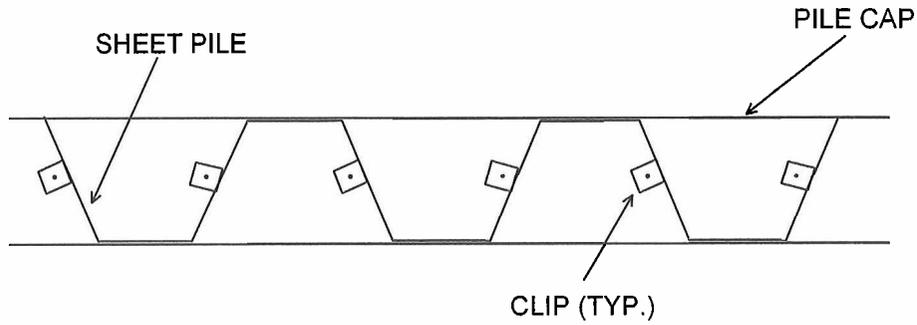


FILL MATERIAL

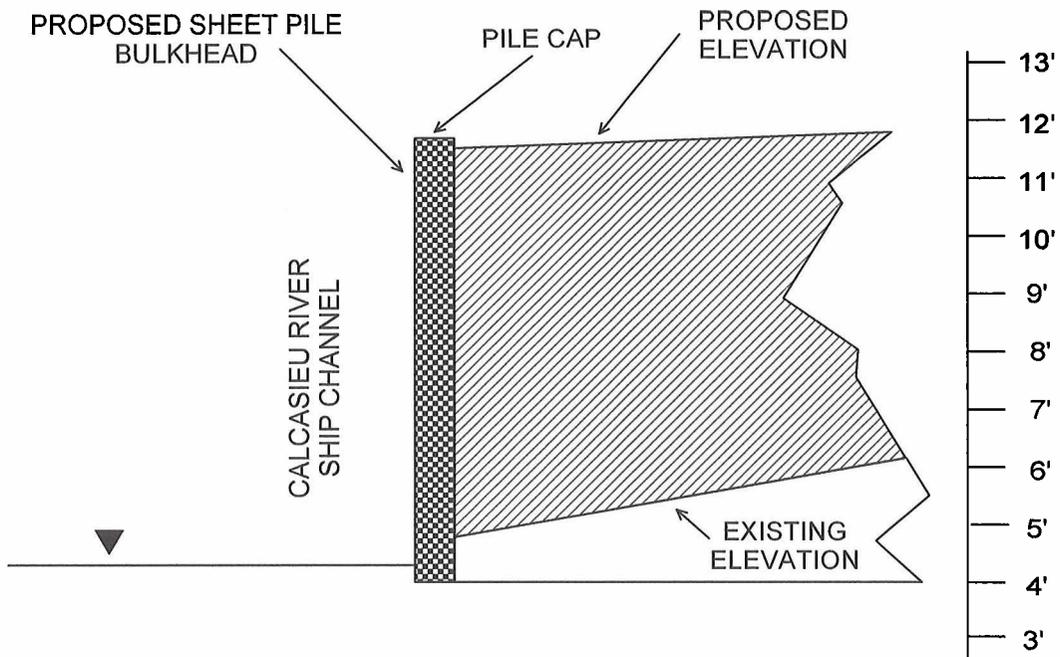
- NOTES: 1) SLOPE OF PROPOSED ELEVATION = 0.5%  
 2) FILL MATERIAL WILL RESULT IN A MEAN RISE IN ELEVATION OF +/- 8'.

NOT TO SCALE  
 DIMENSIONS AS NOTED

ARABIE ENVIRONMENTAL SOLUTIONS		<b>FIGURE 3 OF 4</b>	
		<b>CROSS SECTIONS</b>	
		PERMIT APPLICATION	
		LAKE CHARLES HARBOR AND TERMINAL DISTRICT	
		LAKE CHARLES COGEN SITE	
		WESTLAKE, LOUISIANA	
Drawn By:	RSK	Checked By:	RRB
Date:	09/20/2007	Drawing No:	10779-3



**PLAN VIEW FOR SHEET PILE BULKHEAD**



**CROSS SECTIONAL VIEW OF SHEET PILE BULKHEAD**

 FILL MATERIAL

NOTE: Max Water Levels = +1.2'  
Min Water Levels = -1.2'

NOT TO SCALE

ARABIE ENVIRONMENTAL SOLUTIONS

**FIGURE 4 OF 4  
BULKHEAD CROSS SECTIONS**

PERMIT APPLICATION  
LAKE CHARLES HARBOR AND TERMINAL DISTRICT  
LAKE CHARLES COGEN SITE  
WESTLAKE, LOUISIANA

Drawn By:	RSK	Checked By:	RRB
Date:	09/28/2007	Drawing No:	10779-4



Safety is a Part of Your Contract

LIMIT OF DREDGING  
C/L 1545.00  
APPROX. MILE 29.3

C/L STATION	X COORDINATE	Y COORDINATE
P 1 1428-27.2	264897.140	607253.828
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P 3 1428-27.2	264897.140	607253.828
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P 99 1428-27.2	264897.140	607253.828
P 100 1428-27.2	264897.140	607253.828



CLIENT DATA  
 0-1-2007  
 1-15-2007  
 8-28-2007

TERRACE INC.  
 87 PERLINE CO.  
 APPROX. C/L STA 1504-83.9

SHORE PERLINE CO.  
 APPROX. C/L STA 1410-33  
 ELEV. 480.0 M.L.C.

SHORE PERLINE CO.  
 APPROX. C/L STA 1410-33  
 ELEV. 480.0 M.L.C.

SHORE PERLINE CO.  
 APPROX. C/L STA 1410-33  
 ELEV. 480.0 M.L.C.

SHORE PERLINE CO.  
 APPROX. C/L STA 1410-33  
 ELEV. 480.0 M.L.C.

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 ELEV. 480.0 M.L.C.

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 ELEV. 480.0 M.L.C.

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 APPROX. C/L STA 1410-33  
 ELEV. 480.0 M.L.C.

SHORE PERLINE CO.  
 APPROX. C/L STA 1410-33  
 ELEV. 480.0 M.L.C.

SHORE PERLINE CO.  
 APPROX. C/L STA 1410-33  
 ELEV. 480.0 M.L.C.

SHORE PERLINE CO.  
 APPROX. C/L STA 1410-33  
 ELEV. 480.0 M.L.C.

SHORE PERLINE CO.  
 APPROX. C/L STA 1410-33  
 ELEV. 480.0 M.L.C.

SHORE PERLINE CO.  
 APPROX. C/L STA 1410-33  
 ELEV. 480.0 M.L.C.

SHORE PERLINE CO.  
 APPROX. C/L STA 1410-33  
 ELEV. 480.0 M.L.C.

MATCH LINE  
 PT 1428-27.2  
 E/L 1428-27.2

TERRACE INC.  
 87 PERLINE CO.  
 APPROX. C/L STA 1410-33  
 ELEV. 480.0 M.L.C.

CLIENT DATA  
 0-1-2007  
 1-15-2007  
 8-28-2007

TERRACE INC.  
 87 PERLINE CO.  
 APPROX. C/L STA 1410-33  
 ELEV. 480.0 M.L.C.

TERRACE INC.  
 87 PERLINE CO.  
 APPROX. C/L STA 1410-33  
 ELEV. 480.0 M.L.C.

		PROJECT NO. 1428-27.2 DRAWING NO. 1428-27.2 DATE 10/30/2007	SHEET NO. 1428-27.2 TOTAL SHEETS 1428-27.2
		PROJECT NAME DRAWING TITLE	PROJECT LOCATION DRAWING SCALE
PROJECT LOCATION: CALCASIEU RIVER, CALCASIEU PARISH, LOUISIANA		PROJECT OWNER:	
PROJECT DESCRIPTION:		PROJECT ENGINEER:	
PROJECT CONTRACT NO.:		PROJECT DATE:	
PROJECT STATUS:		PROJECT PHASE:	
PROJECT BUDGET:		PROJECT COST:	
PROJECT RISK:		PROJECT COMPLETION:	
PROJECT CONTACT:		PROJECT PHONE:	
PROJECT FAX:		PROJECT EMAIL:	
PROJECT WEBSITE:		PROJECT ADDRESS:	
PROJECT ZIP:		PROJECT STATE:	
PROJECT COUNTRY:		PROJECT CONTINENT:	



DEPARTMENT OF THE ARMY

NEW ORLEANS DISTRICT CORPS OF ENGINEERS

P.O. BOX 60267

NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO  
ATTENTION OF:

OCT 20 2004

Operations Division  
Western Evaluation Section

SUBJECT: MVN-1998-3311-WY

Lake Charles Harbor & Terminal District  
Post Office Box 3753  
Lake Charles, Louisiana 70602

Gentlemen:

As requested in your letter dated October 1, 2004, the authorization granted by the Secretary of the Army in a permit dated January 24, 2000, from the District Engineer at New Orleans, Louisiana, to complete clearing, grading, and placing fill material as necessary to construct an industrial bulk handling facility with associated roadways, utilities and drainage improvements, in Lake Charles, Louisiana, in Calcasieu Parish, is specifically extended to October 31, 2007.

The conditions, to which the work is made subject, excepting the time limit for completion, remain in full force and effect.

A copy of this signed letter, including the attached drawings, must be conspicuously displayed at the project site, until the proposed work is completed.

This is the last extension of time that will be granted for this permit without full permit reprocessing. If the work is not completed by the date granted under this letter, it will be necessary for you to reapply for a permit to perform any work after that date. You then must submit a new completed application form, permit drawings indicating work completed and remaining, and request new letters of no objection. It is possible that, as a result of the new evaluation, your request for a time extension could be denied or the authorization for the portion of your project not completed could be significantly modified.

BY AUTHORITY OF THE SECRETARY OF THE ARMY:

Ronald J. Ventola  
Chief, Regulatory Branch  
for  
Peter J. Rowan  
Colonel, U.S. Army  
District Engineer

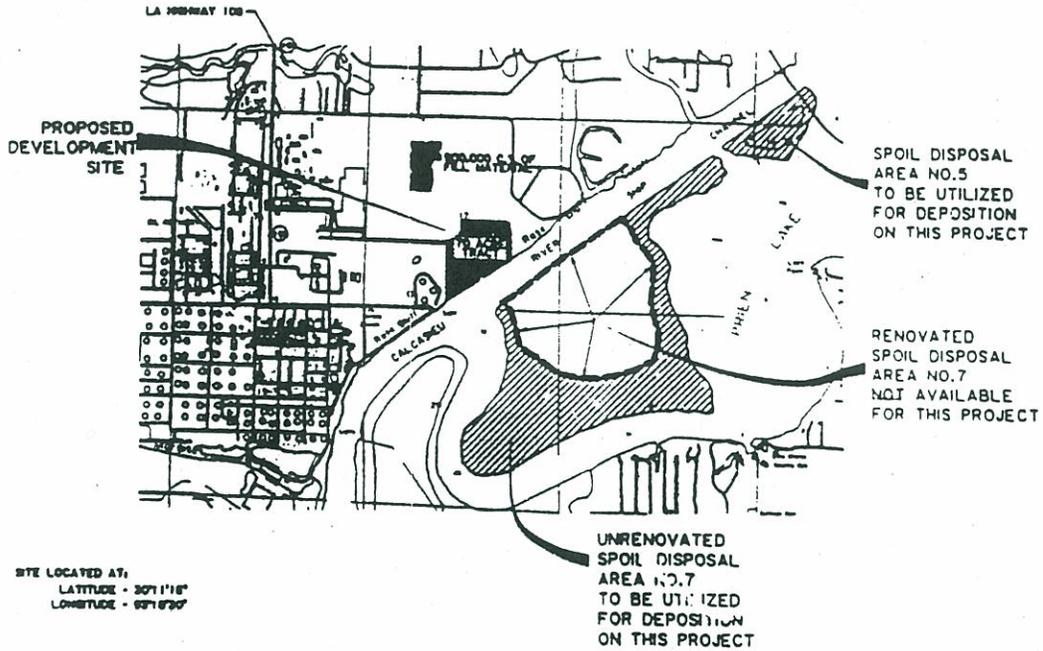
Enclosures

*Site Copy*

*Pujo Property  
BTI  
(Part owner)*



LOUISIANA VICINITY MAP  
NOT TO SCALE



LAKE CHARLES VICINITY MAP  
SCALE 1" = 4000'

PURPOSE: TO FILL LOW AREAS ACROSS PORT OF LAKE CHARLES PROPERTY.

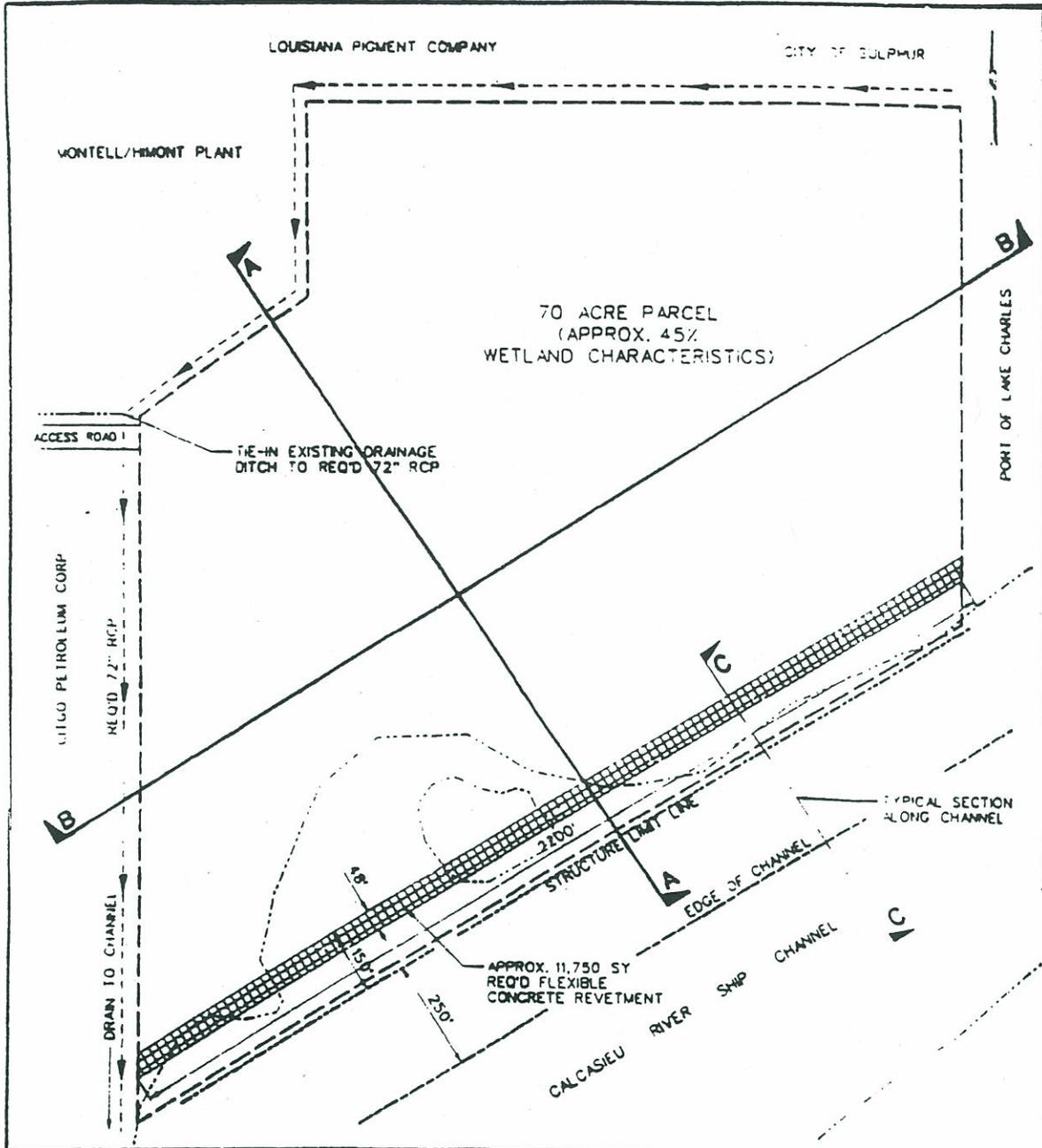
ADJACENT PROPERTY OWNERS  
SEE ATTACHED SHEET FOR LISTING

VICINITY MAP

SCALE AS NOTED  
WYATT & ASSOCIATES, INC.  
ENGINEERS AND ARCHITECTS  
500 ONE SERVICE HWY.  
SULPHUR, LOUISIANA 70683

PORT OF LAKE CHARLES  
PUJO PROPERTY DEVELOPMENT

N. LAKE CHARLES  
AT: BETWEEN MILE MARKERS 32 & 33 (CALCASIEU RIVER)  
PARISH OF CALCASIEU STATE OF LOUISIANA  
APPLICATION BY: PORT OF LAKE CHARLES  
REVISED NOV. 1998  
DATE: MAY 1998  
SHEET: 1 of 8



PURPOSE: TO FILL LOW AREAS ACROSS PORT OF LAKE CHARLES PROPERTY.

ADJACENT PARTY OWNERS:  
SEE ATTACHED SHEET FOR LISTING

**SITE PLAN**



SCALE: 1" = 300'  
 KEVIN J. ANDERSON, INC.  
 CIVIL AND SURVEYING  
 600 GILES DRIVE WEST  
 SUITE 100, LAKE CHARLES, LOUISIANA 70601

**PORT OF LAKE CHARLES  
 PUJO PROPERTY DEVELOPMENT**

W. LAKE CHARLES  
 AT: BETWEEN MILE MARKERS 32 & 33 (CALCASIEU RIVER)  
 PARISH OF: CALCASIEU STATE OF: LOUISIANA  
 APPLICATION BY: PORT OF LAKE CHARLES  
 SHEET: 2 of 6 DATE: MAY 1998

October 1, 2004

Mr. Ronald J. Ventola  
Chief, Regulatory Branch  
Department of the Army  
New Orleans District, Corp of Engineers  
P.O. Box 60267  
New Orleans, LA 70160

Re: Permit WI-19-908-3311

Dear Mr. Ventola:

This letter is written to request an extension to permit WI-19-980-3311 in accordance with the general conditions of the permit. The planned improvements to this site south of our Bulk Terminal 1 have not been ~~started~~ <sup>completed</sup> due to funding limitations. It is anticipated that these improvements will be completed within the next four years as part of continued port development.

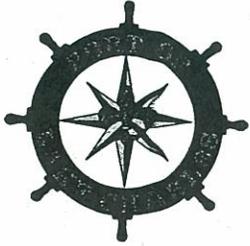
If you have any questions please contact me at (337) 493-3526. Thank you for your assistance.

Sincerely,



Jimmy D. McGinnis, P.E.  
Director of Engineering, Maintenance, & Development

CC:  
Linda Manuel  
Mike Dees, General Counsel  
File



**Lake Charles  
Harbor  
& Terminal  
District**

Post Office Box 3753  
Lake Charles, LA 70602  
Phone 337-439-3661  
Facsimile 337-493-3523



DEPARTMENT OF THE ARMY

NEW ORLEANS DISTRICT, CORPS OF ENGINEERS

P.O. BOX 60267

NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO  
ATTENTION OF:

JAN 24 2000



Operations Division  
Western Evaluation Section

SUBJECT: WI-19-980-3311

Lake Charles Harbor and  
Terminal District  
Post Office Box 3753  
Lake Charles, Louisiana 70602

Gentlemen:

Enclosed is a permit dated this date, subject as above, authorizing work under the Department of the Army permit program.

You are again reminded that any work not in accordance with the plans is subject to removal regardless of the expense and the inconvenience that such removal may involve and regardless of the date when the discrepancy is discovered.

Your attention is directed to all the terms and conditions of the approval, especially those conditions relative to supervision and approval of work by the District Engineer. In order to have the work finally approved and declared legal, all terms and conditions of the permit and plans shown on the drawings attached thereto, must be rigidly adhered to.

It is necessary that you notify the District Engineer, Attention: Regulatory Branch, Western Evaluation Section, in writing, prior to commencement of work and also upon its completion. The notification must include the permittee's name, as shown on the permit, and the permit number. Please note the expiration date on the permit. Should the project not be completed by that date, you may request a permit time extension. Such requests must be received before, but no sooner than, six months before the permit expiration date and must show the work completed and the reason the project was not finished within the time period granted by the permit.

The enclosed Notice of Authorization, ENG Form 4336, is to be conspicuously displayed at the site of work.

Sincerely,

Ronald J. Ventola  
Chief, Regulatory Branch

Enclosure

RECEIPT FOR COLLECTION OF PERMIT FEES

DATE: 1/20/00

RECEIVED FROM: Spbe Charles Harbor Terminal District

THE SUM OF \$ One hundred and no/100

(\$ 100.00) FOR THE FOLLOWING.

WF-19-980-3311

CHF-034459

TITLE OF RECEIVING AGENT

OAC

SIGNATURE OF AGENT

Kathy Matranga

RESOLUTION NO. 2000-008

A RESOLUTION approving agreement with Stream Wetland Services, L.L.C. for mitigation of 26.2 acres of the 70-acre tract of District property between Bulk Terminal No. 1 and Citgo.

WHEREAS, the District acquired a permit from the Corps of Engineers for the 70-acre tract of District property between Bulk Terminal No. 1 and Citgo that was purchased from the Pujo Heirs; and

WHEREAS, the permit requires wetland mitigation of the property; and

WHEREAS, Stream Wetland Services, L.L.C. was named in the permit as the agency the District has a contract with; and

WHEREAS, Stream Wetland Services, L.L.C. has requested payment in the amount of \$95,660.000 for mitigation of 26.2 acres of the 70-acre tract of District property.

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF COMMISSIONERS OF THE LAKE CHARLES HARBOR AND TERMINAL DISTRICT IN REGULAR SESSION CONVENED THAT:

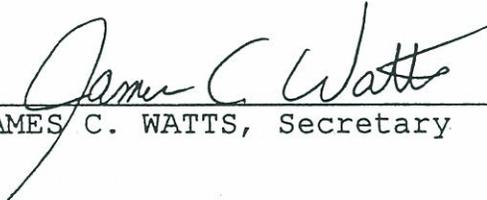
SECTION 1: All of the foregoing introductory provisions are hereby made a part of this Resolution and the Board of Commissioners of the Lake Charles Harbor and Terminal District does hereby approve the agreement with Stream Wetland Services, L.L.C. for mitigation of 26.2 acres of the 70-acre tract of District property between Bulk Terminal No. 1 and Citgo at a

cost of \$95,600.00, and authorize the Executive Director, Glenwood W. Wiseman, to execute any necessary documents therewith.

THUS PASSED AND ADOPTED AT Lake Charles, Louisiana, on this 14th day of February, 2000.

  
HILLERY J. LANGLEY, JR., President

I HEREBY CERTIFY that the above and foregoing is a true and correct copy of a resolution adopted by the Board of Commissioners of the Lake Charles Harbor and Terminal District in regular session convened on this 14th day of February, 2000.

  
JAMES C. WATTS, Secretary



REPLY TO  
ATTENTION OF:

**DEPARTMENT OF THE ARMY**  
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS  
P.O. BOX 60267  
NEW ORLEANS, LOUISIANA 70160-0267

JAN 26 2012

Operations Division  
Western Evaluation Section

SUBJECT: MVN 1998-03311 WY

Lake Charles Harbor & Terminal District  
Post Office Box 3753  
Lake Charles, Louisiana 70602

FILED

Gentlemen:

Revised drawings attached in three sheets, furnished with your application dated December 15, 2011, indicating a modification to change the bulkhead material from standard sheet pile with tie backs, to an open cell design, located at the Lake Charles Cogeneration Plant on the right descending bank of the Calcasieu River Ship Channel, Calcasieu Parish, are approved and will be included in your plans for the work authorized by the Secretary of the Army in a permit dated August 18, 2008.

The conditions to which the work is made subject, remain in full force and effect.

A copy of the first page of this permit approval letter must be conspicuously displayed at the project site. Also, you must keep a copy of this signed letter, with enclosed drawings, at the project site until the work is completed.

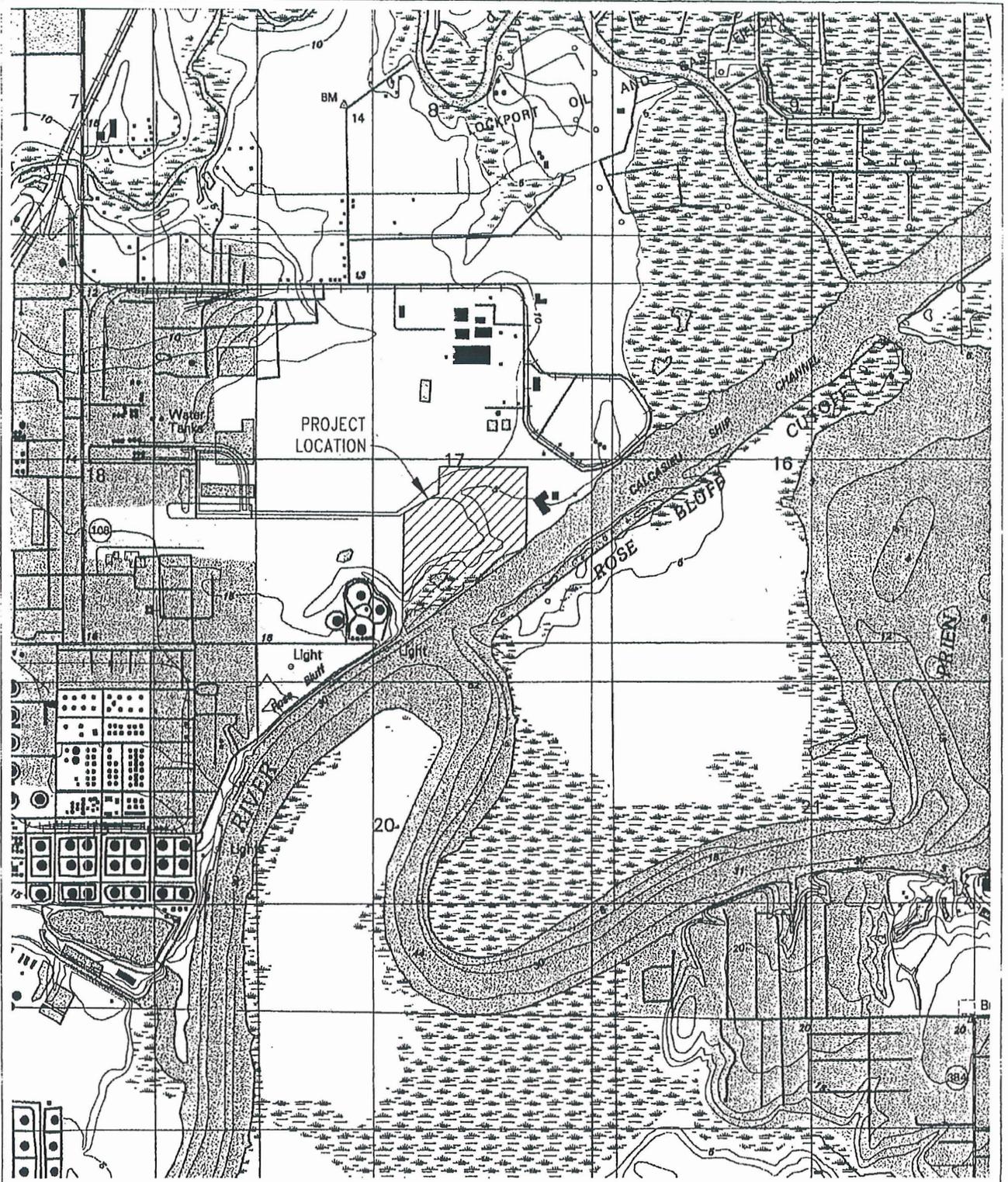
The time limit for completion of this work is August 30, 2013.

The New Orleans District Regulatory Branch is committed to providing quality and timely service to our customers. In an effort to improve customer service, please take a moment to complete and return the attached Customer Service Survey or go to the survey found on our web site at <http://per2.nwp.usace.army.mil/survey.html>.

BY AUTHORITY OF THE SECRETARY OF THE ARMY:

Pete J. Serio  
Chief, Regulatory Branch  
for  
Edward R. Fleming  
Colonel, US Army  
District Commander

Enclosures

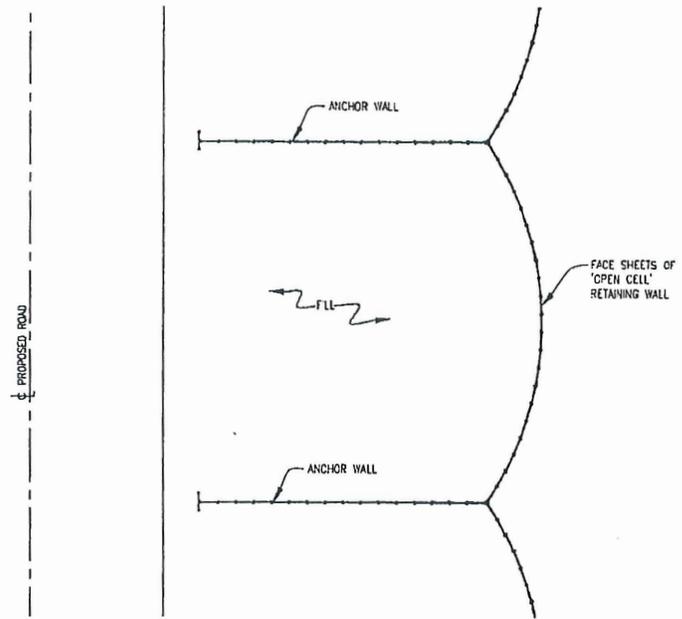



**LEVINGSTON ENGINEERS, INC.**  
 P.O. BOX 1863  
 Lake Charles, Louisiana 70602

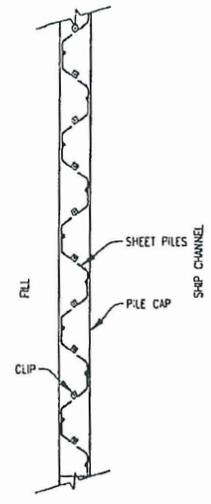
**LAKE CHARLES COGENERATION PROJECT**  
**PERMIT APPLICATION VICINITY MAP**

	BY	DATE	FILE: SITE LOCATION MAP I.DWG
DRAWN:	MTB	12/12/11	SCALE: 1" = 2000'
CHECKED:			REV. A
ENGINEER:	MTB	12/12/11	DWG. NO. SKETCH 1 OF 3

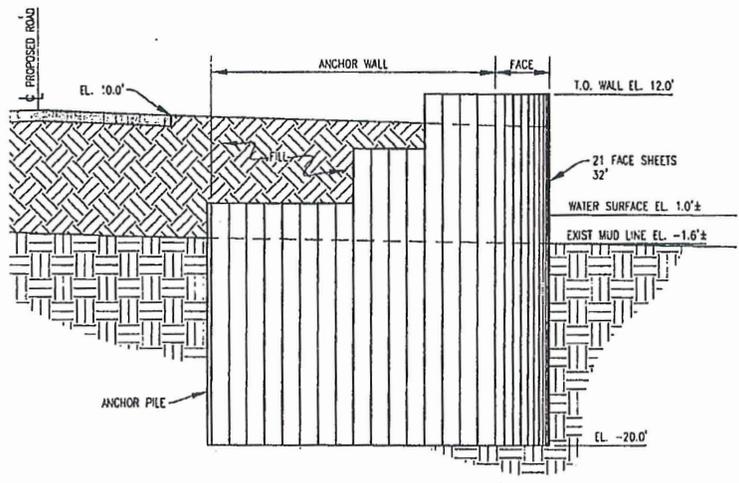




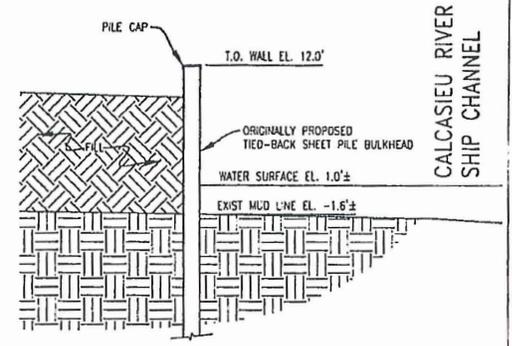
TYP. PLAN AT NEW PROPOSED 'OPEN CELL' SHEET PILE BULKHEAD  
1" = 1/16"



TYP. PLAN AT ORIGINALLY PROPOSED TIED-BACK SHEET PILE BULKHEAD  
1" = 1/8"



TYP. SECTION AT NEW PROPOSED 'OPEN CELL' SHEET PILE BULKHEAD  
1" = 1/16"



TYP. SECTION AT ORIGINALLY PROPOSED TIED-BACK SHEET PILE BULKHEAD  
1" = 1/16"

**NOTES:**

1. THE ORIGINALLY PROPOSED TIED-BACK SHEET PILE BULKHEAD WAS DETERMINED TO BE IMPRACTICAL AND THE 'OPEN CELL' ARRANGEMENT IS BEING PROPOSED IN ITS PLACE.
2. THE NUMBER, LENGTH, AND DEPTH OF SHEETS SHOWN ON THE 'OPEN CELL' ARRANGEMENT WILL VARY ALONG THE LENGTH OF THE WALL AS THE SOIL PROFILE AND GRADES CHANGE.

 <b>LEVINGSTON ENGINEERS, INC.</b> P.O. BOX 1865 Lake Charles, Louisiana 70602			
<b>LAKE CHARLES COGENERATION PROJECT</b> <b>TYP. SHEET PILE PLAN AND SECTIONS</b>			
DRAWN:	BY	DATE	FILE: TYP PLAN AND SECTIONS 3.0WG
CHECKED:	MTB	12/12/11	SCALE: AS SHOWN REV. A
ENGINEER:	MTB	12/12/11	DWG. NO. SKETCH 3 OF 3

**APPENDIX C**  
**USFWS CONSULTATIONS**

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BOBBY JINDAL  
GOVERNOR

State of Louisiana  
DEPARTMENT OF WILDLIFE AND FISHERIES  
OFFICE OF WILDLIFE

ROBERT J. BARHAM  
SECRETARY  
JIMMY L. ANTHONY  
ASSISTANT SECRETARY

**Date** May 28, 2009  
**Name** Lawrence R. Leib  
**Company** Lake Charles Cogeneration, LLC  
**Street Address** 1330 Post Oak Boulevard, Suite 1600  
**City, State, Zip** Houston, TX 77056  
**Project**  
**Project ID** 5280901  
**Invoice Number** 09052801

Personnel of the Habitat Section of the Coastal & Non-Game Resources Division have reviewed the preliminary data for the captioned project. After careful review of our database, no impacts to rare, threatened, or endangered species or critical habitats are anticipated for the proposed technical assistance project. No state or federal parks, wildlife refuges, scenic streams, or wildlife management areas are known at the specified site within Louisiana's boundaries.

The Louisiana Natural Heritage Program (LNHP) has compiled data on rare, endangered, or otherwise significant plant and animal species, plant communities, and other natural features throughout the state of Louisiana. Heritage reports summarize the existing information known at the time of the request regarding the location in question. The quantity and quality of data collected by the LNHP are dependent on the research and observations of many individuals. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Louisiana have not been surveyed. This report does not address the occurrence of wetlands at the site in question. Heritage reports should not be considered final statements on the biological elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. LNHP requires that this office be acknowledged in all reports as the source of all data provided here. If at any time Heritage tracked species are encountered within the project area, please contact the LNHP Data Manager at 225-765-2643. If you have any questions, or need additional information, please call 225-765-2357.

Sincerely,

  
for Gary Lester, Coordinator  
Natural Heritage Program

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September 28, 2012

Joshua Marceaux  
Endangered Species Coordinator  
Louisiana Ecological Services Field Office  
U.S. Fish and Wildlife Service Southeast Region 4  
646 Cajundome Boulevard, Suite 400  
Lafayette, Louisiana 70506-4290

**SUBJECT:** Initiation of Agency Coordination Under the Endangered Species Act for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project in Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Mr. Marceaux:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia), and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). The DOE is preparing an Environmental Impact Statement (EIS) for the proposed Project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 7 of the Endangered Species Act (ESA) of 1973 (7 U.S.C. § 136, 16 U.S.C. § 1531 et seq.). As part of compliance with Section 7 of the ESA, the DOE is also consulting with the Louisiana Department of Wildlife and Fisheries on the proposed project.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings Oil Field south of Houston, in Brazoria County, Texas. Please note that as of June 1, 2012, the name of Lake Charles Cogeneration, LLC was changed to Lake Charles Clean Energy, LLC. Historical references to Lake Charles Cogeneration (LCC) Gasification are now LCCE Gasification.

During the DOE demonstration phase of the proposed project, approximately 4 million tons per year of CO<sub>2</sub> would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project and transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast and is not part of DOE's evaluation. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings Oil Field in Brazoria County, Texas during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the Lake Charles CCS Project and its associated CO<sub>2</sub> capture and compression facilities in Calcasieu Parish, Louisiana;
- the Lake Charles CCS Project proposed 11.1 mile CO<sub>2</sub> pipeline in Calcasieu Parish Louisiana;
- the Lake Charles CCS Project proposed Research Monitoring, Verification, Analysis program for the CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation in Brazoria County, Texas; and
- the LCCE Gasification Project and its associated facilities in Calcasieu Parish, Louisiana (connected action).

The area of interest consists of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCCE Gasification (being evaluated as a connected action), which are located in Calcasieu Parish, Louisiana and in Brazoria County, Texas. The area of interest in Calcasieu Parish, Louisiana shown in Enclosure 2 includes the locations of:

- the CO<sub>2</sub> capture and compression facilities for the Lake Charles CCS Project on the west bank of the Calcasieu River;
- the LCCE Gasification project, located entirely within the AGR and compression facilities site also on the west bank of the Calcasieu River;
- the offsite facilities associated with the LCCE Gasification project including the proposed new methanol storage area; hydrogen pipeline; water supply pipeline; natural gas pipeline; co-located transmission line, potable water line, and methanol pipeline; equipment laydown area; and offsite parking area (see Enclosure 2).
- the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline; or,
- the alternative 11.6-mile long alignment for the CO<sub>2</sub> pipeline that connects to the existing Green Pipeline to the southwest.

The project area in Texas includes the location of the proposed CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation at the existing Hastings Oil Field in Brazoria County, Texas. The proposed Research MVA program at the existing Hastings Oil Field will not result in any new project-related facilities.

Natural resources investigations have been conducted previously within portions of the project area in Calcasieu Parish, Louisiana, including: investigations by the Port of Lake Charles and permitting for 70-acre property that contains the locations of the Lake Charles CCS Project and LCCE Gasification; and investigations by Denbury Onshore, LLC of the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline, including extra workspace and access roads. These investigations included wetland delineation to support US Army Corps of Engineer Clean Water Act Section 404 permitting of the 70-acre property.

Natural resources investigations conducted for the proposed new 11.1-mile long CO<sub>2</sub> pipeline consisted of site investigations. A desktop review was performed of the site conditions for all the other project components. DOE is not aware of any other previously conducted natural resources investigations in other portions of the project area in Calcasieu Parish, Louisiana. DOE has determined from these investigations that no threatened or endangered species, nor habitat conditions that could support them, are located within the project area or a 0.5-mile radius around the project area in Calcasieu Parish.

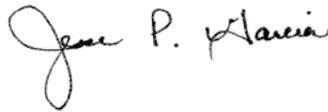
In accordance with Section 7 of the ESA, DOE is writing to seek your input and confirmation that no threatened or endangered species are within the project area in Calcasieu Parish, Louisiana and would therefore, not be impacted by the proposed project. DOE is also seeking your comments on any issues or concerns for wildlife resources such as significant/critical habitats that might be affected by the proposed Project. DOE has not conducted separate consultation with the Texas Parks and Wildlife Department on the proposed new facilities in Brazoria County, Texas since the proposed project components are within an existing, operating oil field. Based on publicly available information, no species of concern nor significant or critical habitat is present.

DOE looks forward to receiving your comments on any issues or concerns for wildlife and significant/critical habitat resources that might be affected by the proposed project. Please forward the results of your review and any requests for additional information to our contractor:

Janine Whitken  
Ecology and Environment, Inc.  
368 Pleasant View Drive  
Lancaster, New York 14086

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,

A handwritten signature in cursive script that reads "Pierina N. Fayish". The signature is written in black ink and is positioned centrally below the "Sincerely," text.

For Pierina N. Fayish  
NEPA Document Manager

cc: Amity Bass, Louisiana Department of Wildlife and Fisheries

Enclosures:    1. Location of the proposed Lake Charles CCS Project  
                  2. Area of Interest for proposed Lake Charles CCS Project and LCCE  
                      Gasification facilities in Calcasieu Parish, Louisiana

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Enclosure 1

Location of the Proposed Lake Charles Carbon Capture and Sequestration Project and LCCE  
Gasification Project

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# Lake Charles CCS Project Carbon Dioxide (CO<sub>2</sub>) Capture and Sequestration (CCS)



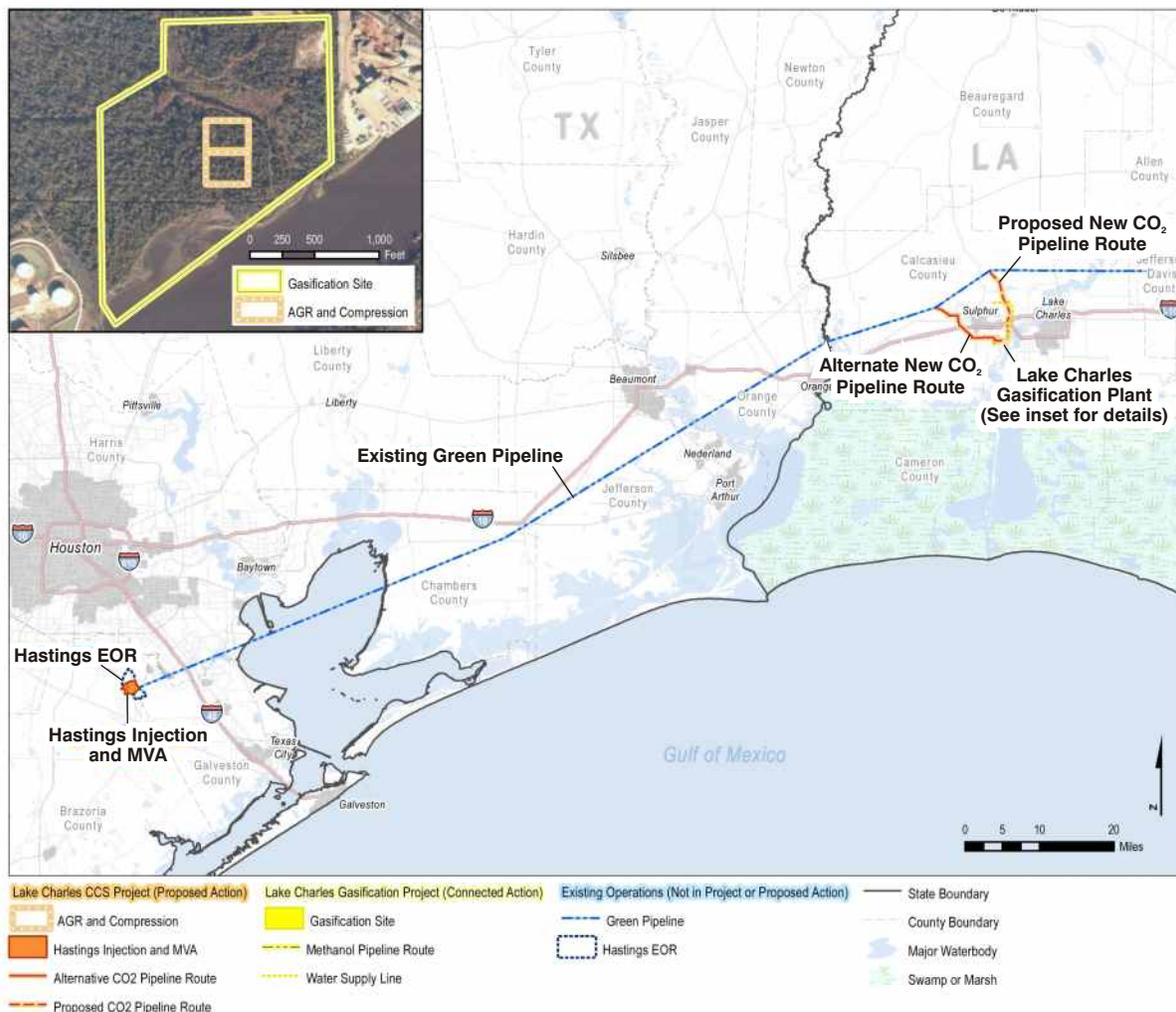
The **Lake Charles CCS Project** will capture and separate CO<sub>2</sub> from the process gas associated with the gasification process at the Lake Charles Cogeneration Gasification Plant (LCC Gasification Project), considered a connected action. The LCC Gasification Project will use **petroleum coke (“pet coke”)**, a lower value oil refinery by-product, to produce methanol. Approximately 4 million tons per year of CO<sub>2</sub> would be compressed and delivered via a new connecting pipeline to the existing Green Pipeline for transport and use in existing Enhanced Oil Recovery (EOR) operations along the Gulf Coast, including a portion of the Hastings oil field, south of Houston, Texas.

## CCS Technology

The Lake Charles CCS Project includes the incorporation of the CCS technology at the LCC Gasification plant, which would capture and compress the produced CO<sub>2</sub>. As part of the project, the following facilities and other ancillary facilities would be incorporated:

- **CO<sub>2</sub> capture facility** – CO<sub>2</sub> is separated from the gasification process gas.
- **CO<sub>2</sub> compression facilities** – CO<sub>2</sub> is compressed, monitored, and transported to the pipeline.

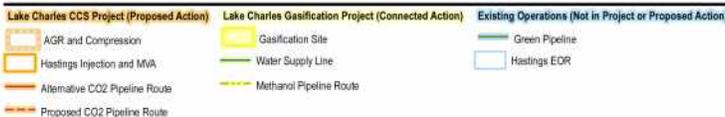
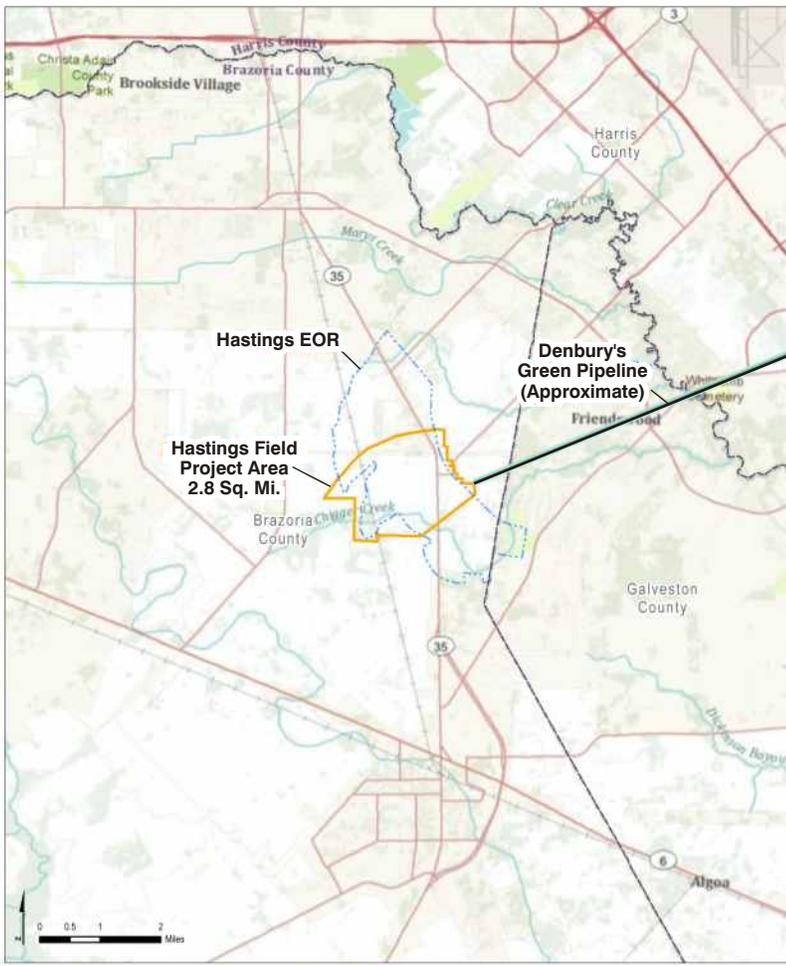
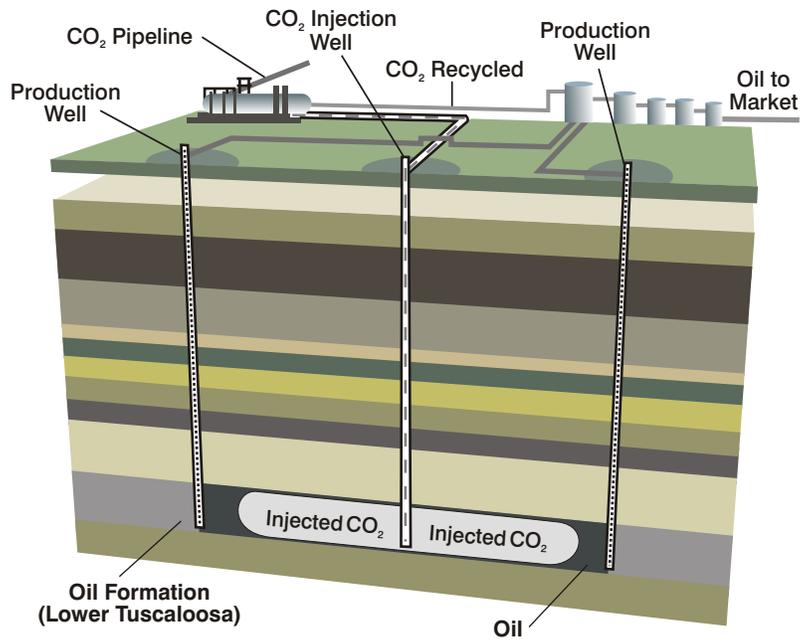
Compressed CO<sub>2</sub> would be transported to a storage site along a new CO<sub>2</sub> pipeline, which will parallel existing rights-of-ways (ROWs), such as roadways, pipelines, railroads, and transmission lines to the extent practicable.



## CO<sub>2</sub> Sequestration Process

CO<sub>2</sub> Sequestration is the process by which CO<sub>2</sub> is injected into suitable geologic formation and permanently stored. The Lake Charles CCS Project will use existing **Enhanced Oil Recovery (EOR)** operations to store the captured CO<sub>2</sub>.

EOR is the process by which compressed CO<sub>2</sub> is used to increase the amount of crude oil that is extracted from an oil reservoir. CO<sub>2</sub> is injected into the reservoir which displaces the oil, allowing more oil to be extracted than compared to standard methods. After EOR operations are concluded, the CO<sub>2</sub> injected in the EOR reservoir is ultimately permanently stored within the reservoir.

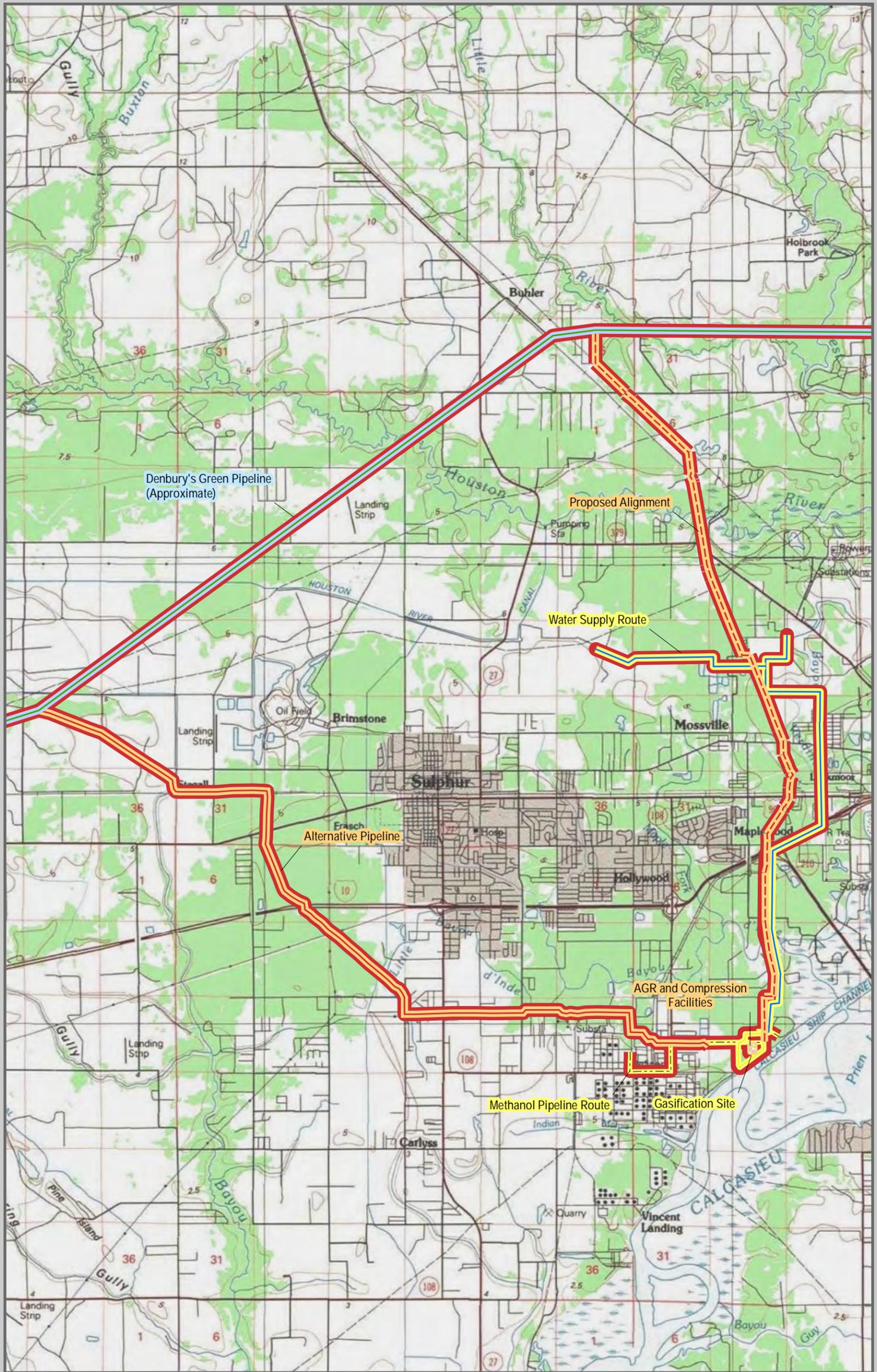


DOE's demonstration phase of the Lake Charles CCS Project includes a comprehensive **research monitoring, verification, and accounting (MVA)** program that would be implemented over a portion of the existing CO<sub>2</sub> EOR operations at Hastings oil field, Texas. The MVA program will assess the safety and effectiveness of long-term geologic storage of CO<sub>2</sub>, by demonstrating the permanent storage of approximately 1 million tons per year of the injected CO<sub>2</sub>.

Enclosure 2

Proposed Lake Charles Carbon Capture and Sequestration Project and LCCE Gasification Project  
Facilities in Calcasieu Parish, Louisiana

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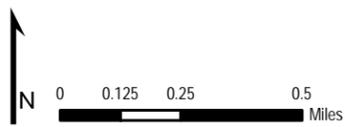
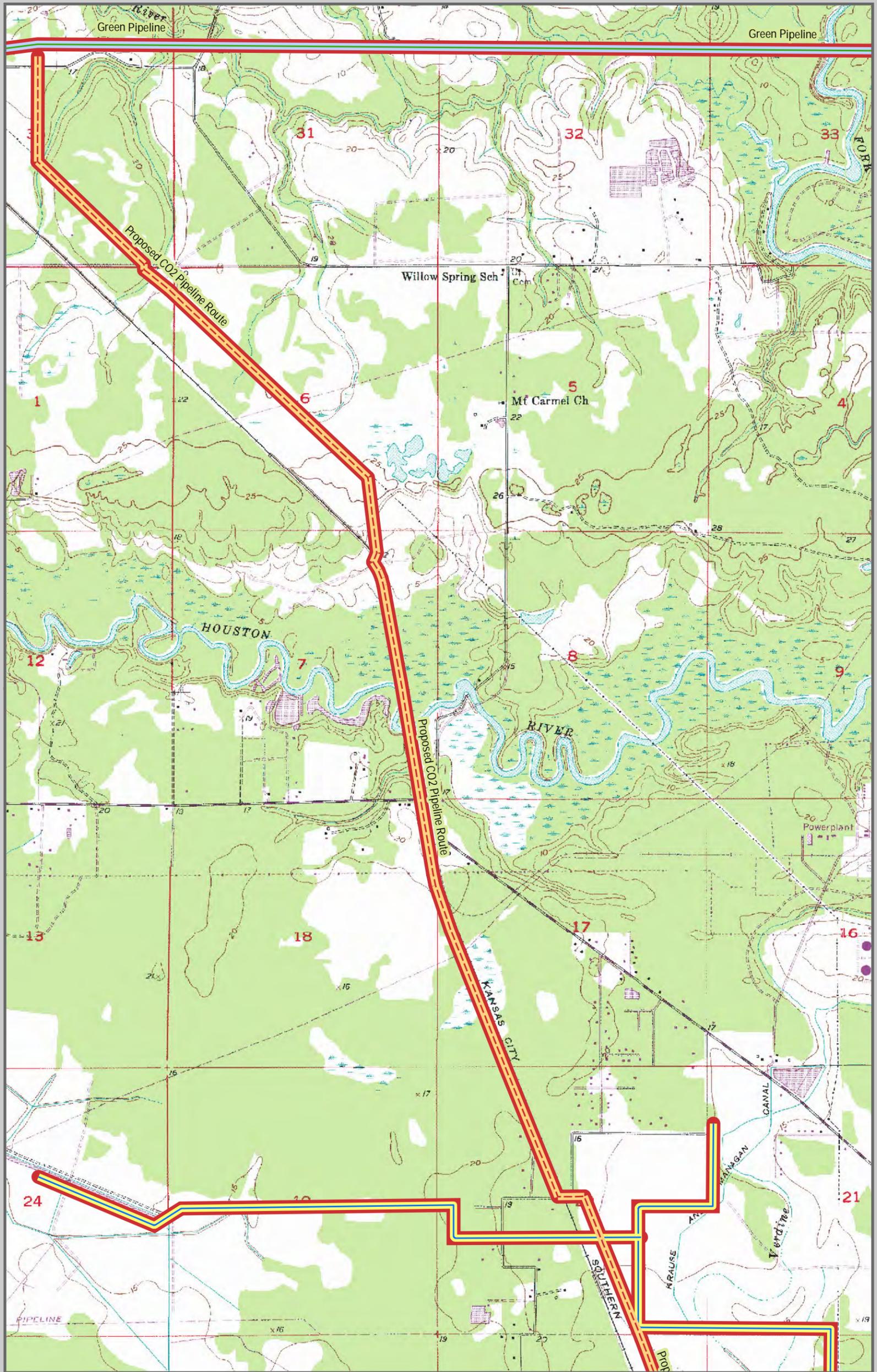


Source: USGS 1:24,000 Friendswood (1998); Pearland (1983); Manval (1977); and Algoa (1977) Quadrangles.

- Area of Potential Effect (APE)
- Lake Charles CCS Project (Proposed Action)
- AGR and Compression
- Alternative CO2 Pipeline Route
- Proposed CO2 Pipeline Route
- Lake Charles Gasification Project (Connected Action)
- Gasification Site
- Water Supply Line
- Methanol Pipeline Route
- Existing Operations (Not in Project or Proposed Action)
- Green Pipeline

Figure 1  
Overview of the APE  
(Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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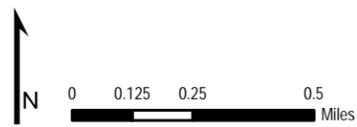
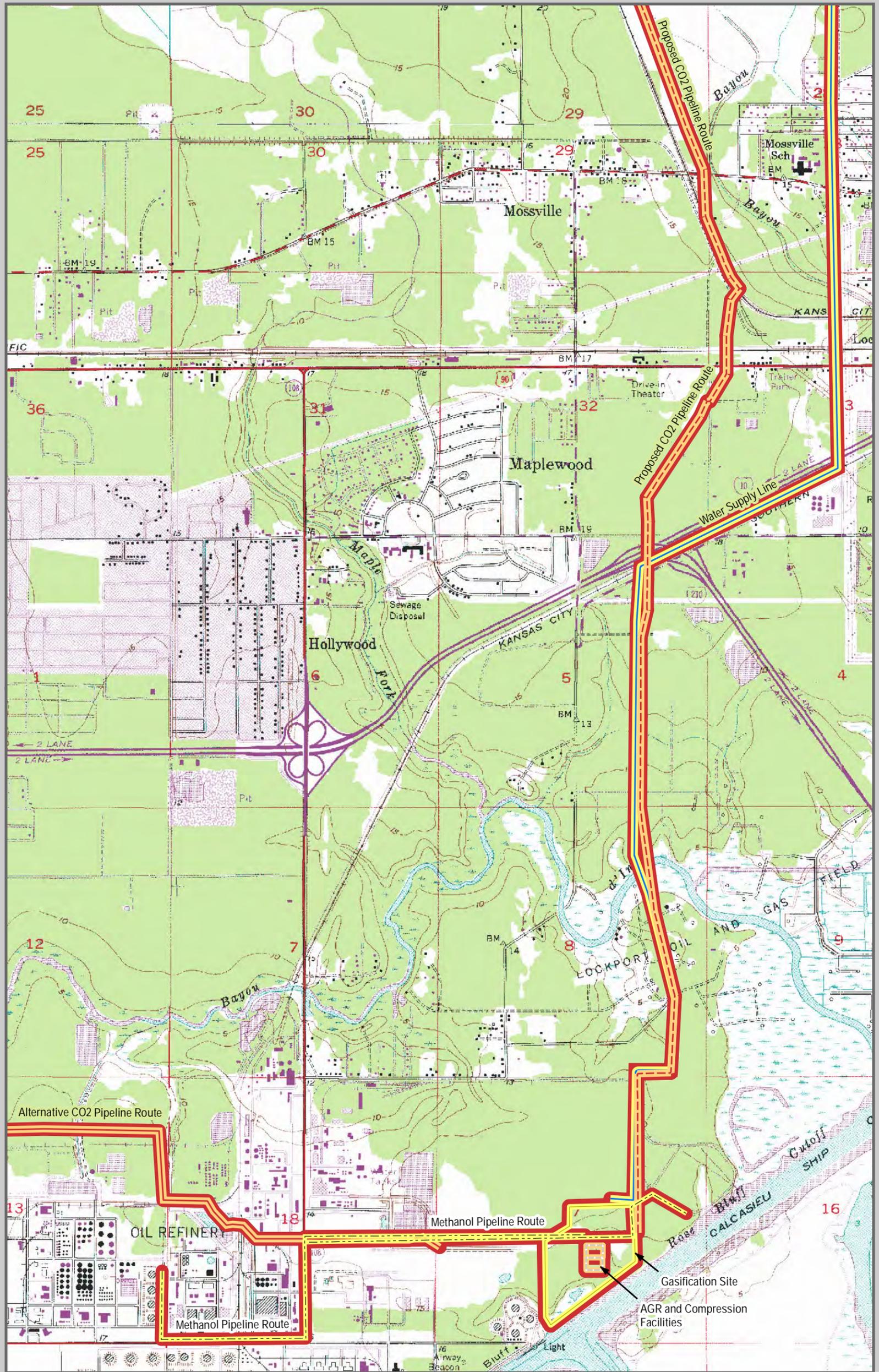


Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakt (1977) Quadrangles.

- |  |  |
|--|--|
|  Area of Potential Effect (APE)             |  Lake Charles Gasification Project (Connected Action)    |
|  Lake Charles CCS Project (Proposed Action) |  Gasification Site                                       |
|  AGR and Compression                        |  Methanol Pipeline Route                                 |
|  Alternative CO2 Pipeline Route             |  Water Supply Line                                       |
|  Proposed CO2 Pipeline Route                |  Existing Operations (Not in Project or Proposed Action) |
|  |  Green Pipeline  |

Figure 1-1  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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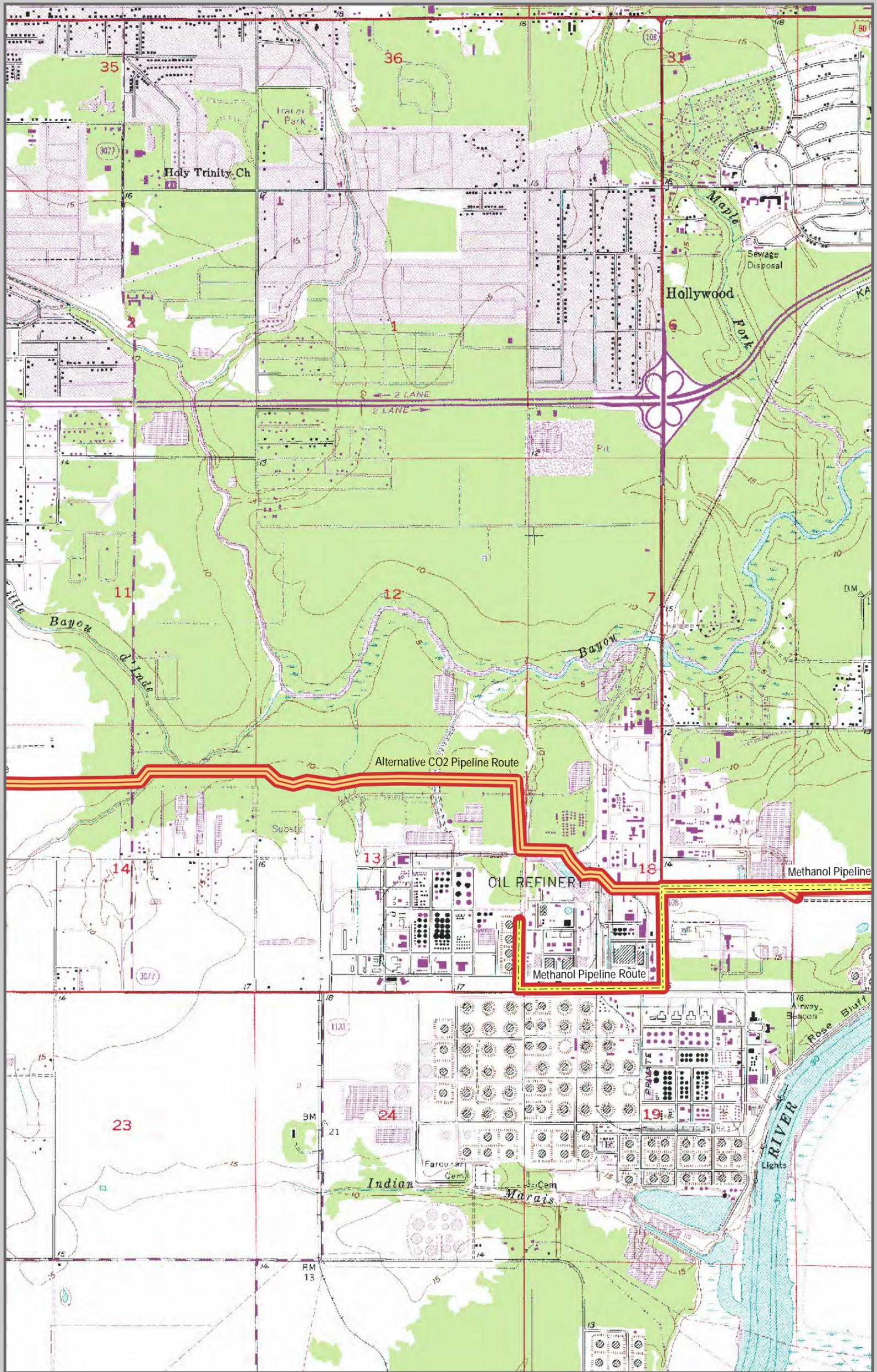


Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakt (1977) Quadrangles.

- |   |  |  |   |
|---|--|--|---|
|  | Area of Potential Effect (APE)             |  | Lake Charles Gasification Project (Connected Action)    |
|  | Lake Charles CCS Project (Proposed Action) |  | Gasification Site                                       |
|  | AGR and Compression                        |  | Methanol Pipeline Route                                 |
|  | Alternative CO2 Pipeline Route             |  | Water Supply Line                                       |
|  | Proposed CO2 Pipeline Route                |  | Existing Operations (Not in Project or Proposed Action) |
|   |  |  | Green Pipeline  |

Figure 1-2  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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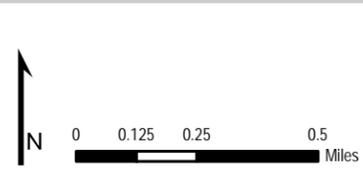
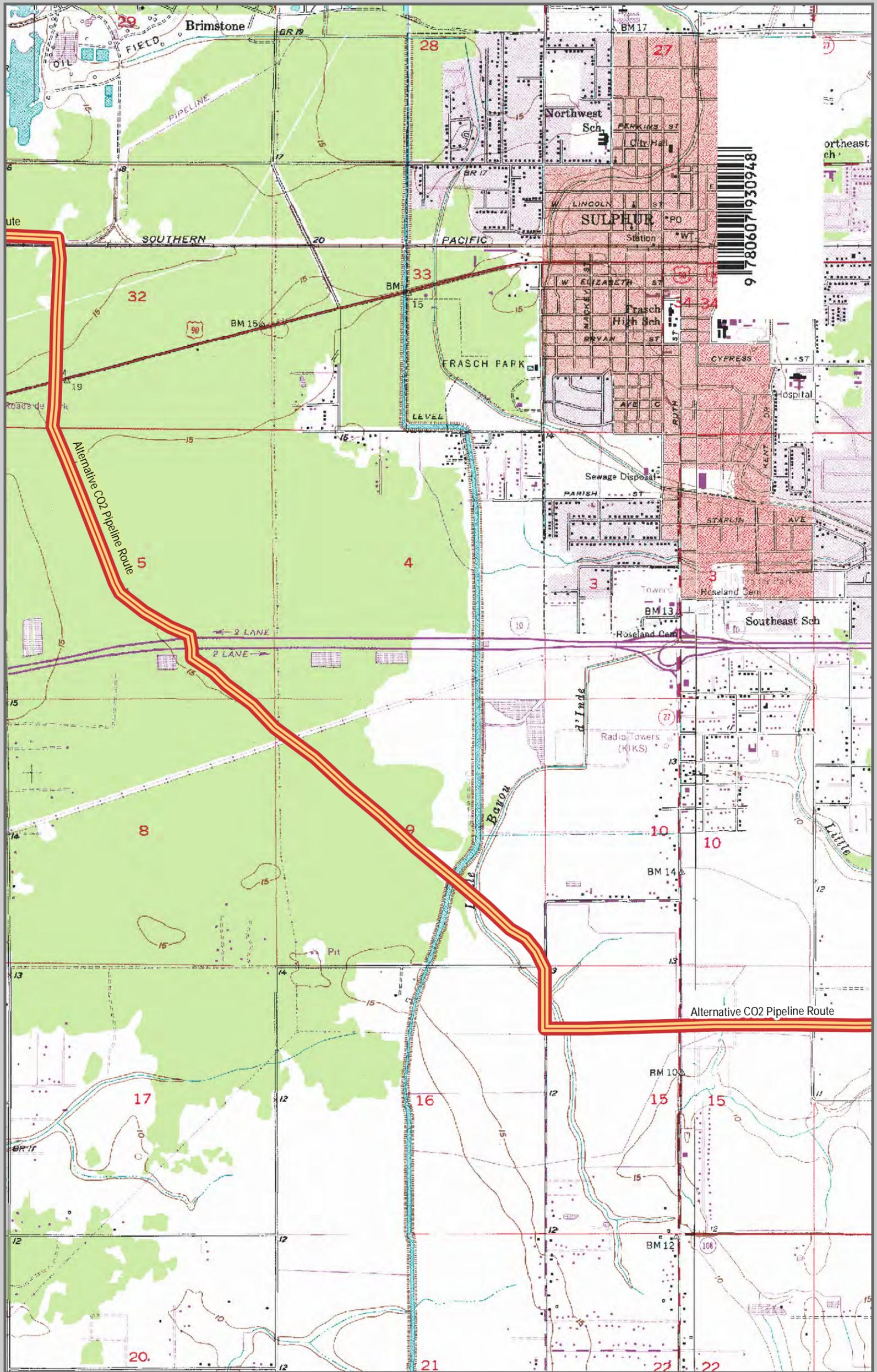


Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlark (1977) Quadrangles.

- |   |  |  |   |
|---|--|--|---|
|  | Area of Potential Effect (APE)             |  | Lake Charles Gasification Project (Connected Action)    |
|  | Lake Charles CCS Project (Proposed Action) |  | Gasification Site                                       |
|  | AGR and Compression                        |  | Methanol Pipeline Route                                 |
|  | Alternative CO2 Pipeline Route             |  | Water Supply Line                                       |
|  | Proposed CO2 Pipeline Route                |  | Existing Operations (Not in Project or Proposed Action) |
|   |  |  | Green Pipeline  |

Figure 1-3  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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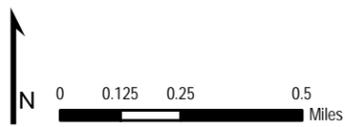
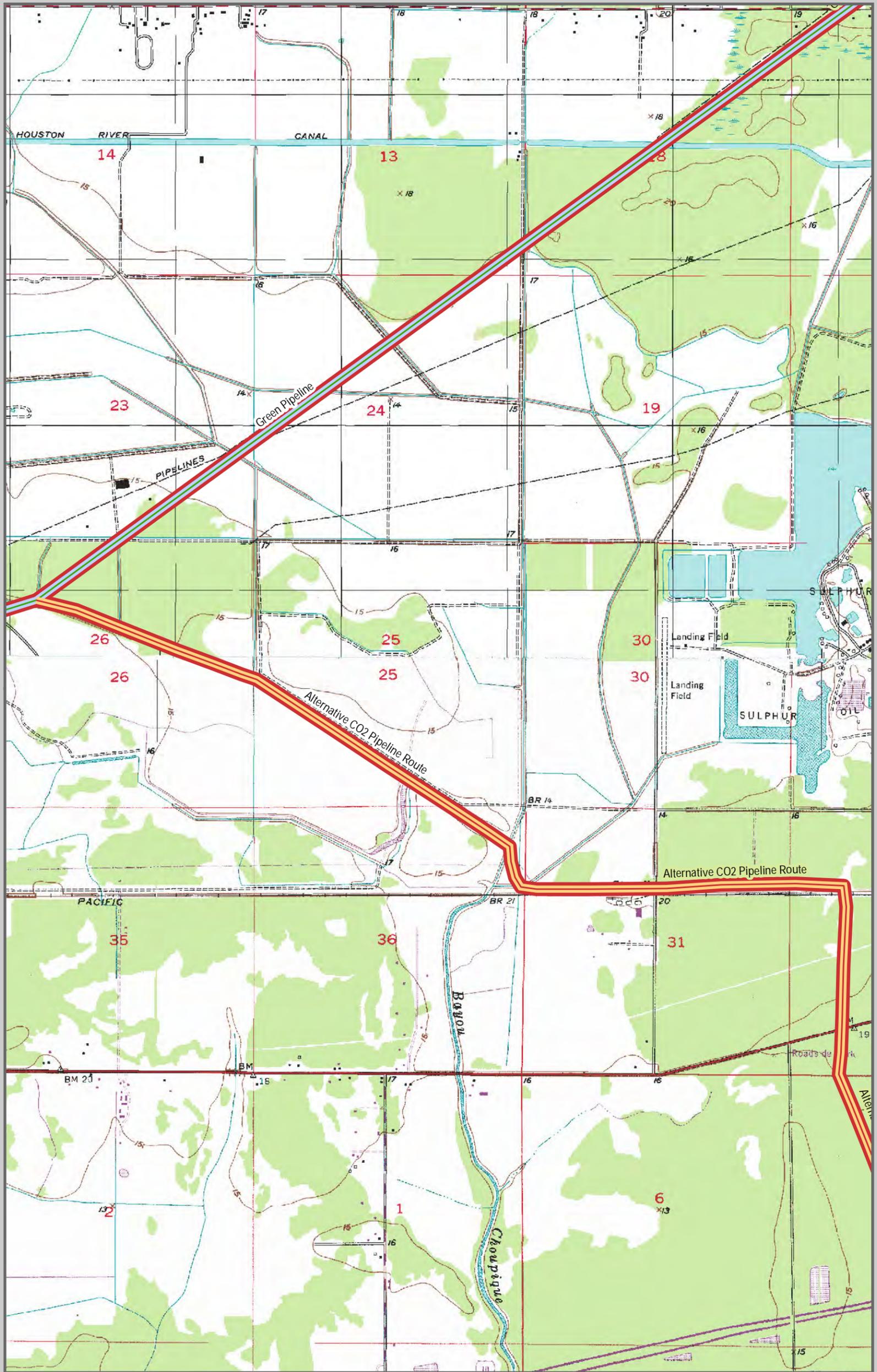


Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakt (1977) Quadrangles.

- |  |  |
|--|--|
|  Area of Potential Effect (APE)             |  Lake Charles Gasification Project (Connected Action)    |
|  Lake Charles CCS Project (Proposed Action) |  Gasification Site                                       |
|  AGR and Compression                        |  Methanol Pipeline Route                                 |
|  Alternative CO2 Pipeline Route             |  Water Supply Line                                       |
|  Proposed CO2 Pipeline Route                |  Existing Operations (Not in Project or Proposed Action) |
|  |  Green Pipeline  |

Figure 1-4  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakt (1977) Quadrangles.

- |  |  |
|--|--|
|  Area of Potential Effect (APE)             |  Lake Charles Gasification Project (Connected Action)    |
|  Lake Charles CCS Project (Proposed Action) |  Gasification Site                                       |
|  AGR and Compression                        |  Methanol Pipeline Route                                 |
|  Alternative CO2 Pipeline Route             |  Water Supply Line                                       |
|  Proposed CO2 Pipeline Route                |  Existing Operations (Not in Project or Proposed Action) |
|  |  Green Pipeline  |

Figure 1-5  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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## Joshua Marceaux

---

**From:** Hassan, Komi  
**Sent:** Monday, March 18, 2013 4:15 PM  
**To:** joshua\_Marceaux@fws.gov; Whitken, Janine  
**Cc:** Collins, Georganna B.  
**Subject:** Agency Coordination Under the Endangered Species Act for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project in Calcasieu Parish, Louisiana (and Brazoria  
**Attachments:** Figure 2.3-1 GasificationSite\_Details.pdf; Natural Resource Investigations Summary Table.pdf; LCCE Project Shapefiles\_031813.zip

Dear Joshua,

In response to your request for additional information from the Initiation of Agency Coordination Letter that was submitted by DOE NETL on September 28, 2012, please find attached the shapefiles for the permitted Lake Charles Clean Energy (LCCE) Gasification Plant and the proposed raw water and hydrogen pipelines associated with the LCCE project. A summary table describing the project components and status of associated natural resource investigations is also attached to this email.

The exact location of the methanol and sulfuric acid material storage area has not been selected. The area would be located a short distance from the LCCE Gasification Plant site at the Port of Lake Charles. Leucadia is in the process of identifying a parcel of up to 40 acres required for storage. Leucadia would use siting criteria described below to select the site for the proposed storage area within 1 mile of the gasification plant to minimize the pipeline routes to and from the storage area. The siting criteria include:

- Land ownership (public, private);
- Consistency with current land use;
- Proximity of the Port of Lake Charles to the gasification facility's major components;
- Proximity to the gasification facility for off-site components;
- Parcel size;
- Use of existing utility corridors;
- Avoidance of wetlands, streams, and floodplains;
- Minimization of the number of pipeline and linear stream crossings;
- Avoidance of sensitive habitats; and
- Avoidance of cultural resources.

The routes of the natural gas and potable water pipelines and electric transmission line would be within existing maintained ROWs along the access road to the gasification plant site, as shown in Figure 2.3-1.

Please use the center of the LCCE project area shapefile to create the appropriate buffer to perform the listed species clearance review for the methanol and sulfuric acid material storage area and pipelines.

Please contact me at 225-773-2276 if you have any questions or require any additional information.

Thanks,

Komi

Komi Hassan  
Ecology and Environment, Inc.  
11550 Newcastle Ave, Suite 250  
Baton Rouge, LA 70791  
Phone: 225-773-2276 | Fax: 225-298-5081  
[khassan@ene.com](mailto:khassan@ene.com) | [www.ene.com](http://www.ene.com)



Celebrating 40 Years of Green Solutions



This project has been reviewed for effects to Federal trust resources under our jurisdiction and currently protected by the Endangered Species Act of 1973 (Act). The project, as proposed,  
( ) Will have no effect on those resources  
(x) Is not likely to adversely affect those resources.  
This finding fulfills the requirements under Section 7(a)(2) of the Act.

Debra A Fuller March 26, 2013  
Acting Supervisor Date  
Louisiana Field Office  
U.S. Fish and Wildlife Service

**SITE MAY CONTAIN WETLANDS**  
Contact the U.S. Army Corps of Engineers  
for a jurisdictional determination.

District: New Orleans, LA  
Telephone No. 504-862-2274

**APPENDIX D**  
**SECTION 106 CONSULTATIONS**

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Lake Charles Cogeneration LLC  
1330 Post Oak Boulevard  
Suite 1600  
Houston, TX 77056

September 8, 2008

Ms. Pam Breaux  
State Historic Preservation Officer  
State of Louisiana  
Office of Cultural Development  
P.O. Box 94361  
Baton Rouge, LA 70802

Re: Air Permit Application: Lake Charles Gasification Facility  
Lake Charles Cogeneration, LLC  
Lake Charles, Louisiana

Dear Ms. Breaux:

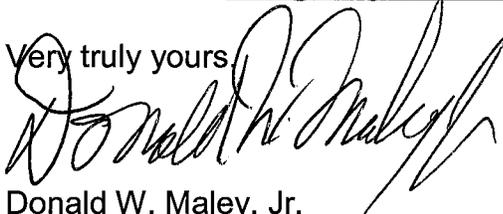
The Lake Charles Cogeneration, LLC (LCC) is preparing an air permit application for the proposed Lake Charles Gasification Facility to be located on property owned by the Port of Lake Charles, in Lake Charles, Louisiana. The LCC property to be developed is adjacent to and west of the existing Port of Lake Charles facilities as shown on the attached.

The LCC requests the following confirmation:

- There are no known archeological sites or historical structures either listed on or eligible for listing on the National Register of Historic Places within 1000 feet of the nearest LCC property boundary.

Should you have any questions, please contact Larry Leib at our office (713) 963-4637, or via e-mail at [lrlal@sbcglobal.net](mailto:lrlal@sbcglobal.net). Thank you for your assistance.

Very truly yours,



Donald W. Maley, Jr.  
Vice President

cc: Doug Barba  
Larry Leib

Enclosures

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MITCHELL J. LANDRIEU  
LIEUTENANT GOVERNOR

**State of Louisiana**  
OFFICE OF THE LIEUTENANT GOVERNOR  
DEPARTMENT OF CULTURE, RECREATION & TOURISM  
OFFICE OF CULTURAL DEVELOPMENT  
DIVISION OF ARCHAEOLOGY

PAM BREAUX  
SECRETARY

SCOTT HUTCHESON  
ASSISTANT SECRETARY

October 28, 2008

Mr. Donald W. Maley, Jr.  
Vice President  
Lake Charles Cogeneration, LLC  
1330 Post Oak Boulevard, Suite 1600  
Houston, TX 77056

Re: Air Permit Application: Lake Charles Gasification Facility  
Lake Charles Cogeneration, LLC  
Calcasieu Parish, Louisiana

Dear Mr. Maley:

This is in response to your letter dated September 8, 2008, concerning the above-referenced project. There is one known archaeological site located with the Port property boundaries, 16CU29, the Citgo Shell Mound; therefore, our office is requesting that a Phase I survey be conducted. I have enclosed a copy of our contracting archaeologists list for your use.

If you have any questions concerning our comments, please do not hesitate to contact Rachel Watson in the Division of Archaeology at (225) 342-8170.

Sincerely,

A handwritten signature in blue ink, appearing to read "Scott Hutcheson".

Scott Hutcheson  
State Historic Preservation Officer

SH:RW:kc

enclosure

The State of Louisiana does not license, register, or otherwise approve professional archaeologists.

The Department of Culture, Recreation and Tourism has found that a listing of archaeologists active in Louisiana is often a useful guide for those contracting agencies requiring the services of an archaeological consultant. The appearance of names of individuals and firms on the following list in no way implies recommendation or endorsement by the State of Louisiana. There are other competent, qualified archaeologists living both in-state and out-of-state. This list is furnished as a state service only upon request.

Contracting agencies are advised to contact several archaeological consultants, as price and availability for work vary greatly.

**AR Consultants, Inc.**  
S. Alan Skinner, PhD  
11020 Audelia Road, Suite C 105  
Dallas, TX 75243  
Office: (214) 369- 0478  
Fax: (214) 221- 1519  
Cell: (214) 906-8021  
[aredigs@aol.com](mailto:aredigs@aol.com)

**ArcCom  
Archaeological Compliance  
Consultant**  
Thomas I. McIntosh, RPA  
4202 Mandell Street  
Houston, TX 77006  
Phone (505) 982-2341  
[jeraii@aol.com](mailto:jeraii@aol.com)

**Archaeo-Geophysical Associates,  
LLC**  
Mr. Chester P. Walker, M.A.,RPA  
8316 Hanbridge Lane  
Austin, TX 78736  
Phone: (512) 535-0976  
[chetwalker@aga-llc.net](mailto:chetwalker@aga-llc.net)  
<http://www.aga-llc.net>

**Archeological and Environmental  
Consultants, LLC**  
Dr. Timothy K. Perttula  
10101 Woodhaven Drive  
Austin, TX 78753-4346  
Phone: (512) 873-8131  
Fax: (512) 873-8131  
[tkp4747@aol.com](mailto:tkp4747@aol.com)

**Barr & Associates\***  
Mr. William B. Barr  
2636 Highway 394  
DeRidder, LA 70634  
Phone/Fax (888) 532-0392  
[bbbarch1@aol.com](mailto:bbbarch1@aol.com)

**BIO-WEST, Inc.\***  
Jeffrey M. Enright  
Maritime Archaeologist  
Office: (512) 990-3954  
Cell: (512) 801-5683

**Bluestone Research, LLC**  
Dr. Allan Morton, RPA  
162 Point Anne Dr.  
Hartfield, VA 23071  
Phone (804) 545-3151  
[allan@bluestonererearch.com](mailto:allan@bluestonererearch.com)  
[www.bluestonererearch.com](http://www.bluestonererearch.com)

**Brazos Valley Research Associates**  
William E. Moore, RPA  
813 Beck Street  
Bryan, TX 77803  
Phone (979) 823-1148  
[bvracrm@suddenlink.net](mailto:bvracrm@suddenlink.net)

**Brockington Cultural  
Resources Consulting**  
Thomas G. Whitley  
6611 Bay Circle, Suite 220  
Norcross, Georgia 30071  
Phone (770) 662-5807  
Fax (770) 662-5824  
[tomwhitley@brockington.org](mailto:tomwhitley@brockington.org)

**C & C Technologies, Inc\***  
Mr. Robert Church or  
Mr. Daniel J. Warren  
730 E. Kaliste Saloom Road  
Lafayette, LA 70508  
Phone (337) 261-0660  
Fax (337) 261-0192

**Carved Trowel Archaeology, Ltd.**  
Dr. Jon Gibson  
355 Coleman Loop  
Homer, LA 71040  
Phone (318) 927-4915  
[jgibson@bayou.com](mailto:jgibson@bayou.com)

**Coastal Environments, Inc.\***  
Dr. David Kelley or  
Mr. Richard Weinstein  
1260 Main Street  
Baton Rouge, LA 70802  
Phone (225) 383-7455  
Fax (225) 383-7925  
[dkelley@coastalenv.com](mailto:dkelley@coastalenv.com)  
[rweinstein@coastalenv.com](mailto:rweinstein@coastalenv.com)

**CRC, International Archaeology &  
Ecology, LLC\***  
Mr. Robert P. d'Aigle, RPA  
555 FM 646, Suite 428  
Dickinson, TX 77539  
Phone (832) 592-9549  
Fax (832) 225-1409  
[www.culturalresource.com](http://www.culturalresource.com)  
[postoffice@culturalresource.com](mailto:postoffice@culturalresource.com)

**Cultural Resource Analysts, Inc.**  
Andrew V. Martin, RPA  
Steve D. Creasman, RPA  
151 Walton Avenue  
Lexington, KY 40508  
Phone (859) 252-4737  
[www.crai-ky.com](http://www.crai-ky.com)

**Deep East Texas Archaeological  
Consultants**  
Victor J. Galan  
4215 Red Oak  
Nacogdoches, TX 75965  
Phone (936) 560-4670

**Earth Search, Inc.\***  
Dr. Jill-Karen Yakubik  
P.O. Box 770336  
New Orleans, LA 70177-0336  
Phone (504) 947-0737  
Fax (504) 947-1714  
[jill@earth-search.com](mailto:jill@earth-search.com)

**Earth Services & Equipment, Inc.**  
Cheryl L. Bommarito, EP, MA, RPA  
Ronald F. Bacon, MS  
Southeast Office:  
1367 Marina Drive  
Slidell, LA 70458  
Phone (985) 641-4129  
Fax (985) 641-4149  
[cbommarito@earthservices.net](mailto:cbommarito@earthservices.net)  
[rfacon@earthservices.net](mailto:rfacon@earthservices.net)

**Engineering-Environmental  
Management, Inc.**  
Mr. Jeffrey Hokanson, M.A., RPA  
9563 S. Kingston Court  
Englewood, CO 80112  
Phone (303) 754-4200  
Fax (303) 721-9202  
[jhokanson@e2m.net](mailto:jhokanson@e2m.net)  
Additional office locations in NM,  
VA, and CA

**Environment & Archaeology, LLC**  
David Breetzke, RPA  
7736 Hwy. 42, Suite D3/5  
Florence, Kentucky 41042  
Phone: (859) 746-1778  
(859) 746-1788

**GAI Consultants, Inc.**  
Mr. Benjamin Resnick  
385 East Waterfront Drive  
Homestead, PA 15120-5005  
Phone (412) 476-2000, Ext. 1200  
Fax (412) 476-2020  
[b.resnick@gaiconsultants.com](mailto:b.resnick@gaiconsultants.com)

**Geo-Marine, Inc.**  
Ms. Melissa M. Green  
2201 K Avenue, Suite A2  
Plano, TX 75074  
(972) 423-5480 voice  
(972) 422-2736 fax  
[mgreen@geo-marine.com](mailto:mgreen@geo-marine.com)  
[www.geo-marine.com](http://www.geo-marine.com)

**Great Rivers Archaeological Services**  
Vincent Versluis, RPA  
6038 Lakeview Drive  
Burlington, KY 41005  
Phone (859) 689-1360  
Cell (859) 916-0042  
[v.versluis@juno.com](mailto:v.versluis@juno.com)

**Gulf South Research Corporation**  
Mr. John Lindemuth or  
Mr. Carl Welch  
P.O. Box 83564  
Baton Rouge, LA 70884-3564  
Phone (225) 757-8088  
Fax (225) 761-8077  
[johnl@gsrcorp.com](mailto:johnl@gsrcorp.com)

**Halff Associates, Inc.**  
Mr. Leonard R. Voellinger, RPA  
4030 West Braker Lane, Ste. 450  
Austin, TX 78759  
Phone (512) 252-8184  
Fax (512) 252-8141  
[lvoellinger@halff.com](mailto:lvoellinger@halff.com)

**History, Incorporated**  
Mr. Artis West, MA, RPA  
1375 Union Industrial Court, Suite A  
Alpharetta, GA 30004  
Phone (770) 667-2060  
Fax (770) 667-2041  
[artis.west@HistoryIncOnline.com](mailto:artis.west@HistoryIncOnline.com)  
[www.HistoryIncOnline.com](http://www.HistoryIncOnline.com)

**HRA Gray & Pape, LLC**  
Mr. Jim Hughey  
Mr. Thomas I. McIntosh, RPA  
1428 West Alabama St.  
Houston, TX 77006  
Phone (713) 541-0473  
Fax (713) 541-0479  
[jhughey@hragp.com](mailto:jhughey@hragp.com)  
[tmcintosh@hragp.com](mailto:tmcintosh@hragp.com)  
[www.HRAGP.com](http://www.HRAGP.com)

**Dr. Carl Kuttruff**  
621 Albert Hart Dr.  
Baton Rouge, LA 70808  
Phone (225) 767-6605  
[ckuttruff@bellsouth.net](mailto:ckuttruff@bellsouth.net)

**New South Associates**  
Dr. J.W. Joseph or  
Natalie Adams  
6150 East Ponce de Leon Ave.  
Stone Mountain, GA 30083  
Phone (770) 498-4155  
Fax (770) 498-3809  
[jwjoseph@newsouthassoc.com](mailto:jwjoseph@newsouthassoc.com)  
[www.newsouthassoc.com](http://www.newsouthassoc.com)

**Northwestern State University  
Cultural Resource Office**  
Dr. Tommy Hailey  
Natchitoches, LA 71497  
Phone (318) 357-6130  
(318) 357-4453  
Fax (318) 357-5273  
[haileyt@nsula.edu](mailto:haileyt@nsula.edu)

**Panamerican Consultants, Inc.\***  
Steve James or  
Drew Buchner  
91 Tillman Street  
Memphis, TN 38111  
Phone (901) 454-4733  
Fax (901) 454-4736  
[panamtn@mindspring.com](mailto:panamtn@mindspring.com)  
[panamconsultants.com](http://panamconsultants.com)

**Pathfinder CRM, LLC**  
Mr. Robert C. Vogel  
168 W. Main Street  
Spring Grove MN 55974  
Phone (507) 498-3810  
[pathfindercrm@springgrove.coop](mailto:pathfindercrm@springgrove.coop)  
[www.pathfindercrm.com](http://www.pathfindercrm.com)

**PBS&J\***  
Mr. Robert Rogers  
6504 Bridge Point Parkway, Ste 200  
Austin, TX 78730  
Phone (512) 342-3340  
Fax (512) 327-2453  
[rmrogers@pbsj.com](mailto:rmrogers@pbsj.com)

**Precision Cartographics**  
Mr. Gary Joiner or  
Dr. C. Wade Meade  
1029 Blanchard Place  
Shreveport, LA 71104  
Phone (318) 222-6122  
Fax (318) 222-0662  
[caesar@latech.edu](mailto:caesar@latech.edu)

**Prentice Thomas & Associates, Inc.**  
Dr. Prentice M. Thomas, Jr.  
Ms. Jan Campbell  
Ms. Carrie Williams-Bourgeois  
P.O. Box 4246  
Fort Walton Beach, FL 32549  
Phone (850) 243-5992  
Fax (850) 664-7835  
[jcampbell@pta-crm.com](mailto:jcampbell@pta-crm.com)

**R. Christopher Goodwin & Associates, Inc.\***  
Mr. William P. Athens or  
Dr. R. Christopher Goodwin  
309 Jefferson Highway, Suite A  
New Orleans, LA 70121  
Phone (504) 837-1940  
Fax (504) 837-1550

**Dr. Katherine M. Roberts**  
Archaeologist/Paleoethnobotanist  
901 South National Avenue  
Springfield, MO 65897  
Phone (417) 836-6074  
Fax (417) 836-4772  
[KittyRoberts@MissouriState.edu](mailto:KittyRoberts@MissouriState.edu)

**Southeastern Archaeological Research, Inc. (SEARCH)\***  
Michael C. Krivor, M.A., RPA  
Jason M. Burns, M.A., RPA  
315 NW 138<sup>th</sup> Terrace  
Jonesville, FL 32669  
Phone: (352) 333-0049  
Fax: (352) 333-0069  
[www.searchinc.com](http://www.searchinc.com)

**Sphere 3 Environmental, Inc.**  
Marc Tiemann, RPA  
1501 Bill Owens Parkway  
Longview, TX 75604  
Phone (903) 297-4673  
Fax (903) 297-4675  
[Tiemann@sphere3environmental.com](mailto:Tiemann@sphere3environmental.com)  
[www.sphere3environmental.com](http://www.sphere3environmental.com)

**Surveys Unlimited  
Research Associates, Inc.**  
Dr. Malcolm K. Shuman  
P.O. Box 14414  
2931 Government Street  
Baton Rouge, LA 70898-4414  
Phone (225) 381-8201  
(225) 346-8072  
Fax (225) 381-8206  
[mkshuman@surainc.com](mailto:mkshuman@surainc.com)

**Tejas Archaeology**  
R.J. Bo Nelson  
344 CR 4154  
Pittsburg, TX 75686  
Phone (903) 856-5291  
[RboNelson@aol.com](mailto:RboNelson@aol.com)

**University of Louisiana Lafayette  
Department of Sociology and  
Anthropology**  
Dr. Mark A. Rees  
P.O. Box 40198  
Lafayette, LA 70504-0198  
Phone (337) 482-6045  
Fax (337) 482-5374  
[markrees@louisiana.edu](mailto:markrees@louisiana.edu)

**University of Tennessee  
Archaeological Research  
Laboratory  
Department of Anthropology**  
Dr. Boyce Driskell  
Dr. Elizabeth DeCorse,  
Dr. Kandace D. Hollenbach  
Room 237, Middlebrook Building  
Knoxville, TN 37996-0060  
Phone: (865) 974-6525  
Fax: (865) 946-1883  
<http://archaeology.as.utk.edu>  
[bdriskel@utk.edu](mailto:bdriskel@utk.edu)  
[ekellard@utk.edu](mailto:ekellard@utk.edu)  
[kdh@utk.edu](mailto:kdh@utk.edu)

**URS Corporation\***  
Martin Handly  
Roaber Lackowicz  
7389 Florida Blvd, Ste 300  
Baton Rouge, LA 70806  
Phone (225) 922-5700  
Fax (225) 922-5701  
[Martin\\_handly@urscorp.com](mailto:Martin_handly@urscorp.com)  
[Rob\\_lackowicz@urscorp.com](mailto:Rob_lackowicz@urscorp.com)

**Weaver & Associates, LLC**  
Guy Weaver  
Jeremy Blazier  
Nicole Palmer  
2563 Broad Avenue  
Memphis, TN 38112  
Phone (901) 452-7554  
Fax (901) 452-7803  
[www.weaverassociatesllc.com](http://www.weaverassociatesllc.com)

**Westwood Professional Services,  
Inc.**  
Dean T. Sather, M.A., RPA  
Steven J. Blondo, M.A.  
7699 Anagram Drive  
Eden Prairie, MN 55344  
Phone (952) 937-5150  
[Dean.Sather@westwoodps.com](mailto:Dean.Sather@westwoodps.com)  
[Steven.Blondo@westwoodps.com](mailto:Steven.Blondo@westwoodps.com)

**William Self Associates, Inc.**  
James Karbula, PhD  
16238 Highway 620, Ste F-400  
Austin, TX 78717  
Phone (512) 394-7477  
Fax (512) 527-3078  
[jkarbula@williamself.com](mailto:jkarbula@williamself.com)

\* Capable of Underwater  
Archaeological Investigations



MITCHELL J. LANDRIEU  
LIEUTENANT GOVERNOR

**State of Louisiana**  
OFFICE OF THE LIEUTENANT GOVERNOR  
DEPARTMENT OF CULTURE, RECREATION & TOURISM  
OFFICE OF CULTURAL DEVELOPMENT

PAM BREAUX  
SECRETARY

SCOTT HUTCHESON  
ASSISTANT SECRETARY

June 26, 2009

Mr. Niels Larsen  
LA Department of Environmental Quality  
Permits Application Administrative Review Group  
Permit Support Services Division  
Office of Environmental Services  
P.O. Box 4313  
Baton Rouge, LA 70821-4313

Re: Lake Charles Gasification Facility  
Lake Charles Cogeneration LLC  
Agency Interest No. 160213  
Activity No. PER20090001  
Lake Charles, Calcasieu Parish, LA

Dear Mr. Larsen:

Reference is made to our letter dated March 9, 2009 (copy enclosed), in which we informed your agency that a Phase I survey had been requested of the proposed Lake Charles Gasification Facility, due to the presence of a recorded archaeological site (16CM29) within the project boundaries. We asked that issuance of the LPDES permit be withheld pending review of the survey results by the State Historic Preservation Office.

Please be advised that we are in receipt of documentation dated June 9, 2009, concerning the archaeological site assessment made of site 16CU29 by URS (copy enclosed). Field investigations resulted in the delineation of expanded boundaries for this site and the assessment that the site was not eligible for listing on the National Register of Historic Places due to a lack of depositional integrity and limited research potential. As we concur with this assessment, additional investigations are not warranted. Consequently, we have no objection to issuance of the LPDES permit.

Mr. Niels Larsen  
June 26, 2009  
Page 2

Should you have any questions concerning our comments, do not hesitate to contact Duke Rivet in the Division of Archaeology at (225) 219-4598 or be e-mail at [drivet@crt.state.la.us](mailto:drivet@crt.state.la.us).

Sincerely,



Scott Hutcheson  
State Historic Preservation Officer

SH:DR:s

Enclosures: as stated

c: Mr. Martin Handly  
URS Corporation  
7389 Florida Blvd., Suite 300  
Baton Rouge, LA 70806



JAY DARDENNE  
LIEUTENANT GOVERNOR

State of Louisiana  
OFFICE OF THE LIEUTENANT GOVERNOR  
DEPARTMENT OF CULTURE, RECREATION & TOURISM  
OFFICE OF CULTURAL DEVELOPMENT

CHARLES R. DAVIS  
DEPUTY SECRETARY

PAM BREAU  
ASSISTANT SECRETARY

25 April 2012

Joel Watkins  
Cultural Resource Analyst  
Office of Archaeological Research  
13075 Moundville Archaeological Park  
Moundville, AL 35474

Re: Draft Report  
La Division of Archaeology Report No. 22-4007  
*Phase I Cultural Resource Survey of the Proposed Lake Charles Pipeline Lateral Project Located near Sulphur, Calcasieu Parish, Louisiana*

Dear Mr Watkins:

We acknowledge receipt of your report dated 21 November 2011 and received in our office 16 April 2012, along with two copies of the above-referenced report. We have completed our review of this report and offer the following comments.

In the Abstract, please provide the total project acreage. We appreciate the effort to inspect all of the pimple mounds encountered within the project ROW. We request that a site form be completed for the Harvey Cemetery. This request reflects recent legislative acts that give our office regulatory responsibilities for many cemeteries and so we are making a concerted effort to record all that are encountered during projects.

We concur that site 16CU73 is not eligible for nomination to the National Register of Historic Places and that if the pipeline is directionally drilled under the Harvey Cemetery, no historic properties will be impacted by this project, and that no further work is necessary.

We look forward to receiving two bound copies of the final report with the comments addressed as appropriate, along with a pdf of the report. If you have any questions, please contact Chip McGimsey in the Division of Archaeology by email at [cmcgimsey@crt.la.gov](mailto:cmcgimsey@crt.la.gov) or by phone at 225-219-4598.

Sincerely,

Pam Breau  
State Historic Preservation Officer

PB:crm

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TEXAS HISTORICAL COMMISSION  
*real places telling real stories*

November 1, 2011

James Karbula  
William Self Associates, Inc.  
16238 Highway 620, Ste. F-400  
Austin, Texas 78717

Re: Project review under Section 106 of the National Historic Preservation Act of 1966 and the Antiquities Code of Texas  
Denbury Onshore, LLC, CO2 Sequestration Monitoring, Verification, and Accounting (MVA),  
Hastings Field, Brazoria County, Texas

Dear Mr. Karbula:

Thank you for your correspondence describing the above referenced project. This letter serves as comment on the proposed undertaking from the Executive Director of the Texas Historical Commission and the State Historic Preservation Officer. As the state agency responsible for administering the Antiquities Code of Texas, these comments also provide recommendations on compliance with state antiquities laws and regulations.

The review staff, led by Jeff Durst, has completed its review. After reviewing the documentation, we concur that there exists a very low probability that properties located within the above referenced project area and eligible for inclusion in the National Register of Historic Places (National Register) and/or for formal designation as a State Archeological Landmark, will be impacted by the proposed research project. The above referenced project may proceed without consultation with this office, provided that no significant archeological deposits are encountered during development activities on the property.

At your request we have attached a copy of the previous correspondence dating to 2010 that we have on file related to this project.

Thank you for your cooperation in this federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If you have any questions concerning our review or if we can be of further assistance, please contact Jeff Durst at 512/463-6096.**

Sincerely,



for  
Mark Wolfe, State Historic Preservation Officer

MW/jjd

Attachment: Review of Public Notice issued by U.S. Army Corps of Engineers Galveston District



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# Public Notice

<b>U.S. Army Corps Of Engineers Galveston District</b>	Permit Application No: _____	SWG-2010-00194
	Date Issued: _____	8 July 2010
	Comments Due: _____	9 August 2010

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## U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT

**PURPOSE OF PUBLIC NOTICE:** To inform you of a proposal for work in which you might be interested. It is also to solicit your comments and information to better enable us to make a reasonable decision on factors affecting the public interest.

**AUTHORITY:** This application will be reviewed pursuant to Section 404 of the Clean Water Act.

**APPLICANT:** Denbury Onshore, LLC  
5100 Tennyson Parkway, Suite 3000  
Plano, Texas 75024-4932

**AGENT:** Project Consulting Services, Inc.  
3300 West Esplanade Avenue South, Suite 500  
Metairie, Louisiana 70002-3447  
Telephone: 504-833-5321  
POC: Richard Leonhard

**LOCATION:** The project is located on a 47-acre tract within an existing oil field located approximately 4,500 feet southwest of the State Highway 35 and County Road 128 intersection, in Brazoria County, Texas. The project can be located on the U.S.G.S. quadrangle map entitled: Manvel and Pearland, Texas. Approximate UTM Coordinates in NAD 27 (meters): Zone 15; Easting: 280760; Northing: 3265475. Latitude: 29° 29' 58.69" N. Longitude: 95° 15' 41.71" W (NAD 27).

**PROJECT DESCRIPTION:** The applicant proposes permanent fill impacts to 7.08 acres of herbaceous and shrub scrub jurisdictional wetlands during the construction of a foundation for a facility designed to support the sequestering and recovery of CO<sub>2</sub>, all of which are associated with enhanced oil recovery processes for reserves located within the project area. The proposed project site is located within an existing oil field and is in an area presently used for farraing and livestock grazing. The area is dominated by yaupon (*Ilex vomitoria*), Chinese tallow (*Sapium sebiferum*), little bluestem (*Schizachyrium scoparium*), bushy bluestem (*Andropogons glomeratus*) and southern dewberry (*Rubus trivialis*).

The project site was selected due to the fact that it is centrally located within the Hastings Field. The project footprint was designed and situated to avoid jurisdictional wetland impacts to the maximum extent practicable. Of the 19.2 acres of jurisdictional wetlands on the tract, 12.12 acres of wetlands will be avoided. Existing infrastructure is located directly adjacent to the site, which minimizes the potential for additional wetland impacts. The applicant proposes to mitigate for the proposed unavoidable impacts to 7.08 acres of wetlands by donating a 60-acre tract composed of cypress-tupelo swamp to the Big Thicket National Preserve. The mitigation tract is located directly south of the tract that was previously utilized as mitigation for the Denbury Green Pipeline project, permitted under SWG-2007-01963.

**NOTES:** This public notice is being issued based on information furnished by the applicant. This information has not been verified. The applicant's plans in 6 sheets, Alternative Analysis in 2 sheets and Mitigation Plan in 3 sheets are enclosed.

A preliminary review of this application indicates that an Environmental Impact Statement (EIS) is not required. Since permit assessment is a continuing process, this preliminary determination of EIS requirement will be changed if data or information brought forth in the coordination process is of a significant nature.

Our evaluation will also follow the guidelines published by the U.S. Environmental Protection Agency pursuant to Section 404 (b)(1) of the Clean Water Act (CWA).

**OTHER AGENCY AUTHORIZATIONS:** Texas Railroad Commission certification is required. Texas Coastal Zone consistency certification is required. The applicant has stated that the project is consistent with the Texas Coastal Management Program goals and policies and will be conducted in a manner consistent with said program.

**NATIONAL REGISTER OF HISTORIC PLACES:** The staff archaeologist has reviewed the latest published version of the National Register of Historic Places, lists of properties determined eligible, and other sources of information. The following is current knowledge of the presence or absence of historic properties and the effects of the undertaking upon these properties:

The permit area has been so extensively modified that little likelihood exists for the proposed project to impinge upon a historic property, even if present within the affected area.

**THREATENED AND ENDANGERED SPECIES:** Preliminary indications are that no known threatened and/or endangered species or their critical habitat will be affected by the proposed work.

**ESSENTIAL FISH HABITAT:** This notice initiates the Essential Fish Habitat consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. Our initial determination is that the proposed action would not have a substantial adverse impact on Essential Fish Habitat or federally managed fisheries in the Gulf of Mexico. Our final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the National Marine Fisheries Service.

**PUBLIC INTEREST REVIEW FACTORS:** This application will be reviewed in accordance with 33 CFR 320-332, the Regulatory Programs of the Corps of Engineers (Corps), and other pertinent laws, regulations and executive orders. The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits, which reasonably may be expected to accrue from the proposal, must be balanced against its reasonably foreseeable detriments. All factors, which may be relevant to the proposal, will be considered: among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs and, in general, the needs and welfare of the people.

**SOLICITATION OF COMMENTS:** The Corps is soliciting comments from the public, Federal, State, and local agencies and officials, Indian tribes, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Impact Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

This public notice is being distributed to all known interested persons in order to assist in developing facts upon which a decision by the Corps may be based. For accuracy and completeness of the record, all data in support of or in opposition to the proposed work should be submitted in writing setting forth sufficient detail to furnish a clear understanding of the reasons for support or opposition.

**PUBLIC HEARING:** Prior to the close of the comment period any person may make a written request for a public hearing setting forth the particular reasons for the request. The District Engineer will determine whether the issues are substantial and should be considered in the permit decision. If a public hearing is warranted, all known interested persons will be notified of the time, date, and location.

**CLOSE OF COMMENT PERIOD:** All comments pertaining to this Public Notice must reach this office on or before **9 August 2010**. Extensions of the comment period may be granted for valid reasons provided a written request is received by the limiting date. **If no comments are received by that date, it will be considered that there are no objections.** Comments and requests for additional information should be submitted to:

Kristy Farmer  
Regulatory Branch, CESWG-PE-RE  
U.S. Army Corps of Engineers  
P.O. Box 1229  
Galveston, Texas 77553-1229  
409-766-3935 Phone  
409-766-6301 Fax

DISTRICT ENGINEER  
GALVESTON DISTRICT  
CORPS OF ENGINEERS



August 15, 2012

Ms. Pam Breaux  
State Historic Preservation Officer  
Office of Cultural Development  
Louisiana Department of Culture, Recreation & Tourism  
P.O. Box 44247  
Baton Rouge, Louisiana 70804-44247

**SUBJECT:** Initiation of Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Ms. Breaux:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, the DOE is consulting with the Louisiana State Historic Preservation Officer (SHPO) on the proposed project.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, in Brazoria County, Texas. Please note that as of June 1, 2012, the name of Lake Charles Cogeneration, LLC was changed to Lake Charles Clean Energy, LLC. Historical references to Lake Charles Cogeneration (LCC) Gasification are now LCCE Gasification.

During the DOE demonstration phase of the proposed project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard

cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast and is not part of DOE's evaluation. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the Lake Charles CCS Project and its associated CO<sub>2</sub> capture and compression facilities in Calcasieu Parish, Louisiana;
- the Lake Charles CCS Project proposed 11.1 mile CO<sub>2</sub> pipeline in Calcasieu Parish Louisiana; Lake Charles CCS Project proposed Research Monitoring, Verification, Analysis (MVA) program for the CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation in Brazoria County, Texas; and
- the LCCE Gasification Project and its associated facilities in Calcasieu Parish, Louisiana (connected action).

DOE has determined that the area of potential effects (APE) for the undertaking will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCCE Gasification, which are located in Calcasieu Parish, Louisiana and in Brazoria County, Texas. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The APE in Calcasieu Parish, Louisiana includes the locations of:

- the CO<sub>2</sub> capture and compression facilities for the Lake Charles CCS Project on the west bank of the Calcasieu River;
- the LCCE Gasification project, also on the west bank of the Calcasieu River;
- the offsite facilities associated with the LCCE Gasification project including the proposed new methanol storage area; hydrogen pipeline; water supply pipeline; natural gas pipeline; co-located transmission line, potable water line, and methanol pipeline; equipment laydown area; and offsite parking area (see Enclosure 2).
- the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline; or,
- the alternative 11.6-mile long alignment for the CO<sub>2</sub> pipeline that connects to the existing Green Pipeline to the southwest.

The APE in Texas includes the location of the proposed CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation and Research MVA program at the existing Hastings Oil Field in Brazoria County, Texas.

Cultural resources investigations have been conducted within portions of the APE in Calcasieu Parish, Louisiana, including: Phase I archaeological survey of the property that contains the locations of the Lake Charles CCS Project and LCCE Gasification project; Phase I cultural resources survey of the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline, including extra workspace and access roads; and Phase IA cultural resources investigations of offsite facilities associated with the LCCE Gasification project (raw water, hydrogen, potable water, methanol and sulfuric acid pipelines; an overhead transmission line; a construction laydown area; and construction parking area). A table summarizing these cultural resources investigations is in Enclosure 3.

Cultural resources investigations conducted at the locations of the Lake Charles CCS Project and LCCE Gasification project consisted of: (1) a Phase I cultural resources investigation for the entire property in 2001 by Earth Science, Inc. (Smith et al. 2001 as cited in Handly 2009), which identified a portion of one archaeological site, Site 16CU29, a prehistoric shell midden, and (2) additional archaeological investigations of Site 16CU29 in 2009 by URS Corporation, which determined that the site had been adversely impacted by naturally-occurring erosion and /or redeposition (possibly as a result of hurricane storm surges between 2001 and 2009), and was not eligible for inclusion in the National Register of Historic Places (NRHP) (Handly 2009). The Louisiana SHPO concurred with URS Corporation's assessment that Site 16CU29 was not eligible for inclusion in the NRHP due to a lack of depositional integrity and limited research potential, and indicated that no further investigations were necessary (Hutcheson 2009). Documentation of the previous consultation with your office by other parties regarding the results of the cultural resources investigations for the Lake Charles CCS Project and LCCE Gasification project, which was conducted as part of the air permitting process for the Lake Charles Gasification Facility, is in Enclosure 4.

Cultural resources investigations conducted for the proposed new 11.1-mile long CO<sub>2</sub> pipeline consisted of a Phase I cultural resources investigation conducted in 2011 by the University of Alabama's Office of Archaeological Research (Watkins and Futato 2011). Results of these investigations consisted of the identification of one historic archaeological site, 16CU73, and one modern cemetery, the Hardey Family Cemetery established in 1988, within the APE. Site 16CU73 was recommended not eligible for listing in the NRHP and no further archaeological investigations were recommended for the site. Recommendations for avoiding impacts on the Hardey Family Cemetery consisted of installation of the proposed pipeline beneath the cemetery at a minimum depth of 10 feet (3 meters) below the surface of the cemetery.

The report documenting these cultural resources investigations, entitled *A Phase I Cultural Resources Survey of the Proposed Lake Charles Pipeline Lateral Project Located near Sulphur, Calcasieu Parish, Louisiana (Draft Report, dated November 18, 2011)*, was submitted separately to your office for review and comment by the consultant on behalf of the Applicant. The Louisiana SHPO concurred with the University of Alabama's recommendation that archaeological site 16CU73 was not eligible for the NRHP and no further archaeological investigations were required and concurred with the

Applicant's proposed measures to avoid impacts on the Hardey Family Cemetery (Breux 2012). Documentation of the previous consultation with your office by other parties regarding the results of the cultural resources investigation for the CO<sub>2</sub> pipeline is in Enclosure 4.

Cultural resources investigations conducted for the proposed offsite facilities associated with the Lake Charles CCS Project and LCCE Gasification project consisted of Phase IA cultural resources investigations conducted in 2012 by URS (URS 2012 and Handly 2012 in Enclosure 5). Results of these investigations indicated that: no previously identified cultural resources, including resources listed in or determined eligible for listing in the National Register of Historic Places (NRHP), are located within the APE for the offsite facilities: portions of the APE have been previously surveyed for other unrelated projects or have been previously disturbed by prior construction; and portions of the APE may be considered sensitive for the presence of previously unidentified cultural resources. Additional Phase IB field investigations were recommended for the proposed offsite facilities to identify previously unrecorded aboveground resources (historic buildings and/or cemeteries) and below ground resources (archaeological sites).

The documentation for the Phase IA cultural resources investigations for the proposed offsite facilities, consisting of a report entitled *Lake Charles Cogeneration, LLC, Cultural Resources Assessment, Calcasieu Parish, Louisiana* (URS report dated July 2012) and a letter report regarding *Cultural Resources Evaluation - Lake Charles Cogeneration, LLC (LCC), Calcasieu Parish, Louisiana* (Handly 2012), are in Enclosure 5. They are provided to your office for review and comment pursuant to Section 106 of the NHPA.

DOE is not aware of any other previously conducted cultural resources investigations in other portions of the APE in Calcasieu Parish, Louisiana (i.e., the alignments of the proposed or alternative CO<sub>2</sub> pipeline, the proposed methanol pipeline, and the proposed water supply line). DOE confirmed that no NRHP-listed historic properties or previously recorded standing structures or historic districts are located within the APE or a 0.5-mile radius around the APE in Calcasieu Parish (NPS 2011a, 2011b; Louisiana Department of Culture, Recreation and Tourism [CRT] 2011a).

In accordance with Section 106 of the NHPA, DOE is writing to seek your concurrence on the proposed project's APE in Calcasieu Parish, Louisiana, per 36 CFR 800.4(a)(1). DOE is also seeking your review of the cultural resources reports in Enclosure 5 and your comments on any issues or concerns for cultural resources or historic properties that might be affected by the proposed Project, per 36 CFR 800.4(a)(3).

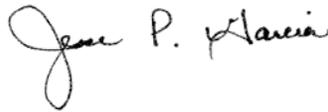
DOE has identified 11 federally recognized Indian tribes with a potential interest in the portions of the proposed Project in Louisiana (see Enclosure 6) and is also seeking information for any other parties that may have an interest in the Section 106 consultation process for the proposed Project per 36 CFR 800.3(f). DOE is conducting separate consultation with the Texas State Historic Preservation Officer (SHPO) and federally recognized Indian tribes and other consulting parties for the proposed new facilities in Brazoria County, Texas.

DOE looks forward to receiving your concurrence with the APE for the portions of the proposed Project that are in Calcasieu Parish, Louisiana per 36 CFR 800.4(a)(1) and your comments on the cultural resources reports in Enclosure 5 and on any issues or concerns for cultural resources or historic properties that might be affected by the proposed Project. DOE also looks forward to your assistance in identifying any parties that may have an interest in the Section 106 consultation for the proposed Project. Please forward the results of your review and any requests for additional information to our contractor:

Janine Whitken  
Ecology and Environment, Inc.  
368 Pleasant View Drive  
Lancaster, New York 14086  
(716) 684-8060 extension 2745  
JWhitken@ene.com

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

cc: Amity Bass, Louisiana Department of Wildlife and Fisheries

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Calcasieu Parish, Louisiana
  3. Summary Table for Cultural Resources Investigations Conducted within the Louisiana APE
  4. Previous correspondence with the Louisiana SHPO for Lake Charles Gasification Facility
  5. Phase IA Cultural Resources Reports for Proposed Offsite Facilities
  6. List of federally recognized Indian tribes

## References Cited

Breaux, Pam. 2012. Letter dated April 25, 2012, from Pam Breaux, State Historic Preservation Officer, Office of Cultural Development, Louisiana Department of Culture, Recreation & Tourism, Baton Rouge, Louisiana, to Joel Watkins, Cultural Resource Analyst, Office of Archaeological Research, Moundville, Alabama. RE: *Draft Report, La Division of Archaeology Report No. 22-4007, Phase I Cultural Resource Survey of the Proposed Lake Charles Pipeline Lateral Project located near Sulphur, Calcasieu Parish, Louisiana.*

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Handly, Martin. 2009. Letter dated June 15, 2009, from Martin Handly, Principal Investigator, URS Corporation, Baton Rouge, Louisiana, to Mr. Donald W. Maley, Vice-President, Lake Charles Cogeneration, LLC, Houston, Texas. RE: *Field Assessment of Archaeological Site 16CU29, Lake Charles Gasification Facility, Lake Charles Cogeneration, LLC, Westlake, Calcasieu Parish, Louisiana.*

Handly, Martin. 2012. Letter dated May 16, 2012, from Martin Handly, Principal Investigator, URS Corporation, Baton Rouge, Louisiana, to Mr. Philip Leonards, Leucadia Energy, Houston, Texas. Re: *Cultural Resources Evaluation - Lake Charles Cogeneration, LLC (LCC), Calcasieu Parish, Louisiana.*

Hutcheson, Scott. 2009. Letter dated June 26, 2009, from Scott Hutcheson, State Historic Preservation Officer, Office of Cultural Development, Department of Culture, Recreation and Tourism, State of Louisiana, Baton Rouge, Louisiana. RE: *Lake Charles Gasification Facility, Lake Charles Cogeneration LLC, Agency Interest No. 160213, Activity No. PER20090001, Lake Charles, Calcasieu Parish, LA.*

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<http://www.nps.gov/history/nhl/designations/Lists/LA01.pdf> and <http://www.nps.gov/history/nhl/designations/Lists/TX01.pdf> (web sites accessed March 7, 2011).

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URS Corporation. 2012. *Lake Charles Cogeneration, LLC, Cultural Resources Assessment, Calcasieu Parish, Louisiana*. URS Job No. 10003620, July 2012.

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Enclosure 1

Location of the Proposed  
Lake Charles Carbon Capture and Sequestration Project and LCCE Gasification Project

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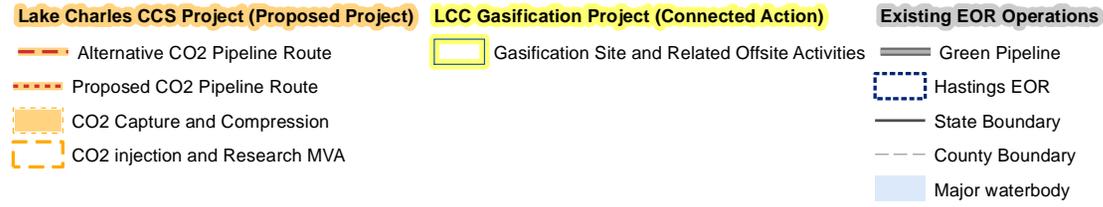
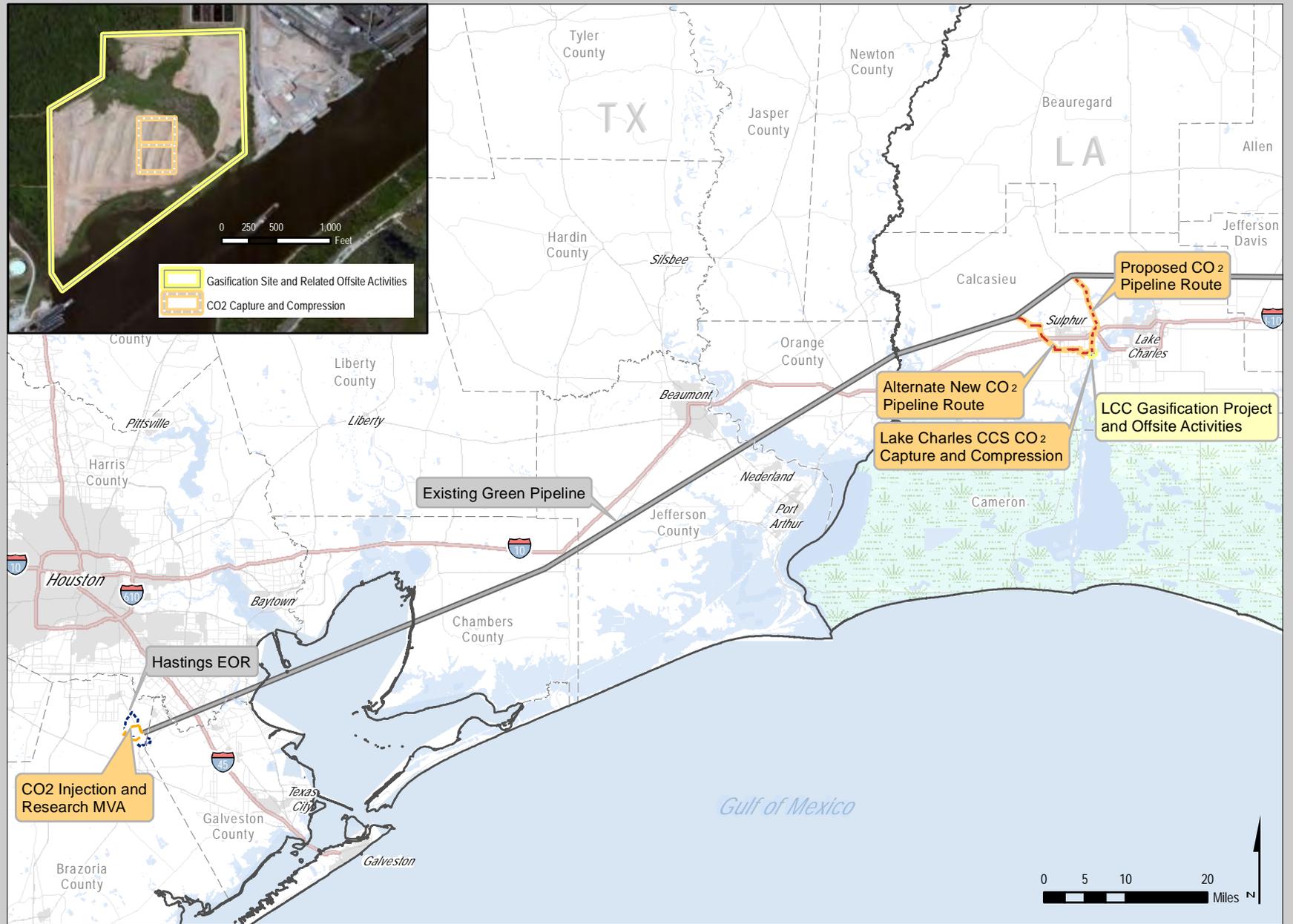


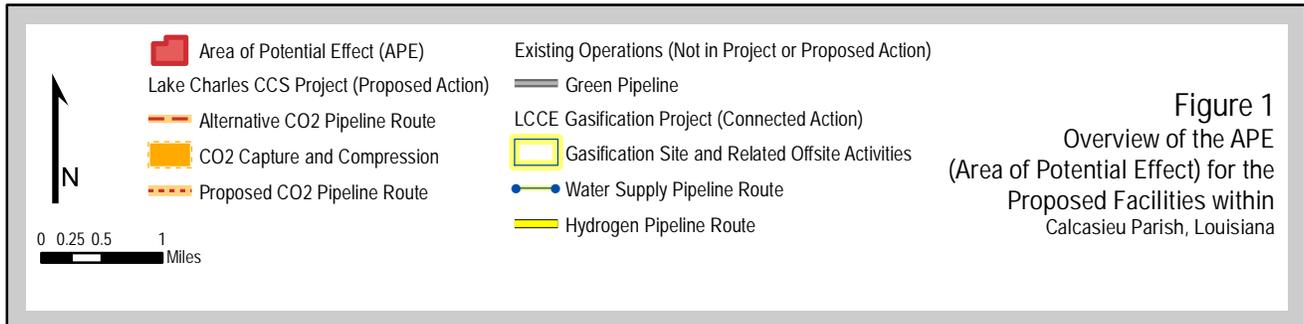
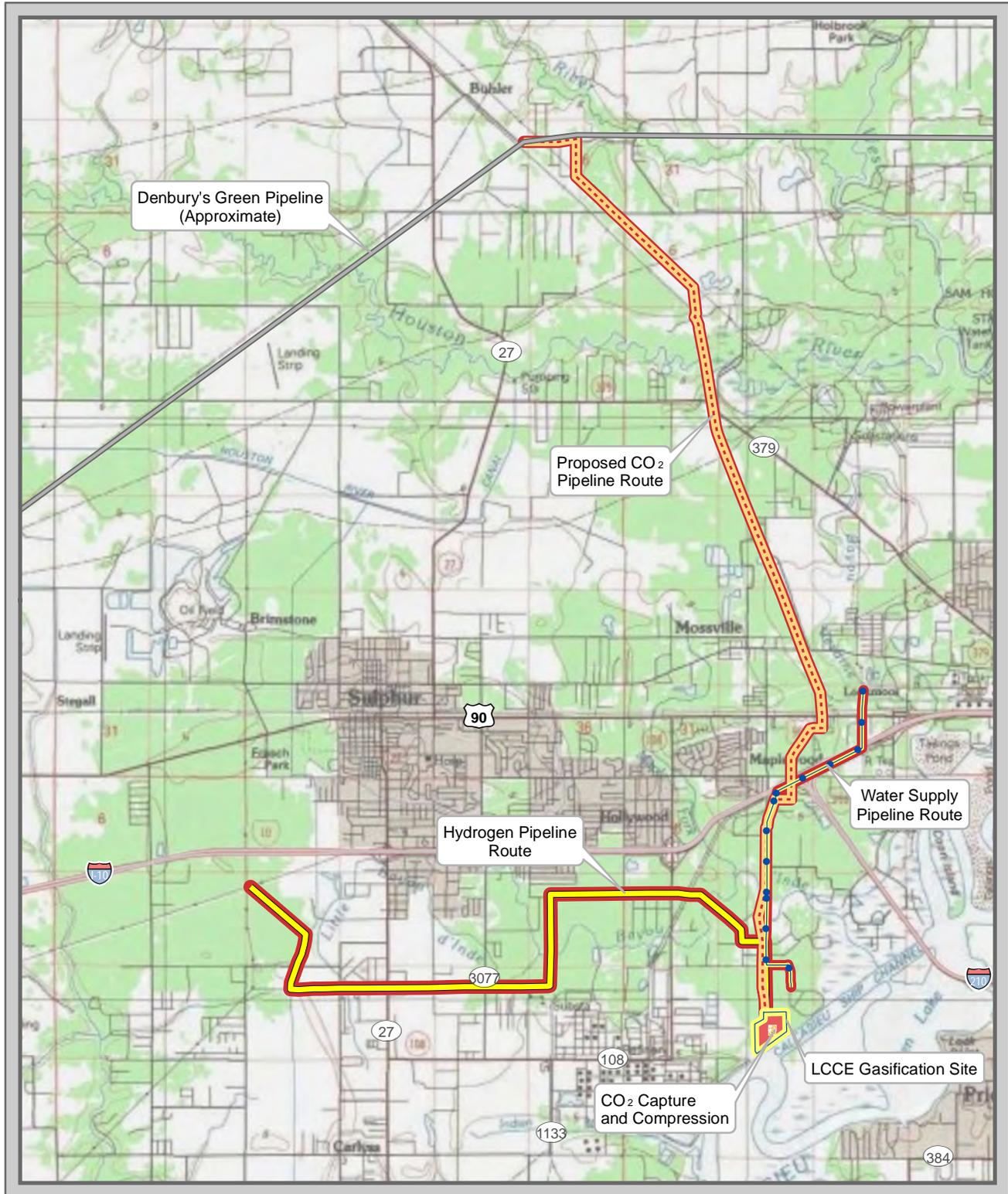
Figure 2.2-1  
Lake Charles CCS Project  
Overall Location  
Texas and Louisiana

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Enclosure 2

Area of Potential Effect  
for Proposed Lake Charles Carbon Capture and Sequestration Project and LCCE  
Gasification Project Facilities  
in Calcasieu Parish, Louisiana

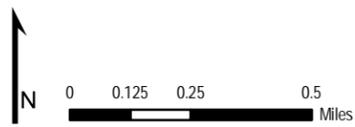
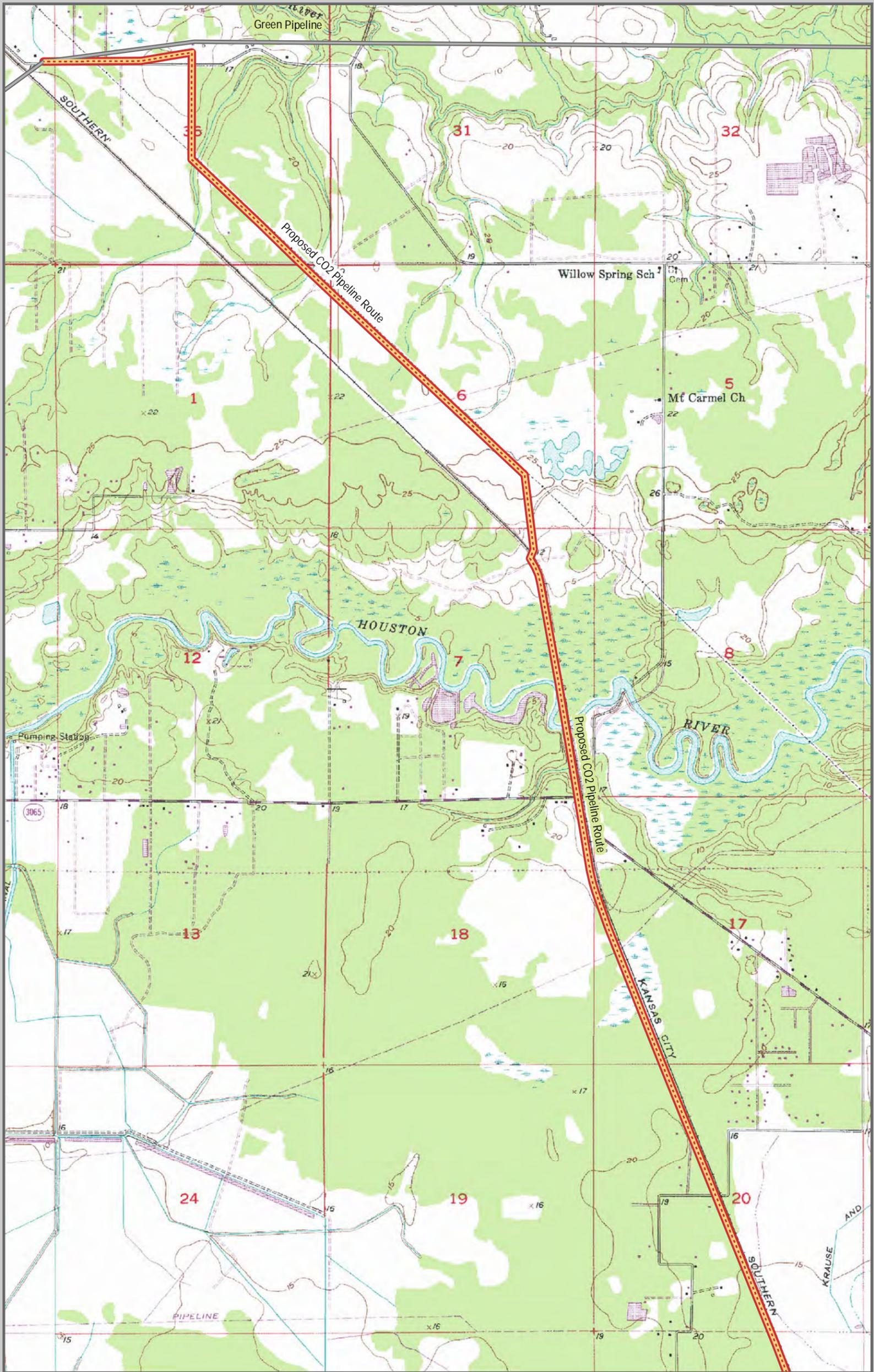
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**Figure 1**  
Overview of the APE  
(Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

Source: USGS 1:24,000 Friendswood (1998); Pearland (1983); Manval (1977); and Algoa (1977) Quadrangles.

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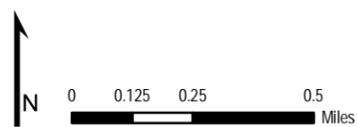
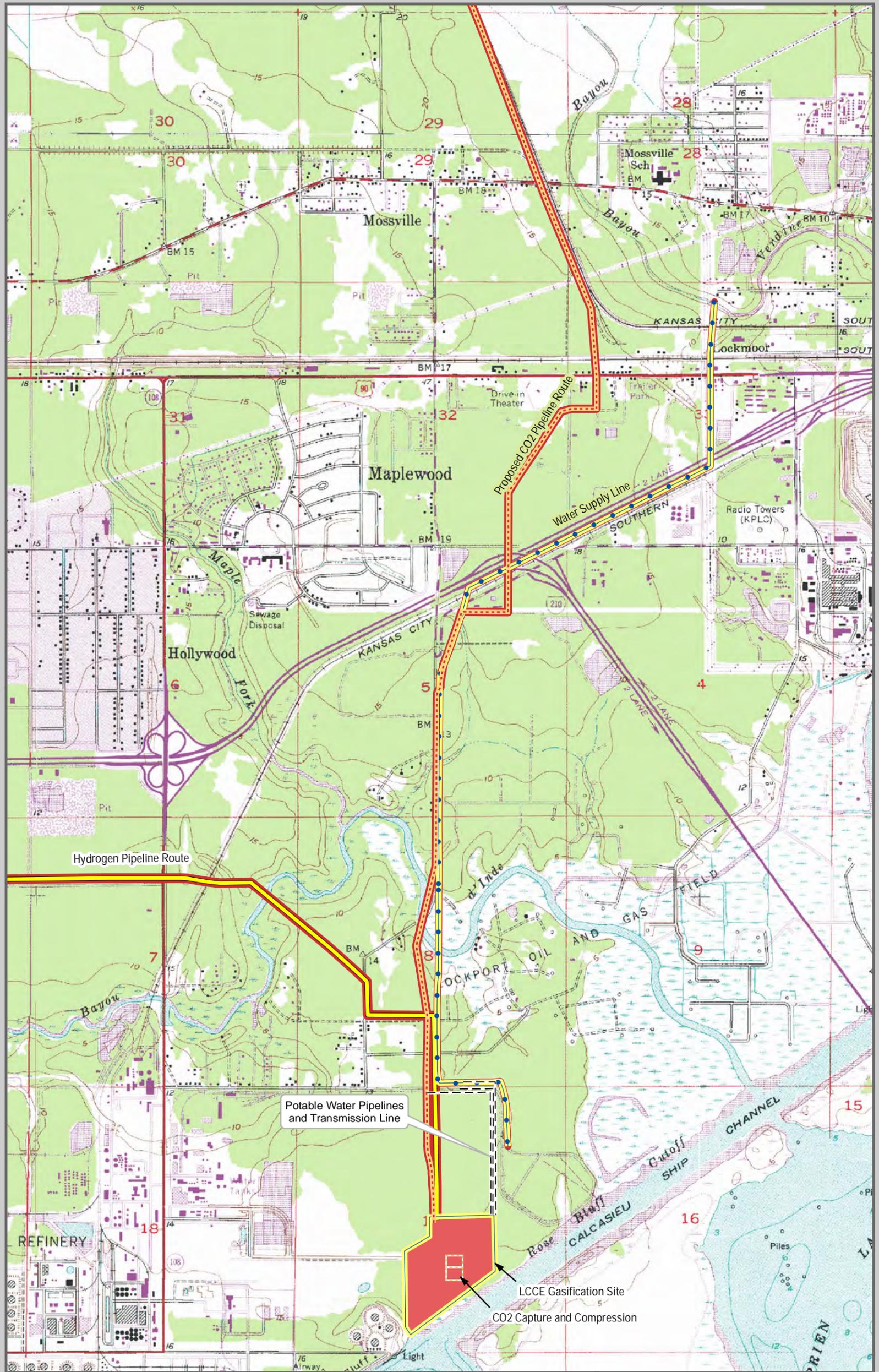


Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakd (1977) Quadrangles.

- |   |   |
|---|---|
|  Area of Potential Effect (APE)  |  Lake Charles Gasification Project (Connected Action)<br>Gasification Site |
|  Existing Operations (Not in Project or Proposed Action)<br>Green Pipeline |  Water Supply Line   |
|  Lake Charles CCS Project (Proposed Action)<br>CO2 Capture and Compression |  Hydrogen Pipeline Route   |
|  Proposed CO2 Pipeline Route   |   |

**Figure 1-1**  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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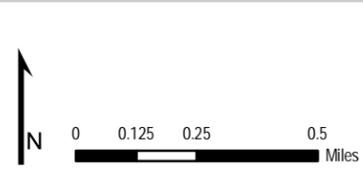
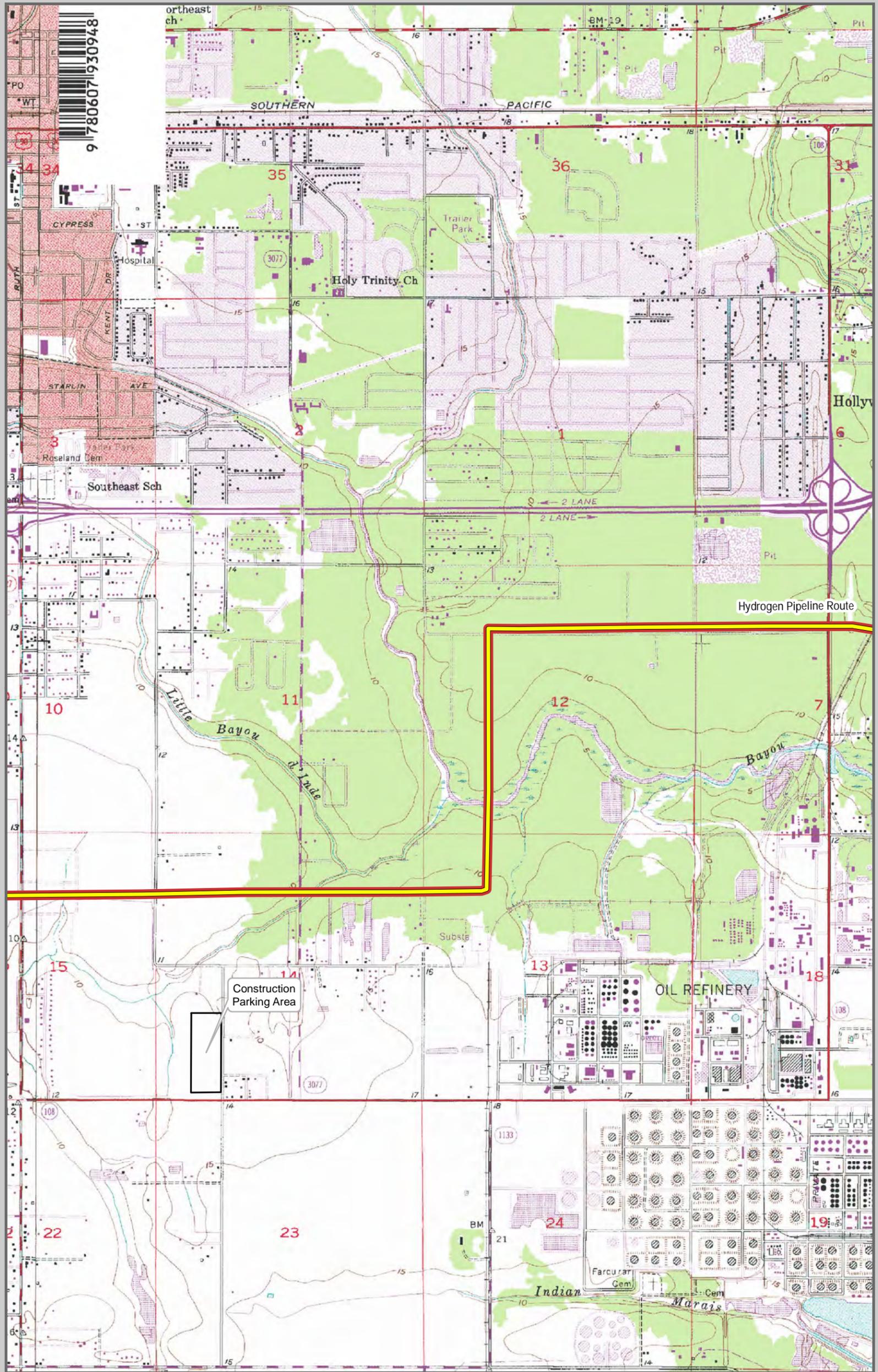


Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakd (1977) Quadrangles.

- |   |   |   |  |
|---|---|---|--|
|  | Area of Potential Effect (APE)                          |  | Lake Charles Gasification Project (Connected Action) |
|  | Existing Operations (Not in Project or Proposed Action) |  | Gasification Site                                    |
|  | Green Pipeline  |  | Water Supply Line                                    |
|  | Lake Charles CCS Project (Proposed Action)              |  | Hydrogen Pipeline Route                              |
|  | CO2 Capture and Compression                             |   |  |
|  | Proposed CO2 Pipeline Route                             |   |  |

Figure 1-2  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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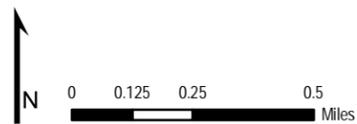
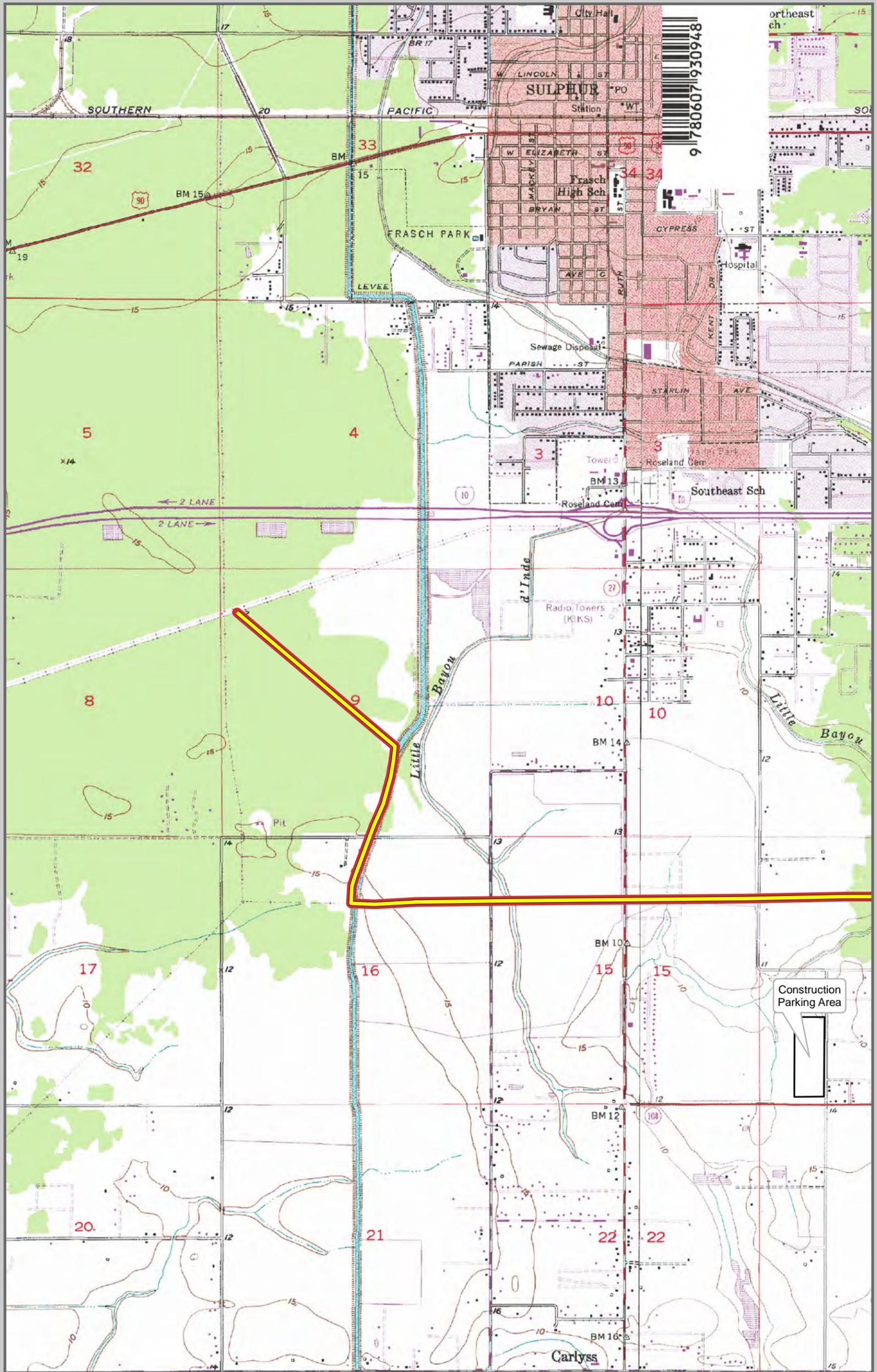


Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakd (1977) Quadrangles.

- ▭ Area of Potential Effect (APE)
- ▭ Existing Operations (Not in Project or Proposed Action)
- Green Pipeline
- ▭ Lake Charles CCS Project (Proposed Action)
- ▭ CO2 Capture and Compression
- Proposed CO2 Pipeline Route
- ▭ Lake Charles Gasification Project (Connected Action)
- ▭ Gasification Site
- Water Supply Line
- Hydrogen Pipeline Route

**Figure 1-3**  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakt (1977) Quadrangles.

- |  |  |
|--|--|
| Area of Potential Effect (APE)   | Lake Charles Gasification Project (Connected Action) Gasification Site |
| Existing Operations (Not in Project or Proposed Action) Green Pipeline | Water Supply Line  |
| Lake Charles CCS Project (Proposed Action) CO2 Capture and Compression | Hydrogen Pipeline Route  |
| Proposed CO2 Pipeline Route  |  |

**Figure 1-4**  
APE (Area of Potential Effect) for the Proposed Facilities within Calcasieu Parish, Louisiana

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Enclosure 3

Summary Table for Cultural Resources Investigations  
Conducted within the Louisiana APE

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Summary Table for Cultural Resources Investigations  
Conducted within the Louisiana APEs

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
<b>Lake Charles CCS Project (DOE proposes to fund)</b>		
Carbon Capture and Compression	<ul style="list-style-type: none"> <li>• 2 acid gas removal units to capture CO<sub>2</sub> that would otherwise be emitted to the atmosphere</li> <li>• Produce CO<sub>2</sub> in the purity needed for sequestration or EOR</li> <li>• 2 CO<sub>2</sub> compressors pressurizing CO<sub>1</sub> to 2,250 psig for transport in a supercritical state</li> <li>• Monitoring and metering equipment</li> <li>• All equipment is completely contained within the LCC Gasification Project Site.</li> </ul>	<p>Phase I archaeological survey of known site within parcel previously conducted by URS in 2009; one cultural resources present (prehistoric archaeological site 16CU 29); site recommended not eligible for NRHP (letter report dated June 15, 2009 [Handly]).</p> <p>LA SHPO concurred with NRHP-eligibility recommendation; no further investigations of property required. (letter dated June 26, 2009 [Hutcheson]).</p> <p><b>Action: None</b></p>
CO <sub>2</sub> Pipeline	<ul style="list-style-type: none"> <li>• 11.1 mile pipeline from the CO<sub>2</sub> compressors to an existing CO<sub>2</sub> pipeline</li> <li>• Route includes a 50 foot permanent right of way (ROW) that would parallel existing ROWs (such as roadways, pipelines, railroads, transmission lines, and other linear features) throughout the length of the pipeline corridor to the extent practicable</li> <li>• CO<sub>2</sub> meter station at tie-in to existing CO<sub>2</sub> pipeline (Green Pipeline)</li> </ul>	<p>Phase I cultural resources survey (for archaeological and architectural resources) by University of Alabama; two cultural resources identified (historic archaeological site 16CU73; and modern [late 20<sup>th</sup> century] Hardey Cemetery). Both resources recommended not eligible for NRHP; drilling pipeline beneath cemetery recommended for Hardey Cemetery (draft report dated November 18, 2011 [Watkins and Futato]).</p> <p>LA SHPO concurred with results of survey: no NRHP-eligible resources were identified within the APE; no historic properties will be impacted by the project; and no further work is necessary (letter dated April 25, 2012 [Breux]).</p> <p><b>Action: None</b></p>
<b>LCCE Gasification Project (Connected Action, not under consideration for DOE funding)</b>		

**Summary Table for Cultural Resources Investigations  
Conducted within the Louisiana APEs**

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
Gasification Plant	<ul style="list-style-type: none"> <li>• Provides CO2 to the Lake Charles CCS Project</li> <li>• Petroleum coke gasification facility to produce methanol, hydrogen, and sulfuric acid on a 70 acre site in Calcasieu Parish</li> <li>• Site preparation of clearing, grading, raising the elevation currently being performed under USACE permit, including 26 acres of wetland mitigation implemented by the Port of Lake Charles</li> <li>• Construction expected to begin Fall 2012 and continue for 40 months</li> </ul>	<p>Phase I archaeological survey of known site within parcel previously conducted by URS in 2009; one cultural resources present (prehistoric archaeological site 16CU 29); site recommended not eligible for NRHP (letter report dated June 15, 2009 [Handly]).</p> <p>LA SHPO concurred with NRHP-eligibility recommendation; no further investigations of property required. (letter dated June 26, 2009 [Hutcheson]).</p> <p><b>Action: None</b></p>
Offsite Activities	<ul style="list-style-type: none"> <li>• 4 mile Raw Water Pipeline from Sabine River Canal. Route includes a 50 foot permanent ROW and 50 to 250 foot construction ROW that would parallel existing roadways, pipelines, railroads, transmission lines, and other linear features to the extent practicable. Leucadia would own and operate the raw water pipeline.</li> </ul>	<p>Phase IA cultural resources survey for archaeological and architectural resources) by URS; no cultural resources identified; further investigations of those areas that have not been previously disturbed or surveyed for cultural resources recommended (letter report dated May 16, 2012 [Handly]).</p> <p><b>Action: Letter report is submitted with this consultation letter for review and comment by the LA SHPO.</b></p>
	<ul style="list-style-type: none"> <li>• 8.5 mile Hydrogen Pipeline to transport hydrogen to Air Products in, Sulphur, Louisiana. Route includes a 50 foot permanent ROW and 75 foot construction ROW that would parallel existing roadways, pipelines, railroads, transmission lines, and other linear features to the extent practicable. The hydrogen pipeline would be owned and operated by Air Products.</li> </ul>	<p>Phase IA cultural resources survey (for archaeological and architectural resources) by URS; no cultural resources identified; further investigations of those areas that have not been previously disturbed or surveyed for cultural resources recommended (letter report dated May 16, 2012 [Handly]).</p> <p><b>Action: Letter report is submitted with this consultation letter for review and comment by the LA SHPO.</b></p>

Summary Table for Cultural Resources Investigations  
Conducted within the Louisiana APEs

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
	<ul style="list-style-type: none"> <li>• Offsite Construction Parking Area with shuttle buses to and from the Plant site. This site is partially cleared and graded.</li> </ul>	<p>Phase IA cultural resources survey (for archaeological and architectural resources) by URS; no previously recorded cultural resources identified within APE; further investigations of those areas that have not been previously disturbed or surveyed for cultural resources recommended (letter report dated May 16, 2012 [Handly]).</p> <p><b>Action: Letter report is submitted with this consultation letter for review and comment by the LA SHPO.</b></p>
	<ul style="list-style-type: none"> <li>• Potable Water Pipeline to provide access to existing city water currently supplying the Port of Lake Charles. This work would take place within currently developed ROWs.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (letter report dated May 16, 2012 [Handly]).</p> <p><b>Action: Letter report is submitted with this consultation letter for review and comment by the LA SHPO.</b></p>
	<ul style="list-style-type: none"> <li>• Natural Gas Pipeline to provide start up fuel. This work includes upgrade to an existing line and new line and would take place within currently developed ROWs.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p><b>Action: Report submitted with this consultation letter for review and comment by the LA SHPO.</b></p>

Summary Table for Cultural Resources Investigations  
Conducted within the Louisiana APEs

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
	<ul style="list-style-type: none"> <li>Transmission Line to connect with the existing 230 kV transmission line. Route includes one alternative that would take place within currently developed ROWs on the east side of the Plant access road or on the west side of adjacent industrial property occupied by LA Pigment.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p><b>Action: Report submitted with this consultation letter for review and comment by the LA SHPO.</b></p>
	<ul style="list-style-type: none"> <li>Methanol and Sulfuric Acid Pipelines to Storage. These pipelines would transport products to the LCC Gasification Project offsite storage area. This work would take place within currently developed ROWs.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p><b>Action: Report submitted with this consultation letter for review and comment by the LA SHPO.</b></p>
	<ul style="list-style-type: none"> <li>Construction Laydown Area for staging of construction equipment. This site would be located near LCC Gasification Project on property to be leased from the Port of Lake Charles. The site would be prepared for storage of construction equipment prior to use by Leucadia.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p><b>Action: Report submitted with this consultation letter for review and comment by the LA SHPO.</b></p>

Summary Table for Cultural Resources Investigations  
Conducted within the Louisiana APEs

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
	<ul style="list-style-type: none"> <li>• Methanol and Sulfuric Acid Storage Area and Pipelines to Port of Lake Charles. The area will contain above ground storage tanks for methanol and sulfuric acid. The pipelines move product from the storage area to offload by barge, ship, truck, and rail on the Port of Lake Charles property. The storage area and pipelines will be on property owned by the Port of Lake Charles.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p><b>Action: Report submitted with this consultation letter for review and comment by the LA SHPO.</b></p>

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Enclosure 4

Previous Correspondence with the  
Louisiana State Historic Preservation Office for the  
Lake Charles Clean Energy Gasification Project (formerly Lake Charles Cogeneration)

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Lake Charles Cogeneration LLC  
1330 Post Oak Boulevard  
Suite 1600  
Houston, TX 77056

September 8, 2008

Ms. Pam Breaux  
State Historic Preservation Officer  
State of Louisiana  
Office of Cultural Development  
P.O. Box 94361  
Baton Rouge, LA 70802

Re: Air Permit Application: Lake Charles Gasification Facility  
Lake Charles Cogeneration, LLC  
Lake Charles, Louisiana

Dear Ms. Breaux:

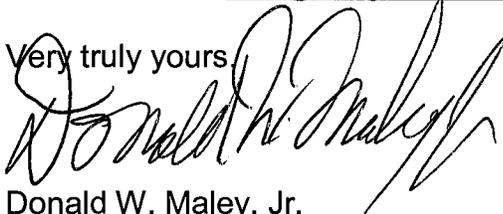
The Lake Charles Cogeneration, LLC (LCC) is preparing an air permit application for the proposed Lake Charles Gasification Facility to be located on property owned by the Port of Lake Charles, in Lake Charles, Louisiana. The LCC property to be developed is adjacent to and west of the existing Port of Lake Charles facilities as shown on the attached.

The LCC requests the following confirmation:

- There are no known archeological sites or historical structures either listed on or eligible for listing on the National Register of Historic Places within 1000 feet of the nearest LCC property boundary.

Should you have any questions, please contact Larry Leib at our office (713) 963-4637, or via e-mail at [lrlal@sbcglobal.net](mailto:lrlal@sbcglobal.net). Thank you for your assistance.

Very truly yours,



Donald W. Maley, Jr.  
Vice President

cc: Doug Barba  
Larry Leib

Enclosures

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MITCHELL J. LANDRIEU  
LIEUTENANT GOVERNOR

**State of Louisiana**  
OFFICE OF THE LIEUTENANT GOVERNOR  
DEPARTMENT OF CULTURE, RECREATION & TOURISM  
OFFICE OF CULTURAL DEVELOPMENT  
DIVISION OF ARCHAEOLOGY

PAM BREAU  
SECRETARY

SCOTT HUTCHESON  
ASSISTANT SECRETARY

October 28, 2008

Mr. Donald W. Maley, Jr.  
Vice President  
Lake Charles Cogeneration, LLC  
1330 Post Oak Boulevard, Suite 1600  
Houston, TX 77056

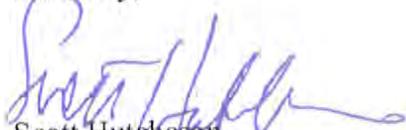
Re: Air Permit Application: Lake Charles Gasification Facility  
Lake Charles Cogeneration, LLC  
Calcasieu Parish, Louisiana

Dear Mr. Maley:

This is in response to your letter dated September 8, 2008, concerning the above-referenced project. There is one known archaeological site located with the Port property boundaries, 16CU29, the Citgo Shell Mound; therefore, our office is requesting that a Phase I survey be conducted. I have enclosed a copy of our contracting archaeologists list for your use.

If you have any questions concerning our comments, please do not hesitate to contact Rachel Watson in the Division of Archaeology at (225) 342-8170.

Sincerely,

  
Scott Hutcheson  
State Historic Preservation Officer

SH:RW:kc

enclosure

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The State of Louisiana does not license, register, or otherwise approve professional archaeologists.

The Department of Culture, Recreation and Tourism has found that a listing of archaeologists active in Louisiana is often a useful guide for those contracting agencies requiring the services of an archaeological consultant. The appearance of names of individuals and firms on the following list in no way implies recommendation or endorsement by the State of Louisiana. There are other competent, qualified archaeologists living both in-state and out-of-state. This list is furnished as a state service only upon request.

Contracting agencies are advised to contact several archaeological consultants, as price and availability for work vary greatly.

**AR Consultants, Inc.**  
S. Alan Skinner, PhD  
11020 Audelia Road, Suite C 105  
Dallas, TX 75243  
Office: (214) 369- 0478  
Fax: (214) 221- 1519  
Cell: (214) 906-8021  
[arcdigs@aol.com](mailto:arcdigs@aol.com)

**ArcCom  
Archaeological Compliance  
Consultant**  
Thomas I. McIntosh, RPA  
4202 Mandell Street  
Houston, TX 77006  
Phone (505) 982-2341  
[jeraii@aol.com](mailto:jeraii@aol.com)

**Archaeo-Geophysical Associates,  
LLC**  
Mr. Chester P. Walker, M.A., RPA  
8316 Hanbridge Lane  
Austin, TX 78736  
Phone: (512) 535-0976  
[chetwalker@aga-llc.net](mailto:chetwalker@aga-llc.net)  
<http://www.aga-llc.net>

**Archeological and Environmental  
Consultants, LLC**  
Dr. Timothy K. Perttula  
10101 Woodhaven Drive  
Austin, TX 78753-4346  
Phone: (512) 873-8131  
Fax: (512) 873-8131  
[tkp4747@aol.com](mailto:tkp4747@aol.com)

**Barr & Associates\***  
Mr. William B. Barr  
2636 Highway 394  
DeRidder, LA 70634  
Phone/Fax (888) 532-0392  
[bbbarch1@aol.com](mailto:bbbarch1@aol.com)

**BIO-WEST, Inc.\***  
Jeffrey M. Enright  
Maritime Archaeologist  
Office: (512) 990-3954  
Cell: (512) 801-5683

**Bluestone Research, LLC**  
Dr. Allan Morton, RPA  
162 Point Anne Dr.  
Hartfield, VA 23071  
Phone (804) 545-3151  
[allan@bluestoneresearch.com](mailto:allan@bluestoneresearch.com)  
[www.bluestoneresearch.com](http://www.bluestoneresearch.com)

**Brazos Valley Research Associates**  
William E. Moore, RPA  
813 Beck Street  
Bryan, TX 77803  
Phone (979) 823-1148  
[bvracrm@suddenlink.net](mailto:bvracrm@suddenlink.net)

**Brockington Cultural  
Resources Consulting**  
Thomas G. Whitley  
6611 Bay Circle, Suite 220  
Norcross, Georgia 30071  
Phone (770) 662-5807  
Fax (770) 662-5824  
[tomwhitley@brockington.org](mailto:tomwhitley@brockington.org)

**C & C Technologies, Inc.\***  
Mr. Robert Church or  
Mr. Daniel J. Warren  
730 E. Kaliste Saloom Road  
Lafayette, LA 70508  
Phone (337) 261-0660  
Fax (337) 261-0192

**Carved Trowel Archaeology, Ltd.**  
Dr. Jon Gibson  
355 Coleman Loop  
Homer, LA 71040  
Phone (318) 927-4915  
[jgibson@bayou.com](mailto:jgibson@bayou.com)

**Coastal Environments, Inc.\***  
Dr. David Kelley or  
Mr. Richard Weinstein  
1260 Main Street  
Baton Rouge, LA 70802  
Phone (225) 383-7455  
Fax (225) 383-7925  
[dkelley@coastalenv.com](mailto:dkelley@coastalenv.com)  
[rweinstein@coastalenv.com](mailto:rweinstein@coastalenv.com)

**CRC, International Archaeology &  
Ecology, LLC\***  
Mr. Robert P. d'Aigle, RPA  
555 FM 646, Suite 428  
Dickinson, TX 77539  
Phone (832) 592-9549  
Fax (832) 225-1409  
[www.culturalresource.com](http://www.culturalresource.com)  
[postoffice@culturalresource.com](mailto:postoffice@culturalresource.com)

**Cultural Resource Analysts, Inc.**  
Andrew V. Martin, RPA  
Steve D. Creasman, RPA  
151 Walton Avenue  
Lexington, KY 40508  
Phone (859) 252-4737  
[www.crai-ky.com](http://www.crai-ky.com)

**Deep East Texas Archaeological  
Consultants**  
Victor J. Galan  
4215 Red Oak  
Nacogdoches, TX 75965  
Phone (936) 560-4670

**Earth Search, Inc.\***  
Dr. Jill-Karen Yakubik  
P.O. Box 770336  
New Orleans, LA 70177-0336  
Phone (504) 947-0737  
Fax (504) 947-1714  
[jill@earth-search.com](mailto:jill@earth-search.com)

**Earth Services & Equipment, Inc.**  
Cheryl L. Bommarito, EP, MA, RPA  
Ronald F. Bacon, MS  
Southeast Office:  
1367 Marina Drive  
Slidell, LA 70458  
Phone (985) 641-4129  
Fax (985) 641-4149  
[cbommarito@earthservices.net](mailto:cbommarito@earthservices.net)  
[rfbacon@earthservices.net](mailto:rfbacon@earthservices.net)

**Engineering-Environmental  
Management, Inc.**  
Mr. Jeffrey Hokanson, M.A., RPA  
9563 S. Kingston Court  
Englewood, CO 80112  
Phone (303) 754-4200  
Fax (303) 721-9202  
[jhokanson@e2m.net](mailto:jhokanson@e2m.net)  
Additional office locations in NM,  
VA, and CA

**Environment & Archaeology, LLC**  
David Breetzke, RPA  
7736 Hwy. 42, Suite D3/5  
Florence, Kentucky 41042  
Phone: (859) 746-1778  
(859) 746-1788

**GAI Consultants, Inc.**  
Mr. Benjamin Resnick  
385 East Waterfront Drive  
Homestead, PA 15120-5005  
Phone (412) 476-2000, Ext. 1200  
Fax (412) 476-2020  
[b.resnick@gaiconsultants.com](mailto:b.resnick@gaiconsultants.com)

**Geo-Marine, Inc.**  
Ms. Melissa M. Green  
2201 K Avenue, Suite A2  
Plano, TX 75074  
(972) 423-5480 voice  
(972) 422-2736 fax  
[mgreen@geo-marine.com](mailto:mgreen@geo-marine.com)  
[www.geo-marine.com](http://www.geo-marine.com)

**Great Rivers Archaeological Services**  
Vincent Versluis, RPA  
6038 Lakeview Drive  
Burlington, KY 41005  
Phone (859) 689-1360  
Cell (859) 916-0042  
[v.versluis@juno.com](mailto:v.versluis@juno.com)

**Gulf South Research Corporation**  
Mr. John Lindemuth or  
Mr. Carl Welch  
P.O. Box 83564  
Baton Rouge, LA 70884-3564  
Phone (225) 757-8088  
Fax (225) 761-8077  
[johnl@gsrcorp.com](mailto:johnl@gsrcorp.com)

**Half Associates, Inc.**  
Mr. Leonard R. Voellinger, RPA  
4030 West Braker Lane, Ste. 450  
Austin, TX 78759  
Phone (512) 252-8184  
Fax (512) 252-8141  
[lvoellinger@half.com](mailto:lvoellinger@half.com)

**History, Incorporated**  
Mr. Artis West, MA, RPA  
1375 Union Industrial Court, Suite A  
Alpharetta, GA 30004  
Phone (770) 667-2060  
Fax (770) 667-2041  
[artis.west@HistoryIncOnline.com](mailto:artis.west@HistoryIncOnline.com)  
[www.HistoryIncOnline.com](http://www.HistoryIncOnline.com)

**HRA Gray & Pape, LLC**  
Mr. Jim Hughey  
Mr. Thomas I. McIntosh, RPA  
1428 West Alabama St.  
Houston, TX 77006  
Phone (713) 541-0473  
Fax (713) 541-0479  
[jhughey@hragp.com](mailto:jhughey@hragp.com)  
[tmcintosh@hragp.com](mailto:tmcintosh@hragp.com)  
[www.HRAGP.com](http://www.HRAGP.com)

**Dr. Carl Kuttruff**  
621 Albert Hart Dr.  
Baton Rouge, LA 70808  
Phone (225) 767-6605  
[ckuttruff@bellsouth.net](mailto:ckuttruff@bellsouth.net)

**New South Associates**  
Dr. J.W. Joseph or  
Natalie Adams  
6150 East Ponce de Leon Ave.  
Stone Mountain, GA 30083  
Phone (770) 498-4155  
Fax (770) 498-3809  
[jjoseph@newsouthassoc.com](mailto:jjoseph@newsouthassoc.com)  
[www.newsouthassoc.com](http://www.newsouthassoc.com)

**Northwestern State University  
Cultural Resource Office**  
Dr. Tommy Hailey  
Natchitoches, LA 71497  
Phone (318) 357-6130  
(318) 357-4453  
Fax (318) 357-5273  
[haileyt@nsula.edu](mailto:haileyt@nsula.edu)

**Panamerican Consultants, Inc.\***  
Steve James or  
Drew Buchner  
91 Tillman Street  
Memphis, TN 38111  
Phone (901) 454-4733  
Fax (901) 454-4736  
[panamtn@mindspring.com](mailto:panamtn@mindspring.com)  
[panameconsultants.com](http://panameconsultants.com)

**Pathfinder CRM, LLC**  
Mr. Robert C. Vogel  
168 W. Main Street  
Spring Grove MN 55974  
Phone (507) 498-3810  
[pathfindercrm@springgrove.coop](mailto:pathfindercrm@springgrove.coop)  
[www.pathfindercrm.com](http://www.pathfindercrm.com)

**PBS&J\***  
Mr. Robert Rogers  
6504 Bridge Point Parkway, Ste 200  
Austin, TX 78730  
Phone (512) 342-3340  
Fax (512) 327-2453  
[rmrogers@pbsj.com](mailto:rmrogers@pbsj.com)

**Precision Cartographics**  
Mr. Gary Joiner or  
Dr. C. Wade Meade  
1029 Blanchard Place  
Shreveport, LA 71104  
Phone (318) 222-6122  
Fax (318) 222-0662  
[caesar@latech.edu](mailto:caesar@latech.edu)

**Prentice Thomas & Associates, Inc.**  
Dr. Prentice M. Thomas, Jr.  
Ms. Jan Campbell  
Ms. Carrie Williams-Bourgeois  
P.O. Box 4246  
Fort Walton Beach, FL 32549  
Phone (850) 243-5992  
Fax (850) 664-7835  
[jcampbell@pta-crm.com](mailto:jcampbell@pta-crm.com)

**R. Christopher Goodwin & Associates, Inc.\***  
Mr. William P. Athens or  
Dr. R. Christopher Goodwin  
309 Jefferson Highway, Suite A  
New Orleans, LA 70121  
Phone (504) 837-1940  
Fax (504) 837-1550

**Dr. Katherine M. Roberts**  
Archaeologist/Paleoethnobotanist  
901 South National Avenue  
Springfield, MO 65897  
Phone (417) 836-6074  
Fax (417) 836-4772  
[KittyRoberts@MissouriState.edu](mailto:KittyRoberts@MissouriState.edu)

**Southeastern Archaeological Research, Inc. (SEARCH)\***  
Michael C. Krivor, M.A., RPA  
Jason M. Burns, M.A., RPA  
315 NW 138<sup>th</sup> Terrace  
Jonesville, FL 32669  
Phone: (352) 333-0049  
Fax: (352) 333-0069  
[www.searchinc.com](http://www.searchinc.com)

**Sphere 3 Environmental, Inc.**  
Marc Tiemann, RPA  
1501 Bill Owens Parkway  
Longview, TX 75604  
Phone (903) 297-4673  
Fax (903) 297-4675  
[Tiemann@sphere3environmental.com](mailto:Tiemann@sphere3environmental.com)  
[www.sphere3environmental.com](http://www.sphere3environmental.com)

**Surveys Unlimited  
Research Associates, Inc.**  
Dr. Malcolm K. Shuman  
P.O. Box 14414  
2931 Government Street  
Baton Rouge, LA 70898-4414  
Phone (225) 381-8201  
(225) 346-8072  
Fax (225) 381-8206  
[mkshuman@surainc.com](mailto:mkshuman@surainc.com)

**Tejas Archaeology**  
R.J. Bo Nelson  
344 CR 4154  
Pittsburg, TX 75686  
Phone (903) 856-5291  
[RboNelson@aol.com](mailto:RboNelson@aol.com)

**University of Louisiana Lafayette  
Department of Sociology and  
Anthropology**  
Dr. Mark A. Rees  
P.O. Box 40198  
Lafayette, LA 70504-0198  
Phone (337) 482-6045  
Fax (337) 482-5374  
[markrees@louisiana.edu](mailto:markrees@louisiana.edu)

**University of Tennessee  
Archaeological Research  
Laboratory**  
Department of Anthropology  
Dr. Boyce Driskell  
Dr. Elizabeth DeCorse,  
Dr. Kandace D. Hollenbach  
Room 237, Middlebrook Building  
Knoxville, TN 37996-0060  
Phone: (865) 974-6525  
Fax: (865) 946-1883  
<http://archaeology.as.utk.edu>  
[bdriskel@utk.edu](mailto:bdriskel@utk.edu)  
[ekellard@utk.edu](mailto:ekellard@utk.edu)  
[kdh@utk.edu](mailto:kdh@utk.edu)

**URS Corporation\***  
Martin Handly  
Roaber Lackowicz  
7389 Florida Blvd, Ste 300  
Baton Rouge, LA 70806  
Phone (225) 922-5700  
Fax (225) 922-5701  
[Martin\\_handly@urscorp.com](mailto:Martin_handly@urscorp.com)  
[Rob\\_lackowicz@urscorp.com](mailto:Rob_lackowicz@urscorp.com)

**Weaver & Associates, LLC**  
Guy Weaver  
Jeremy Blazier  
Nicole Palmer  
2563 Broad Avenue  
Memphis, TN 38112  
Phone (901) 452-7554  
Fax (901) 452-7803  
[www.weaverassociatesllc.com](http://www.weaverassociatesllc.com)

**Westwood Professional Services,  
Inc.**  
Dean T. Sather, M.A., RPA  
Steven J. Blondo, M.A.  
7699 Anagram Drive  
Eden Prairie, MN 55344  
Phone (952) 937-5150  
[Dean.Sather@westwoodps.com](mailto:Dean.Sather@westwoodps.com)  
[Steven.Blondo@westwoodps.com](mailto:Steven.Blondo@westwoodps.com)

**William Self Associates, Inc.**  
James Karbula, PhD  
16238 Highway 620, Ste F-400  
Austin, TX 78717  
Phone (512) 394-7477  
Fax (512) 527-3078  
[jkarbula@williamself.com](mailto:jkarbula@williamself.com)

\* Capable of Underwater  
Archaeological Investigations

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June 15, 2009

Mr. Donald W. Maley  
Vice-President  
Lake Charles Cogeneration, LLC  
1330 Post Oak Boulevard  
Suite 1600  
Houston, TX 77056

**Re: Field Assessment of Archaeological Site 16CU29, Lake Charles Gasification Facility, Lake Charles Cogeneration, LLC, Westlake, Calcasieu Parish, Louisiana.**

Dear Mr. Maley:

URS was retained to conduct a Phase I cultural resources survey within the immediate vicinity of archaeological Site 16CU29, identified previously by Earth Search, Inc. in 2001. Smith et al. (2001:26, 36) indicated that intact portions of the *Rangia* shell midden associated with Site 16CU29 potentially extended from the southeast corner of the Citgo Petroleum Corporation property into the southwest corner of the proposed Lake Charles Gasification Facility, Lake Charles Cogeneration, LLC, Westlake, Calcasieu Parish, Louisiana (Figure 1).

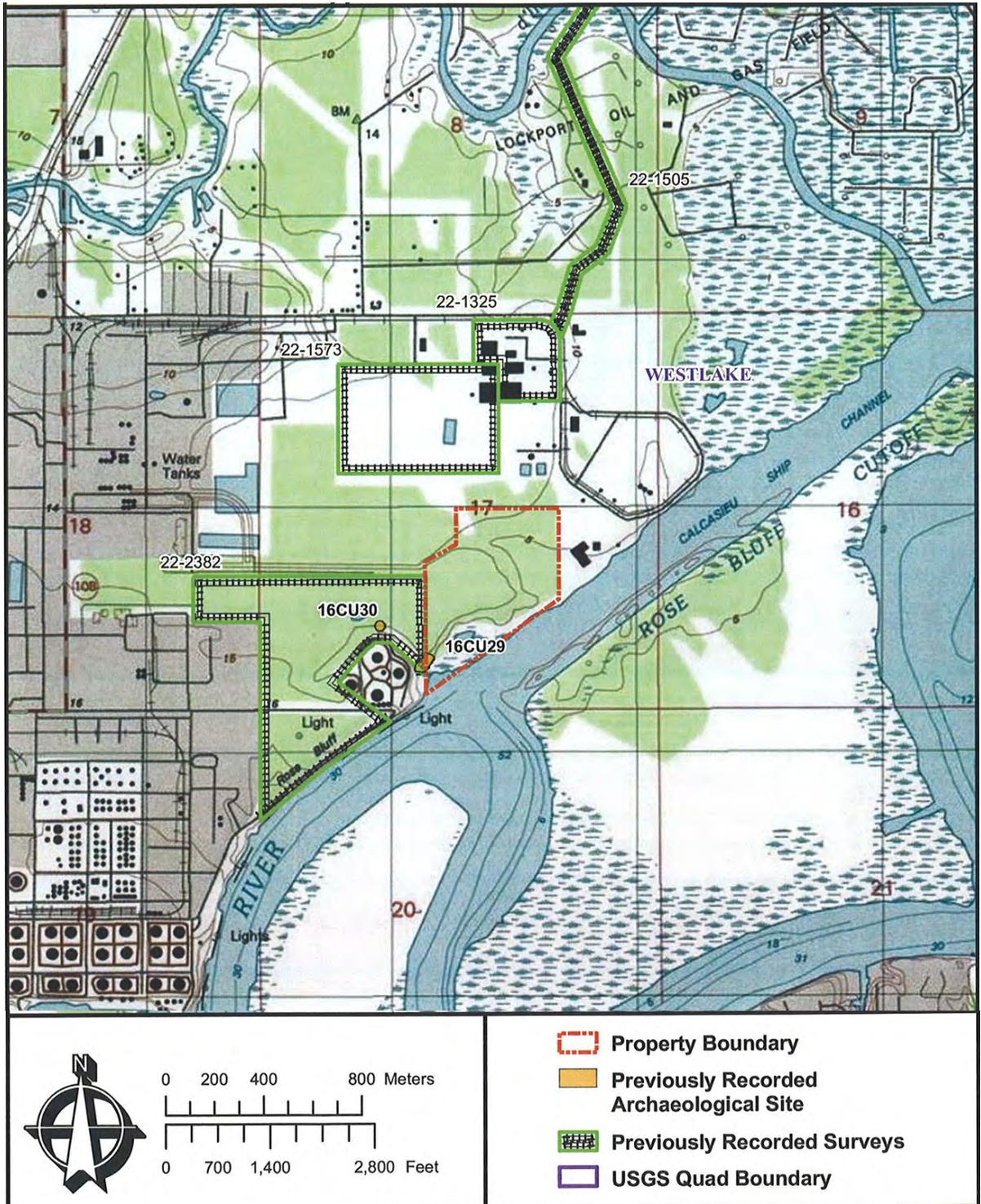
That portion of Site 16CU29 located on the Citgo Petroleum Corporation property was considered not eligible for listing on the National Register of Historic Places (NRHP). Smith et al. (2001), however, indicated that the eastern portion of the site might contain intact archaeological deposits that could potentially be considered eligible for listing in the NRHP. The purpose of this current Phase I cultural resources survey was therefore to ascertain whether intact archaeological deposits associated with Site 16CU29 extended onto the Lake Charles Gasification Facility property and, if they did, whether those cultural deposits would be considered eligible for listing in the NRHP. The cultural resources survey was conducted between June 8 and 9, 2009. Mr. Martin Handly (M.A., R.P.A.) served as Principal Investigator for this project. Mr. Hilary Dafoe (B.A.) was the Crew Chief assigned to this project; Ms. Mary Sandell (B.A.) aided him in the field effort. Ms. Lauren Bair (B.A.) conducted the laboratory analysis of the recovered prehistoric ceramics and Mr. Shane Poche (B.A.) prepared the graphics that appear within this letter.

#### Landform and Soil

The lower reaches of the Calcasieu River near the project area appear to have stabilized approximately 2,500 to 3,500 years ago (Roy and Midkiff 1988:98-99). Prior to the excavation of the Calcasieu Ship Channel in the 1920s through Rose Bluff, it appears that Site 16CU29 would have been located on the west (descending) bank of the Calcasieu River. The site area is characterized by the Mowata-Vidrine silt loam soils which are level, poorly drained sediments positioned on broad flats along the Gulf Coast Prairie in Calcasieu Parish (Roy and Midkiff 1988:38-40). The Mowata soils are associated with the broad flats adjacent to the Calcasieu River. The Vidrine soils occur on small convex ('pimple') mounds, rising approximately 1 to 2 m (3.3 to 6.6 ft) above the flats; these generally circular mounds can extend anywhere from 15.2 to 45.7 m (50 to 150 ft) across. Site 16CU29 appears to be positioned on top of a slightly elevated 'pimple mound' that is located in the southwest corner of the proposed Lake Charles Gasification Facility property. This area also appears to have been heavily impacted by storm surge associated with Hurricanes Rita (2005) and Ike (2008), as represented by the significant amount of debris that was deposited in the project area.

URS Corporation  
7389 Florida Blvd., Suite 300  
Baton Rouge, LA 70806  
Tel: 225.922.5700  
Fax: 225.922.5701  
www.urscorp.com

Figure 1. Location of Lake Charles Gasification Facility, Lake Charles Cogeneration, LLC, Westlake, Calcasieu Parish, Louisiana. Note locations of Sites 16CU29 and 16CU30.



**Cultural Resources Background**

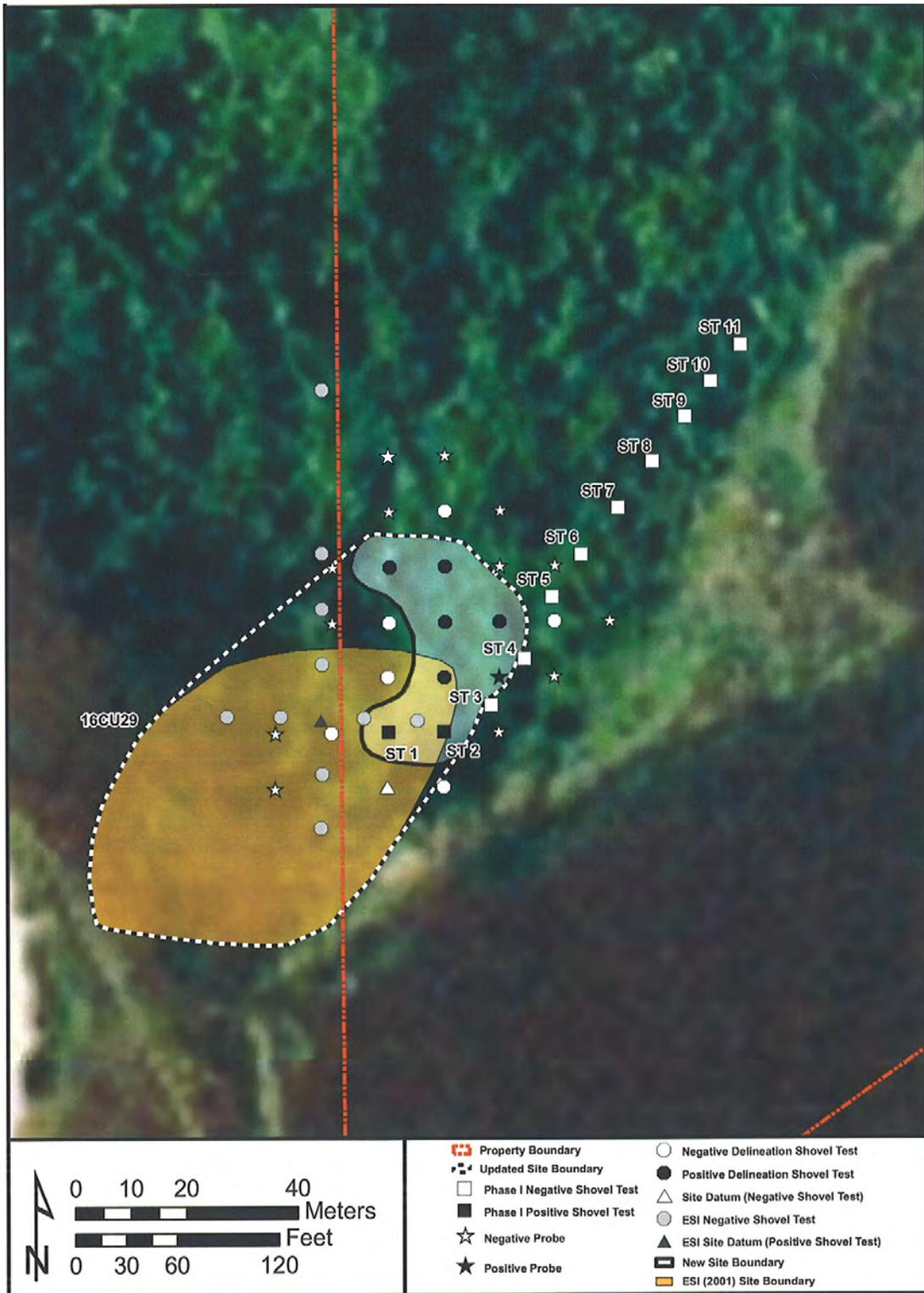
Four cultural resources surveys have been completed within 0.5 mi (0.8 km) of Site 16CU29 (Table 1). Three of these surveys were associated with industrial developments along the west (descending) bank of the Calcasieu River, while the final survey was completed for a chlorine pipeline corridor. Over 110 hectares (270 acres) of land was systematically surveyed for these four cultural resources surveys and two (2) archaeological sites were identified (Smith et al. 2001; see below).

**Table 1: Previously Completed Cultural Resources Surveys located within 0.5 mi (0.8 km).**

<b>Report Number</b>	<b>Title (Author)</b>	<b>Results</b>
22-1325	<i>Cultural Resource Survey of the Proposed NL Chemicals Property, Calcasieu Parish, Lake Charles, Louisiana, WSNCo Project No. 87255</i> (Frank 1988)	A Phase I cultural resources survey was conducted for the proposed 40-acre NL Chemicals Property. The project area lies on the west ascending bank of the Calcasieu Ship Channel. The survey consisted of pedestrian survey and judgmental shovel-testing program on several ‘pimple’ mounds located in the project area. No cultural materials were recovered.
22-1505	<i>Level II Cultural Resources Survey of a Proposed Chlorine Pipeline, Calcasieu Parish, Louisiana</i> (Shuman 1990)	A Phase I cultural resources survey was conducted for a 3-mile long 6-inch diameter chlorine pipeline. No further additional cultural resources studies were recommended, but monitoring was advised for any locations that required deep drilling.
22-1573	<i>Cultural Resource Survey of the Proposed Kronos Louisiana, INC. Calcasieu Parish, Louisiana, WSNCo Project No. 91183</i> (Frank 1991)	A Phase I cultural resources survey was conducted for the proposed 110-acre Kronos Louisiana Property. The project area lies on the west ascending bank of the Calcasieu Ship Channel. The survey consisted of pedestrian survey and judgmental shovel testing on ‘pimple’ mounds encountered in the project area. Monitoring was recommended, but no cultural materials were recovered.
22-2382	<i>Intensive Cultural Resources Survey Citgo Petroleum Corporation, Lake Charles Refinery, Calcasieu Parish, Louisiana</i> (Smith et al. 2001)	A Phase I cultural resources survey was conducted for the proposed 120-acre CITGO oil refinery. The project area lies directly west of the Calcasieu River, and at the southern extent of the Calcasieu Shipping Channel. Based on the results of the survey and site delineation, both Sites 16CU29 and 16CU30 were recommended for avoidance and additional testing of Site 16CU29 was recommended for the portions that extended to the east (outside) of their project area.

Site 16CU29, initially measured 70 by 55 m (230 by 180 ft) in extent, was identified in the southeast corner of the Citgo Petroleum Corporation property, but appeared to extend into the southwest corner of the proposed Lake Charles Gasification Facility project area (Figures 1 and 2; Smith et al. 2001:26-33). The site was initially identified by an extensive *Rangia* shell midden located near the toe of a low ridge that terminated near the bank of the Calcasieu Ship Channel. The shell midden was clearly represented along the shoreline and ranged between 20 and 30 cm (8 and 12 in) in thickness; the *Rangia* shell also appeared to be wave-washed and redeposited (Smith et al. 2001:28, 36). Eleven shovel tests were placed on the slope above the exposed bankline that displayed the intact shell midden. Of this number, only one shovel test contained cultural material, consisting of a single ceramic sherd of Baytown Plain, *var. unspecified* (Phillips 1970), dated from ca. 100 B.C. to A.D. 700. Based on the presence of the exposed shell midden along the Calcasieu Ship Channel bankline, it was suggested by Smith et al. (2001:36) that intact cultural materials might be represented to the east of the Citgo Petroleum Corporation property; however, the portion of Site 16CU29 located within the Citgo property was considered not eligible for listing in the NRHP.

Figure 2. Map of Site 16CU29 identifying 2001 and 2009 investigations.



Historic Site 16CU30 was also identified on the Citgo Petroleum Corporation property, approximately 240 m (787 ft) to the northwest of Site 16CU29 (Figure 1). The site measured 15 by 40 m (49 by 131 ft) in extent and was comprised of the remnants of a double fireplace surrounded by chimney rubble (Smith et al. 2001:26-33). Within the chimney rubble, ironstone and whiteware ceramic sherds, glass shards, square and wire nails, and animal bone were recovered; in addition, two of the 14 shovel tests contained pearlware and ironstone ceramic sherds and glass shards. The manufacturing dates associated with these items indicated that the site was associated with an occupation from the early nineteenth century through to the early twentieth century; the recoveries suggested to Smith et al. (2001) that the site represented a historic residential structure. The site was considered eligible for listing in the NRHP based on the limited information associated with historic period homesteads along the Calcasieu River (Smith et al. 2001:36).

#### Field Investigation Methods

Visual inspection of the Calcasieu Ship Channel bankline was implemented during boat access to the site area; however, no evidence of the *Rangia* shell midden was noted during this visual inspection. Water levels were fairly high at the time of the site visit, however. Pedestrian survey transects were attempted within the site area upon landing, but the thickness of the vegetation precluded a systematic inspection of the ground surface at Site 16CU29 (Figure 3). During the delineation shovel testing effort (discussed below), evidence of *Rangia* shell was noted on the ground surface near several of the shovel tests locations (Figure 4).

A site datum was established near the GPS point used by Smith et al. (2001) as their datum for Site 16CU29 (Figure 2). Shovel tests within the previously identified site area were oriented in a cruciform pattern and they were excavated until two (2) negative shovel tests and/or soil probes were encountered. This process served to delimit the horizontal boundaries of the site. When cultural materials were encountered, then the base of the shovel test excavation was extended to at least 20 cm (8 in) beneath the last occurrence of cultural materials; this functioned to define the vertical boundaries of the site. To ensure that any potential cultural materials located to the east of the known site area were identified, a single shovel test transect was also placed 20 m (66 ft) to the northwest of the Calcasieu Ship Channel, parallel to the bankline; these shovel tests were spaced 10 m (32.8 ft) apart.

Shovel tests displayed an average excavated diameter of 30 cm (12 in) and they were excavated to between 50 and 60 cm (20 and 24 in) below surface (bs) to sterile subsoil, unless water was encountered. All shovel tests were excavated according to their natural or cultural stratigraphy and all excavated soils were screened through ¼-inch mesh. Hand-sorting and visual examination was used when extremely wet or compact clayey soils were encountered. Typical Munsell soil charts were used to describe soil color and standard soils nomenclatures were used in the description of the excavated sediments associated with each shovel test. All of the excavated shovel tests were backfilled immediately upon completion of the excavation. In addition, soil probes were also utilized to determine the presence or absence of *Rangia* shell beyond the boundaries of the shovel testing effort; these probes were also spaced at 10 m (33 ft) intervals. A total of 22 shovel tests and 14 probes were excavated during the systematic assessment of Site 16CU29.

An Xplore Tablet PC in conjunction with a Trimble Pro-XT antenna with sub-meter accuracy was used by URS to record the beginning and endpoint of shovel test transects (i.e., BOT and EOT) and selected shovel test locations. Shovel test information was collected on standardized survey forms, with digital photographs taken of all survey areas to document current conditions. A detailed pace-and-compass site map for all encountered cultural resources was also produced.

Figure 3. Overview of Site 16CU29 near the Calcasieu River shoreline, facing west.  
Note tank farm in background.



Figure 4. Close-up of surface scatter of *Rangia* shell, Site 16CU29, Shovel Test 1030N, 1010E.



### Cultural Resources Survey Results

At the time of the field inspection, the landform containing Site 16CU29 was covered with regenerating forest and a thick understory; evidence of storm surge was represented by redeposited debris throughout the project area. Twelve shovel tests and 14 soil probes were placed on the 10 m (33 ft) delineation grid to define the boundaries of the previously recorded site within the Lake Charles Gasification Project area. A typical shovel test encountered in the site area displayed three strata in profile. Stratum I extended to 10 cmbs (4 inbs) and it was described as a dark gray (10YR 4/1) silty loam. Beneath this was Stratum II, a 10 cmbs (4 inbs) thick deposit of dark brown (10YR 3/3) silty loam. Where represented in the site area, the lens of variably thick *Rangia* shell would have been located beneath Stratum II and above Stratum III. Stratum III contained a reddish brown (5YR 4/3) clay mottled with a yellow (2.5Y 8/6) silty clay that terminated between 20 and 24 inbs (50 and 60 cmbs).

Six of the seven shovel tests and a single soil probe encountered a variably thick (10 to 40 cm [4 to 16 in]) lens of *Rangia* shell. The last shovel test (1030N, 1010E) recovered two small, fragmentary ceramic sherds of Baytown Plain, *var. unspecified* (Phillips 1970) within the center of the shell midden. These sherds were recovered from between 15 and 35 cmbs (6 and 14 inbs). This delineation shovel test is located approximately 30 m (99 ft) to the northeast of the 2001 shovel test that contained a comparable ceramic sherd of Baytown Plain, *var. unspecified*. The current shell midden deposit appears roughly kidney-shaped and it is positioned to the northeast of the previously defined boundary of Site 16CU29. The site area within the Lake Charles Gasification Project area appears to measure 30 by 40 m (99 by 131 ft) in extent. When combined with the previously defined boundary described by Smith et al. (2001), Site 16CU29 appears to be aligned along a northeast-southwest axis and measures 45 by 95 m (148 by 312 ft) in extent, representing 0.43 hectares (1.1 acres).

To ensure that no additional cultural materials were located to the east of the recently defined boundaries of Site 16CU29, a single shovel test transect was oriented northeast-southwest, paralleling the Calcasieu Ship Channel and the approximate axis of the known site. Eleven shovel tests were spaced at 10 m (33 ft) intervals along this transect. Of this number, only the two that fell within the boundaries of Site 16CU29 displayed a *Rangia* shell lens; no further cultural materials were encountered along this northeastern transect.

### Management Recommendations

Smith et al. (2001) suggested that intact cultural materials might be located to the east of the Citgo Petroleum Corporation property associated with Site 16CU29. They recommended that “(a)dditional testing should be undertaken to determine the NRHP status of the indeterminate portion of 16CU29 that extends outside of the APE (Area of Potential Effects)” (Smith et al. 2001:36).

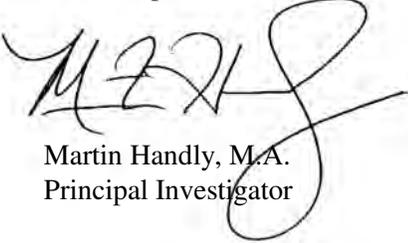
The current Phase I cultural resources survey was successful in relocating Site 16CU29; however, the integrity of the site appears to have changed since the 2001 investigations. A shovel test placed immediately adjacent to the 2001 shovel test containing the single prehistoric ceramic sherd failed to locate any *Rangia* shell and/or cultural materials. In addition, ST1 and ST2 (Figure 2), associated with the northeast-southwest transect, were positive for *Rangia* shell deposits; these two shovel tests were located immediately adjacent to two shovel tests that were negative for shell in 2001. Finally, the extensive shell midden that was noted in the southeast corner of the Citgo Petroleum Corporation property was not observed during the current field investigation. Given the above, it would appear that the shell midden noted in 2001 has been eroded and/or redeposited from that portion of Site 16CU29 (possibly as a result of hurricane storm surges over the last four years).

Although shell midden deposits are present in the center of the newly defined extent of Site 16CU29, the intensive subsurface testing program initiated during the site delineation process suggests that the site has been disturbed and displays very low artifact densities. This would indicate that Site 16CU29 lacks depositional integrity and has limited research value. URS recommends that Site 16CU29 does not possess those qualities of significance as identified by the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]). The site should not be considered eligible for listing in the NRHP and no additional assessment of this site is warranted.

If you have any questions or concerns with the above recommendations, please do not hesitate to contact me at (225) 276-4826.

Sincerely,

URS Corporation



Martin Handly, M.A.  
Principal Investigator

## References Cited

- Frank, J.  
1988 *Cultural Resource Survey of the Proposed NL Chemicals Property, Calcasieu Parish, Lake Charles, Louisiana, WSNCo Project No. 87255.* Report No. 22-1325, on file, Louisiana Division of Archaeology, Baton Rouge, Louisiana.
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2001 *Intensive Cultural Resources Survey - Citgo Petroleum Corporation, Lake Charles Refinery, Calcasieu Parish, Louisiana.* Report No. 22-2382, on file, Louisiana Division of Archaeology, Baton Rouge, Louisiana.

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MITCHELL J. LANDRIEU  
LIEUTENANT GOVERNOR

**State of Louisiana**  
OFFICE OF THE LIEUTENANT GOVERNOR  
DEPARTMENT OF CULTURE, RECREATION & TOURISM  
OFFICE OF CULTURAL DEVELOPMENT

PAM BREAUX  
SECRETARY

SCOTT HUTCHESON  
ASSISTANT SECRETARY

June 26, 2009

Mr. Niels Larsen  
LA Department of Environmental Quality  
Permits Application Administrative Review Group  
Permit Support Services Division  
Office of Environmental Services  
P.O. Box 4313  
Baton Rouge, LA 70821-4313

Re: Lake Charles Gasification Facility  
Lake Charles Cogeneration LLC  
Agency Interest No. 160213  
Activity No. PER20090001  
Lake Charles, Calcasieu Parish, LA

Dear Mr. Larsen:

Reference is made to our letter dated March 9, 2009 (copy enclosed), in which we informed your agency that a Phase I survey had been requested of the proposed Lake Charles Gasification Facility, due to the presence of a recorded archaeological site (16CM29) within the project boundaries. We asked that issuance of the LPDES permit be withheld pending review of the survey results by the State Historic Preservation Office.

Please be advised that we are in receipt of documentation dated June 9, 2009, concerning the archaeological site assessment made of site 16CU29 by URS (copy enclosed). Field investigations resulted in the delineation of expanded boundaries for this site and the assessment that the site was not eligible for listing on the National Register of Historic Places due to a lack of depositional integrity and limited research potential. As we concur with this assessment, additional investigations are not warranted. Consequently, we have no objection to issuance of the LPDES permit.

Mr. Niels Larsen  
June 26, 2009  
Page 2

Should you have any questions concerning our comments, do not hesitate to contact Duke Rivet in the Division of Archaeology at (225) 219-4598 or be e-mail at [drivet@crt.state.la.us](mailto:drivet@crt.state.la.us).

Sincerely,



Scott Hutcheson  
State Historic Preservation Officer

SH:DR:s

Enclosures: as stated

c: Mr. Martin Handly  
URS Corporation  
7389 Florida Blvd., Suite 300  
Baton Rouge, LA 70806

# DRAFT REPORT

November 21, 2011

A Phase I Cultural Resources Survey of the Proposed Lake Charles Pipeline Lateral Project Located near Sulphur, Calcasieu Parish, Louisiana

**OAR PROJECT NUMBER: 11-144**  
**CH2M HILL PROJECT: 413754.01.SV.CU**  
**CH2M HILL PURCHASE ORDER NO. 941464**

PERFORMED FOR: CH2M HILL  
1000 Abernathy Road, Suite 1600  
Atlanta, Georgia 30328  
Attn: Mr. Jason Wallace

PERFORMED BY: Joel H. Watkins, Cultural Resources Analyst  
John F. Lieb, Cultural Resources Assistant  
Daryll R. Berryman, Cultural Resources Assistant  
Donald L. Brown, Cultural Resources Assistant  
The University of Alabama  
Office of Archaeological Research  
13075 Moundville Archaeological Park  
Moundville, Alabama 35474

DATE PERFORMED: April 18-22, May 10-13, June 8-10,  
August 31-September 2, 2011

---

Joel H. Watkins  
Cultural Resources Analyst  
Office of Archaeological Research

---

Eugene M. Futato RPA/Deputy Director  
The University of Alabama  
Office of Archaeological Research

# DRAFT REPORT

## ABSTRACT

The University of Alabama, Office of Archaeological Research recently conducted a Phase I cultural resources survey of the proposed Lake Charles Pipeline Lateral Project in Calcasieu Parish, Louisiana. The proposed pipeline project consists of a main route approximately 11 miles (17.7 km) in length, a series of five temporary work areas (TWA) ranging from one to four acres in size (.4 to 1.6 ha), and a 0.5 acre (.2 ha) meter station. Also included are eight access roads, although only three are not fully paved or gravel topped. The pipeline has a 200 ft (61 m) environmental survey width along the entire corridor except where encroached by an existing railroad right-of-way.

Background research for the pipeline project was conducted online with the Louisiana Division of Archaeology (LDOA) Archaeological Database, and at the LDOA offices, located in Baton Rouge, Louisiana. The results of the background research showed six prerecorded historic associated sites located within a general 0.5 mile radius of the project corridor, although none will be impacted as they are all well away from the project corridor. The National Register of Historic Places (NRHP) and related supplements for Louisiana list no properties or historic structures within a one mile radius of the project corridor.

The field survey was conducted during the periods April 18-22, May 10-13, June 8-10, and August 31-September 2, 2011. The survey corridor, as well as the TWAs, access roads, and meter station site were walked over and a combination of surface observation and shovel testing was utilized for testing methodology. As a result, one site, Site 16CU73, has been added to the Louisiana State Site File. Based on the sparse material recovery, absence of any structural features and undetermined historic validity of the material recovered, the site is not considered significant, and no further testing is recommended. In addition, one modern cemetery (Hardey Cemetery) was also found to be within the proposed pipeline corridor and will be avoided by using the Horizontal Directional Drill technique beneath the site to avoid any impact to the two burials present.

As a result of this project, it is recommended that the proposed pipeline, associated TWAs and access roads, be cleared from a cultural resources perspective, with the understanding the Hardey Cemetery will be directionally drilled beneath to avoid impact.

# DRAFT REPORT

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## DRAFT REPORT

### *A Phase I Cultural Resources Survey of the Proposed Lake Charles Pipeline Lateral Project Located in Calcasieu Parish, Louisiana*

Joel H. Watkins

#### *Introduction*

The University of Alabama, Office of Archaeological Research (OAR) was contracted by Denbury Offshore, Inc. c/o CH2M Hill to perform a Phase I cultural resources survey for the proposed Lake Charles Lateral Pipeline Project (Appendix B). The pipeline is situated entirely within Calcasieu Parish, oriented north-south between the towns of Lake Charles to the east and Sulphur to the west. Included in the project scope of work is approximately 11 miles (17.7 km) of pipeline right-of-way (ROW), with a general environmental survey width of 200 ft (61 m), narrowing to 150 ft (48 m) along an approximately 1.2 mile (1.9 km) segment due to an existing railroad line ROW that parallels the proposed pipeline corridor along the eastern side in this area. Included in the survey is one short alternate route of less than .4 mi (.6 km) close to the Hwy 90 crossing. Also included in the survey is a proposed 0.5 acre (.2 ha) meter station site at the northern terminus of the pipeline, where it will tie-in to an existing pipeline. In addition several temporary work area/equipment storage yard sites (TWA) along the corridor were surveyed. These sites range in size from four acres to less than one acre, and include a few long, linear TWA's for pipe storage during directional drilling operations. The final aspect of the project involves a series of eight access roads leading to the proposed pipeline ROW. The total project survey area is equivalent to approximately 286 acres (115.7 ha). Joel H. Watkins (Cultural Resources Analyst/Field Director), John F. Lieb (Cultural Resources Assistant), Daryll R. Berryman (Cultural Resources Assistant) and Donald L. Brown (Cultural Resources Assistant) conducted the survey during the periods April 18-22, May 10-13, June 8-10, and August 31-September 2, 2011 to locate and identify any archaeological sites or historic standing structures with potential for impact as a result of this project. The Principal Investigator for the survey is Eugene M. Futato, RPA/Deputy Director of OAR.

The research design of the Phase I survey is to locate and identify any archaeological sites or historic standing structures within the survey boundaries, assess their significance, and provide recommendation with regard to guidelines set forth by the *National Register of Historic Places* (NRHP). Included in this report is a discussion of the environmental setting of the survey area, a literature search of any sites within or near the survey area, a description of field and laboratory methods, the results of the cultural resources reconnaissance, and conclusions and recommendations based on the findings of this survey.

DRAFT REPORT*Environmental Setting*

The proposed pipeline route is approximately 11 mi (17.7 km) in length and has an environmental survey width of 200 ft (61 m) along a majority of the route. The origin point of the pipeline can be seen on the USGS 7.5' Westlake, Louisiana topographic quadrangle in the NW ¼ of the SE ¼ of the SE ¼ of Section 17, T10S, R9W. The pipeline will originate just north of the Calcasieu Ship Channel where an industrial plant will be built. Plans are to directionally drill beneath an existing chemical plant that sits just to the north of the origin point and emerge on the north side of the plant, north of Bayou d'Inde Road. The pipeline then bears roughly north, then northwest and finally west, primarily aligned adjacent to a series of existing transmission line, pipeline, railroad, and roadway corridors. The pipeline will terminate at a proposed 0.5 acre (.2 ha) meter station tie-in located adjacent to the north side of Bankins Road. The terminus point of the pipeline can be seen on the USGS 7.5' Buhler, LA topographic quadrangle in the SE ¼ of the NE ¼ of the NE ¼ of Section 35, T8S, R10W. Also included are a series of temporary equipment/pipe storage yards associated with the project. These sites are situated at strategic locations along the corridor and range in size from four acres (1.6 ha), to less than one acre (.4 ha) (Figures 1-5).

Of the eight access roads, five consist of either paved or gravel topped roads that extend directly to or across the proposed pipeline corridor (AR 1, 4, 5, 7, 8). These roads were surveyed, although they will receive little modification to the existing roadbed. The three remaining access roads will necessitate some modification to allow for heavy machinery/truck access to the corridor. A description of the access roads follows:

*Access Road 1:* AR 1 is Bayou d'Inde Road - A paved residential road that becomes a grass field leading to the proposed pipeline (Figure 1).

*Access Road 2:* AR 2 is an unmodified utility road that extends west from Anthony Ferry Road for approximately 2,300 ft (701 m) out to the pipeline corridor just as it turns off of the railroad ROW alignment (Figure 4).

*Access Road 3:* AR 3 will extend south then west from Houston River Road onto the corridor (Figure 3). The initial portion is gravel topped. The access road will extend south along this road, and then continue south for less than 100 ft (30 m) onto an east-west oriented transmission line ROW. The road will turn east and follow the northern edge of the transmission line ROW for approximately 400 ft (122 m) to terminate at the pipeline corridor.

*Access Road 4:* AR 4 is PPG Industries private road, a gravel-topped road that directly accesses the pipeline (Figure 2).

*Access Road 5:* AR 5 is Pete Manena Road, a paved public road that directly accesses the pipeline (Figure 2).

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Figure 1. Topographic map showing location of project route.

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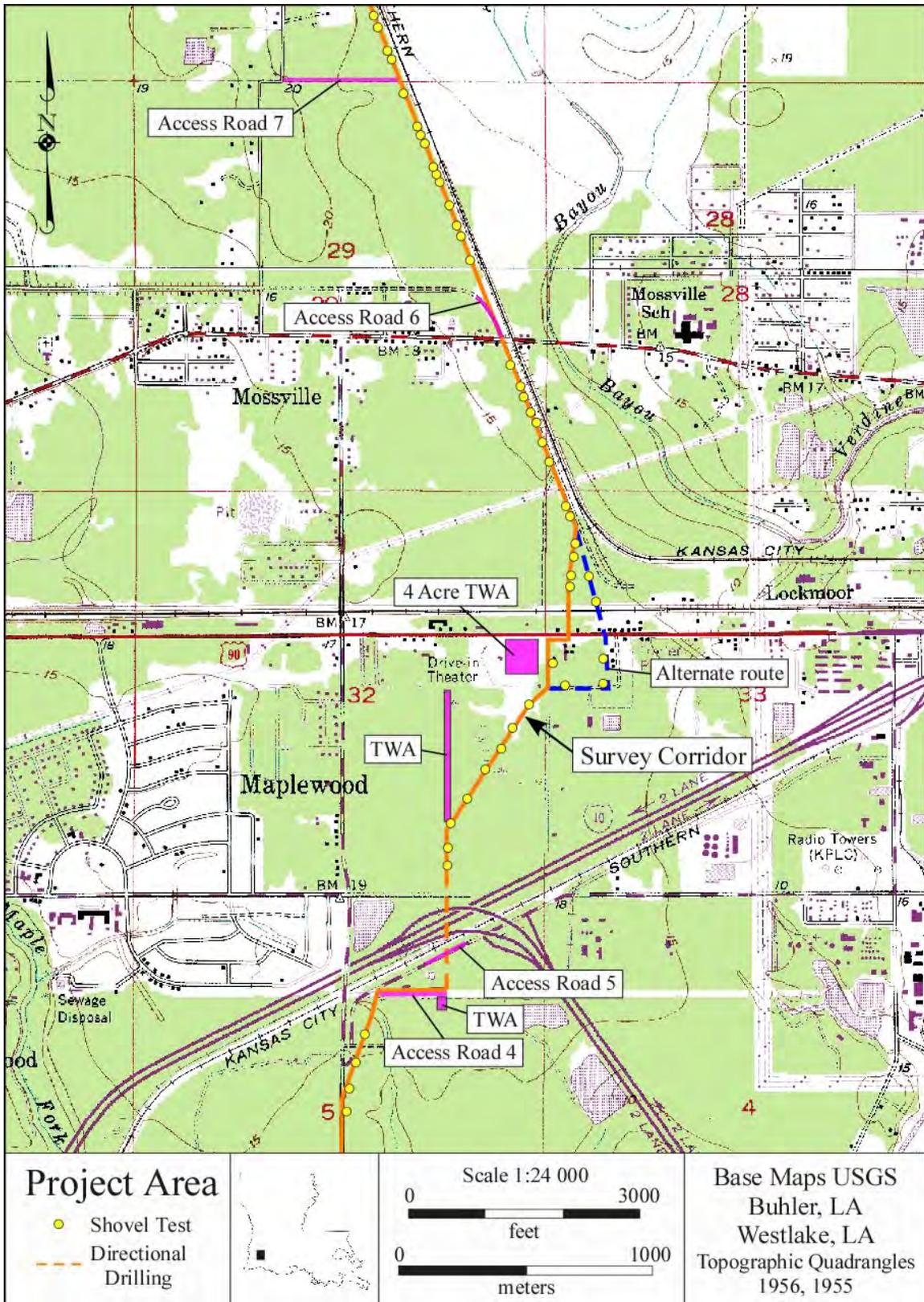


Figure 2. Topographic map showing location of project route.

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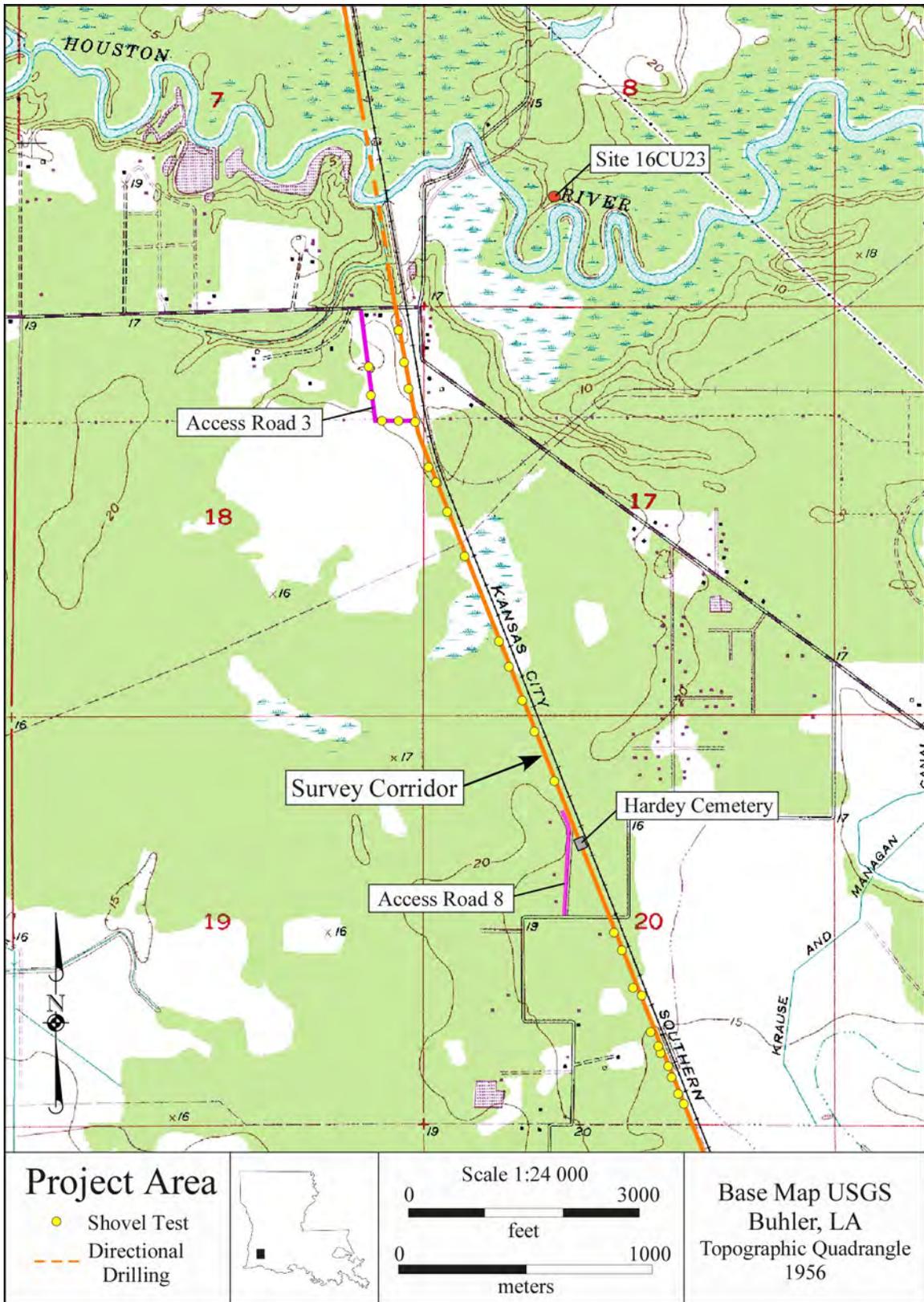


Figure 3. Topographic map showing location of project route.

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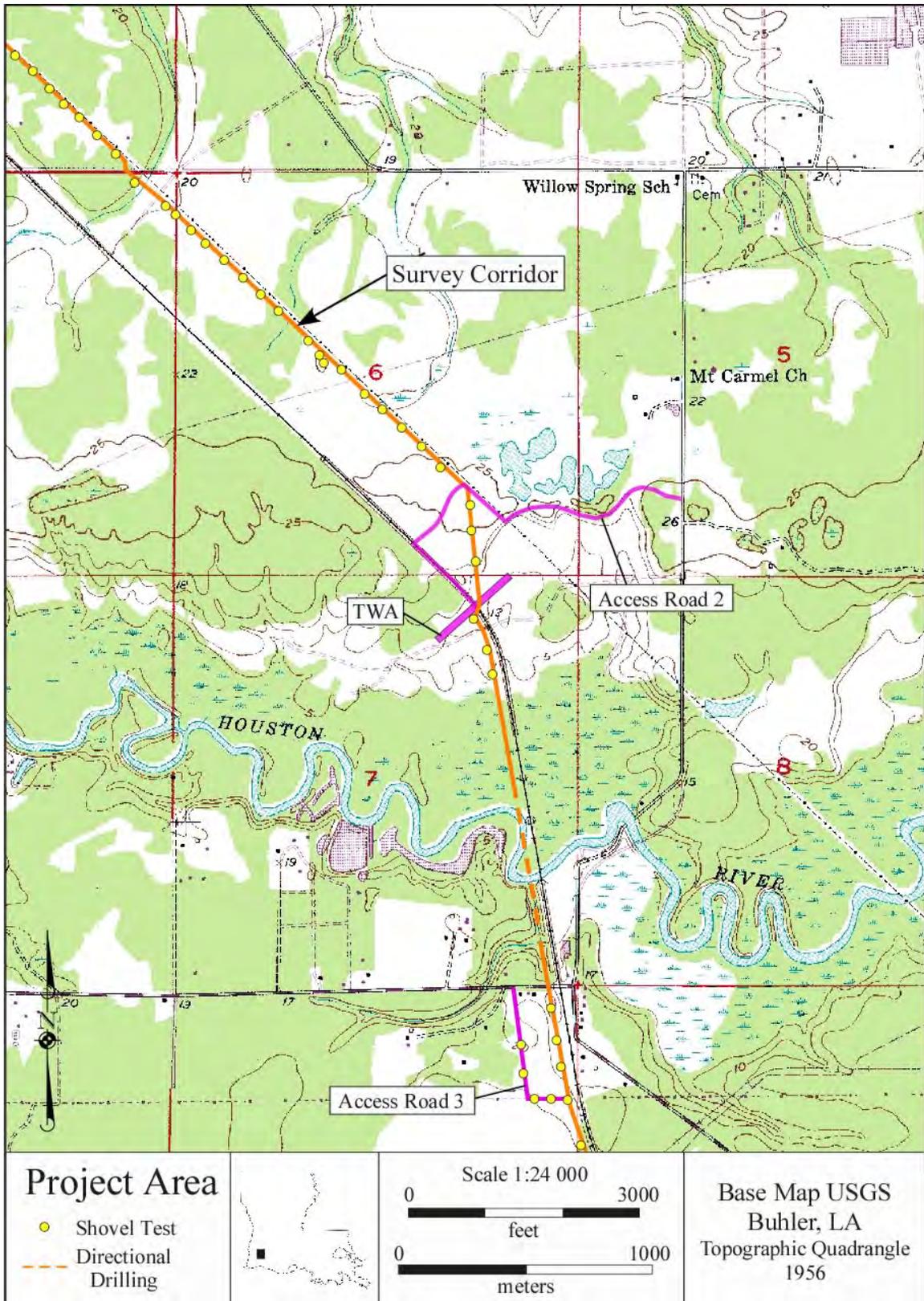


Figure 4. Topographic map showing location of project route.

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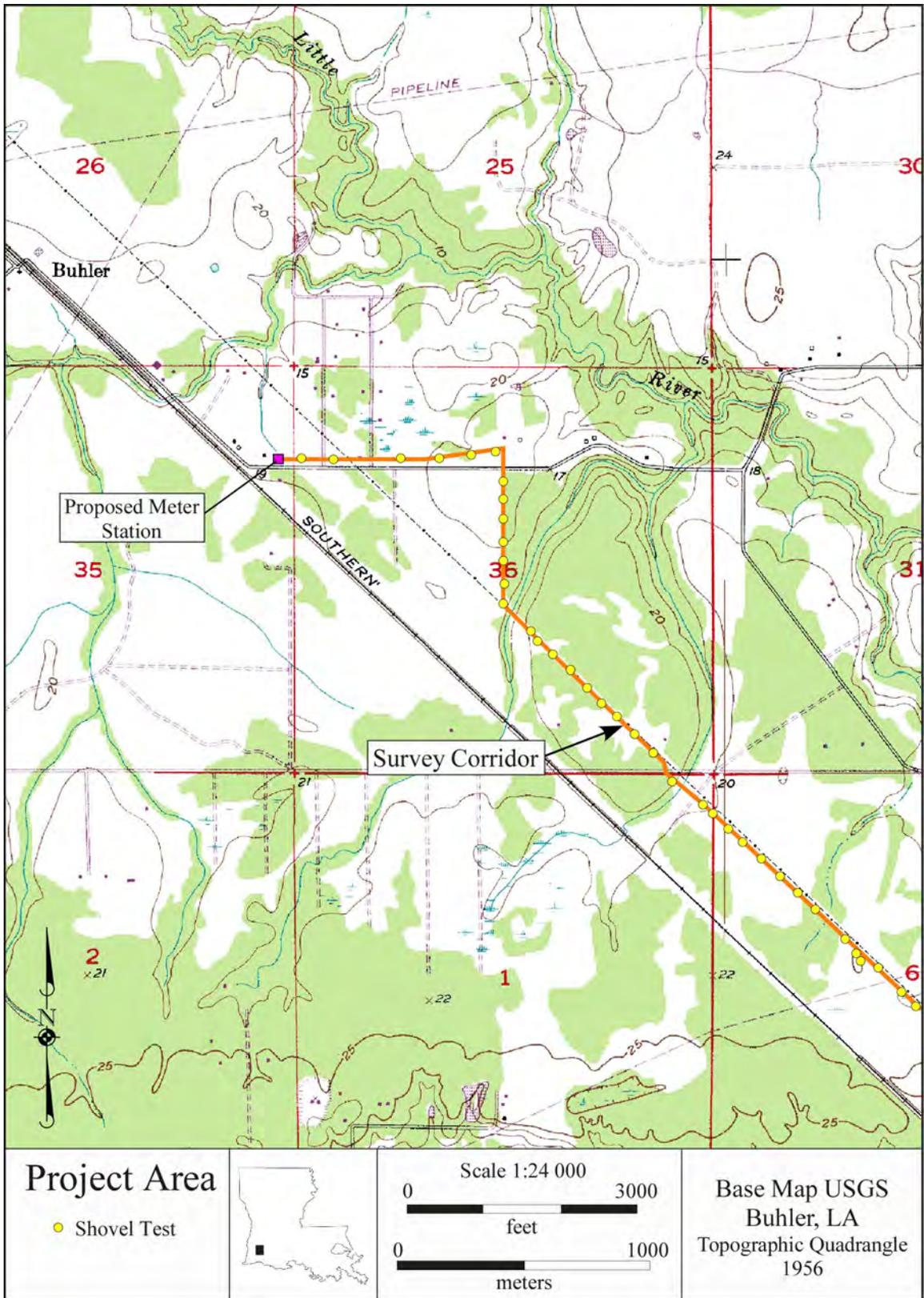


Figure 5. Topographic map showing location of project route.

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*Access Road 6.* AR 6 extends onto the pipeline from Old Spanish Trail Road (Figure 2). AR 6 is a remnant of an old railroad corridor, now with a pipeline emplaced in it. The corridor is less than 200 ft (61 m) in length and covered with grass.

*Access Road 7:* AR 7 is a gravel-topped private road that will access the pipeline directly from Evergreen Road (Figure 2).

*Access Road 8:* AR 8 is Hardey Road, a paved residential road that will access the pipeline corridor directly (Figure 3).

The survey area is located in the Northern Humid Gulf Coastal Prairies Level IV Ecoregion of the Western Gulf Coastal Plain Level III Ecoregion (Daigle et al. 2006). The Northern Humid Gulf Coastal Prairie is described as a flat coastal plain with innumerable low circular mounds (pimple mounds) and occasional low coastal ridges and indistinct relict fluvial channels. Low-gradient rivers and streams are present, some of which are channelized. Geologically, the region is formed on Quaternary (late Pleistocene) alluvial and deltaic sand, silt, clay, and gravel. Soils typical of the region include Crowley, Kaplan, Judice, Midland, Morey, Mowata, and Vidrine. On floodplains are Basile and Brule soils (Soil Survey Staff 2008). Natural vegetation includes Prairie grassland with little bluestem, big bluestem, Indiangrass, brownseed paspalum, switchgrass, and other herbaceous species. Forested areas include riparian forests or gallery forests of bottomland hardwoods. In wetter areas such as the backswamps adjoining the Houston River are cypress-gum swamps (bald cypress, water tupelo), and on less flooded zones are pecan, water oak, live oak, and elm.

### *Cultural Overview*

#### Paleo-Indian Stage 10,000 B.C. to 6,000 B.C.

This stage is not well documented in the region, due in part to changing geography, sea level rising, and shifting river courses (Jeter et al. 1989). Most Paleo-Indian artifacts have been surface collected from ridges, hills, and, occasionally, terraces or floodplain rises (Kenmotsu and Pertulla 1993). The Paleo-Indians lived in small, nomadic groups with a subsistence economy based on hunting and foraging. The stage is characterized by the use of lanceolate points with or without fluting. These points range in size from two to six inches in length with a straight or incurvate base. Point types include Clovis and Folsom, followed by transitional Paleo-Indian points such as Dalton, San Patrice, and Scottsbluff (Jeter et al. 1989).

#### Archaic Stage 6000 B.C. to 200 B.C.

The Archaic stage is marked by a change in projectile point styles and the addition of new tool types. The stage is generally divided into Early, Middle, and Late Archaic periods. In Louisiana, some researchers refer to the Archaic stage as Meso-Indian, which includes the period

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from the close of the Paleo-Indian stage to the beginnings of the Poverty Point culture (Brain 1971; Haag 1978; Neuman 1984). Regardless, the stage is typified by small nomadic groups; however, their range was becoming less extensive as they learned to more fully exploit local resources (Story et al. 1990). Innovations included the use of the atlatl for hunting and the use of fishhooks, traps, and nets for catching fish and small animals (Neuman and Hawkins 1993). In general, Archaic occupation is represented by a progression of side-notched, expanded stemmed and straight stemmed dart point types. Most Archaic sites are found primarily in the uplands and on floodplain rises (Jeter et al. 1989). Earthen mounds such as those at Poverty Point have been dated as early as this time period in Louisiana and are some of the earliest known mounds in North America (Driskell and Howard 1988). The Poverty Point culture lasted until approximately 600 B.C., when it was replaced by Tchula/Tchefuncte cultures (Webb 1968, 1970, 1982). No Poverty Point components have been identified in northwest Louisiana (Campbell et al. 1983). Poverty Point influence generally extends up the Mississippi Valley, up tributaries into the Ozarks, and into southeastern Missouri. Poverty Point is also documented in the Yazoo Basin, along the Gulf Coast of Florida, and throughout southern Mississippi (Connaway et al. 1977; Thomas and Campbell 1991).

#### Woodland Stage 200 B.C. to A.D. 1200

As with the Archaic, this stage is also generally divided into Early, Middle, and Late periods. Woodland is subsumed within the Neo-Indian era (Brain 1971; Neuman 1984). Distinctive phases or cultures for this stage have been identified for the Mississippi Valley generally based on ceramic assemblages or types. These include Early Woodland-Tchula/Tchefuncte, 600 B.C. to 100 B.C.; Middle Woodland-Marksville, 100 B.C. to A.D. 400; and Late Woodland-Baytown/Troyville/Deasonville/Coles Creek, A.D. 400 to A.D. 1200. While the hallmark types such as Tchefuncte, Coles Creek Incised, or Marksville Stamped occur at sites in this area, the most common types appear to be Goose Creek and San Jacinto variants (Springer 1979). In general, the sites lack the complex assemblages associated with the types of sites commonly found in the Mississippi River Valley.

#### Mississippian Stage A.D. 1200 to A.D. 1600

The Mississippian stage generally falls between A.D. 1200 and A.D. 1600. In the Ouachita River drainage, the Plaquemine period supplants the initial Mississippian stage further to the east, although Fuller (1985) posits the Plaquemine was rather short lived and weakly represented in this general area. This period is typified by ceramic styles similar to those of the preceding Troyville-Coles Creek period. Brushing and engraving were two new techniques used for ceramic decoration during this time. To the east, closer to the Mississippi River and eastward, began the rise of the Mississippian stage, typified by a much more varied agricultural production and construction of fortified towns, some with platform mounds used for ceremonial purposes. Also notable were well established trade networks and powerful and influential societal/tribal leadership.

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## Historic Period

While Mississippian culture flourished further to the east, in this area, the Plaquemine culture gradually gave way to the protohistoric Attakapa. Engaged in a well-defined seasonal procurement strategy, the Attakapa made full use of the Prairie Terrace and Chenier Plain resources. Attakapa material culture was predominantly utilitarian with an apparently strong basketry tradition. Weinstein and Gibson both postulate that Attakapa baskets were a prime trade item (Weinstein et al. 1979, Gibson 1976). The Attakapa remained in the area through about the first 150 years of Euro-American occupation. By the time of the Louisiana Purchase, however, their numbers had been greatly reduced, as the Euro-American population gradually but persistently increased from the late 1600s through the late 1700s.

*Literature and Document Search*

Prior to the field portion of this survey, background research for this project was conducted on-line at the Louisiana Division of Archaeology (LDOA) database website (LDOA 2011). A 0.5 mile radius along the survey corridor was utilized in a search for previously recorded archaeological sites. The resulting information shows six previously recorded archaeological sites, all historic structure sites, located within the search parameters, including north to south: Site 16CU23 (located on the north bank of the Houston River), Sites 16CU172, 16CU201, and 16CU198 (located near the Bayou d'Inde crossing), and Sites 16CU29 and 16CU30 (located along the ship channel south of the origin point). None of these sites will receive any impact as they are well away from the actual project corridor.

Research at the LDOA office in Baton Rouge for prior projects conducted in the general vicinity of the pipeline corridor showed only three surveys. Joseph V. Frank, III conducted a survey along the north bank of the Calcasieu Ship Channel, south of this project area, for a proposed industrial plant (Frank 1991) with no cultural resources discovered. Frank also conducted a survey just east of the origin point of this survey for a proposed chemical plant, again with no cultural resources discovered (Frank 1988). Finally, EMANCO, Inc. conducted a survey for a proposed railroad right-of-way, which crosses this corridor on an east-west orientation, approximately one mile south of the Houston River (Weed et al. 1993). Again, no cultural resources were discovered as a result of the project.

Also researched were early 20<sup>th</sup> century maps of the area to note the locations of any potential historic structure sites along the proposed corridor. The earliest maps located were the 1955 Sulphur, LA. and 1956 Da Quincey, LA. 7.5' topographic maps. No early soil maps, highway maps or other early 20<sup>th</sup> century maps were located. The maps reviewed showed a few structures not visible on the current map, including a cluster of buildings along the south side of Highway 90 where the proposed corridor will be located. These locations were plotted on

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topographic maps for reference during the pedestrian survey. None of the other structures visible are located within the actual survey corridor.

*Field Methods*

Field investigations consisted of a pedestrian walkover employing visual inspection of exposed surface areas and subsurface shovel testing. As required in the state of Louisiana, all shovel tests had a minimum diameter of 30 cm and were excavated to recognizable, culturally sterile subsoil. All removed soil was screened through 6 mm (¼ in) mesh screen in an effort to locate cultural materials. Soil profiles were recorded for each shovel test noting soil colors, soil textures, and depths of soil texture/color changes. A total of 197 shovel tests were excavated in the course of this survey (Figures 1-5).

Where soil was visible at the surface, initial investigations consisted of ground surface inspection. The locations included bare soil exposures along natural slopes, plowed fields, drainages, road cutbanks, road surfaces, and erosional surfaces. However, most land within the survey corridor had limited surface visibility. Where visibility of the soil surface was limited, shovel tests were excavated at 30 m intervals in those areas with a high probability of containing archaeological sites. Such high probability areas were limited in extent and consisted of landforms with relatively level settings (areas of <10% slope) and terraces adjacent to intermittent and permanent water courses. These 30 m interval methods were also limited to those settings showing an absence of disturbance from prior timber planting and harvesting activities and from erosion that has removed upper soil horizons. Lower probability areas were sampled at greater intervals ranging up to 50 m. These areas included tracts of planted pine, mechanically disturbed areas and residential/commercial lots. Slopes greater than 20 percent were only visually inspected, although due to the general low-lying environmental setting of this survey area, there is very little “excessively” sloping terrain present along the corridor. Also not shovel tested were large areas of standing water such the back swamp that abuts the Houston River, or hydric soiled, quasi-wetland areas. In these areas, shovel testing was limited to isolated rises, in particular the pimple mounds that are a unique feature in this region.

The field survey originated at the northern terminus of the pipeline along Bankins Road. While an existing station is present, a new meter station will be constructed at this location for this pipeline (Figure 6). The proposed pipeline runs east adjacent to the north side of Bankins Road, first across a series of residential lots, then through a stand of planted pine before turning to the south, extending through a secondary growth wooded area that is adjacent to an area of open pastures/farm lots to the west (Figure 7). Shovel testing in this general area showed similar soil profiles of light grey to grayish brown, powdery, silty soil, with ferrous staining and dark brown silty clay mottles, underlain by yellow-brown silty clay subsoil (Figure 8). Just south of the woods, the line turns to the southeast, now situated in secondary growth pine and hardwoods adjacent to the western edge of an existing transmission line ROW (Figure 9). Shovel tests show

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a continuation of the profiles noted above, with a grey, very fine, almost powdery consistency in the upper soil zone, becoming more mottled and hardpacked with depth. Further south, the line crosses a large, open pasture, then through more secondary growth woods, prior to reaching a large relic clearcut area. Soils continue to show the same general soil profile noted above, although in the open field, the initial color is more of a pale brown, becoming yellow-brown with depth. Very little shovel testing was utilized in the relic clearcut due to surface exposure and extensive surface impact from machinery. Soils in this area also reflected the close proximity of the river to the south, with near hydric soil profiles (pale grey damp silty clay loam mottled with rust, brown and yellow mottles) evident in a majority of the shovel tests excavated (Figure 12).



Figure 6. West view of north terminus of pipeline at proposed meter station tie-in.



Figure 7. South view of corridor set in woods to east and pasture to west.



Figure 8. Typical soil profile along this portion of pipeline route.



Figure 9. South view of transmission line ROW alignment.



Figure 10. South view of relic clearcut.



Figure 11. Southeast view of bottomland north of railroad ROW.



Figure 12. Typical bottomland soil profile.

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At this location is a somewhat linear TWA for equipment/pipe storage (Figure 4). It is oriented somewhat northeast/southwest. There are several large open areas of exposure within the TWA, which were visually inspected. As noted above, shovel testing indicated soils are quasi-hydric in profile, and few were excavated. The pipeline now turns to a more southerly orientation, aligned with the west side of a railroad ROW. The next .5 miles (.8 km) or so of the corridor is set in a standing water back swamp adjacent to the Houston River (Figure 13). The edge of the ROW along the tracks was walked and the terrain was scrutinized for any evident rises such as pimple mounds within the survey corridor, with no area noted as suitable for testing. South of the river, a small stream runs along the west side of the railway ROW within the survey corridor. No suitable terrain was located along this particular low-lying segment either. Further south, the corridor extends through an area of mixed open pastures/farmland and wooded tracts. Periodic shovel testing showed continuing, near hydric soil conditions, with soil profiles showing an average of 14 cm of light grayish-brown fine silty clay loam mottled with ferrous staining, dark brown and yellow-brown silty clay mottles, underlain by yellow-brown mottled silty clay to at least 30 cmbs (Figure 14). The terrain and soil profiles remain relatively consistent until just north of Hardey Road, where the terrain rises up slightly in elevation. A small cemetery is located within the ROW, adjacent to the east side of Hardey Road (Figure 15). The small, fenced cemetery is recent and contains two interments in small vaults. Further information is provided in the *Inventory of Cultural Resources* section of this report. South of the cemetery the corridor extends past a series of small residential lots and small wooded tracts that border the railroad ROW. The line then crosses Evergreen Road and is now still aligned with the railroad to the east, with secondary growth pine and hardwood secondary growth woods along the actual survey corridor. The terrain for the next 1.6 miles (2.5 km) is all low-lying, with evidence of periodic inundation in many areas. The main features evident along this segment are the many isolated pimple mounds that rise up from the surrounding terrain. While most are small, at less than 5 m in diameter, and less than 2 m above the surrounding terrain, others were noted as large as 30 m to 40 m in diameter, and estimated at 3 m or higher than the surrounding terrain (Figure 16). Each of the pimple mounds larger than approximately 5 m in diameter present within the corridor was tested with at least one shovel test. Larger mounds received at least two or more shovel tests depending on size. In general, the mounds showed a similar soil profile of 3 to 4 cm of dark grayish-brown humus/rootmat, underlain by 14 cm of off white to light grey, fine to powdery silt, underlain by pale yellow to pale grayish-brown, hardpacked silt (Figure 17). Other than some isolated railroad associated debris (crossties, metal fittings) on the surface of a few of the mounds, no cultural material was recovered from this segment of the pipeline.

As the corridor crosses Highway 90, the alignment extends through a more industrial setting, crossing some small wooded tracts, and running adjacent to an existing transmission line ROW. Just south of Hwy 90 is the location for a possible alternate route, less than .4 mi (.6 km) in distance. At this location is a large, wooded lot, set within an industrial setting of small businesses and manufacturing facilities. The main route will extend west along the Hwy 90 frontage for a short distance, then turn south, following the east side of Walcott Road within the wooded lot, then turning southwest, crossing Wolcott Road and aligning with an existing



Figure 13. Southwest view of swampy terrain north of Houston River.



Figure 14. Hydric soil profile in shovel test.



Figure 15. South view of Hardey Cemetery on corridor.



Figure 16. South view of pimple mound along railroad alignment.

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Figure 17. Typical pimple mound soil profile.

transmission line ROW along the northwest side. The alternate route will extend around the east side of the wooded lot, then turn west along the south side of the lot and realign with the original routing of the line. As noted on the 1955 topographic map of the area, the wooded lot had several buildings depicted at this location along the Hwy 90 frontage. A walkover of the general area within the lot indicated the area had been occupied by some structures, but none are currently standing. There is a large amount of construction/building refuse scattered within the woods. Material noted included cinderblocks, machine made brick, modern glass, roofing shingles, and metal, along with scattered household refuse. Shovel testing within the wooded lot produced only modern debris, such as bottle glass, brick fragments and rusted metal. With no evidence of historic materials present nor structural remains located, the location was not further tested. Further south, the line will be directional drilled beneath the Interstate 10 corridor. South of I-10, the line runs along the east side of Bayou d'Inde Pass Road and an adjacent pipeline ROW. The wooded setting of the pipeline is low-lying with saw palmetto, cypress, and other wetland plants present (Figure 18). Shovel testing revealed hydric soils present at the surface.

This alignment continues till the crossing at Bayou d'Inde. A long, linear TWA extends to the northeast, a short distance north of where the direction drilling recovery will occur. The terrain along the TWA is low-lying and subject to periodic inundation. Soils were hydric in profile. The pipeline drill set up will be in a partially open pasture on the south bank of the bayou. At this location, a slight rise is present in the field, with a few mature isolated hardwoods

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Figure 18. East view of drainage along north Bayou d'Inde Pass Road corridor.

present. A scatter of historic material was recovered during shovel testing in close proximity to the trees, indicative of a former house site. Approximately 20 m to the south is a partially collapsed wood framed outbuilding. Further details related to this discovery are provided in the *Inventory of Cultural Resources* section of this report.

South of the site, the pipeline corridor extends through an area of secondary growth woods, emerging at an open, transmission line corridor (Figure 19). The line will be located along the east side of the ROW. The terrain within the woods is generally low-lying with near hydric soil profiles consisting of mottled, fine to near powdery pale brown silty soils. A few isolated pimple mounds are present, which were tested if they fell within the survey corridor, although no cultural material was recovered. North of Bayou d'Inde Road, is a large TWA for use during the boring operation to the south. The soils in the field are hydric, indicative of the low-lying nature of the terrain. Plans are to drill beneath a large industrial plant that sits adjacent to the south side of the road, with the recovery operation set up at this location. South of the plant is a large open field that has been mechanically cleared and had the terrain extensively re-shaped in preparation for construction of the chemical plant that will produce the carbon dioxide this pipeline will transport (Figures 20-21). This is the origin point of the pipeline, where the drill set up will be. The general surface is void of any vegetation. No shovel testing was conducted in this general area due to the extensive prior mechanical impact.



Figure 19. North view of transmission line ROW north of Bayou d'Inde Road.



Figure 20. South view of mechanical impact at southern origin point of pipeline.

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Figure 21. Southwest view of rise containing Site 16CU73.

### *Laboratory Methods and Collection Curation*

All cultural materials recovered during the project were transported to the David L. DeJarnette Laboratory at Moundville Archaeological Park in Moundville, Alabama for processing and analysis. Laboratory analysis followed accepted standard procedures involving washing of all recovered materials, sorting by artifact class, and tabulation of all artifacts. During the analysis process, artifacts were placed into archival bags with permanent provenience information and prepared for permanent curation. All cultural material, photographs, field notes, maps, and documentation pertinent to the survey will be curated at the Louisiana Division of Archaeology (LDOA) located in Baton Rouge, Louisiana.

### *Inventory of Cultural Resources*

As a result of this project, one site, Site 16CU73, has been added to the Louisiana State Site File. The following is a brief description of the site, the procedures used to investigate the site, the result of these investigations, and an evaluation with regard to its eligibility for the NRHP.

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## Site 16CU73

<i>Topographic Map:</i> Westlake	<i>Zone:</i> 15 <i>Easting:</i> 470202 <i>Northing:</i> 3341678
<i>Elevation:</i> 10 ft AMSL	<i>Site Size:</i> 20 m by 10 m
<i>Maximum Depth:</i> 13 cmbs	<i>Vegetation:</i> Pasture with isolated trees
<i>Degree of Disturbance:</i> 90%	<i>NRHP Status:</i> Considered Ineligible
<i>Topographic Association:</i> Rise on Terrace	<i>Nearest Water Source:</i> Bayou d'Inde
<i>Distance to Water:</i> 25 m	<i>Direction to Water:</i> North
<i>Ground Cover:</i> Grass-Pasture	<i>Cultural Affiliation:</i> Mid 20 <sup>th</sup> Century

*Research Methods:* Pedestrian survey and shovel testing

*Comments:* Site 16CU73 consists of a sparse, subsurface scatter of artifacts located on a rise on a terrace on the south bank of Bayou d'Inde (Figure 1). The general area is mixed open pastures and small stands of trees, with continuing woods further to the south and west. Bayou d'Inde Pass Road is located less than 400 ft to the northwest. A large tree standing at the crest of the rise in the field had a sparse amount of modern debris scattered around it (Figure 21). The general area was walked over and no evidence of any structural remains was noted. Twelve shovel tests were excavated in the general proximity of the tree with three positive for cultural material recovery, averaging four items per positive result (Figure 22). All material was recovered in a shallow, 13 cm thick on average, pale brown silty loam upper soil zone, underlying the initial rootmat. Below is hardpacked, yellow-brown silty clay to at least 30 cmbs (Figure 23). Recovered material included wire nails, unidentified metal, clear bottle glass, and undecorated whiteware. Approximately 20 m southwest of the large tree is a small wood framed outbuilding. The structure is constructed with machined wood, wire nails weatherboard siding and has brick pier supports along with corrugated metal roofing. An attached structure has collapsed, also constructed of the same building materials. Testing around the perimeter of the outbuilding yielded no cultural material.

*Recovery Technique:* Shovel Testing

*Materials Recovered:*

## Shovel Test 1

<u>Group</u>	Category	Remarks	Ct.	Wt (gr)
Ceramics	Whiteware	Plain	2	9.4
Glass	Bottle, Clear	Neck	1	3.3
Metal	Wire Nail	Fragment	2	16.7

## Shovel Test 2

Glass	Bottle, Clear	Base	1	23.9
Metal	Bolt		1	6.4
Brick	Machine Made	Fragment	1	30.1

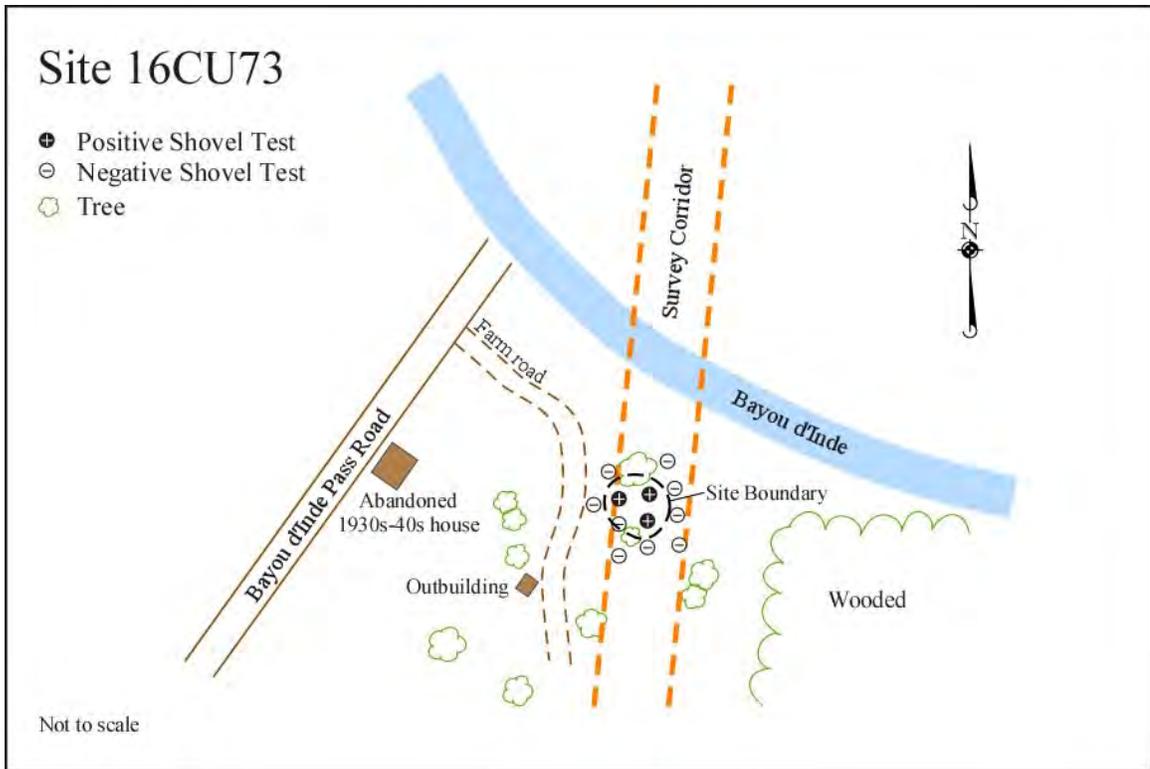


Figure 22. Sketch map of Site 16CU73.



Figure 23. Soil profile at Site 16CU73.

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## Shovel Test 5

<u>Group</u>	Category	Remarks	Ct.	Wt (gr)
Glass	Bottle, Clear	Base	1	23.2
Glass	Bottle, Clear	Body	1	6.1
Metal	Wire Nail		1	5
Metal	Unidentified		2	16.8

*Cultural Affiliation:* Mid 20th Century

*Evaluation/Recommendations:* Based on the absence of any structural remains associated with a residence, sparse, relatively modern cultural material recovery and the absence of any structural remains, the site is not considered significant. Further testing is not likely to yield insightful information about this site or the history of the area. As such, Site 16CU73 is not considered eligible for the NRHP and no further investigation is considered necessary.

*Hardey Cemetery*

Location: UTM Zone 15 Easting 470082, Northing 3348423 NAD 83.

This small, cyclone fence lined, modern cemetery lies directly within the proposed pipeline corridor (Figure 3). The cemetery is located on the east side of Hardey Road, just before it basically dead-ends into the pipeline corridor (Figure 24). The cemetery was established in 1988 and has two interments (Figure 25). Plans are to set up and directionally drill beneath the cemetery a minimum of 10 ft (3 m) in depth to avoid any impact on the burials present.



Figure 24. East view of Hardey Cemetery.

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Figure 25. Close-up of monument at gate of Hardey Cemetery.

### *Results*

As a result of this survey, approximately 11 miles (17.7 km) of pipeline corridor have been surveyed, along with TWA's extending off of the pipeline corridor for pipe storage during directional drilling operations. In addition, eight access roads, and a 0.5 acre (.2 ha) meter station were also investigated. The investigations resulted in the discovery of one site, Site 16CU73, which has been added to the Louisiana State Site File. The site represents a possible home site of a mid 20<sup>th</sup> century vintage, although no evidence of any structural features were located in the general area of the recovered material. In addition, the structure is not depicted on the 1955 topographic map of the area. The lack of any diagnostic materials such as decorated ceramics, vintage bottle glass, or other datable material suggests the possibility this material represents a more recent trash dump. The nearby wood framed outbuilding, which lies at the edge of the pipeline corridor, is likely associated with another abandoned wood framed residence located west of the pipeline corridor adjacent to Bayou d'Inde Road (Figure 26). This structure does appear on the 1955 topographic map, although the outbuilding itself does not (Figure 1).

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Figure 26. East view of abandoned house on Bayou d'Inde Pass Road near 16CU73.

A modern cemetery (Hardey Cemetery) was also found to be located directly within the proposed pipeline corridor. Plans are to drill the pipeline beneath the cemetery to avoid any impact.

### *Recommendations*

Based on the determination that Site 16CU73 is not considered eligible for the NRHP, it is the opinion of this office that construction of the Lake Charles Pipeline Lateral Project will have no adverse effect on any significant cultural resources and it is recommended that it be cleared from a cultural resources perspective. It is also recommended that directional drilling beneath the Hardey Cemetery be conducted so as to avoid any potential impact on the burials present. A drilled depth of 10 feet (3 m) at minimum below the surface of the cemetery is advised.

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APPENDIX A

DRAFT REPORTSTATE OF LOUISIANA SITE RECORD FORM**Site Name:****Site Number:** 16CU73**Other Site Designations:****Parish:** Calcasieu**Instructions for Reaching the Site:** From Intersection of I-20 and Highway 27 in Sulphur, head south on Hwy27 to Bayou d'Inde Road on the left. Turn left till the intersection with Bayou d'Inde Pass Rd. Turn left and proceed to dead-end at bayou. Go through gate to the south. Site is on evident rise in open pasture 300 ft from gate.

7.5' USGS Quadrangle (name, date): Westlake 1955 (revised 1967, 1975)

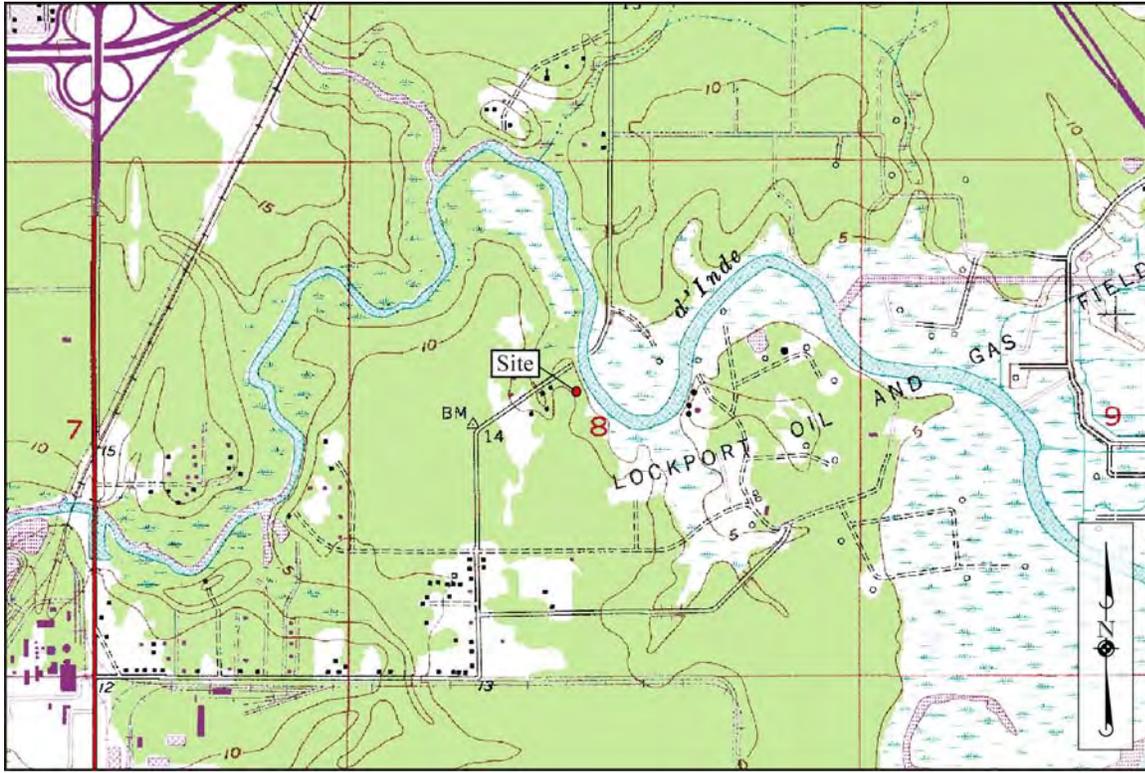
SE ¼ of the SE ¼ of the NW ¼ of **Section:** 8 **Township:** 10S **Range:** 9W**UTM CP Coordinates:** **Zone:** 15 **Easting:** 470202 **Northing:** 3341678 **NAD:** 83**Geographical Coordinates:** **Latitude:** \_\_\_\_\_ **Longitude:** \_\_\_\_\_**Geographical Setting****Landform:** Rise on terrace**Distance and Direction to Nearest Water:** Bayou d'Inde 15 m to the northeast**Soil Series:** Sharkey silt loam**Site Investigation and Description****Survey Method(s):** Shovel Testing**Site Size:** 20 x 10**Site Shape/Plan:** Circular**Representative Stratigraphy:** 13 cm of pale brown, silty loam, underlain by 30 cm of brown, silty clay, mottled with ferrous staining and yellow-brown silty clay.**Depth of Deposit:** 13 cm**Cultural Features:** None**Cultural Affiliation:** Mid 20<sup>th</sup> Century**Site Function:** House site/dump**Description of Material:** Undecorated whiteware, clear bottle glass, wire nail, unidentified metal**Site Condition****Present Use:** Pasture**Disturbance:** Yes please explain in the Narrative**Site Evaluation****Research Potential:** Not Significant**Recommend Further Work:** No**Records****Owner and Address/Contact Info:** Henry Marvin Moss c/o Jill Hines (337-217-4940 wk)**References:****Permanent Disposition of Current Collection:** LDOA**Recorded By:** Joel H. Watkins**Company/Organization Contact Info:** University of Alabama, Office of Archaeological Research**Date:** May 13, 2011

**DRAFT REPORT**  
**STATE OF LOUISIANA MAP PAGE**

Site Name:

Site Number: 16CU73

**USGS 7.5' Quadrangle Map of Site Area**



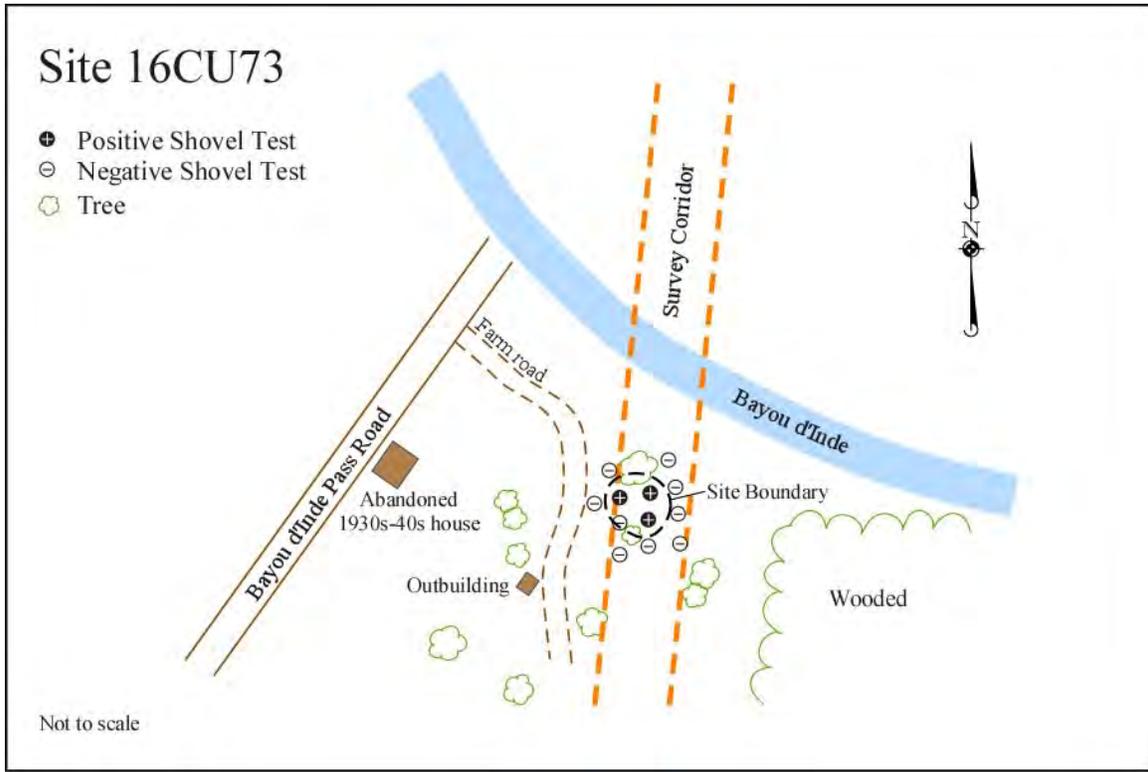
7.5' Westlake, La topographic quadrangle 1955 (revised 1967, 1975)

**DRAFT REPORT**  
**STATE OF LOUISIANA SITE MAP PAGE**

Site Name:

Site Number: 16CU73

**Site Sketch Map**



Drawn by: Joel H. Watkins  
Date: 4/19/2011

**STATE OF LOUISIANA PHOTOGRAPH FORM**

Site Name:

Site Number: 16CU73

**Site Overview Photograph**



Southeast view of rise with scatter present

Photo taken: 4/19/2011



Outbuilding near artifact scatter.  
Photo taken: 4/19/2011

## DRAFT REPORT

**STATE OF LOUISIANA NARRATIVE PAGE**

Site Name:

Site Number: 16CU73

**Please provide a brief summary of the geographical setting and site condition. This information may include site elevation, slope, other potential resources, other nearby sites, past/current environmental information, site orientation on the landscape, collecting conditions such as ground visibility, and any possible future threats to the site. Also use this page to elaborate on any of the sections on the site form, including additional UTM coordinates for the site boundaries.**

---

This site is located on a noticeable rise in a pasture/field adjacent to the south bank of Bayou d'Inde, approximately 300 ft south of Bayou d'Inde Pass Road. A small stand of trees is situated on the rise, and a sparse surface scatter of debris including machined wood, shell, bottle glass and metal is scattered around on the surface in close proximity to the tree. None of the visible material was determined to be historic in association ie. 50 yrs or older. Shovel testing in the general vicinity resulted in 3 of 12 shovel tests positive for cultural material recovery. A walkover of the general area resulted in the discovery of a small wood framed outbuilding approximately 25 m southwest of the tested area. The outbuilding is constructed of machined 2x4's, wire nails, corrugated metal roofing and has weatherboard siding. Brick piers support the building, and an attached structure to the rear has collapsed. Hay is currently being stored in the building. Shovel testing around the perimeter of the outbuilding yielded no cultural material. Based on the material recovered from the initial shovel testing grid, the validity as a home site is questionable. The site represents a possible home site of a mid 20<sup>th</sup> century vintage, although no evidence of any structural features was located in the general area of the recovered material. In addition, the structure is not depicted on the 1955 topographic map of the area. The lack of any diagnostic materials such as decorated ceramics, vintage bottle glass, or other datable material suggests the possibility this material represents a more recent trash dump. The nearby wood framed outbuilding may be associated with another, abandoned wood framed residence located west of the pipeline corridor adjacent to Bayou d'Inde Road. This structure does appear on the 1955 topographic map, although the outbuilding itself does not. Based on this data, the site is not considered to be eligible for the National Register of Historic Places. This location is within the general corridor boundaries for a proposed pipeline that will be directionally drilled beneath the bayou. The outbuilding sits at the perimeter of the corridor and will not be impacted by drilling operations. As the site is not considered significant, no further testing is recommended.

DRAFT REPORT  
**LACAD CODING FORM**

Site Name:

Site Number: 16CU73

**Landform** (1 Entry)

- |   |   |  |   |
|---|---|--|---|
| <input type="checkbox"/> <b>kn</b> Knoll        | <input type="checkbox"/> <b>sd</b> Salt Dome  | <input type="checkbox"/> <b>bea</b> Beach                    | <input type="checkbox"/> <b>nrs</b> Nat Relic Scar      |
| <input type="checkbox"/> <b>rid</b> Ridge       | <input type="checkbox"/> <b>swa</b> Swamp     | <input type="checkbox"/> <b>udw</b> Underwater               | <input type="checkbox"/> <b>bat</b> Batture             |
| <input type="checkbox"/> <b>bn</b> Bench        | <input type="checkbox"/> <b>bsw</b> Backswamp | <input checked="" type="checkbox"/> <b>nal</b> Natural Levee | <input type="checkbox"/> <b>ot</b> Other, see site form |
| <input type="checkbox"/> <b>pm</b> Pimple Mound | <input type="checkbox"/> <b>msh</b> Marsh     | <input type="checkbox"/> <b>chr</b> Chenier                  |   |

**Cultural Features** (up to 4 Entries)

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> <b>sar</b> Single Artifact    | <input type="checkbox"/> <b>psc</b> Prehistoric Scatter         | <input type="checkbox"/> <b>ls</b> Lithic Scatter     |
| <input type="checkbox"/> <b>md1</b> Mound/Earthwork    | <input checked="" type="checkbox"/> <b>hsc</b> Historic Scatter | <input type="checkbox"/> <b>bu</b> Burial(s)          |
| <input type="checkbox"/> <b>md2</b> Mounds/Earthworks  | <input type="checkbox"/> <b>hst</b> Hist. Sheet Midden          | <input type="checkbox"/> <b>ss</b> Standing Structure |
| <input type="checkbox"/> <b>her</b> Historic Earthwork | <input type="checkbox"/> <b>shn</b> Shell Midden                | <input checked="" type="checkbox"/> <b>du</b> Dump    |
| <input type="checkbox"/> <b>ote</b> Other Earthwork    | <input type="checkbox"/> <b>erm</b> Earth Midden                | <input type="checkbox"/> <b>hr</b> Historic Ruins     |
| <input type="checkbox"/> <b>sw</b> Shipwreck(s)        |   |   |

**Cultural Affiliation** (up to 7 Entries)

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> <b>pu</b> Prehistoric (Unknown) | <input type="checkbox"/> <b>tc</b> Tchefoncte       | <input type="checkbox"/> <b>cm</b> Caddo – Middle                       |
| <input type="checkbox"/> <b>pal</b> Paleo-Indian         | <input type="checkbox"/> <b>mar</b> Marksville      | <input type="checkbox"/> <b>cl</b> Caddo – Late                         |
| <input type="checkbox"/> <b>au</b> Archaic (Unknown)     | <input type="checkbox"/> <b>is</b> Issaquena        | <input type="checkbox"/> <b>hu</b> Historic (Unknown)                   |
| <input type="checkbox"/> <b>ea</b> Early Archaic         | <input type="checkbox"/> <b>ba</b> Baytown          | <input type="checkbox"/> <b>hi</b> Historic Indian Contact              |
| <input type="checkbox"/> <b>ma</b> Middle Archaic        | <input type="checkbox"/> <b>tro</b> Troyville       | <input type="checkbox"/> <b>ex</b> Historic Exploration 1541-1803       |
| <input type="checkbox"/> <b>la</b> Late Archaic          | <input type="checkbox"/> <b>cc</b> Coles Creek      | <input type="checkbox"/> <b>ant</b> Antebellum 1803-1860                |
| <input type="checkbox"/> <b>po</b> Poverty Point         | <input type="checkbox"/> <b>pq</b> Plaquemine       | <input type="checkbox"/> <b>war</b> War & Aftermath 1860-1890           |
| <input type="checkbox"/> <b>wu</b> Woodland (Unknown)    | <input type="checkbox"/> <b>ms</b> Mississippian    | <input checked="" type="checkbox"/> <b>in</b> Industrial & Modern 1890- |
|  | <input type="checkbox"/> <b>cad</b> Caddo (Unknown) |   |
|  | <input type="checkbox"/> <b>ce</b> Caddo – Early    |   |

Remarks \_\_\_\_\_

**Site Function** (up to 3 Entries)

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> <b>pu</b> Prehistoric (Unknown) | <input checked="" type="checkbox"/> <b>fa</b> Farmstead | <input type="checkbox"/> <b>ci</b> Commercial/Service Cen.  |
| <input type="checkbox"/> <b>hu</b> Historic (Unknown)    | <input type="checkbox"/> <b>wt</b> Watercraft           | <input type="checkbox"/> <b>it</b> Institution (Rel. & Ed.) |
| <input type="checkbox"/> <b>ch</b> Chipping Station      | <input type="checkbox"/> <b>pt</b> Plantation           | <input type="checkbox"/> <b>gv</b> Governmental             |
| <input type="checkbox"/> <b>cam</b> Camp                 | <input type="checkbox"/> <b>hs</b> Hist. Town/Vill.     | <input type="checkbox"/> <b>id</b> Industrial               |
| <input type="checkbox"/> <b>el</b> Extraction Locale     | <input type="checkbox"/> <b>ur</b> Urban                | <input checked="" type="checkbox"/> <b>du</b> Dump          |
| <input type="checkbox"/> <b>ha</b> Hamlet/Village        | <input type="checkbox"/> <b>cr</b> Cemetery (Mort.)     | <input type="checkbox"/> <b>ml</b> Military                 |
| <input type="checkbox"/> <b>cer</b> Ceremonial Center    | <input type="checkbox"/> <b>ht</b> Hist. Transport      | <input type="checkbox"/> <b>rs</b> Residence                |

Remarks \_\_\_\_\_

DRAFT REPORT**Description of Material** (up to 6 Entries)

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> <b>cra</b> Ceramics, Native American    | <input type="checkbox"/> <b>hb</b> Human Bone                    | <input checked="" type="checkbox"/> <b>cmt</b> Construction Material (Brick, Wattle & Daub) |
| <input checked="" type="checkbox"/> <b>hc</b> Ceramics, Historic | <input type="checkbox"/> <b>wb</b> Worked Bone                   | <input type="checkbox"/> <b>pi</b> Personal Items (jewelry, clothing, personal care)        |
| <input type="checkbox"/> <b>cs</b> Chipped Stone                 | <input type="checkbox"/> <b>ub</b> Unmodified Bone (Fauna)       | <input type="checkbox"/> <b>toy</b> Toys (dolls, marbles, tea set)                          |
| <input type="checkbox"/> <b>gs</b> Ground Stone                  | <input type="checkbox"/> <b>fl</b> Flora                         | <input type="checkbox"/> <b>rec</b> Recreation Items (chunky stones, dominoes, dice)        |
| <input type="checkbox"/> <b>fer</b> Fire Cracked Rock            | <input checked="" type="checkbox"/> <b>gl</b> Glass              | <input type="checkbox"/> <b>rp</b> Rubber/Plastic   |
| <input type="checkbox"/> <b>pp</b> Projectile Points             | <input checked="" type="checkbox"/> <b>me</b> Metal (Nails, etc) |   |
| <input type="checkbox"/> <b>she</b> Shell                        | <input type="checkbox"/> <b>wo</b> Wood                          |   |
| <input type="checkbox"/> <b>ppo</b> Poverty Point Object         | <input type="checkbox"/> <b>ch</b> Charcoal                      |   |
| <input type="checkbox"/> <b>bc</b> Baked Clay Items              |  |   |

Remarks Wire nails, plain whiteware, machine made brick, unid. metal

**Method of Investigation at Site** (up to 3 Entries)

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> <b>vi</b> Visual Inspection             | <input type="checkbox"/> <b>pr</b> Probing                    | <input type="checkbox"/> <b>stp</b> Mechanical Stripping |
| <input type="checkbox"/> <b>ma</b> Mapping                       | <input type="checkbox"/> <b>au</b> Auger Testing              | <input type="checkbox"/> <b>tr</b> Trenching             |
| <input type="checkbox"/> <b>gra</b> Grab Surface Collection      | <input type="checkbox"/> <b>co</b> Coring                     | <input type="checkbox"/> <b>exc</b> Excavation           |
| <input type="checkbox"/> <b>sy</b> Systematic Surface Collection | <input checked="" type="checkbox"/> <b>sht</b> Shovel Testing | <input type="checkbox"/> <b>di</b> Diver Inspection      |
| <input type="checkbox"/> <b>rs</b> Remote Sensing                | <input type="checkbox"/> <b>tu</b> Test Units                 | <input type="checkbox"/> <b>otr</b> Other, see narrative |

APPENDIX B

Ms. Rachel Watson  
Section 106 Review & Compliance  
Louisiana Division of Archaeology  
1051 N. 3rd St., Room 319  
Baton Rouge, LA 70802

**RE: A Phase I Cultural Resources Survey of ± 10.5 Miles of Pipeline Right-Of-Way in Calcasieu Parish, Louisiana**

Dear Ms. Watson:

With reference to the above project, the University of Alabama, Office of Archaeological Research (OAR) proposes to conduct an archaeological Phase I survey of the proposed pipeline corridor and any associated temporary work areas (TWA) and access roads. All phases of the project will be conducted in compliance with the guidelines set forth by the Louisiana Division of Archaeology (LDOA) for Section 106 compliance.

Project Description

The following is a description of the proposed pipeline as provided to OAR by their client for this project, CH2MHill.

Denbury Onshore, LLC (Denbury) is proposing to construct, own, and operate a 11.8-mile carbon dioxide (CO<sub>2</sub>) pipeline and associated ancillary equipment (Project) originating at a new industrial facility near Lake Charles, Louisiana and terminating at its existing Green Pipeline in Calcasieu Parish. The Green Pipeline is an interstate pipeline used to transport CO<sub>2</sub> from natural and anthropogenic sources in the southeast United States to depleted oilfields for sequestration and enhanced oil recovery (EOR). The new pipeline will transport more than 1 million tons per day of CO<sub>2</sub> emissions captured at Leucadia Energy, LLC's, Lake Charles cogeneration petroleum coke-to-chemicals plant being constructed near Lake Charles, Louisiana. The CO<sub>2</sub> will be transported through new and existing pipeline systems to be used for EOR at Denbury's Hastings Field located south of Houston, Texas.

The new pipeline will include a 16-inch outside diameter CO<sub>2</sub> pipeline, one valve, and one meter station located in Calcasieu Parish, Louisiana. The pipeline route begins just west of Lake Charles, Louisiana at Latitude: 30°11'22.39"N and Longitude: -93°18'16.07"W within an industrial facility currently being constructed and proceeds in a northerly direction for 10.5 miles to its terminus at Latitude: 30°19'36.25"N and Longitude: -93°20'32.74"W.

The meter station will be located at the terminus of the pipeline at the interconnection with the Green Pipeline, and the valve will be located about mid-way between the beginning of the route and the Green Pipeline, within the pipeline corridor. The pipeline route will parallel existing rights-of-way (ROWs) (transmission lines, roads, pipelines, railroads, and other linear features) to the extent practicable. The pipeline ROW will consist of an 80-foot temporary ROW for construction and a permanent ROW of 30-feet for operation, for a total of 110-feet of ROW to be used during construction. Also surveyed will be a 4 acre temporary work area (TWA) at Mile Post 4.2 adjacent to the south side of Hwy 90.

Proposed Testing Methodology

A Phase I cultural resources survey generally involves a literature/records search and an actual on-site field survey. Background research will be conducted via the LDOA website for pre-recorded archaeological

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sites along the proposed corridor. This will provide information as to the status of any previously recorded archaeological sites, historic and prehistoric, within the area. In addition a visit to the LDOA office in Baton Rouge, La. will be necessary to gather information related to prior archaeological surveys conducted in the general proximity of the project corridor. This, coupled with a literature/records search will also identify any *National Register of Historic Places* (NRHP) properties which may be located in the project area, or in close proximity which may be visually impacted as a result of the project.

Field investigations will include a pedestrian survey of the project area. Field techniques will include visual inspection of any exposed surface areas, and the employment of 30 cm by 30 cm shovel tests spaced at regular intervals along survey transects in accordance with LDOA guidelines. High probability areas will be tested at approximate 30 m intervals, while lower probability areas will be tested at intervals up to 50 m. Probability factors include distance to water, terrain, soil type and prior impact.

In the event that any new archaeological sites are encountered, an assessment of NRHP eligibility is also necessary. Should a site not be considered eligible for the NRHP, then the site will be recommended for clearance. Should a site be considered potentially eligible for the NRHP, then avoidance or Phase II testing will be recommended. Also, this survey will identify historic structures, defined as 50 years or older with any potential for impact, visual or physical, as a result of this project. Historic structures will be evaluated to a preliminary level regarding their NRHP eligibility.

In the event human remains should be encountered during this Phase I project, work will stop immediately in the vicinity of the uncovered human remains. Notice regarding the discovery will be made as soon as possible to the appropriate local law enforcement agency and the appropriate Parish Coroner's Office following the provisions of the Louisiana Unmarked Human Burial Sites Preservation Act (R.S. 8:671-871, et seq.). The State Archaeologist will also be notified directly upon discovery. Per La. DOA guidelines, within 24-hours of notification, the State Archaeologist shall notify any Native American tribe that has indicated interest in the area where the discovery of human remains was made. The local law enforcement officials shall assess the nature and age of the human skeletal remains. If the coroner determines that the human skeletal remains are older than 50 years of age, the Louisiana Division of Archaeology has jurisdiction over the remains and will work out appropriate plans among property owners, appropriate Tribes, living descendents, and other interested parties to insure compliance with existing state laws. **No remains will be removed from the site until jurisdiction is established and the appropriate permits obtained from the Division.**

Finally, a report will be prepared per LDOA guidelines detailing the Phase I investigations in the field and laboratory and submitted to the LDOA for review. Recommendations of clearance or avoidance of any archaeological sites encountered will also be generated in the report.

Thank you for your time,

Joel Watkins  
Cultural Resources Analyst  
University of Alabama, Office of Archaeological Research  
13075 Moundville Archaeological Park  
Moundville, Alabama 35474



JAY DARDENNE  
LIEUTENANT GOVERNOR

**State of Louisiana**  
OFFICE OF THE LIEUTENANT GOVERNOR  
DEPARTMENT OF CULTURE, RECREATION & TOURISM  
OFFICE OF CULTURAL DEVELOPMENT

CHARLES R. DAVIS  
DEPUTY SECRETARY

PAM BREAU  
ASSISTANT SECRETARY

25 April 2012

Joel Watkins  
Cultural Resource Analyst  
Office of Archaeological Research  
13075 Moundville Archaeological Park  
Moundville, AL 35474

Re: Draft Report  
La Division of Archaeology Report No. 22-4007  
*Phase I Cultural Resource Survey of the Proposed Lake Charles Pipeline Lateral Project Located near Sulphur, Calcasieu Parish, Louisiana*

Dear Mr Watkins:

We acknowledge receipt of your report dated 21 November 2011 and received in our office 16 April 2012, along with two copies of the above-referenced report. We have completed our review of this report and offer the following comments.

In the Abstract, please provide the total project acreage. We appreciate the effort to inspect all of the pimple mounds encountered within the project ROW. We request that a site form be completed for the Harvey Cemetery. This request reflects recent legislative acts that give our office regulatory responsibilities for many cemeteries and so we are making a concerted effort to record all that are encountered during projects.

We concur that site 16CU73 is not eligible for nomination to the National Register of Historic Places and that if the pipeline is directionally drilled under the Harvey Cemetery, no historic properties will be impacted by this project, and that no further work is necessary.

We look forward to receiving two bound copies of the final report with the comments addressed as appropriate, along with a pdf of the report. If you have any questions, please contact Chip McGimsey in the Division of Archaeology by email at [cmcgimsey@crt.la.gov](mailto:cmcgimsey@crt.la.gov) or by phone at 225-219-4598.

Sincerely,

Pam Breau  
State Historic Preservation Officer

PB:crm

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Enclosure 5

Phase IA Cultural Resources Reports for Proposed LCCE Gasification Project Offsite  
*Facilities*

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May 16, 2012

Mr. Philip Leonards  
Leucadia Energy  
1330 Post Oak Blvd. Suite 1600  
Houston, Texas 77056  
Office - 713-963-4636  
Email: [pleonards@leucadiaenergy.com](mailto:pleonards@leucadiaenergy.com)

**Re: Cultural Resources Evaluation - Lake Charles Cogeneration, LLC (LCC), Calcasieu Parish, Louisiana**

Dear Mr. Leonards:

During May of 2012, URS completed a Phase IA cultural resources desktop assessment for an approximately 5.2 mi (8.4 km) long water pipeline corridor, an 8.3 mi (13.4 km) long hydrogen pipeline corridor, and a parking area, all currently under consideration by Lake Charles Cogeneration, LLC (LCC) for the Lake Charles Gasification Facility (LCGF) in Calcasieu Parish, southwest Louisiana (Figure 1). The purpose of this desktop investigation was to identify any previously recorded cultural resources within a 0.5 mi (0.8 km) radius of the potential corridors and a 1.0 mile (1.6 km) radius of the proposed parking area and provide a preliminary assessment of the archaeological site potential of these areas. In total, these survey corridors and parking areas represented approximately 428 ac of land that was assessed for cultural resources as part of this Phase IA desktop study.

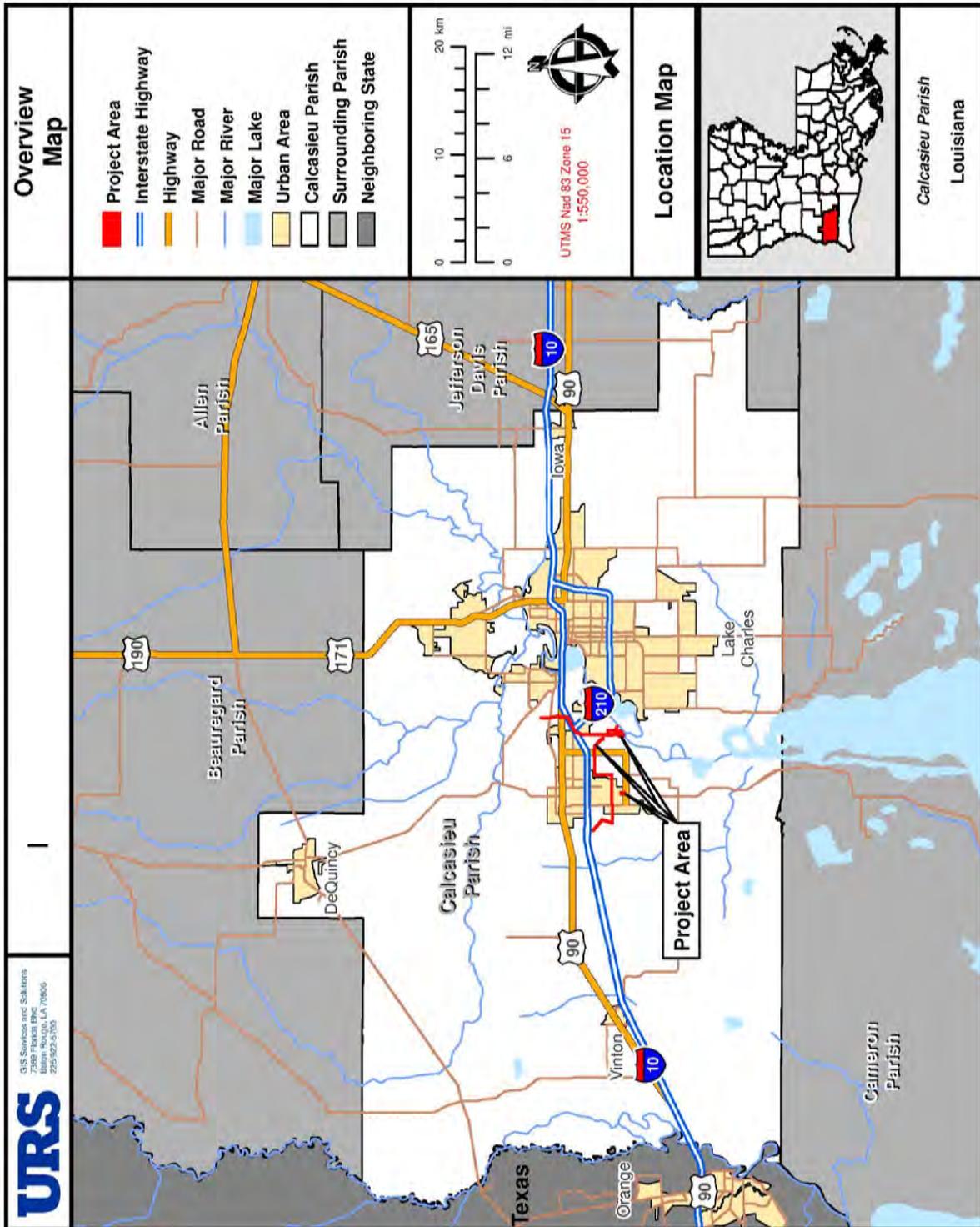
This investigation followed the general guidelines and procedures outlined in *Louisiana's Comprehensive Archaeological Plan* (Smith et al. 1983), the Cultural Resource Assessment standards provided by the Louisiana Division of Archaeology (2009), the National Historic Preservation Act of 1966 (as amended), the Archaeological and Historic Preservation Act of 1974, Title 36 of the Code of Federal Regulations (Parts 60-66 and 800) and *Archeology and Historic Preservation: The Secretary of the Interior's Guidelines*.

No field studies or surveys were conducted for this project; at this preliminary stage, cultural resource data collection and evaluation was conducted on a desktop basis using only existing hard copy data, internet site information, and GIS data. A summary of the various data sources from which the information was gathered is presented below:

- (1) Louisiana Division of Archaeology (site forms and cultural resource surveys), located in Baton Rouge, Louisiana;
- (2) Louisiana Division of Historic Preservation/State Library (historic standing structures), located in Baton Rouge, Louisiana;
- (3) Louisiana Cultural Resources Map hosted by the Louisiana Division of Archaeology;
- (4) National Register of Historic Places (NRHP) online database; and,
- (5) Louisiana Division of Historic Preservation National Register Website.

URS Group  
7389 Florida Blvd., Suite 300  
Baton Rouge, LA 70806  
Tel: 225.922.5700  
Fax: 225.922.5701  
[www.urscorp.com](http://www.urscorp.com)

Figure 1 Overview of Project Areas, Calcasieu Parish, Louisiana



The project areas were assessed to provide a technical estimate to LCC concerning the expected levels of archaeological effort (i.e., Phase I cultural resources inventory) that may be required to receive Section 106 clearance on the property.

Mr. Martin Handly (MA) served as the Principal Investigator for this project and wrote this section of the report, while Ms. Lauren Poche (MA) collected the background information, and Mr. Shane Poche (BA) prepared the graphics that appear in this section.

### NATURAL SETTING

Currently, the property appears to be a mix of coastal prairie, low-gradient drainages, coastal marsh, and man-made lands. The project area is characterized by 11 soils (Figures 2 to 15; Table 1). A single soil (Clovelly muck) is associated with the coastal marsh. This predominantly inundated soil represents approximately 2.0% of the survey area. Overall, these soils are anticipated to be located on landforms with low archaeological site potential; however, low-lying natural levees associated with the bayous and drainages within the project areas are considered to display higher archaeological site potential. Given the inundated nature of this portion of the project area, visual assessment may only be required.

**Table 1 Soil Table, Calcasieu Parish, Louisiana**

Soil Name	Landform	Slope (%)	Drainage	%age	Archaeological Potential
Acadia silt loam	Terraces	1-3	Somewhat poorly	8.0	High
Glenmora silt loam		1-5	Moderately well	1.0	High
Basile and Guyton silt loams, frequently flooded	Floodplains	0-1	Poorly	8.3	High
Clovelly muck	Coastal Marsh	0-1	Very Poorly	2.0	High
Leton silt loam	Stream Meander	0-1	Poorly	1.3	High
Crowley-Vidrine silt loams	Coastal Prairie (Pimple Mounds)	1-3	Somewhat poorly	6.6	Low-Moderate
Guyton-Messer silt loams		0-3	Very poorly to Moderately well	9.0	Low-Moderate
Kinder-Messer silt loams		0-3	Poorly to Moderately well	39.1	Low-Moderate
Mowata-Vidrine silt loams		0-1	Poorly to Somewhat poorly	19.6	Low-Moderate
Dumps	Man-Made	Variable	Variable	1.5	Low
Urban land	Man-Made	Variable	Variable	0.1	Low
Water	Water	NA	NA	3.6	Low
			<b>TOTAL</b>	<b>100.0</b>	

Figure 2 Soil Maps, Calcasieu Parish, Louisiana (Map 1 of 14)

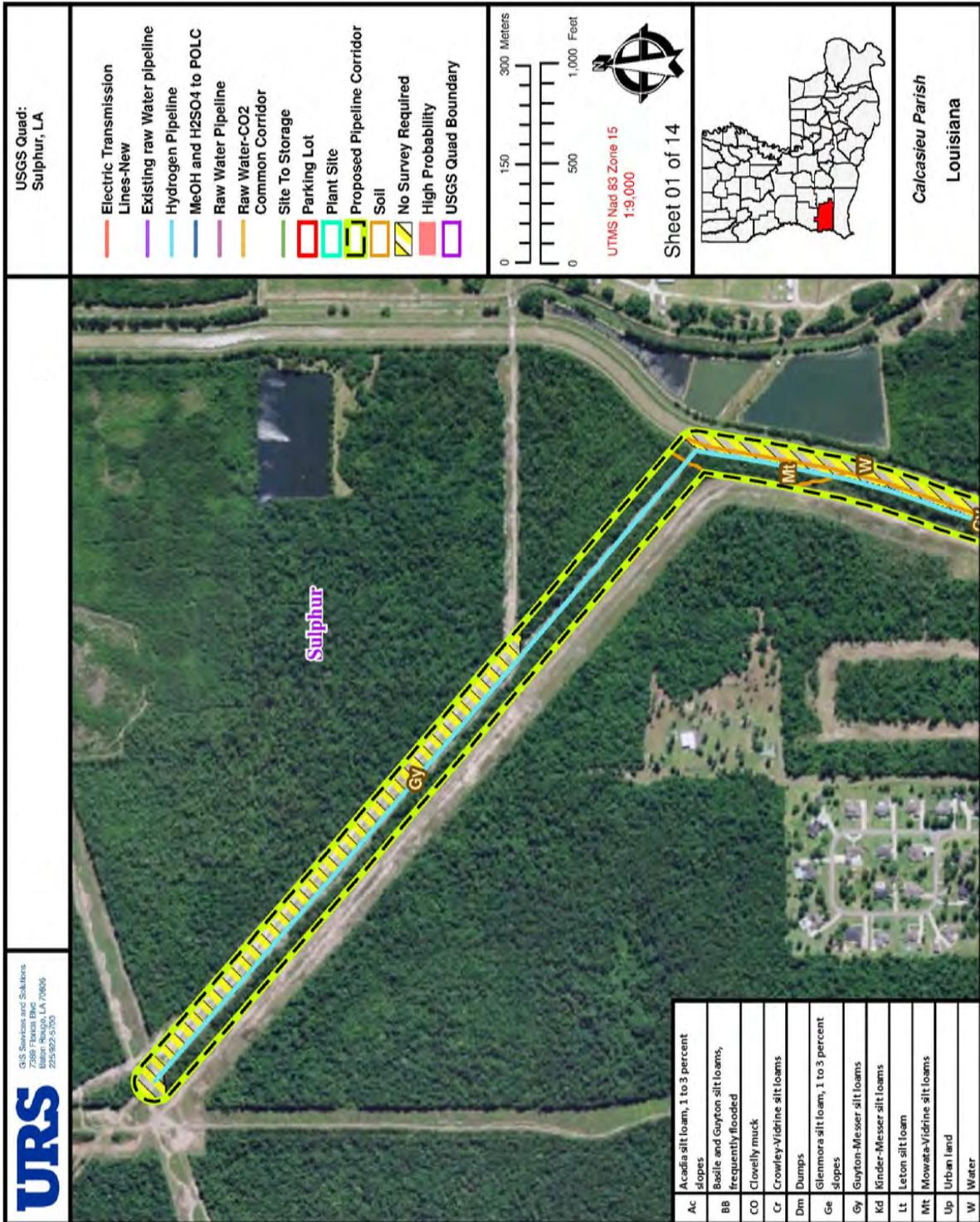


Figure 3 Soil Maps, Calcasieu Parish, Louisiana (Map 2 of 14)

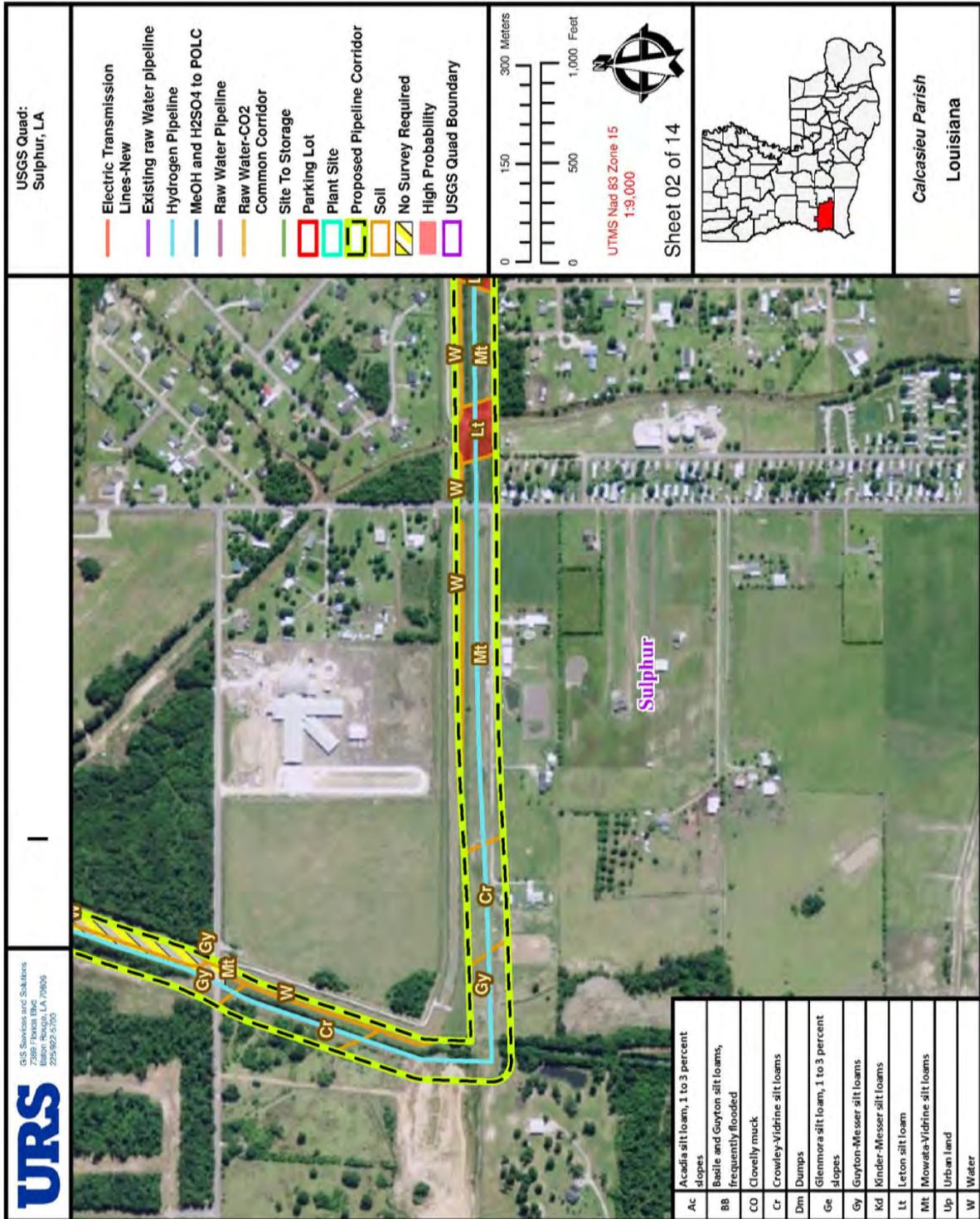


Figure 4 Soil Maps, Calcasieu Parish, Louisiana (Map 3 of 14)

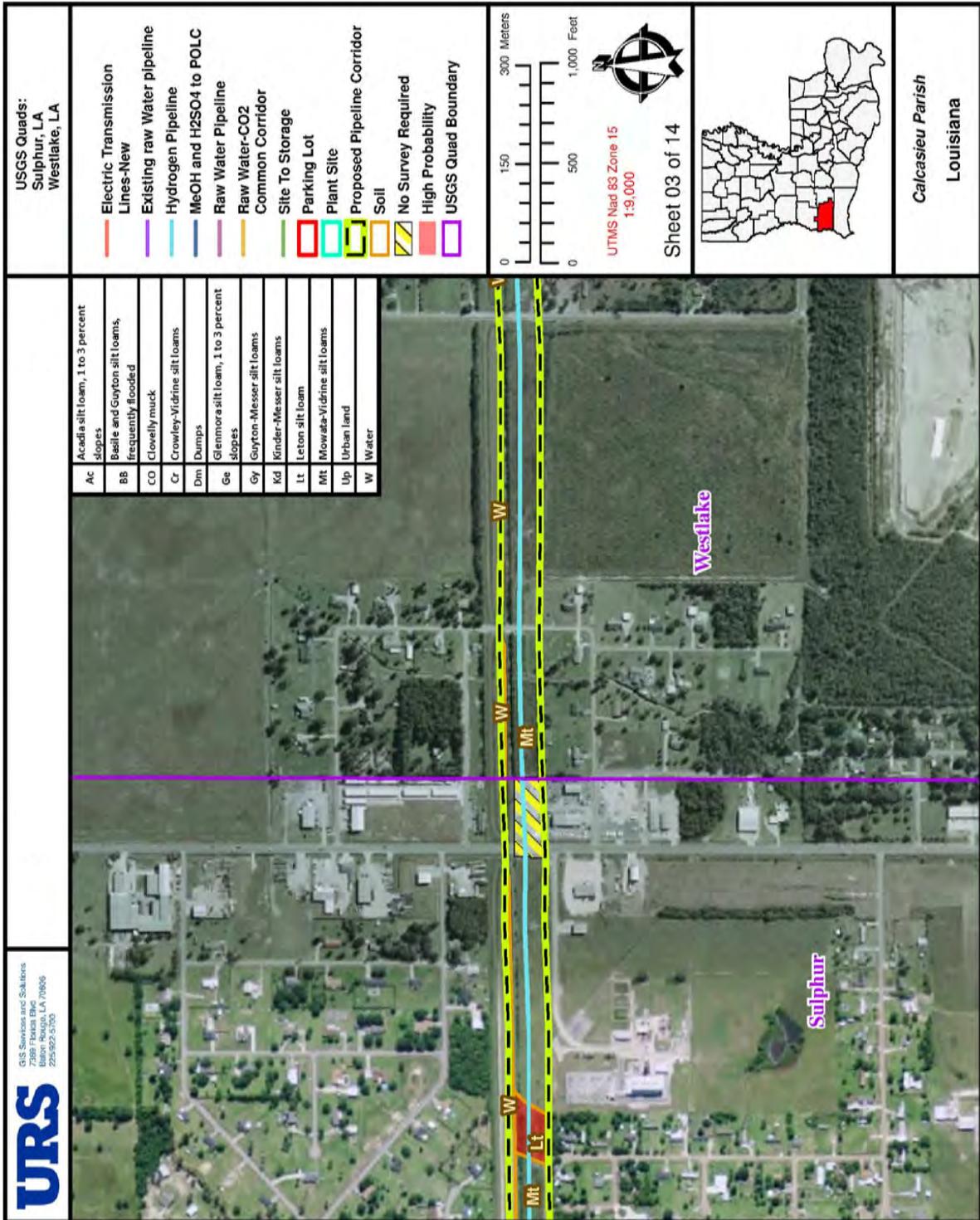


Figure 5 Soil Maps, Calcasieu Parish, Louisiana (Map 4 of 14)

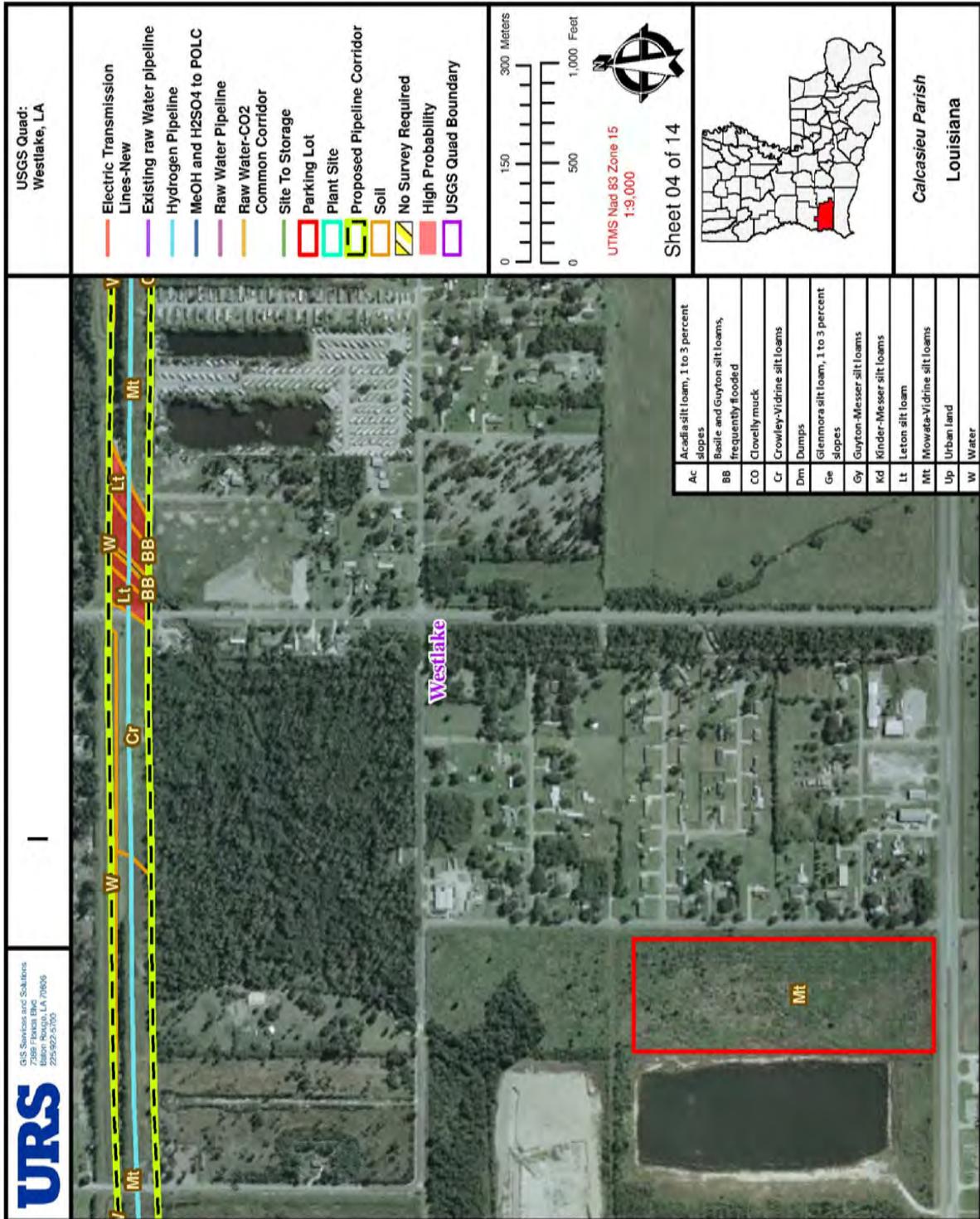


Figure 6 Soil Maps, Calcasieu Parish, Louisiana (Map 5 of 14)

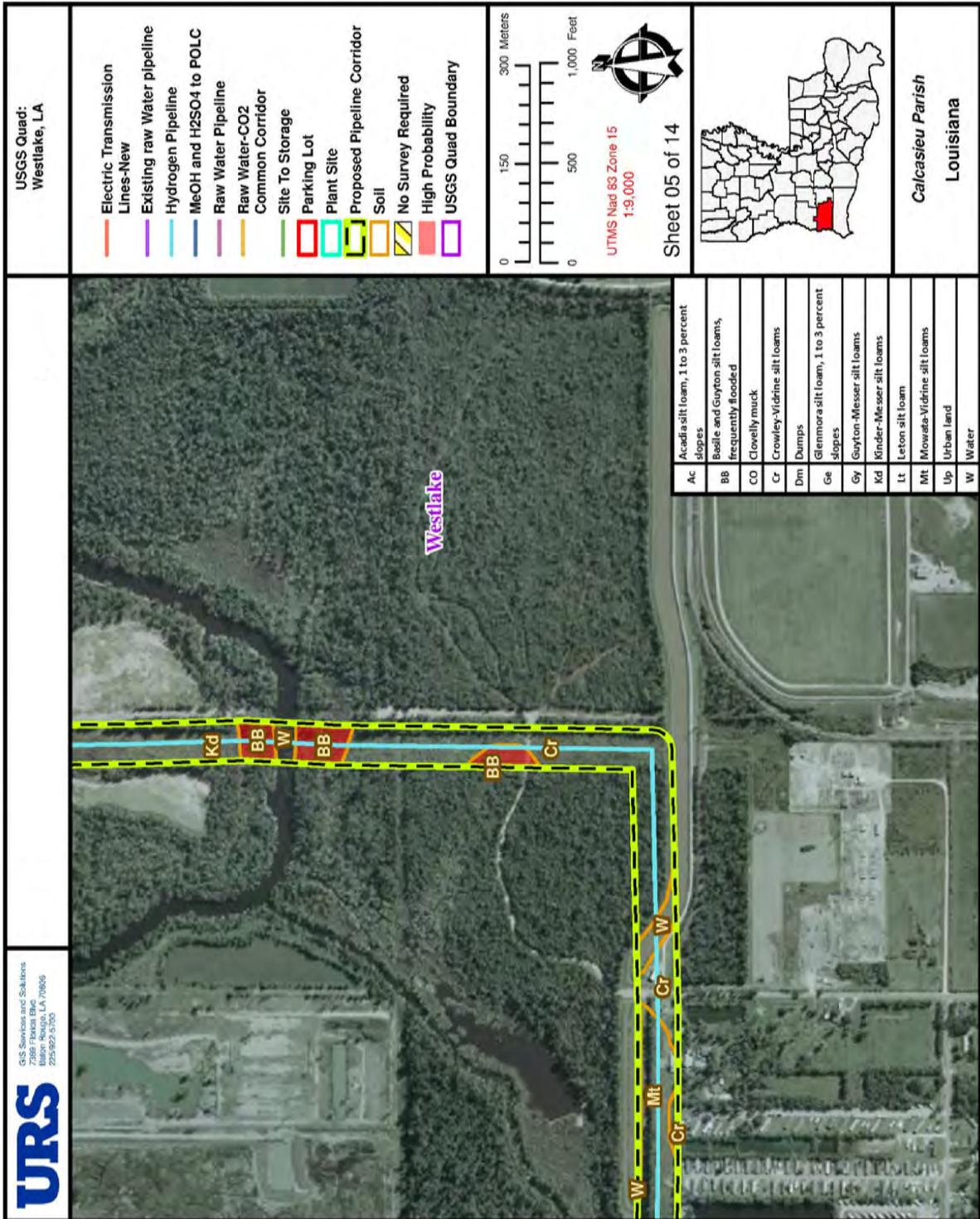


Figure 7 Soil Maps, Calcasieu Parish, Louisiana (Map 6 of 14)

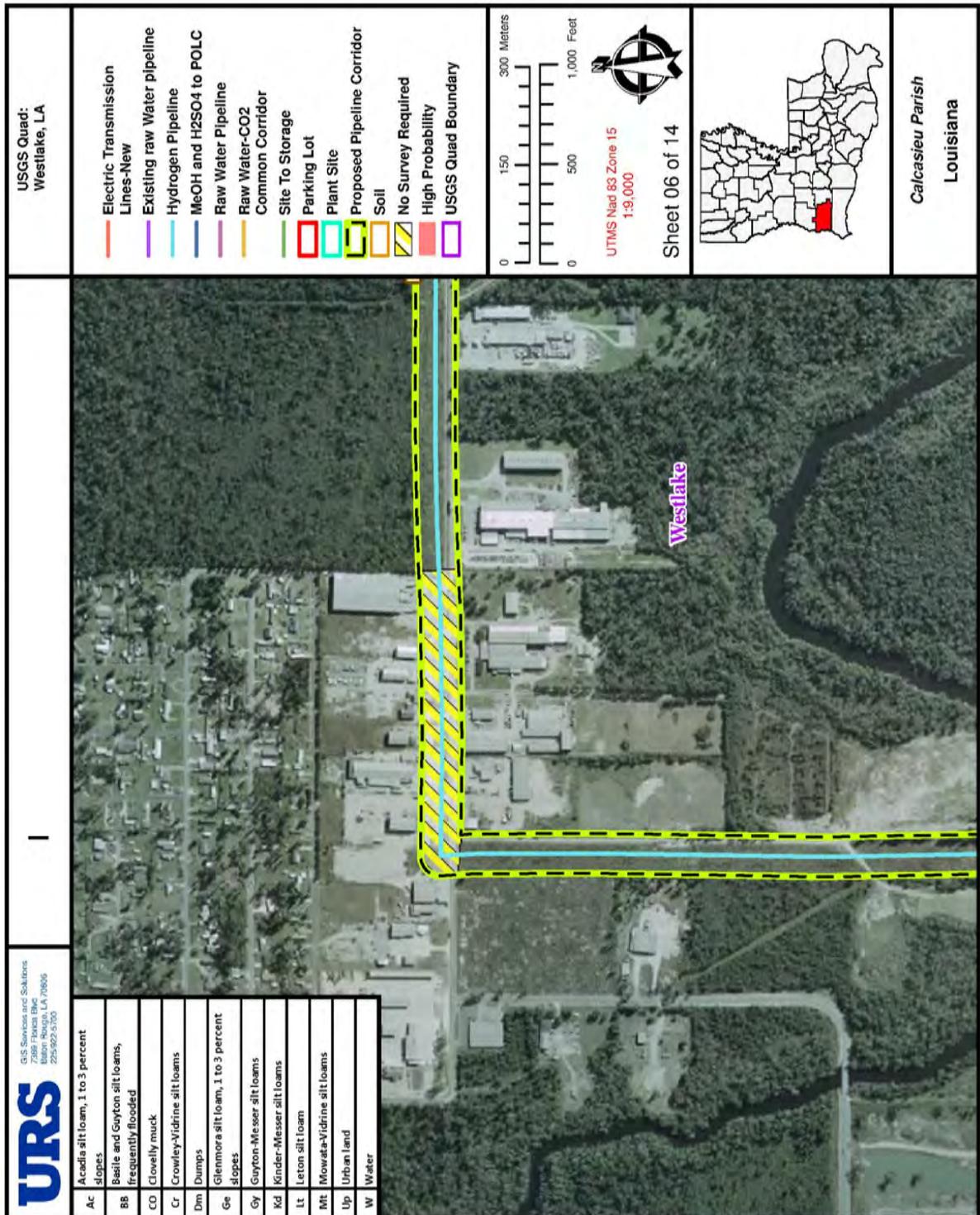


Figure 8 Soil Maps, Calcasieu Parish, Louisiana (Map 7 of 14)

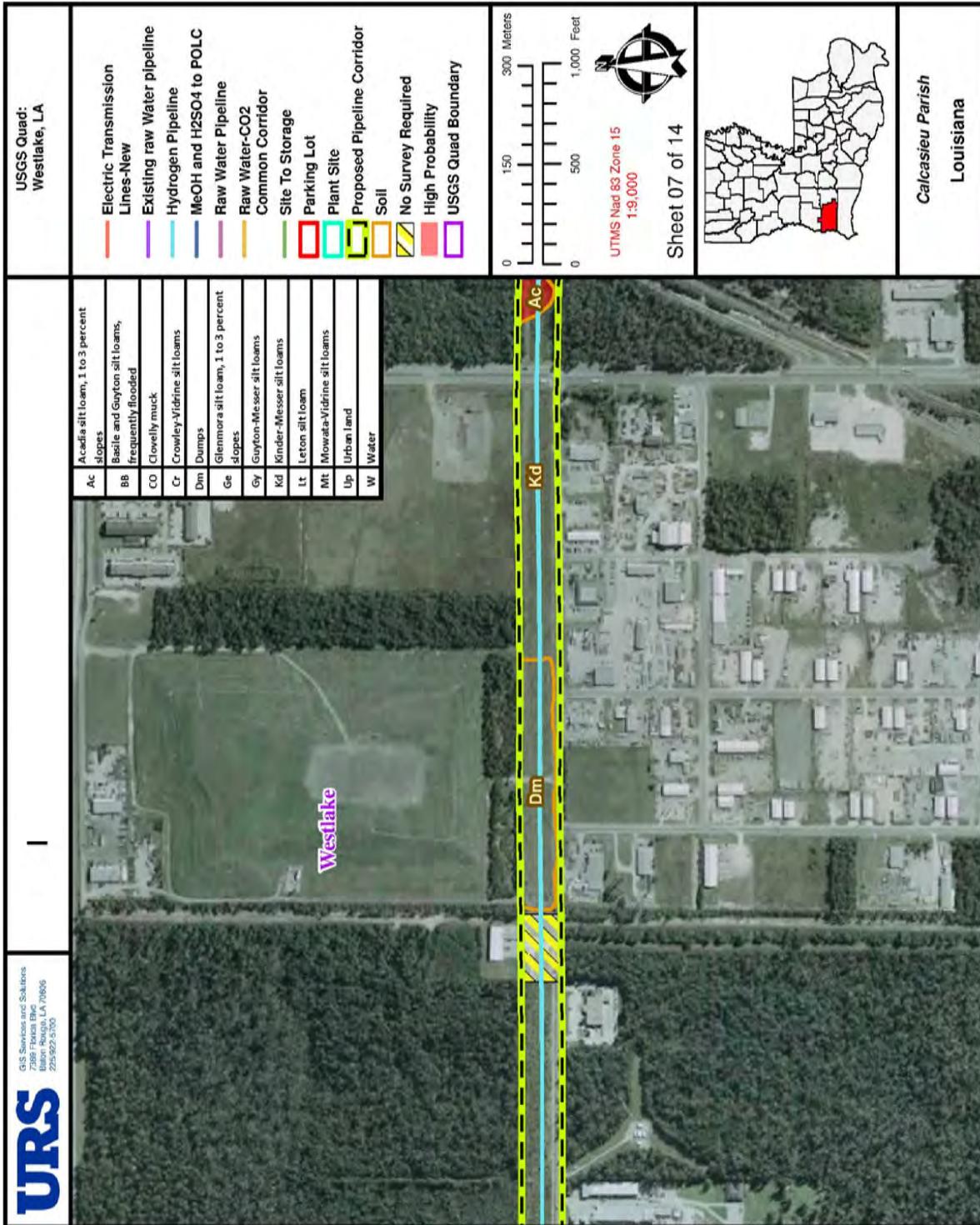


Figure 9 Soil Maps, Calcasieu Parish, Louisiana (Map 8 of 14)

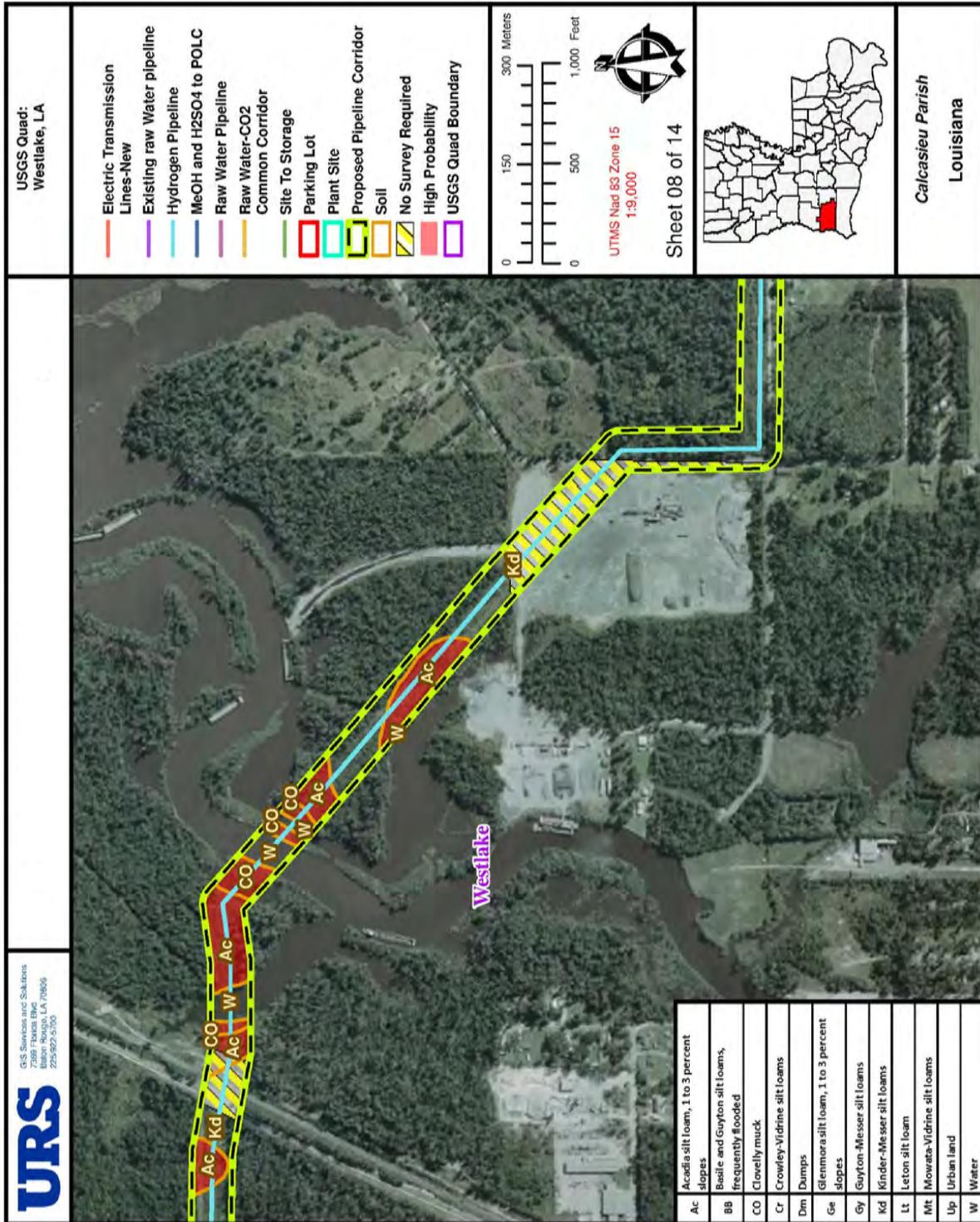


Figure 10 Soil Maps, Calcasieu Parish, Louisiana (Map 9 of 14)

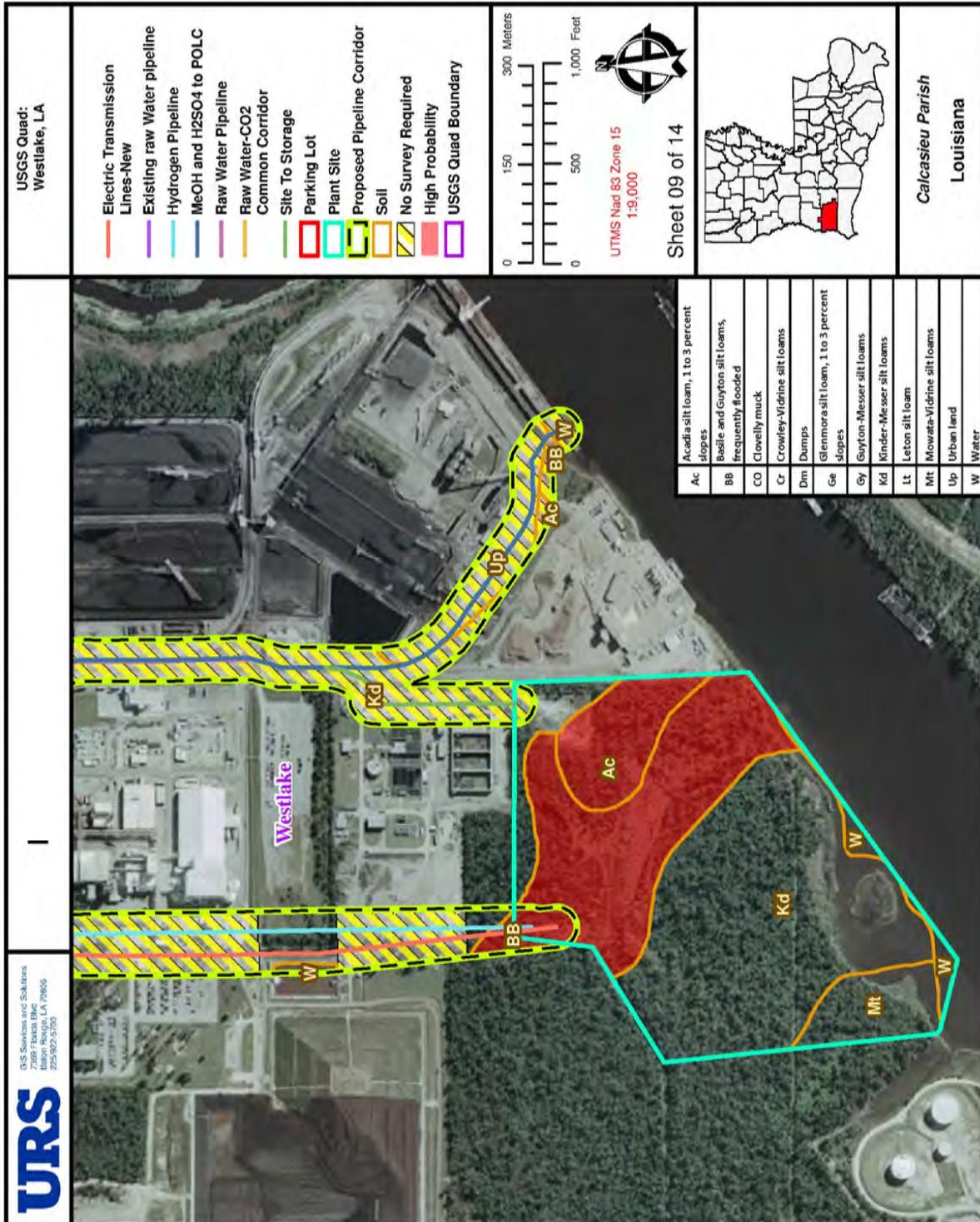


Figure 11 Soil Maps, Calcasieu Parish, Louisiana (Map 10 of 14)

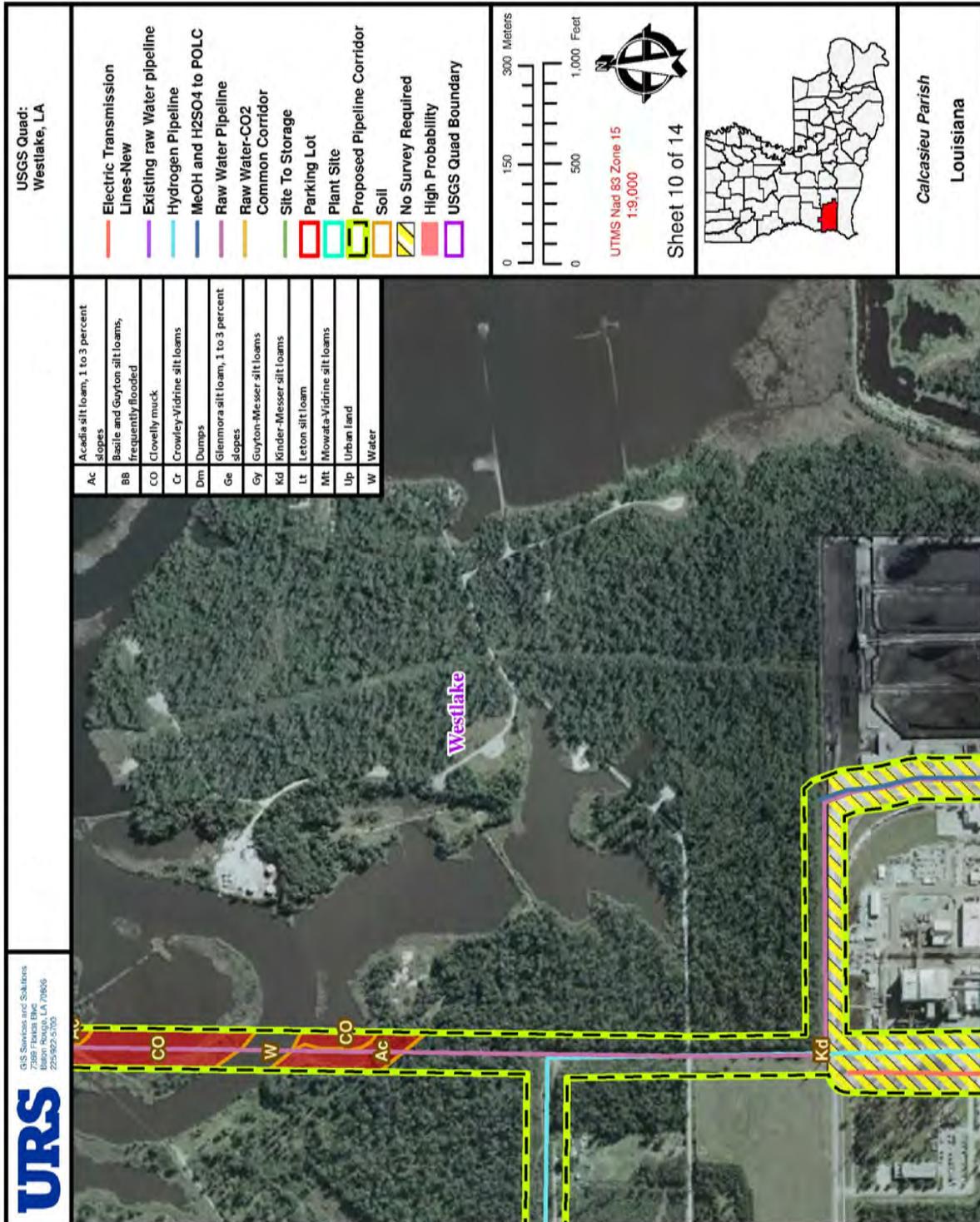


Figure 12 Soil Maps, Calcasieu Parish, Louisiana (Map 11 of 14)

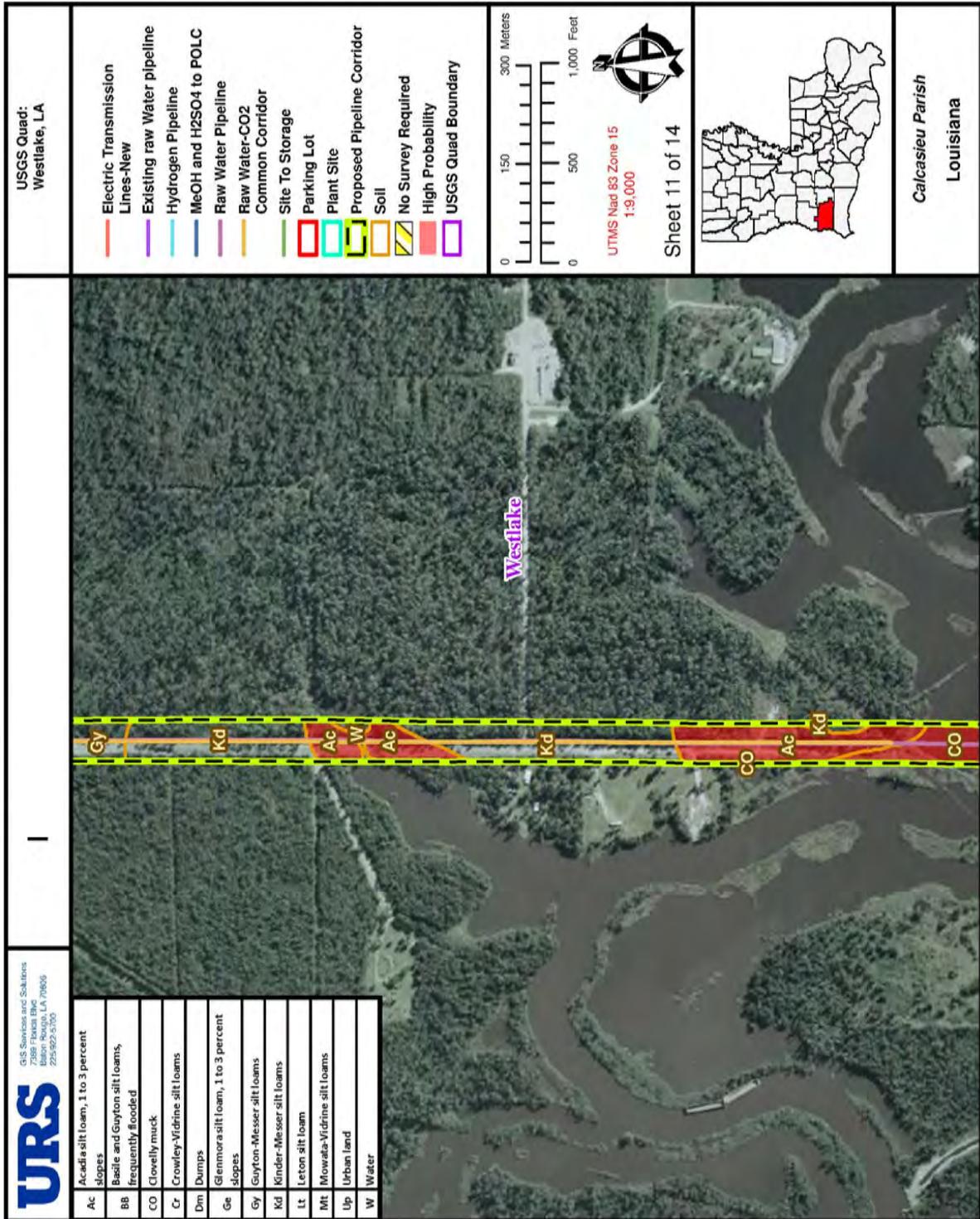


Figure 13 Soil Maps, Calcasieu Parish, Louisiana (Map 12 of 14)

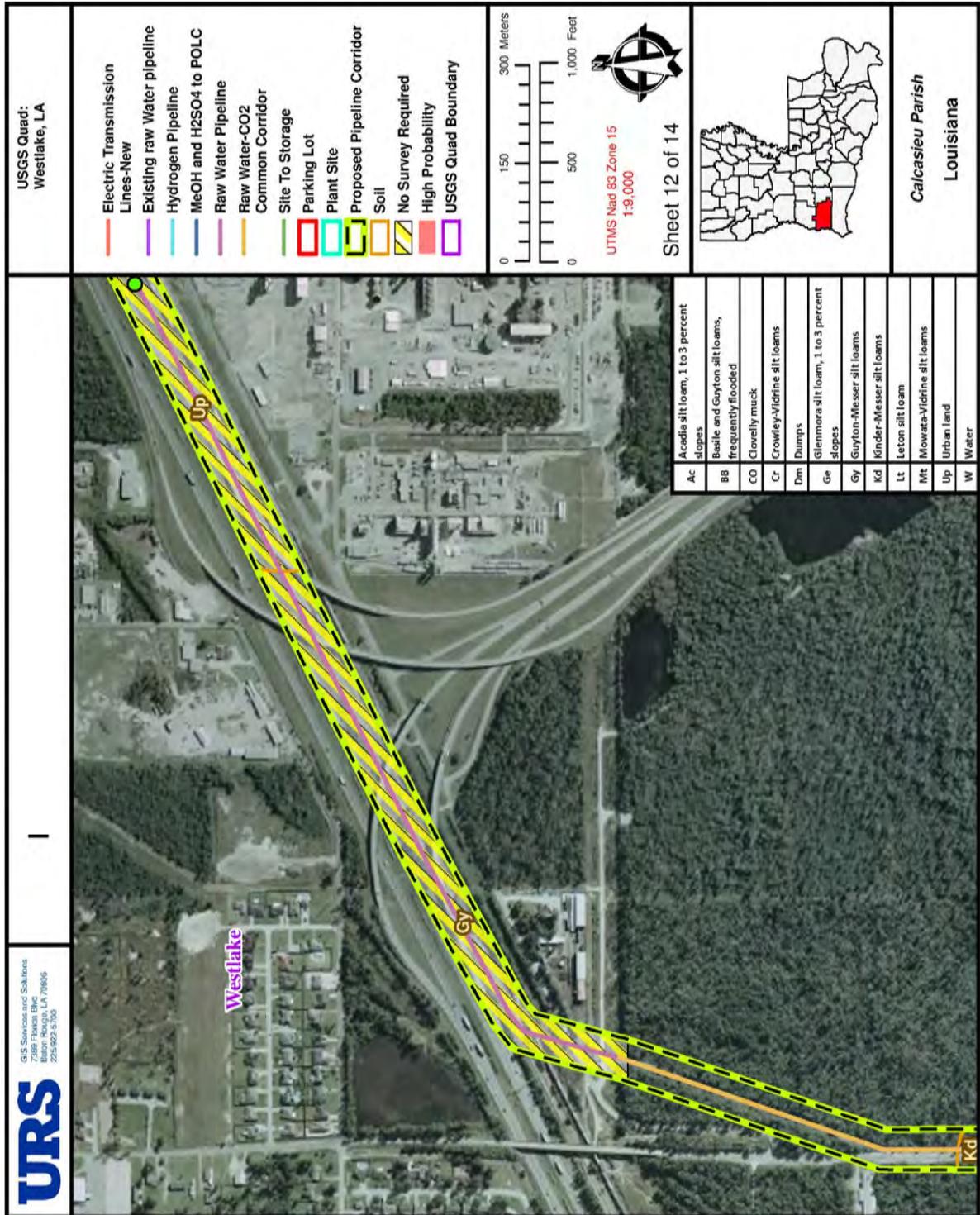


Figure 14 Soil Maps, Calcasieu Parish, Louisiana (Map 13 of 14)

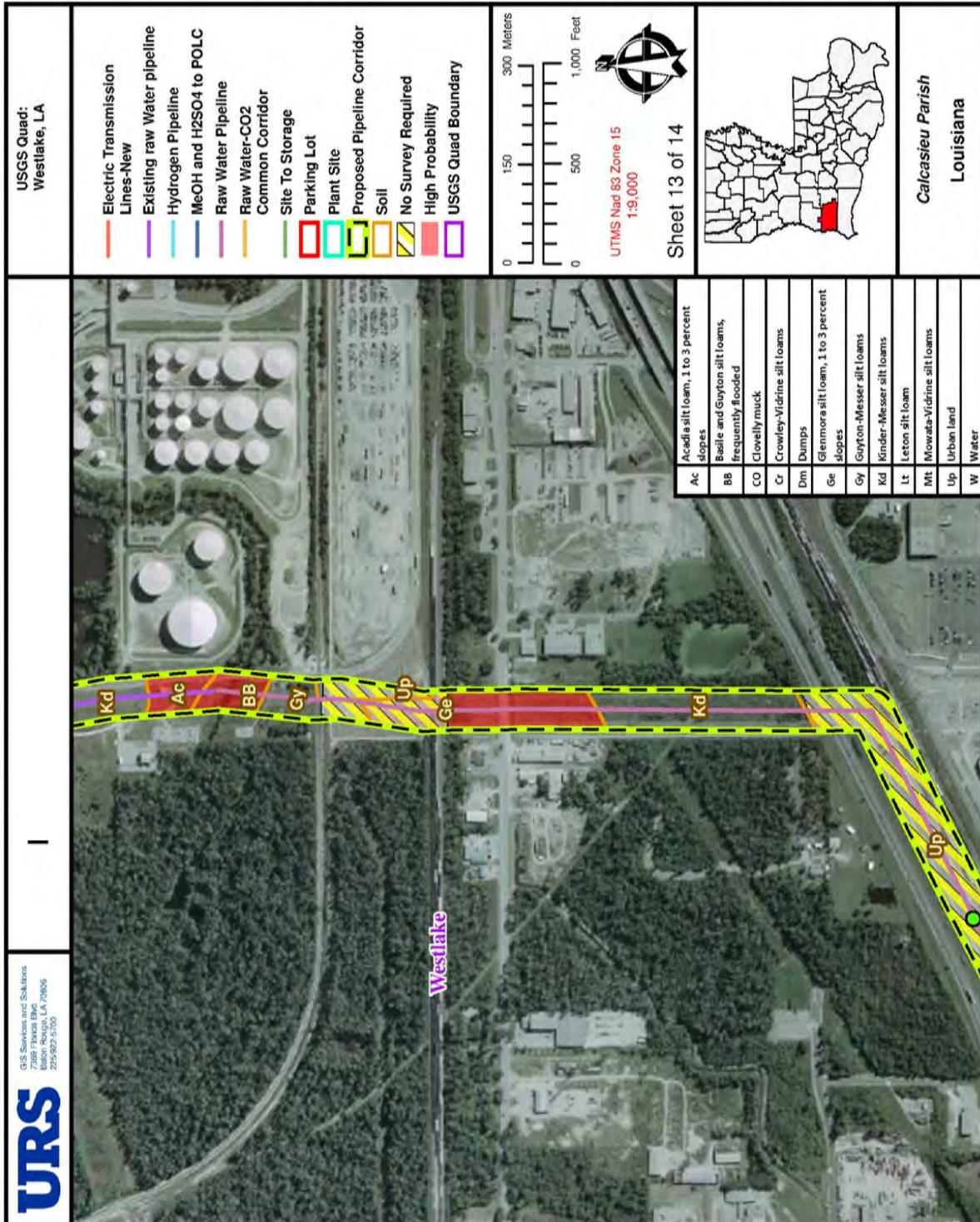
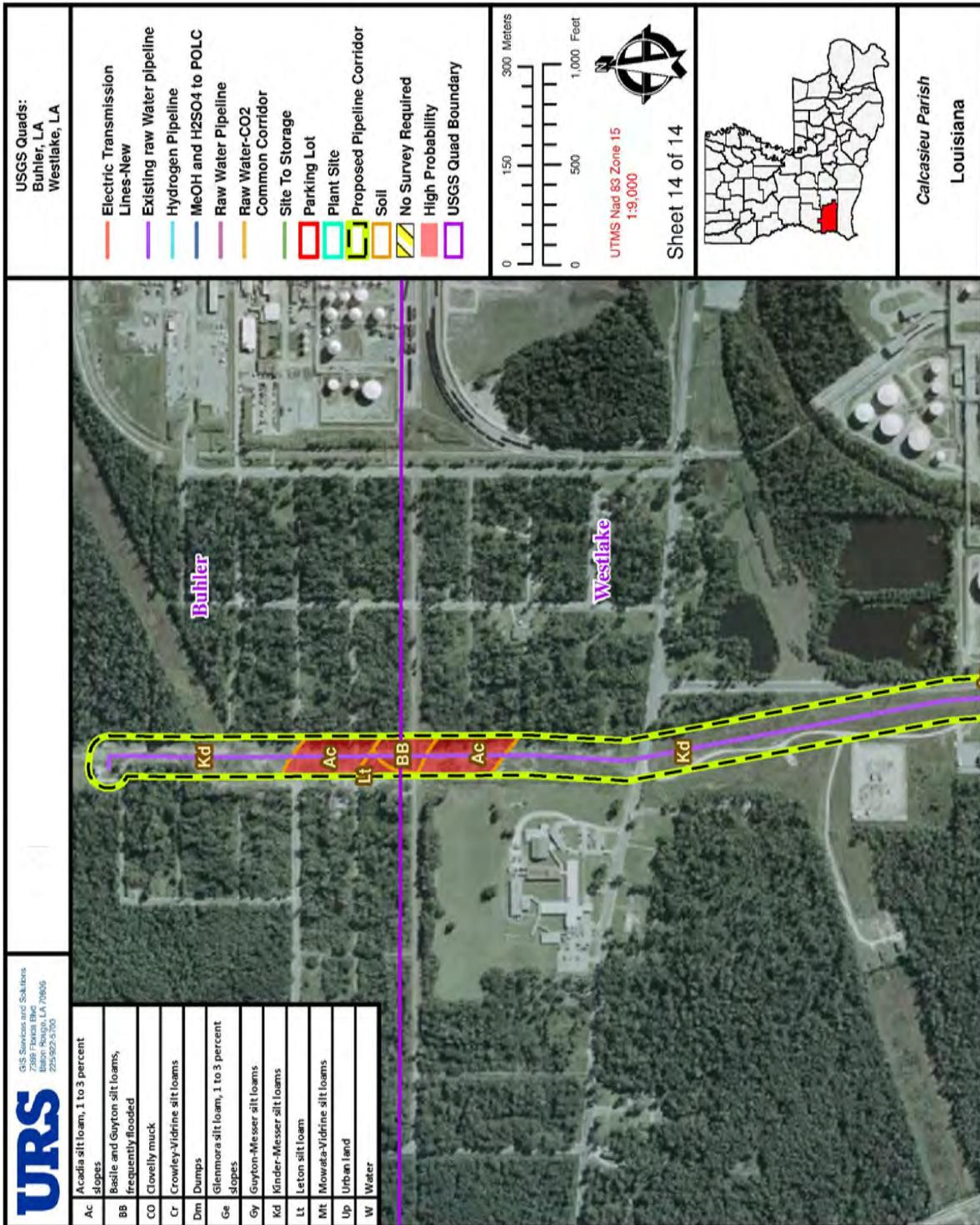


Figure 15 Soil Maps, Calcasieu Parish, Louisiana (Map 14 of 14)



Much of the survey corridor is characterized by gently sloping upland soils associated with the Gulf Coast Prairies (i.e., Crowley-Vidrine, Guyton-Messer, Kinder-Messer, and Mowata-Vidrine silt loams; 74.3%). These soils are located on flat to gently sloping, late Pleistocene alluvial, deltaic, and fluvial deposits; numerous natural circular mounds (pimple mounds) are also situated across the land surface. These landscapes have not been subject to alluvial deposition during the Holocene period (ca. 10,000 B.C. to present); therefore, archaeological cultural materials will generally be located close to the ground surface and have been subjected to natural and cultural erosional forces. This region also displays the highest degree of residential, agricultural, and industrial development; this, in concert with the shallowness of the archaeological deposits, can effectively destroy the integrity of archaeological deposits across this landscape.

The Floodplain and Stream Meander soils (i.e., Basile and Guyton; Leton) are associated mainly with the various drainages crossed by the project corridors. These soils account for approximately 9.6% of the survey area. Buried archaeological deposits are anticipated along the current and relict natural levees flanking these drainages, due to seasonal overbank flooding that used to characterize these waterways. In addition, the terrace margin deposits associated with the Acadia and Glenmora silt loams (9.0%) are also anticipated to display high archaeological site potential, as they are elevated landforms in close proximity to the drainages and floodplains. The two (2) Man-Made soils encountered in the project area (i.e., Dumps and Urban Land; 1.5%) are considered to display low archaeological site potential, based upon the level of disturbance associated with their deposition. In addition, 3.6% of the survey corridor was associated with open water bodies.

### **CULTURAL RESOURCES DATA COLLECTION**

Calcasieu Parish lies within Management Unit III while, as defined by *Louisiana's Comprehensive Archaeological Plan* (Smith et al. 1983). This management unit is defined based on common geography, culture, and economic development. Management Unit III is associated with a diverse geography, including forested uplands (north), open prairie (central), and coastal wetlands and cheniers (south) (Smith et al. 1983:61). Cultural resources background information was obtained for previously completed cultural resources surveys, previously recorded historic and prehistoric archaeological sites, historic standing structures, cemeteries, and listed National Register of Historic Places (NRHP) properties within the parish. For the purposes of this report, and as required by the Louisiana Division of Archaeology, the background review encompassed an approximately 0.5 to 1.0 mi (0.8 to 1.6 km) buffer zone surrounding the project areas. A summary of the various data sources from which information was gathered is presented below: (a) Louisiana Division of Archaeology (site forms and cultural resource surveys), located in Baton Rouge, Louisiana; (b) Louisiana Division of Historic Preservation/State Library (historic standing structures), located in Baton Rouge, Louisiana; (c) Louisiana Cultural Resources Map hosted by the Louisiana Division of Archaeology; (d) NRHP online database; and (e) the Louisiana Division of Historic Preservation National Register Website. This information provided a context for the subsequent discussions focusing on known cultural resource distributions within, and immediately adjacent to, the proposed property.

Twelve (12) Phase I cultural resources surveys have been conducted within or immediately adjacent to the proposed project areas (Table 2; Figures 15 to 20). Seven (7) of these studies were completed prior to 1994, with the remaining five (5) investigations after 2001. Five (5) of the studies were

conducted for proposed petrochemical facility footprints along the Calcasieu River, with an additional four (4) investigations associated with proposed lineal pipeline corridors. Dredging activities along the Calcasieu River accounted for two (2) cultural resources reports, while a single report dealt with the proposed access ramps associated with the I-10 and I-210 interchange.

**Table 2 Cultural Resources Investigations, Calcasieu Parish, Louisiana**

<b>Report Number</b>	<b>Title (Author)</b>	<b>Results</b>
22-0500	<i>Cultural Resources Survey of the I-210 and I-10 Interchange, West Ramp Modifications, Route I-220, Calcasieu Parish, Louisiana.</i> (Rivet 1979)	Assessed access ramps at the west terminus of the I-10, I-210 interchange just west of Lake Charles in Calcasieu Parish; no evidence of cultural material was found.
22-1168	<i>Cultural Resource Survey of the Proposed Bayou D'Inde Dredging and Maintenance Program, LMNOD-SA (Bayou D'Inde) 28.</i> (Frank 1986)	A cultural resources survey of the proposed Bayou D'Inde dredging and maintenance program was conducted, with boat, pedestrian survey, and shovel testing performed. Two previously recorded sites and four new sites were identified; four of the sites were considered potentially significant in terms of National Register criteria.
22-1325	<i>Cultural Resource Survey of the Proposed NL Chemicals Property, Calcasieu Parish, Lake Charles, Louisiana, WSNCo Project No. 87255</i> (Frank 1988)	A Phase I cultural resources survey was conducted for the proposed 40-acre NL Chemicals Property. The project area lies on the west ascending bank of the Calcasieu Ship Channel. The survey consisted of pedestrian survey and judgmental shovel-testing program on several 'pimple' mounds located in the project area. No cultural materials were recovered.
22-1501	<i>A Cultural Resources Survey of Two Segments of the Proposed Enron Products Pipeline, Inc.'s Cypress Pipeline Project, Cameron and Calcasieu Parishes, Louisiana.</i> (Price 1990)	A cultural resources survey of two segments of the proposed Enron Product's Cypress pipeline project in Cameron and Calcasieu Parishes was conducted, with boat and pedestrian survey implemented. Survey of both pipeline segments located no evidence of cultural material.
22-1505	<i>Level II Cultural Resources Survey of a Proposed Chlorine Pipeline, Calcasieu Parish, Louisiana</i> (Shuman 1990)	A Phase I cultural resources survey was conducted for a 3-mile long 6-inch diameter chlorine pipeline. No further additional cultural resources studies were recommended, but monitoring was advised for any locations that required deep drilling.
22-1573	<i>Cultural Resource Survey of the Proposed Kronos Louisiana, INC. Calcasieu Parish, Louisiana, WSNCo Project No. 91183</i> (Frank 1991)	A Phase I cultural resources survey was conducted for the proposed 110-acre Kronos Louisiana Property. The project area lies on the west ascending bank of the Calcasieu Ship Channel. The survey consisted of pedestrian survey and judgmental shovel testing on 'pimple' mounds encountered in the project area. Monitoring was recommended.
22-1783	<i>Cultural Resources Investigations Relative to the Proposed Sulphur Mines Salt Dome, Underground Natural Gas Storage Area, Calcasieu Parish, Louisiana</i> (Hahn and Weinstein 1994)	A cultural resources investigation (Phase 1) was conducted for the Proposed Sulphur Mines Salt Dome, Underground Natural Gas Storage Area, and its associated pipelines and compressor facilities in Calcasieu Parish, Louisiana. The study consisted of a reconnaissance survey of 37.13 km (23.06 mi) of a 18.29 m (60 ft) wide right-of-way and approximately 2.19 ha (5.41 ac) of various staging areas (e.g., metering stations, etc.). Two archaeological sites, one an aboriginal site (16CU27) and the other a historic industrial complex with an aboriginal component (16CU28), were discovered. Two standing structures constructed prior to 1943 were also recorded. None of the cultural resources have been recommended for inclusion in the National Register of Historic Places.

Report Number	Title (Author)	Results
22-2382	<i>Intensive Cultural Resources Survey Citgo Petroleum Corporation, Lake Charles Refinery, Calcasieu Parish, Louisiana</i> (Smith et al. 2001)	A Phase I cultural resources survey was conducted for the proposed 120-acre CITGO oil refinery. The project area lies directly west of the Calcasieu River, and at the southern extent of the Calcasieu Shipping Channel. Based on the results of the survey and site delineation, both Sites 16CU29 and 16CU30 were recommended for avoidance and additional testing of Site 16CU29 was recommended for the portions that extended to the east (outside) of their project area.
22-2498	<i>Phase I Cultural Resources Survey of the Proposed Hackberry LNG Terminal L.L.C. Project, Beauregard, Calcasieu and Cameron Parishes, Louisiana</i> (Ryan et al. 2002)	Coastal Environments, Inc., (CEI) conducted a Phase I cultural resources investigation for the Proposed Hackberry LNG Terminal L.L.C. project route through Beauregard, Calcasieu, and Cameron Parishes, Louisiana. The study consisted of a reconnaissance survey of 35.4 mi (56.95 km) of a 100 ft (30.5 m) wide right-of-way (ROW); in all approximately 233.05 ha (575.43 ac) were surveyed. Two archaeological sites, one historic house site (16CU31) and the other a historic industrial complex (16CU28), were examined during this survey. Two standing structures were also recorded.
22-2707	<i>A Cultural Resources Survey for the proposed Cheniere Creole Trail Pipeline, Cameron, Calcasieu, Beauregard, Jefferson Davis, Allen, and Acadia Parishes, Louisiana</i> (Dixon et al. 2005)	A Phase I survey of terrestrial cultural resources was conducted for the proposed Cheniere Creole Trail Pipeline in Cameron, Calcasieu, Beauregard, Jefferson Davis, Allen, and Acadia Parishes, Louisiana. The survey corridor for the pipeline measures approximately 275.4 km (171.1 mi) in length by 107 m (350 ft) in width. The fieldwork resulted in the recording of 11 new archaeological sites, 1 historic standing structure, and revisits to 2 previously recorded sites. Three prehistoric sites (16AL43, 16AL45, and 16AL46) and one historic grave site (16CU38) are recommended for avoidance. The remaining 9 sites are not considered to be eligible for listing in the National Register.
22-2988	<i>Phase I Cultural Resources Investigations Calcasieu River and Pass Dredged Material Management Plan Calcasieu and Cameron Parishes, Louisiana</i> (Ryan 2007)	Phase I cultural resources investigations were conducted for the Calcasieu River and Pass Dredged material management Plan (DMMP) in preparation by the U.S. Army Corps of Engineers (COE), New Orleans District. One archaeological site of undetermined eligibility (16CU14) was thought to be located within Disposal Area 12B. Map overlays of historic coastlines from 1955 through 2005 clearly showed that the site eroded into the River.
NA	<i>Field Assessment of Archaeological Site 16CU29, Lake Charles Gasification Facility, Lake Charles Cogeneration, LLC, Westlake, Calcasieu Parish, Louisiana</i> (Handly 2009)	A Phase I cultural resources survey was conducted within the immediate vicinity of archaeological Site 16CU29, identified previously by Smith et al. (2001:26, 36) as an intact prehistoric <i>Rangia</i> shell midden. The site appeared to extend into the southwest corner of the proposed Lake Charles Gasification Facility, Lake Charles Cogeneration, LLC, Westlake, Calcasieu Parish, Louisiana. The extensive shell midden that was previously noted was not observed during this later field investigation. It appeared that this shell midden had been eroded and/or redeposited from that portion of Site 16CU29. As a result, the site was not considered eligible for listing in the NRHP.

Ten (10) archaeological sites have been identified within 0.5 mi (0.8 km) of the proposed pipeline corridors and 1.0 mi (1.6 km) of the proposed project areas (Figures 15 to 20; Table 3); none of these sites is currently situated within the boundaries of these proposed development areas. Two (2) of the sites are located along the Calcasieu Ship Channel, with an additional seven (7) sites identified along Bayou D’Inde; a single site (16CU31) is located inland on a low terrace. Sites 16CU30, 16CU31, and 16CU73 are historic period scatters associated with the late nineteenth through mid-twentieth

centuries. The remaining seven (7) sites are prehistoric shell middens, containing large quantities of *Rangia cuneata* shell, prehistoric ceramics, and lithic tools. The cultural material associated with the majority of these prehistoric period sites (n=6) is affiliated with the Coles Creek Period in southwestern Louisiana, spanning from ca. AD 700 to 1100. The material culture found with Site 16CU29 is affiliated with slightly earlier periods; i.e., Marksville (100 BC to AD 400) and Baytown (AD 400 to 700). With regard to NRHP eligibility, five (5) sites were considered Eligible for listing; the remaining five (5) sites were considered Not Eligible for listing in the NRHP. Finally, no historic standing structures and/or listed NRHP properties are located within, or immediately adjacent to, the project areas.

**Table 3 Archaeological Sites, Calcasieu Parish, Louisiana**

Site Number	Site Type	Period	Location	Survey Method	NRHP Recommendations
16CU29	Shell Midden	Prehistoric (ca. 100 BC to AD 700)	Calcasieu Ship Channel	Shovel Test	Not Eligible
16CU30	Historic	Late 19 <sup>th</sup> – early 20 <sup>th</sup> century	Calcasieu Ship Channel	Shovel Test	Eligible
16CU31	Historic	Late 19 <sup>th</sup> – Mid-20 <sup>th</sup> century	Terrace	Shovel Test	Not Eligible
16CU73	Historic	Mid-20 <sup>th</sup> century	Bayou D’Inde	Shovel Test	Not Eligible
16CU170	Shell Midden	Prehistoric (AD 1 to 1400)	Bayou D’Inde	Surface Collection	Not Eligible
16CU195	Shell Midden	Prehistoric (Coles Creek)	Bayou D’Inde	Shovel Test	Eligible
16CU198	Shell Midden	Prehistoric (AD 500 to 1000)	Bayou D’Inde	Surface Collection	Eligible
16CU199	Shell Midden	Prehistoric (AD 700 to 1100)	Bayou D’Inde	Surface Collection	Not Eligible
16CU200	Shell Midden	Prehistoric (AD 700 to 1100)	Bayou D’Inde	Surface Collection, Shovel Test	Eligible
16CU201	Shell Midden	Prehistoric (AD 700 to 1100)	Bayou D’Inde	Surface Collection, Shovel Test	Eligible

**RESULTS AND RECOMMENDATIONS**

Approximately 22% (i.e., 95 ac) of the pipeline corridors have been impacted by prior land-altering disturbance, including the installation of underground utilities (i.e., pipeline emplacement and hydro-electric transmission line corridors), industrial petrochemical complexes, and/or the construction of Interstate I-10. Portions of these proposed pipeline corridors may also have been assessed during prior cultural resources surveys. URS recommends that those areas identified as either previously disturbed (as defined above and delineated preliminarily on Figures 2 to 14) or previously surveyed, should not require any additional cultural resources investigation. Consultation should be initiated between the LCC and the Louisiana Division of Archaeology to ensure that this proposed survey methodology would be considered acceptable.

Figure 15 Previous Investigations, Calcasieu Parish, Louisiana (Map 1 of 6)

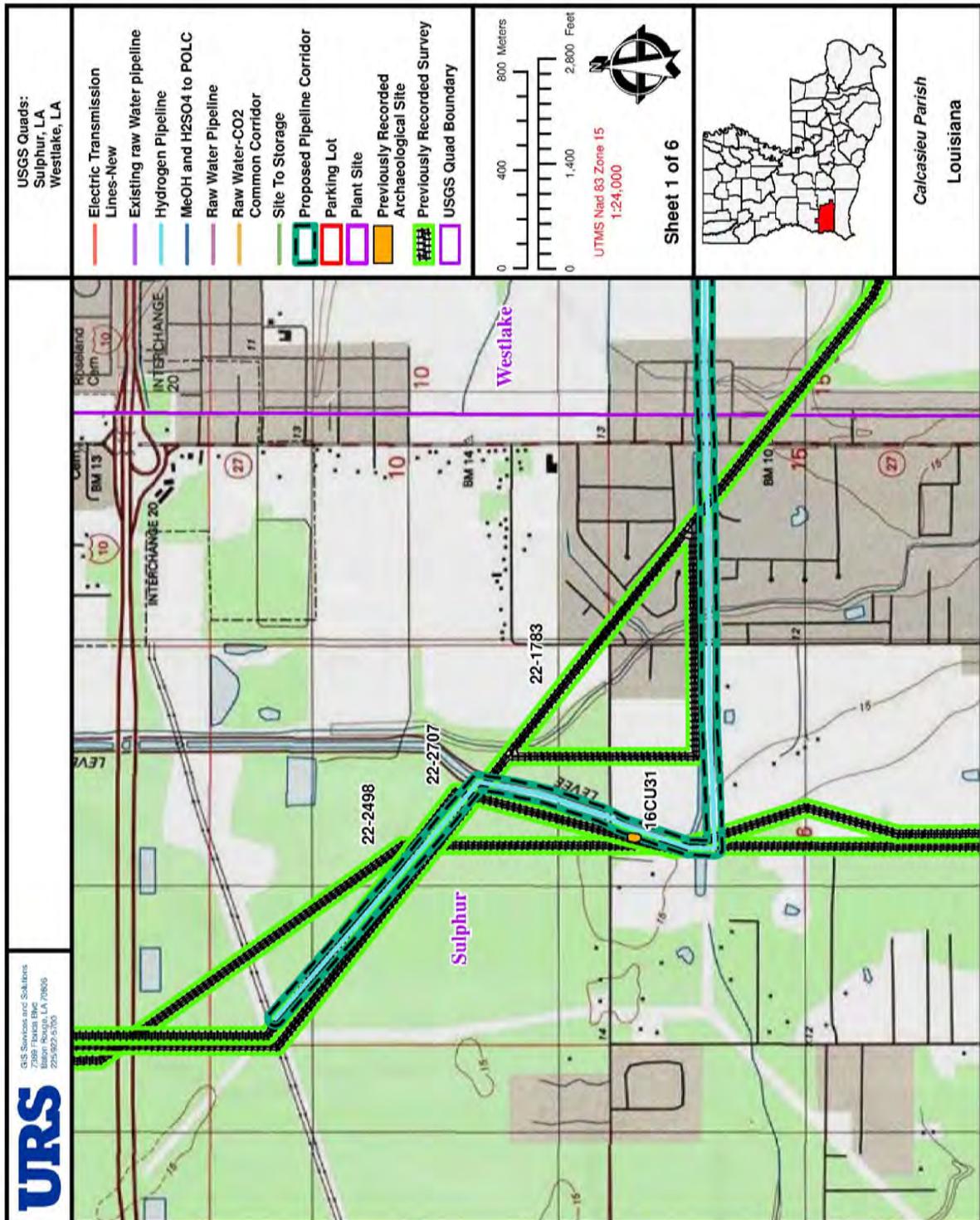


Figure 16 Previous Investigations, Calcasieu Parish, Louisiana (Map 2 of 6)

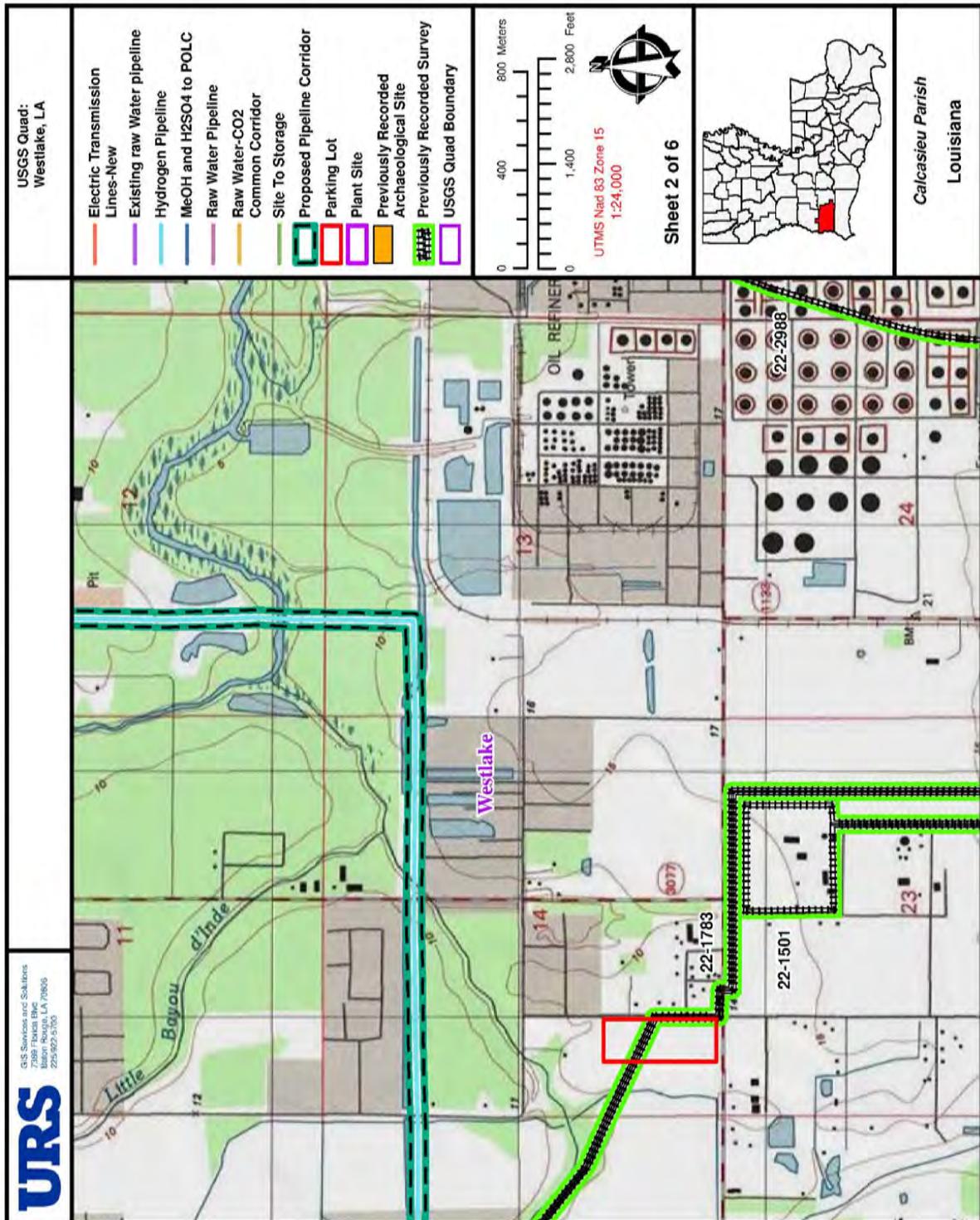




Figure 18 Previous Investigations, Calcasieu Parish, Louisiana (Map 4 of 6)

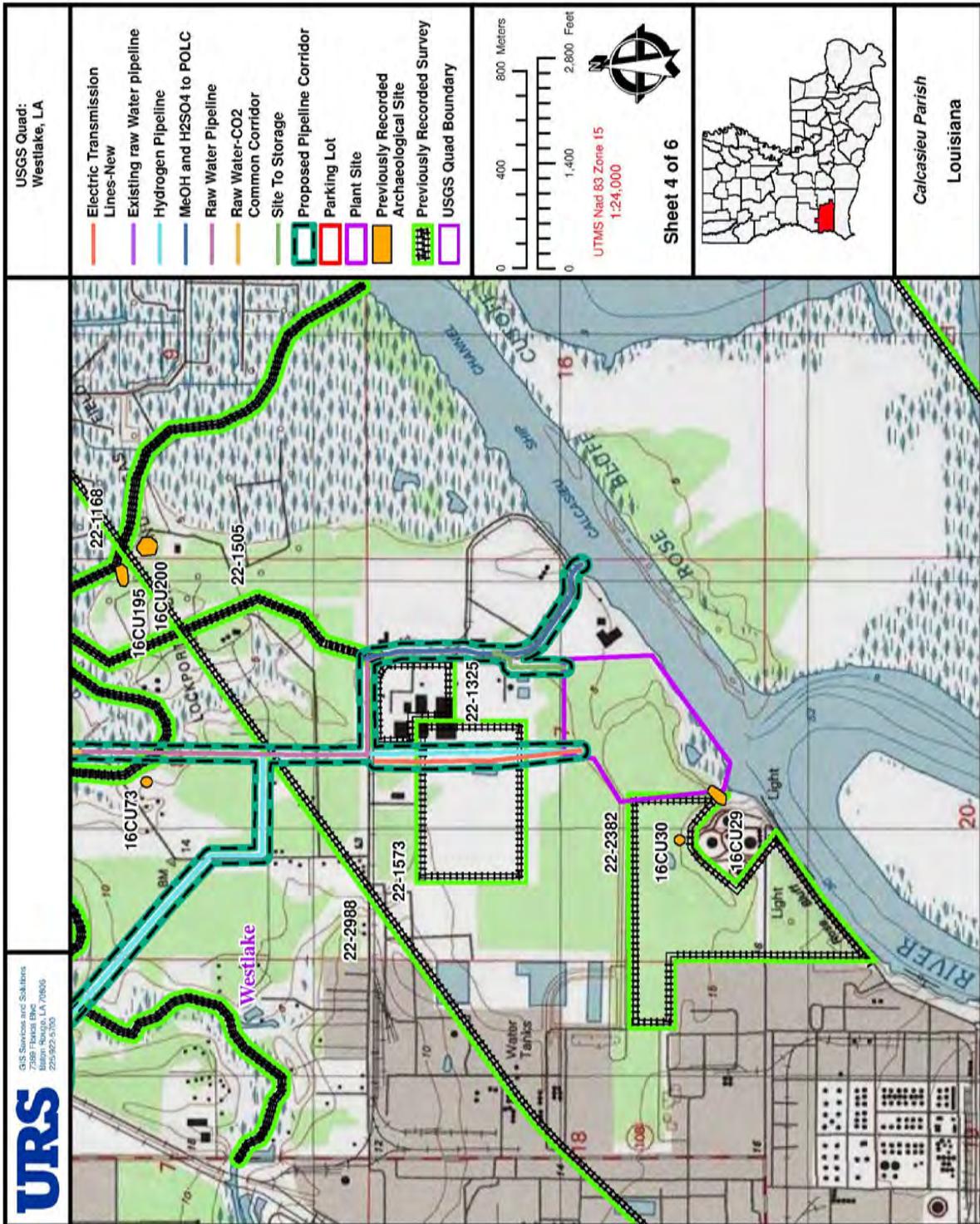
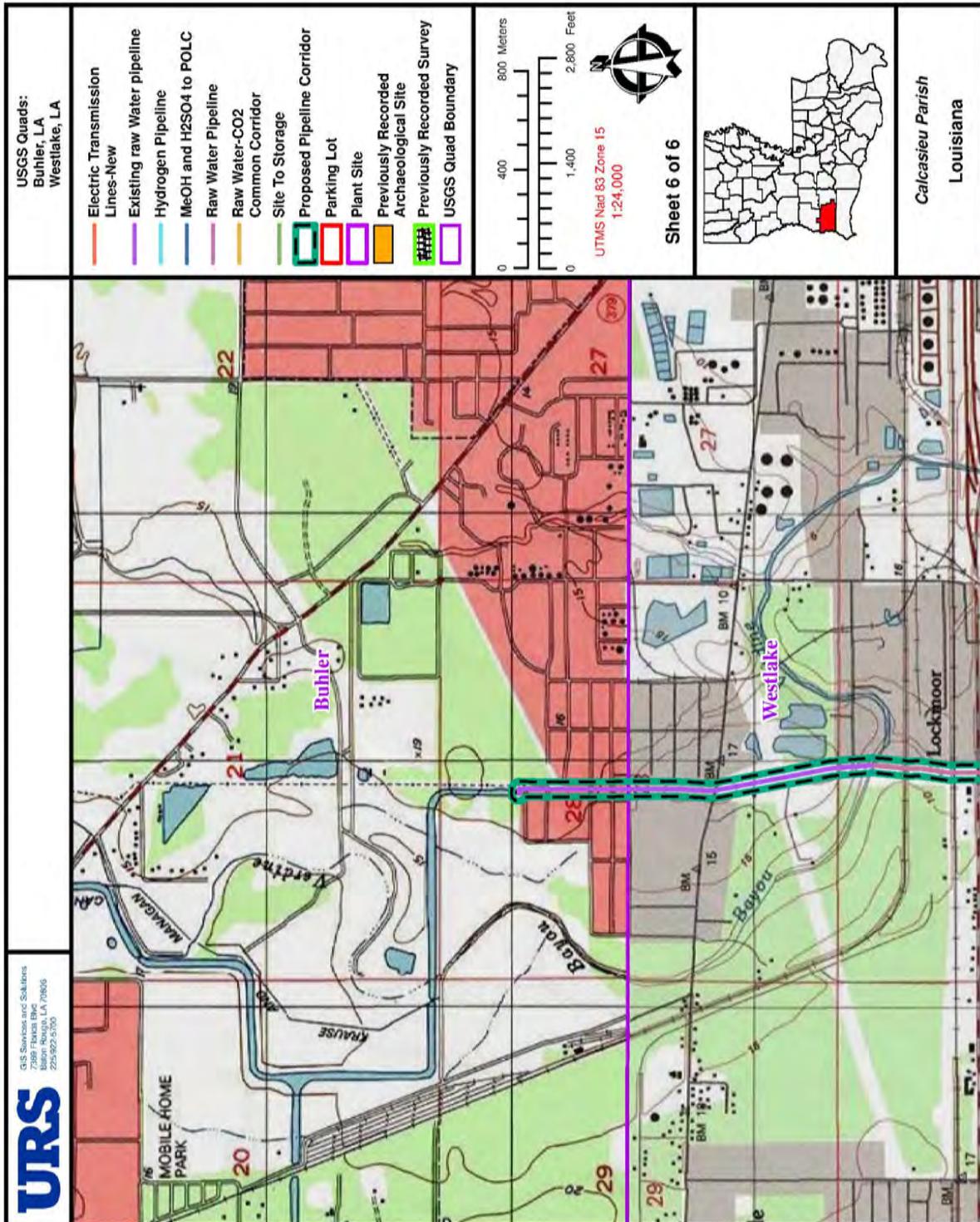




Figure 20 Previous Investigations, Calcasieu Parish, Louisiana (Map 6 of 6)



In addition, portions of the proposed parking area have been surveyed for cultural resources by Hahn and Weinstein (1994); this in combination with the prior clearing and grubbing of the parking area would indicate that the probability for identifying intact cultural resources in this area would also be considered very low. Consultation should be initiated between the LCC and the Louisiana Division of Archaeology to determine whether any further cultural resources investigation should be required for the proposed parking area.

### **PHASE I CULTURAL RESOURCES INVENTORY**

Phase I field studies are generally the initial stage of investigation to assess whether significant above-ground (historic buildings and/or cemeteries) or below-ground (archaeological sites) cultural resources are located within the property. Each Phase I project will generally begin with a background literature search for the project area using information on file at the Louisiana State Historic Preservation Office (SHPO) and the National Register of Historic Places (NRHP); most of that information is contained within this present document. The subsequent Phase I field investigation will record any above-ground historic standing structures and also implement the appropriate subsurface testing strategies to locate any historic and/or prehistoric archaeological sites that are present.

Based on state guidelines, the Phase I cultural resources survey effort would likely entail systematic subsurface shovel testing in areas of both low and high archeological site potential. According to the recent Louisiana Division of Archaeology fieldwork guidelines, assessment must also include some level of subsurface examination. Transect survey methods would allow for the properties to be assessed in a systematic and uniform manner and assist with the identification and assessment of any cultural resources encountered during the survey effort. Any cultural resources identified during the Phase I study would need to be assessed to determine their integrity, association, and research potential. Using SHPO guidelines, delineation of the cultural resources would normally involve the excavation of additional shovel tests at 10 to (32.8 ft) intervals from an established site datum. These shovel tests continue to be excavated until two (2) negative shovel tests were encountered within the site area. All archaeological sites are then recorded on Louisiana Archeological Site Forms and submitted for a formal site number. The gathered information, in association with the subsequent analysis of the recovered cultural material, is then used to determine whether the sites should be considered eligible or not eligible in relation to the NRHP criteria for evaluation (36 CFR 60.4 [a-d]), or if it requires further study to make this determination.

In a Phase I investigation, cultural resources staff also record all buildings and engineering elements greater than 50 years in age within or adjacent to the property boundary. The recording procedures for architectural resources follow the guidelines established by the National Park Service in their 1995 publication *National Register Bulletin 24: Guidelines for Local Survey – A Basis for Preservation Planning*. Both straight-on and corner photographs of all historic structures over approximately 50 years in age are taken, where possible. Specific information related to building materials, foundation type, structural form, architectural style, associated outbuildings and observed alterations, is collected to assess whether the property is believed eligible, not eligible, or cannot be assessed with respect to the NRHP criteria for evaluation (36 CFR 60.4 [a-d]).

## **REPORTING**

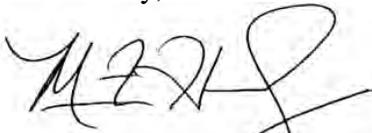
Upon completion of any fieldwork, the state requires a Draft Report be prepared that follows the content guidelines established by the Louisiana Division of Archaeology. Two copies of the draft report are sent to the Louisiana Division of Archaeology for their review and comment. Typically, this agency has 30 days to review a Phase I report. Upon receipt and incorporation of any agency comments, and concurrence with the report findings and recommendations, final reports are prepared and submitted to the relevant agencies for curation in their libraries.

## **CURATION**

The Louisiana Division of Archaeology requires that following the review and acceptance of the final cultural resources report, all artifacts, and copies of the records, photographs, and field notes must be curated at an acceptable public facility. The Division of Archaeology has its own facility that meets this requirement; costs for curation currently run at \$200.00/cubic foot of materials.

URS thanks you for the opportunity to submit this information to your office. If you have any questions or concerns, please feel free to contact me at the numbers below.

Sincerely,

A handwritten signature in black ink, appearing to read 'M Handly', with a large, stylized flourish extending from the end of the signature.

Martin Handly, M.A.  
Principal Investigator  
Phone: 225-231-6328  
Email: [martin.handly@urs.com](mailto:martin.handly@urs.com)

## REFERENCES CITED

Dixon, Boyd, Dale Norton, Rita Fields, and John Fulmer

- 2005 *A Cultural Resources Survey for the Proposed Cheniere Creole Trail Pipeline, Cameron, Calcasieu, Beauregard, Jefferson Davis, Allen, and Acadia Parishes, Louisiana.* PBS&J. Report No. 22-2707, on file, Louisiana Division of Archaeology, Baton Rouge, Louisiana.

Frank, J.

- 1988 *Cultural Resource Survey of the Proposed NL Chemicals Property, Calcasieu Parish, Lake Charles, Louisiana, WSNCo Project No. 87255.* Report No. 22-1325, on file, Louisiana Division of Archaeology, Baton Rouge, Louisiana.
- 1986 *Cultural Resource Survey of the Proposed Bayou D'Inde Dredging and Maintenance Program, LMNOD-SA (Bayou D'Inde) 28.* Report No. 22-1168, on file, Louisiana Division of Archaeology, Baton Rouge, Louisiana.
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Price, G.R. Dennis

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**Lake Charles Cogeneration LLC**

**Cultural Resources Assessment**

**Calcasieu Parish, Louisiana**

**URS Job. No. 10003620**

**July 2012**

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## 1.0 CULTURAL RESOURCES EVALUATION

During March of 2012, URS completed a Phase IA cultural resources desktop assessment for Lake Charles Cogeneration, LLC (LCC) in association with their proposed the Lake Charles Gasification Facility (LCGF) in Calcasieu Parish, southwest Louisiana (Figure 1). The purpose of this desktop investigation was to identify any previously recorded cultural resources within a 1.0 mile (1.6 km) radius of the existing LCC facility and provide a preliminary assessment of the archaeological site potential of areas surrounding the existing facility. The desktop radius was shifted slightly to the northwest to encompass lands on the west bank of the Calcasieu Ship Channel, adjacent to the existing LCC facility, which might be suitable for the location of a proposed storage/laydown area.

This investigation followed the general guidelines and procedures outlined in *Louisiana's Comprehensive Archaeological Plan* (Smith et al. 1983), the Cultural Resource Assessment standards provided by the Louisiana Division of Archaeology (2009), the National Historic Preservation Act of 1966 (as amended), the Archaeological and Historic Preservation Act of 1974, Title 36 of the Code of Federal Regulations (Parts 60-66 and 800) and *Archeology and Historic Preservation: The Secretary of the Interior's Guidelines*.

No field studies or surveys were conducted for this project; at this preliminary stage, cultural resource data collection and evaluation was conducted on a desktop basis using only existing hard copy data, internet site information, and GIS data. A summary of the various data sources from which the information was gathered is presented below:

- (1) Louisiana Division of Archaeology (site forms and cultural resource surveys), located in Baton Rouge, Louisiana;
- (2) Louisiana Division of Historic Preservation/State Library (historic standing structures), located in Baton Rouge, Louisiana;
- (3) Louisiana Cultural Resources Map hosted by the Louisiana Division of Archaeology;
- (4) National Register of Historic Places (NRHP) online database; and,
- (5) Louisiana Division of Historic Preservation National Register Website.

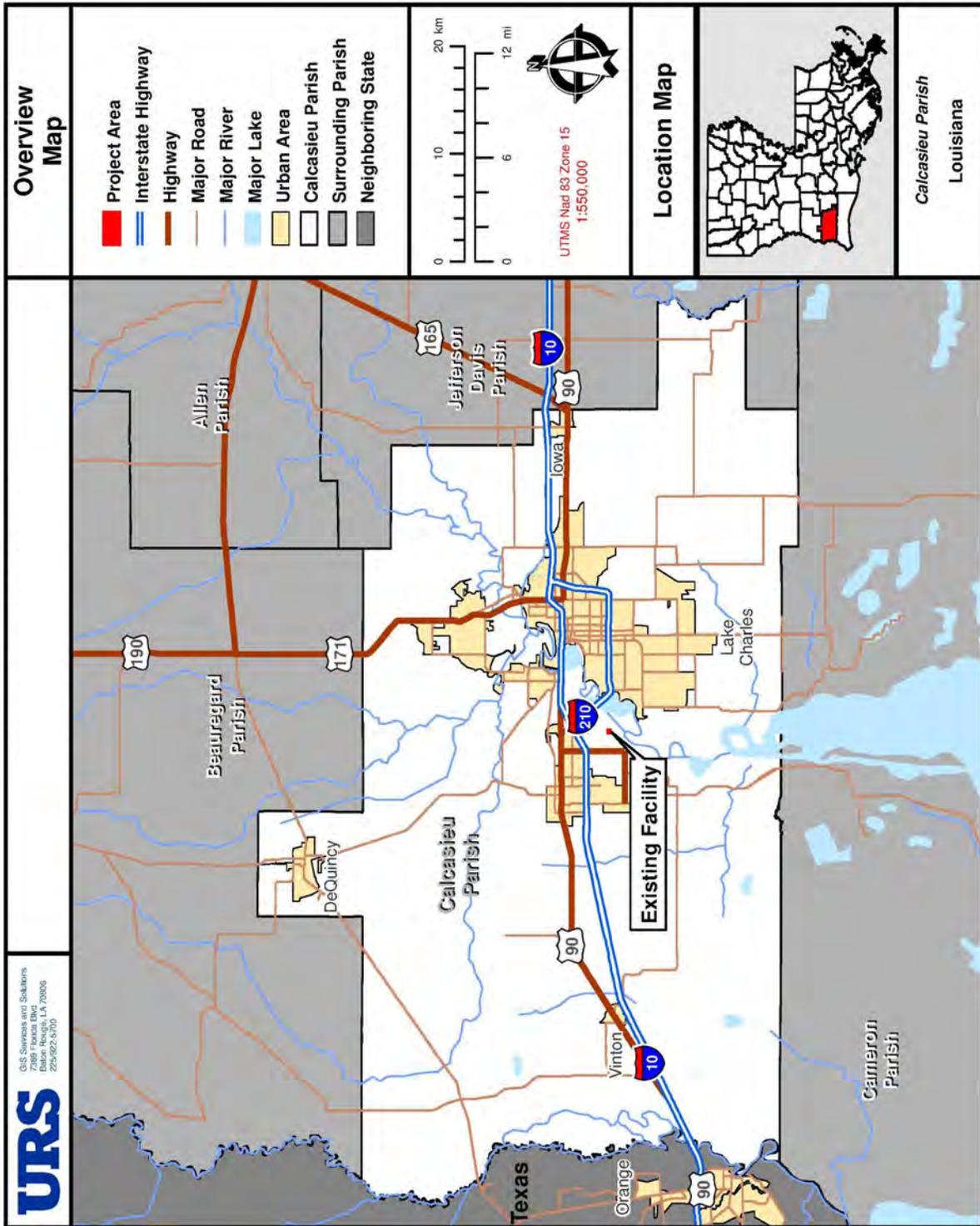
The property was assessed to provide a technical estimate to LCC concerning the expected levels of archaeological effort (i.e., Phase I cultural resources inventory, Phase II National Register evaluative testing, and/or Phase III data recovery) that may be required to receive Section 106 clearance on the property. Mr. Martin Handly (MA) served as the Principal Investigator for this project and wrote this report, while Mr. Shane Poche (BA) prepared the graphics that appear in this report.

### 1.1 CULTURAL RESOURCES DATA COLLECTION

Calcasieu Parish lies within Management Unit III while, as defined by *Louisiana's Comprehensive Archaeological Plan* (Smith et al. 1983). This management unit is defined based on common geography, culture, and economic development. Management Unit III is associated with a diverse geography, including forested uplands (north), open prairie (central), and coastal wetlands and cheniers (south) (Smith et al. 1983:61). Cultural resources background information was obtained for previously completed cultural resources surveys, previously recorded historic

and prehistoric archaeological sites, historic standing structures, cemeteries, and listed National Register of Historic Places (NRHP) properties within the parish.

**Figure 1 Overview of LCC Property, Calcasieu Parish, Louisiana**



For the purposes of this report, and as required by the Louisiana Division of Archaeology, the background review encompassed an approximately 1.0 mile (1.6 km) buffer zone surrounding the existing facility boundary (Area of Potential Effect [APE]). A summary of the various data sources from which information was gathered is presented below: (a) Louisiana Division of Archaeology (site forms and cultural resource surveys), located in Baton Rouge, Louisiana; (b) Louisiana Division of Historic Preservation/State Library (historic standing structures), located in Baton Rouge, Louisiana; (c) Louisiana Cultural Resources Map hosted by the Louisiana Division of Archaeology; (d) NRHP online database; and (e) the Louisiana Division of Historic Preservation National Register Website. This information provided a context for the subsequent discussions focusing on known cultural resource distributions within, and immediately adjacent to, the proposed property.

Four (4) cultural resources surveys have been conducted within or immediately adjacent to the existing facility (Table 1; Figure 2). Three (3) of these studies were completed prior to 1990, with the remaining investigation conducted in 2001. Three (3) of the studies were conducted for proposed petrochemical facility footprints along the Calcasieu River, with a single study associated with a lineal pipeline corridor leading to one of the facilities. All four (4) of the investigations were Phase I cultural resources survey efforts.

**Table 1 Cultural Resources Investigations, LCC Property, Calcasieu Parish, Louisiana**

<b>Report Number</b>	<b>Title (Author)</b>	<b>Results</b>
22-1325	<i>Cultural Resource Survey of the Proposed NL Chemicals Property, Calcasieu Parish, Lake Charles, Louisiana, WSNCo Project No. 87255</i> (Frank 1988)	A Phase I cultural resources survey was conducted for the proposed 40-acre NL Chemicals Property. The project area lies on the west ascending bank of the Calcasieu Ship Channel. The survey consisted of pedestrian survey and judgmental shovel-testing program on several ‘pimple’ mounds located in the project area. No cultural materials were recovered.
22-1505	<i>Level II Cultural Resources Survey of a Proposed Chlorine Pipeline, Calcasieu Parish, Louisiana</i> (Shuman 1990)	A Phase I cultural resources survey was conducted for a 3-mile long 6-inch diameter chlorine pipeline. No further additional cultural resources studies were recommended, but monitoring was advised for any locations that required deep drilling.
22-1573	<i>Cultural Resource Survey of the Proposed Kronos Louisiana, INC. Calcasieu Parish, Louisiana, WSNCo Project No. 91183</i> (Frank 1991)	A Phase I cultural resources survey was conducted for the proposed 110-acre Kronos Louisiana Property. The project area lies on the west ascending bank of the Calcasieu Ship Channel. The survey consisted of pedestrian survey and judgmental shovel testing on ‘pimple’ mounds encountered in the project area. Monitoring was recommended, but no cultural materials were recovered.
22-2382	<i>Intensive Cultural Resources Survey Citgo Petroleum Corporation, Lake Charles Refinery, Calcasieu Parish, Louisiana</i> (Smith et al. 2001)	A Phase I cultural resources survey was conducted for the proposed 120-acre CITGO oil refinery. The project area lies directly west of the Calcasieu River, and at the southern extent of the Calcasieu Shipping Channel. Based on the results of the survey and site delineation, both Sites 16CU29 and 16CU30 were recommended for avoidance and additional testing of Site 16CU29 was recommended for the portions that extended to the east (outside) of their project area.

Nine (9) archaeological sites have been identified within 1.0 mi (1.6 km) of the existing facility (Figure 2; Table 2). Two (2) of the sites are located along the Calcasieu Ship Channel, with the remainder identified along Bayou D’Inde, to the north of the existing facility. Sites 16CU30 and 16CU73 are both historic period scatters associated with the late nineteenth through mid-twentieth centuries. The remaining seven (7) sites are prehistoric shell middens, containing large quantities of *Rangia cuneata* shell, prehistoric ceramics, and lithic tools. The cultural material associated with the majority of these prehistoric period sites (n=6) is affiliated with the Coles Creek Period in southwestern Louisiana, spanning from ca. AD 700 to 1100. The material culture found with Site 16CU29 is affiliated with slightly earlier periods; i.e., Marksville (100 BC to AD 400) and Baytown (AD 400 to 700). With regard to NRHP eligibility, five (5) sites were considered Eligible for listing; the remaining four (4) sites were considered Not Eligible for listing in the NRHP. Finally, no historic standing structures, cemeteries, and/or listed NRHP properties are located within, or immediately adjacent to, the project property.

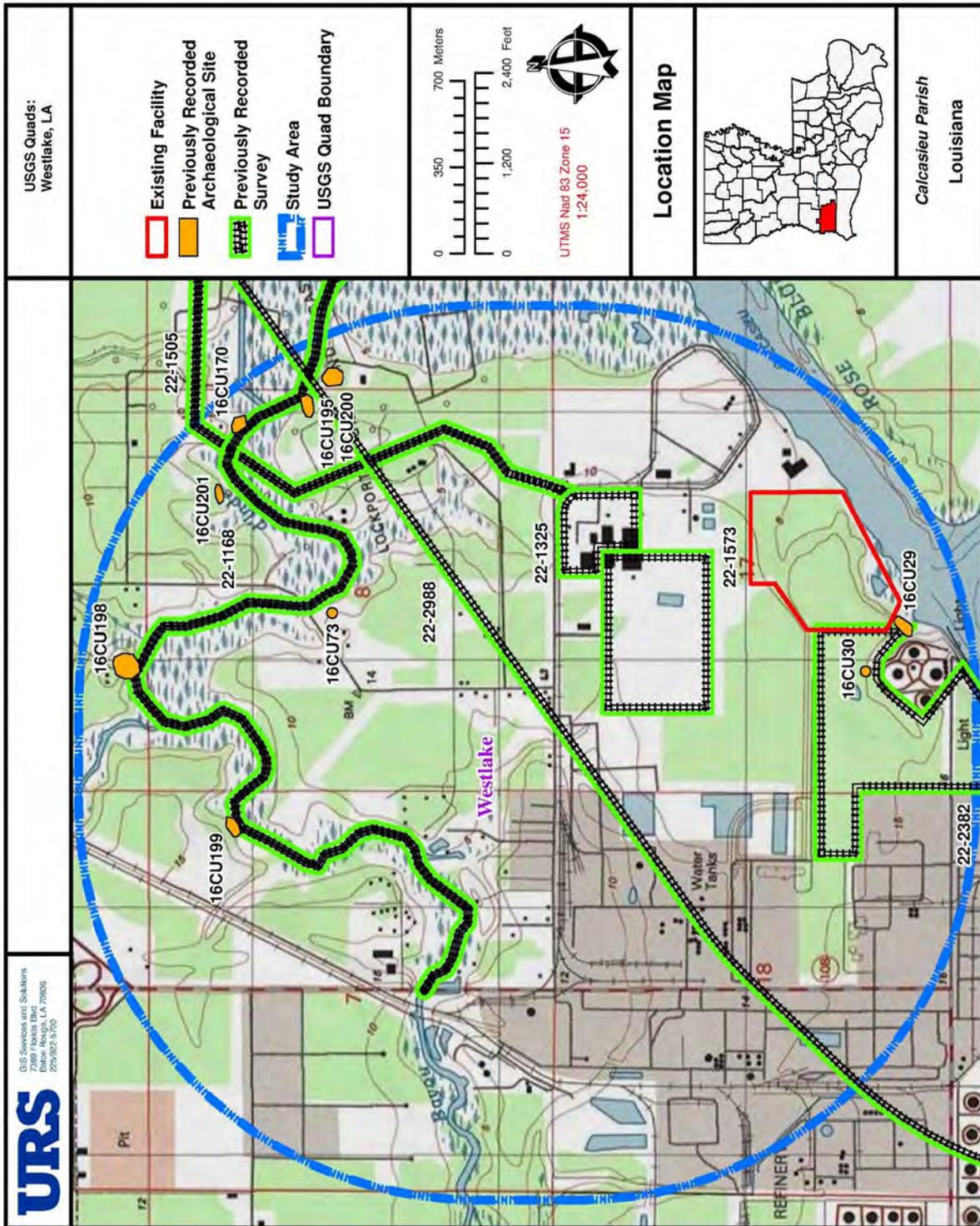
**Table 2 Archaeological Sites, LCC Property, Calcasieu Parish, Louisiana**

Site Number	Site Type	Period	Location	Survey Method	NRHP Recommendations
16CU29	Shell Midden	Prehistoric (ca. 100 BC to AD 700)	Calcasieu Ship Channel	Shovel Test	Not Eligible
16CU30	Historic	Late 19 <sup>th</sup> –early 20 <sup>th</sup> century	Calcasieu Ship Channel	Shovel Test	Eligible
16CU73	Historic	Mid-20 <sup>th</sup> century	Bayou D’Inde	Shovel Test	Not Eligible
16CU170	Shell Midden	Prehistoric (AD 1 to 1400)	Bayou D’Inde	Surface Collection	Not Eligible
16CU195	Shell Midden	Prehistoric (Coles Creek)	Bayou D’Inde	Shovel Test	Eligible
16CU198	Shell Midden	Prehistoric (AD 500 to 1000)	Bayou D’Inde	Surface Collection	Eligible
16CU199	Shell Midden	Prehistoric (AD 700 to 1100)	Bayou D’Inde	Surface Collection	Not Eligible
16CU200	Shell Midden	Prehistoric (AD 700 to 1100)	Bayou D’Inde	Surface Collection, Shovel Test	Eligible
16CU201	Shell Midden	Prehistoric (AD 700 to 1100)	Bayou D’Inde	Surface Collection, Shovel Test	Eligible

Currently, the area surrounding the existing facility is a mix of coastal marsh, woodland, and industrial facilities. Of the nine previously identified archaeological sites, seven are situated on stream terrace soils affiliated with the Acadia silt loam (Table 3). These elevated terrace margins are located adjacent to waterbodies, such as Bayou D’Inde, and considered to display higher archaeological site potential. This drainage is where five of the prehistoric shell midden sites and two of the historic period sites were identified.

The Clovelly Muck is associated with predominantly inundated brackish waters found in coastal marshes. Overall, these soils are anticipated to display lower archaeological site potential; however, two previously recorded prehistoric shell midden sites (i.e., 16CU170 and 16CU198) were associated with this soil type within the study area.

Figure 2 Previous Investigations, LCC Property, Calcasieu Parish, Louisiana



**Table 3 Archaeological Site Locations and Associated Soils, LCC Property, Calcasieu Parish, Louisiana**

Archaeological Sites	Landform	Soil Name	Drainage	Slope (%)	Archaeological Potential
16CU170 16CU198	Coastal Marsh	Clovelly muck	Very Poorly Draining	0	Low
16CU29 16CU30 16CU73 16CU195 16CU199 16CU200 16CU201	Stream Terrace	Acadia silt loam	Somewhat poorly	1-3	High

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Enclosure 6

List of Federally Recognized Indian Tribes for the portions of the  
Proposed Lake Charles CCS Project and LCCE Gasification Project in Calcasieu Parish,  
Louisiana

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**List of Federally Recognized Indian Tribes with a Potential Interest in  
the proposed Lake Charles CCS Project and LCCE Gasification Project in  
Calcasieu Parish, Louisiana**

<b>Federally-recognized Indian Tribe</b>	<b>Potential Interest</b>
Chitimacha Tribe of Louisiana	Located in Louisiana
Coushatta Tribe of Louisiana	Located in Louisiana
Jena Band of Choctaw Indians	Located in Louisiana
Tunica-Biloxi Tribe of Louisiana	Located in Louisiana
Alabama Coushatta Tribe of Texas	Located in Texas, but identified as a tribe with historical interest in parts of Louisiana by the Louisiana CRT
Caddo Nation	Located in Oklahoma, but identified as a tribe with historical interest in parts of Louisiana by the Louisiana CRT
Mississippi Band of Choctaw Indians	Located in Mississippi, but identified as a tribe with historical interest in parts of Louisiana by the Louisiana CRT
Quapaw Tribe of Oklahoma	Located in Oklahoma, but identified as a tribe with historical interest in parts of Louisiana by the Louisiana CRT
Choctaw Nation of Oklahoma	Located in Oklahoma, but identified as a tribe with historical interest in parts of Louisiana by the Louisiana CRT
Seminole Nation of Oklahoma	Located in Oklahoma, but identified as a tribe with historical interest in parts of Louisiana by the Louisiana CRT
Seminole Tribe of Florida	Located in Florida, but identified as a tribe with historical interest in parts of Louisiana by the Louisiana CRT

Sources: Louisiana CRT 2011b, BIA 2011; NPS 2011c, 2011d, 2011e, 2011f; Sturtevant 1967.

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JAY DARDENNE  
LIEUTENANT GOVERNOR

**State of Louisiana**  
OFFICE OF THE LIEUTENANT GOVERNOR  
DEPARTMENT OF CULTURE, RECREATION & TOURISM  
OFFICE OF CULTURAL DEVELOPMENT  
DIVISION OF ARCHAEOLOGY

CHARLES R. DAVIS  
DEPUTY SECRETARY  
  
PAM BREAUX  
ASSISTANT SECRETARY

January 24, 2013

Ms. Janine Whitken  
Ecology and Environment, Inc.  
368 Pleasant View Drive  
Lancaster, New York 14086

Re: Lake Charles Carbon Capture and Sequestration (CCS) Project  
APE, Phase IA Cultural Resources Investigations, an Cultural Resources  
Calcasieu Parish, Louisiana

Dear Ms. Whitken:

This in response to your submission dated August 15, 2012, concerning the above-referenced project. We have reviewed the enclosed documentation and concur with the proposed Area of Potential Effect. Furthermore, we have reviewed the Phase IA cultural Resources Report for the Proposed LCCE Gasification Project Offsite Facilities. We agree with the recommendation of the archaeologists that previously surveyed areas or areas that have been identified as distributed do require any further investigation.

For the remaining areas, we agree that the field methodology outlined in the report is an appropriate measure to identify any potential historic properties. We agree with the high probability areas determination and those areas should be surveyed as such. The remaining areas will be surveyed at our low probability standards. We look forward to reviewing the report upon completion of the field work. If you have any questions, please contact Rachel Watson in the Division of Archaeology at (225)342-8165 or [rwatson@crt.la.gov](mailto:rwatson@crt.la.gov).

Sincerely,

Pam Breaux  
State Historic Preservation Officer

PB:RW:s

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August 15, 2012

Mr. Mark Wolfe  
State Historic Preservation Officer  
Texas Historical Commission  
P.O. Box 12276  
Austin, Texas 78711

**SUBJECT:** Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Brazoria County, Texas (and Calcasieu Parish, Louisiana)

Dear Mr. Wolfe:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR Part 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, the DOE is consulting with the Texas Historical Commission on the proposed project.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, in Brazoria County, Texas. Please note that as of June 1, 2012, the name of Lake Charles Cogeneration, LLC was changed to Lake Charles Clean Energy, LLC. Historical references to Lake Charles Cogeneration (LCC) Gasification are now LCCE Gasification.

During the DOE demonstration phase of the proposed project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, and transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast and is not part of DOE's evaluation.

A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the Lake Charles CCS Project and its associated CO<sub>2</sub> capture and compression facilities in Calcasieu Parish, Louisiana;
- the Lake Charles CCS Project proposed 11.1 mile CO<sub>2</sub> pipeline in Calcasieu Parish Louisiana;
- Lake Charles CCS Project proposed Research Monitoring, Verification, Analysis (MVA) program for the CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation in Brazoria County, Texas; and
- the LCCE Gasification Project and its associated facilities in Calcasieu Parish, Louisiana (connected action).

DOE has determined that the area of potential effects (APE) for the undertaking will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCCE Gasification, which are located in Calcasieu Parish, Louisiana and in Brazoria County, Texas. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The APE in Texas includes the location of the CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation and Research MVA program at the existing Hastings Oil Field in Brazoria County, Texas (see Enclosure 2).

The APE in Calcasieu Parish, Louisiana includes the locations of:

- the CO<sub>2</sub> capture and compression facilities for the Lake Charles CCS Project on the west bank of the Calcasieu River;
- the LCCE Gasification project, also on the west bank of the Calcasieu River;
- the offsite facilities associated with the LCCE Gasification project including the proposed new methanol storage area; hydrogen pipeline; water supply pipeline; natural gas pipeline; co-located transmission line, potable water line, and methanol pipeline; equipment laydown area; and offsite parking area (see Enclosure 2).
- the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline; or,
- the alternative 11.6-mile long alignment for the CO<sub>2</sub> pipeline that connects to the existing Green Pipeline (to the southwest).

In October 2011, William Self Associates, Inc. (WSA) conducted a records and literature search of the area within the Research MVA portion of the APE for the proposed action (Karbula 2011). The results of this records and literature search were sent to your office on October 25, 2011 and are included in Enclosure 3. The purpose of the records and literature search by WSA was to determine the presence of previously identified cultural resources and historic properties within the Research MVA portion of the APE; to determine the extent of previous and existing disturbance

and development within the Research MVA portion of the APE; and to evaluate the potential sensitivity of the Research MVA portion of the APE for unidentified cultural resources or historic properties. Results of the records and literature search by WSA indicated that there are no recorded archaeological sites, cemeteries, NRHP properties, State Archaeological Landmarks (SAL) or markers within the Research MVA portion of the APE. Because the Hastings Oil Field is a highly disturbed landscape resulting from decades of exploration for oil and characterized by the presence of numerous oil companies' pipelines, wells and support infrastructure, the potential for intact undisturbed soil profiles with archaeological sensitivity within the Research MVA portion of the APE is limited, if not entirely absent (Karbula 2011).

As a result of the records and literature search, WSA recommended that the Research MVA portion of the APE has a low probability for containing NRHP-eligible historic properties and that no archeological survey of the Research MVA areas is needed for the Proposed Action (Karbula 2011). The Texas State Historic Preservation Officer (SHPO) concurred that the Research MVA area has a very low probability for containing NRHP-eligible properties and/or for formal designation as an SAL, and indicated that the Research MVA portion of the Proposed Action may proceed without consultation with the Texas SHPO, provided that no significant archaeological deposits are encountered during development activities within the Research MVA area (Wolfe 2011). Documentation of the previous consultation between WSA and your office regarding the results of the records and literature search and archaeological sensitivity assessment for the APE in Brazoria County is in Enclosure 3.

DOE is not aware of any other previously conducted cultural resources investigations in the portion of the APE in Brazoria County, Texas (i.e., at the location of the proposed Hasting injection site and Research MVA program at the existing Hastings Oil Field). DOE confirmed that no NRHP-listed historic properties or districts, neighborhood surveys, historical markers, cemeteries, museums, historic county courthouses, military sites, or SALs that are buildings are within the APE or a 0.5 mile radius around the APE in Brazoria County, Texas (NPS 2011a, 2011b; Texas Historical Commission [THC] 2011).

In accordance with Section 106 of the NHPA, DOE is writing to seek your concurrence on the proposed project's APE in Texas per 36 CFR 800.4(a)(1). DOE is also seeking your concurrence with DOE's proposed determination of no historic properties affected for the proposed project under 36 CFR 800.4(d)(1), based on the results of the records and literature search by WSA and the conclusions included in correspondence between your office and WSA.

DOE has identified three federally recognized Indian Tribes with a potential interest in the portions of the proposed project in Texas (see Enclosure 4) and is also seeking information from your office for any other parties that may have an interest in the Section 106 consultation process for the proposed project in accordance with 36 CFR 800.3(f). Additionally, DOE would appreciate your assistance with the identification of any additional issues or concerns regarding cultural resources or historic properties in Texas that may be affected by the proposed project. DOE is conducting separate consultation with the Louisiana SHPO and federally recognized Indian Tribes and other consulting parties for the proposed new facilities in Calcasieu Parish, Louisiana.

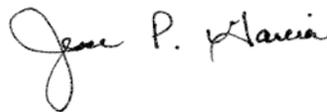
DOE looks forward to receiving your concurrence with the APE and the determination of effects on historic properties for the portion of the proposed project that is in Brazoria County, Texas, and your comments on any issues or concerns for cultural resources or historic properties that might be

affected by the proposed project or on any other parties that may have an interest in the Section 106 consultation for the proposed project. Please forward the results of your review and any requests for additional information to our contractor:

Janine Whitken  
Ecology and Environment, Inc.  
368 Pleasant View Drive  
Lancaster, New York 14086  
(716) 684-8060 extension 2745  
JWhitken@ene.com

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Pierina N. Fayish". The signature is written in a cursive style with a large initial "P".

For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Brazoria County, Texas
  3. Previous correspondence with the THC/Texas SHPO for the Hastings injection site and MVA
  4. List of federally recognized Indian tribes

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Enclosure 1

Location of the Proposed  
Lake Charles Carbon Capture and Sequestration Project

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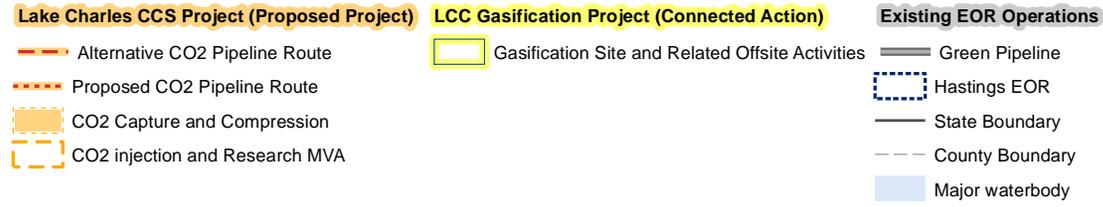
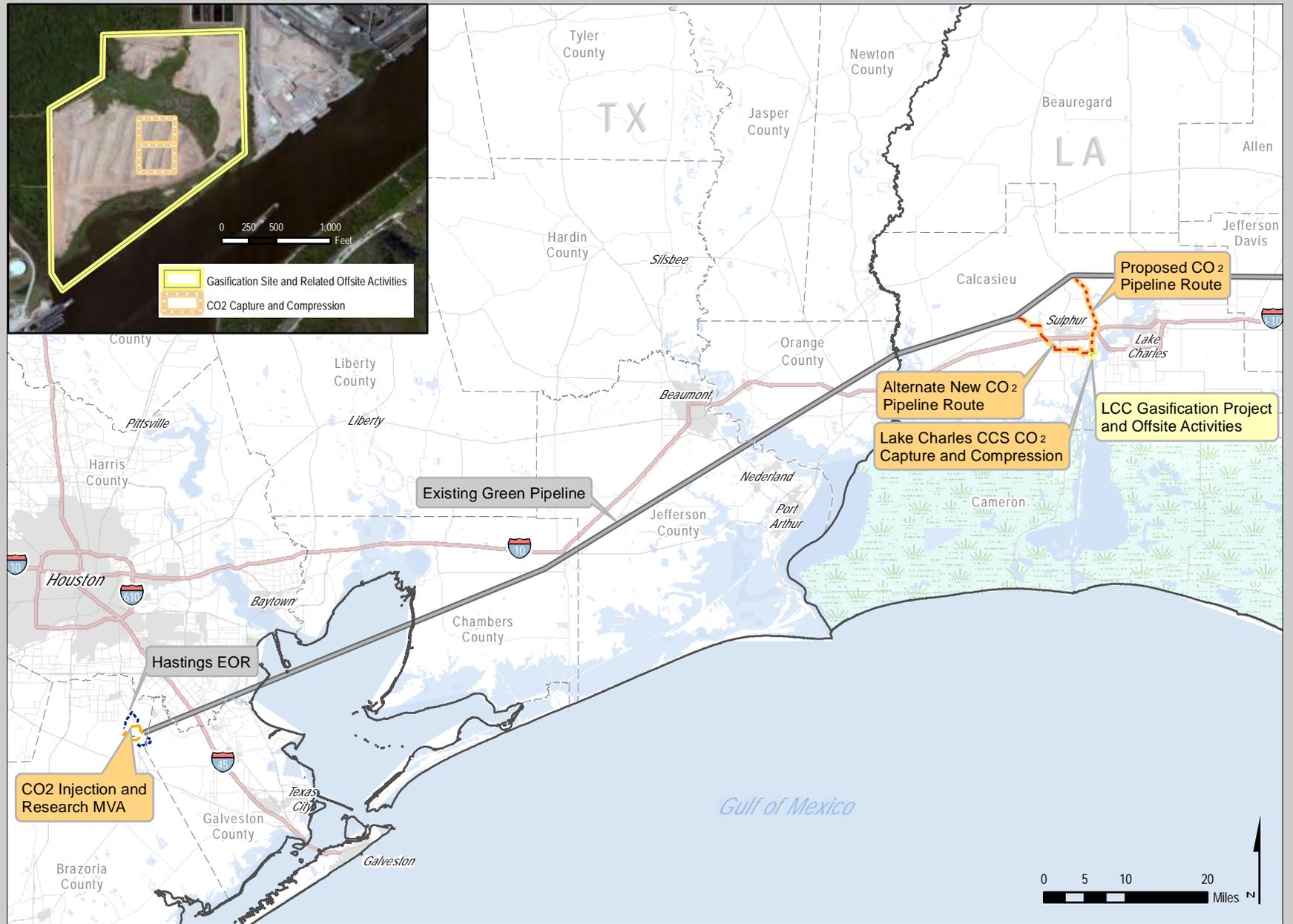


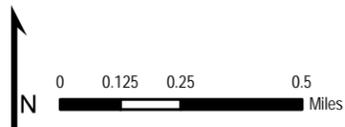
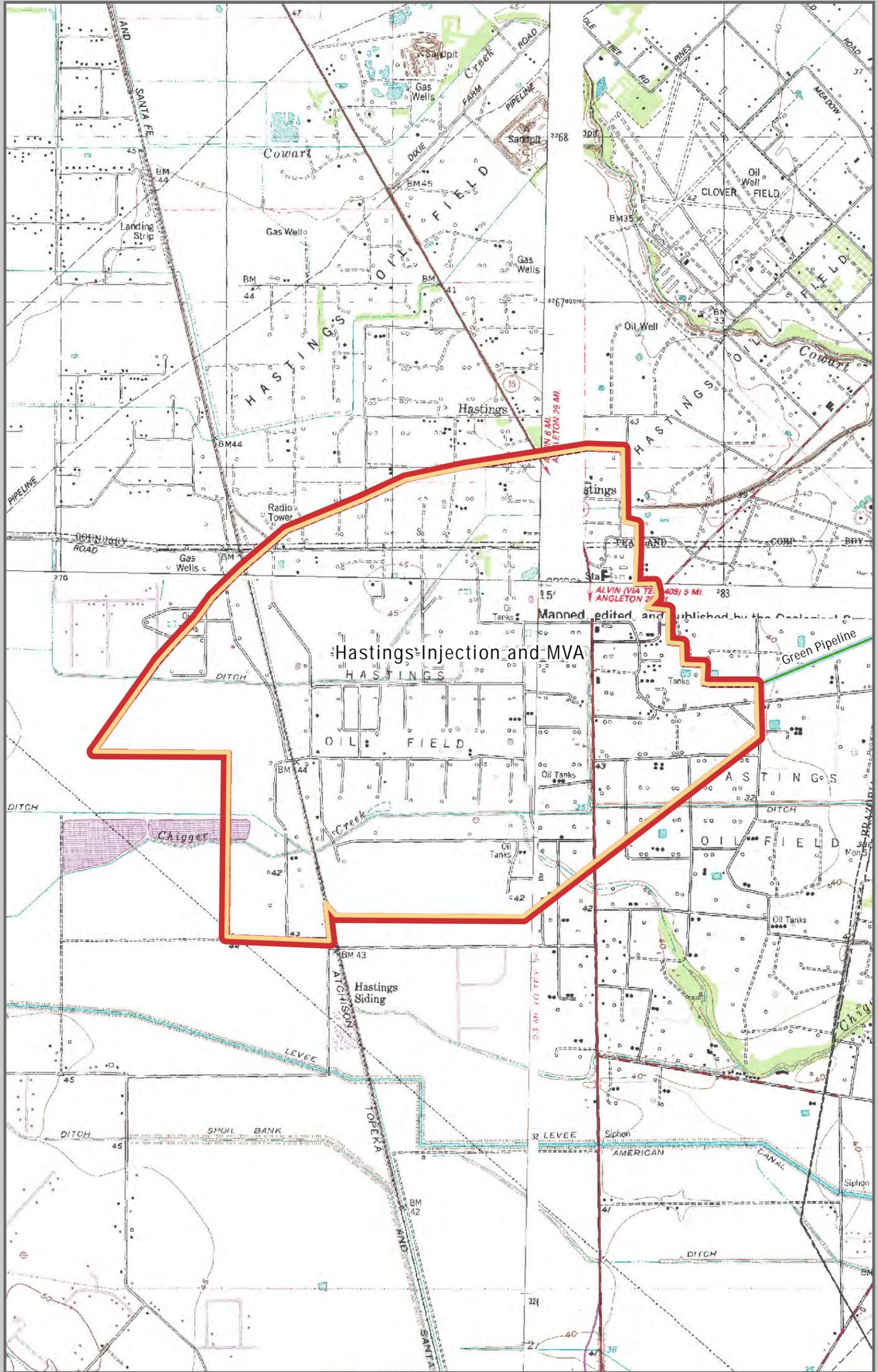
Figure 2.2-1  
Lake Charles CCS Project  
Overall Location  
Texas and Louisiana

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Enclosure 2

Area of Potential Effect for  
Proposed Lake Charles Carbon Capture and Sequestration Project Facilities in  
Brazoria County, Texas

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Source: USGS 1:24,000 Friendswood (1998); Pearland (1983); Manval (1977); and Algoa (1977) Quadrangles.

- Existing Operations (Not in Project or Proposed Action)
- Green Pipeline
- Lake Charles CCS Project (Proposed Action)
- Hastings Injection and MVA
- Area of Potential Effect (APE)

Figure 2  
APE (Area of Potential Effect) for the  
Proposed AGR and Compression Site  
Calcasieu Parish, Louisiana

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Enclosure 3

Previous Correspondence with the  
Texas Historical Commission/Texas State Historic Preservation Office for the  
MVA, Hastings Oil Field, Brazoria County

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www.williamself.com

ACRA  
Consultants in Archaeology and Historic Preservation

575 Round Rock West Drive, Suite J-380,  
Austin, TX 78681  
Phone: (512) 394-7477  
Fax: (512) 527-3078

October 25, 2011

Ms. Patricia Mercado-Allinger  
State Archaeologist, Archeology Division  
P.O. Box 12276  
Austin, TX 78711-2276

**RE: Denbury Onshore, LLC, CO<sub>2</sub> Sequestration Monitoring, Verification, and Accounting (MVA), Hastings Field, Brazoria County, Texas.**

Dear Ms. Mercado-Allinger:

## INTRODUCTION

It is our understanding that Denbury Onshore, LLC (Denbury), will conduct monitoring, verification, and accounting (MVA) activities on CO<sub>2</sub>-based enhanced oil recovery (EOR) operations in the Hastings Oil Field, Brazoria County, Texas (Figure 1). The proposed action is seeking U.S. Department of Energy (DOE) funding to conduct scientific research MVA activities to determine the effectiveness of EOR for long-term geologic storage of anthropogenic carbon dioxide (CO<sub>2</sub>). The purpose of the proposed action is to test the application of carbon sequestration within a geologic formation concurrent with EOR. Specifically, additional research-oriented MVA activities will be conducted on CO<sub>2</sub>-based EOR operations by Denbury in the Hastings Oil Field to further demonstrate the safety and effectiveness of long-term geologic storage of anthropogenic CO<sub>2</sub>. Although the processes of geologic sequestration are relatively well known, additional research is needed to fill gaps in the scientific understanding of carbon sequestration to ensure the protection of human health and the environment, to reduce costs, and to facilitate the full-scale deployment of this technology. The goal is to possess the scientific understanding of carbon sequestration and develop to the point of deployment those options that insure large-scale, environmentally acceptable sequestration to reduce anthropogenic CO<sub>2</sub> emissions and/or atmospheric concentrations.

The research MVA activities will supplement privately-funded, on-going monitoring activities conducted in conjunction with Denbury's commercial EOR operations. While on-going monitoring will include both commercial and research monitoring activities, only the research MVA activities will be federally funded and subject to National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) Section 106 review. Commercial monitoring is linked to effective "best practices" procedures for an effective EOR CO<sub>2</sub> flood and to meet current regulatory

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**William Self Associates, Inc.**  
Email: jraivesloot@williamself.com

CORPORATE OFFICE: Southwest Region  
PO Box 40214, Tucson, AZ 85717  
(520) 624-0101 / (520) 792-1005 fax

requirements. The commercial EOR flood and related monitoring will occur independent of federal funding and thus are not to be considered under NEPA or NHPA Section 106. Only the research MVA activities are subject to NEPA and NHPA Section 106 review.

William Self Associates, Inc. (WSA), is supporting CH2M HILL, Inc., in providing project environmental clearances for Denbury Onshore, LLC. WSA is conducting project cultural resource investigations and coordination with the Texas State Historic Preservation Officer (SHPO), consistent with NHPA Section 106. An Environmental Information Volume (EIV) was previously prepared to compile information required by NEPA to evaluate the potential for adverse environmental, ecological, cultural, and socioeconomic impacts of the proposed project (Walden and RDB Environmental Consultants 2010). This letter seeks to clarify the extent of Texas SHPO coordination that has previously occurred in the development of the EIV related to the project, and to elicit SHPO comment on the project responsibilities under Section 106 of the NHPA. It is our understanding the proposed project will be conducted entirely upon private lands.

## **PROJECT ENVIRONMENT AND ACTIVITIES**

While the overall extent of the Hastings Oil Field consists of approximately 25 square miles of rural farmlands, suburban areas, and residential neighborhoods, the proposed project area is less than 4 square miles located between Alvin and Pearland, Texas, on State Highway 35 (Figure 1). State Highway 35 runs north–south through the eastern portion of the project area, and County Road 128 (Hastings Cannon Road) runs east–west along the northern portion of the project area. Numerous smaller county and private roads provide access to the site. A spur of the Burlington Northern (Atchison, Topeka & Santa Fe) Railroad also intersects the project area to the west. A large high-power transmission line is located just southwest of the project site.

The Hastings Oil Field was discovered in 1934, and oil production continues to be a primary land use in the area. The project area contains approximately 80 active, 100 inactive, and 110 plugged and abandoned wells, as well as a number of temporarily abandoned (TA) wells. Denbury is currently drilling and/or reworking a large number of wells in the Hastings Oil Field that will be used for injection of CO<sub>2</sub>, production of oil and gas, testing, water production, and brine disposal. All activities related to the commercial operations at the Hastings project site will be permitted by the Texas Railroad Commission and implemented for Denbury's EOR operations. Again, EOR activities and associated monitoring will be completed by Denbury regardless of the implementation of the research MVA activities.

The following MVA activities will be conducted:

- Well Integrity Testing—Logging of existing idle production wells and testing of plugged and abandoned wells to detect CO<sub>2</sub> leakage through non-sealing well bores.
- Flood Conformance Testing—Augmentation of measurements to observe and model movement of CO<sub>2</sub> in subsurface formations during the EOR flood operations.
- Above-zone Monitoring—Monitoring of pressures and geochemical parameters in the formations above the confining layer to detect CO<sub>2</sub> leakage beyond the injection zone.

Research MVA activities will be conducted on a periodic or continual basis during active commercial EOR flood operations from 2012 through 2015.

In most cases, MVA activities will be conducted in or around existing Denbury idle or plugged and abandoned wells. Any new wells drilled for groundwater monitoring or soil-gas testing will be shallow and require only temporary placement and use of drilling equipment. Seismic profiles will be conducted with minimal surface disturbance and/or downhole equipment in existing wells. Above-zone testing will be conducted in selected idle wells that will be plugged back to above the confining layer to minimize potential impacts. If new wells are required, drilling will be performed at existing well pads, if at all possible. As a result of these measures, potential cultural impacts will be minimized or eliminated. However, significant benefits to the local economy may result from the increased production from the EOR activities at the Hasting Oil Field and its potential as a long-term anthropogenic CO<sub>2</sub> storage repository.

According to the 2001 USGS Land Use Survey, a large portion of the area is dedicated to pasture hay and cultivated crops. The majority of the remaining area is open space and represents low-intensity development. Pockets of medium-intensity and high-intensity development are located in the area, primarily along and just east of State Highway 35. Only small, scattered areas of deciduous forests and shrub/scrub remain. Cowart Creek is located in the northeastern section of the area and Chigger Creek flows through the southern edge. Both streams are small tributaries of Clear Creek, approximately 3.5 miles to the east of the site. Chigger Creek crosses the proposed project area from east to west in the southern quarter of the proposed project area. Within the project, this creek has been channelized and appears to have sizeable artificial levees on the north and south banks. In addition, the creek has been ponded into an artificial wetland at the point the creek exits the west side of the proposed project area. Based upon a review of existing aerial photography, both creeks appear to have been significantly channelized. There is one sizeable ditch that crosses the project area from southwest to northeast in the northern third of the proposed project area. This ditch is artificial in nature, appears to have sizeable levees on the banks, and is labeled "DITCH" on 7.5-minute topographic quadrangle maps.

Examination of the Texas Water Development Board (TWDB) Geologic Atlas of Texas, Houston Sheet indicates the project area is set entirely upon the Pleistocene-age Beaumont Formation (Qb), in particular Pleistocene-age muds, abandoned channel fill muds, and overbank fluvial muds. Further examination of the USDA Natural Resources Conservation Service Web Soil Survey indicates that the project area is mapped as Bernard clay loam; Bernard-Edna complex, and Lake Charles clay, 0–1 percent slopes. All these soils form on Beaumont Formation clays. Any Holocene deposition within the project area would be a surficial thin veneer. Many of the agricultural fields and developed areas represent disturbance with no potential for intact archaeological sites.

An extensive network of large oil and gas pipelines exists in this part of the North Gulf Texas coastal area and many run within a few miles of the project area. Denbury has identified pipelines owned and operated by the following companies in the West Hastings Field: BP Pipelines, Conoco Phillips, Enterprise Products, Exxon Mobil GGS, Kinder Morgan Tejas, Texas Eastern Transmission, TexCal Energy, and several others. A large network of smaller gathering pipelines also services the existing well sites in the Hastings Oil Field. High pressure and low pressure gas collection lines, production water and salt water lines, and power lines service the area as well.

## **BACKGROUND SEARCH**

WSA has conducted a records and literature search for the proposed project area to within 0.5 mile outside the proposed project boundaries. The records and literature search/background research included reviewing the Texas Archeological Sites Atlas (Atlas), an online resource hosted by the Texas Historical Commission (THC), which contains restricted cultural resources information. The Atlas was consulted for information on previously conducted surveys or the presence of previously discovered prehistoric and historic archaeological sites as well as State Archeological Landmarks (SALs), Historic Markers, and Registered Texas Historic Landmarks that may be located within or adjacent to the project area. WSA also examined USGS topographic maps for existing cemeteries and historic sites. Archival research indicates that there are no recorded archaeological sites, cemeteries, NRHP properties, SALs, or markers within 0.5 mile (805 m) of the proposed project. There is one previously conducted survey that runs north–south through the eastern third of the proposed project area; it consisted of a 480-m-wide corridor centered on an existing pipeline corridor that runs parallel and west of the Atchison, Topeka & Santa Fe Railroad. This survey was a 2008 U.S. Army Corps of Engineers Survey conducted prior to pipeline construction. The survey was conducted by SWCA Environmental Consultants for the Denbury Green Pipeline located south of the current project. In 2008, a 124-mile length of the proposed Denbury Green Pipeline was surveyed in Calcasieu Parish, Louisiana, and in Orange, Jefferson, Chambers, Galveston, and Brazoria counties, Texas. One site was recorded on this survey, in Orange County, well away from the current proposed project area.

## **PREVIOUS AGENCY COORDINATION**

As mentioned above, an Environmental Information Volume (EIV) was previously prepared to compile project information required by NEPA and NHPA Section 106 (Walden and RDB Environmental Consultants 2010). The EIV states that “The Texas Historical Commission has been contacted to confirm the locations of any existing or potential historical or archeological sites near the Hastings project site, and an official response is pending (Section 3.7:25).” This coordination letter in part seeks to clarify the format and extent of SHPO coordination that has previously occurred on the project, and to obtain copies of all correspondence to augment Denbury records. Previous coordination records are no longer available from the EIV authors. Further, EIV correspondence on the project indicates that the “Environmental Protection Agency (EPA) Region 6 Office of Environmental Justice and Tribal Affairs (EPA, 2010) and the Alabama Coushatta Indian Tribe (ACIT, 2010) were contacted regarding potential Native American tribal interests in or near the Hastings MVA project area. No sites were identified and an official response is pending” (Section 3.7:26). The EIV further states that “No Native American or tribal interests have been identified” (Section 4.7:29). These correspondences are cited in the EIV as personal communications (February 2010). WSA similarly contacted the EPA Region 6 Office and a representative of the Alabama Coushatta Indian Tribe in an attempt to obtain records of project correspondence. The results of these inquiries are pending.

## NHPA SECTION 106

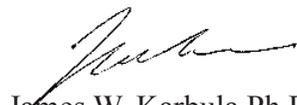
The MVA research project will result in very limited if any new ground disturbing impact due to the proposed project methods focusing on the reuse of existing facilities (see above). Additionally, the Hastings Oil Field represents a highly disturbed landscape due to decades of exploration and the presence of numerous oil companies' pipelines, wells, and support infrastructure, as described above. The project area contains over 250 extant, active, or abandoned wells and associated access roads and pipelines. The soils and geology indicate the project is entirely Pleistocene-age Beaumont Formation heavy clays. In this environment, Holocene deposition is very limited in extent if not entirely absent due to oil production and associated pipelines. The majority of the project area consists of cleared, denuded, pasture and agricultural fields or oil lands. Both creeks in the project exhibit exceptional linear symmetry indicating channelization and significant modification of the natural stream courses. In these circumstances, little in the way of intact, undisturbed Holocene deposition remains. Background archival research indicates a complete absence of previously recorded cultural resources.

## CONCLUSIONS AND RECOMMENDATIONS

Due to the combination of limited project ground disturbance, significant oil production and pipeline disturbance, and ancient landform, WSA concludes that there exists a very low probability that properties eligible for the National Register of Historic Places (NRHP) will be impacted by the proposed research project. WSA respectfully requests SHPO concurrence with the conclusion that there exists a low probability that significant NRHP-eligible cultural resources will be impacted by the proposed MVA project and that project activities be allowed to proceed with respect to Section 106 requirements under the NHPA, and concurrence that no archaeological survey is required under Section 106. Second, WSA respectfully requests copies of all previous SHPO correspondence (from 2010) on the project, on behalf of Denbury, to complete their project records. WSA also respectfully requests any SHPO input on Native American Tribal coordination in terms of identifying any federally recognized tribes that may have interests in the project area.

This letter is submitted to the SHPO to initiate (or continue) NHPA Section 106 consultation on the project. WSA respectfully submits this coordination letter on behalf of Denbury and CH2M HILL. We request concurrence and/or comment with regard to project Section 106 responsibilities. We would be pleased to facilitate transfer of any project records by visiting your office. If there are any questions or any need for additional information needed please feel free to contact me.

Sincerely,



James W. Karbula Ph.D., RPA  
Regional Project Director

cc:

David Thomas, CH2M HILL, Inc.

Attachments:

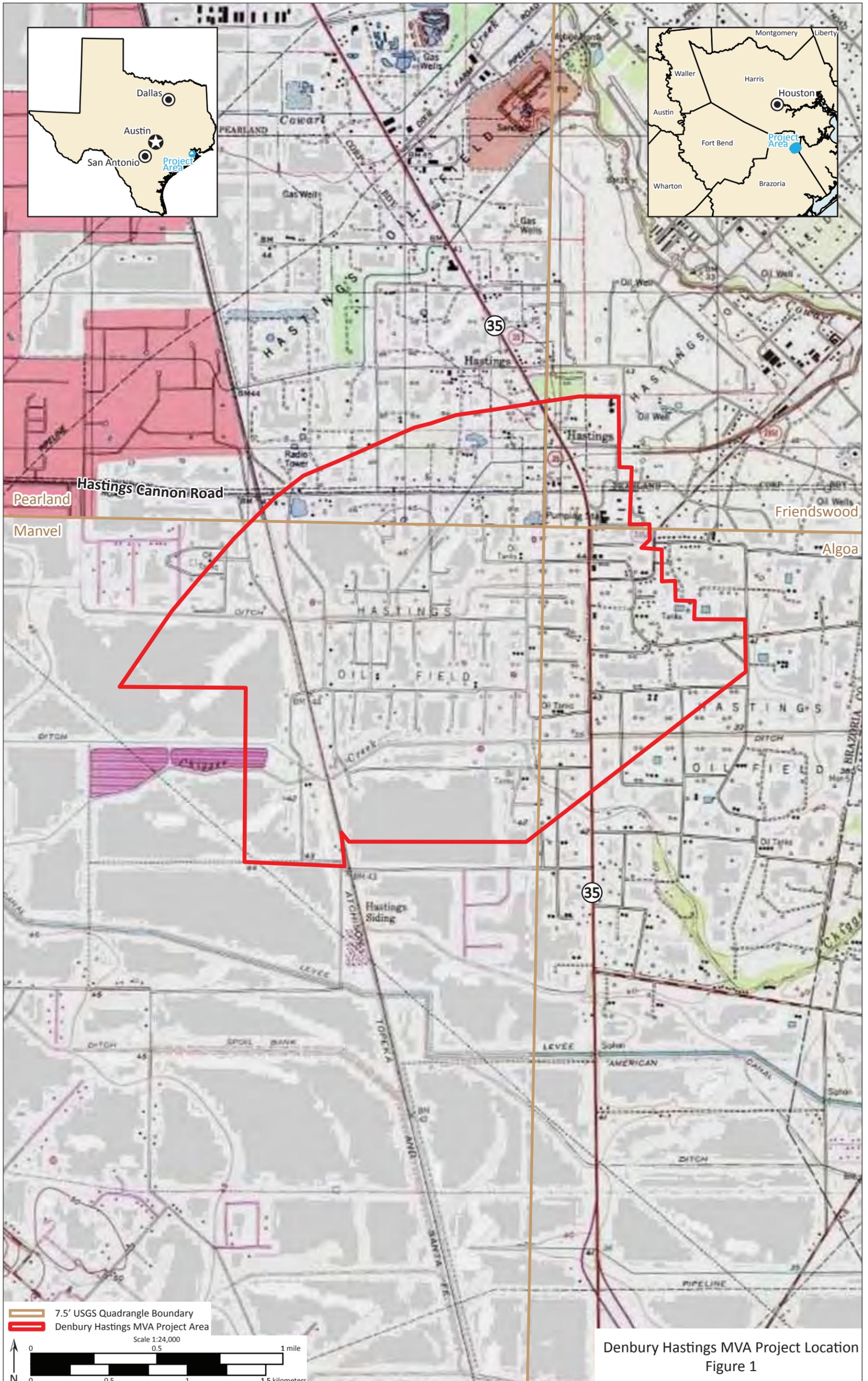
Figure 1

## REFERENCES CITED

Alabama Coushatta Indian Tribe (ACIT), 2010, personal communications with Bryant Celestine, Tribal Historian, February 12, 2010, by Steve Walden Consulting & RDB Environmental Consulting.

Environmental Information Volume, CO<sub>2</sub> Sequestration Monitoring, Verification, and Accounting Hastings Field, Texas, prepared for Denbury Onshore, LLC, by Steve Walden Consulting & RDB Environmental Consulting, March 2010.

U.S. Environmental Protection Agency (EPA), 2010, Region 6 Office of Environmental Justice and Tribal Affairs, Dallas, Texas, personal communications with Jay Harris, GAP Project Officer and Tribal Liaison, February 12, 2010, by Steve Walden Consulting & RDB Environmental Consulting.



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TEXAS HISTORICAL COMMISSION  
*real places telling real stories*

November 1, 2011

James Karbula  
William Self Associates, Inc.  
16238 Highway 620, Ste. F-400  
Austin, Texas 78717

Re: Project review under Section 106 of the National Historic Preservation Act of 1966 and the Antiquities Code of Texas  
Denbury Onshore, LLC, CO2 Sequestration Monitoring, Verification, and Accounting (MVA),  
Hastings Field, Brazoria County, Texas

Dear Mr. Karbula:

Thank you for your correspondence describing the above referenced project. This letter serves as comment on the proposed undertaking from the Executive Director of the Texas Historical Commission and the State Historic Preservation Officer. As the state agency responsible for administering the Antiquities Code of Texas, these comments also provide recommendations on compliance with state antiquities laws and regulations.

The review staff, led by Jeff Durst, has completed its review. After reviewing the documentation, we concur that there exists a very low probability that properties located within the above referenced project area and eligible for inclusion in the National Register of Historic Places (National Register) and/or for formal designation as a State Archeological Landmark, will be impacted by the proposed research project. The above referenced project may proceed without consultation with this office, provided that no significant archeological deposits are encountered during development activities on the property.

At your request we have attached a copy of the previous correspondence dating to 2010 that we have on file related to this project.

Thank you for your cooperation in this federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If you have any questions concerning our review or if we can be of further assistance, please contact Jeff Durst at 512/463-6096.**

Sincerely,



for  
Mark Wolfe, State Historic Preservation Officer

MW/jjd

Attachment: Review of Public Notice issued by U.S. Army Corps of Engineers Galveston District



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# Public Notice

<b>U.S. Army Corps Of Engineers Galveston District</b>	Permit Application No: _____	SWG-2010-00194
	Date Issued: _____	8 July 2010
	Comments Due: _____	9 August 2010

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## U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT

**PURPOSE OF PUBLIC NOTICE:** To inform you of a proposal for work in which you might be interested. It is also to solicit your comments and information to better enable us to make a reasonable decision on factors affecting the public interest.

**AUTHORITY:** This application will be reviewed pursuant to Section 404 of the Clean Water Act.

**APPLICANT:** Denbury Onshore, LLC  
5100 Tennyson Parkway, Suite 3000  
Plano, Texas 75024-4932

**AGENT:** Project Consulting Services, Inc.  
3300 West Esplanade Avenue South, Suite 500  
Metairie, Louisiana 70002-3447  
Telephone: 504-833-5321  
POC: Richard Leonhard

**LOCATION:** The project is located on a 47-acre tract within an existing oil field located approximately 4,500 feet southwest of the State Highway 35 and County Road 128 intersection, in Brazoria County, Texas. The project can be located on the U.S.G.S. quadrangle map entitled: Manvel and Pearland, Texas. Approximate UTM Coordinates in NAD 27 (meters): Zone 15; Easting: 280760; Northing: 3265475. Latitude: 29° 29' 58.69" N. Longitude: 95° 15' 41.71" W (NAD 27).

**PROJECT DESCRIPTION:** The applicant proposes permanent fill impacts to 7.08 acres of herbaceous and shrub scrub jurisdictional wetlands during the construction of a foundation for a facility designed to support the sequestering and recovery of CO<sub>2</sub>, all of which are associated with enhanced oil recovery processes for reserves located within the project area. The proposed project site is located within an existing oil field and is in an area presently used for farraing and livestock grazing. The area is dominated by yaupon (*Ilex vomitoria*), Chinese tallow (*Sapium sebiferum*), little bluestem (*Schizachyrium scoparium*), bushy bluestem (*Andropogons glomeratus*) and southern dewberry (*Rubus trivialis*).

The project site was selected due to the fact that it is centrally located within the Hastings Field. The project footprint was designed and situated to avoid jurisdictional wetland impacts to the maximum extent practicable. Of the 19.2 acres of jurisdictional wetlands on the tract, 12.12 acres of wetlands will be avoided. Existing infrastructure is located directly adjacent to the site, which minimizes the potential for additional wetland impacts. The applicant proposes to mitigate for the proposed unavoidable impacts to 7.08 acres of wetlands by donating a 60-acre tract composed of cypress-tupelo swamp to the Big Thicket National Preserve. The mitigation tract is located directly south of the tract that was previously utilized as mitigation for the Denbury Green Pipeline project, permitted under SWG-2007-01963.

**NOTES:** This public notice is being issued based on information furnished by the applicant. This information has not been verified. The applicant's plans in 6 sheets, Alternative Analysis in 2 sheets and Mitigation Plan in 3 sheets are enclosed.

A preliminary review of this application indicates that an Environmental Impact Statement (EIS) is not required. Since permit assessment is a continuing process, this preliminary determination of EIS requirement will be changed if data or information brought forth in the coordination process is of a significant nature.

Our evaluation will also follow the guidelines published by the U.S. Environmental Protection Agency pursuant to Section 404 (b)(1) of the Clean Water Act (CWA).

**OTHER AGENCY AUTHORIZATIONS:** Texas Railroad Commission certification is required. Texas Coastal Zone consistency certification is required. The applicant has stated that the project is consistent with the Texas Coastal Management Program goals and policies and will be conducted in a manner consistent with said program.

**NATIONAL REGISTER OF HISTORIC PLACES:** The staff archaeologist has reviewed the latest published version of the National Register of Historic Places, lists of properties determined eligible, and other sources of information. The following is current knowledge of the presence or absence of historic properties and the effects of the undertaking upon these properties:

The permit area has been so extensively modified that little likelihood exists for the proposed project to impinge upon a historic property, even if present within the affected area.

**THREATENED AND ENDANGERED SPECIES:** Preliminary indications are that no known threatened and/or endangered species or their critical habitat will be affected by the proposed work.

**ESSENTIAL FISH HABITAT:** This notice initiates the Essential Fish Habitat consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. Our initial determination is that the proposed action would not have a substantial adverse impact on Essential Fish Habitat or federally managed fisheries in the Gulf of Mexico. Our final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the National Marine Fisheries Service.

**PUBLIC INTEREST REVIEW FACTORS:** This application will be reviewed in accordance with 33 CFR 320-332, the Regulatory Programs of the Corps of Engineers (Corps), and other pertinent laws, regulations and executive orders. The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits, which reasonably may be expected to accrue from the proposal, must be balanced against its reasonably foreseeable detriments. All factors, which may be relevant to the proposal, will be considered: among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs and, in general, the needs and welfare of the people.

**SOLICITATION OF COMMENTS:** The Corps is soliciting comments from the public, Federal, State, and local agencies and officials, Indian tribes, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Impact Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

This public notice is being distributed to all known interested persons in order to assist in developing facts upon which a decision by the Corps may be based. For accuracy and completeness of the record, all data in support of or in opposition to the proposed work should be submitted in writing setting forth sufficient detail to furnish a clear understanding of the reasons for support or opposition.

**PUBLIC HEARING:** Prior to the close of the comment period any person may make a written request for a public hearing setting forth the particular reasons for the request. The District Engineer will determine whether the issues are substantial and should be considered in the permit decision. If a public hearing is warranted, all known interested persons will be notified of the time, date, and location.

**CLOSE OF COMMENT PERIOD:** All comments pertaining to this Public Notice must reach this office on or before **9 August 2010**. Extensions of the comment period may be granted for valid reasons provided a written request is received by the limiting date. **If no comments are received by that date, it will be considered that there are no objections.** Comments and requests for additional information should be submitted to:

Kristy Farmer  
Regulatory Branch, CESWG-PE-RE  
U.S. Army Corps of Engineers  
P.O. Box 1229  
Galveston, Texas 77553-1229  
409-766-3935 Phone  
409-766-6301 Fax

DISTRICT ENGINEER  
GALVESTON DISTRICT  
CORPS OF ENGINEERS

Enclosure 4

List of Federally Recognized Indian Tribes for the portions of the  
Proposed Lake Charles CCS Project in Brazoria County, Texas

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**List of Federally Recognized Indian Tribes with a Potential Interest in the proposed Lake Charles CCS Project in Brazoria County, Texas**

<b>Federally-recognized Indian Tribe</b>	<b>Potential Interest</b>
Alabama Coushatta Tribe of Texas	Located in Texas
Kickapoo Traditional Tribe of Texas	Located in Texas
Ysleta Del Sur Pueblo of Texas	Located in Texas

Sources: BIA 2011; NPS 2011c, 2011d, 2011e, 2011f, Sturtevant 1967.

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August 15, 2012

Mr. Mark Wolfe  
State Historic Preservation Officer  
Texas Historical Commission  
P.O. Box 12276  
Austin, Texas 78711



**SUBJECT:** Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Brazoria County, Texas (and Calcasieu Parish, Louisiana)

Dear Mr. Wolfe:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, the DOE is consulting with the Texas Historical Commission on the proposed project.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, in Brazoria County, Texas. Please note that as of June 1, 2012, the name of Lake Charles Cogeneration, LLC was changed to Lake Charles Clean Energy, LLC. Historical references to Lake Charles Cogeneration (LCC) Gasification are now LCCE Gasification.

During the DOE demonstration phase of the proposed project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, and transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast and is not part of DOE's evaluation.

A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the Lake Charles CCS Project and its associated CO<sub>2</sub> capture and compression facilities in Calcasieu Parish, Louisiana;
- the Lake Charles CCS Project proposed 11.1 mile CO<sub>2</sub> pipeline in Calcasieu Parish Louisiana;
- Lake Charles CCS Project proposed Research Monitoring, Verification, Analysis (MVA) program for the CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation in Brazoria County, Texas; and
- the LCCE Gasification Project and its associated facilities in Calcasieu Parish, Louisiana (connected action).

DOE has determined that the area of potential effects (APE) for the undertaking will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCCE Gasification, which are located in Calcasieu Parish, Louisiana and in Brazoria County, Texas. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The APE in Texas includes the location of the CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation and Research MVA program at the existing Hastings Oil Field in Brazoria County, Texas (see Enclosure 2).

The APE in Calcasieu Parish, Louisiana includes the locations of:

- the CO<sub>2</sub> capture and compression facilities for the Lake Charles CCS Project on the west bank of the Calcasieu River;
- the LCCE Gasification project, also on the west bank of the Calcasieu River;
- the offsite facilities associated with the LCCE Gasification project including the proposed new methanol storage area; hydrogen pipeline; water supply pipeline; natural gas pipeline; co-located transmission line, potable water line, and methanol pipeline; equipment laydown area; and offsite parking area (see Enclosure 2).
- the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline; or,
- the alternative 11.6-mile long alignment for the CO<sub>2</sub> pipeline that connects to the existing Green Pipeline (to the southwest).

In October 2011, William Self Associates, Inc. (WSA) conducted a records and literature search of the area within the Research MVA portion of the APE for the proposed action (Karbula 2011). The results of this records and literature search were sent to your office on October 25, 2011 and are included in Enclosure 3. The purpose of the records and literature search by WSA was to determine the presence of previously identified cultural resources and historic properties within the Research MVA portion of the APE; to determine the extent of previous and existing disturbance

and development within the Research MVA portion of the APE; and to evaluate the potential sensitivity of the Research MVA portion of the APE for unidentified cultural resources or historic properties. Results of the records and literature search by WSA indicated that there are no recorded archaeological sites, cemeteries, NRHP properties, State Archaeological Landmarks (SAL) or markers within the Research MVA portion of the APE. Because the Hastings Oil Field is a highly disturbed landscape resulting from decades of exploration for oil and characterized by the presence of numerous oil companies' pipelines, wells and support infrastructure, the potential for intact undisturbed soil profiles with archaeological sensitivity within the Research MVA portion of the APE is limited, if not entirely absent (Karbula 2011).

As a result of the records and literature search, WSA recommended that the Research MVA portion of the APE has a low probability for containing NRHP-eligible historic properties and that no archeological survey of the Research MVA areas is needed for the Proposed Action (Karbula 2011). The Texas State Historic Preservation Officer (SHPO) concurred that the Research MVA area has a very low probability for containing NRHP-eligible properties and/or for formal designation as an SAL, and indicated that the Research MVA portion of the Proposed Action may proceed without consultation with the Texas SHPO, provided that no significant archaeological deposits are encountered during development activities within the Research MVA area (Wolfe 2011). Documentation of the previous consultation between WSA and your office regarding the results of the records and literature search and archaeological sensitivity assessment for the APE in Brazoria County is in Enclosure 3.

DOE is not aware of any other previously conducted cultural resources investigations in the portion of the APE in Brazoria County, Texas (i.e., at the location of the proposed Hasting injection site and Research MVA program at the existing Hastings Oil Field). DOE confirmed that no NRHP-listed historic properties or districts; neighborhood surveys, historical markers, cemeteries, museums, historic county courthouses, military sites, or SALs that are buildings are within the APE or a 0.5 mile radius around the APE in Brazoria County, Texas (NPS 2011a, 2011b; Texas Historical Commission [THC] 2011).

In accordance with Section 106 of the NHPA, DOE is writing to seek your concurrence on the proposed project's APE in Texas per 36 CFR 800.4(a)(1). DOE is also seeking your concurrence with DOE's proposed determination of no historic properties affected for the proposed project under 36 CFR 800.4(d)(1), based on the results of the records and literature search by WSA and the conclusions included in correspondence between your office and WSA.

DOE has identified three federally recognized Indian Tribes with a potential interest in the portions of the proposed project in Texas (see Enclosure 4) and is also seeking information from your office for any other parties that may have an interest in the Section 106 consultation process for the proposed project in accordance with 36 CFR 800.3(f). Additionally, DOE would appreciate your assistance with the identification of any additional issues or concerns regarding cultural resources or historic properties in Texas that may be affected by the proposed project. DOE is conducting separate consultation with the Louisiana SHPO and federally recognized Indian Tribes and other consulting parties for the proposed new facilities in Calcasieu Parish, Louisiana.

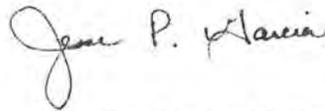
DOE looks forward to receiving your concurrence with the APE and the determination of effects on historic properties for the portion of the proposed project that is in Brazoria County, Texas, and your comments on any issues or concerns for cultural resources or historic properties that might be

affected by the proposed project or on any other parties that may have an interest in the Section 106 consultation for the proposed project. Please forward the results of your review and any requests for additional information to our contractor:

Janine Whitken  
Ecology and Environment, Inc.  
368 Pleasant View Drive  
Lancaster, New York 14086  
(716) 684-8060 extension 2745  
JWhitken@ene.com

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at pierina.fayish@netl.doe.gov.

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Brazoria County, Texas
  3. Previous correspondence with the THC/Texas SHPO for the Hastings injection site and MVA
  4. List of federally recognized Indian tribes





August 16, 2012

Robert Cast  
Tribal Historic Preservation Officer  
Caddo Nation  
P.O. Box 487  
Binger, OK 73009

**SUBJECT:** Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Mr. Cast:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with the Caddo Nation on the portion of the proposed project in Louisiana.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

During the DOE demonstration phase of the proposed Project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast and is not part of DOE's evaluation. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field to confirm permanent storage of about one million tons per year during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the facilities associated with the Lake Charles CCS Project and its associated CO<sub>2</sub> capture and compression facilities in Calcasieu Parish, Louisiana;
- the Lake Charles CCS Project proposed 11.1-mile long CO<sub>2</sub> pipeline in Calcasieu Parish;
- the Lake Charles CCS Project proposed Research MVA program for the CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation in Brazoria County, Texas; and,
- the LCCE Gasification Project and its associated facilities in Calcasieu Parish, Louisiana (a connected action).

DOE has determined that the area of potential effects (APE) for the undertaking in Louisiana will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCCE Gasification that are located in Calcasieu Parish, Louisiana. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The APE in Louisiana is in an industrial setting on the west side of the Calcasieu River, and is in the vicinity of numerous energy-related facilities. The APE includes the locations of:

- the CO<sub>2</sub> capture and compression facilities for the Lake Charles CCS Project on the west bank of the Calcasieu River;
- the LCCE Gasification project, also on the west bank of the Calcasieu River;
- the offsite facilities associated with the LCCE Gasification project including the proposed new methanol storage area; hydrogen pipeline; water supply pipeline; natural gas pipeline; co-located transmission line, potable water line, and methanol pipeline; equipment laydown area; and offsite parking area
- the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline; or,
- the alternative 11.6-mile long alignment for the CO<sub>2</sub> pipeline that connects to the existing Green Pipeline to the southwest (see Enclosure 2).

Cultural resources investigations have been conducted within portions of the APE in Louisiana, including: Phase I archaeological survey of the property that contains the locations of the Lake Charles CCS Project and LCCE Gasification project; Phase I cultural resources survey of the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline, including extra workspace and access roads; and Phase IA cultural resources investigations of offsite facilities associated with the LCCE Gasification project (raw water, hydrogen, potable water, methanol and sulfuric acid pipelines; an overhead transmission line; a construction laydown area; and construction parking area). The reports documenting these cultural resources investigations have been submitted separately to the Louisiana SHPO for review and comment by the consultants on behalf of the Applicant. A table summarizing the cultural resources investigations is in Enclosure 3.

DOE has confirmed that no NRHP-listed historic properties or previously recorded standing structures or historic districts are located within the APE or a 0.5-mile radius around the APE in Calcasieu Parish, Louisiana (NPS 2011a, 2011b; Louisiana Department of Culture, Recreation and Tourism 2011).

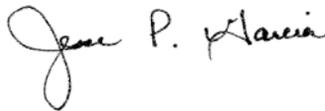
The DOE is also initiating Section 106 consultation with the Louisiana State Historic Preservation Officer to identify any issues or concerns regarding cultural resources and historic properties in the APE in Calcasieu Parish, Louisiana that may be affected by the proposed Project as part of the DOE's fulfillment of responsibilities under Section 106 of the NHPA for the proposed Project and per 36 CFR Part 800. Additional consulting parties with interest and standing, as identified to in 36 CFR 800.2(c), will be invited to participate in the Section 106 consultation process.

The DOE looks forward to receiving your comments or concerns regarding traditional cultural properties, sacred sites, or site of traditional religious or cultural importance in the APE that might be affected by the proposed Project and an indication as to whether you wish to participate in the Section 106 consultation for the proposed project. Please forward the results of your review and any requests for additional information to DOE's tribal liaison for the Project:

Jesse Garcia  
NETL Tribal Liaison  
Environmental Compliance Division  
National Energy Technology Laboratory  
3610 Collins Ferry Road  
Mail Stop B07, Room 333  
Morgantown, WV 26507  
PH: 304-285-0256  
Fax: 304-285-4403  
[Jesse.Garcia@NETL.doe.gov](mailto:Jesse.Garcia@NETL.doe.gov)

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Calcasieu Parish, Louisiana
  3. Summary Table for Cultural Resources Investigations Conducted within the APE in Louisiana

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## References:

- Breaux, Pam. 2012. Letter dated April 25, 2012, from Pam Breaux, State Historic Preservation Officer, Office of Cultural Development, Louisiana Department of Culture, Recreation & Tourism, Baton Rouge, Louisiana, to Joel Watkins, Cultural Resource Analyst, Office of Archaeological Research, Moundville, Alabama. RE: *Draft Report, La Division of Archaeology Report No. 22-4007, Phase I Cultural Resource Survey of the Proposed Lake Charles Pipeline Lateral Project located near Sulphur, Calcasieu Parish, Louisiana.*
- Handley, Martin. 2009. Letter dated June 15, 2009, from Martin Handley, Principal Investigator, URS Corporation, Baton Rouge, Louisiana, to Mr. Donald W. Maley, Vice-President, Lake Charles Cogeneration, LLC, Houston, Texas. RE: *Field Assessment of Archaeological Site 16CU29, Lake Charles Gasification Facility, Lake Charles Cogeneration, LLC, Westlake, Calcasieu Parish, Louisiana.*
- Handley, Martin. 2012. Letter dated May 16, 2012, from Martin Handley, Principal Investigator, URS Corporation, Baton Rouge, Louisiana, to Mr. Philip Leonards, Leucadia Energy, Houston, Texas. Re: *Cultural Resources Evaluation - Lake Charles Cogeneration, LLC (LCC), Calcasieu Parish, Louisiana.*
- Hutcheson, Scott. 2009. Letter dated June 26, 2009, from Scott Hutcheson, State Historic Preservation Officer, Office of Cultural Development, Department of Culture, Recreation and Tourism, State of Louisiana, Baton Rouge, Louisiana. RE: *Lake Charles Gasification Facility, Lake Charles Cogeneration LLC, Agency Interest No. 160213, Activity No. PER20090001, Lake Charles, Calcasieu Parish, LA.*
- Louisiana Department of Culture, Recreation and Tourism. 2011a. Louisiana Cultural Resources Map: Standing Structures and Historic Districts within 0.5 miles of Project Areas in Calcasieu Parish, Louisiana. <http://kronos.crt.state.la.us/website/lahpweb/viewer.htm> (web site accessed March 7, 2011).
- National Park Service. 2011a. National Historic Landmarks Program, Lists of National Historic Landmarks: National Historic Landmarks Survey, Listing of National Historic Landmarks by State: Louisiana and Texas. <http://www.nps.gov/history/nhl/designations/Lists/LA01.pdf> and <http://www.nps.gov/history/nhl/designations/Lists/TX01.pdf> (web sites accessed March 7, 2011).
- National Park Service. 2011b. National Register of Historic Places, NPS Focus: Calcasieu Parish, Louisiana and Brazoria County, Texas. <http://nrhp.focus.nps.gov/natreghome.do> (web site accessed March 7, 2011).
- Smith, R. L., M. E. Weed, A. I. Wilson, and A. Deter-Wolf. 2001. *Intensive Cultural Resources Survey – Citgo Petroleum Corporation, Lake Charles Refinery, Calcasieu Parish, Louisiana.* Report No. 22-2382, on file, Louisiana Division of Archaeology, Baton Rouge, Louisiana. Cited in letter dated June 15, 2009, from Martin Handley, Principal Investigator, URS Corporation, Baton Rouge, Louisiana, to Mr. Donald W. Maley, Vice-President, Lake Charles Cogeneration, LLC, Houston, Texas. RE: *Field Assessment of*

*Archaeological Site 16CU29, Lake Charles Gasification Facility, Lake Charles Cogeneration, LLC, Westlake, Calcasieu Parish, Louisiana.*

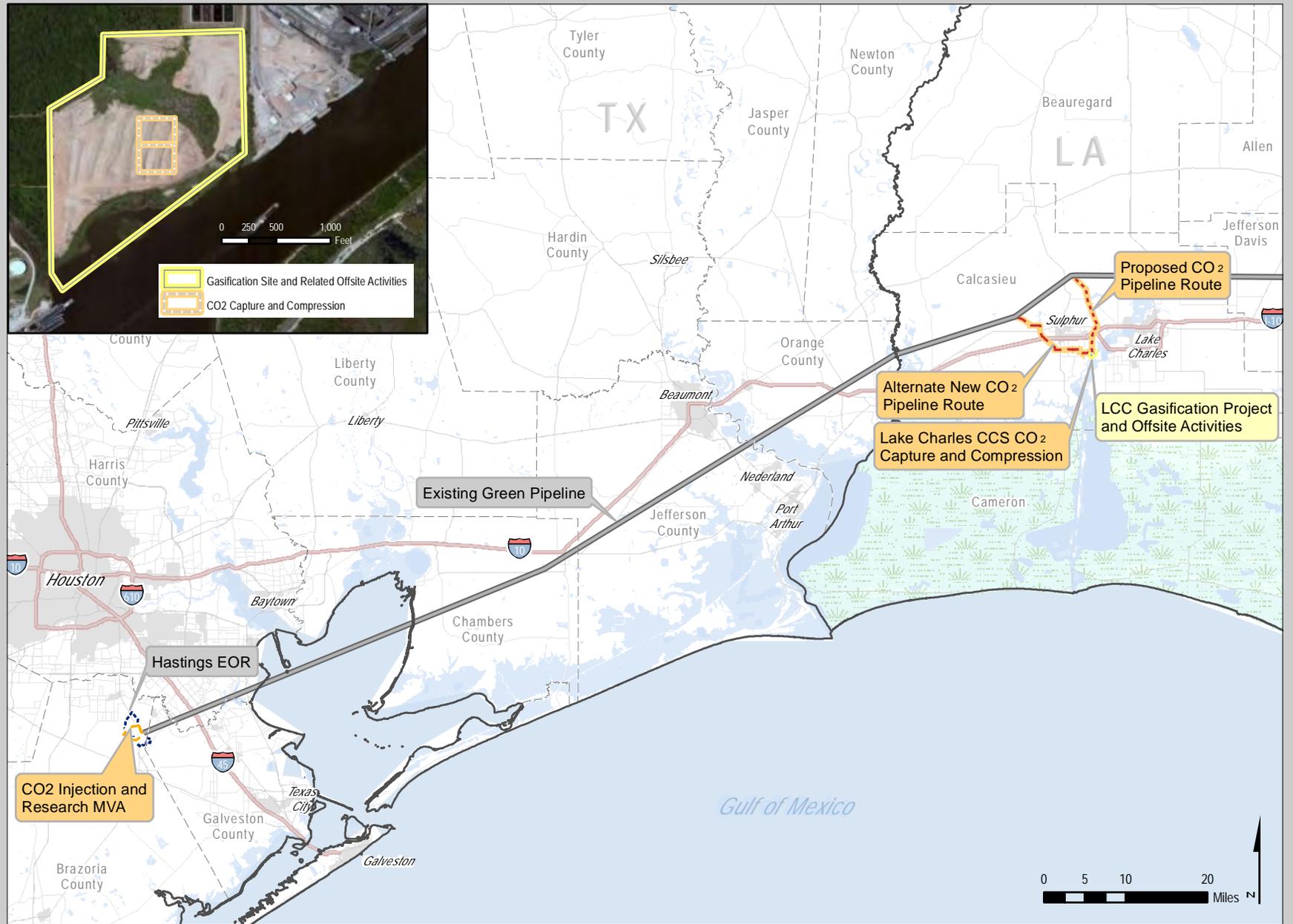
URS Corporation. 2012. *Lake Charles Cogeneration, LLC, Cultural Resources Assessment, Calcasieu Parish, Louisiana.* URS Job No. 10003620, July 2012.

Watkins, Joel H. and Eugene M. Futato. 2011. *Phase I Cultural Resource Survey of the Proposed Lake Charles Pipeline Lateral Project located near Sulphur, Calcasieu Parish, Louisiana.* Draft report prepared November 21, 2011, by the University of Alabama, Office of Archaeological Research, Moundville, Alabama. Prepared for CH2M HILL, Atlanta, Georgia.

Enclosure 1

Location of the Proposed  
Lake Charles Carbon Capture and Sequestration Project

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**Lake Charles CCS Project (Proposed Project)**

- - - Alternative CO2 Pipeline Route
- - - Proposed CO2 Pipeline Route
- CO2 Capture and Compression
- CO2 injection and Research MVA

**LCC Gasification Project (Connected Action)**

- Gasification Site and Related Offsite Activities

**Existing EOR Operations**

- Green Pipeline
- Hastings EOR
- State Boundary
- County Boundary
- Major waterbody

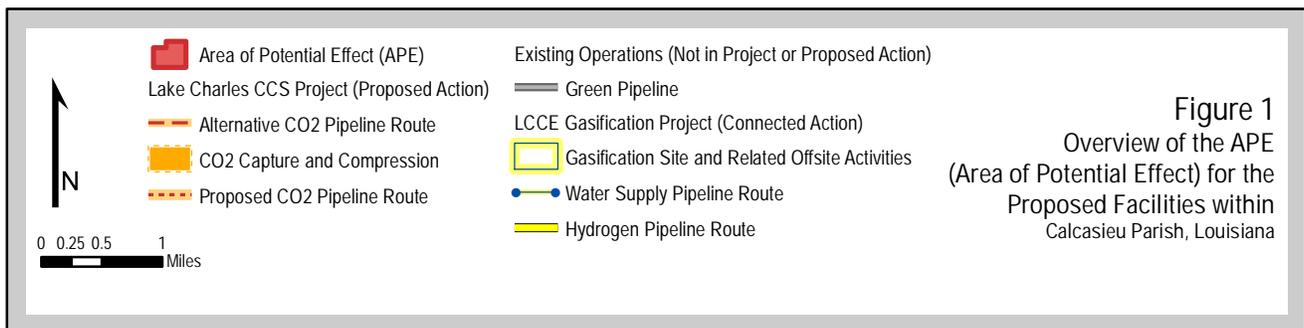
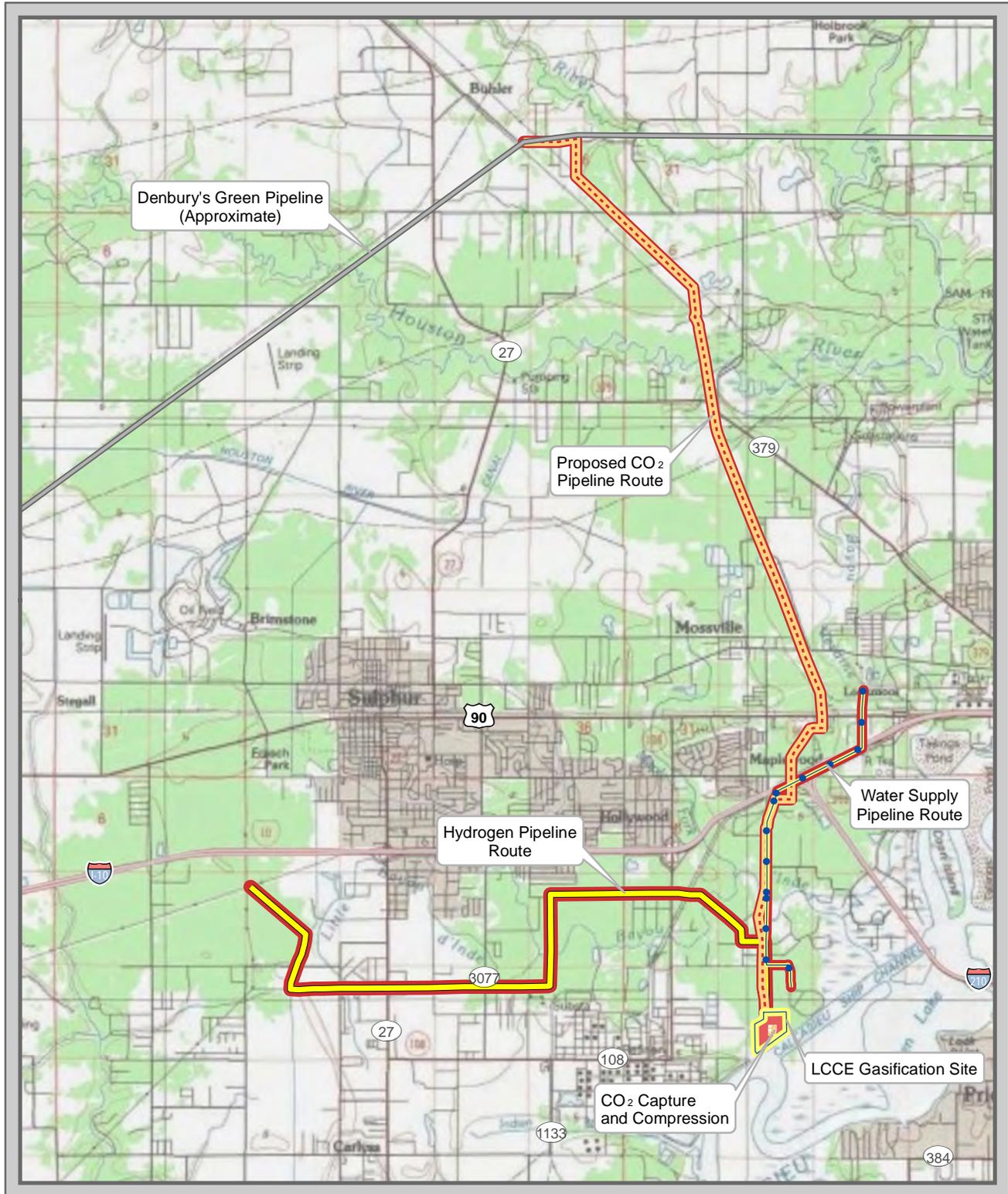
Figure 2.2-1  
Lake Charles CCS Project  
Overall Location  
Texas and Louisiana

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Enclosure 2

Area of Potential Effect  
for Proposed Lake Charles Carbon Capture and Sequestration Project Facilities  
in Calcasieu Parish, Louisiana

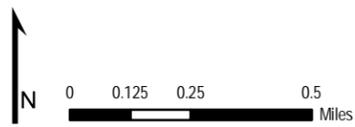
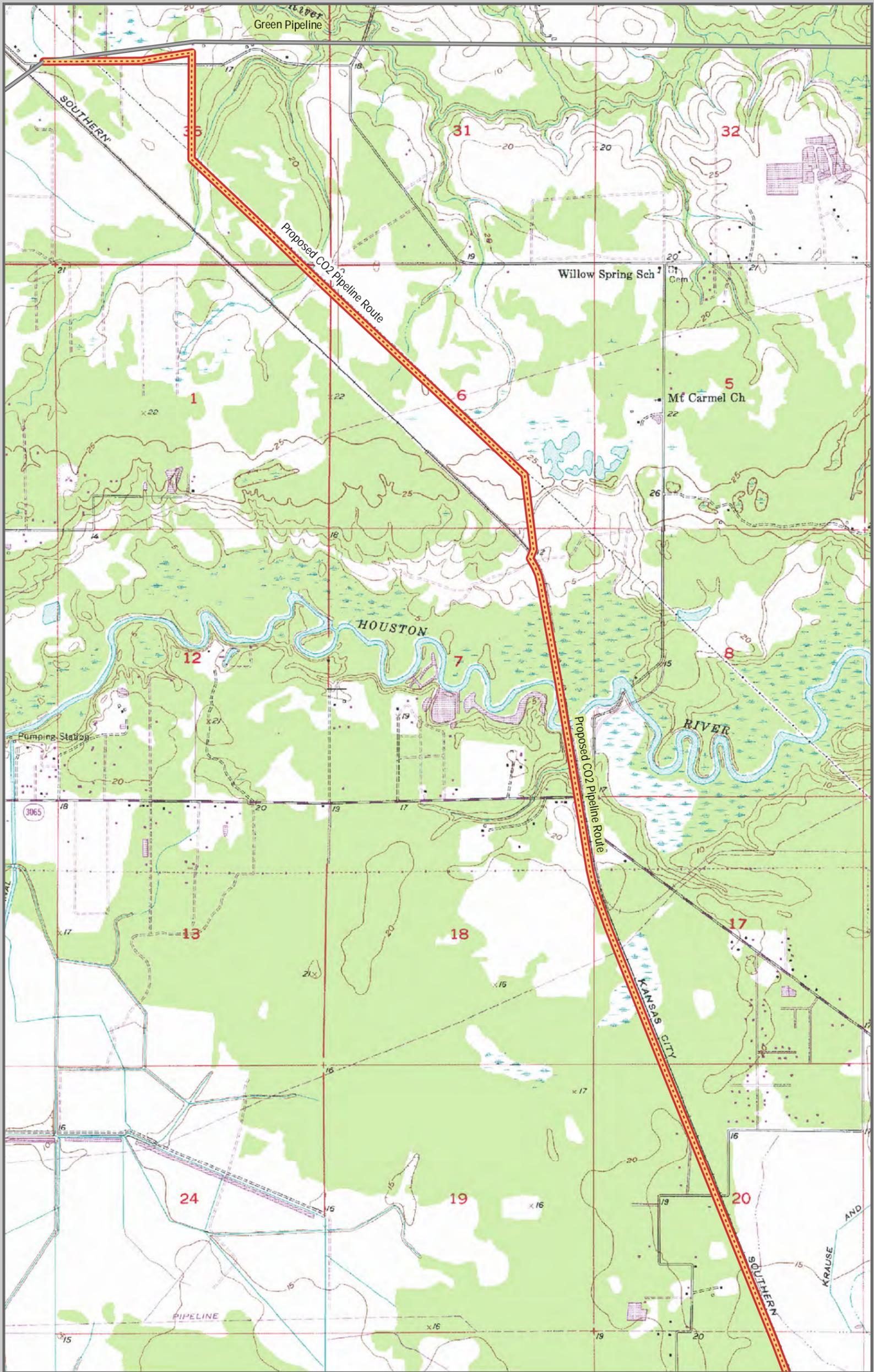
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**Figure 1**  
 Overview of the APE  
 (Area of Potential Effect) for the  
 Proposed Facilities within  
 Calcasieu Parish, Louisiana

Source: USGS 1:24,000 Friendswood (1998); Pearland (1983); Manval (1977); and Algoa (1977) Quadrangles.

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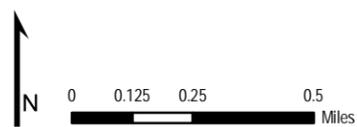
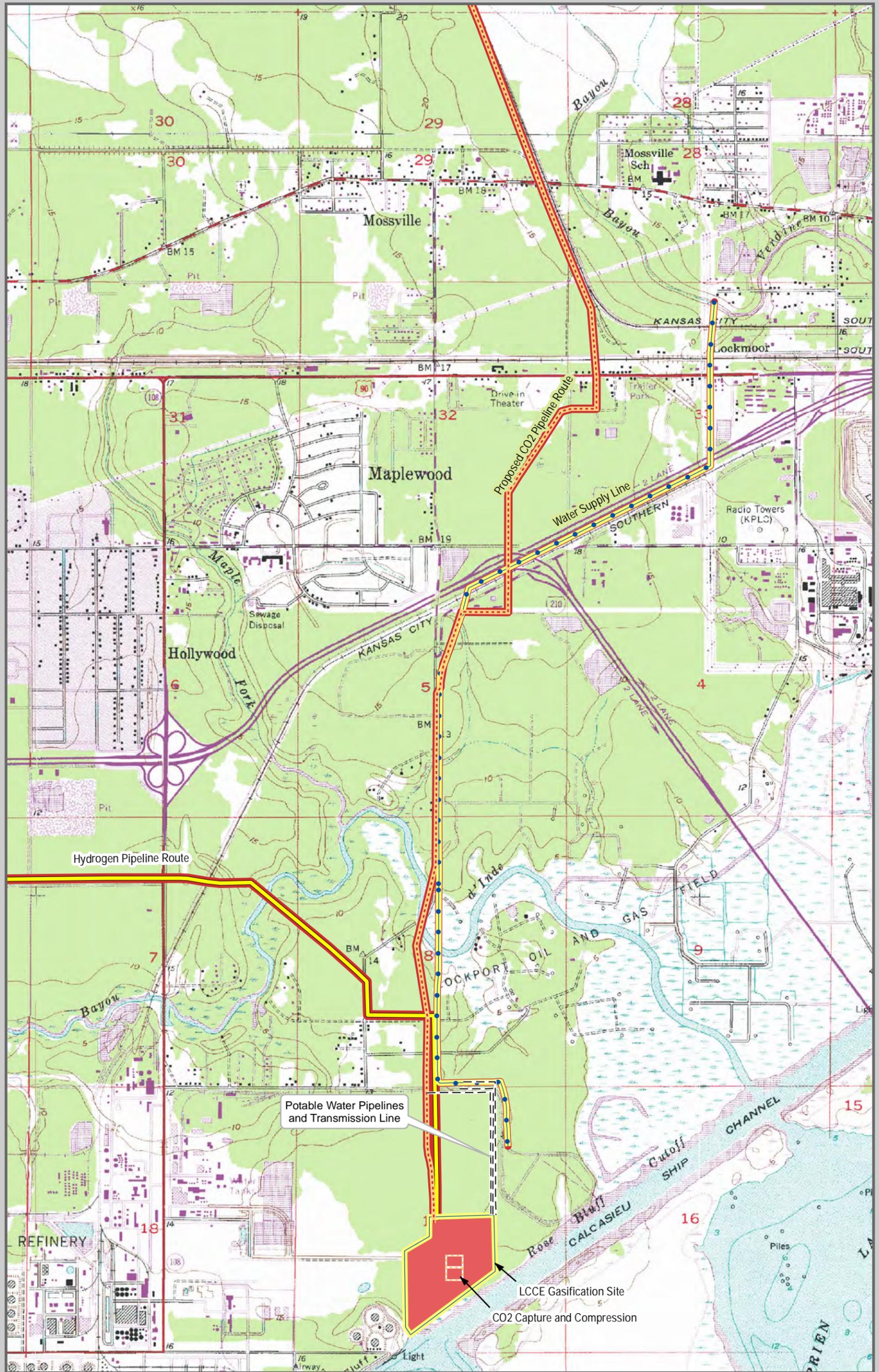


Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakd (1977) Quadrangles.

- |   |   |
|---|---|
|  Area of Potential Effect (APE)  |  Lake Charles Gasification Project (Connected Action)<br>Gasification Site |
|  Existing Operations (Not in Project or Proposed Action)<br>Green Pipeline |  Water Supply Line   |
|  Lake Charles CCS Project (Proposed Action)<br>CO2 Capture and Compression |  Hydrogen Pipeline Route   |
|  Proposed CO2 Pipeline Route   |   |

**Figure 1-1**  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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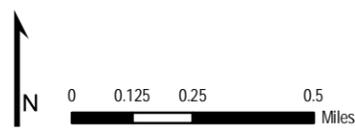
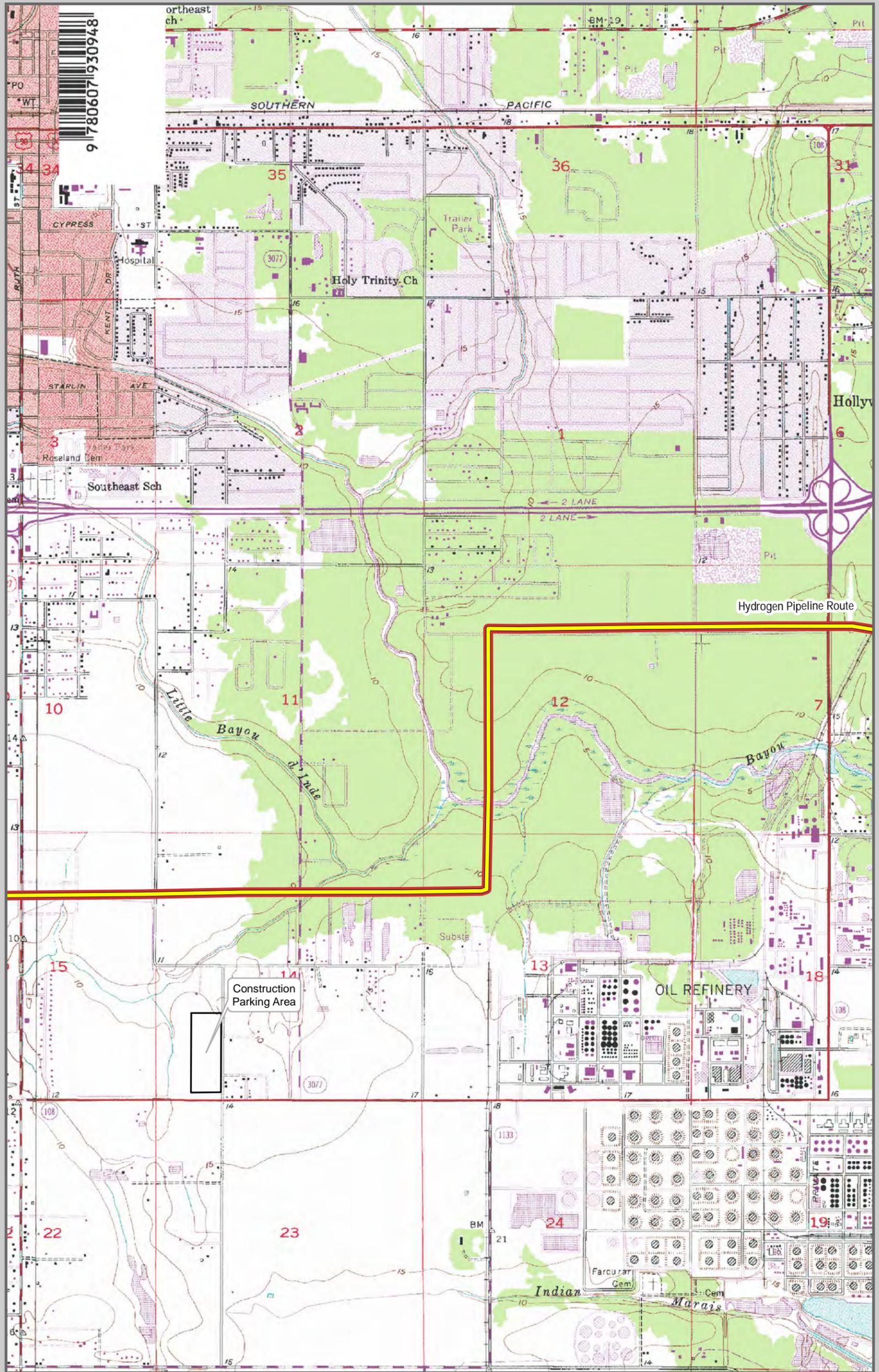


Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakd (1977) Quadrangles.

- |   |   |   |  |
|---|---|---|--|
|  | Area of Potential Effect (APE)                          |  | Lake Charles Gasification Project (Connected Action) |
|  | Existing Operations (Not in Project or Proposed Action) |  | Gasification Site                                    |
|  | Green Pipeline  |  | Water Supply Line                                    |
|  | Lake Charles CCS Project (Proposed Action)              |  | Hydrogen Pipeline Route                              |
|  | CO2 Capture and Compression                             |   |  |
|  | Proposed CO2 Pipeline Route                             |   |  |

Figure 1-2  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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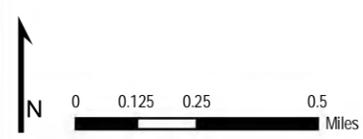
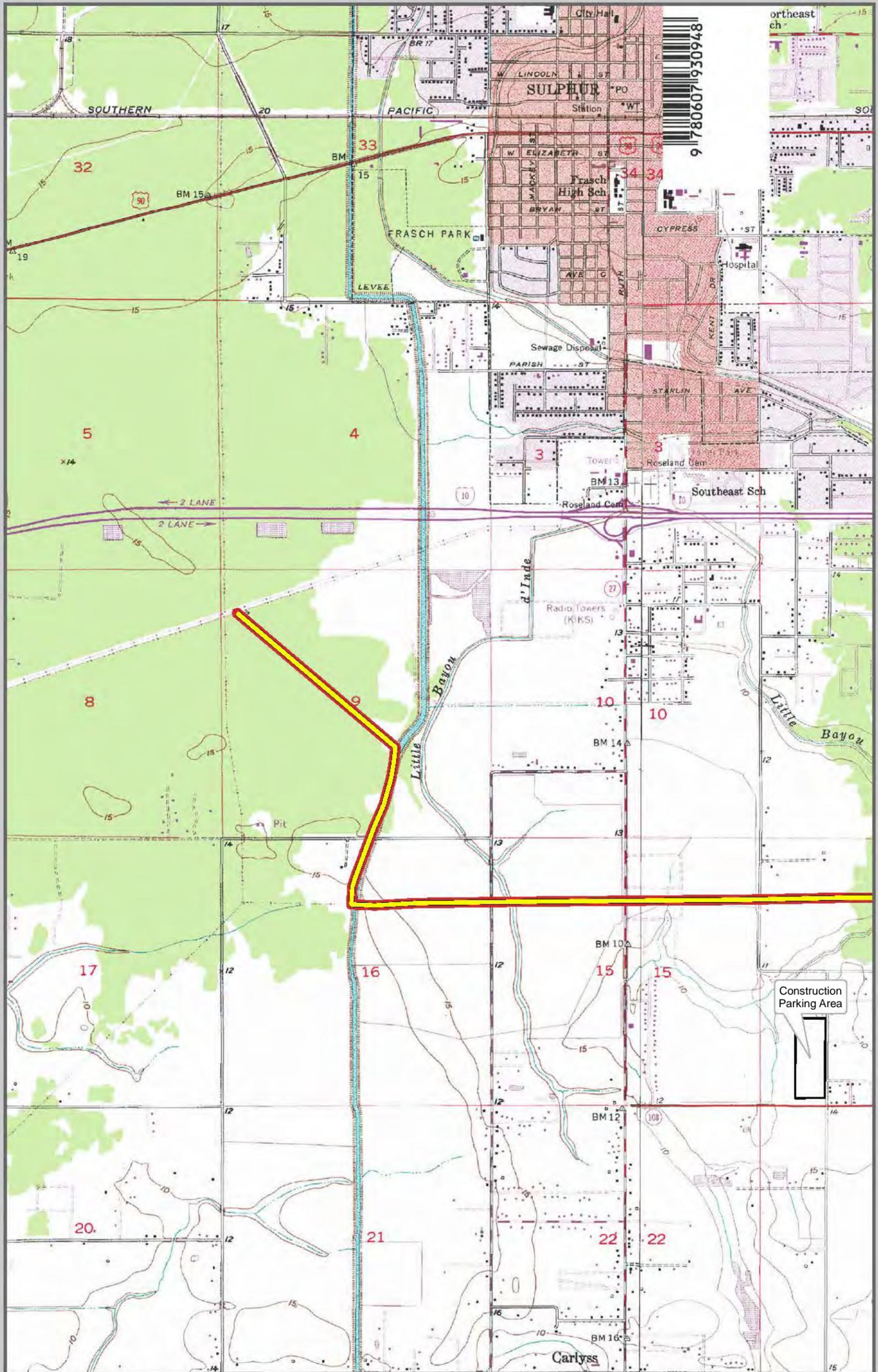


Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakd (1977) Quadrangles.

- ▭ Area of Potential Effect (APE)
- ▭ Existing Operations (Not in Project or Proposed Action)
- Green Pipeline
- ▭ Lake Charles CCS Project (Proposed Action)
- ▭ CO2 Capture and Compression
- Proposed CO2 Pipeline Route
- ▭ Lake Charles Gasification Project (Connected Action)
- ▭ Gasification Site
- Water Supply Line
- Hydrogen Pipeline Route

**Figure 1-3**  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakt (1977) Quadrangles.

- Area of Potential Effect (APE)
- Existing Operations (Not in Project or Proposed Action)
- Green Pipeline
- Lake Charles CCS Project (Proposed Action)
- CO2 Capture and Compression
- Proposed CO2 Pipeline Route
- Lake Charles Gasification Project (Connected Action)
- Gasification Site
- Water Supply Line
- Hydrogen Pipeline Route

**Figure 1-4**  
APE (Area of Potential Effect) for the Proposed Facilities within Calcasieu Parish, Louisiana

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Enclosure 3

Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana

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Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
<b>Lake Charles CCS Project (DOE proposes to fund)</b>		
Carbon Capture and Compression (Calcasieu Parish, Louisiana)	<ul style="list-style-type: none"> <li>• 2 acid gas removal units to capture CO<sub>2</sub> that would otherwise be emitted to the atmosphere</li> <li>• Produce CO<sub>2</sub> in the purity needed for sequestration or EOR</li> <li>• 2 CO<sub>2</sub> compressors pressurizing CO<sub>2</sub> to 2,250 psig for transport in a supercritical state</li> <li>• Monitoring and metering equipment</li> <li>• All equipment is completely contained within the LCC Gasification Project Site.</li> </ul>	<p>Phase I archaeological survey of known site within parcel previously conducted by URS in 2009; one cultural resources present (prehistoric archaeological site 16CU 29); site recommended not eligible for NRHP (letter report dated June 15, 2009 [Handley]).</p> <p>LA SHPO concurred with NRHP-eligibility recommendation; no further investigations of property required. (letter dated June 26, 2009 [Hutcheson]).</p>
CO2 Pipeline (Calcasieu Parish, Louisiana)	<ul style="list-style-type: none"> <li>• 11.1 mile pipeline from the CO<sub>2</sub> compressors to an existing CO<sub>2</sub> pipeline</li> <li>• Route includes a 50 foot permanent right of way (ROW) that would parallel existing ROWs (such as roadways, pipelines, railroads, transmission lines, and other linear features) throughout the length of the pipeline corridor to the extent practicable</li> <li>• CO<sub>2</sub> meter station at tie-in to existing CO<sub>2</sub> pipeline (Green Pipeline)</li> </ul>	<p>Phase I cultural resources survey (for archaeological and architectural resources) by University of Alabama; two cultural resources identified (historic archaeological site 16CU73; and modern [late 20<sup>th</sup> century] Hardey Cemetery). Both resources recommended not eligible for NRHP; drilling pipeline beneath cemetery recommended for Hardey Cemetery (draft report dated November 18, 2011 [Watkins and Futato]).</p> <p>LA SHPO concurred with results of survey: no NRHP-eligible resources were identified within the APE; no historic properties will be impacted by the project; and no further work is necessary (letter dated April 25, 2012 [Breux]).</p>
<b>LCCE Gasification Project (Connected Action, not under consideration for DOE funding)</b>		

**Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana**

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
Gasification Plant	<ul style="list-style-type: none"> <li>• Provides CO<sub>2</sub> to the Lake Charles CCS Project</li> <li>• Petroleum coke gasification facility to produce methanol, hydrogen, and sulfuric acid on a 70 acre site in Calcasieu Parish</li> <li>• Site preparation of clearing, grading, raising the elevation currently being performed under USACE permit, including 26 acres of wetland mitigation implemented by the Port of Lake Charles</li> <li>• Construction expected to begin Fall 2012 and continue for 40 months</li> </ul>	<p>Phase I archaeological survey of known site within parcel previously conducted by URS in 2009; one cultural resources present (prehistoric archaeological site 16CU 29); site recommended not eligible for NRHP (letter report dated June 15, 2009 [Handley]).</p> <p>LA SHPO concurred with NRHP-eligibility recommendation and indicated no further investigations of property required (letter dated June 26, 2009 [Hutcheson]).</p>
Offsite Activities	<ul style="list-style-type: none"> <li>• 4 mile Raw Water Pipeline from Sabine River Canal. Route includes a 50 foot permanent ROW and 50 to 250 foot construction ROW that would parallel existing roadways, pipelines, railroads, transmission lines, and other linear features to the extent practicable. Leucadia would own and operate the raw water pipeline.</li> </ul>	<p>Phase IA cultural resources survey for archaeological and architectural resources) by URS; no cultural resources identified; further investigations of those areas that have not been previously disturbed or surveyed for cultural resources recommended (letter report dated May 16, 2012 [Handley]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>• 8.5 mile Hydrogen Pipeline to transport hydrogen to Air Products in, Sulphur, Louisiana. Route includes a 50 foot permanent ROW and 75 foot construction ROW that would parallel existing roadways, pipelines, railroads, transmission lines, and other linear features to the extent practicable. The hydrogen pipeline would be owned and operated by Air Products.</li> </ul>	<p>Phase IA cultural resources survey (for archaeological and architectural resources) by URS; no cultural resources identified; further investigations of those areas that have not been previously disturbed or surveyed for cultural resources recommended (letter report dated May 16, 2012 [Handley]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>

Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
	<ul style="list-style-type: none"> <li>Offsite Construction Parking Area with shuttle buses to and from the Plant site. This site is partially cleared and graded.</li> </ul>	<p>Phase IA cultural resources survey (for archaeological and architectural resources) by URS; no previously recorded cultural resources identified within APE; further investigations of those areas that have not been previously disturbed or surveyed for cultural resources recommended (letter report dated May 16, 2012 [Handley]). Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>Potable Water Pipeline to provide access to existing city water currently supplying the Port of Lake Charles. This work would take place within currently developed ROWs.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (letter report dated May 16, 2012 [Handley]). Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>Natural Gas Pipeline to provide start up fuel. This work includes upgrade to an existing line and new line and would take place within currently developed ROWs.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]). Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>Transmission Line to connect with the existing 230 kV transmission line. Route includes one alternative that would take place within currently developed ROWs on the east side of the Plant access road or on the west side of adjacent industrial property occupied by LA Pigment.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]). Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>

Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
	<ul style="list-style-type: none"> <li>Methanol and Sulfuric Acid Pipelines to Storage. These pipelines would transport products to the LCC Gasification Project offsite storage area. This work would take place within currently developed ROWs.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>Construction Laydown Area for staging of construction equipment. This site would be located near LCC Gasification Project on property to be leased from the Port of Lake Charles. The site would be prepared for storage of construction equipment prior to use by Leucadia.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>Methanol and Sulfuric Acid Storage Area and Pipelines to Port of Lake Charles. The area will contain above ground storage tanks for methanol and sulfuric acid. The pipelines move product from the storage area to offload by barge, ship, truck, and rail on the Port of Lake Charles property. The storage area and pipelines will be on property owned by the Port of Lake Charles.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>



August 16, 2012

Kimberly Walden  
Cultural Director  
Chitimacha Tribe of Louisiana  
P.O. Box 661  
Charenton, LA 70523

**SUBJECT:** Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Ms. Walden:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with the Chitimacha Tribe of Louisiana on the portion of the proposed project in Louisiana.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

During the DOE demonstration phase of the proposed Project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast and is not part of DOE's evaluation. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field to confirm permanent storage of about one million tons per year during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the facilities associated with the Lake Charles CCS Project and its associated CO<sub>2</sub> capture and compression facilities in Calcasieu Parish, Louisiana;
- the Lake Charles CCS Project proposed 11.1-mile long CO<sub>2</sub> pipeline in Calcasieu Parish;
- the Lake Charles CCS Project proposed Research MVA program for the CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation in Brazoria County, Texas; and,
- the LCCE Gasification Project and its associated facilities in Calcasieu Parish, Louisiana (a connected action).

DOE has determined that the area of potential effects (APE) for the undertaking in Louisiana will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCCE Gasification that are located in Calcasieu Parish, Louisiana. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The APE in Louisiana is in an industrial setting on the west side of the Calcasieu River, and is in the vicinity of numerous energy-related facilities. The APE includes the locations of:

- the CO<sub>2</sub> capture and compression facilities for the Lake Charles CCS Project on the west bank of the Calcasieu River;
- the LCCE Gasification project, also on the west bank of the Calcasieu River;
- the offsite facilities associated with the LCCE Gasification project including the proposed new methanol storage area; hydrogen pipeline; water supply pipeline; natural gas pipeline; co-located transmission line, potable water line, and methanol pipeline; equipment laydown area; and offsite parking area
- the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline; or,
- the alternative 11.6-mile long alignment for the CO<sub>2</sub> pipeline that connects to the existing Green Pipeline to the southwest (see Enclosure 2).

Cultural resources investigations have been conducted within portions of the APE in Louisiana, including: Phase I archaeological survey of the property that contains the locations of the Lake Charles CCS Project and LCCE Gasification project; Phase I cultural resources survey of the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline, including extra workspace and access roads; and Phase IA cultural resources investigations of offsite facilities associated with the LCCE Gasification project (raw water, hydrogen, potable water, methanol and sulfuric acid pipelines; an overhead transmission line; a construction laydown area; and construction parking area). The reports documenting these cultural resources investigations have been submitted separately to the Louisiana SHPO for review and comment by the consultants on behalf of the Applicant. A table summarizing the cultural resources investigations is in Enclosure 3.

DOE has confirmed that no NRHP-listed historic properties or previously recorded standing structures or historic districts are located within the APE or a 0.5-mile radius around the APE in

Calcasieu Parish, Louisiana (NPS 2011a, 2011b; Louisiana Department of Culture, Recreation and Tourism 2011).

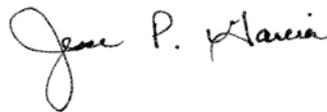
The DOE is also initiating Section 106 consultation with the Louisiana State Historic Preservation Officer to identify any issues or concerns regarding cultural resources and historic properties in the APE in Calcasieu Parish, Louisiana that may be affected by the proposed Project as part of the DOE's fulfillment of responsibilities under Section 106 of the NHPA for the proposed Project and per 36 CFR Part 800. Additional consulting parties with interest and standing, as identified to in 36 CFR 800.2(c), will be invited to participate in the Section 106 consultation process.

The DOE looks forward to receiving your comments or concerns regarding traditional cultural properties, sacred sites, or site of traditional religious or cultural importance in the APE that might be affected by the proposed Project and an indication as to whether you wish to participate in the Section 106 consultation for the proposed project. Please forward the results of your review and any requests for additional information to DOE's tribal liaison for the Project:

Jesse Garcia  
NETL Tribal Liaison  
Environmental Compliance Division  
National Energy Technology Laboratory  
3610 Collins Ferry Road  
Mail Stop B07, Room 333  
Morgantown, WV 26507  
PH: 304-285-0256  
Fax: 304-285-4403  
[Jesse.Garcia@NETL.doe.gov](mailto:Jesse.Garcia@NETL.doe.gov)

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Calcasieu Parish, Louisiana
  3. Summary Table for Cultural Resources Investigations Conducted within the APE in Louisiana

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## References:

- Breaux, Pam. 2012. Letter dated April 25, 2012, from Pam Breaux, State Historic Preservation Officer, Office of Cultural Development, Louisiana Department of Culture, Recreation & Tourism, Baton Rouge, Louisiana, to Joel Watkins, Cultural Resource Analyst, Office of Archaeological Research, Moundville, Alabama. RE: *Draft Report, La Division of Archaeology Report No. 22-4007, Phase I Cultural Resource Survey of the Proposed Lake Charles Pipeline Lateral Project located near Sulphur, Calcasieu Parish, Louisiana.*
- Handley, Martin. 2009. Letter dated June 15, 2009, from Martin Handley, Principal Investigator, URS Corporation, Baton Rouge, Louisiana, to Mr. Donald W. Maley, Vice-President, Lake Charles Cogeneration, LLC, Houston, Texas. RE: *Field Assessment of Archaeological Site 16CU29, Lake Charles Gasification Facility, Lake Charles Cogeneration, LLC, Westlake, Calcasieu Parish, Louisiana.*
- Handley, Martin. 2012. Letter dated May 16, 2012, from Martin Handley, Principal Investigator, URS Corporation, Baton Rouge, Louisiana, to Mr. Philip Leonards, Leucadia Energy, Houston, Texas. Re: *Cultural Resources Evaluation - Lake Charles Cogeneration, LLC (LCC), Calcasieu Parish, Louisiana.*
- Hutcheson, Scott. 2009. Letter dated June 26, 2009, from Scott Hutcheson, State Historic Preservation Officer, Office of Cultural Development, Department of Culture, Recreation and Tourism, State of Louisiana, Baton Rouge, Louisiana. RE: *Lake Charles Gasification Facility, Lake Charles Cogeneration LLC, Agency Interest No. 160213, Activity No. PER20090001, Lake Charles, Calcasieu Parish, LA.*
- Louisiana Department of Culture, Recreation and Tourism. 2011a. Louisiana Cultural Resources Map: Standing Structures and Historic Districts within 0.5 miles of Project Areas in Calcasieu Parish, Louisiana. <http://kronos.crt.state.la.us/website/lahpweb/viewer.htm> (web site accessed March 7, 2011).
- National Park Service. 2011a. National Historic Landmarks Program, Lists of National Historic Landmarks: National Historic Landmarks Survey, Listing of National Historic Landmarks by State: Louisiana and Texas. <http://www.nps.gov/history/nhl/designations/Lists/LA01.pdf> and <http://www.nps.gov/history/nhl/designations/Lists/TX01.pdf> (web sites accessed March 7, 2011).
- National Park Service. 2011b. National Register of Historic Places, NPS Focus: Calcasieu Parish, Louisiana and Brazoria County, Texas. <http://nrhp.focus.nps.gov/natreghome.do> (web site accessed March 7, 2011).
- Smith, R. L., M. E. Weed, A. I. Wilson, and A. Deter-Wolf. 2001. *Intensive Cultural Resources Survey – Citgo Petroleum Corporation, Lake Charles Refinery, Calcasieu Parish, Louisiana.* Report No. 22-2382, on file, Louisiana Division of Archaeology, Baton Rouge, Louisiana. Cited in letter dated June 15, 2009, from Martin Handley, Principal Investigator, URS Corporation, Baton Rouge, Louisiana, to Mr. Donald W. Maley, Vice-President, Lake Charles Cogeneration, LLC, Houston, Texas. RE: *Field Assessment of*

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Same as Enclosures 1 through 3 per  
August 16, 2012 Correspondence to the Caddo Nation  
Regarding Section 106 Consultation for Proposed Financial Assistance for the Lake Charles  
Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

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August 16, 2012

Terry Cole  
Tribal Historic Preservation Officer  
Choctaw Nation of Oklahoma  
P.O. Box 1210  
Durant, OK 74702

**SUBJECT:** Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Mr. Cole:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with the Choctaw Nation of Oklahoma on the portion of the proposed project in Louisiana.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

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DOE has determined that the area of potential effects (APE) for the undertaking in Louisiana will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCCE Gasification that are located in Calcasieu Parish, Louisiana. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

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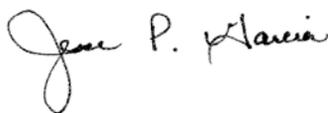
The DOE is also initiating Section 106 consultation with the Louisiana State Historic Preservation Officer to identify any issues or concerns regarding cultural resources and historic properties in the APE in Calcasieu Parish, Louisiana that may be affected by the proposed Project as part of the DOE's fulfillment of responsibilities under Section 106 of the NHPA for the proposed Project and per 36 CFR Part 800. Additional consulting parties with interest and standing, as identified to in 36 CFR 800.2(c), will be invited to participate in the Section 106 consultation process.

The DOE looks forward to receiving your comments or concerns regarding traditional cultural properties, sacred sites, or site of traditional religious or cultural importance in the APE that might be affected by the proposed Project and an indication as to whether you wish to participate in the Section 106 consultation for the proposed project. Please forward the results of your review and any requests for additional information to DOE's tribal liaison for the Project:

Jesse Garcia  
NETL Tribal Liaison  
Environmental Compliance Division  
National Energy Technology Laboratory  
3610 Collins Ferry Road  
Mail Stop B07, Room 333  
Morgantown, WV 26507  
PH: 304-285-0256  
Fax: 304-285-4403  
[Jesse.Garcia@NETL.doe.gov](mailto:Jesse.Garcia@NETL.doe.gov)

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Calcasieu Parish, Louisiana
  3. Summary Table for Cultural Resources Investigations Conducted within the APE in Louisiana

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- National Park Service. 2011a. National Historic Landmarks Program, Lists of National Historic Landmarks: National Historic Landmarks Survey, Listing of National Historic Landmarks by State: Louisiana and Texas. <http://www.nps.gov/history/nhl/designations/Lists/LA01.pdf> and <http://www.nps.gov/history/nhl/designations/Lists/TX01.pdf> (web sites accessed March 7, 2011).
- National Park Service. 2011b. National Register of Historic Places, NPS Focus: Calcasieu Parish, Louisiana and Brazoria County, Texas. <http://nrhp.focus.nps.gov/natreghome.do> (web site accessed March 7, 2011).
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Same as Enclosures 1 through 3 per  
August 16, 2012 Correspondence to the Caddo Nation  
Regarding Section 106 Consultation for Proposed Financial Assistance for the Lake Charles  
Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

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August 16, 2012

Dr. Linda Langley  
Cultural Preservation Officer  
Coushatta Tribe of Louisiana  
P.O. Box 818  
Elton, LA 70532

**SUBJECT:** Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Dr. Langley:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with the Coushatta Tribe of Louisiana on the portion of the proposed project in Louisiana.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

During the DOE demonstration phase of the proposed Project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast and is not part of DOE's evaluation. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field to confirm permanent storage of about one million tons per year during the demonstration period.

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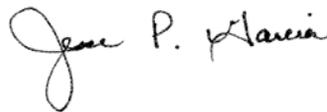
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Jesse Garcia  
NETL Tribal Liaison  
Environmental Compliance Division  
National Energy Technology Laboratory  
3610 Collins Ferry Road  
Mail Stop B07, Room 333  
Morgantown, WV 26507  
PH: 304-285-0256  
Fax: 304-285-4403  
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If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
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Calcasieu Parish, Louisiana (and Brazoria County, Texas)

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August 16, 2012

Michael Tarpley  
Tribal Historic Preservation Officer  
Jena Band of Choctaw Indians  
P.O.Box-14  
Jena, LA 71342-0014

**SUBJECT:** Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Mr. Tarpley:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with the Jena Band of Choctaw Indians on the portion of the proposed project in Louisiana.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

During the DOE demonstration phase of the proposed Project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast and is not part of DOE's evaluation. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field to confirm permanent storage of about one million tons per year during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the facilities associated with the Lake Charles CCS Project and its associated CO<sub>2</sub> capture and compression facilities in Calcasieu Parish, Louisiana;
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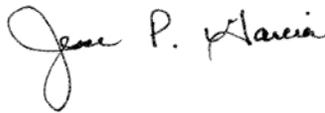
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Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

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August 16, 2012

Kenneth Carleton  
Tribal Archaeologist & THPO  
Mississippi Band of Choctaw Indians  
P.O. Box 6257  
Philadelphia, MS 39350

**SUBJECT:** Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Mr. Carleton:

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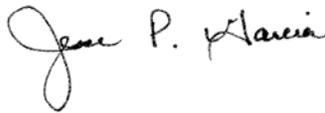
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Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

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Same as Enclosures 1 through 3 per  
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Regarding Section 106 Consultation for Proposed Financial Assistance for the Lake Charles  
Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

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August 16, 2012

John Berrey  
Chair  
Quapaw Tribe of Oklahoma  
P.O. Box 765  
Quapaw, OK 74363-0765

**SUBJECT:** Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Mr. Berrey:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with the Quapaw Tribe of Oklahoma on the portion of the proposed project in Louisiana.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

During the DOE demonstration phase of the proposed Project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast and is not part of DOE's evaluation. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field to confirm permanent storage of about one million tons per year during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the facilities associated with the Lake Charles CCS Project and its associated CO<sub>2</sub> capture and compression facilities in Calcasieu Parish, Louisiana;
- the Lake Charles CCS Project proposed 11.1-mile long CO<sub>2</sub> pipeline in Calcasieu Parish;
- the Lake Charles CCS Project proposed Research MVA program for the CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation in Brazoria County, Texas; and,
- the LCCE Gasification Project and its associated facilities in Calcasieu Parish, Louisiana (a connected action).

DOE has determined that the area of potential effects (APE) for the undertaking in Louisiana will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCCE Gasification that are located in Calcasieu Parish, Louisiana. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The APE in Louisiana is in an industrial setting on the west side of the Calcasieu River, and is in the vicinity of numerous energy-related facilities. The APE includes the locations of:

- the CO<sub>2</sub> capture and compression facilities for the Lake Charles CCS Project on the west bank of the Calcasieu River;
- the LCCE Gasification project, also on the west bank of the Calcasieu River;
- the offsite facilities associated with the LCCE Gasification project including the proposed new methanol storage area; hydrogen pipeline; water supply pipeline; natural gas pipeline; co-located transmission line, potable water line, and methanol pipeline; equipment laydown area; and offsite parking area
- the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline; or,
- the alternative 11.6-mile long alignment for the CO<sub>2</sub> pipeline that connects to the existing Green Pipeline to the southwest (see Enclosure 2).

Cultural resources investigations have been conducted within portions of the APE in Louisiana, including: Phase I archaeological survey of the property that contains the locations of the Lake Charles CCS Project and LCCE Gasification project; Phase I cultural resources survey of the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline, including extra workspace and access roads; and Phase IA cultural resources investigations of offsite facilities associated with the LCCE Gasification project (raw water, hydrogen, potable water, methanol and sulfuric acid pipelines; an overhead transmission line; a construction laydown area; and construction parking area). The reports documenting these cultural resources investigations have been submitted separately to the Louisiana SHPO for review and comment by the consultants on behalf of the Applicant. A table summarizing the cultural resources investigations is in Enclosure 3.

DOE has confirmed that no NRHP-listed historic properties or previously recorded standing structures or historic districts are located within the APE or a 0.5-mile radius around the APE in

Calcasieu Parish, Louisiana (NPS 2011a, 2011b; Louisiana Department of Culture, Recreation and Tourism 2011).

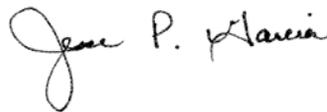
The DOE is also initiating Section 106 consultation with the Louisiana State Historic Preservation Officer to identify any issues or concerns regarding cultural resources and historic properties in the APE in Calcasieu Parish, Louisiana that may be affected by the proposed Project as part of the DOE's fulfillment of responsibilities under Section 106 of the NHPA for the proposed Project and per 36 CFR Part 800. Additional consulting parties with interest and standing, as identified to in 36 CFR 800.2(c), will be invited to participate in the Section 106 consultation process.

The DOE looks forward to receiving your comments or concerns regarding traditional cultural properties, sacred sites, or site of traditional religious or cultural importance in the APE that might be affected by the proposed Project and an indication as to whether you wish to participate in the Section 106 consultation for the proposed project. Please forward the results of your review and any requests for additional information to DOE's tribal liaison for the Project:

Jesse Garcia  
NETL Tribal Liaison  
Environmental Compliance Division  
National Energy Technology Laboratory  
3610 Collins Ferry Road  
Mail Stop B07, Room 333  
Morgantown, WV 26507  
PH: 304-285-0256  
Fax: 304-285-4403  
[Jesse.Garcia@NETL.doe.gov](mailto:Jesse.Garcia@NETL.doe.gov)

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Calcasieu Parish, Louisiana
  3. Summary Table for Cultural Resources Investigations Conducted within the APE in Louisiana

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## References:

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Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

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August 16, 2012

Alan Emarthle  
Historic Preservation Officer  
Seminole Nation of Oklahoma  
P.O. Box 1498  
Wewoka, OK 74884

**SUBJECT:** Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Mr. Emarthle:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with the Seminole Nation of Oklahoma on the portion of the proposed project in Louisiana.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

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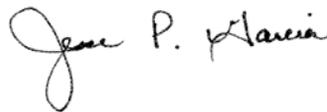
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Jesse Garcia  
NETL Tribal Liaison  
Environmental Compliance Division  
National Energy Technology Laboratory  
3610 Collins Ferry Road  
Mail Stop B07, Room 333  
Morgantown, WV 26507  
PH: 304-285-0256  
Fax: 304-285-4403  
[Jesse.Garcia@NETL.doe.gov](mailto:Jesse.Garcia@NETL.doe.gov)

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Calcasieu Parish, Louisiana
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Calcasieu Parish, Louisiana (and Brazoria County, Texas)

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August 16, 2012

Willard Steele  
Tribal Historic Preservation Officer  
Seminole Tribe of Florida  
30290 Josie Billie Hwy  
PMB 1004  
Clewiston, FL 33440

**SUBJECT:** Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Mr. Steele:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with the Seminole Tribe of Florida on the portion of the proposed project in Louisiana.

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- Louisiana Department of Culture, Recreation and Tourism. 2011a. Louisiana Cultural Resources Map: Standing Structures and Historic Districts within 0.5 miles of Project Areas in Calcasieu Parish, Louisiana. <http://kronos.crt.state.la.us/website/lahpweb/viewer.htm> (web site accessed March 7, 2011).
- National Park Service. 2011a. National Historic Landmarks Program, Lists of National Historic Landmarks: National Historic Landmarks Survey, Listing of National Historic Landmarks by State: Louisiana and Texas. <http://www.nps.gov/history/nhl/designations/Lists/LA01.pdf> and <http://www.nps.gov/history/nhl/designations/Lists/TX01.pdf> (web sites accessed March 7, 2011).
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Watkins, Joel H. and Eugene M. Futato. 2011. *Phase I Cultural Resource Survey of the Proposed Lake Charles Pipeline Lateral Project located near Sulphur, Calcasieu Parish, Louisiana.* Draft report prepared November 21, 2011, by the University of Alabama, Office of Archaeological Research, Moundville, Alabama. Prepared for CH2M HILL, Atlanta, Georgia.

Same as Enclosures 1 through 3 per  
August 16, 2012 Correspondence to the Caddo Nation  
Regarding Section 106 Consultation for Proposed Financial Assistance for the Lake Charles  
Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

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August 16, 2012

Earl J. Barbry, Jr.  
Tribal Historic Preservation Officer  
Tunica-Biloxi Tribe of Louisiana  
Attn: Museum Division Offices  
P.O. Box 1589  
Marksville, LA 71351

**SUBJECT:** Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Mr. Barbry:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with the Tunica-Biloxi Tribe of Louisiana on the portion of the proposed project in Louisiana.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

During the DOE demonstration phase of the proposed Project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast and is not part of DOE's evaluation.

A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field to confirm permanent storage of about one million tons per year during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the facilities associated with the Lake Charles CCS Project and its associated CO<sub>2</sub> capture and compression facilities in Calcasieu Parish, Louisiana;
- the Lake Charles CCS Project proposed 11.1-mile long CO<sub>2</sub> pipeline in Calcasieu Parish;
- the Lake Charles CCS Project proposed Research MVA program for the CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation in Brazoria County, Texas; and,
- the LCCE Gasification Project and its associated facilities in Calcasieu Parish, Louisiana (a connected action).

DOE has determined that the area of potential effects (APE) for the undertaking in Louisiana will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCCE Gasification that are located in Calcasieu Parish, Louisiana. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The APE in Louisiana is in an industrial setting on the west side of the Calcasieu River, and is in the vicinity of numerous energy-related facilities. The APE includes the locations of:

- the CO<sub>2</sub> capture and compression facilities for the Lake Charles CCS Project on the west bank of the Calcasieu River;
- the LCCE Gasification project, also on the west bank of the Calcasieu River;
- the offsite facilities associated with the LCCE Gasification project including the proposed new methanol storage area; hydrogen pipeline; water supply pipeline; natural gas pipeline; co-located transmission line, potable water line, and methanol pipeline; equipment laydown area; and offsite parking area
- the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline; or,
- the alternative 11.6-mile long alignment for the CO<sub>2</sub> pipeline that connects to the existing Green Pipeline to the southwest (see Enclosure 2).

Cultural resources investigations have been conducted within portions of the APE in Louisiana, including: Phase I archaeological survey of the property that contains the locations of the Lake Charles CCS Project and LCCE Gasification project; Phase I cultural resources survey of the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline, including extra workspace and access roads; and Phase IA cultural resources investigations of offsite facilities associated with the LCCE Gasification project (raw water, hydrogen, potable water, methanol and sulfuric acid pipelines; an overhead transmission line; a construction laydown area; and construction parking area). The reports documenting these cultural resources investigations have been submitted separately to the Louisiana SHPO for review and comment by the consultants on behalf of the Applicant. A table summarizing the cultural resources investigations is in Enclosure 3.

DOE has confirmed that no NRHP-listed historic properties or previously recorded standing structures or historic districts are located within the APE or a 0.5-mile radius around the APE in Calcasieu Parish, Louisiana (NPS 2011a, 2011b; Louisiana Department of Culture, Recreation and Tourism 2011).

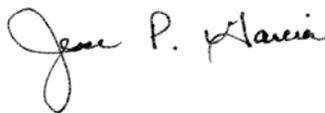
The DOE is also initiating Section 106 consultation with the Louisiana State Historic Preservation Officer to identify any issues or concerns regarding cultural resources and historic properties in the APE in Calcasieu Parish, Louisiana that may be affected by the proposed Project as part of the DOE's fulfillment of responsibilities under Section 106 of the NHPA for the proposed Project and per 36 CFR Part 800. Additional consulting parties with interest and standing, as identified to in 36 CFR 800.2(c), will be invited to participate in the Section 106 consultation process.

The DOE looks forward to receiving your comments or concerns regarding traditional cultural properties, sacred sites, or site of traditional religious or cultural importance in the APE that might be affected by the proposed Project and an indication as to whether you wish to participate in the Section 106 consultation for the proposed project. Please forward the results of your review and any requests for additional information to DOE's tribal liaison for the Project:

Jesse Garcia  
NETL Tribal Liaison  
Environmental Compliance Division  
National Energy Technology Laboratory  
3610 Collins Ferry Road  
Mail Stop B07, Room 333  
Morgantown, WV 26507  
PH: 304-285-0256  
Fax: 304-285-4403  
[Jesse.Garcia@NETL.doe.gov](mailto:Jesse.Garcia@NETL.doe.gov)

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Calcasieu Parish, Louisiana
  3. Summary Table for Cultural Resources Investigations Conducted within the APE in Louisiana

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## References:

- Breaux, Pam. 2012. Letter dated April 25, 2012, from Pam Breaux, State Historic Preservation Officer, Office of Cultural Development, Louisiana Department of Culture, Recreation & Tourism, Baton Rouge, Louisiana, to Joel Watkins, Cultural Resource Analyst, Office of Archaeological Research, Moundville, Alabama. RE: *Draft Report, La Division of Archaeology Report No. 22-4007, Phase I Cultural Resource Survey of the Proposed Lake Charles Pipeline Lateral Project located near Sulphur, Calcasieu Parish, Louisiana.*
- Handley, Martin. 2009. Letter dated June 15, 2009, from Martin Handley, Principal Investigator, URS Corporation, Baton Rouge, Louisiana, to Mr. Donald W. Maley, Vice-President, Lake Charles Cogeneration, LLC, Houston, Texas. RE: *Field Assessment of Archaeological Site 16CU29, Lake Charles Gasification Facility, Lake Charles Cogeneration, LLC, Westlake, Calcasieu Parish, Louisiana.*
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- Louisiana Department of Culture, Recreation and Tourism. 2011a. Louisiana Cultural Resources Map: Standing Structures and Historic Districts within 0.5 miles of Project Areas in Calcasieu Parish, Louisiana. <http://kronos.crt.state.la.us/website/lahpweb/viewer.htm> (web site accessed March 7, 2011).
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- National Park Service. 2011b. National Register of Historic Places, NPS Focus: Calcasieu Parish, Louisiana and Brazoria County, Texas. <http://nrhp.focus.nps.gov/natreghome.do> (web site accessed March 7, 2011).
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Same as Enclosures 1 through 3 per  
August 16, 2012 Correspondence to the Caddo Nation  
Regarding Section 106 Consultation for Proposed Financial Assistance for the Lake Charles  
Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

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August 16, 2012

Bryant Celestine  
Historic Preservation Officer  
Alabama Coushatta Tribe of Texas  
571 State Park Rd. 56  
Livingston, TX 77351

**SUBJECT:** Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana and Brazoria County, Texas

Dear Mr. Celestine:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with the Alabama Coushatta Tribe of Texas on the proposed project.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

During the DOE demonstration phase of the proposed Project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast and is not part of DOE's evaluation. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field to confirm permanent storage of about one million tons per year during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the facilities associated with the Lake Charles CCS Project and its associated CO<sub>2</sub> capture and compression facilities in Calcasieu Parish, Louisiana;
- the Lake Charles CCS Project proposed 11.1-mile long CO<sub>2</sub> pipeline in Calcasieu Parish;
- the Lake Charles CCS Project proposed Research MVA program for the CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation in Brazoria County, Texas; and,
- the LCCE Gasification Project and its associated facilities in Calcasieu Parish, Louisiana (a connected action).

DOE has determined that the area of potential effects (APE) for the undertaking will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCCE Gasification, which are located in Calcasieu Parish, Louisiana and in Brazoria County, Texas. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The APE in Louisiana is in an industrial setting on the west side of the Calcasieu River, and is in the vicinity of numerous energy-related facilities. The APE includes the locations of:

- the CO<sub>2</sub> capture and compression facilities for the Lake Charles CCS Project on the west bank of the Calcasieu River;
- the LCCE Gasification project, also on the west bank of the Calcasieu River;
- the offsite facilities associated with the LCCE Gasification project including the proposed new methanol storage area; hydrogen pipeline; water supply pipeline; natural gas pipeline; co-located transmission line, potable water line, and methanol pipeline; equipment laydown area; and offsite parking area
- the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline; or,
- the alternative 11.6-mile long alignment for the CO<sub>2</sub> pipeline that connects to the existing Green Pipeline to the southwest (see Enclosure 2).

Cultural resources investigations have been conducted within portions of the APE in Louisiana, including: Phase I archaeological survey of the property that contains the locations of the Lake Charles CCS Project and LCCE Gasification project; Phase I cultural resources survey of the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline, including extra workspace and access roads; and Phase IA cultural resources investigations of offsite facilities associated with the LCCE Gasification project (raw water, hydrogen, potable water, methanol and sulfuric acid pipelines; an overhead transmission line; a construction laydown area; and construction parking area). The reports documenting these cultural resources investigations have been submitted separately to the Louisiana SHPO for review and comment by the consultants on behalf of the Applicant. A table summarizing the cultural resources investigations is in Enclosure 3.

The APE in Texas includes the location of the proposed CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation and Research MVA program at the existing Hastings Oil Field in Brazoria County, Texas (see Enclosure 4).

A records and literature search of the area within the MVA portion of the APE in Brazoria County, Texas was conducted by William Self Associates, Inc. (WSA) in October 2011. The letter report documenting the results of the records and literature search was submitted separately to the Texas SHPO for review and comment by the consultants on behalf of the Applicant. A summary of this cultural resources investigation is also in Enclosure 3.

DOE has confirmed that no NRHP-listed historic properties or previously recorded standing structures or historic districts are located within the APE or a 0.5-mile radius around the APE in Calcasieu Parish, Louisiana (NPS 2011a, 2011b; Louisiana Department of Culture, Recreation and Tourism 2011). DOE has also confirmed that no NRHP-listed historic properties or districts, neighborhood surveys, historical markers, cemeteries, museums, historic county courthouses, military sites, or state archaeological landmarks (buildings only) are within the APE or a 0.5 mile radius around the APE in Brazoria County, Texas (NPS 2011a, 2011b; Texas Historical Commission 2011).

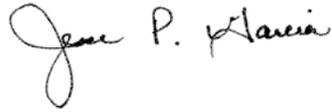
The DOE is also initiating Section 106 consultation with the Louisiana and Texas State Historic Preservation Officers to identify any issues or concerns regarding cultural resources and historic properties in the APE in Calcasieu Parish, Louisiana and Brazoria County, Texas, respectively, that may be affected by the proposed Project as part of the DOE's fulfillment of responsibilities under Section 106 of the NHPA for the proposed Project and per 36 CFR Part 800. Additional consulting parties with interest and standing, as identified to in 36 CFR 800.2(c), will be invited to participate in the Section 106 consultation process.

The DOE looks forward to receiving your comments or concerns regarding traditional cultural properties, sacred sites, or site of traditional religious or cultural importance in the APE that might be affected by the proposed Project and an indication as to whether you wish to participate in the Section 106 consultation for the proposed project. Please forward the results of your review and any requests for additional information to DOE's tribal liaison for the Project:

Jesse Garcia  
NETL Tribal Liaison  
Environmental Compliance Division  
National Energy Technology Laboratory  
3610 Collins Ferry Road  
Mail Stop B07, Room 333  
Morgantown, WV 26507  
PH: 304-285-0256  
Fax: 304-285-4403  
[Jesse.Garcia@NETL.doe.gov](mailto:Jesse.Garcia@NETL.doe.gov)

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,

A handwritten signature in black ink that reads "James P. Haines". The signature is written in a cursive style with a large initial 'J'.

For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Calcasieu Parish, Louisiana
  3. Summary Table for Cultural Resources Investigations Conducted within the APE in Louisiana and Texas
  4. APE for proposed Lake Charles CCS Project facilities in Brazoria County, Texas

## References:

- Breaux, Pam. 2012. Letter dated April 25, 2012, from Pam Breaux, State Historic Preservation Officer, Office of Cultural Development, Louisiana Department of Culture, Recreation & Tourism, Baton Rouge, Louisiana, to Joel Watkins, Cultural Resource Analyst, Office of Archaeological Research, Moundville, Alabama. RE: *Draft Report, La Division of Archaeology Report No. 22-4007, Phase I Cultural Resource Survey of the Proposed Lake Charles Pipeline Lateral Project located near Sulphur, Calcasieu Parish, Louisiana.*
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- Karbula, James W., Ph.D. 2011. Letter dated October 25, 2011, from Dr. James W. Karbula, Regional Project Director, William Self Associates, Inc., Austin, Texas, to Patricia Mercado-Allinger, State Archaeologist, Archeology Division, Texas Historical Commission, Austin, Texas. Re: *Denbury Onshore, LLC, CO2 Sequestration Monitoring, Verification, and Accounting (MVA), Hastings Field, Brazoria County, Texas.*
- Louisiana Department of Culture, Recreation and Tourism. 2011a. Louisiana Cultural Resources Map: Standing Structures and Historic Districts within 0.5 miles of Project Areas in Calcasieu Parish, Louisiana. <http://kronos.crt.state.la.us/website/lahpweb/viewer.htm> (web site accessed March 7, 2011).
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- National Park Service. 2011b. National Register of Historic Places, NPS Focus: Calcasieu Parish, Louisiana and Brazoria County, Texas. <http://nrhp.focus.nps.gov/natreghome.do> (web site accessed March 7, 2011).

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Texas Historical Commission. 2011. Texas Historic Sites Atlas. <http://atlas.thc.state.tx.us/shell-map-address.htm> (web site accessed March 7, 2011).

URS Corporation. 2012. *Lake Charles Cogeneration, LLC, Cultural Resources Assessment, Calcasieu Parish, Louisiana*. URS Job No. 10003620, July 2012.

Watkins, Joel H. and Eugene M. Futato. 2011. *Phase I Cultural Resource Survey of the Proposed Lake Charles Pipeline Lateral Project located near Sulphur, Calcasieu Parish, Louisiana*. Draft report prepared November 21, 2011, by the University of Alabama, Office of Archaeological Research, Moundville, Alabama. Prepared for CH2M HILL, Atlanta, Georgia.

Wolfe, Mark. 2011. Letter dated November 1, 2011, from Mark Wolfe, State Historic Preservation Officer, Texas Historical Commission, Austin, Texas, to James Karbula, William Self Associates, Inc., Austin, Texas. Re: *Project Review under Section 106 of the National Historic Preservation act of 1966 and the Antiquities Code of Texas, Denbury Onshore, LLC, CO2 Sequestration Monitoring, Verification, and Accounting (MVA), Hastings Field, Brazoria County, Texas*.

Enclosure 1

Location of the Proposed  
Lake Charles Carbon Capture and Sequestration Project

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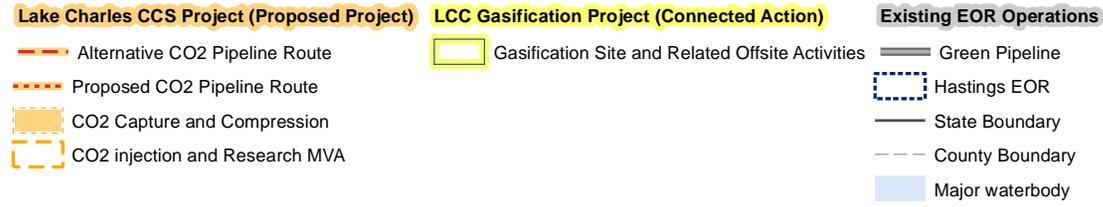
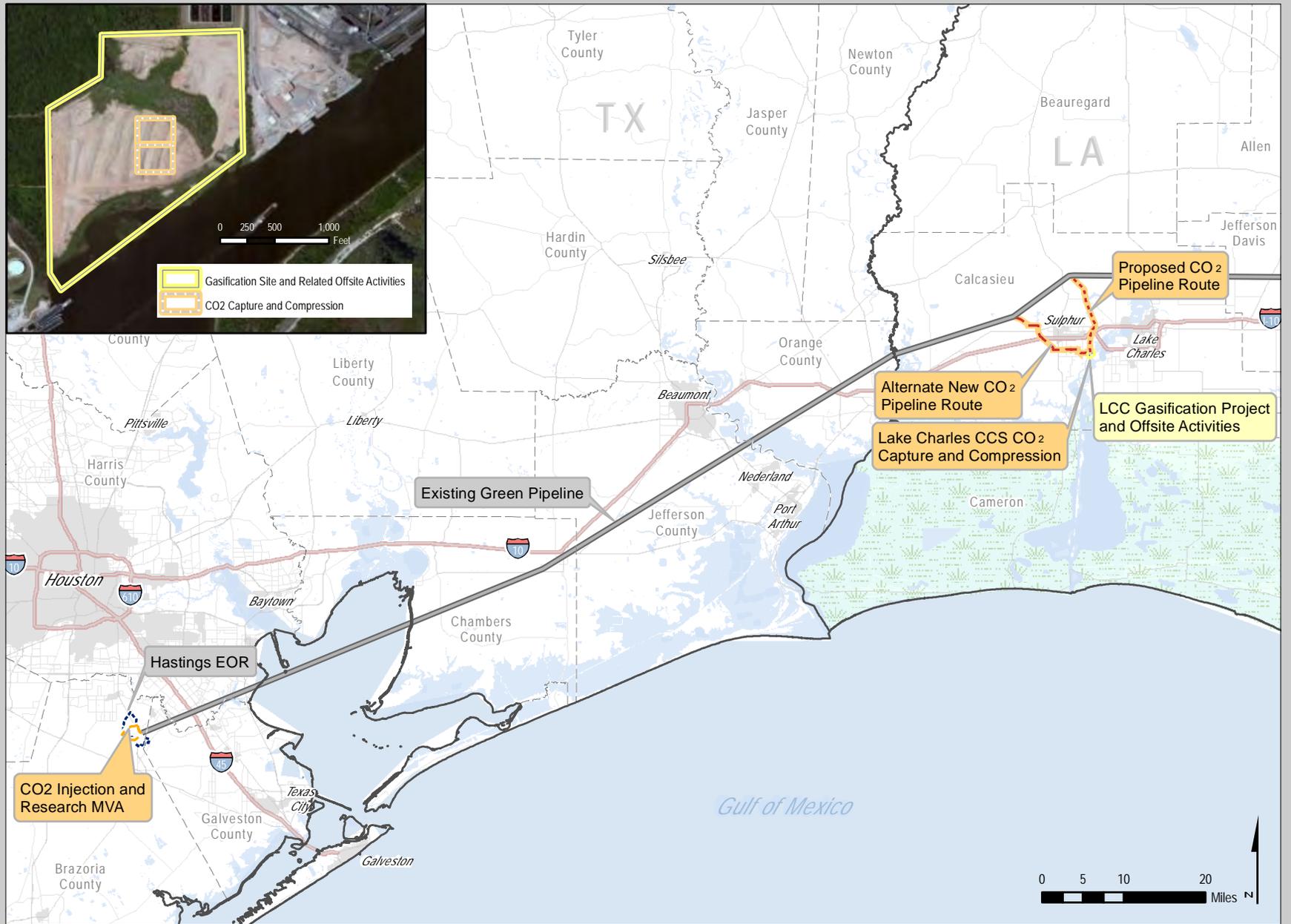


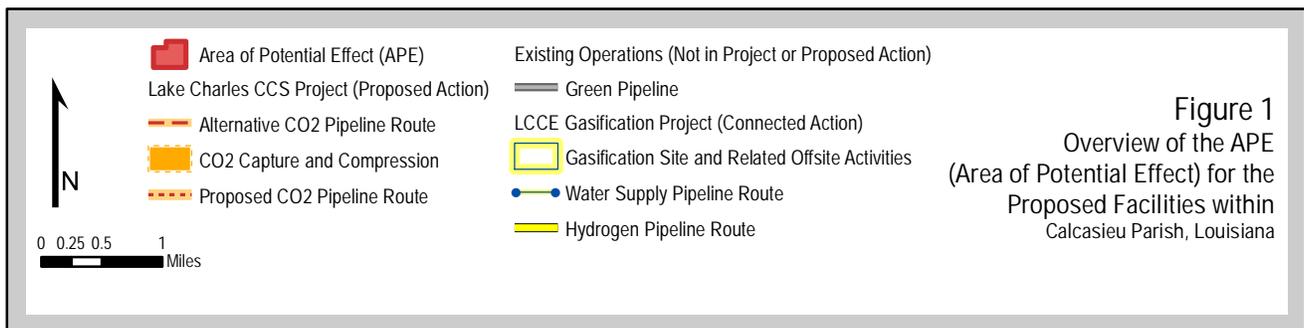
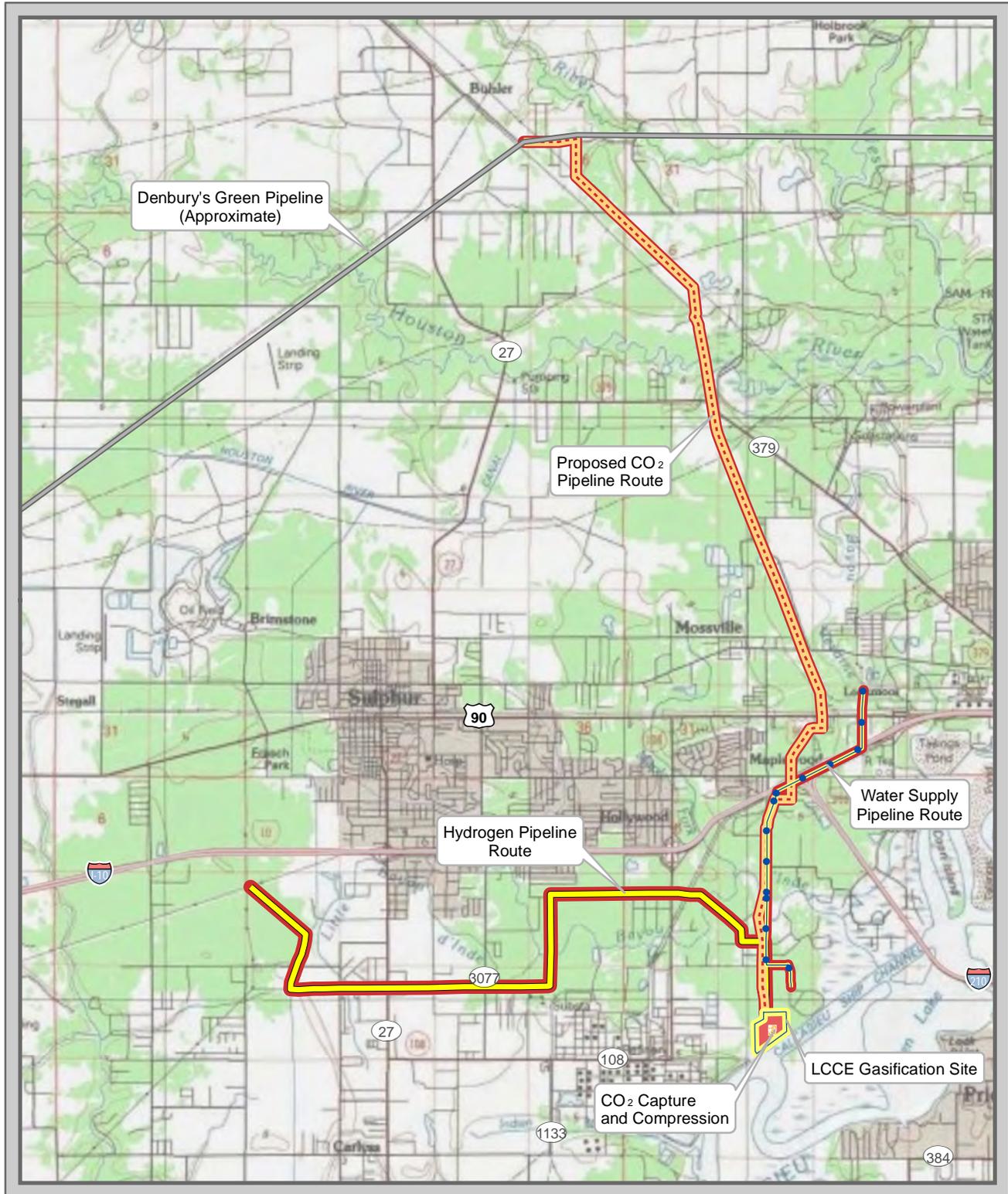
Figure 2.2-1  
Lake Charles CCS Project  
Overall Location  
Texas and Louisiana

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Enclosure 2

Area of Potential Effect  
for Proposed Lake Charles Carbon Capture and Sequestration Project Facilities  
in Calcasieu Parish, Louisiana

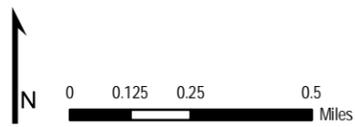
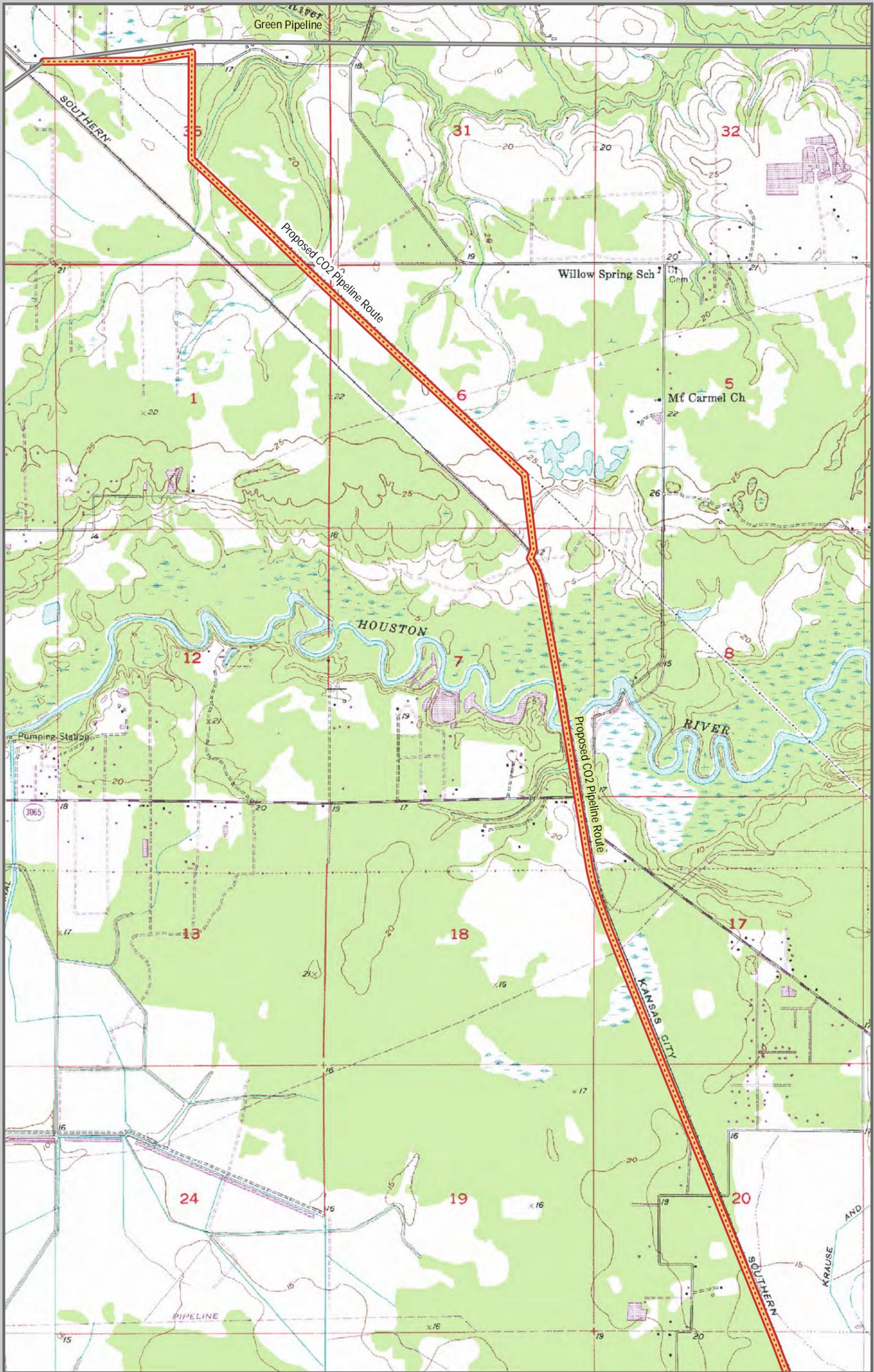
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**Figure 1**  
 Overview of the APE  
 (Area of Potential Effect) for the  
 Proposed Facilities within  
 Calcasieu Parish, Louisiana

Source: USGS 1:24,000 Friendswood (1998); Pearland (1983); Manval (1977); and Algoa (1977) Quadrangles.

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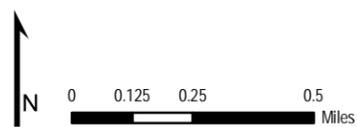
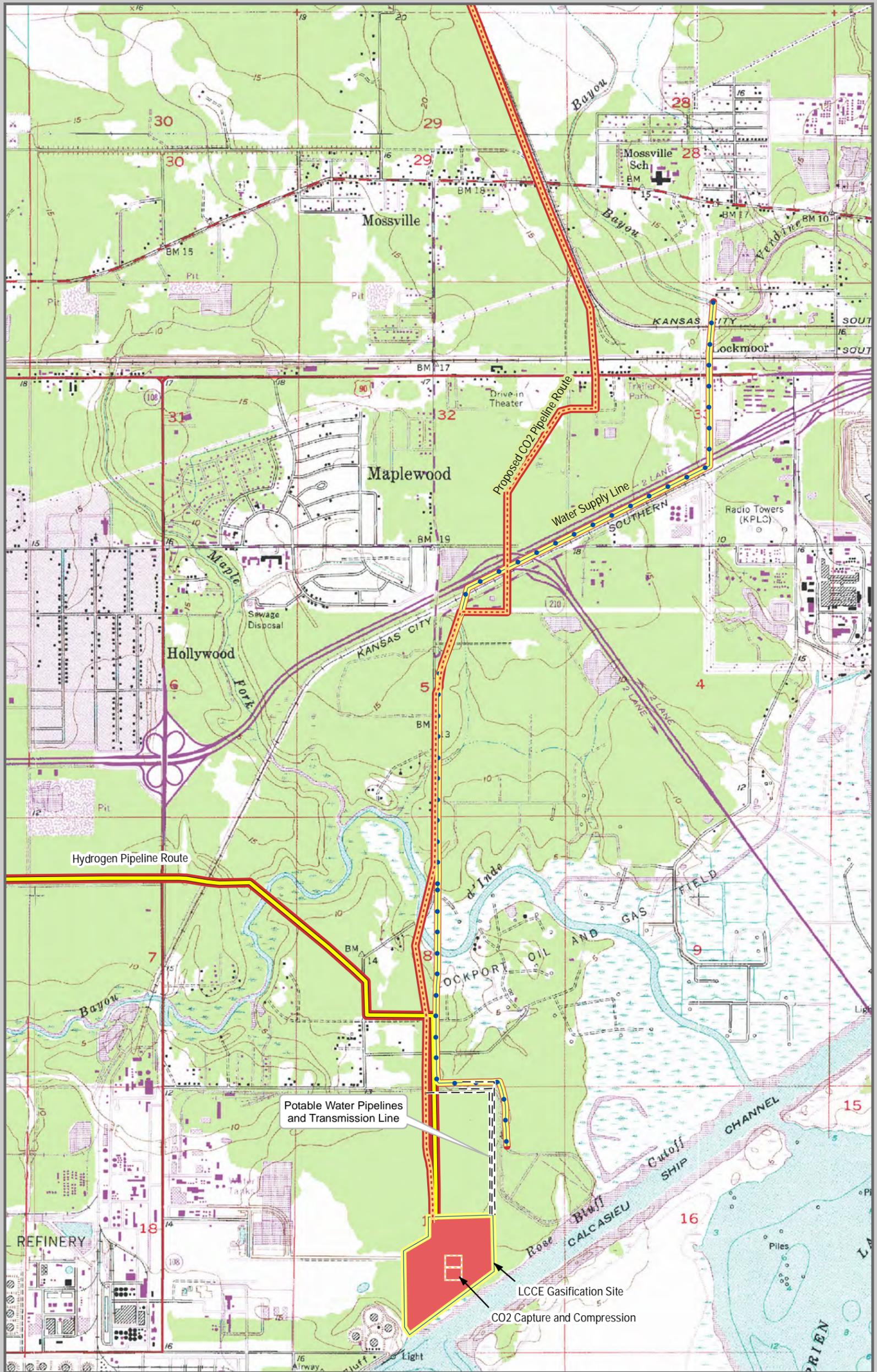


Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakd (1977) Quadrangles.

- |   |   |
|---|---|
|  Area of Potential Effect (APE)  |  Lake Charles Gasification Project (Connected Action)<br>Gasification Site |
|  Existing Operations (Not in Project or Proposed Action)<br>Green Pipeline |  Water Supply Line   |
|  Lake Charles CCS Project (Proposed Action)<br>CO2 Capture and Compression |  Hydrogen Pipeline Route   |
|  Proposed CO2 Pipeline Route   |   |

**Figure 1-1**  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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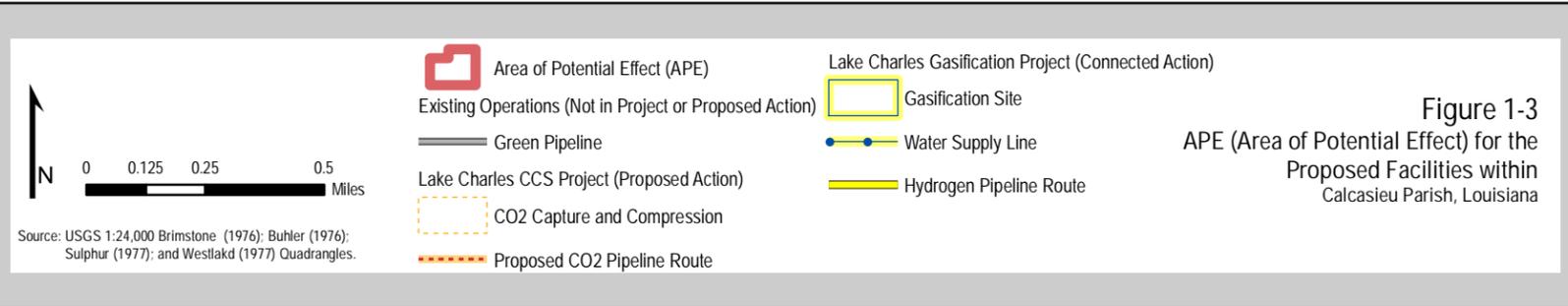
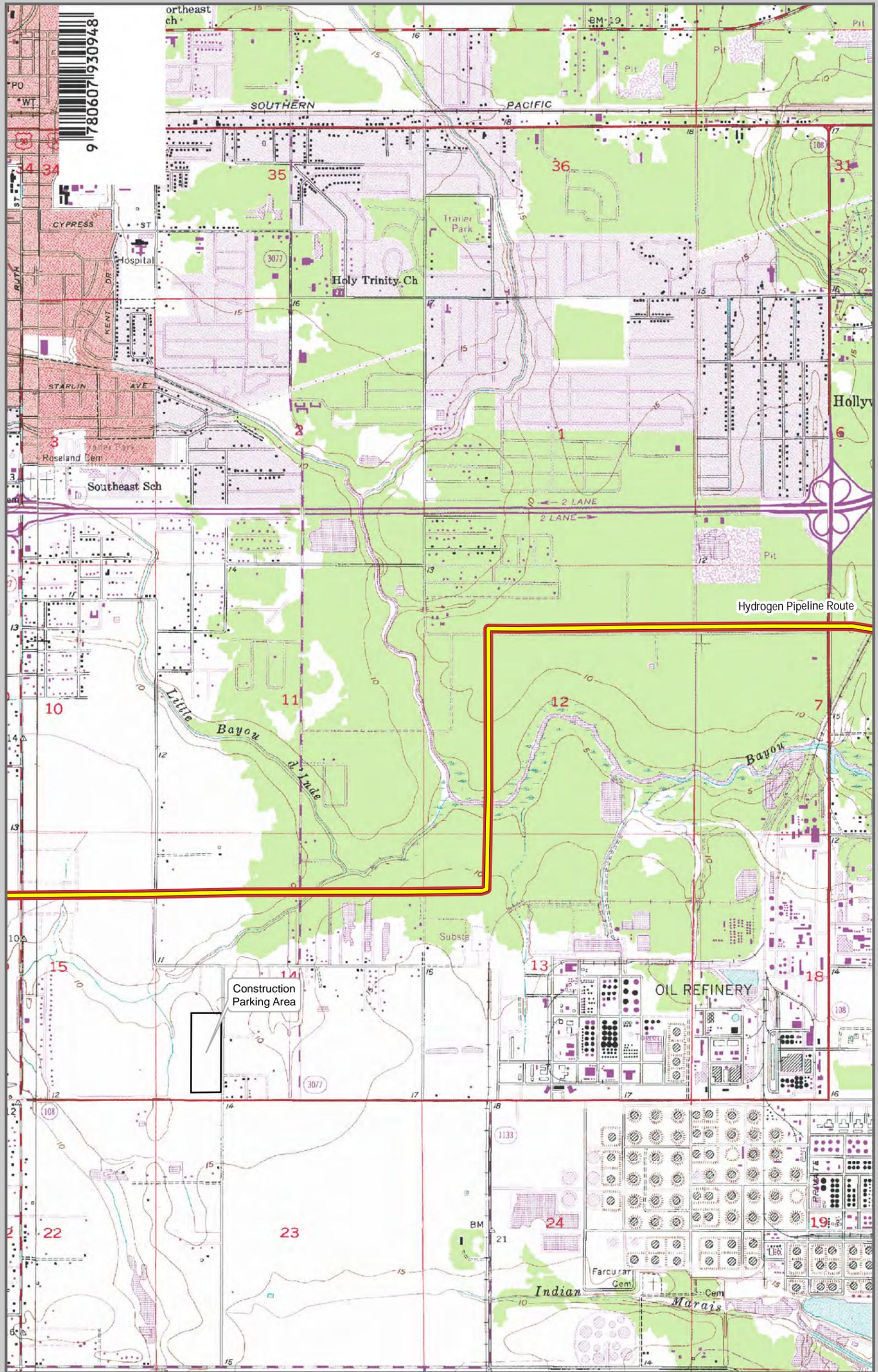


Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakd (1977) Quadrangles.

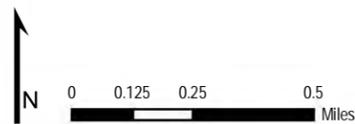
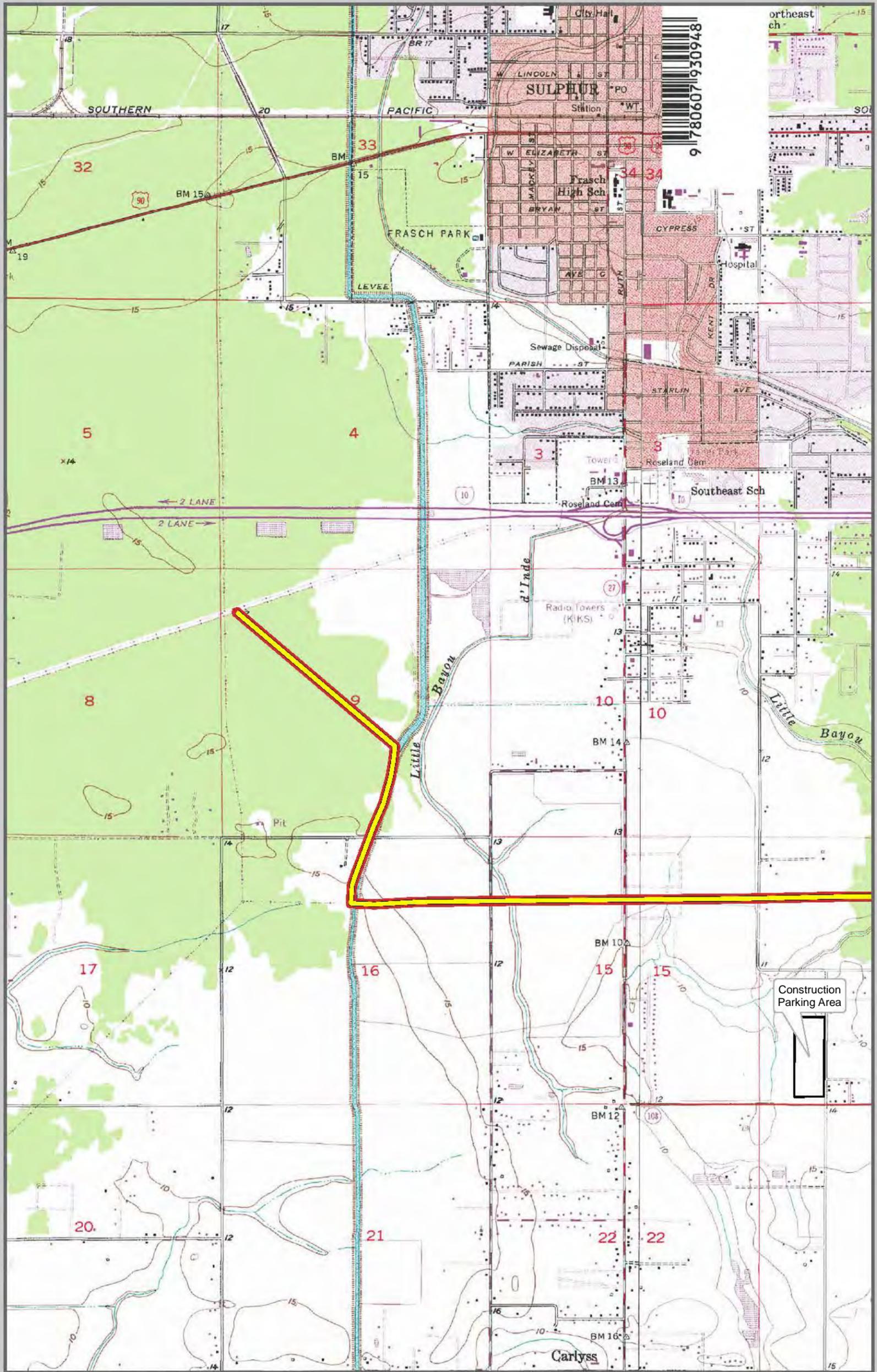
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|---|---|---|--|
|  | Area of Potential Effect (APE)                          |  | Lake Charles Gasification Project (Connected Action) |
|  | Existing Operations (Not in Project or Proposed Action) |  | Gasification Site                                    |
|  | Green Pipeline  |  | Water Supply Line                                    |
|  | Lake Charles CCS Project (Proposed Action)              |  | Hydrogen Pipeline Route                              |
|  | CO2 Capture and Compression                             |   |  |
|  | Proposed CO2 Pipeline Route                             |   |  |

Figure 1-2  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakt (1977) Quadrangles.

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| Area of Potential Effect (APE)   | Lake Charles Gasification Project (Connected Action) Gasification Site |
| Existing Operations (Not in Project or Proposed Action) Green Pipeline | Water Supply Line  |
| Lake Charles CCS Project (Proposed Action) CO2 Capture and Compression | Hydrogen Pipeline Route  |
| Proposed CO2 Pipeline Route  |  |

**Figure 1-4**  
APE (Area of Potential Effect) for the Proposed Facilities within Calcasieu Parish, Louisiana

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Enclosure 3

Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana and Texas

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Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana and Texas

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
<b>Lake Charles CCS Project (DOE proposes to fund)</b>		
Carbon Capture and Compression (Calcasieu Parish, Louisiana)	<ul style="list-style-type: none"> <li>• 2 acid gas removal units to capture CO<sub>2</sub> that would otherwise be emitted to the atmosphere</li> <li>• Produce CO<sub>2</sub> in the purity needed for sequestration or EOR</li> <li>• 2 CO<sub>2</sub> compressors pressurizing CO<sub>2</sub> to 2,250 psig for transport in a supercritical state</li> <li>• Monitoring and metering equipment</li> <li>• All equipment is completely contained within the LCC Gasification Project Site.</li> </ul>	<p>Phase I archaeological survey of known site within parcel previously conducted by URS in 2009; one cultural resources present (prehistoric archaeological site 16CU 29); site recommended not eligible for NRHP (letter report dated June 15, 2009 [Handley]).</p> <p>LA SHPO concurred with NRHP-eligibility recommendation; no further investigations of property required. (letter dated June 26, 2009 [Hutcheson]).</p>
CO <sub>2</sub> Pipeline (Calcasieu Parish, Louisiana)	<ul style="list-style-type: none"> <li>• 11.1 mile pipeline from the CO<sub>2</sub> compressors to an existing CO<sub>2</sub> pipeline</li> <li>• Route includes a 50 foot permanent right of way (ROW) that would parallel existing ROWs (such as roadways, pipelines, railroads, transmission lines, and other linear features) throughout the length of the pipeline corridor to the extent practicable</li> <li>• CO<sub>2</sub> meter station at tie-in to existing CO<sub>2</sub> pipeline (Green Pipeline)</li> </ul>	<p>Phase I cultural resources survey (for archaeological and architectural resources) by University of Alabama; two cultural resources identified (historic archaeological site 16CU73; and modern [late 20<sup>th</sup> century] Hardey Cemetery). Both resources recommended not eligible for NRHP; drilling pipeline beneath cemetery recommended for Hardey Cemetery (draft report dated November 18, 2011 [Watkins and Futato]).</p> <p>LA SHPO concurred with results of survey: no NRHP-eligible resources were identified within the APE; no historic properties will be impacted by the project; and no further work is necessary (letter dated April 25, 2012 [Breux]).</p>

**Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana and Texas**

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
Research MVA program (Brazoria County, Texas)	<ul style="list-style-type: none"> <li>• CO<sub>2</sub> sequestration monitoring locations in existing Hastings Oil Field</li> </ul>	<p>Phase IA cultural resources survey for archaeological and architectural resources) by WSA; no cultural resources identified; location has been previously disturbed during development of Hastings Oil Field; no further surveys for cultural resources recommended (letter report dated October 25, 2011 [Karbula]).</p> <p>TX SHPO concurred with recommendation and indicated no further investigations of property required (letter dated November 1, 2011 [Wolfe]).</p>
<b>LCCE Gasification Project (Connected Action, not under consideration for DOE funding)</b>		
Gasification Plant	<ul style="list-style-type: none"> <li>• Provides CO<sub>2</sub> to the Lake Charles CCS Project</li> <li>• Petroleum coke gasification facility to produce methanol, hydrogen, and sulfuric acid on a 70 acre site in Calcasieu Parish</li> <li>• Site preparation of clearing, grading, raising the elevation currently being performed under USACE permit, including 26 acres of wetland mitigation implemented by the Port of Lake Charles</li> <li>• Construction expected to begin Fall 2012 and continue for 40 months</li> </ul>	<p>Phase I archaeological survey of known site within parcel previously conducted by URS in 2009; one cultural resources present (prehistoric archaeological site 16CU 29); site recommended not eligible for NRHP (letter report dated June 15, 2009 [Handley]).</p> <p>LA SHPO concurred with NRHP-eligibility recommendation and indicated no further investigations of property required (letter dated June 26, 2009 [Hutcheson]).</p>
Offsite Activities	<ul style="list-style-type: none"> <li>• 4 mile Raw Water Pipeline from Sabine River Canal. Route includes a 50 foot permanent ROW and 50 to 250 foot construction ROW that would parallel existing roadways, pipelines, railroads, transmission lines, and other linear features to the extent practicable. Leucadia would own and operate the raw water pipeline.</li> </ul>	<p>Phase IA cultural resources survey for archaeological and architectural resources) by URS; no cultural resources identified; further investigations of those areas that have not been previously disturbed or surveyed for cultural resources recommended (letter report dated May 16, 2012 [Handley]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>

Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana and Texas

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
	<ul style="list-style-type: none"> <li>8.5 mile Hydrogen Pipeline to transport hydrogen to Air Products in, Sulphur, Louisiana. Route includes a 50 foot permanent ROW and 75 foot construction ROW that would parallel existing roadways, pipelines, railroads, transmission lines, and other linear features to the extent practicable. The hydrogen pipeline would be owned and operated by Air Products.</li> </ul>	<p>Phase IA cultural resources survey (for archaeological and architectural resources) by URS; no cultural resources identified; further investigations of those areas that have not been previously disturbed or surveyed for cultural resources recommended (letter report dated May 16, 2012 [Handley]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>Offsite Construction Parking Area with shuttle buses to and from the Plant site. This site is partially cleared and graded.</li> </ul>	<p>Phase IA cultural resources survey (for archaeological and architectural resources) by URS; no previously recorded cultural resources identified within APE; further investigations of those areas that have not been previously disturbed or surveyed for cultural resources recommended (letter report dated May 16, 2012 [Handley]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>Potable Water Pipeline to provide access to existing city water currently supplying the Port of Lake Charles. This work would take place within currently developed ROWs.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (letter report dated May 16, 2012 [Handley]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>Natural Gas Pipeline to provide start up fuel. This work includes upgrade to an existing line and new line and would take place within currently developed ROWs.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>

Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana and Texas

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
	<ul style="list-style-type: none"> <li>Transmission Line to connect with the existing 230 kV transmission line. Route includes one alternative that would take place within currently developed ROWs on the east side of the Plant access road or on the west side of adjacent industrial property occupied by LA Pigment.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>Methanol and Sulfuric Acid Pipelines to Storage. These pipelines would transport products to the LCC Gasification Project offsite storage area. This work would take place within currently developed ROWs.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>Construction Laydown Area for staging of construction equipment. This site would be located near LCC Gasification Project on property to be leased from the Port of Lake Charles. The site would be prepared for storage of construction equipment prior to use by Leucadia.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>

Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana and Texas

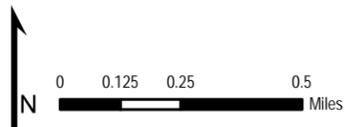
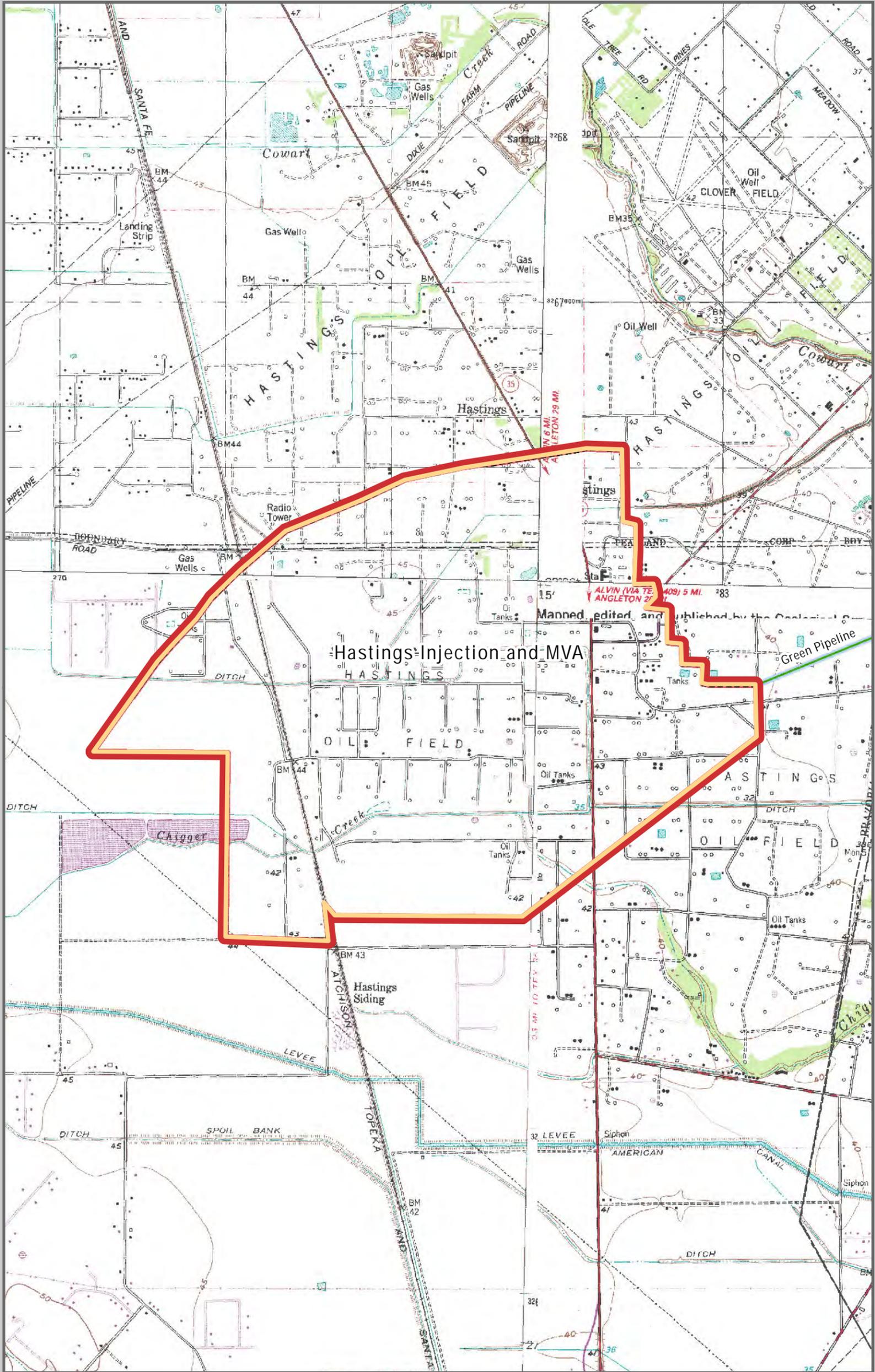
Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
	<ul style="list-style-type: none"> <li>• Methanol and Sulfuric Acid Storage Area and Pipelines to Port of Lake Charles. The area will contain above ground storage tanks for methanol and sulfuric acid. The pipelines move product from the storage area to offload by barge, ship, truck, and rail on the Port of Lake Charles property. The storage area and pipelines will be on property owned by the Port of Lake Charles.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>

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Enclosure 4

Area of Potential Effect  
for Proposed Lake Charles Carbon Capture and Sequestration Project Facilities  
in Brazoria County, Texas

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Source: USGS 1:24,000 Friendswood (1998); Pearland (1983); Manval (1977); and Algoa (1977) Quadrangles.

- Existing Operations (Not in Project or Proposed Action)
- Green Pipeline
- Lake Charles CCS Project (Proposed Action)
- Hastings Injection and MVA
- Area of Potential Effect (APE)

Figure 2  
APE (Area of Potential Effect) for the  
Proposed AGR and Compression Site  
Calcasieu Parish, Louisiana

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August 16, 2012

Juan Garza, Jr.  
Chairman  
Kickapoo Traditional Tribe of Texas  
HC 1, Box 9700  
Eagle Pass, TX 78852

**SUBJECT:** Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Brazoria County, Texas (and Calcasieu Parish, Louisiana)

Dear Mr. Garza:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with the Kickapoo Traditional Tribe of Texas on the proposed project.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

During the DOE demonstration phase of the proposed Project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast and is not part of DOE's evaluation. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field to confirm permanent storage of about one million tons per year during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the facilities associated with the Lake Charles CCS Project and its associated CO<sub>2</sub> capture and compression facilities in Calcasieu Parish, Louisiana;
- the Lake Charles CCS Project proposed 11.1-mile long CO<sub>2</sub> pipeline in Calcasieu Parish;
- the Lake Charles CCS Project proposed Research MVA program for the CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation in Brazoria County, Texas; and,
- the LCCE Gasification Project and its associated facilities in Calcasieu Parish, Louisiana (a connected action).

DOE has determined that the area of potential effects (APE) for the undertaking in Texas will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project that are located in Brazoria County, Texas. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The APE in Texas includes the location of the proposed CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation and Research MVA program at the existing Hastings Oil Field in Brazoria County, Texas (see Enclosure 2).

In October 2011, William Self Associates, Inc. (WSA) conducted a records and literature search of the area within the Research MVA portion of the APE for the proposed action (Karbula 2011). The results of this records and literature search were sent to your office on October 25, 2011 and are included in Enclosure 3. The purpose of the records and literature search by WSA was to determine the presence of previously identified cultural resources and historic properties within the Research MVA portion of the APE; to determine the extent of previous and existing disturbance and development within the Research MVA portion of the APE; and to evaluate the potential sensitivity of the Research MVA portion of the APE for unidentified cultural resources or historic properties. Results of the records and literature search by WSA indicated that there are no recorded archaeological sites, cemeteries, NRHP properties, State Archaeological Landmarks (SAL) or markers within the Research MVA portion of the APE. Because the Hastings Oil Field is a highly disturbed landscape resulting from decades of exploration for oil and characterized by the presence of numerous oil companies' pipelines, wells and support infrastructure, the potential for intact undisturbed soil profiles with archaeological sensitivity within the Research MVA portion of the APE is limited, if not entirely absent (Karbula 2011).

As a result of the records and literature search, WSA recommended that the Research MVA portion of the APE has a low probability for containing NRHP-eligible historic properties and that no archeological survey of the Research MVA areas is needed for the Proposed Action (Karbula 2011). The Texas State Historic Preservation Officer (SHPO) concurred that the Research MVA area has a very low probability for containing NRHP-eligible properties and/or for formal designation as an SAL, and indicated that the Research MVA portion of the Proposed Action may proceed without consultation with the Texas SHPO, provided that no significant archaeological deposits are encountered during development activities within the Research MVA area (Wolfe 2011).

DOE has confirmed that no NRHP-listed historic properties or districts, neighborhood surveys, historical markers, cemeteries, museums, historic county courthouses, military sites, or state archaeological landmarks (buildings only) are within the APE or a 0.5 mile radius around the APE in Brazoria County, Texas (NPS 2011a, 2011b; Texas Historical Commission 2011).

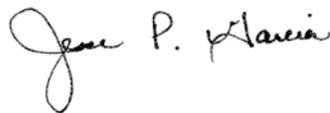
The DOE is also initiating Section 106 consultation with the Texas State Historic Preservation Officer to identify any issues or concerns regarding cultural resources and historic properties in the APE in Brazoria County, Texas, that may be affected by the proposed Project as part of the DOE's fulfillment of responsibilities under Section 106 of the NHPA for the proposed Project and per 36 CFR Part 800. Additional consulting parties with interest and standing, as identified to in 36 CFR 800.2(c), will be invited to participate in the Section 106 consultation process.

The DOE looks forward to receiving your comments or concerns regarding traditional cultural properties, sacred sites, or site of traditional religious or cultural importance in the APE that might be affected by the proposed Project and an indication as to whether you wish to participate in the Section 106 consultation for the proposed project. Please forward the results of your review and any requests for additional information to DOE's tribal liaison for the Project:

Jesse Garcia  
NETL Tribal Liaison  
Environmental Compliance Division  
National Energy Technology Laboratory  
3610 Collins Ferry Road  
Mail Stop B07, Room 333  
Morgantown, WV 26507  
PH: 304-285-0256  
Fax: 304-285-4403  
[Jesse.Garcia@NETL.doe.gov](mailto:Jesse.Garcia@NETL.doe.gov)

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Brazoria County, Texas

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## References:

- Karbula, James W., Ph.D. 2011. Letter dated October 25, 2011, from Dr. James W. Karbula, Regional Project Director, William Self Associates, Inc., Austin, Texas, to Patricia Mercado-Allinger, State Archaeologist, Archeology Division, Texas Historical Commission, Austin, Texas. Re: *Denbury Onshore, LLC, CO2 Sequestration Monitoring, Verification, and Accounting (MVA), Hastings Field, Brazoria County, Texas.*
- National Park Service. 2011a. National Historic Landmarks Program, Lists of National Historic Landmarks: National Historic Landmarks Survey, Listing of National Historic Landmarks by State: Louisiana and Texas. <http://www.nps.gov/history/nhl/designations/Lists/LA01.pdf> and <http://www.nps.gov/history/nhl/designations/Lists/TX01.pdf> (web sites accessed March 7, 2011).
- National Park Service. 2011b. National Register of Historic Places, NPS Focus: Calcasieu Parish, Louisiana and Brazoria County, Texas. <http://nrhp.focus.nps.gov/natreghome.do> (web site accessed March 7, 2011).
- Texas Historical Commission. 2011. Texas Historic Sites Atlas. <http://atlas.thc.state.tx.us/shell-map-address.htm> (web site accessed March 7, 2011).
- Wolfe, Mark. 2011. Letter dated November 1, 2011, from Mark Wolfe, State Historic Preservation Officer, Texas Historical Commission, Austin, Texas, to James Karbula, William Self Associates, Inc., Austin, Texas. Re: *Project Review under Section 106 of the National Historic Preservation act of 1966 and the Antiquities Code of Texas, Denbury Onshore, LLC, CO2 Sequestration Monitoring, Verification, and Accounting (MVA), Hastings Field, Brazoria County, Texas.*

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Enclosure 1

Location of the Proposed  
Lake Charles Carbon Capture and Sequestration Project

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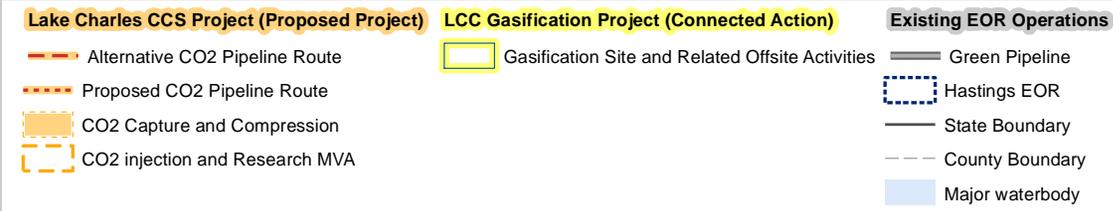
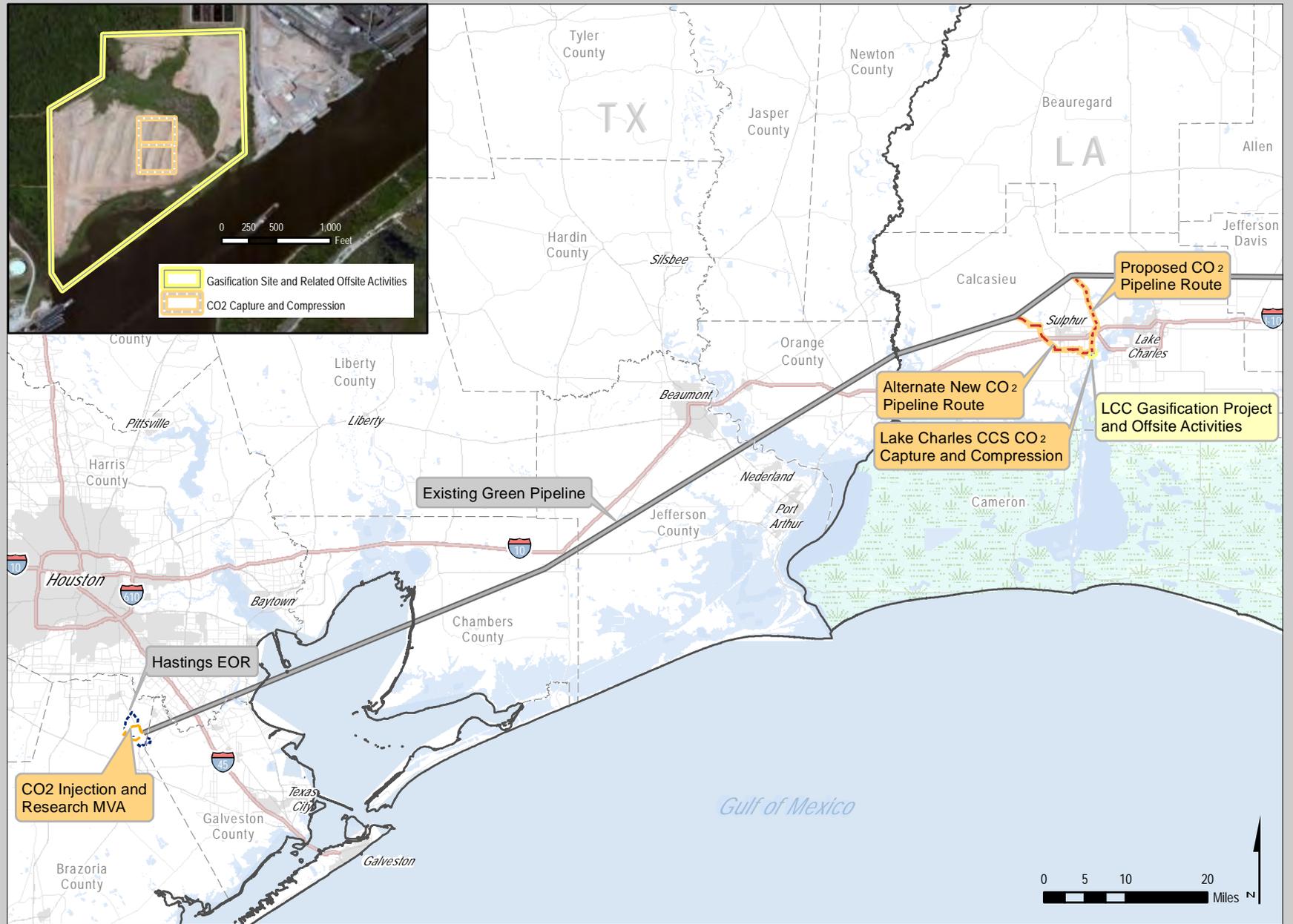


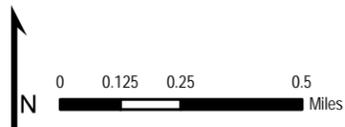
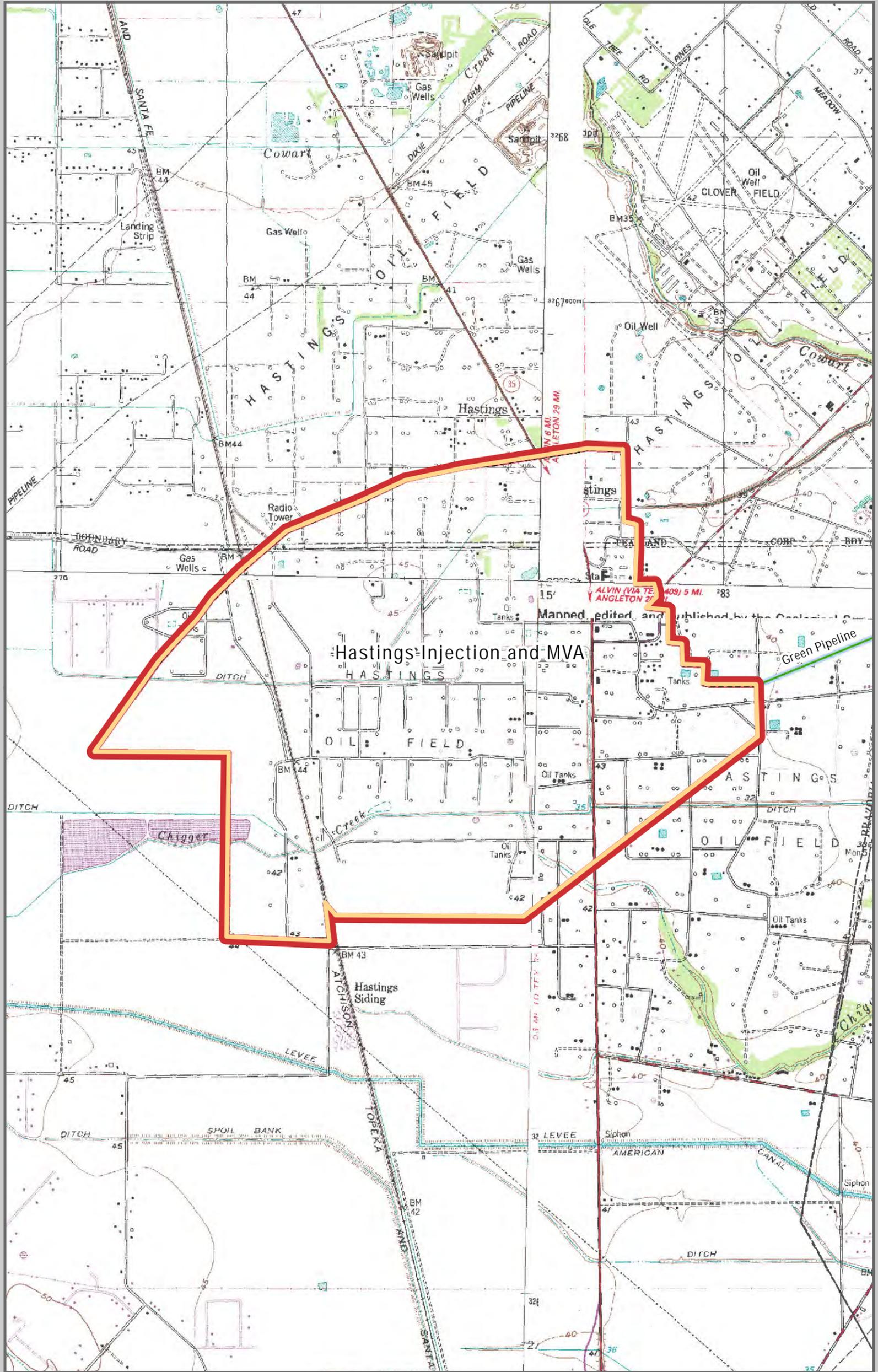
Figure 2.2-1  
Lake Charles CCS Project  
Overall Location  
Texas and Louisiana

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Enclosure 2

Area of Potential Effect  
for Proposed Lake Charles Carbon Capture and Sequestration Project Facilities  
in Brazoria County, Texas

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Source: USGS 1:24,000 Friendswood (1998); Pearland (1983); Manval (1977); and Algoa (1977) Quadrangles.

- Existing Operations (Not in Project or Proposed Action)
- Green Pipeline
- Lake Charles CCS Project (Proposed Action)
- Hastings Injection and MVA
- Area of Potential Effect (APE)

Figure 2  
APE (Area of Potential Effect) for the  
Proposed AGR and Compression Site  
Calcasieu Parish, Louisiana

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August 16, 2012

Frank K. Paiz  
Governor  
Ysleta Del Sur Pueblo of Texas  
P.O. box 17579 – Ysleta Station  
El Paso, TX 79917

**SUBJECT:** Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Brazoria County, Texas (and Calcasieu Parish, Louisiana)

Dear Governor Paiz:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with the Ysleta Del Sur Pueblo of Texas on the proposed project.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

During the DOE demonstration phase of the proposed Project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast and is not part of DOE's evaluation. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field to confirm permanent storage of about one million tons per year during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the facilities associated with the Lake Charles CCS Project and its associated CO<sub>2</sub> capture and compression facilities in Calcasieu Parish, Louisiana;
- the Lake Charles CCS Project proposed 11.1-mile long CO<sub>2</sub> pipeline in Calcasieu Parish;
- the Lake Charles CCS Project proposed Research MVA program for the CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation in Brazoria County, Texas; and,
- the LCCE Gasification Project and its associated facilities in Calcasieu Parish, Louisiana (a connected action).

DOE has determined that the area of potential effects (APE) for the undertaking in Texas will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project that are located in Brazoria County, Texas. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The APE in Texas includes the location of the proposed CO<sub>2</sub> sequestration in an ongoing commercial enhanced oil recovery operation and Research MVA program at the existing Hastings Oil Field in Brazoria County, Texas (see Enclosure 2).

In October 2011, William Self Associates, Inc. (WSA) conducted a records and literature search of the area within the Research MVA portion of the APE for the proposed action (Karbula 2011). The results of this records and literature search were sent to your office on October 25, 2011 and are included in Enclosure 3. The purpose of the records and literature search by WSA was to determine the presence of previously identified cultural resources and historic properties within the Research MVA portion of the APE; to determine the extent of previous and existing disturbance and development within the Research MVA portion of the APE; and to evaluate the potential sensitivity of the Research MVA portion of the APE for unidentified cultural resources or historic properties. Results of the records and literature search by WSA indicated that there are no recorded archaeological sites, cemeteries, NRHP properties, State Archaeological Landmarks (SAL) or markers within the Research MVA portion of the APE. Because the Hastings Oil Field is a highly disturbed landscape resulting from decades of exploration for oil and characterized by the presence of numerous oil companies' pipelines, wells and support infrastructure, the potential for intact undisturbed soil profiles with archaeological sensitivity within the Research MVA portion of the APE is limited, if not entirely absent (Karbula 2011).

As a result of the records and literature search, WSA recommended that the Research MVA portion of the APE has a low probability for containing NRHP-eligible historic properties and that no archeological survey of the Research MVA areas is needed for the Proposed Action (Karbula 2011). The Texas State Historic Preservation Officer (SHPO) concurred that the Research MVA area has a very low probability for containing NRHP-eligible properties and/or for formal designation as an SAL, and indicated that the Research MVA portion of the Proposed Action may proceed without consultation with the Texas SHPO, provided that no significant archaeological deposits are encountered during development activities within the Research MVA area (Wolfe 2011).

DOE has confirmed that no NRHP-listed historic properties or districts, neighborhood surveys, historical markers, cemeteries, museums, historic county courthouses, military sites, or state archaeological landmarks (buildings only) are within the APE or a 0.5 mile radius around the APE in Brazoria County, Texas (NPS 2011a, 2011b; Texas Historical Commission 2011).

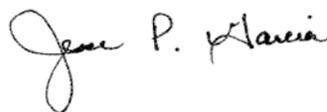
The DOE is also initiating Section 106 consultation with the Texas State Historic Preservation Officer to identify any issues or concerns regarding cultural resources and historic properties in the APE in Brazoria County, Texas, that may be affected by the proposed Project as part of the DOE's fulfillment of responsibilities under Section 106 of the NHPA for the proposed Project and per 36 CFR Part 800. Additional consulting parties with interest and standing, as identified to in 36 CFR 800.2(c), will be invited to participate in the Section 106 consultation process.

The DOE looks forward to receiving your comments or concerns regarding traditional cultural properties, sacred sites, or site of traditional religious or cultural importance in the APE that might be affected by the proposed Project and an indication as to whether you wish to participate in the Section 106 consultation for the proposed project. Please forward the results of your review and any requests for additional information to DOE's tribal liaison for the Project:

Jesse Garcia  
NETL Tribal Liaison  
Environmental Compliance Division  
National Energy Technology Laboratory  
3610 Collins Ferry Road  
Mail Stop B07, Room 333  
Morgantown, WV 26507  
PH: 304-285-0256  
Fax: 304-285-4403  
[Jesse.Garcia@NETL.doe.gov](mailto:Jesse.Garcia@NETL.doe.gov)

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Brazoria County, Texas

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References:

- Karbula, James W., Ph.D. 2011. Letter dated October 25, 2011, from Dr. James W. Karbula, Regional Project Director, William Self Associates, Inc., Austin, Texas, to Patricia Mercado-Allinger, State Archaeologist, Archeology Division, Texas Historical Commission, Austin, Texas. Re: *Denbury Onshore, LLC, CO2 Sequestration Monitoring, Verification, and Accounting (MVA), Hastings Field, Brazoria County, Texas.*
- National Park Service. 2011a. National Historic Landmarks Program, Lists of National Historic Landmarks: National Historic Landmarks Survey, Listing of National Historic Landmarks by State: Louisiana and Texas. <http://www.nps.gov/history/nhl/designations/Lists/LA01.pdf> and <http://www.nps.gov/history/nhl/designations/Lists/TX01.pdf> (web sites accessed March 7, 2011).
- National Park Service. 2011b. National Register of Historic Places, NPS Focus: Calcasieu Parish, Louisiana and Brazoria County, Texas. <http://nrhp.focus.nps.gov/natreghome.do> (web site accessed March 7, 2011).
- Texas Historical Commission. 2011. Texas Historic Sites Atlas. <http://atlas.thc.state.tx.us/shell-map-address.htm> (web site accessed March 7, 2011).
- Wolfe, Mark. 2011. Letter dated November 1, 2011, from Mark Wolfe, State Historic Preservation Officer, Texas Historical Commission, Austin, Texas, to James Karbula, William Self Associates, Inc., Austin, Texas. Re: *Project Review under Section 106 of the National Historic Preservation act of 1966 and the Antiquities Code of Texas, Denbury Onshore, LLC, CO2 Sequestration Monitoring, Verification, and Accounting (MVA), Hastings Field, Brazoria County, Texas.*

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Same as Enclosures 1 and 2 per  
August 16, 2012 Correspondence to the Kikapoo Traditional Tribe of Texas  
Regarding Section 106 Consultation for Proposed Financial Assistance for the Lake Charles  
Carbon Capture and Sequestration (CCS) Project  
Brazoria County, Texas (and Calcasieu Parish, Louisiana)

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August 17, 2012

Donna Richard  
President  
Calcasieu Historical Preservation Society  
P.O. Box 1214  
Lake Charles, LA 70602

**SUBJECT:** Initiation of Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Ms. Richard:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed Project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with the Calcasieu Historical Preservation Society on the proposed Project.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

During the DOE demonstration phase of the proposed Project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field to confirm permanent storage of about one million tons per year during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the facilities associated with the Lake Charles CCS portion of the proposed Project in Calcasieu Parish, Louisiana;
- the facilities associated with the LCC Gasification portion of the proposed Project in Calcasieu Parish, Louisiana;
- the portion of the existing Green Pipeline that connects the facilities in Calcasieu Parish with the facilities in Brazoria County, Texas and traverses portions of Calcasieu Parish Louisiana, and Orange, Jefferson, Chambers, Harris, Galveston and Brazoria County, Texas; and,
- the facilities associated with the Lake Charles CCS portion of the proposed Project in Brazoria County, Texas.

DOE has determined that the area of potential effects (APE) for the undertaking in Louisiana will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCC Gasification that are located in Calcasieu Parish, Louisiana. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The APE in Louisiana is in an industrial setting on the west side of the Calcasieu River, and is in the vicinity of numerous energy-related facilities. The APE includes the locations of:

- the CO<sub>2</sub> capture and compression facilities for the Lake Charles CCS Project on the west bank of the Calcasieu River;
- the LCCE Gasification project, also on the west bank of the Calcasieu River;
- the offsite facilities associated with the LCCE Gasification project including the proposed new methanol storage area; hydrogen pipeline; water supply pipeline; natural gas pipeline; co-located transmission line, potable water line, and methanol pipeline; equipment laydown area; and offsite parking area
- the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline; or,
- the alternative 11.6-mile long alignment for the CO<sub>2</sub> pipeline that connects to the existing Green Pipeline to the southwest (see Enclosure 2).

Cultural resources investigations have been conducted within portions of the APE in Louisiana, including: Phase I archaeological survey of the property that contains the locations of the Lake Charles CCS Project and LCCE Gasification project; Phase I cultural resources survey of the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline, including extra workspace and access roads; and Phase IA cultural resources investigations of offsite facilities associated with the LCCE Gasification project (raw water, hydrogen, potable water, methanol and sulfuric acid pipelines; an overhead transmission line; a construction laydown area; and construction parking area).

The reports documenting these cultural resources investigations have been submitted separately to the Louisiana SHPO for review and comment by the consultants on behalf of the Applicant. A table summarizing the cultural resources investigations is in Enclosure 3.

DOE has confirmed that no NRHP-listed historic properties or previously recorded standing structures or historic districts are located within the APE or a 0.5-mile radius around the APE in Calcasieu Parish.

The DOE is conducting Section 106 consultation with the Louisiana State Historic Preservation Officer and federally recognized Indian tribes to identify any issues or concerns regarding cultural resources and historic properties in the APE in Calcasieu Parish, Louisiana that may be affected by the proposed Project as part of the DOE's fulfillment of responsibilities under Section 106 of the NHPA for the proposed Project and per 36 CFR Part 800.

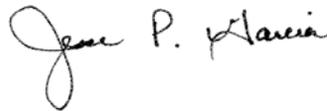
Additional consulting parties with interest and standing, as identified to in 36 CFR 800.2(c), are also invited to participate in the Section 106 consultation process. Therefore, the DOE is writing to seek your comments on any issues or concerns for cultural resources or historic properties in the APE that might be affected by the proposed project and would like to know whether you wish to participate in the Section 106 consultation process for the proposed project, per 36 CFR 800.3(f).

DOE looks forward to receiving your comments on any issues or concerns for cultural resources or historic properties that might be in the APE and affected by the proposed project or on any other parties that may have an interest in the Section 106 consultation for the proposed project. DOE also looks forward to receiving an indication as to whether you wish to participate in the Section 106 consultation for the proposed Project. Please forward the results of your review and any requests for additional information to our contractor:

Janine Whitken  
Ecology and Environment, Inc.  
368 Pleasant View Drive  
Lancaster, New York 14086  
(716) 684-8060 extension 2745  
JWhitken@ene.com

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Calcasieu Parish, Louisiana
  3. Summary Table for Cultural Resources Investigations Conducted within the APE in Louisiana

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Enclosure 1

Location of the Proposed  
Lake Charles Carbon Capture and Sequestration Project

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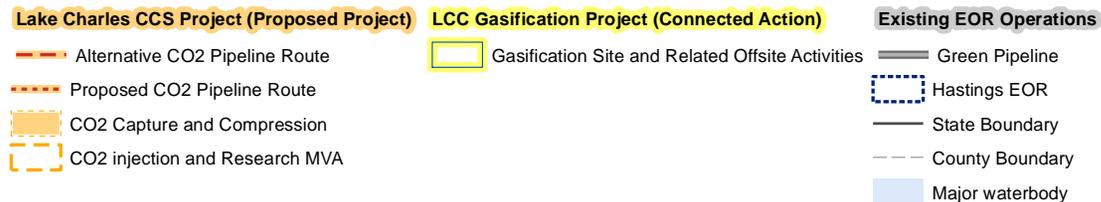
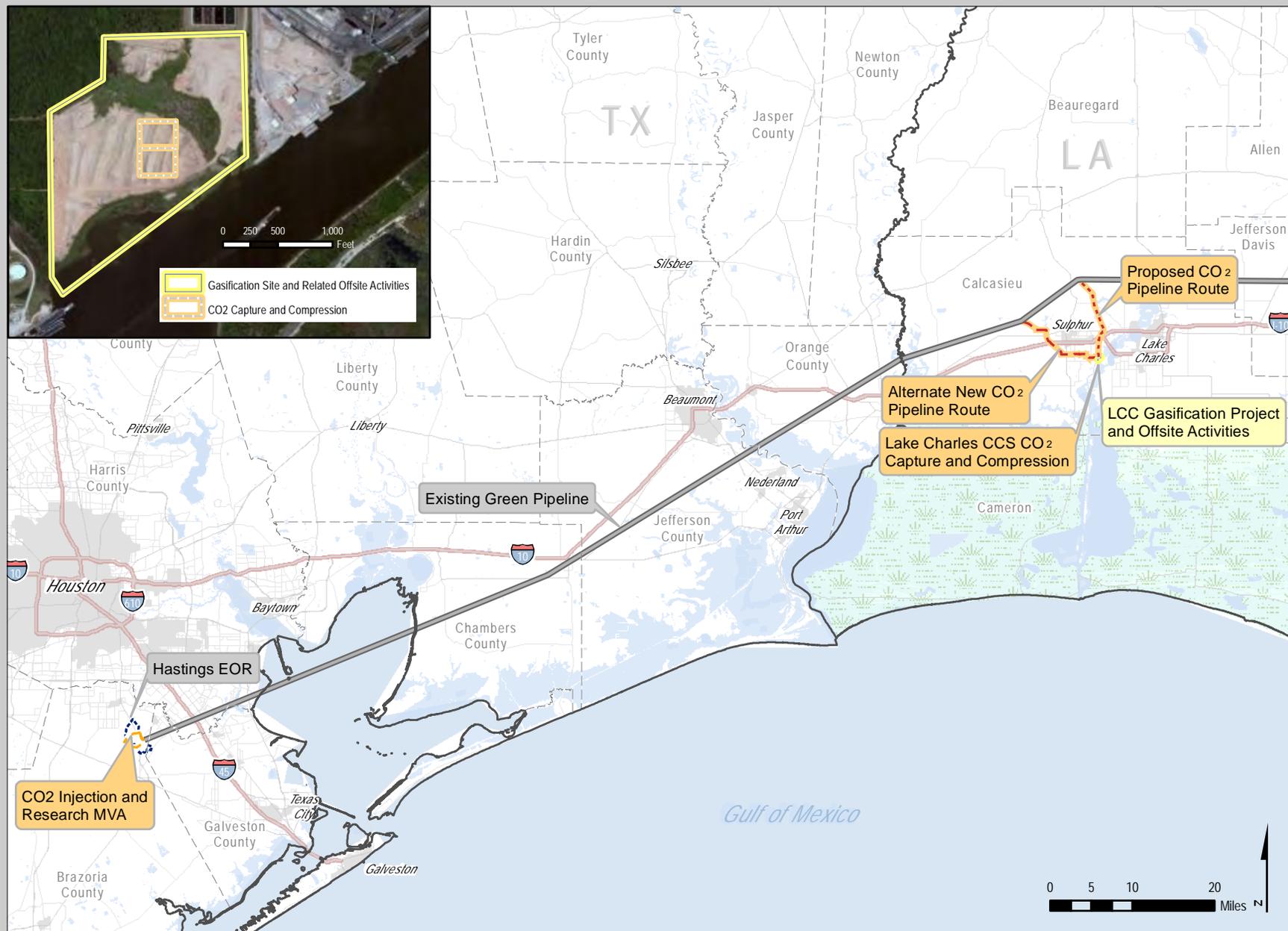


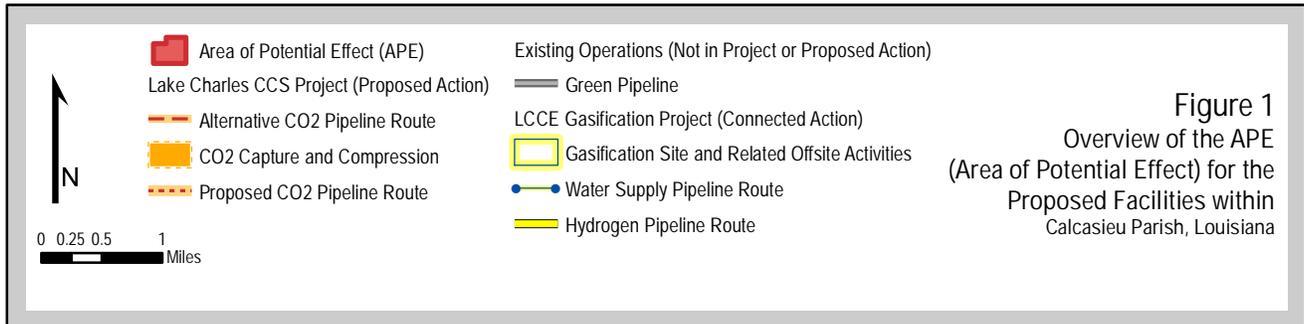
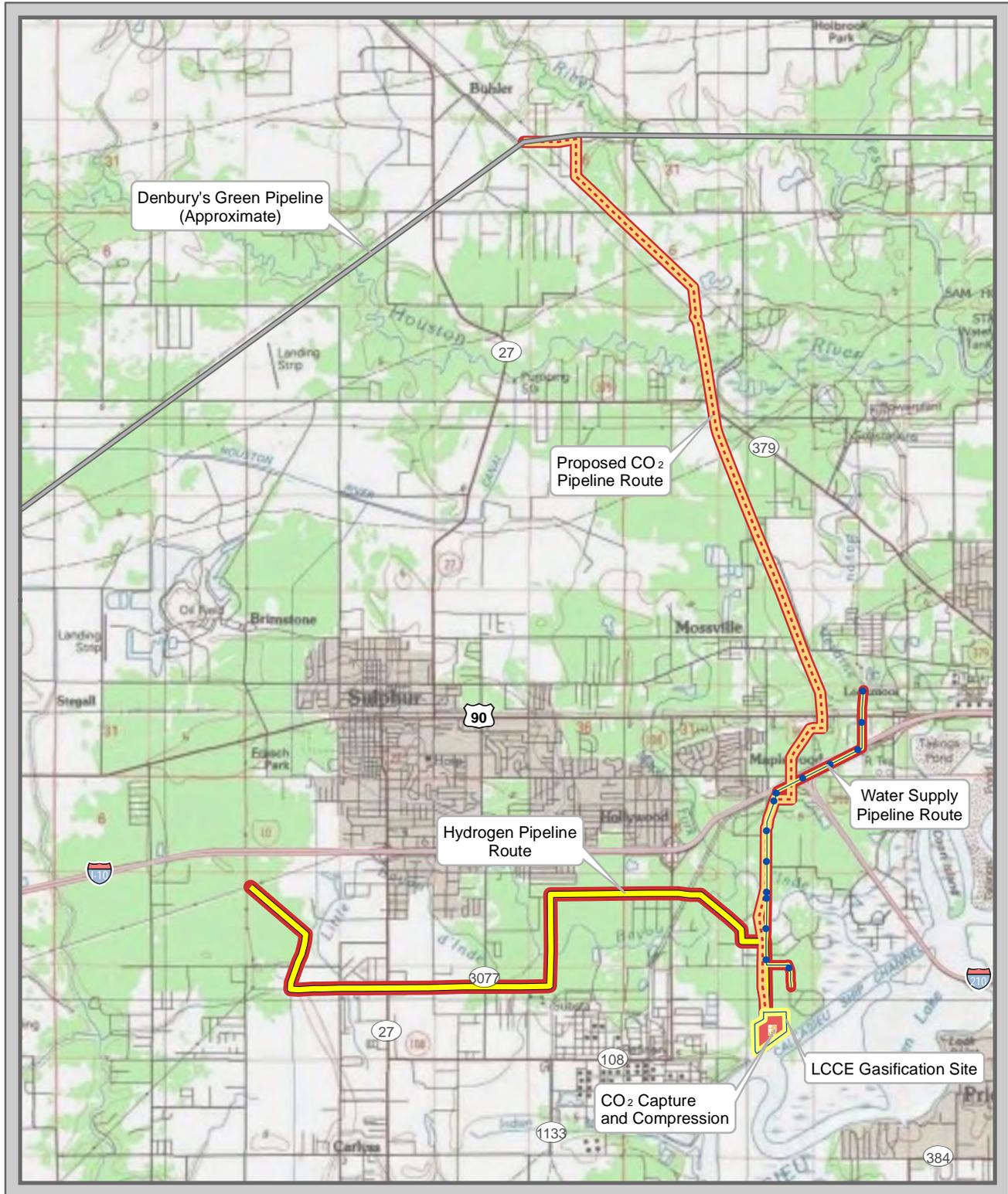
Figure 2.2-1  
Lake Charles CCS Project  
Overall Location  
Texas and Louisiana

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Enclosure 2

Area of Potential Effect  
for Proposed Lake Charles Carbon Capture and Sequestration Project Facilities  
in Calcasieu Parish, Louisiana

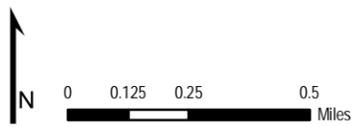
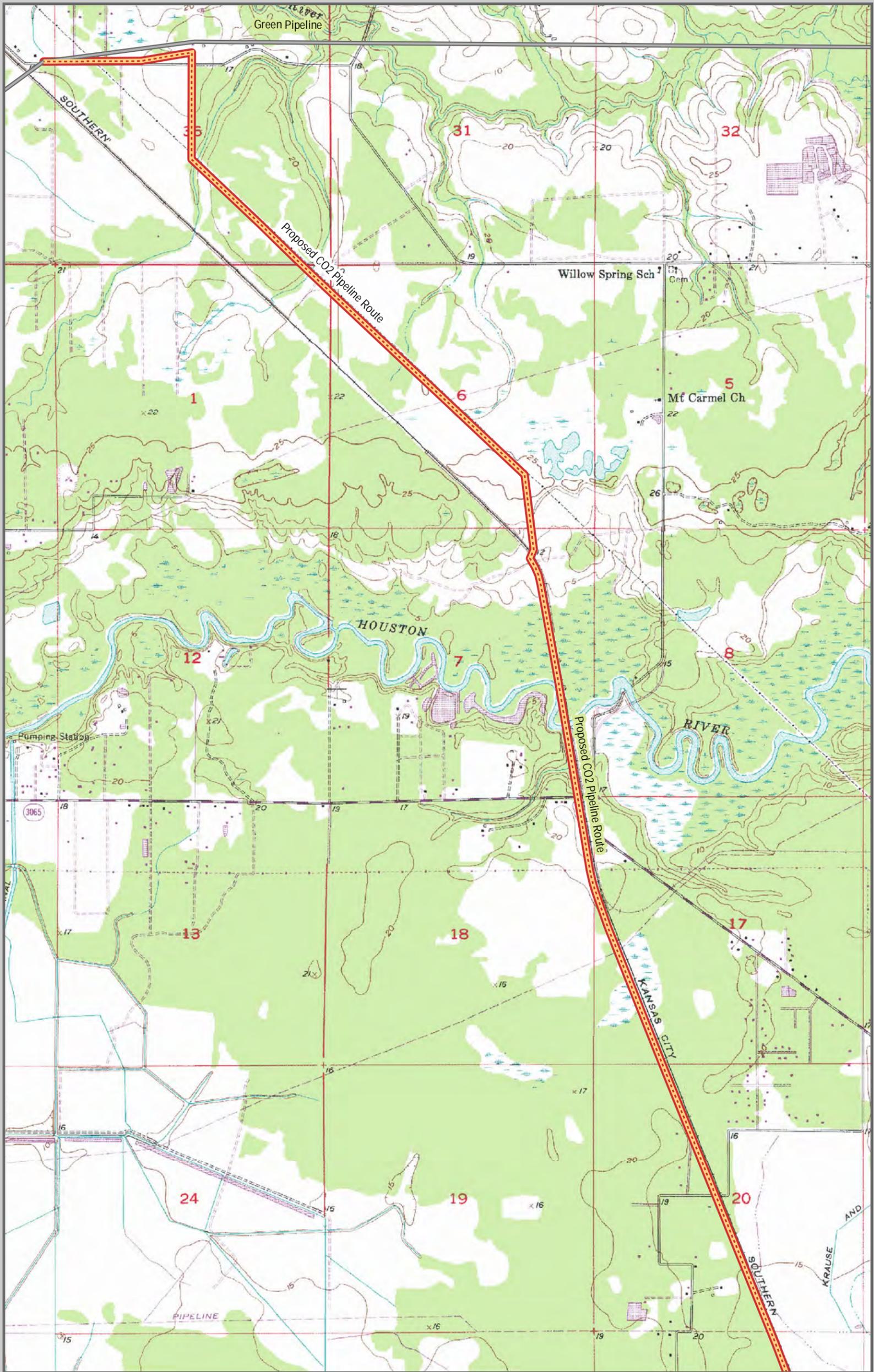
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**Figure 1**  
 Overview of the APE  
 (Area of Potential Effect) for the  
 Proposed Facilities within  
 Calcasieu Parish, Louisiana

Source: USGS 1:24,000 Friendswood (1998); Pearland (1983); Manval (1977); and Algoa (1977) Quadrangles.

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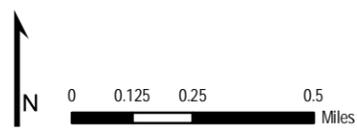
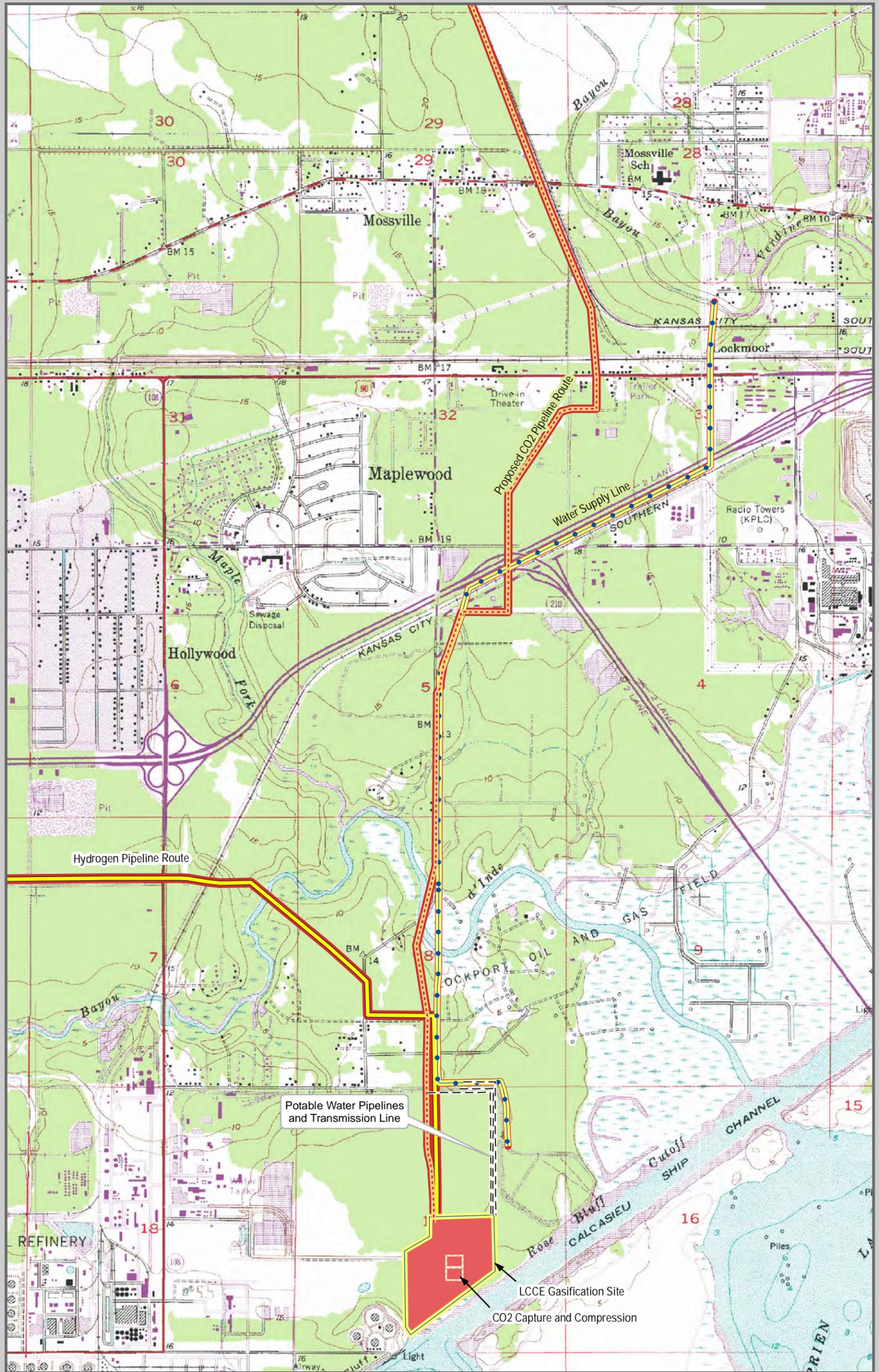


Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakd (1977) Quadrangles.

- |   |   |
|---|---|
|  Area of Potential Effect (APE)                          |  Gasification Site         |
|  Existing Operations (Not in Project or Proposed Action) |  Water Supply Line         |
|  Green Pipeline  |  Hydrogen Pipeline Route   |
|  Lake Charles CCS Project (Proposed Action)              |  Proposed CO2 Pipeline Route |
|  CO2 Capture and Compression                             |   |

**Figure 1-1**  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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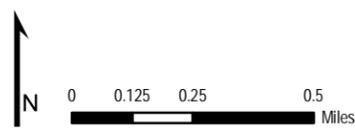
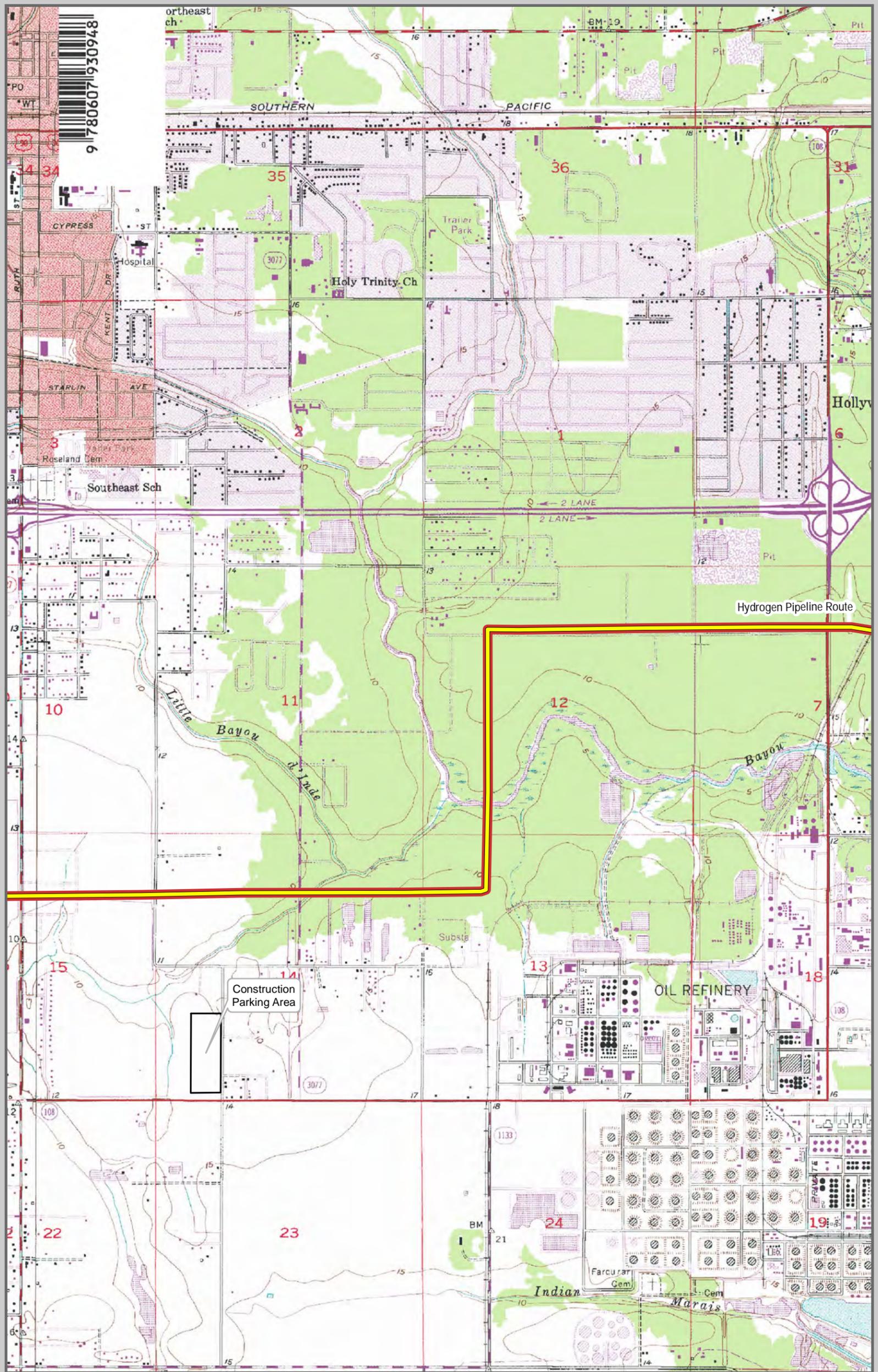


Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakd (1977) Quadrangles.

- |   |   |   |  |
|---|---|---|--|
|  | Area of Potential Effect (APE)                          |  | Lake Charles Gasification Project (Connected Action) |
|  | Existing Operations (Not in Project or Proposed Action) |  | Gasification Site                                    |
|  | Green Pipeline  |  | Water Supply Line                                    |
|  | Lake Charles CCS Project (Proposed Action)              |  | Hydrogen Pipeline Route                              |
|  | CO2 Capture and Compression                             |   |  |
|  | Proposed CO2 Pipeline Route                             |   |  |

Figure 1-2  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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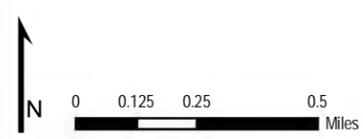
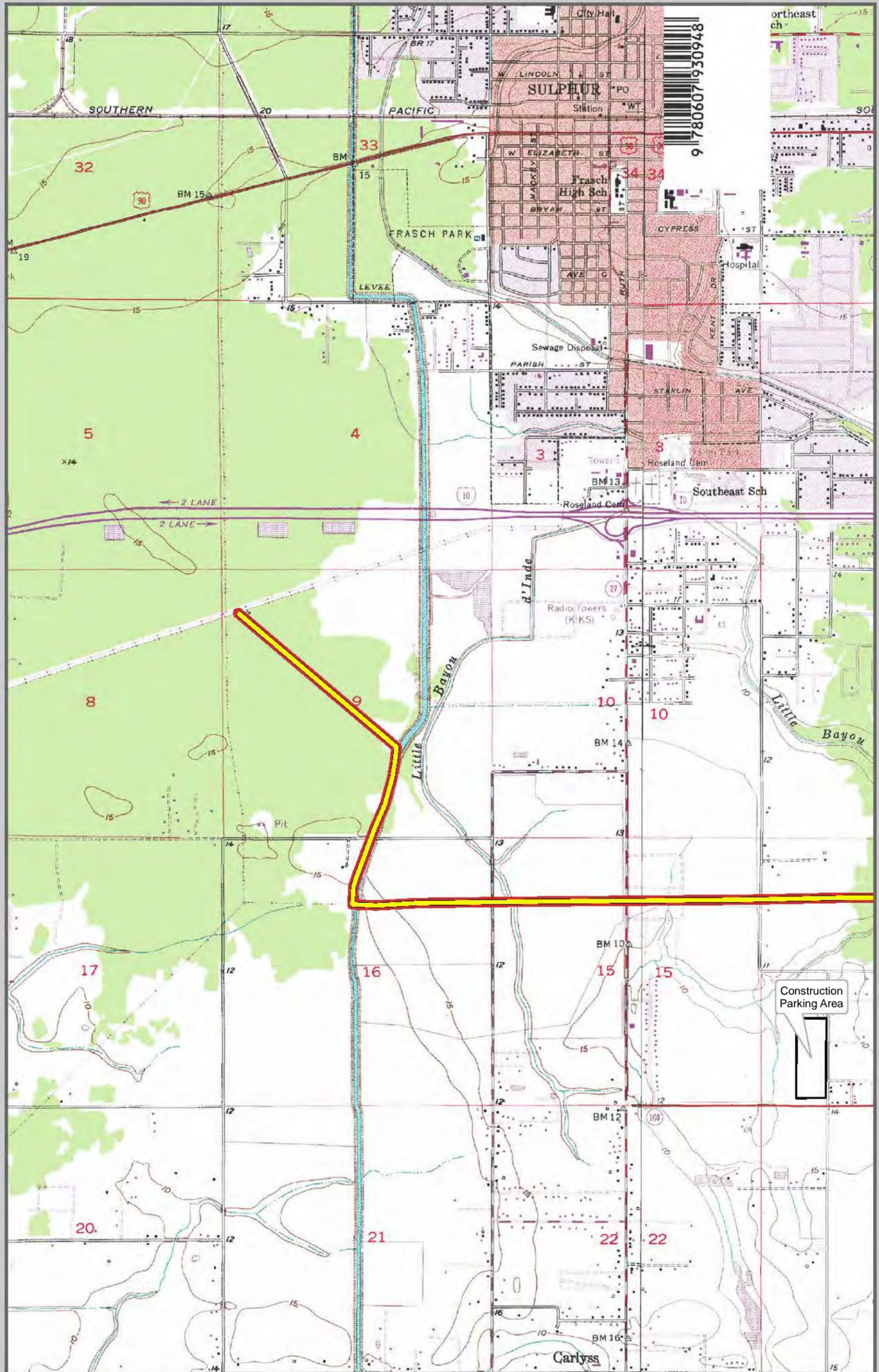


Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakd (1977) Quadrangles.

- ▭ Area of Potential Effect (APE)
- ▭ Existing Operations (Not in Project or Proposed Action)
- Green Pipeline
- ▭ Lake Charles CCS Project (Proposed Action)
- ▭ CO2 Capture and Compression
- Proposed CO2 Pipeline Route
- ▭ Lake Charles Gasification Project (Connected Action)
- ▭ Gasification Site
- Water Supply Line
- Hydrogen Pipeline Route

**Figure 1-3**  
APE (Area of Potential Effect) for the  
Proposed Facilities within  
Calcasieu Parish, Louisiana

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Source: USGS 1:24,000 Brimstone (1976); Buhler (1976); Sulphur (1977); and Westlakt (1977) Quadrangles.

- Area of Potential Effect (APE)
- Existing Operations (Not in Project or Proposed Action)
- Green Pipeline
- Lake Charles CCS Project (Proposed Action)
- CO2 Capture and Compression
- Proposed CO2 Pipeline Route
- Lake Charles Gasification Project (Connected Action)
- Gasification Site
- Water Supply Line
- Hydrogen Pipeline Route

**Figure 1-4**  
APE (Area of Potential Effect) for the Proposed Facilities within Calcasieu Parish, Louisiana

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Enclosure 3

Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana

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**Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana**

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
<b>Lake Charles CCS Project (DOE proposes to fund)</b>		
Carbon Capture and Compression (Calcasieu Parish, Louisiana)	<ul style="list-style-type: none"> <li>• 2 acid gas removal units to capture CO<sub>2</sub> that would otherwise be emitted to the atmosphere</li> <li>• Produce CO<sub>2</sub> in the purity needed for sequestration or EOR</li> <li>• 2 CO<sub>2</sub> compressors pressurizing CO<sub>2</sub> to 2,250 psig for transport in a supercritical state</li> <li>• Monitoring and metering equipment</li> <li>• All equipment is completely contained within the LCC Gasification Project Site.</li> </ul>	<p>Phase I archaeological survey of known site within parcel previously conducted by URS in 2009; one cultural resources present (prehistoric archaeological site 16CU 29); site recommended not eligible for NRHP (letter report dated June 15, 2009 [Handley]).</p> <p>LA SHPO concurred with NRHP-eligibility recommendation; no further investigations of property required. (letter dated June 26, 2009 [Hutcheson]).</p>
CO2 Pipeline (Calcasieu Parish, Louisiana)	<ul style="list-style-type: none"> <li>• 11.1 mile pipeline from the CO<sub>2</sub> compressors to an existing CO<sub>2</sub> pipeline</li> <li>• Route includes a 50 foot permanent right of way (ROW) that would parallel existing ROWs (such as roadways, pipelines, railroads, transmission lines, and other linear features) throughout the length of the pipeline corridor to the extent practicable</li> <li>• CO<sub>2</sub> meter station at tie-in to existing CO2 pipeline (Green Pipeline)</li> </ul>	<p>Phase I cultural resources survey (for archaeological and architectural resources) by University of Alabama; two cultural resources identified (historic archaeological site 16CU73; and modern [late 20<sup>th</sup> century] Hardey Cemetery). Both resources recommended not eligible for NRHP; drilling pipeline beneath cemetery recommended for Hardey Cemetery (draft report dated November 18, 2011 [Watkins and Futato]).</p> <p>LA SHPO concurred with results of survey: no NRHP-eligible resources were identified within the APE; no historic properties will be impacted by the project; and no further work is necessary (letter dated April 25, 2012 [Breux]).</p>
<b>LCCE Gasification Project (Connected Action, not under consideration for DOE funding)</b>		

Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
Gasification Plant	<ul style="list-style-type: none"> <li>• Provides CO<sub>2</sub> to the Lake Charles CCS Project</li> <li>• Petroleum coke gasification facility to produce methanol, hydrogen, and sulfuric acid on a 70 acre site in Calcasieu Parish</li> <li>• Site preparation of clearing, grading, raising the elevation currently being performed under USACE permit, including 26 acres of wetland mitigation implemented by the Port of Lake Charles</li> <li>• Construction expected to begin Fall 2012 and continue for 40 months</li> </ul>	<p>Phase I archaeological survey of known site within parcel previously conducted by URS in 2009; one cultural resources present (prehistoric archaeological site 16CU 29); site recommended not eligible for NRHP (letter report dated June 15, 2009 [Handley]).</p> <p>LA SHPO concurred with NRHP-eligibility recommendation and indicated no further investigations of property required (letter dated June 26, 2009 [Hutcheson]).</p>
Offsite Activities	<ul style="list-style-type: none"> <li>• 4 mile Raw Water Pipeline from Sabine River Canal. Route includes a 50 foot permanent ROW and 50 to 250 foot construction ROW that would parallel existing roadways, pipelines, railroads, transmission lines, and other linear features to the extent practicable. Leucadia would own and operate the raw water pipeline.</li> <li>• 8.5 mile Hydrogen Pipeline to transport hydrogen to Air Products in, Sulphur, Louisiana. Route includes a 50 foot permanent ROW and 75 foot construction ROW that would parallel existing roadways, pipelines, railroads, transmission lines, and other linear features to the extent practicable. The hydrogen pipeline would be owned and operated by Air Products.</li> </ul>	<p>Phase IA cultural resources survey for archaeological and architectural resources) by URS; no cultural resources identified; further investigations of those areas that have not been previously disturbed or surveyed for cultural resources recommended (letter report dated May 16, 2012 [Handley]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p> <p>Phase IA cultural resources survey (for archaeological and architectural resources) by URS; no cultural resources identified; further investigations of those areas that have not been previously disturbed or surveyed for cultural resources recommended (letter report dated May 16, 2012 [Handley]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>

Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
	<ul style="list-style-type: none"> <li>Offsite Construction Parking Area with shuttle buses to and from the Plant site. This site is partially cleared and graded.</li> </ul>	<p>Phase IA cultural resources survey (for archaeological and architectural resources) by URS; no previously recorded cultural resources identified within APE; further investigations of those areas that have not been previously disturbed or surveyed for cultural resources recommended (letter report dated May 16, 2012 [Handley]). Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>Potable Water Pipeline to provide access to existing city water currently supplying the Port of Lake Charles. This work would take place within currently developed ROWs.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (letter report dated May 16, 2012 [Handley]). Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>Natural Gas Pipeline to provide start up fuel. This work includes upgrade to an existing line and new line and would take place within currently developed ROWs.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]). Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>Transmission Line to connect with the existing 230 kV transmission line. Route includes one alternative that would take place within currently developed ROWs on the east side of the Plant access road or on the west side of adjacent industrial property occupied by LA Pigment.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]). Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>

Summary Table for Cultural Resources Investigations  
Conducted within the APE in Louisiana

Project Component	Description	Status of Cultural Resources Investigations/ SHPO consultation
	<ul style="list-style-type: none"> <li>• Methanol and Sulfuric Acid Pipelines to Storage. These pipelines would transport products to the LCC Gasification Project offsite storage area. This work would take place within currently developed ROWs.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>• Construction Laydown Area for staging of construction equipment. This site would be located near LCC Gasification Project on property to be leased from the Port of Lake Charles. The site would be prepared for storage of construction equipment prior to use by Leucadia.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>
	<ul style="list-style-type: none"> <li>• Methanol and Sulfuric Acid Storage Area and Pipelines to Port of Lake Charles. The area will contain above ground storage tanks for methanol and sulfuric acid. The pipelines move product from the storage area to offload by barge, ship, truck, and rail on the Port of Lake Charles property. The storage area and pipelines will be on property owned by the Port of Lake Charles.</li> </ul>	<p>Included in 1-mile study area for Phase IA cultural resources desktop assessment (for archaeological and architectural resources) by URS of a methanol and sulfuric acid storage facility; no previously recorded cultural resources or historic properties identified (report dated July 2012 [URS]).</p> <p>Letter report was submitted to the LA SHPO on August 15, 2012, and LA SHPO review and comment is pending.</p>



August 17, 2012

Mr. Bryan C. Beam  
Parish Administrator  
Office of the Administrator  
Calcasieu Parish Police Jury  
Parish Government Building  
1015 Pithon Street  
P.O. Box 1583  
Lake Charles, LA 70602

**SUBJECT:** Initiation of Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Mr. Beam:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed Project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with Calcasieu Parish on the proposed Project.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

During the DOE demonstration phase of the proposed Project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field to confirm permanent storage of about one million tons per year during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the facilities associated with the Lake Charles CCS portion of the proposed Project in Calcasieu Parish, Louisiana;
- the facilities associated with the LCC Gasification portion of the proposed Project in Calcasieu Parish, Louisiana;
- the portion of the existing Green Pipeline that connects the facilities in Calcasieu Parish with the facilities in Brazoria County, Texas and traverses portions of Calcasieu Parish Louisiana, and Orange, Jefferson, Chambers, Harris, Galveston and Brazoria County, Texas; and,
- the facilities associated with the Lake Charles CCS portion of the proposed Project in Brazoria County, Texas.

DOE has determined that the area of potential effects (APE) for the undertaking in Louisiana will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCC Gasification that are located in Calcasieu Parish, Louisiana. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The APE in Louisiana is in an industrial setting on the west side of the Calcasieu River, and is in the vicinity of numerous energy-related facilities. The APE includes the locations of:

- the CO<sub>2</sub> capture and compression facilities for the Lake Charles CCS Project on the west bank of the Calcasieu River;
- the LCCE Gasification project, also on the west bank of the Calcasieu River;
- the offsite facilities associated with the LCCE Gasification project including the proposed new methanol storage area; hydrogen pipeline; water supply pipeline; natural gas pipeline; co-located transmission line, potable water line, and methanol pipeline; equipment laydown area; and offsite parking area
- the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline; or,
- the alternative 11.6-mile long alignment for the CO<sub>2</sub> pipeline that connects to the existing Green Pipeline to the southwest (see Enclosure 2).

Cultural resources investigations have been conducted within portions of the APE in Louisiana, including: Phase I archaeological survey of the property that contains the locations of the Lake Charles CCS Project and LCCE Gasification project; Phase I cultural resources survey of the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline, including extra workspace and access roads; and Phase IA cultural resources investigations of offsite facilities associated with the LCCE Gasification project (raw water, hydrogen, potable water, methanol and sulfuric acid pipelines; an overhead transmission line; a construction laydown area; and construction parking area). The reports documenting these cultural resources investigations have been submitted separately to the Louisiana SHPO for review and comment by the consultants on behalf of the Applicant. A table summarizing the cultural resources investigations is in Enclosure 3.

DOE has confirmed that no NRHP-listed historic properties or previously recorded standing structures or historic districts are located within the APE or a 0.5-mile radius around the APE in Calcasieu Parish.

The DOE is conducting Section 106 consultation with the Louisiana State Historic Preservation Officer and federally recognized Indian tribes to identify any issues or concerns regarding cultural resources and historic properties in the APE in Calcasieu Parish, Louisiana that may be affected by the proposed Project as part of the DOE's fulfillment of responsibilities under Section 106 of the NHPA for the proposed Project and per 36 CFR Part 800.

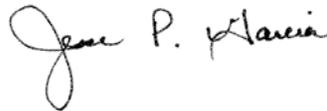
Additional consulting parties with interest and standing, as identified in 36 CFR 800.2(c), are also invited to participate in the Section 106 consultation process. Therefore, the DOE is writing to seek your comments on any issues or concerns for cultural resources or historic properties in the APE that might be affected by the proposed project and would like to know whether you wish to participate in the Section 106 consultation process for the proposed project, per 36 CFR 800.3(f).

DOE looks forward to receiving your comments on any issues or concerns for cultural resources or historic properties that might be in the APE and affected by the proposed project or on any other parties that may have an interest in the Section 106 consultation for the proposed project. DOE also looks forward to receiving an indication as to whether you wish to participate in the Section 106 consultation for the proposed Project. Please forward the results of your review and any requests for additional information to our contractor:

Janine Whitken  
Ecology and Environment, Inc.  
368 Pleasant View Drive  
Lancaster, New York 14086  
(716) 684-8060 extension 2745  
JWhitken@ene.com

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Pierina N. Fayish". The signature is fluid and cursive, with the first name being the most prominent.

For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Calcasieu Parish, Louisiana
  3. Summary Table for Cultural Resources Investigations Conducted within the APE in Louisiana

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Same as Enclosures 1 through 3 per

August 17, 2012 Correspondence to the Calcasieu Historical Preservation Society  
Regarding Initiation of Section 106 Consultation for Proposed Financial Assistance for the Lake  
Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

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August 17, 2012

Susan H. Reed  
Executive Director  
Imperial Calcasieu Museum  
204 W. Sallier Street  
Lake Charles, LA 70601

**SUBJECT:** Initiation of Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Ms. Reed:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed Project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with the Imperial Calcasieu Museum on the proposed Project.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

During the DOE demonstration phase of the proposed Project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field to confirm permanent storage of about one million tons per year during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the facilities associated with the Lake Charles CCS portion of the proposed Project in Calcasieu Parish, Louisiana;
- the facilities associated with the LCC Gasification portion of the proposed Project in Calcasieu Parish, Louisiana;
- the portion of the existing Green Pipeline that connects the facilities in Calcasieu Parish with the facilities in Brazoria County, Texas and traverses portions of Calcasieu Parish Louisiana, and Orange, Jefferson, Chambers, Harris, Galveston and Brazoria County, Texas; and,
- the facilities associated with the Lake Charles CCS portion of the proposed Project in Brazoria County, Texas.

DOE has determined that the area of potential effects (APE) for the undertaking in Louisiana will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCC Gasification that are located in Calcasieu Parish, Louisiana. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The APE in Louisiana is in an industrial setting on the west side of the Calcasieu River, and is in the vicinity of numerous energy-related facilities. The APE includes the locations of:

- the CO<sub>2</sub> capture and compression facilities for the Lake Charles CCS Project on the west bank of the Calcasieu River;
- the LCCE Gasification project, also on the west bank of the Calcasieu River;
- the offsite facilities associated with the LCCE Gasification project including the proposed new methanol storage area; hydrogen pipeline; water supply pipeline; natural gas pipeline; co-located transmission line, potable water line, and methanol pipeline; equipment laydown area; and offsite parking area
- the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline; or,
- the alternative 11.6-mile long alignment for the CO<sub>2</sub> pipeline that connects to the existing Green Pipeline to the southwest (see Enclosure 2).

Cultural resources investigations have been conducted within portions of the APE in Louisiana, including: Phase I archaeological survey of the property that contains the locations of the Lake Charles CCS Project and LCCE Gasification project; Phase I cultural resources survey of the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline, including extra workspace and access roads; and Phase IA cultural resources investigations of offsite facilities associated with the LCCE Gasification project (raw water, hydrogen, potable water, methanol and sulfuric acid pipelines; an overhead transmission line; a construction laydown area; and construction parking area). The reports documenting these cultural resources investigations have been submitted separately to the Louisiana SHPO for review and comment by the consultants on behalf of the Applicant. A table summarizing the cultural resources investigations is in Enclosure 3.

DOE has confirmed that no NRHP-listed historic properties or previously recorded standing structures or historic districts are located within the APE or a 0.5-mile radius around the APE in Calcasieu Parish.

The DOE is conducting Section 106 consultation with the Louisiana State Historic Preservation Officer and federally recognized Indian tribes to identify any issues or concerns regarding cultural resources and historic properties in the APE in Calcasieu Parish, Louisiana that may be affected by the proposed Project as part of the DOE's fulfillment of responsibilities under Section 106 of the NHPA for the proposed Project and per 36 CFR Part 800.

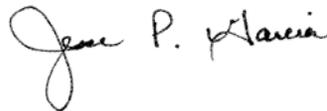
Additional consulting parties with interest and standing, as identified to in 36 CFR 800.2(c), are also invited to participate in the Section 106 consultation process. Therefore, the DOE is writing to seek your comments on any issues or concerns for cultural resources or historic properties in the APE that might be affected by the proposed project and would like to know whether you wish to participate in the Section 106 consultation process for the proposed project, per 36 CFR 800.3(f).

DOE looks forward to receiving your comments on any issues or concerns for cultural resources or historic properties that might be in the APE and affected by the proposed project or on any other parties that may have an interest in the Section 106 consultation for the proposed project. DOE also looks forward to receiving an indication as to whether you wish to participate in the Section 106 consultation for the proposed Project. Please forward the results of your review and any requests for additional information to our contractor:

Janine Whitken  
Ecology and Environment, Inc.  
368 Pleasant View Drive  
Lancaster, New York 14086  
(716) 684-8060 extension 2745  
JWhitken@ene.com

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Calcasieu Parish, Louisiana
  3. Summary Table for Cultural Resources Investigations Conducted within the APE in Louisiana

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August 17, 2012 Correspondence to the Calcasieu Historical Preservation Society  
Regarding Initiation of Section 106 Consultation for Proposed Financial Assistance for the Lake  
Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

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August 17, 2012

Debbie Johnson-Houston  
Director  
McNeese Library  
Archives and Special Collections Department  
McNeese State University  
4205 Ryan Street  
Lake Charles, LA

**SUBJECT:** Initiation of Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

Dear Ms. Johnson-Houston:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed Project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with Archives and Special Collections Department of McNeese State University on the proposed Project.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

During the DOE demonstration phase of the proposed Project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field to confirm permanent storage of about one million tons per year during the demonstration period.

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- the facilities associated with the Lake Charles CCS portion of the proposed Project in Calcasieu Parish, Louisiana;
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- the portion of the existing Green Pipeline that connects the facilities in Calcasieu Parish with the facilities in Brazoria County, Texas and traverses portions of Calcasieu Parish Louisiana, and Orange, Jefferson, Chambers, Harris, Galveston and Brazoria County, Texas; and,
- the facilities associated with the Lake Charles CCS portion of the proposed Project in Brazoria County, Texas.

DOE has determined that the area of potential effects (APE) for the undertaking in Louisiana will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCC Gasification that are located in Calcasieu Parish, Louisiana. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The APE in Louisiana is in an industrial setting on the west side of the Calcasieu River, and is in the vicinity of numerous energy-related facilities. The APE includes the locations of:

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- the LCCE Gasification project, also on the west bank of the Calcasieu River;
- the offsite facilities associated with the LCCE Gasification project including the proposed new methanol storage area; hydrogen pipeline; water supply pipeline; natural gas pipeline; co-located transmission line, potable water line, and methanol pipeline; equipment laydown area; and offsite parking area
- the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline; or,
- the alternative 11.6-mile long alignment for the CO<sub>2</sub> pipeline that connects to the existing Green Pipeline to the southwest (see Enclosure 2).

Cultural resources investigations have been conducted within portions of the APE in Louisiana, including: Phase I archaeological survey of the property that contains the locations of the Lake Charles CCS Project and LCCE Gasification project; Phase I cultural resources survey of the proposed new 11.1-mile long CO<sub>2</sub> pipeline transporting CO<sub>2</sub> to the existing Green Pipeline, including extra workspace and access roads; and Phase IA cultural resources investigations of offsite facilities associated with the LCCE Gasification project (raw water, hydrogen, potable water, methanol and sulfuric acid pipelines; an overhead transmission line; a construction laydown area; and construction parking area). The reports documenting these cultural resources investigations have been submitted separately to the Louisiana SHPO for review and comment by the consultants on behalf of the Applicant. A table summarizing the cultural resources investigations is in Enclosure 3.

DOE has confirmed that no NRHP-listed historic properties or previously recorded standing structures or historic districts are located within the APE or a 0.5-mile radius around the APE in Calcasieu Parish.

The DOE is conducting Section 106 consultation with the Louisiana State Historic Preservation Officer and federally recognized Indian tribes to identify any issues or concerns regarding cultural resources and historic properties in the APE in Calcasieu Parish, Louisiana that may be affected by the proposed Project as part of

the DOE's fulfillment of responsibilities under Section 106 of the NHPA for the proposed Project and per 36 CFR Part 800.

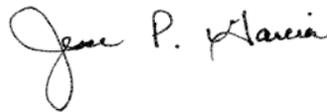
Additional consulting parties with interest and standing, as identified to in 36 CFR 800.2(c), are also invited to participate in the Section 106 consultation process. Therefore, the DOE is writing to seek your comments on any issues or concerns for cultural resources or historic properties in the APE that might be affected by the proposed project and would like to know whether you wish to participate in the Section 106 consultation process for the proposed project, per 36 CFR 800.3(f).

DOE looks forward to receiving your comments on any issues or concerns for cultural resources or historic properties that might be in the APE and affected by the proposed project or on any other parties that may have an interest in the Section 106 consultation for the proposed project. DOE also looks forward to receiving an indication as to whether you wish to participate in the Section 106 consultation for the proposed Project. Please forward the results of your review and any requests for additional information to our contractor:

Janine Whitken  
Ecology and Environment, Inc.  
368 Pleasant View Drive  
Lancaster, New York 14086  
(716) 684-8060 extension 2745  
JWhitken@ene.com

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Calcasieu Parish, Louisiana
  3. Summary Table for Cultural Resources Investigations Conducted within the APE in Louisiana

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Same as Enclosures 1 through 3 per

August 17, 2012 Correspondence to the Calcasieu Historical Preservation Society  
Regarding Initiation of Section 106 Consultation for Proposed Financial Assistance for the Lake  
Charles Carbon Capture and Sequestration (CCS) Project  
Calcasieu Parish, Louisiana (and Brazoria County, Texas)

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August 17, 2012

Gerald L. Roberts, PE  
County Engineer  
Brazoria County Engineering Department  
451 N Valasco, Suite 230  
Angleton, Texas 77515

**SUBJECT:** Initiation of Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Brazoria County, Texas (and Calcasieu Parish, Louisiana)

Dear Mr. Roberts:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed Project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with Brazoria County on the proposed Project.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

During the DOE demonstration phase of the proposed Project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field to confirm permanent storage of about one million tons per year during the demonstration period.

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- the facilities associated with the Lake Charles CCS portion of the proposed Project in Brazoria County, Texas.

DOE has determined that the area of potential effects (APE) for the undertaking in Texas will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCC Gasification that are located in Brazoria County, Texas. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The portion of the APE in Texas is in an industrial setting within the existing Hastings Oil Field, and is in the immediate vicinity of numerous energy-related facilities. The APE includes the location of the proposed Hasting injection site and MVA program at the existing Hastings Oil Field in Brazoria County, Texas (see Enclosure 2).

In October 2011, William Self Associates, Inc. (WSA) conducted a records and literature search of the area within the MVA portion of the APE for the proposed action. The purpose of the records and literature search by WSA was to determine the presence of previously identified cultural resources and historic properties within the MVA portion of the APE; to determine the extent of previous and existing disturbance and development within the MVA portion of the APE; and to evaluate the potential sensitivity of the MVA portion of the APE for unidentified cultural resources or historic properties. Results of the records and literature search by WSA indicated that there are no recorded archaeological sites, cemeteries, NRHP properties, State Archaeological Landmarks (SALs) or markers within the MVA portion of the APE. Because the Hastings Oil Field is a highly disturbed landscape resulting from decades of exploration for oil and characterized by the presence of numerous oil companies' pipelines, wells and support infrastructure, the potential for intact undisturbed soil profiles with archaeological sensitivity within the MVA portion of the APE is limited, if not entirely absent.

As a result of the records and literature search, WSA recommended that the MVA portion of the APE has a low probability for containing NRHP-eligible historic properties and that no archeological survey of the MVA areas is needed for the Proposed Action.

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DOE is also conducting Section 106 consultation with the Texas State Historic Preservation Officer and federally recognized to identify any issues or concerns and seek concurrence on the APE and on DOE's proposed finding of no historic properties affected, as part of DOE's fulfillment of responsibilities under Section 106 of the NHPA for the proposed project in accordance with 36 CFR Part 800.

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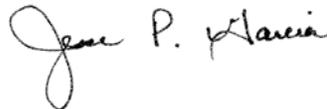
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Please forward the results of your review and any requests for additional information to our contractor:

Janine Whitken  
Ecology and Environment, Inc.  
368 Pleasant View Drive  
Lancaster, New York 14086  
(716) 684-8060 extension 2745  
JWhitken@ene.com

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Brazoria County, Texas

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Enclosure 1

Location of the Proposed  
Lake Charles Carbon Capture and Sequestration Project

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- | Lake Charles CCS Project (Proposed Project) | LCC Gasification Project (Connected Action)      | Existing EOR Operations |
|---|--|-------------------------|
| Alternative CO2 Pipeline Route              | Gasification Site and Related Offsite Activities | Green Pipeline          |
| Proposed CO2 Pipeline Route                 |  | Hastings EOR            |
| CO2 Capture and Compression                 |  | State Boundary          |
| CO2 injection and Research MVA              |  | County Boundary         |
|   |  | Major waterbody         |

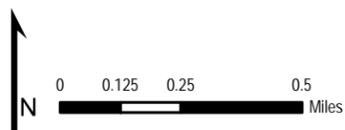
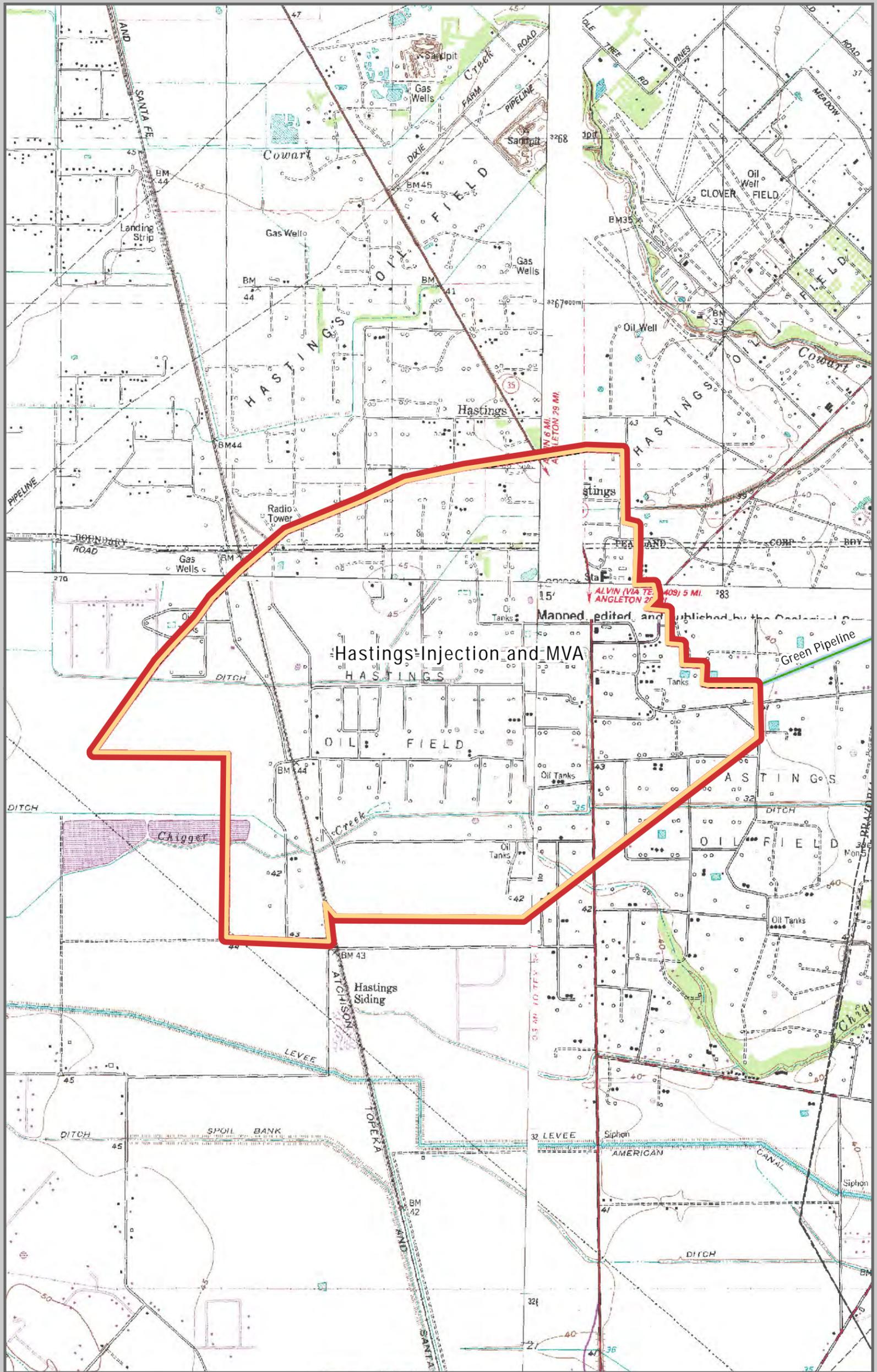
Figure 2.2-1  
Lake Charles CCS Project  
Overall Location  
Texas and Louisiana

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Enclosure 2

Area of Potential Effect  
for Proposed Lake Charles Carbon Capture and Sequestration Project Facilities  
in Brazoria County, Texas

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Source: USGS 1:24,000 Friendswood (1998); Pearland (1983); Manval (1977); and Algoa (1977) Quadrangles.

- Existing Operations (Not in Project or Proposed Action)
- Green Pipeline
- Lake Charles CCS Project (Proposed Action)
- Hastings Injection and MVA
- Area of Potential Effect (APE)

Figure 2  
APE (Area of Potential Effect) for the  
Proposed AGR and Compression Site  
Calcasieu Parish, Louisiana

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August 17, 2012

Sandra Pollan  
Brazoria County Historical Commissioner  
109 Lazy Lane  
Lake Jackson, Texas 77566

**SUBJECT:** Initiation of Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Brazoria County, Texas (and Calcasieu Parish, Louisiana)

Dear Ms. Pollan:

The Department of Energy (DOE) proposes to provide financial assistance for the construction and operation of the Lake Charles Carbon Capture and Sequestration (CCS) (Project), proposed by Leucadia Energy, LLC (Leucadia) and located in Calcasieu Parish, Louisiana and Brazoria County, Texas (see Enclosure 1). DOE is preparing an Environmental Impact Statement (EIS) for the proposed Project as part of compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and the DOE's regulations for implementing NEPA at 10 CFR 1021. This undertaking and its effects are also being considered under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and implementing regulations at 36 CFR Part 800. As part of compliance with Section 106 of the NHPA, DOE is consulting with the Brazoria County Historical Commission on the proposed Project.

DOE's proposed action is to provide partial funding for the construction and operation of the proposed Lake Charles CCS Project, which was selected by the DOE for an award of financial assistance through a competitive process under the Industrial Carbon Capture and Sequestration (ICCS) Program. The Lake Charles CCS Project would demonstrate: (1) advanced technologies that capture carbon dioxide (CO<sub>2</sub>) emissions at the Lake Charles Clean Energy Gasification Project (the LCCE Gasification Project) to be located on the west bank of the Calcasieu River in southern Calcasieu Parish, Louisiana; and (2) permanent storage of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations in the Hastings oil field south of Houston, Texas.

During the DOE demonstration phase of the proposed Project, approximately 4 million tons per year of CO<sub>2</sub> from two Acid Gas Removal (AGR) units would be captured and compressed in Calcasieu Parish, Louisiana at the LCC Gasification project, transported through a new pipeline connecting to Denbury Onshore, LLC's existing Green Pipeline. The existing Green Pipeline is designed to transport approximately 800 million standard cubic feet of CO<sub>2</sub> per day (about 17 million tons per year) and currently transports CO<sub>2</sub> from natural sources to existing EOR operations along the Gulf Coast. A comprehensive research monitoring, verification, and accounting (MVA) program would be implemented on a portion of the existing CO<sub>2</sub> EOR operations at the Hastings oil field to confirm permanent storage of about one million tons per year during the demonstration period.

As shown on Enclosure 1, these proposed and existing project-related facilities consist of:

- the facilities associated with the Lake Charles CCS portion of the proposed Project in Calcasieu Parish, Louisiana;
- the facilities associated with the LCC Gasification portion of the proposed Project in Calcasieu Parish, Louisiana;
- the portion of the existing Green Pipeline that connects the facilities in Calcasieu Parish with the facilities in Brazoria County, Texas and traverses portions of Calcasieu Parish Louisiana, and Orange, Jefferson, Chambers, Harris, Galveston and Brazoria County, Texas; and
- the facilities associated with the Lake Charles CCS portion of the proposed Project in Brazoria County, Texas.

DOE has determined that the area of potential effects (APE) for the undertaking in Texas will consist of the proposed new project-related facilities associated with the Lake Charles CCS Project and LCC Gasification that are located in Brazoria County, Texas. The APE for the undertaking does not include the portion of the Green Pipeline that connects the proposed new facilities in Calcasieu Parish, Louisiana and Brazoria County, Texas because it is an existing operating pipeline and no new project-related facilities are proposed along this portion of the pipeline.

The portion of the APE in Texas is in an industrial setting within the existing Hastings Oil Field, and is in the immediate vicinity of numerous energy-related facilities. The APE includes the location of the proposed Hasting injection site and MVA program at the existing Hastings Oil Field in Brazoria County, Texas (see Enclosure 2).

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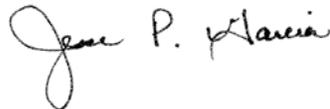
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Janine Whitken  
Ecology and Environment, Inc.  
368 Pleasant View Drive  
Lancaster, New York 14086  
(716) 684-8060 extension 2745  
JWhitken@ene.com

If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

- Enclosures:
1. Location of the proposed Lake Charles CCS Project
  2. APE for proposed Lake Charles CCS Project facilities in Brazoria County, Texas

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Same as Enclosures 1 and 2 per

August 17, 2012 Correspondence to the Brazoria County Engineering Department  
Regarding Initiation of Section 106 Consultation for Proposed Financial Assistance for the Lake  
Charles Carbon Capture and Sequestration (CCS) Project  
Brazoria County, Texas (and Calcasieu Parish, Louisiana)

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August 17, 2012

Jackie Haynes  
Executive Director  
Brazoria County Historical Museum  
100 E Cedar Street  
Angleton, TX 77515

**SUBJECT:** Initiation of Section 106 Consultation for Proposed Financial Assistance for the Lake Charles Carbon Capture and Sequestration (CCS) Project  
Brazoria County, Texas (and Calcasieu Parish, Louisiana)

Dear Ms. Haynes:

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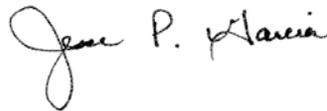
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Lancaster, New York 14086  
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If you have any questions or comments, please do not hesitate to contact Pierina Fayish, at 412-386-5428 or by email at [pierina.fayish@netl.doe.gov](mailto:pierina.fayish@netl.doe.gov).

Sincerely,



For Pierina N. Fayish  
NEPA Document Manager

Enclosures:    1. Location of the proposed Lake Charles CCS Project  
                    2. APE for proposed Lake Charles CCS Project facilities in Brazoria County, Texas

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Same as Enclosures 1 and 2 per

August 17, 2012 Correspondence to the Brazoria County Engineering Department  
Regarding Initiation of Section 106 Consultation for Proposed Financial Assistance for the Lake  
Charles Carbon Capture and Sequestration (CCS) Project  
Brazoria County, Texas (and Calcasieu Parish, Louisiana)

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## **Appendix E**

### **Floodplain and Wetland Assessment**

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## 1 INTRODUCTION

In accordance with the regulations contained in Title 10 Code of Federal Regulations (CFR) Part 1022, Compliance with Floodplain/Wetlands Environmental Review Requirements, the U.S. Department of Energy (DOE) has established policy and procedures to consider impacts on floodplains and wetlands as part of its decision-making process. This policy was developed in response to Executive Order 11990—Protection of Wetlands (May 24, 1977), and Executive Order 11988—Floodplain Management (May 24, 1977). These executive orders require federal agencies to evaluate and, to the extent possible, minimize the impacts of their projects on floodplains and wetlands.

Concurrent with DOE's preparation of the EIS for the proposed Lake Charles Carbon Capture and Sequestration (Lake Charles CCS project); DOE assessed the applicability of the floodplain management and wetland protection requirements in 10 CFR 1022 for the proposed action. DOE determined that construction of the Lake Charles CCS project would result in impacts to wetlands and 100-year floodplains. DOE developed this floodplain and wetland assessment to describe the floodplains and wetlands that would potentially occur, evaluate the significance of potential floodplain and wetland impacts, and discuss potential alternatives and mitigation measures that could be implemented to avoid or minimize impacts of the proposed action on flood plains and wetlands to the maximum extent practicable.

## 2 PROJECT DESCRIPTION

### 2.1 DOE's Proposed Action

DOE's proposed action is to provide financial assistance to Leucadia for implementation of their proposed Lake Charles CCS project. The project would demonstrate: (1) advanced technologies to capture CO<sub>2</sub> and (2) permanent sequestration of a portion of the CO<sub>2</sub> injected as part of existing enhanced oil recovery (EOR) operations. Specifically, financial assistance to implement the Lake Charles CCS project would facilitate the following:

- Capture and compression of CO<sub>2</sub> at the LCCE Gasification plant in Calcasieu Parish, Louisiana,
- Transport of CO<sub>2</sub> via a new 11.9-mile-long pipeline that will connect to the existing Green Pipeline, and

- A research MVA program aimed at providing an accurate accounting of approximately 1 million tons of stored CO<sub>2</sub> and a high level of confidence that the CO<sub>2</sub> will remain sequestered permanently in a portion of the Hastings oil field through existing EOR operations in Texas.

## 2.2 Applicant's Proposed Project

The Lake Charles CCS Project, as described above, involves the capture and sequestration of CO<sub>2</sub> from Leucadia's Lake Charles LCCE Gasification plant (LCCE Gasification plant), a petroleum coke gasification plant to be constructed by Lake Charles Clean Energy, LLC., in Calcasieu Parish, adjacent to the Lake Charles Harbor and Terminal District Bulk Handling Terminal near Carlyss, Louisiana. (As of June 1, 2012, the name of Lake Charles Cogeneration, LLC was changed to Lake Charles Clean Energy, LLC. Prior references to Lake Charles Cogeneration (LCC) Gasification are now LCCE Gasification.) The LCCE Gasification plant would not be funded by DOE; however, the DEIS addressed it as a connected action (Federal Register 2011). Leucadia would implement the Lake Charles CCS project with Denbury Onshore, LLC ("Denbury"). Leucadia would capture and compress CO<sub>2</sub> for delivery to Denbury's affiliate pipeline, and Denbury would inject and monitor CO<sub>2</sub> as part of ongoing commercial EOR operations at the Hastings oil field. The LCCE Gasification plant would consist of:

- The Gasification plant and
- Offsite Activities:
  - Construction Parking Area
  - Equipment Laydown and Methanol/Sulfuric Acid Storage
  - Linears for Natural Gas, Potable Water, Transmission, Sulfuric Acid, and Methanol
  - Water Supply and Hydrogen Pipelines

In selecting the locations of LCCE Gasification plant and the Lake Charles CCS project sites, Leucadia applied siting criteria, including:

- Land ownership (public, private)
- Consistency with current land use
- Proximity to the Port of Lake Charles for the gasification facility major components
- Proximity to the gasification facility for offsite components
- Parcel size
- Use of existing utility corridors

- Avoid wetland, streams and floodplains
- Minimize the number of pipeline and linear stream crossings
- Avoid sensitive habitats, and
- Avoid cultural resources.

### **2.3 Nature and Extent of the Flood Hazard**

Executive Order 11988, *Flood Plain Management*, requires that development in floodplains be avoided if practicable. A floodplain is any land area susceptible to inundation by floodwaters from any source. A 100-year flood is a flood having a 1% chance of being equaled or exceeded in magnitude in any given year. The 100-year floodplain is the area adjoining a river, stream, or watercourse covered by water in the event of a 100-year flood. These floodplains are mapped by the Federal Emergency Management Agency (FEMA) for insurance rate purposes and emergency response planning. These floodplains are assigned zone designations. Zone A indicates an area with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage, and because detailed analyses are not performed for such area, no depths or base flood elevations are shown within these zones. Zone AE indicates the base floodplain where base flood elevations are provided. AE Zones are now used on new format Flood Insurance Rate Maps. Zone AO indicates river and stream flood hazard areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones. Floodplain encroachment is any man-made obstruction or filling in of the floodplain that displaces the natural passage of floodwaters.

DOE utilized multiple information sources to identify areas where proposed project components would be located within FEMA mapped floodplains that would then represent potential areas of concern for floodplains. Additionally, in the project vicinity, wetlands comprise much of the floodplains in the Lake Charles area. Therefore, as part of flood hazard evaluation and wetland impact assessment, DOE utilized multiple information sources including field surveys conducted in 2007 by the Port of Lake Charles and a jurisdictional wetland determination conducted by the USACE New Orleans District as part of a 2008 USACE permit approval for LCCE Gasification plant site development to identify wetland areas of concern. DOE also used desktop surveys, Flood Insurance Rate Maps (FIRM's), U.S. Geological Survey topographic maps, and U.S. Fish and Wildlife Service National Wetlands Inventory data at the LCCE Gasification plant site and offsite activities locations, the Lake Charles CCS project site, pipeline corridors, and the West

Hastings research MVA site at the Hastings oil field to identify floodplains and wetlands that would potentially be impacted by the proposed and connected actions.

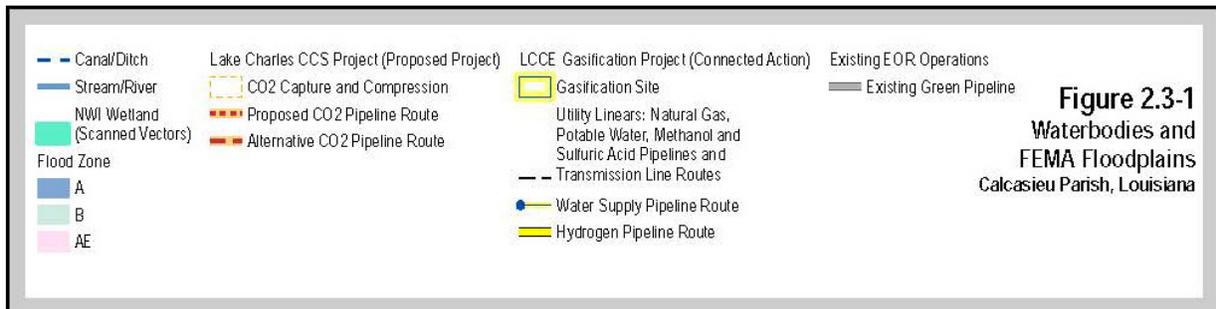
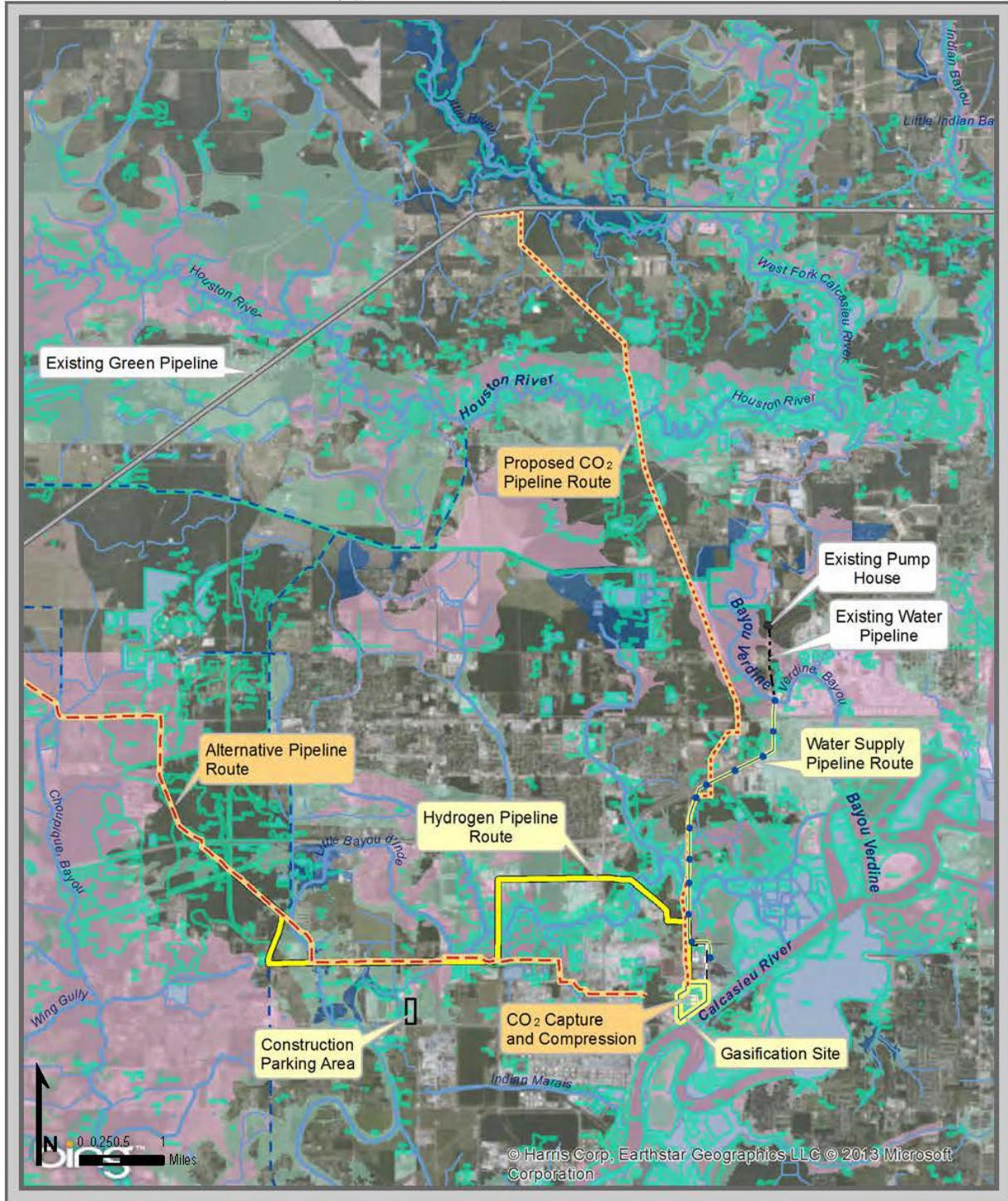
DOE assessed impacts to wetlands and floodplains primarily by using GIS to calculate impact acreages for reported wetlands and mapped floodplains and also relied on flood hazard analysis undertaken in 2012 by the Calcasieu Parish Police Jury Engineering Department. Baseline environmental data (i.e., wetlands and floodplains locations) were overlaid with project features to determine the locations and areal extents of potential wetland and floodplain impacts. In locations where wetlands and floodplains would be impacted, qualitative assessments were made of what those impacts would be, based on the factors considered for assessing impacts described in Section 4.4.1 of the Lake Charles CCS Project EIS.

### **2.3.1 LCCE Gasification Project and Lake Charles CCS Project CO<sub>2</sub> Capture and Compression Facilities**

Figure 2.3-1 shows the LCCE Gasification plant and the Lake Charles CCS CO<sub>2</sub> Capture and Compression Facilities site and related project components relative to the FEMA Flood Insurance Rate Map (effective June 1, 1983) and Rita Recovery Map (panel numbers LA-KK19 and LA-KK20). Sections of the connected 70-acre LCCE Gasification plant site are within 100- year or 500-year floodplains. Site development activities include the addition of fill material that would result in elevations significantly above the local 100-year and 500-year base flood elevations. The Advisory Base Flood Elevation (ABFE) for the site is 10 feet above mean sea level (MSL). The natural topographic elevations ranged from 2 feet to 11 feet MSL. The project site does not encroach on the regulatory floodway which is the Calcasieu River. Offsite Activities associated with the LCCE Gasification plant including the proposed 5-acre off site construction parking area, 40-acre equipment laydown and methanol/sulfuric acid storage area, linears for natural gas, potable water, electric transmission, sulfuric acid and methanol pipelines are located within portions of the Bayou d'Inde and Calcasieu River floodplains. Approximately 107 acres would be involved in these various linears and pipelines.

#### **CO<sub>2</sub> Pipeline Lateral**

The proposed CO<sub>2</sub> pipeline route is located in proximity to the floodplains of Bayou d'Inde, the Houston River, and the Calcasieu River, and much of the proposed CO<sub>2</sub> pipeline route is located within 100-year floodplains of the Calcasieu River and its tributaries (see Figure 2.3-1).



**Figure 2.3-1**  
**Waterbodies and**  
**FEMA Floodplains**  
**Calcasieu Parish, Louisiana**

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Therefore, the proposed CO<sub>2</sub> pipeline route would experience flooding conditions similar to those of the LCCE Gasification plant and Lake Charles CCS CO<sub>2</sub> Capture and Compression facilities site.

### **2.3.2 Research MVA Site**

FEMA conducted a floodplain survey in the vicinity of the Hastings Oil Field, which is located in Brazoria County, Texas, and developed Flood Insurance Rate Maps (FEMA 2010) for the area. Areas identified as Special Flood Hazard Areas are inundated by 100-year floods (Zones A, AE, and AO) which occur within short distances of Chigger Creek and Cowart Creek (see Figure 2.3-2). The southern approximately one-third of the Hastings Oil Field, including the two proposed well locations for the MVA, are located within the 100-year floodplain of Chigger Creek.

## **3 POTENTIAL FLOODPLAIN AND WETLAND IMPACTS**

### **3.1 LCCE Gasification (Connected Action)**

#### **3.1.1 Construction**

##### **3.1.1.1 Gasification Plant**

#### **Floodplains**

The LCCE Gasification plant site was within the 100- year floodplain. The U.S. Army Corps of Engineers New Orleans District (COE) issued a permit to the Lake Charles Harbor and Terminal District to develop the LCCE Gasification plant site on October 18, 2008. Completed site development activities included the addition of fill material that resulted in elevations significantly above the local 100-year and 500-year base flood elevations.

Construction of the LCCE Gasification plant site has filled 70 acres of 100-year floodplain associated with Calcasieu River and Bayou D'Inde. In compliance with the Executive Order 11988 (Floodplain Management), the DOE evaluated whether funding the Lake Charles CCS, and therefore the connected action of the LCCE Gasification plant construction, conflicts with applicable local flood management plans or ordinances, or with FEMA's national standard for floodplain management. The Calcasieu Parish Police Jury Division of Engineering and Public Works (Conner 2012) issued a waiver of floodplain and drainage impact analysis for the construction associated with the connected action. Therefore, construction of the LCCE

Gasification plant site by virtue of the receiving the waiver from the regulatory agency with jurisdiction, would not conflict with applicable flood management plans or ordinances.

Construction of the LCCE Gasification plant would not encroach upon the regulatory floodway which is the Calcasieu River or alter the navigability of the Calcasieu River. Leucadia would coordinate with the Coast Guard and COE during construction of permitted bulkheads avoid impacts to navigation on the Calcasieu River. Construction would alter the infiltration rates within the site. However, the site size, 70 acres, is negligible compared to the 2, 240,000 acre watershed area of the Calcasieu River, and the increase in the volume of site runoff would not significantly increase flow volumes downstream.

### **Wetlands**

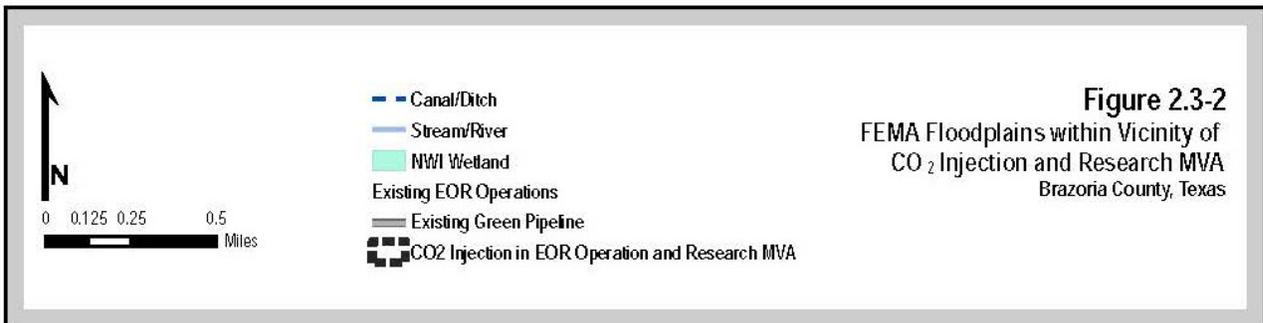
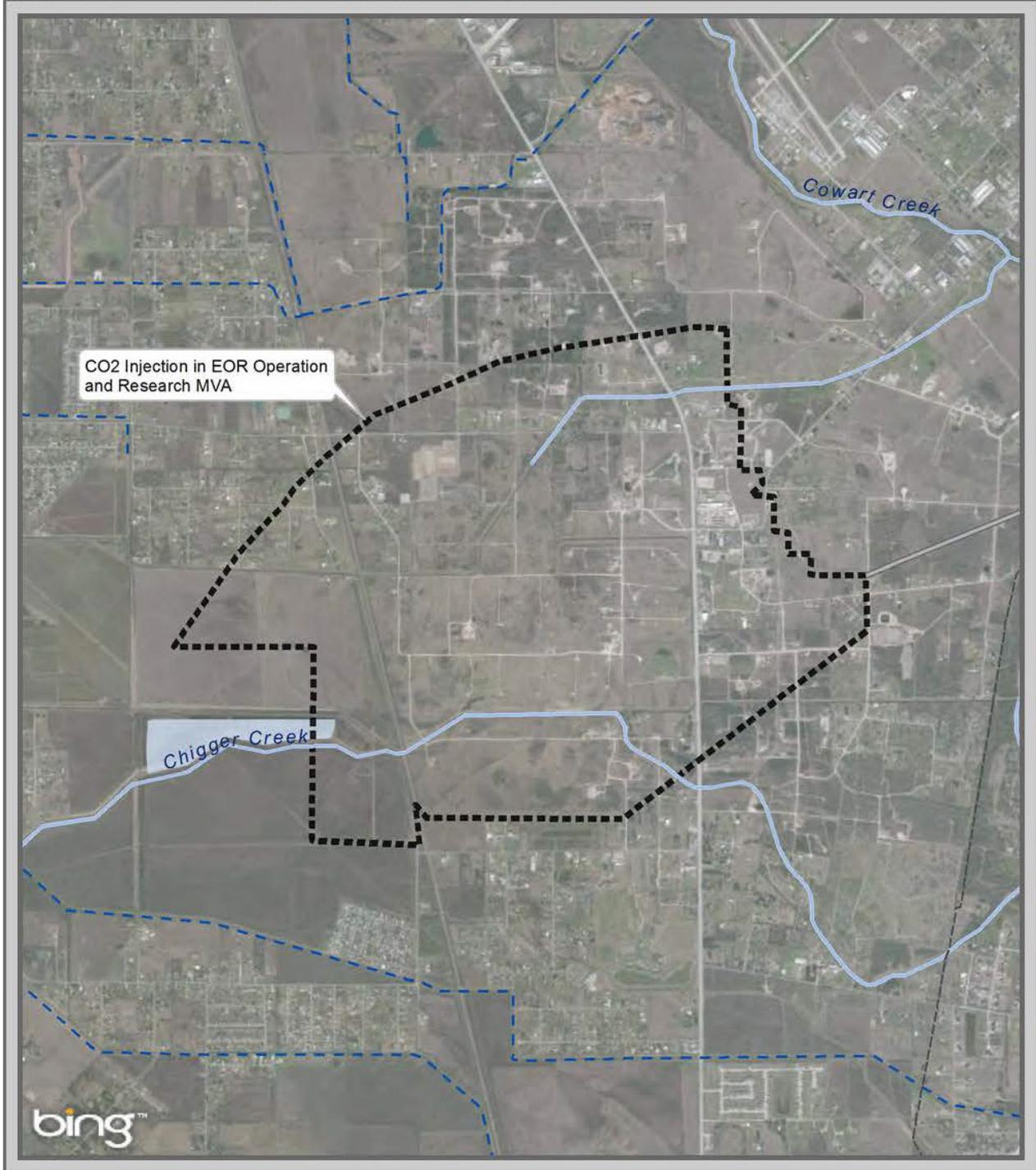
The COE conducted a jurisdictional determination on the Gasification Plant site and determined that construction of the Plant would impact 26.2 acres of forested and emergent marsh wetlands along the Calcasieu River. The COE required compensatory mitigation to offset the impacts to wetlands and the Port of Lake Charles mitigated 26.2 acres of the wetlands through an agreement with the COE and Stream Wetland Services, LLC in 2008.

### **3.1.1.2 Off-Site Activities**

#### **Construction Parking**

##### **Floodplains**

The proposed offsite 5-acre construction parking area is an upland undeveloped parcel of land. Portions of the area proposed for temporary construction parking are located within the 100-year floodplain of the Calcasieu River. Prior to construction, local building permits would be obtained, including NPDES permit and coordination with the local Calcasieu Parish floodplain administrator. The temporary offsite construction parking area would only be utilized during the 3-year construction period of the LCCE Gasification plant. After site clearing and compacting, approximately 4 to 6 inches of gravel fill would be placed over the 5-acre area to create a level, firm surface for the parking of automobiles. The placement of gravel on the construction parking area would negligibly raise elevations within the floodplain and would not increase the potential for floods, conflict with applicable flood management plans or ordinances, or conflict with the Federal Emergency Management Agency's (FEMA's) national standard for floodplain



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management. Therefore no impacts to floodplain would occur from construction of the construction parking area.

### **Wetlands**

No wetlands are present within the location proposed for the offsite construction parking area, therefore no wetland impacts would occur. An open water feature is present immediately west of the proposed location and is a man-made borrow pit for sand and would be classified as a non-jurisdictional open water pond. Local drainage pattern and site grading should direct any runoff from the parking area and not resulting in direct impacts to this open water feature. A potential wetland is present approximately 700 feet southeast of the proposed parking area; however, the parking area is physically separated from this potential wetland by LA 108. No impacts to wetlands would occur from the construction of the offsite construction parking area.

## **Equipment Laydown and Methanol/Sulfuric Acid Storage**

### **Floodplains**

Construction of the storage site would likely impact a maximum of 40 acres of 100-year floodplain of Bayou D'Inde and the Calcasieu River. Filling 40 acres of floodplain would alter the local floodplain however; flood waters in this vicinity are conveyed through the designated floodway of the Calcasieu River which drains the 2.24 million-acre Calcasieu watershed. Minor impacts to the floodplain would occur as a result of the construction of the equipment laydown and methanol/sulfuric acid storage areas. Prior to construction of the equipment laydown and methanol/sulfuric acid storage facilities, Leucadia would obtain applicable permits through USACE and the local Calcasieu Parish floodplain administrator and would perform any required compensatory mitigation to compensate for unavoidable impacts to the floodplain.

### **Wetlands**

Construction of the equipment laydown and methanol/sulfuric acid storage site would likely require the fill of a maximum of 40 acres of wetlands by virtue of proximity to the gasification plant site, Bayou D'Inde, and Calcasieu River. Forested wetlands within the vicinity of the Gasification Plant site, Bayou, and River include bottomland hardwood forests and bald cypress/tupelo swamps. Wetlands within this vicinity also include emergent marsh. Therefore, if avoidance is not practicable, impacts to wetlands would occur and a USACE permit would be required. In order to comply with the policy of "No Net Loss" of wetlands, a USACE permit would require mitigation to offset the fill of any wetlands and reduction in the value of wetlands filled.

## **Linears for Natural Gas, Potable Water, Transmission, Sulfuric Acid, and Methanol**

### **Floodplains**

The proposed natural gas, potable water, sulfuric acid and methanol pipelines would be installed below ground within the 100-year floodplain of Bayou D'Inde and Calcasieu River. Because these linears would be installed below grade, no floodplain filling would occur. The transmission line pole footings would also be below grade. The approximate area associated with these linears is 6 acres. There would be no measurable decrease in infiltration rates that could increase downstream volumes as a result of installation of the linears because of their relative size to the much larger floodplain area. Because the linears are installed below ground and their footprint is relatively small by comparison, the construction of these linears would result in no impacts to the floodplain. Prior to construction, Leucadia would obtain applicable permits and undertake coordination with the Calcasieu Parish floodplain administrator and would therefore not conflict with applicable local flood management plans or ordinances or FEMA national standard for floodplain management.

### **Wetlands**

There are no wetlands present within the locations proposed for the offsite linears, therefore no wetland impacts would occur.

## **Raw Water Pipeline and Hydrogen Pipeline**

### **Floodplains**

The proposed raw water supply pipeline would be approximately 4 miles in length and have a footprint of approximately 24.2 acres, given a ROW width of 50 feet. The hydrogen pipeline would be approximately 8.5 miles in length and have a footprint of approximately 77.3 acres, given a ROW of 75 feet. Both pipelines were sited consistent with Leucadia's siting criteria. The raw water and hydrogen pipelines would occupy 76% and 99% of existing ROW, respectively. Due to the relatively narrow nature of the permanent pipeline ROW and the temporary construction ROW, no measurable alteration of infiltration rates would occur. Additionally, these pipelines are installed below the ground surface and would not fill or elevate the floodplain. Therefore, no substantial decrease in the volume of surface water that flows downstream would result. Because the pipeline would be buried, it would not result in a fill above the existing ground elevations and have a no permanent effect on surface storm water flow patterns or flooding and would not conflict with applicable local storm water management plans. Pipeline construction permitted under the USACE permit and local building permits would not

alter a floodway or floodplain or otherwise impede or redirect flows in a manner that would increase the potential for floods or impacts on human health, the environment, or personal property, nor would construction conflict with applicable local flood management plans or parish ordinances. Therefore, permitted pipelines would not conflict with FEMA’s national standard for floodplain management.

**Wetlands**

A desktop review identified potential wetlands within the proposed footprints of the raw water and hydrogen pipelines using the U.S. Fish and Wildlife Service’s National Wetlands Inventory (NWI) maps, the U.S. Department of Agriculture’ Soil Survey of Calcasieu Parish for indications of wetlands (hydric) soils, and regional aerial photographs. These pipelines would extend approximately 4 miles and 8.5 miles, respectively. Tables 3.1-1 and 3.1-2 summarize the potential wetland impacts that may result from construction of the raw water supply and hydrogen pipelines which are 3.55 acres and 3.59 acres, respectively. The estimate of wetland impacts assumes the use of an open-lay construction method; however, in some cases, horizontal directional drilling (HDD) method would be used for construction, and wetland impacts would be avoided or reduced from the worst-case scenario presented in Table 3.1-1 and therefore evaluated.

**Table 3.1-1 Potential Wetland Impacts by Segments for the Raw Water Supply Pipeline**

Segment	Length (feet)	Square Feet	Acres
2	5	500	0.01
7	45	4,500	0.1
8	1,500	150,000	3.44
TOTAL			3.55

Source: URS 2012.

Note: The potential impact estimate is based on the use of an open-lay construction method and is a worst-case estimate.

**Table 3.1-2 Potential Wetland Impacts by Segment for the Hydrogen Pipeline**

Segment	Length (feet)	Square Feet	Acres
4	25	2,500	0.06
6	15	1,500	0.07
8	36	3,600	0.08
10	85	8,500	0.08
12	770	77,000	1.8
16	650	65,000	1.5
<b>TOTAL</b>			<b>3.59</b>

Source: URS, 2012

Note: The potential impact estimate is based on the use of an open-lay construction method and is a worst-case estimate.

The USACE regulates, discharges of dredged, excavated, or fill material into U.S. waters (rivers, streams, and bayous), including associated wetlands, and the placement of structures in navigable waters such as that associated with construction of pipelines under Sections 9 and 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Requirements under the applicable regulations include identifying waters of the U.S., including wetlands; assessing the potential impacts on waters of the U.S.; and modifying plans to first avoid impacts to the extent practicable, then minimize impacts, or finally, to fully mitigate for unavoidable impacts. The regulations also require obtaining permits, either through preconstruction notification, a Nationwide Permit, or an Individual Permit, depending on the level of impact. For segments of the pipelines with the potential to impact wetlands, a site-specific survey would be required to quantify any potential wetland impacts and determine wetland type and functional value. If a water body, including wetlands, would be crossed by the proposed pipeline route and is determined to be a water of the U.S. (jurisdictional), the potential construction impacts on wetlands would be determined. HDD crossing method would be used in specially designated stream crossings, such as crossing Bayou D'Inde or the Houston River. HDD method involves using specialized equipment to install pipelines beneath the surface water, i.e. wetlands or waterways, which potentially minimizes environmental impacts. However, a potential exists for environmental impacts, such as turbidity and deposition of drilling muds, which can accidentally occur from the inadvertent back up of drilling muds during the drilling process. These potential impacts are reported immediately and cleaned up typically with full restoration and mitigation with an HDD failure contingency plan and/or drilling mud disposal plan. The applicability of this method is subject to a variety of site-specific physical and engineering factors and specified in the actual permit to be obtained for pipeline installation. Therefore, this method is applicable to water bodies with conditions determined to be suitable and after extensive assessment and

permitting for both environmental and engineering considerations. Once applicable crossing methods are determined and if applicable wetland impact thresholds would be exceeded, Leucadia would obtain the necessary COE Permit. During construction Leucadia would implement BMPs to minimize potential impacts. If a COE permit is required for construction, Leucadia would perform compensatory mitigation as directed by the COE to minimize impacts to the extent practicable.

Leucadia would choose one of four water body crossing methods, including implementing HDD construction method, to avoid and/or minimize wetland impacts. Use of the appropriate water body crossing method that avoids wetland impacts would result in no mitigation being necessary. However, permitted wetland impacts would be fully offset with specified mitigation.

Leucadia would obtain local building permits and USACE permits to cross navigable waters and wetlands. Leucadia would comply with the applicable requirements such that pipeline construction would not significantly alter storm water discharges, adversely affect drainage patterns, increase flooding, or result in erosion or sedimentation that would violate water quality standards.

### **3.1.2 Operation**

#### **3.1.2.1 Gasification Plant**

##### **Floodplains**

Operations would not increase the potential for floods, alter a floodway or floodplain or otherwise impede or redirect flows such that human health, the environment or personal property could be affected, nor conflict with applicable local or FEMA flood management plans or ordinances. Therefore, no floodplain impacts would occur as a result of operation of the Gasification Plant.

##### **Wetlands**

Operations of the Gasification Plant would not result in any additional wetland fills.

### 3.1.2.2 Off-Site Activities

#### Construction Parking

##### Floodplains

The off-site parking area would be used temporarily during the 3-year construction period of the LCCE Gasification plant. Use of the parking area would be discontinued once construction of the gasification project is completed. No floodplain impacts would occur as a result of terminating the use of the parking area.

##### Wetlands

No wetland impacts would occur as a result of terminating the use of the parking area.

#### Equipment Laydown and Methanol/Sulfuric Acid Storage

Leucadia would conduct operational activities in accordance with required federal and state permits and would comply with water quality standards and discharge limitations stipulated in the permits such that surface water impacts from storm water runoff would be minor and would not degrade surface water quality by increasing erosion or sedimentation, or by introducing contaminants. All methanol and sulfuric acid tanks would be surrounded by impermeable containment berms to contain leaks or spills and prevent discharges. Leucadia would also use good housekeeping practices to keep exposed areas clean; regularly inspect, test, maintain, and repair all industrial equipment and storage sites to avoid situations that may result in leaks, spills, and other releases of pollutants in stormwater discharges that could affect floodplains and wetlands water quality; minimize the potential for leaks, spills and other releases that may be exposed to stormwater and develop plans for effective response to such spills if or when they occur; stabilize exposed area and contain runoff using structural and/or non-structural control measures to minimize onsite erosion and sedimentation, and resulting discharge of pollutants; divert, infiltrate, reuse, contain or otherwise reduce stormwater runoff, to minimize pollutants in discharges to floodplains and nearby wetlands; enclose or cover storage piles; train all employees who work in areas where industrial materials or activities are exposed to stormwater; and ensure that waste and floatable debris are not discharged in receiving floodplains and waters, including wetlands. Therefore, potential impacts to floodplain and wetland water quality in the unlikely event of leaks or spills would be avoided or minimized, and/or cleaned up effectively.

### **Floodplains**

Once construction of the LCCE Gasification plant is completed, use of the equipment laydown area would be discontinued and the site would be used for methanol and sulfuric acid storage. No additional floodplain fills and/or impacts are anticipated during operation of the storage area and no additional floodplain impacts would occur as a result of operation of the storage area.

### **Wetlands**

No additional wetland fills would occur as a result of normal activities of methanol/sulfuric acid storage.

### **Linears for Natural Gas, Potable Water, Transmission, Sulfuric Acid, and Methanol**

In the event of leaks and spills that could impact floodplain and wetland water quality, see discussion above under equipment laydown and storage site.

### **Floodplains**

No floodplain fills and/or impacts are anticipated during operation of the proposed linears. Routine maintenance activities along permanent ROW would not increase the potential for floods, alter a floodway or floodplain or otherwise impede or redirect flows such that human health, the environment or personal property could be affected, nor conflict with applicable local or FEMA flood management plans or ordinances.

### **Wetlands**

No additional wetland fills would occur as a result of normal activities of routine maintenance along the permanent linears ROW.

### **Raw Water Supply and Hydrogen Pipelines**

#### **Floodplains**

No floodplain impacts are anticipated from raw water supply and hydrogen pipeline operations because no floodplain filling would occur during operations. Due to the relatively narrow nature of the permanent pipeline ROW, no measurable alteration of infiltration rates would occur during pipeline maintenance activities. Maintenance activities would involve visual inspection of pipeline ROW and leak detection monitoring via sensors which do not involve floodplain filling. Additionally, no decrease in the volume of surface water that flows downstream would result because the pipelines are underground during operations. Because the pipelines would remain buried, no fill above the existing ground elevations and no effect on surface storm water flow

patterns or flooding would occur during operations and operational activities would not conflict with applicable local storm water management plans.

### **Wetlands**

No wetland fills would occur as a result of normal pipeline operations and maintenance activities.

## **3.2 Lake Charles CCS Project**

### **3.2.1 CO<sub>2</sub> Capture and Compression Facilities**

#### **3.2.1.1 Construction**

### **Floodplains**

During construction of the LCCE Gasification plant, 70 acres of floodplain were filled as described in Section 3.1.1.1. As a result, no additional floodplain filling would occur from CO<sub>2</sub> Capture and Compression facilities construction.

### **Wetlands**

During construction of the LCCE Gasification plant, 26.2 acres of wetland filling was permitted under USACE Section 404 permit as described in Section 3.1.1.1. As a result, no additional wetland fills would occur from CO<sub>2</sub> Capture and Compression facilities construction.

#### **3.2.1.2 Operation**

### **Floodplains**

Operations would not result in floodplain fills or alteration of infiltration rates that would increase volumes downstream. No impacts to floodplains would occur as a result of operation of the CO<sub>2</sub> Capture and Compression facilities.

### **Wetlands**

Operation of CO<sub>2</sub> Capture and Compression facilities would cause no impacts to wetlands.

## **3.2.2 CO<sub>2</sub> Pipeline**

### **3.2.2.1 Proposed Route**

#### **3.2.2.1.1 Construction**

##### **Floodplains**

The proposed CO<sub>2</sub> pipeline route would be approximately 11.1 miles in length and have a footprint area of approximately 33.6 acres. This route would be located within the 100-year floodplain of the Calcasieu River and Bayou D'Inde. Due to the relatively narrow nature of the permanent pipeline ROW and the temporary construction ROW compared to the size of the floodplain and the fact the pipeline would be buried, no alteration of infiltration rates would be expected. There would also be no substantial decrease in the volume of surface water that flows downstream. The preferred route would permanently impact 14.98 acres and temporarily impact 13.23 acres of 100-year floodplain (CH2MHill 2011). See table 3.2-2. Pipeline construction affecting floodplain would require coordination and approvals from the Calcasieu Parish floodplain administrator. Additionally, floodplain associated with Calcasieu River and Bayou D'Inde typically includes wetlands. Impacts to wetlands would require USACE permits. Based on receipt of local approvals for pipeline installation within the floodplain and USACE permits to cross waters of the U.S., including associated wetlands, approved and permitted pipeline construction should not significantly alter storm water discharges, nor would it adversely affect drainage patterns and flooding, because the pipeline would be buried.

Because the pipeline would be buried, it would not have a permanent effect on surface storm water flow patterns or flooding and would not conflict with applicable local storm water management plans. Pipelines permitted and constructed under the USACE permit and local building permits would not alter a floodway or floodplain or otherwise impede or redirect flows in a manner that would increase the potential for floods or impacts on human health, the environment, or personal property, nor would construction conflict with applicable local flood management plans or parish ordinances. Therefore, the permitted pipeline would not conflict with FEMA's national standard for floodplain management because no fill above existing ground elevations would occur.

##### **Wetlands**

Construction of the proposed pipeline across wetlands would result in short-term disturbances to wetland hydrology and, where new permanent ROW is required, long-term disturbance in the form of functional conversion from forested or scrub-shrub wetlands to emergent wetlands. Impacts from in-stream disturbances would occur during construction and restoration

activities at each pipeline crossing of a water body. The proposed 11.9-mile-long pipeline route involves 21 water body crossings, including two major water bodies: the Houston River and Bayou d’Inde; and the Sabine River Canal. A majority of the route would be collocated within existing utility easements, as identified in Table 3.2-1 below.

**Table 3.2-1 Co-location of the Proposed Lake Charles Pipeline Lateral Project with Existing Easements and Rights-of-Way**

County/State/Owner	Begin Milepost	End Milepost	Total Miles Paralleled	Type of Easement	Width of Existing Easement (feet)	Direction from Existing Easement	Width Used for Temporary Construction Easement (feet) <sup>a</sup>
Gulf States Utilities	0.5	0.8	0.3	Power Line	75 <sup>b</sup>	West	0
Calcasieu Parish	1.4	2.0	0.6	Road (Bayou D’Inde Pass / Prater Road)	55 <sup>c</sup>	East	0
Shell Pipeline Easement	2.5	2.9	0.4	Pipeline	30 <sup>b</sup>	East	0
Petrologistics Easement	2.9	3.3	0.4	Pipeline	25 <sup>b</sup>	Northwest	0
Air Products Easement	3.9	4.5	0.6	Pipeline	30 <sup>b</sup>	Southwest	0 to 25
Kansas City Railroad	4.5	5.6	1.1	Railroad	100 <sup>c</sup>	Southwest	0 to 7
Beauregard Electric	5.6	6.8	1.2	Power Line	55 <sup>c</sup>	Southwest	30 to 50
Kansas City Railroad	6.8	7.4	0.6	Railroad	100 <sup>c</sup>	Southwest	0 to 20
Air Products Easement	7.4	7.5	0.1	Pipeline	35 <sup>b</sup>	East	11 to 14
Air Products Easement	7.6	7.7	0.1	Pipeline	35 <sup>b</sup>	East	7 to 10
Kansas City Railroad	7.7	8.1	0.4	Railroad	100 <sup>c</sup>	West	25 to 35
Entergy Easement	8.4	10.1	1.7	Power Line	100 <sup>b</sup>	Southwest	0
Calcasieu Parish	10.7	11.1	0.4	Road (Bankens Road)	60 <sup>c</sup>	North	0 to 11
<b>Total Pipeline Miles Paralleled</b>			<b>7.9<sup>d</sup></b>				

Source: CH2MHill 2011.

<sup>a</sup> Width is based on the potential of overlap with the existing easement. Consultations and legal agreements with existing easement owners would be finalized prior to construction.

<sup>b</sup> Easement width was estimated based on the county’s tax lot/parcel data set.

<sup>c</sup> Existing easement width was estimated from the maintained corridor width detailed on aerial photography.

<sup>d</sup> Not all listed easement/ROW calculations are counted toward the total collocation length of the Project. Where the proposed Project route is collocated with two or more additional ROWs, due to collocation of two or more landowners at one time, only one easement/ROW collocation is counted toward the total collocation length of the Denbury Project.

Pipeline route is co-located as much as practicable to avoid and/or minimize wetland impacts. As described in Section 4.4.2.1.2 of the Lake Charles CCS Project DEIS, Water Supply and Hydrogen Pipeline Construction, there are four proposed surface water crossing methods. A water body crossing method is selected to avoid and/or minimize impacts to the water body, including wetlands. Denbury proposes to cross specially designated perennial waterbodies, including wetlands, using horizontal directional drill (HDD) method; and to cross other surface waters using crossing methods 1 through 3, as described above, with conventional pipeline crossing techniques, potentially including both wet and dry trenching methods, which include full restoration of a site after construction (CH2MHill 2011).

According to the pre-construction notification to the USACE, construction of the CO<sub>2</sub> pipeline along the preferred route would temporarily affect approximately 8.01 acres of wetlands and 4.96 acres of wetlands during operation and permanently impact 3.68 acres of wetlands (CH2MHill 2011).

Approximately 0.91 acres of forested and scrub-shrub wetlands would be permanently converted into emergent wetlands within the permanent ROW by the construction and operation of the pipeline, while 1.96 acres of forested wetlands would be cleared during construction but allowed to revegetate to forested wetlands in the longer term following construction (see Table 3.2-2). To minimize impacts on waters of the U.S., including wetlands, the corridor would be reduced to 75 feet from 95 feet, and consist of 50 feet of permanent ROW and 25 feet of temporary ROW through wetlands. Impact analysis considered 8.01 acres of temporary construction impacts and 4.96 acres of temporary operation impacts.

**Table 3.2-2 Summary of Potential Surface Water, Wetland, and Floodplain Impacts of the Proposed Route (acres)**

	<b>Proposed</b>
Number of major water body crossings	2
Number of minor water body crossings	4
Total wetlands	3.68
Forested Wetlands	1.71
Total Permanent Wetland Impacts <sup>a</sup>	0.91
Total Long-Term Temporary Wetland Impacts <sup>b</sup>	1.96
Floodplain Permanent Impact	14.98

Source: CH2MHill 2011.

<sup>a</sup> Permanent conversion from forested wetland to emergent wetland within the permanent ROW.

<sup>b</sup> Temporary clearing impacts allowed to restore to forested/scrub-shrub wetlands within the temporary construction ROW.

<sup>c</sup> Floodplain impacts also include additional 13.23 acres of temporary impacts

Denbury would perform construction in accordance their BMP's to minimize potential impacts to the extent practicable and would comply with all standards and compensatory mitigation required by applicable federal and state permits. Potential permitted wetland impacts would be fully offset with specified mitigation. During construction, construction impacts are minimized through various mitigation measures, depending on location-specific restrictions, available space, and regulatory constraints that may exist (CH2MHill 2011). Denbury's mitigation measures include the following:

- Strip topsoil separately, stockpile for re-use during restoration, and place soils derived from construction work at locations of smaller water body crossings within the pipeline construction ROW at least 10 feet from the water's edge and separated with silt fencing, or in additional specified work areas separated from the surface water body.
- Maintaining the minimum required buffer distance from water bodies during refueling of construction equipment, or, when this cannot be achieved, the construction contractor would employ secondary containment methods and would establish other appropriate spill prevention and cleanup measures to minimize the potential for any accidental spill-related impacts.
- When in proximity to any major water bodies or delineated wetlands for which additional temporary workspace would be necessary for staging, the construction contractor would adhere to the following guidelines:
  - Locate additional staging areas, additional soil storage areas, or other additional work areas at least 50 feet away from the water's edge, unless the adjacent upland area is cultivated cropland or other disturbed land, in which case the buffer may be less;
  - Minimize the clearing of vegetation between any additional required staging/storage areas and the water body or within the ROW of the pipeline; and
  - Establish and clearly mark buffer areas separating water bodies from designated refueling and staging areas.

Mitigation for impacts on waters of the U.S., including wetlands, would include in situ rehabilitation of wetlands temporarily impacted by construction, and the purchase of mitigation credits from approved wetland mitigation banks in the affected watersheds (i.e., the Lower Calcasieu watershed (Hydrological Unit Code [HUC] 08080206) and the West Fork Calcasieu

watershed (HUC 08080205) (CH2MHill 2011). Emergent wetlands and forested wetlands temporarily cleared for construction would be restored to pre-existing contours and hydrology and allowed to revegetate to pre-existing conditions. To compensate for long-term or permanent conversions of forested and scrub-shrub wetlands to emergent wetlands, Denbury proposes to purchase credits from wetland mitigation banks in the affected watershed areas (see Table 3.2-3).

**Table 3.2-3 Compensatory Wetland Mitigation for the Lake Charles Pipeline Lateral Project**

Wetland Type	Permanent Conversion to PEM Wetland (acres) <sup>a</sup>	Long-Term Temporary (acres impacted) <sup>b</sup>
Palustrine/Estuarine Forested		
HUC 08080206	0.35	0.22
HUC 08080205	0.36	1.49
Total Palustrine/Estuarine Forested	0.71	1.71
Palustrine/Estuarine Scrub-Shrub		
HUC 08080206	0.20	0.25
Total Palustrine/Estuarine Scrub-Shrub	0.20	0.25
<b>Total</b>	<b>0.91</b>	<b>1.96</b>

Source: CH2MHill 2011.

<sup>a</sup> Permanent conversion from forested wetland to emergent wetland within the permanent ROW.

<sup>b</sup> Temporary clearing impacts on forested/scrub-shrub wetlands within the temporary construction ROW.

## Operation

### Floodplains

No additional floodplain impacts are anticipated from operation of the proposed CO<sub>2</sub> pipeline because no floodplain filling would occur from operational activities along the installed pipeline. The pipeline would remain buried during normal operations. Therefore, no alteration of infiltration rates would occur during pipeline maintenance activities and no decrease in the volume of surface water that flows downstream would result. Because the pipeline would be buried, it would not result in a fill above the existing ground elevations and no effect on surface storm water flow patterns flooding, or local storm water management plans would occur.

### Wetlands

No impacts to wetlands would occur as a result of normal CO<sub>2</sub> pipeline operations.

### 3.2.2.2 Alternative Pipeline Route B

#### 3.2.2.2.1 Construction

##### Floodplains

The alternative pipeline route would be approximately 11.6 miles in length and involve a temporary construction ROW width of 95 feet. Construction impacts and requirements would be the same as discussed above in Section 3.2.2.1.1 for construction of the preferred route. However, the alternative route would impact more floodplain area because of its location and additional length. Construction of the Alternative CO<sub>2</sub> pipeline would result in 16.67 acres of permanent floodplain impacts and 14.57 acres of temporary floodplain impacts. Due to the relatively narrow nature of the permanent pipeline ROW and the temporary construction ROW when compared to the larger floodplain size, no alteration of infiltration rates would be expected. The alternative pipeline route would also be buried and therefore, no decrease in the volume of surface water that flows downstream would result.

##### Wetlands

Table 3.2-4 summarizes the surface water and wetland impacts of the alternative pipeline compared to the proposed CO<sub>2</sub> pipeline route. The alternative route contains 55.8 acres of wetlands (49.6 acres forested) within the construction corridor (CH2MHill 2011). The alternative route would involve two major water body crossings and nine perennial water body crossings (versus the crossing of two major water body and four perennial streams for the proposed route). The alternative route would impact 26.29 acres of wetland (versus 2.87 acres for the proposed route). The alternative route would permanently impact 16.67 acres and temporarily impact 14.98 acres of 100-year floodplain (CH2MHill 2011).

**Table 3.2-4 Summary of Potential Surface Water, Wetland, and Floodplain Impacts of the Alternative CO<sub>2</sub> Pipeline Route Compared to the Proposed Route, acres**

	Alternative	Proposed
Number of major water body crossings	2	2
Number of minor water body crossings	9	4
Total wetlands	55.8	3.68
Forested wetlands	49.6	1.71
Total Permanent and Temporary Wetland Impacts	26.29	2.87
Floodplain <sup>a</sup> Permanent Impact	16.67	14.98

Source: CH2MHill 2011.

<sup>a</sup> Floodplain impacts also include an additional 14.57 acres of temporary impacts.

Wetland impacts would require a USACE Section 404 permit prior to construction as described in Section 3.2.1.1.1 for the proposed CO<sub>2</sub> pipeline route. Because there would be a greater wetland impact, additional mitigation would be required to offset permitted wetland impacts.

### **Operation**

Operation of the pipeline along the alternative route would be the same as described above for proposed pipeline route and would result in the same level and type of impacts as described above in Section 3.2.1.1.1.

### **Floodplains**

No floodplain impacts are anticipated during operations. Operation of the pipeline along the alternative route would be the same as described above for proposed pipeline route and would result in the same level and type of impacts as described above in Section 3.2.1.1.1.

### **Wetlands**

No wetland impacts are anticipated during operations. Operation of the pipeline along the alternative route would be the same as described above for proposed pipeline route and would result in the same level and type of impacts as described above in Section 3.2.1.1.1.

## **3.2.2.3 Research MVA**

### **Floodplains**

No floodplain impacts would occur. The MVA project area includes Cowart Creek draining northeast from the existing Hastings Field and Chigger Creek draining to the southeast. The Hastings Field MVA area is shown on the FEMA FIRM Panels 48039C0135I, revised September 22, 1999, 48039C0045J, revised September 22, 1999, 48039C0065J, revised September 22, 1999, and 48039C0175I, revised September 22, 1999. Areas identified as Special Flood Hazards inundated by the 100-year floods (Zones A, AE, and AO) occur within short distances, from 100 to 2,000 feet, of Chigger and Cowart Creeks. The southern approximately one third of the Hastings Oil Field, including two proposed well locations in the MVA, is located within the 100-year floodplain of Chigger Creek. However, MVA activities do not involve construction and no floodplain filling would occur as a result of MVA activities. Therefore, there would be no increase in the potential for floods, nor alteration of a floodway or floodplain. The MVA activities would not conflict with local applicable flood management plans or ordinances and would not conflict with the Federal Emergency Management Agency's

(FEMA's) national standard for floodplain management because no floodplain filling is involved.

### **Wetlands**

The NWI indicates that several wetlands are present within the West Hastings Field MVA area, mainly in the vicinity of Chigger Creek. Project wells and construction areas would be located outside of wetland areas and best management practices would be utilized to prevent runoff from entering wetlands outside of construction areas (AIPC 2011). Therefore, no fill of wetlands or reduction in wetland value would occur.

## **4 ALTERNATIVES**

### **4.1 Alternatives to the Proposed Action and Connected Action**

DOE's alternatives to the Lake Charles CCS Project consisted of the 83 technically acceptable applications received in response to the *Funding Opportunity Announcement, Carbon Capture and Sequestration from Industrial Sources and Innovative Concepts for Beneficial CO<sub>2</sub> Use (DE-FOA-0000015)*. Prior to selection, DOE made preliminary determinations regarding the level of review required by NEPA based on potentially significant impacts identified in reviews of acceptable applications. DOE conducted these preliminary environmental reviews pursuant to 10 CFR §1021.216. These preliminary NEPA determinations and reviews were provided to the selecting official, who considered them during the selection process.

Because DOE's proposed action is limited to providing financial assistance in cost-sharing arrangements to projects submitted by applicants in response to a competitive funding opportunity, DOE's decision is limited to either accepting or rejecting the project as proposed by the proponent, including its proposed connected action which encompasses the technology, sites, and pipeline routes selected by the applicant. DOE's consideration of reasonable alternatives is, therefore, limited to the technically acceptable applications and a no action alternative for each selected project.

## **5 FINDINGS**

DOE reviewed the applicant's siting criteria and the potential impacts to floodplains and wetlands as a result of locating the proposed project and connected action to and no practicable alternatives were identified. DOE adoption of the proposed action will minimize potential harm to or within floodplains or wetlands, consistent with the policies set forth in E.O. 11988 and E.O. 11990 to the maximum extent practicable. DOE will develop a Floodplain Statement of Findings that will be incorporated in to the Final EIS for the Lake Charles CCS project.

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## **APPENDIX F**

### **ACCIDENT ANALYSIS AND ALOHA MODELING**

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## Accident Analysis and ALOHA Modeling

DOE evaluated potential release scenarios for the LCCE Gasification plant and Lake Charles CO<sub>2</sub> Capture and Compression equipment based on discussions with Leucadia regarding design and operation, professional judgment, comparison with prior DOE analyses, and an iterative modeling process to characterize potential scenarios for spill and releases. Although all accident scenarios were considered unlikely, the release scenarios identified were ranked according to probability. For this analysis, DOE defined the “probability” scenario as one that, while still unlikely, would be the highest probable scenario of those considered and may occur based on experience or available statistical information and in general, would have a low consequence or impact. The “consequence” scenario was defined as a catastrophic failure that would spill or release a maximum amount of material but would have an extremely low probability of occurrence. DOE estimated the level of exposure to releases of hazardous materials to the air using the ALOHA (Areal Locations of Hazardous Atmospheres) air dispersion modeling software which is a Gaussian plume dispersion model that evaluates release source and meteorological parameters.

### ALOHA Model Description

ALOHA (Areal Locations of Hazardous Atmospheres) is a program designed to model chemical releases for emergency responders and planners. It can estimate how a toxic cloud might disperse after a chemical release and also features several fires and explosions scenarios. ALOHA displays its estimate as a threat zone, which is an area where a hazard (such as toxicity, flammability, thermal radiation, or damaging overpressure) has exceeded a user-specified Level of Concern (LOC). ALOHA, can calculate how quickly chemicals are escaping from tanks, puddles (on both land and water), and gas pipelines and predict how that releases rate changes over time.

ALOHA is developed jointly by NOAA and the Environmental Protection Agency (EPA), and it runs on both Mac and Windows computers, and can be downloaded at this address:  
<http://www.epa.gov/emergencies/content/cameo/aloha.htm>.

### ALOHA Model Results

For this analysis, DOE assumed the worst-case atmospheric conditions during such a release, when applicable. These conditions provide conservative results, because these extreme and unlikely climatic conditions maximize the vaporization to create the vapor cloud and minimize its dispersion, and consist of the following:

- Temperature – The highest temperature 115 degrees Fahrenheit (°F) is recorded for the area in the past 3 years. High temperatures are used because increased temperatures accelerate the vaporization rate of substances upon release.
- Average Humidity – 50 percent atmospheric humidity is used when performing the worst case scenario evaluation. An average humidity of 50 percent is found during months providing the highest temperatures for the area. This level of humidity provides low interference for chemical dispersion, but is still taken into consideration to provide conservative results.
- Wind Speed – A 1.5-meter-per-second (m/s) wind speed is used when performing the worst-case scenario evaluation (equivalent to 4.92 feet per second [ft/s]). A low-wind speed prevents the quick dispersion of vapor clouds.
- Atmospheric Stability – An atmospheric stability level of F is applied for the worst-case scenario. The F atmospheric stability provides the most stable atmospheric environment where the tendency of the atmosphere is to resist or enhance vertical motion and/or turbulence—this also contributes to minimum dissipation of the vapor cloud.

Tables F-1 through F-8 provide the ALOHA inputs and modeling results scenarios for each of the chemicals of concern identified at the Lake Charles Gasification plant and the lake Charles CCS project:

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<b>Table F-1 Summary of 19% Aqueous Ammonia Release ALOHA Simulations</b>					
<b>Description</b>	<b>Catastrophic tank failure</b>	<b>Catastrophic tank failure</b>	<b>Catastrophic tank failure</b>	<b>Loaded Truck complete loss spill accident</b>	<b>Leaking Flange for 60 minutes</b>
<b>Source Type (Aloha)</b>	<b>Evaporating Puddle</b>	<b>Evaporating Puddle</b>	<b>Evaporating Puddle</b>	<b>Evaporating Puddle</b>	<b>Evaporating Puddle</b>
<b>Pipe Size (inches)</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>0.25</b>
<b>Volume (gallons)</b>	<b>16,500</b>	<b>16,500</b>	<b>16,500</b>	<b>7,000</b>	<b>300</b>
<b>Source Dimensions (ft) (length x width) berm</b>	<b>75 X 75</b>	<b>75 X 75</b>	<b>75 X 75</b>	<b>NA</b>	<b>NA</b>
<b>Source Area (Square feet)</b>	<b>5,625</b>	<b>5,625</b>	<b>5,625</b>	<b>42,000</b>	<b>1,800</b>
<b>Ground Type (wet soil, concrete, sand, etc)</b>	<b>Concrete</b>	<b>Concrete</b>	<b>Concrete</b>	<b>Sandy Soil</b>	<b>Concrete</b>
<b>Puddle Depth (inches)</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>0.25</b>	<b>NA</b>
<b>Terrain option</b>	<b>Simple Terrain</b>	<b>Simple Terrain</b>	<b>Simple Terrain</b>	<b>Simple Terrain</b>	<b>Simple Terrain</b>
<b>Urban/rural</b>	<b>Urban</b>	<b>Urban</b>	<b>Urban</b>	<b>Urban</b>	<b>Urban</b>
<b>Inversion</b>	<b>No</b>	<b>Yes/500 ft</b>	<b>No</b>	<b>No</b>	<b>No</b>
<b>Cloud Cover %</b>	<b>100</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>100</b>
<b>Humidity %</b>	<b>63</b>	<b>63</b>	<b>63</b>	<b>63</b>	<b>63</b>
<b>Highest daily maximum temperatures</b>	<b>71</b>	<b>71</b>	<b>92</b>	<b>92</b>	<b>92</b>
<b>Stability class</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>
<b>Wind speed mph)</b>	<b>3.36</b>	<b>3.36</b>	<b>3.36</b>	<b>3.36</b>	<b>3.36</b>
<b>AEGL 3 Downwind Distance (yds)@PPM</b>	<b>194</b>	<b>194</b>	<b>323</b>	<b>581</b>	<b>166</b>
<b>AEGL 2 Downwind Distance (yds)@PPM</b>	<b>771</b>	<b>771</b>	<b>1118</b>	<b>1.1 mile</b>	<b>462</b>
<b>AEGL 1 Downwind Distance (yds)@PPM</b>	<b>1.2 miles</b>	<b>1.2 miles</b>	<b>1.7 miles</b>	<b>2.8 miles</b>	<b>1095</b>

Table F-2 Summary of Methanol Release ALOHA Simulations						
Description	Complete release of 7,500,000 gallon	Complete release of 7,500,000 gallon	Complete release of 2,100,000 gallon	Complete release of 1,600,000 gallon	12" process pipe break release for 10 min	Tanker Truck with minimum leak
Source Type (Aloha)	Evaporating Puddle	Burning Puddle	Splashover	Burning Puddle	Evaporating puddle	Tank no fire
COMMENTS	Released inside secondary containment	Released inside secondary containment; 0.5 inch pipe thickness, max distance is 1 mile between isolation valves	Released inside secondary containment			
Source height above ground (ft)	NA	NA	NA	NA	0	NA
Spill Volume (gallons)	NA	NA	2,100,000	NA	4,957	7,000
Source Dimensions (ft) (length x width) berm	525 X500	525 X500	NA	350 X 250	NA	NA
Source Area (Square feet) liquid puddle	262,500	262,500	337,500	87,500	80,368 sq ft x 1/4 inch deep	NA
Ground Type (wet soil, concrete, sand, etc)	Default soil	NA	Sandy soil	NA	Default	NA
Puddle Depth (inches)	NA	NA	0	NA	0	NA
Tank Dimensions or Volume	NA	NA	NA	85 X 40	NA	7,000
Valve/pipe size (inch)						1
Terrain option	Simple Terrain	Simple Terrain				
Urban/rural	Urban	Urban	Urban	Urban	Urban	Urban
Cloud Cover %	0	0	0	0	0	0
Humidity %	63	63	63	63	63	63
Highest daily maximum temperatures	92	92	92	92	92	92
Stability class	F	F	F	F	F	F
Wind speed (mph)	3	3	3	3	3	3
AEGL 3 Downwind Distance (yds)@PPM	357	NA	405	NA	737	<10.9
AEGL 2 Downwind Distance (yds)@PPM	810	NA	916	NA	1,502	<10.9
AEGL 1 Downwind Distance (yds)@PPM	1.1 mile	NA	1.2 mile	NA	1.8 miles	<10.9
60 sec Fatal Fire Ball Radius (yds)	NA	142	NA	83	NA	NA
60 sec 2 <sup>nd</sup> Burns Radius (yds)	NA	183	NA	109	NA	NA
60 sec Pain Radius (yds)	NA	260	NA	157	NA	NA

**Table F-3 Summary of Information Chlorine Release ALOHA Simulations**

Description	1 ton Release from leaking valve inside controlled building (no scrubber in use during release)	1 ton Release from loss of fusion plug or from cylinder outside the controlled building	Leaking valve (1"fusion plug release) inside controlled building for 60 minutes (scrubber system in use)
Source Type (Aloha)	Tank	Tank	Direct from vent
Comments			
Gas only (lbs/min)	NA	NA	10
Height of vent (ft)	NA	NA	10
Liq. Compressed Gas	Compressed	Compressed	NA
Tank Size or Dimensions	1 ton	1 ton	NA
Release Volume, lbs	NA	NA	NA
Tank Type	NA	NA	NA
Sphere	Horizontal Cylinder	Horizontal Cylinder	NA
Horizontal Cylinder	NA	NA	NA
Vertical Cylinder	NA	NA	NA
Piping size (inch)	0.50	1.00	NA
Tank Pressure (psi)	40	40	NA
Terrain option	Simple Terrain	Simple Terrain	NA
Urban/rural	Urban	Urban	Urban
Cloud Cover %	0	0	0
Humidity %	63	63	63
Highest daily maximum temperatures	92	92	92
Stability class	F*	F*	F*
Wind speed (mph)	3.36	3.36	3.36
AEGL 3 Downwind Distance (yds)@PPM	1470	1.0 miles	1.7 mile
AEGL 2 Downwind Distance (yds)@PPM	3.2	3.0 miles	>6 miles
AEGL 1 Downwind Distance (yds)@PPM	>6 miles	5.6 miles	>6 miles

**Table F-4 Summary of Hydrogen Sulfide Release ALOHA Simulations**

Description	Gasification: Syngas from Quench	Sour Water to WSA	Sour Water to WSA	Sour Water to WSA	AGR to WSA: Release from leaky flange	Sour Water to WSA
Source Type (Aloha)	Tank	Direct	Evaporating Puddle	Gas Pipeline	Gas Pipeline	Burning Puddle
COMMENTS	Max quantity: 148.43 lb	Max quantity 25 lb; catastrophic release of entire amount	Puddle not likely because H2S in gas form under pressure and does not form a liquid	Leak from pipe connecting sour water stripper to WSA	Max quantity: 1467 lb	Burning puddle not likely because H2S in gas form under pressure and does not form a liquid
Gas only (lbs/min)	NA	10	NA	NA	NA	NA
Height of Discharge (ft)	NA	20	NA	NA	NA	NA
Liq. Compressed Gas	Compressed	NA	NA	NA	NA	NA
Puddle Size (ft <sup>2</sup> )	NA	NA	20	NA	NA	20
Puddle Volume (gal)	NA	NA	100	NA	NA	100
Tank Size (feet)	1 x5	NA	NA	NA	NA	NA
Tank Type	NA	NA	NA	NA	NA	NA
Sphere	NA	NA	NA	NA	NA	NA
Horizontal Cylinder	NA	NA	NA	NA	NA	NA
Vertical Cylinder	Vertical Cylinder	NA	NA	NA	NA	NA
Leaking Piping size (inch)	0.50	NA	NA	2.00	0.50	NA
Pipe Length (ft)	NA	NA	NA	100	330	NA
Temperature (F)	NA	NA	NA		87	NA
Tank or Pipe Pressure (psig)	NA	NA	NA	100	100	NA
Volume of Source (Lb)	149	NA	NA	Limited to pipe	1500	NA
Terrain option	Simple Terrain	Simple Terrain	Simple Tertian	Simple Terrain	Simple Terrain	Simple Terrain
Urban/rural	Urban	Urban	Urban	Urban	Urban	Urban
Cloud Cover %	0	0	0	0	0	0
Humidity %	63	63	63	63	63	63
Highest daily maximum temperatures	92	92	92	92	92	92
Stability class	F	F	F	F	F	F
Wind speed (mph)	3.36	3.36	3.36	3.36	3.36	3.36
AEGL 3 Downwind Distance (yds)@PPM	642	483	503	146	232	NA
AEGL 2 Downwind Distance (yds)@PPM	852	688	703	201	331	NA
AEGL 1 Downwind Distance (yds)@PPM	3.0 miles	3.4 miles	2.9 miles	1106	1.6 miles	NA
60 sec Fatal Fire Radius (yds)	NA	NA	NA	NA	NA	<10.9
60 sec 2° Burns Radius (yds)	NA	NA	NA	NA	NA	<10.9
60 sec Pain Radius (yds)	NA	NA	NA	NA	NA	<10.9

<b>Table F-5 Summary of Carbon Monoxide Release ALOHA Simulations</b>		
<b>Description</b>	<b>Gasification: Syngas from</b>	<b>AGR to H2 &amp; MeOH</b>
<b>Source Type</b>	<b>Gas Pipe</b>	<b>Gas Pipe</b>
<b>COMMENTS</b>	<b>Max quantity in process 951 lb</b>	<b>Max quantity in process 2954 lb</b>
<b>Gas only</b>	<b>Compressed</b>	<b>Compressed</b>
<b>Liq. Compressed Gas</b>	<b>NA</b>	<b>NA</b>
<b>Tank Size (inch)</b>	<b>NA</b>	<b>NA</b>
<b>Tank Type</b>	<b>NA</b>	<b>NA</b>
<b>Sphere</b>	<b>NA</b>	<b>NA</b>
<b>Horizontal Cylinder</b>	<b>NA</b>	<b>NA</b>
<b>Vertical Cylinder</b>	<b>NA</b>	<b>NA</b>
<b>Volume Stored (lbs)</b>	<b>NA</b>	<b>NA</b>
<b>Piping diameter (inch)</b>	<b>0.48</b>	<b>0.73</b>
<b>Pipe Length</b>	<b>100.00</b>	<b>500.00</b>
<b>Source Volume</b>	<b>951</b>	<b>2954</b>
<b>Temperature (F)</b>	<b>2500</b>	<b>110</b>
<b>Tank/pipe Pressure (psia)</b>	<b>1000</b>	<b>1000</b>
<b>Terrain option</b>	<b>Simple Terrain</b>	<b>Simple Terrain</b>
<b>Urban/rural</b>	<b>Urban</b>	<b>Urban</b>
<b>Cloud Cover %</b>	<b>0</b>	<b>0</b>
<b>Humidity %</b>	<b>63</b>	<b>63</b>
<b>Highest daily maximum temperatures</b>	<b>92</b>	<b>92</b>
<b>Stability class</b>	<b>F</b>	<b>F</b>
<b>Wind speed (mph)</b>	<b>3.36</b>	<b>3.36</b>
<b>AEGL 3 Downwind Distance (yds)@PPM</b>	<b>164</b>	<b>375</b>
<b>AEGL 2 Downwind Distance (yds)@PPM</b>	<b>343</b>	<b>945</b>
<b>AEGL 1 Downwind Distance (yds)@PPM</b>	<b>NA</b>	<b>NA</b>

**Table F-6 Summary of Hydrogen Release ALOHA Simulations**

Description of Container	Gasification: Syngas from Quench	Gasification: Syngas from Quench	AGR to H2 & MeOH Production
Source Type	Gas Pipe	Gas Pipe Burning	Gas Pipe
COMMENTS	Max quantity in process 266 lb	Same as gas pipe scenario except assumes that ignition occurs	Max quantity in process 437 lb
Gas only	Compressed	Compressed	Compressed
Liq. Compressed Gas	NA	NA	NA
Tank Size (inch)	NA	NA	NA
Tank Type	NA	NA	NA
Sphere	NA	NA	NA
Horizontal Cylinder	NA	NA	NA
Vertical Cylinder	NA	NA	NA
Volume Stored (lbs)	NA	NA	NA
Piping Diameter size (inch)	2.00	2.00	0.58
Pipe Length	100.00	100.00	500.00
Source Volume, lbs	Infinite	Infinite	437
Temperature	NA	NA	110
Tank Pressure (psi)	1000	1000	1000
Terrain option	Simple Terrain	Simple Terrain	Simple Terrain
Urban/rural	Urban	Urban	Urban
Cloud Cover %	0	0	0
Humidity %	63	63	63
Highest daily maximum temperatures	92	92	92
Stability class	F	F	F
Wind speed (mph)	3.36	3.36	3.36
AEGL 3 Downwind Distance (yds)@PPM	86	NA	12
AEGL 2 Downwind Distance (yds)@PPM	115	NA	16

<b>Table F-6 Summary of Hydrogen Release ALOHA Simulations</b>			
<b>AEGL 1 Downwind Distance (yds)@PPM</b>	<b>224</b>	<b>NA</b>	<b>29</b>
<b>60 sec Fatal Fire Ball Radius (yds)</b>	<b>NA</b>	<b>16</b>	<b>NA</b>
<b>60 sec 2<sup>o</sup> Burns Radius (yds)</b>	<b>NA</b>	<b>23</b>	<b>NA</b>
<b>60 sec Pain Radius (yds)</b>	<b>NA</b>	<b>35</b>	<b>NA</b>

<b>Table F-7 Summary of Sulfuric Acid Release Conditions (not modeled with ALOHA)</b>					
<b>Description</b>	<b>Complete release of 1,900,000 gallons</b>	<b>8" process pipe break release for 10 min</b>	<b>8" process pipe (below grade) break release for 60 min</b>	<b>Tanker Truck Belly valve sheer</b>	<b>Tanker Truck with minimum leak</b>
<b>Source Type</b>	<b>Splashover</b>	<b>Direct no fire</b>	<b>Direct no fire</b>	<b>Tank no fire</b>	<b>Tank no fire</b>
<b>COMMENTS</b>	Released inside secondary containment	Released inside secondary containment; 0.5 inch pipe thickness, max distance is 1 mile between isolation valves	Contents released into soil underground; 0.5 inch pipe thickness, max distance is 1 mile between isolation valves	Not selected for analysis; does not volatilize	Released inside secondary containment, does not volatilize
<b>Volume of Release - gal</b>	<b>532,000</b>	<b>2,087</b>	<b>12,524</b>		

<b>Table F-8 Summary of Propylene Release ALOHA Simulations</b>			
<b>Description</b>	<b>5,700 lb Release from one compressor pipe rupture</b>	<b>5,700 lb Release from one compressor pipe rupture</b>	<b>Release from leaky valve (1" area release)</b>
<b>COMMENTS</b>	<b>Two compressors are isolated; closed system for refrigeration of methanol</b>	<b>Two compressors are isolated; closed system for refrigeration of methanol</b>	
<b>Source Type</b>	<b>Gas Pipe</b>	<b>Gas Pipe Burning</b>	<b>Gas Pipe</b>
<b>Gas only</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Liq. Compressed Gas</b>	<b>Compressed</b>	<b>Compressed</b>	<b>Compressed</b>
<b>Tank Size or Dimensions</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Tank Type</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Sphere</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Horizontal Cylinder</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Vertical Cylinder</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Piping diameter (inch)</b>	<b>2.00</b>	<b>2.00</b>	<b>0.5</b>
<b>Pipe Length</b>	<b>100.00</b>	<b>100.00</b>	<b>100</b>
<b>Source Volume</b>	<b>infinite</b>	<b>infinite</b>	<b>infinite</b>
<b>Tank/pipe Pressure (psi)</b>	<b>30</b>	<b>30</b>	<b>200</b>
<b>Terrain option</b>	<b>Simple Terrain</b>	<b>Simple Terrain</b>	<b>Simple Terrain</b>
<b>Urban/rural</b>	<b>Urban</b>	<b>Urban</b>	<b>Urban</b>
<b>Cloud Cover %</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Humidity %</b>	<b>63</b>	<b>63</b>	<b>63</b>
<b>Highest daily maximum temperatures</b>	<b>92</b>	<b>92</b>	<b>92</b>
<b>Stability class</b>	<b>F</b>	<b>F</b>	<b>F</b>
<b>Wind speed (mph)</b>	<b>3.36</b>	<b>3.36</b>	<b>3.36</b>
<b>AEGL 3 Downwind Distance (yds)@PPM</b>	<b>72</b>	<b>NA</b>	<b>34</b>
<b>AEGL 2 Downwind Distance (yds)@PPM</b>	<b>171</b>	<b>NA</b>	<b>75</b>
<b>AEGL 1 Downwind Distance (yds)@PPM</b>	<b>171</b>	<b>NA</b>	<b>75</b>
<b>60 sec Fatal Fire Radius (yds)</b>	<b>NA</b>	<b>11</b>	<b>NA</b>
<b>60 sec 2<sup>o</sup> Burns Radius (yds)</b>	<b>NA</b>	<b>11</b>	<b>NA</b>
<b>60 sec Pain Radius (yds)</b>	<b>NA</b>	<b>17</b>	<b>NA</b>

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## **APPENDIX G**

### **DENBURY LAKE CHARLES PIPELINE LATERAL 16" CO<sub>2</sub> PIPELINE PUBLIC RISK AND PIPELINE DESIGN NARRATIVE**

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## **DENBURY LAKE CHARLES PIPELINE LATERAL**

### **16" CO<sub>2</sub> PIPELINE**

#### **Public Risk and Pipeline Design Narrative**

**DENBURY LAKE CHARLES 16" CO<sub>2</sub> PIPELINE LATERAL  
PUBLIC RISK AND PIPELINE DESIGN**

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## **PUBLIC RISK AND PIPELINE DESIGN**

### **1.0 INTRODUCTION**

This narrative describes aspects of the pipeline design, construction, operation, and maintenance with enhancements to minimize potential hazards to the public and to maintain system reliability. Operational procedures, design, and construction features reflecting accepted industry practices that will be used to avoid undue hazards and effects are also discussed.

### **2.0 PIPELINE SYSTEM DESCRIPTION**

The Denbury CO2 Pipeline Lateral will consist of the following primary components: one 11.87-mile long, 16-inch diameter liquid carbon dioxide pipeline, and associated pipeline support facilities including valves for temporary pig launchers/receivers, main line isolation valves, and metering site equipment.

The transport of the CO2 originates within the Lake Charles Clean Fuels facility at a meter station to be operated and controlled by plant personnel. The inlet meter will consist of two 12" parallel orifice meter runs and automated isolation valves. The meter station will be used to measure the flow, composition, moisture content, pressure and temperature of the CO2 stream going into the pipeline from the plant compressor. This information is hard wired to a flow computer and then transmitted into the plant control system, which is monitored 24 hours per day, 7 days per week by trained operators. The measurement data will be monitored by both LCCE and Denbury for purposes of pipeline leak detection and coordinated response to any upset condition that may arise.

Denbury ownership and operation of the CO2 pipeline begins downstream of the meter at a motorized 16" isolation valve with insulating flanges, which isolate the cathodic protection system within the plant from the system employed to protect the pipeline. Denbury assumes operating control at this flange, and all components and operations downstream of this point are Department of Transportation jurisdictional under 49 CFR 195. The motor operated isolation valve will be located within a fenced site at the plant north property boundary and be used to shut in the pipeline for maintenance or an emergency. Operation of the isolation valve can be accomplished both locally and remotely through the pipeline control center using satellite communication. The site also includes manually operated valves for use in maintenance activities.

Once the pipeline leaves the plant boundary, it will be routed through the adjacent industrial properties and under Bayou D'Inde Road to the north using a horizontal directional drill (HDD). The typical depth for a road crossing is at least 5 feet below the road bed and a river/stream crossing is at least 20 feet below the road or stream/river bed (actual HDD depths depend on the length of the drill, maximum allowed curvature of the pipe based on diameter and wall thickness, and minimum clearance and depth required to avoid any obstructions). The pipeline will continue north to Bayou D'Inde where a 16" manually operated isolation valve will be installed within a 25 feet x 25 feet chain link fence. The valve site is equipped with smaller valves on either side of the isolation valve to allow venting of the CO2 in the event that the pipeline requires maintenance that cannot be completed with the pipeline under pressure. The pipeline will cross under Bayou D'Inde using the HDD installation method. Another pipeline isolation valve station configured as described above will be installed north of the bayou.

After crossing Bayou D'Inde, the pipeline route will progress north using conventional trenched construction methods and then cross under Interstate 10 using HDD installation method. The route continues through a mixed commercial and residential area for approximately 1 mile located between Interstate 10 and State Highway 90. The pipeline will be trenched in place and be buried with at least 3 feet of cover or 4 feet near any buildings located within 50 feet of the pipeline. The pipeline will cross under State Highway 90 using a horizontal bore. The pipeline will then parallel the Kansas City Southern (KCS) Railroad ROW and tracks for approximately 4.3 miles through a largely rural area. Additional pipeline isolation valves will be installed in this section and be located on either bank of the Sabine River Diversion Canal with plans to automate one of these valves to allow remote operation in the event of a pipeline emergency. An automated or motorized valve site foot print expands to 40 feet x 25 feet to allow installation of the valve and an accompanying building for satellite and communication controls equipment.

The route will also cross Houston River Road and the Houston River using the HDD installation method. Pipeline isolation valves will be located on either side of the river near Houston River Road and to the north at a site adjacent to the KCS railroad tracks and access road. Neither valve is planned for automation due to the close proximity to other planned automated valves at the Sabine River Diversion Canal and the pipeline end point less than 2.5 miles to the northwest.

Once the route diverts away from the KCS railroad, it will then parallel an existing power transmission corridor for approximately 1.75 miles. Construction of the pipeline in this portion of the route will include installation of an alternating current (AC) mitigation technology in the trench to protect from stray current from the power transmission lines that could impact the integrity of the steel pipe. The pipe will be buried with at least 3 feet of cover, as is expected for the majority of the pipeline route.

The route will turn westward once crossing under Bankens Road, which will be horizontally bored at a depth at least 5 feet below the road bed. The route will parallel the existing Green Pipeline and terminate inside the Lake Charles Pump Station where the custody measurement station will be installed.

The custody meter station will measure the amount of CO<sub>2</sub> received from Leucadia prior to entering the Green Pipeline. downstream of the pumps at the station. The custody meter site will be configured similar to the plant measurement station and include an over pressure protection valve to protect the meter skid and piping. The meter skid will consist of two 12-inch senior orifice fittings, 16-inch isolation valves, motorized valve actuators with remote communication and control, pressure and temperature transmitters, a flow computer, CO<sub>2</sub> sampling and gas chromatograph, and wiring to the pipeline control system. The data gathered by the meter station will then be transferred by satellite to the Denbury control center for monitoring and shared with the Lake Charles Clean Fuels to help facilitate effective pipeline operation and communication.

### **3.0 INDUSTRY RELIABILITY AND SAFETY OVERVIEW**

This section provides a brief overview of the potential hazards, safety standards, and impacts on public safety associated with carbon dioxide pipelines.

#### **3.1 Hazards**

Carbon dioxide is colorless and tasteless. It is relatively odorless in low concentrations but has a musty smell in at greater concentrations. It is nontoxic, but is classified as an asphyxiant due to its displacement of oxygen in confined spaces or large concentrations. Extended exposure to

CO<sub>2</sub> in high concentrations can lead to the following symptoms: headache, dizziness, restlessness, breathing difficulty, sweating, malaise, increased heart rate, increased blood pressure, coma, asphyxia, and convulsions.

Unconfined mixtures of carbon dioxide in air are not explosive due to the properties of carbon dioxide. The specific gravity of gaseous carbon dioxide is 1.52 and heavier than air at atmospheric temperatures, thus potentially settling near the ground in low lying areas under colder conditions. Wind and increasing ambient temperatures will disperse carbon dioxide over time.

### **3.2 Pipeline Incident Data**

Operating experience records for hazardous liquid and carbon dioxide pipelines have been maintained for more than 60 years. Construction, operations, and maintenance expertise have provided regulators and the industry with the opportunity to identify specific causes of pipeline failure and to address those through appropriate design, construction, operation, and maintenance practices. The primary categories of failure causes defined by the U.S. Department of Transportation (USDOT) Office of Pipeline Safety (OPS) are:

Outside force or third party damage;  
Corrosion (internal and external);  
Construction/material defects; and  
Operator error or actions.

### **3.3 Impact on Public Safety**

On a per mile basis, CO<sub>2</sub> pipelines have experienced much fewer incidents than natural gas or other hazardous liquid pipelines. Of the incidents that have occurred over the years, public impacts have been relatively minimal and include few injuries and monetary impacts due to environmental damage. Specific effects of past and potential future incidents include:

- CO<sub>2</sub> gas release to atmosphere only
- Exposure of the public, habitat, or species to CO<sub>2</sub> at varying concentrations
- Operational impacts with service deficiencies or interruption

## **4.0 PROJECT COMPLIANCE WITH APPLICABLE REGULATORY REQUIREMENTS**

The proposed pipeline will be designed, constructed, operated, and maintained in accordance with USDOT minimum federal safety standards in 49 CFR Part 195, "Transportation of Hazardous Liquids by Pipeline". The regulations are intended to ensure adequate protection for the public from hazardous liquid and carbon dioxide pipeline failures. Part 195 specifies material selection and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion.

Some key provisions of the Part 195 regulations are summarized below:

- System materials and design (49 CFR 195 Subpart C – *Design Requirements*)
- Proper construction (49 CFR 195 Subpart D – *Construction*, and Subpart E – *Pressure Testing*)

- Thorough and adequate inspection, testing, maintenance and repair (49 CFR 195 Subpart F – *Operation and Maintenance*, 195.402 – *Procedural manual for operations, maintenance, and emergencies*, and 195.442 – *Damage Prevention Program*)
- Operations conducted by trained and qualified workers (49 CFR 195 Subpart G – *Qualification of Pipeline Personnel*)
- Identification and mitigation of risks (195.452 - Pipeline Integrity Management)
- Coordination and preparation for emergency response (195.402 – *Procedural manual for operations, maintenance, and emergencies*, 195.403 – *Emergency Response Training*)

In addition to the provisions outlined above, many industry standards are incorporated by reference into 49 CFR Part 195, and are therefore regulatory requirements. These standards provide specifications for materials, fabrication, construction, pipe transportation, and corroded pipe analysis, which contribute to the safety of the pipeline system, and will be used in the design, operation, and maintenance of the proposed pipeline.

#### **4.1 High Consequence Areas and Integrity Management**

In accordance with the federal requirement under 49 CFR 195.452 Pipeline Integrity Management in High Consequence Areas (HCAs), Denbury will add the proposed 16-inch CO<sub>2</sub> pipeline to its established plan titled *CO<sub>2</sub> Integrity Management Program*. Denbury's integrity management plan meets 49 CFR 195.452 and establishes methodology for identifying HCAs, risk assessment of individual line segments, integrity assessment intervals, approved methods of assessment, criteria for prioritizing and repairing anomalies found during assessments, and documentation of all activities related to integrity management.

Part 195 has established pipeline integrity management regulations for pipelines in High Consequence Areas. High Consequence Area (HCA) means:

- (1) A commercially navigable waterway, which means a waterway where a substantial likelihood of commercial navigation exists;
- (2) A high population area, which means an urbanized area, as defined and delineated by the Census Bureau, that contains 50,000 or more people and has a population density of at least 1,000 people per square mile;
- (3) Other populated area, which means a place, as defined and delineated by the Census Bureau, that contains a concentrated population, such as and incorporated or unincorporated city, town, village, or other designated residential or commercial area;
- (4) An unusually sensitive area, as defined in section 195.6.

These populated and sensitive areas are published by PHMSA and used in the HCA identification process required of each natural gas and hazardous liquid pipeline operator.

#### **4.2 Affected HCA Identification**

The affected HCAs, as defined above, have been identified using data released by PHMSA and CO<sub>2</sub> dispersion modeling to determine the extent of possible impacts due to a pipeline release. Denbury contracted with American Innovations to perform the dispersion analysis utilizing a Det Norske Veritas proprietary software called Process Hazard Analysis Software Tool (PHA<sub>ST</sub>) Version 6.6. PHAST is a fully integrated software package that allows detailed hazard assessment of toxic and flammable substances.

The dispersion modeling objective is to determine the worst case dispersion distance for the anticipated maximum pipeline flow rate and pressure. This information is used in developing safety response plans and compliance with integrity management requirements.

#### 4.2.1 Risk Analysis Assumptions

The PHAST software considered the following in determining dispersion distances from a potential release:

- Full pipeline break or guillotine rupture, which is considered a worst case release
- 16 inch pipe diameter
- 0.375 minimum pipe wall thickness
- CO<sub>2</sub> temperature is 110F; density is 1.842 kg/m<sup>3</sup>.
- The CO<sub>2</sub> concentration is normalized to 100%.
- The height for concentration output is 1m (3.281 ft)
- Pipe lengths - lengths between isolation valves and quantity of material between eight (8) isolation valves
- Analysis of releases at the pipeline beginning, 25%, midpoint, 75%, and end point.
- Time to isolate flow into the pipeline and the release location is 15 minutes.
- Maximum pipeline operating pressure – 2,360 psig for a blocked discharge condition.
- Dispersion distance represents extent of 40,000 ppm concentration of CO<sub>2</sub>.
- Average meteorological conditions obtained from the National Oceanic and Atmospheric Administration (NOAA) database for the City of Lake Charles, Louisiana
  - Low temperature (41.2F) with 8.3 mph average wind speed (LTAW)
  - High temperature (91.3F) with 8.3 mph average wind speed (HTAW)

A rupture can happen at any point along the pipeline. The location of a rupture relative to the source affects the dispersion distance due to the volumes of CO<sub>2</sub> contributed both upstream from the source and downstream of a rupture site from the pipeline itself. If a rupture is at the beginning of the pipeline then the mass available is the upstream pump rate and the inventory with the pipe from the downstream side. If the release is in the middle of the pipeline, there is an equal amount of product inventory available from the upstream and downstream ends, which may or may not result in the worst case. A pipeline rupture at the end of the pipe section has the maximum product available, but the pressure at this point will typically be lower compared to the upstream end of the pipeline. To determine which break point along the pipeline gives the worst-case scenario (maximum dispersion distance), different break point distances from the source were used in combination with other parameters.

The response time is the time to detect and isolate the pipeline when a rupture occurs. Isolation of the pipeline can be with a check valve, manually operated valve or a remotely operated valve.

When a CO<sub>2</sub> pipeline rupture occurs, the largest dispersion distance is established within moments of initiation of the rupture when the pressure is greatest and the mass flow rate of CO<sub>2</sub> into the rupture site is highest.

Calculated dispersion distances are applied equally to both sides of the line, assuming wind direction will push the CO<sub>2</sub> plume to one side of the pipeline or the other and create a dispersion corridor or buffer following the centerline of the pipeline.

For CO<sub>2</sub>, 40,000 ppm (0.04 fraction) is the concentration that has been established as the Immediately Dangerous to Life and Health (IDLH) concentration for CO<sub>2</sub> published by the National Institute for Occupational Health and Safety (NIOSH). This value was selected based on the ability for someone exposed to this concentration to: 1) Escape without loss of life or immediate or delayed irreversible health effects. (Per NIOSH, 30 minutes is considered the maximum time for escape without supplied air); and 2) prevention of severe eye or respiratory irritation or other reactions that would hinder escape.

#### 4.2.2 Risk Analysis Results

The point release from the guillotine failure at a 50% break distance, modeled to a CO<sub>2</sub> concentration of 40,000 ppm, had a distance higher than the other break point scenario results. This pipeline segment was then modeled at two (2) different meteorological conditions based on pipeline location to quantify the effects of wind speed on dispersion of the CO<sub>2</sub>. It was found that the high temperature with average wind speed had the largest distance to a CO<sub>2</sub> concentration of 40,000 ppm. (Refer to Table 2 below).

The results of the analysis indicate a maximum dispersion distance of 925 feet for IDLH conditions occurs near the midpoint of the pipeline under the high temperature average wind condition (refer to Table 2 below). The minimum dispersion distance is 707 ft under low temperature average wind condition near the end point of the line. The distance of 925 feet was selected as the worst case and utilized to establish a possible exposure footprint for the entire length of the pipeline lateral and subsequently to determine the segments of the pipeline that have potential to affect HCAs.

**Table 2: Meteorological Conditions - Exposure Distance**

Pipeline Component	Break Point	Break Distance (feet)	HTAW (40,000 ppm Exposure Distance)	LTAW (40,000 ppm Exposure Distance)
16" Lake Charles Line	Begin	20	781	750
16" Lake Charles Line	25%	15,668	872	836
16" Lake Charles Line	50%	31,336	925	886
16" Lake Charles Line	75%	47,004	837	802
16" Lake Charles Line	End	62,673	735	707

Due to the high mass flow rate at the time of rupture, the vapor cloud travels the maximum distance within 7.3 seconds as shown in Figure 2 *CO<sub>2</sub> Concentration vs. Maximum Plume Distance and Time*. The mass expelled from the rupture site will continue to add to the vapor cloud until the valves are completely shut, but this additional mass will not increase the vapor cloud distance due to the decreased pressure in the pipeline. Valve closure speeds and response times have little effect in reducing maximum distance; however, closure times do directly limit the duration of the public exposure and the amount of CO<sub>2</sub> volume released to the rupture site.

Figure 1: Time vs. Mass Flow Rate and Expelled Mass

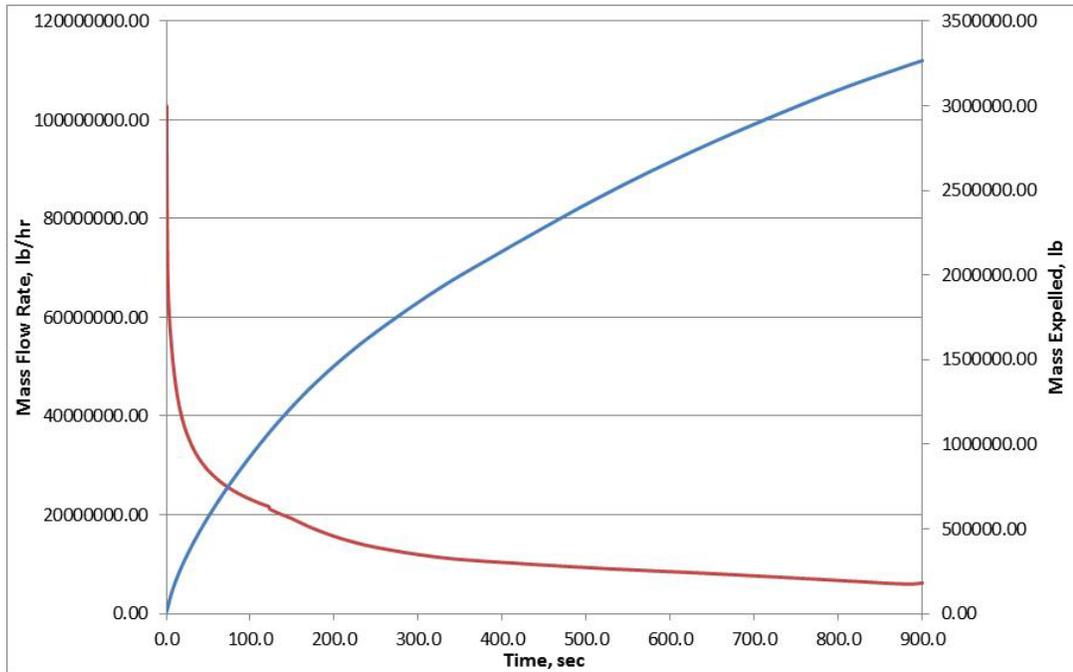
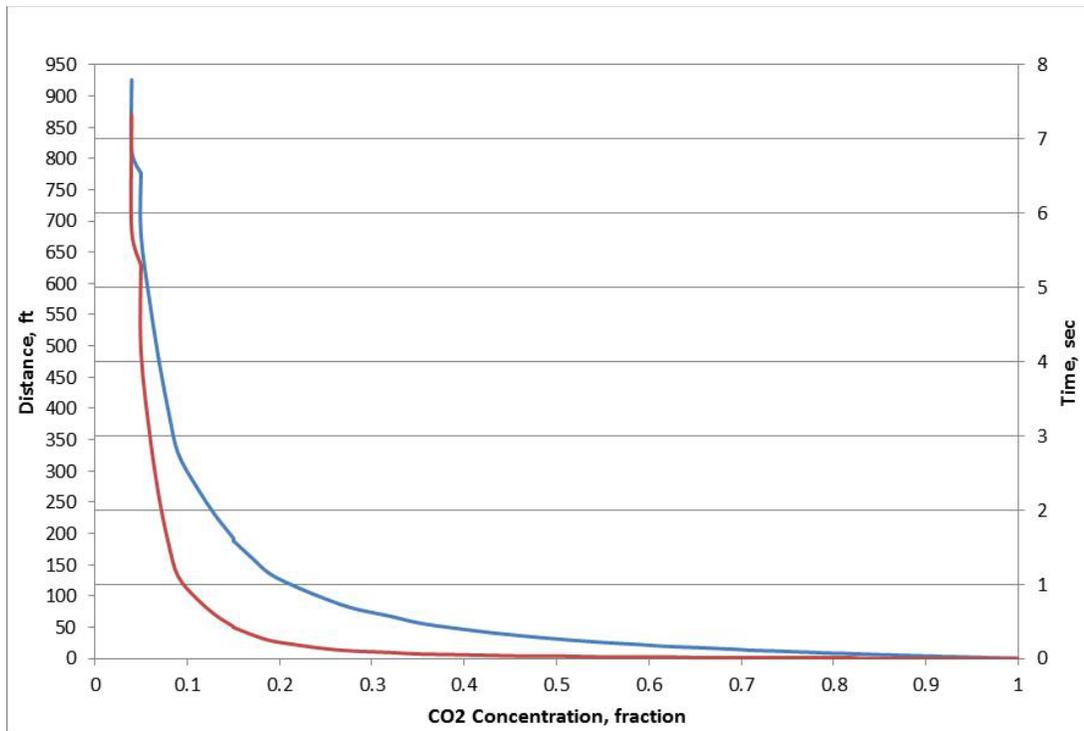


Figure 2: CO2 Concentration vs. Maximum Plume Distance and Time



#### 4.2.3 HCA Identification

Using a 925 foot worst case dispersion corridor, the HCAs identified for the 16-inch line highly populated areas to the north and west of the pipeline near Interstate Highway 10. Approximately 2.26 miles of the route have potential to affect portions of this highly populated area. The remainder of the route is predominantly rural and not identified as an HCA by the US Department of Transportation, which consults recent census data to establish HCA footprints. A release of CO<sub>2</sub> can affect other areas outside of officially designated HCAs, and these are identified and addressed using mitigation measures discussed below.

#### 4.3 Risk Mitigation Measures

The design and construction of the Denbury CO<sub>2</sub> pipeline lateral include the following elements to mitigate risks to the pipeline and surrounding HCA's.

- Selection of the pipeline route to minimize contact with HCA's where possible. Much of the route follows established utility corridors and traverses large undeveloped areas.
- Installing isolation valves on either side of navigable waterways >100ft in width. Waterways meeting this criterion along the pipeline route include Bayou D'Inde, the Houston River, and a Sabine River Diversion Canal. The longest section of pipeline between isolation valves is approximately 4 miles.
- Installing motor operators on strategic valves to facilitate remote closure and faster response time, typically 1-3 minutes after initiation of a closure command. Denbury operations personnel will also be located within approximately 15 minutes travel time to each valve on the pipeline.
- Hydrostatically pressure testing of all pipe and fittings in the pipeline to 125% of the maximum operating pressure. The predicted test pressure will be 2,950 psig based on the current pipeline design.
- Installing heavier wall thickness and abrasion-resistant coated pipe for all horizontal directionally drilled (HDD) installations. Pipe installed in HDDs will be designed with a 0.6 design factor, meaning that the maximum operating pressure of this pipe will be less than 60% of the pipe's specified minimum yield strength. The remainder of the pipeline will use a 0.72 design factor, irrespective of location designation.
- Incorporating inspection tool launchers and receivers into the design to allow for "smart pigs" to be run in the pipeline. Smart pigs traverse the entire length of the pipeline and record the condition of the pipe wall.
- Running a caliper or deformation inspection tool after all pipeline construction is complete to check for and allow for removal of any dents or out-of-round pipe.
- Selecting pipe steel with high impact properties to help resist outside force damage and high toughness to mitigate potential risk of ductile fracture of the pipe.
- Installing and maintaining pipe coatings and cathodic protection in accordance with DOT 49 CFR195 regulations. Pipe coatings will include 14-16 mils of fusion bond epoxy plus an additional 40 mils of abrasion-resistant coating like Powercrete for bored or horizontally drilled sections. Cathodic protection will include an industry-standard application of a low voltage charge to the pipeline to counter the positive ions created by the corrosion process.
- Burying all pipe with a minimum of 3 feet of cover or at least 4 feet of cover for any locations where the pipe is within 50 feet of a residence or business. There are currently less than 10 residences or businesses within 50 feet of the pipeline rights of way. The pipeline will be buried with at least 4 feet of cover adjacent to these structures.
- Establishing and maintaining liaison with appropriate fire, police, and public officials to

coordinate mutual assistance in responding to emergencies. The operator will also establish and maintain a continuing public awareness program in accordance with DOT 49 CFR 195 regulations to enable emergency response officials, the public, government officials, and those engaged in excavation activities to recognize a pipeline emergency and report it to appropriate public officials.

- Incorporating the pipeline and valves into a remote monitoring and control system.

## **5.0 CONSTRUCTION AND OPERATING MITIGATION MEASURES**

The hazardous liquids pipeline industry, in general, has an excellent record of public safety. Pipeline system design, construction, operation, and maintenance follow strict industry practices, standards, and regulations to ensure public safety and reliability and to minimize the possibilities and effects of system failure. In the event of an incident, emergency response and contingency plans provide for a response to each of these circumstances. Prevention and mitigation measures for both the construction and operations phase of the Denbury Lake Charles lateral are discussed below.

### **5.1 Construction Phase**

The pipeline will be constructed, operated and maintained in accordance with applicable Federal, state and local laws and regulations including but not limited to the DOT regulations in 49 CFR Part 195. In addition, construction specifications developed for installation of the pipeline will incorporate the requirements of all construction permits and Denbury engineering specifications, as well as project-specific plans and procedures for unique construction techniques.

Denbury will maintain an established safety program designed to minimize incidents and lost time injuries, and to protect the public near the Pipeline. Denbury will conduct group safety training sessions for inspection crews and construction contractor personnel before construction and each morning before construction activities begin. The construction contractor will also be required to have a safety representative onsite during construction. All personnel working on the right-of-way (ROW) during construction or operation and maintenance activities must at a minimum wear hard hats, safety glasses, and steel-toed shoes. Denbury requires that construction contractors perform all construction activities in a safe manner, including the operation of all construction equipment, all labor activities, and complying with the Occupational Safety and Health Administration's (OSHA's) excavation safety standards.

The Denbury Lake Charles lateral will be constructed of carbon steel manufactured in accordance with American Petroleum Institute (API) 5L, Grade X70, PSL 2 specifications, with an electric resistance welded (ERW) longitudinal weld seam. All pipe and appurtenances installed below grade will be coated with fusion-bonded epoxy or an equivalent protective coating, and painted with an industrial epoxy paint system for above grade installation. Buried pipeline joints will be coated with field-applied epoxy coatings. An impressed current cathodic protection system will be installed to further protect the integrity of the pipeline.

The proposed pipeline will be buried a minimum depth of 3 feet in all areas except at stream crossings where the burial depth will be at least 5 feet or greater under the stream/canal/river bottom (specific permit requirements will dictate exact burial depth for some crossings). Warning signs will be placed at road crossings and at other strategic spots along the pipeline route that will include identification and ownership information, including emergency contact telephone numbers.

The end point inspection tool launcher/receiver traps and intermediate valve stations will be located within security-fenced areas to prevent unauthorized access to the facilities. Buildings will be made of non-combustible materials. Electrical equipment and wiring will be installed in conformance with applicable sections of the National Electric Code, National Fire Protection Association (NFPA)-70.

The pipeline will be hydrostatically tested to prove its structural integrity before CO<sub>2</sub> is introduced into the line and it commences operation. Testing will be performed and documented in accordance with 49 CFR Part 195.

Denbury will take further safety precautions regarding foreign utility lines that may be crossed during construction. Denbury will send letters to the owners of all known, reported, or otherwise documented lines within the proposed work areas along with drawings showing the location of the owners' respective lines. In the letters, Denbury will request a written response to the following inquiries:

- Size, type, and pressure
- Verification of the location and depth of cover
- ROW width
- Information concerning other pipelines immediately adjacent to or intersecting the new pipeline that were identified
- Special construction requirements
- Names, addresses, telephone numbers, and lead time of personnel to contact before construction begins

During construction, the contractor will complete the One Call notification to allow operators of foreign pipelines and utilities to probe and mark each line. Each foreign utility line will be carefully exposed before trenching.

Before construction, Denbury will notify all appropriate local officials and agencies concerning the schedule of upcoming construction activities. Where necessary, arrangements for detours and warning signs will be made for roads that will be impacted.

## **5.2 Operations Phase**

Denbury maintains an operations and maintenance manual containing written procedures for normal operations and maintenance and abnormal operations and emergencies in accordance with DOT 49 CFR 195 regulations. This manual includes requirements for preventive maintenance and patrols of facilities, as well as procedures to be followed in the event of an accident or natural catastrophe. This manual is made available to all affected operations personnel.

Periodic training sessions and review of operating procedures and emergency procedures will be conducted for affected operations employees. This training will include the safe operation of all pipeline system equipment, hazardous material handling procedures, public liaison programs, emergency response actions and coordination, and general operating procedures.

Measures will be implemented to protect the public and exclude unauthorized persons from hazardous areas along the pipeline. All above ground facilities including block valves, scraper traps and delivery points will have perimeter chain link fencing with multiple-strand barbed wire

at the top. Valves and access gates will be locked at unmanned locations. Signage at facilities will include statements such as "Authorized Personnel Only". On the right-of-way, pipeline warning signs complying with DOT regulations will be placed at all road, railroad and waterway crossings and at other locations of public access. Besides warning of the pipeline's location, the signs will direct the public to call the Operations Control Center and the local one-call notification center at least 48 hours before commencing any excavation near the pipeline. Additionally, aerial patrols will give immediate phone notification to dispatch operations personnel of any apparent activity by the public near the pipeline that could be an endangerment to people and the pipeline.

Standard procedures will be implemented for temporary marking of the pipeline for third party contractors and utilities, and for obtaining adequate marking and location information of foreign lines and utilities prior to commencing maintenance work. Standard procedures will be implemented for maintenance activities such as lock-out / tag-out procedures, checking for low-oxygen atmospheres when the pipeline is opened, procedures for excavating pipelines and utilities, traffic control, and procedures that will ensure compliance with pertinent OSHA regulations.

### **5.3 Right-of-Way Inspections**

Regularly scheduled aerial patrols of all Lake Charles lateral facilities will be performed along with scheduled preventive maintenance. Periodic vehicle patrol will also be used. Any unusual situation or condition will be reported and investigated immediately.

Denbury is also a member of the local Louisiana "One Call" System pre-excavation notification organization. Through this system, contractors provide notification to a central agency of proposed excavations, which in turn notifies the operator of the excavation locations. If facilities are located in the area of proposed contractor activity, they will be marked in the field, and a representative of the operator will be present during excavation to ensure that the facility is not compromised.

### **5.4 Monitoring and Control**

An operations control center will monitor system pressures, flows, and customer deliveries. Further, the control center is manned 24 hours per day, 365 days per year. The operator will have remote operation control of specific mainline valves.

A Supervisory Control and Data Acquisition (SCADA) system, in the operations control center, will provide for pipeline control and monitoring at all times. Remote Terminal Units (RTU's) for the SCADA system will be present at the end point stations and specific block valves along the system. If system pressures fall outside a predetermined range, an alarm will be activated and notice will be transmitted to the operations control center. The alarm will include notice if pressures at a station are not within an acceptable range. The operator will take corrective action and/or dispatch personnel to investigate the situation. Denbury personnel will provide quick response to emergencies and direct safety operations as necessary.

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