May 1, 2014

Mr. Alfred Dumaual
U.S. Environmental Protection Agency (6PD-R)
1445 Ross Avenue
Dallas, TX 75202-2733
dumaual.alfred@epa.gov

RE: Biological Assessment
Greenhouse Gas Permit Application
Pinecrest Energy Center, LLC
Angelina County, Texas

Dear Mr. Dumaual:

Please find the attached hard copy version of the Biological Assessment for the above-listed project. An electronic version has been sent to you via email. The BA has been revised per your comments on March 19, 2014 via conference call. Below is a list of the changes made to the document for your review.

Cover Page – Date revised
Page vi – Paragraph 4 added a brief description of the 3 linear easements added to the Action Area
Page 6 – Section 3.2 added reference to the three linear lines
Page 6 – Section 3.2.1 added clearing language for the three easements during construction activities
Page 10 – Section 4.1 paragraph 3 added the three utility easements to the Action Area definition
Page 25 – Section 6.3.1 added the three easements to onsite habitat effects
Page 32 – Added Section 8.0 as a List of Preparers

We trust that this completes the development of the BA and that it is now ready for submittal to the various agencies for review. Should you have any questions regarding these revisions, please contact me at smcvey@zephyrenv.com or 512-879-6625 or Mr. Larry Moon at lmoon@zephyrenv.com or 512-579-3815.

Sincerely,
ZEPHYR ENVIRONMENTAL CORPORATION

Steve McVey, PG
Project Manager

Enclosure

BIOLOGICAL ASSESSMENT
FOR
A COMBINED CYCLE POWER PLANT AT THE PINECREST ENERGY CENTER, LLC ANGELINA COUNTY, TEXAS

Submitted To:

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 6
DALLAS, TEXAS

Submitted For:

PINECREST ENERGY CENTER, LLC
4011 WEST PLANO PARKWAY, SUITE 128
PLANO, TEXAS 75093

Submitted By:

ZEPHYR ENVIRONMENTAL CORPORATION
TEXAS REGISTERED ENGINEERING FIRM F-102
2600 VIA FORTUNA, SUITE 450
AUSTIN, TEXAS 78746

FEBRUARY 2013
REVISED MARCH 2014

zephyr

CONTENTS

TABLES

APPENDICES

ACRONYMS

AOI	area of significant impact
AQRV	air quality related values
AVO	olfactory
BA	biological assessment
BACT	best available control technology
BMP	best management practices
CO	carbon monoxide
dBA	decibels
DLN	Dry Low NO_x
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESL	effects screening level
FCAA	Federal Clean Air Act
FEMA	Federal Emergency Management Agency
FHPM	Federal-Aid High Program Manual
FIRM	flood insurance rate map
GAT	Geologic Atlas of Texas
GE	General Electric
GHG	greenhouse gas
H_2SO_4	sulfuric acid
HRSG	heat recovery steam generator
Km	kilometer
LAER	Lowest Achievable Emission Rate
µm	microns
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NH_3	ammonia
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NRCS	Natural Resources Conservation Service
NSR	New Source Review
NWI	National Wetland Inventory
NWS/AHPS	National Weather Service/Advanced Hydrologic Prediction Service
O_2	oxygen
Pb	lead
PCEC	Pinecrest Energy Center, LLC
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
ppmvd	parts per million by volume, dry basis

PSD	Prevention of Significant Deterioration
RACT	Reasonably Available Control Technology
SCR	selective catalytic reduction
SF_6	sulfur hexafluoride
SIL	significant impact level
SO_2	sulfur dioxide
TCAA	Texas Clean Air Act
TCEQ	Texas Commission on Environmental Quality
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TSP	total suspended particulate
TWDB	Texas Water Development Board
TXNDD	Texas Natural Diversity Database
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compounds

EXECUTIVE SUMMARY

Pinecrest Energy Center, LLC (PCEC) is seeking a Greenhouse Gas (GHG) Prevention of Significant Deterioration (PSD) air quality permit for the construction of a new combined cycle electric generating plant, PCEC, in Angelina County, Texas. PCEC will consist of two natural gas-fired combustion turbines, each exhausting to a fired heat recovery steam generator (HRSG) to produce steam to drive a shared steam turbine. Three models of combustion turbines are being considered for this site: the General Electric 7FA.05, the Siemens SGT6-5000F(4), and the Siemens SGT6-5000F(5). The final selection of the combustion turbine model will not be made until after the permit is issued.

This biological assessment (BA) is an evaluation of the associated potential environmental impacts that the proposed expansion project may have on federally-protected species and/or their potential habitat within the potential area of impact. Protected species included in this document include federally-threatened or endangered, species of Angelina County listed by U.S. Fish and Wildlife Service (USFWS) and Texas Parks and Wildlife (TPWD). Habitat evaluations for this BA were accomplished via pedestrian survey of the project site as well as a windshield assessment of publicly accessed portions within the Action Area. Subsequently, an evaluation of those resources based on air quality modeling results, construction, and operational methodologies determined or gathered by Zephyr Environmental Corporation (Zephyr) was accomplished.

Federally-protected species considered in this BA include: piping plover, red-cockaded woodpecker, Louisiana black bear and red wolf. Data were collected to describe resident vegetation communities and assess the potential for occurrence of protected species. The dominant habitats within the Action Area are mixed pine/hardwood forest, brush shrubland, open grassland and maintained/landscaped lawns.

PCEC performed dispersion modeling of air pollutants that will be emitted as a result of the proposed project in accordance with the PSD Permit Air Quality Analysis requirements and Texas Commission on Environmental Quality (TCEQ) effects screening level (ESL) analysis requirements. Based on this modeling, a study area with a maximum distance from the site of 1.55 miles (2.49 kilometers) was established around the proposed project construction area. Three additional utility lines would also be constructed which include an electric transmission line, water supply pipeline and a natural gas pipeline. All three proposed lines are to be located within an existing easement. The transmission line and water supply pipeline would be approximately 0.8 miles in length and the natural gas line would be 2 miles in length.

Construction of the proposed project will have no direct or indirect impact on federally-listed species habitat. PCEC will utilize the best available control technology (BACT) to control emissions and thus minimize impacts to the surrounding environment to the maximum extent practicable. Based on the background research described in Section 6.1 and the determinations described in Section 6.4, the proposed project will have no direct or indirect impact on federally-listed species habitat.

This BA provides the results of an evaluation of the potential for the proposed project to impact species within the Action Area that are protected under the Endangered Species Act (ESA). The following table summarizes the effect determination for each federally-listed species.

SUMMARY OF RECOMMENDED DETERMINATIONS OF EFFECT		
Federally-listed Species	**Listing/Managing Agency**	**Recommended Determination of Effect**
Piping plover	USFWS/TPWD	No Effect
Red-cockaded woodpecker	USFWS/TPWD	No Effect
Louisiana black bear	USFWS/TPWD	No Effect
Red wolf	USFWS/TPWD	No Effect

1.0 INTRODUCTION

Pinecrest Energy Center, LLC is seeking a Greenhouse Gas (GHG) Prevention of Significant Deterioration (PSD) permit for the construction of a new combined cycle electric generating plant, Pinecrest Energy Center, in Angelina County, Texas. PCEC will consist of two natural gas-fired combustion turbines, each exhausting to a fired heat recovery steam generator (HRSG) to produce steam to drive a shared steam turbine. Three models of combustion turbines are being considered for this site: the General Electric 7FA.05, the Siemens SGT6-5000F(4), and the Siemens SGT6-5000F(5). The final selection of the combustion turbine model will not be made until after the permit is issued.

The proposed project is located at 1002 East Park Avenue, Lufkin, Texas 75901. The project is subject to PSD review for nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOC), particulate matter (PM), particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}), particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$), sulfuric acid mist (H_2SO_4), and GHG.

This BA is an evaluation of the associated potential environmental impacts that the proposed expansion project may have on federally protected species and/or their potential habitat within the Action Area.

Protected species included in this document include federally-threatened or endangered species. A description of the federal agency regulations for the various protected species evaluated in this BA is presented in Section 2.0.

This BA was developed to investigate, qualify, quantify, and report the possible effects, including: direct and indirect, interdependent and interrelated actions that the proposed project may have on federally-protected species within the Action Area. Habitat evaluations for this BA were accomplished via pedestrian survey of the project site as well as a windshield and pedestrian assessment of publicly accessed portions of the Action Area. Subsequently, Zephyr accomplished an evaluation of impacts to those resources based on air quality modeling results, construction, and operational methodologies information determined or gathered.

Following a discussion of possible effects to federally-listed species, a determination of effect will be stated. Three possible determinations as described by USFWS are as follows:

1. No effect - "No effect" means there will be no impacts, positive or negative, to listed or proposed resources. Generally, this means no listed resources will be exposed to action and its environmental consequences. Concurrence from the USFWS is not required.

2. May affect, not likely to adversely affect - A "May affect, but not likely to adversely affect" means that all effects are beneficial, insignificant, or discountable. Beneficial effects have contemporaneous positive effects without any adverse effects to the species or

habitat. Insignificant effects relate to the size of the impact and include those effects that are undetectable, not measurable, or cannot be evaluated. Discountable effects are those extremely unlikely to occur. These determinations require written concurrence from USFWS.

3. May affect, likely to adversely affect - A "may affect" and "is likely to adversely affect" means that listed resources are likely to be exposed to the action or its environmental consequences and will respond in a negative manner to the exposure.

   Note: A finding of "may affect, likely to adversely affect" by an action agency and the USFWS requires "formal consultation" between the action agency and the USFWS. Formal consultation results in the USFWS issuing a biological opinion as to whether or not the action, as proposed, will jeopardize the continued existence of any listed species.

2.0 FEDERAL REGULATIONS

2.1 REGULATIONS AND STANDARDS

2.1.1 Clean Air Act

Both the Federal Clean Air Act (FCAA) and Texas Clean Air Act (TCAA) require that maximum ambient air quality concentration limits be established that are designed to protect public health, welfare and the environment. Ambient air is the air to which the general public has access, as opposed to air within the boundaries of an industrial facility.

The FCAA ambient standards are the National Ambient Air Quality Standards (NAAQS) and are established by the U.S. Environmental Protection Agency (EPA). The NAAQS are maximum concentration limits for specific pollutants in ambient air over a specific averaging time established in federal regulation (40 CFR 50). The NAAQS are classified into two categories: primary and secondary standards. Primary standards are established to protect public health, including "sensitive" populations such as asthmatics, children and the elderly. Secondary standards are established to protect public welfare, including visibility, animals, crops, vegetation and buildings. The FCAA requires periodic review of the science upon which the standards are based and the standards themselves to assure protection of the nation's public health and environment. This review is thorough and extensive involving a science policy workshop to identify key policy-relevant science issues to review, an integrated science assessment which is a comprehensive review, synthesis and evaluation of the science including risk and exposure assessments. Therefore these existing primary and secondary standards represent the current science related to protection of public welfare.

The EPA has established NAAQS for six principal air pollutants, also referred to as criteria air pollutants. These six criteria air pollutants are CO, lead (Pb), nitrogen dioxide (NO_2), ozone, $PM_{10,}$ $PM_{2.5}$, and sulfur dioxide (SO_2). The FCAA also establishes that geographic areas be classified as either having ambient concentrations above or below the established NAAQS. A geographic area whose ambient air concentration for a criteria pollutant is equal to or less than the primary standard is an attainment area. A geographic area with an ambient air concentration greater than the primary standard is a nonattainment area. A geographic area will have a separate designation for each criteria pollutant. There is no NAAQS pollutant for which Angelina County (where the PCEC plant is proposed to be located) is designated nonattainment; therefore Angelina County is considered unclassified/attainment.

In addition to NAAQS, the EPA has established PSD increments which limit the increase in the ambient air concentration in an attainment area to an amount (the PSD increment) that will assure that the total ambient concentration in an attainment area continues to be below.

In order to obtain a PSD permit for criteria pollutants, an applicant is required to demonstrate with computer air dispersion modeling that the emissions from their proposed project will not exceed the NAAQS and the PSD Increment for each pollutant. This demonstration is conducted

in a two-step process. First the emissions from the new project are modeled to determine maximum off-property impacts. If those impacts are below a defined significant impact level (SIL) for a specific pollutant and averaging period, then the increase in ambient concentration is considered to be insignificant and no further evaluation is required for that pollutant and averaging period. If the project impacts are above the SIL, then additional dispersion modeling is required in which the project emission increases are modeled along with other emissions sources in the area and that predicted impact is added to a background level and compared to the NAAQS and PSD Increment.

The TCEQ is the state agency charged with implementing the Texas Clean Air Act (TCAA) to control air pollution in order to protect human health or welfare, animal life, vegetation or property. To assess and assure that emission increases will be protective of human health, welfare, animal life, vegetation or property the TCEQ has established an effects evaluation process using Effect Screening Levels (ESLs) for pollutants for which a NAAQS has not been established. This ESL evaluation is implemented through the state permitting process in which computerized dispersion modeling is used to predict the ambient concentration of individual air contaminant species and then are compared to the published ESLs to determine acceptability of the proposed emissions.

ESLs are chemical-specific air concentrations set to protect human health and welfare. Short-term ESLs are based on data concerning acute health effects, the potential for odors to be a nuisance, and effects on vegetation, while long-term ESLs are based on data concerning chronic health and vegetation effects. Health-based ESLs are set below levels where health effects would occur whereas welfare-based ESLs (odor and vegetation) are set based on effect threshold concentrations. The short-term ESL is the lowest value of acute odor, vegetation- and health-based ESLs. The long-term ESL is defined as the lowest value of chronic vegetation- or health-based ESLs. The ESL Published List includes ESLs for thousands of chemicals and can be found at: http://www.tceq.state.tx.us/implementation/tox/esl/list_main.html.

ESLs are not ambient air standards but rather are screening levels used in TCEQ's air permitting process to evaluate air dispersion modeling's predicted impacts. As described by TCEQ, ESLs are "used to evaluate the potential for effects to occur as a result of exposure to concentrations of constituents in the air. ESLs are based on data concerning health effects, the potential for odors to be a nuisance, and effects on vegetation." Accordingly, if predicted concentrations of a constituent "do not exceed the screening level, adverse health or welfare effects are not expected."

2.1.2 Endangered Species Act (ESA)

Regulation of the ESA is accomplished by the USFWS. "The purpose of the ESA is to protect and recover imperiled species and the ecosystems on which they depend." Imperiled species specifically includes those listed by the USFWS as threatened or endangered.

Section 7 of the ESA requires Federal agencies to insure that any action authorized, funded or carried out by them is not likely to jeopardize the continued existence of listed species or modify their habitat.

The ESA prohibits the "take" of threatened and endangered species. "Take" is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." "Harm" is defined as "an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering."

3.0 PROJECT DESCRIPTION

3.1 PROJECT PURPOSE

The purpose of the project is to construct a new natural gas fired, combined cycle electric generating plant, PCEC, in Angelina County, Texas. The development of the PCEC is to generate 637 - 735 megawatts (MW), of gross electrical power near the City of Lufkin in an efficient manner while increasing the reliability of the electrical supply for the State of Texas.

Project location information:

USGS Quad	*Latitude/Longitude*
Lufkin	*31.35986°N, -94.694651°W*

3.2 CONSTRUCTION INFORMATION

Construction of the PCEC, associated infrastructure, and auxiliary equipment will take place within the proposed 82.5 acre project site. Additional earth disturbances would be limited to the installation of a water supply pipeline, 345 kV transmission line and a natural gas pipeline. The project location map is shown on Figure 4-1 (Appendix A).

The projected construction start date is June 1, 2014. The projected operation start date is October 1, 2016.

3.2.1 Construction Activities

The total time estimated to complete the construction of the expansion project is approximately 28 months and includes the following list of general construction activities.

Approximately 82.5 acres of existing cleared/disturbed property will be converted to industrial purposes. Minimal clearing would be conducted during the installation of the proposed utility lines within existing easements.

1. Clear and grade site to design elevation
2. Place concrete for turbine generators, HRSGs, pumps, buildings, steel, etc.
3. Erect turbine generators, HRSGs, pumps, buildings, steel, piping; electrical, instrumentation installation
4. Insulation
5. Touch-up painting

Equipment required to complete the furnace construction activities and their estimated schedule is listed below.

1. Light Duty Pickup Truck (6)
2. Tandem Axle Dump Truck (4)
3. Water Truck, 4000 gallon (1)
4. Tractor/Trailer 2-3 Axle (2)
5. Dozer Crawler D (2)
6. Excavator Crawler 2.61CY D (2)
7. Grader 28830LB 12 ft D (2)
8. Loader Backhoe 14 ft D (2)
9. Tractor Skid steer 1,600LBS D (4)
10. Tractor Industrial D (1)
11. Crane Crawler -600t D (1)
12. Super Lift 600t (1)
13. Luffer 600t (1)
14. Crane RT 82t D (2)
15. Forklift WHS 4,000LB E (4)
16. Concrete Pump Truck D (4)
17. Miscellaneous Manlifts/Scissorlifts (15)

3.2.2 Emission Controls

As required by 30 TAC §116.111(a)(2)(c), new or modified facilities must apply Best Available Control Technology (BACT), with consideration given to the technical practicability and economic reasonableness of reducing or eliminating the emissions from the facility and thereby minimizing the impact of emissions on the ambient air. TCEQ has established BACT guidance by emission source type and the EPA Reasonably Available Control Technology (RACT)/BACT Lowest Achievable Emission Rate (LAER) Clearinghouse was consulted to determine if any additional controls should be considered. The new facilities associated with this project and their associated emission controls for each pollutant are summarized below. These performance levels reflect emission control levels consistent with TCEQ guidance and the information available in EPA's RACT/BACT/LAER Clearinghouse database. Section 7.0 (Conservation Measures) provides specific information on the project emission controls.

3.3 Operation and Maintenance Information

3.3.1 Operation

PCEC will generate electricity for sale to the Electric Reliability Council of Texas power grid. Each General Electric (GE) combustion turbine model has a maximum base-load electric power output of approximately 183 MW, the Siemens SGT6-5000F(4) is approximately 205 MW, and the Siemens SGT6-5000F(5) is approximately 232 MW. The maximum electric power output from the steam turbine is approximately 271 MW for both the GE and Siemens configurations. The units may operate at reduced load to respond to changes in system power requirements

and/or stability. The power generating equipment, as well as ancillary equipment that will be sources of GHG emissions at the site, are listed below:

- Two natural gas-fired combustion turbines equipped with lean pre-mix low-NO_x combustors
- Two natural gas-fired duct burner systems
- Natural gas piping and metering
- One diesel fuel-fired emergency electrical generator engine
- One diesel fuel-fired fire water pump engine
- One natural gas-fired auxiliary boiler
- Electrical equipment insulated with sulfur hexafluoride (SF_6)

3.3.2 Water Use

One of the factors in siting the Pinecrest plant is the availability of surface water from the City of Lufkin to be used as cooling water and boiler make-up water. It is expected that the PCEC will require four to five million gallons of water per day for condenser cooling and boiler make-up service. This amount will vary based on ambient temperature and humidity as well as the level of duct firing in the HRSG.

3.3.3 Noise Effects

The Project Site will be located in an area that is surrounded by farm land, forests, light industry and a freeway. Current noise levels on or around the site are relatively low and mostly affiliated with transportation such as highway traffic located to the west and a railroad located on the northern boundary. Noise levels from construction or operation of the proposed project will be greater than current noise levels. However there would be no impact to federally listed species or any other sensitive receptors.

3.3.4 Infrastructure-related Effects

Land use impacts of the construction and operation of the expansion project will be limited to the site. Currently, the site is abandoned and is primarily an open field with several drainage structures. Any increased noise, dust, and traffic from construction will be short-term for the duration of the project. BMP's will be applied during construction to reduce potential effects.

3.3.5 Human Activity Effects

Construction and operation of the expansion project will require a significant increase of human activity compared to the current activities at the property. This increased activity would be due to the construction of the proposed project described in 3.2.1. Access to the project site would be from Moffett Road.

The project location has been severely disturbed in the past through clearing and other types of excavations. Although this parcel has been cleared, it still provides habitat for local wildlife such as deer, coyotes, rabbits, birds and several other species. Construction and the increase of human activity would most likely push some of this wildlife to surrounding forests located to the north and east of the project site.

3.4 WASTE WATER AND STORM WATER INFORMATION

The water discharge from boiler blowdown and cooling tower blowdown from the PCEC will be pumped back through a pipeline and connected to a point in the City of Lufkin treatment plant. Since there is not a discharge of waste water to surface waters of Texas, a Texas Pollutant Discharge Elimination System (TPDES) permit will not be required.

During construction of the proposed facility, PCEC will follow the TCEQ requirement to obtain a construction storm water permit for the proposed project. The site will employ best management practices to prevent contamination due to storm water runoff, including erosion control and stabilization, minimization of offsite vehicle tracking and dust generation, and other practices as warranted by site. The site will also follow the notification, recordkeeping, and reporting requirements of TCEQ's construction storm water management program.

The Pinecrest facility will have an Oil and Hazardous Materials Spill Prevention, Control, and Countermeasure Plan and Storm Water Pollution Prevention Plan in place prior to operation and the facility employees will be trained to implement these plans. These plans will be utilized during operations, and maintenance of the proposed additional furnace.

4.0 ACTION AREA

4.1 ACTION AREA DEFINITION

An Action Area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR 402.02). The analysis of species or designated critical habitat likely to be affected by the proposed project is focused on effects within the project's Action Area. For this BA, the Action Area was determined by identifying the maximum area in which the proposed project may result in significant direct and indirect impacts in and around the Project Site. Both construction and operation phases of the proposed combustion turbine were considered. Indirect impacts to surrounding areas may include noise, lighting, dust, erosion, stream sedimentation, air emissions, and physical disturbances. Because air emissions have the potential for widest impact away from the project site, the Action Area was based on determining a de minimis effects boundary (see Section 2.1.1).

Through air-dispersion modeling efforts, the Action Area was determined to extend up to 1.55 miles (2.49 kilometers) from the Project Site (see Figures 4-1 through 4-4, Appendix A). The potential impacts to federally threatened and endangered species and designated critical habitat were evaluated within the identified Action Area.

Although the primary Action Area is the area located within the air-dispersion model, the proposed linear utility easements were also included as part of the Action Area for construction purposes. The maximum distance of the Action Area for the utility easements is 2 miles to the east and contained within existing easements. The following sections describe the methodology used to delineate the Action Area for this BA.

4.2 ACTION AREA DEFINITION METHODOLOGY

The Action Area was established using air emission dispersion modeling in such a manner as to ensure that any potential impact from emissions beyond the defined boundary of the Action Area would, by regulatory definitions, be de minimis, or trivial.

The boundary of the Action Area was conservatively delineated by applying EPA SILs for criteria pollutants and "de minimis" levels for noncriteria pollutants. A SIL is established for each NAAQS, yet at a concentration significantly less than the corresponding NAAQS. By establishing such a de minimis threshold, EPA can ascertain when a potential impact is considered to be so low as to be trivial or insignificant.

The boundaries of the Area of Significant Impact (AOI) for a given pollutant and averaging period are defined by the number of modeling receptors for which predicted concentrations are greater than the respective EPA de minimis levels. The Action Area for the biological

assessment is the cumulative number of modeling receptors for all pollutants and averaging periods for which predicted concentration are greater than the respective de minimis levels.

As mentioned in Section 4.1, the Action Area was also extended to include the linear facilities for the transmission line and two pipelines located within the same easement. Figures 4-1 through 4-4 show the locations of the linear facilities.

4.2.1 Ambient Air Dispersion Modeling

The following is a summary of all of the modeling results of the pollutants submitted for the PSD application. The modeling results in this report were taken directly from the modeling report titled "Air Quality Impacts Analysis in Support of an Application for an Air Quality Permit Amendment" submitted to the TCEQ on April 11, 2013. Emissions associated with the proposed project were modeled using the EPA AERMOD air dispersion model in support of the PSD and state New Source Review (NSR) applications. Emissions from the three models of combustion turbines under consideration were modeled. The Action Area was based on the maximum predicted results from the three considered combustion turbine models. The ambient air concentration results were then compared with de minimis levels associated with the Primary NAAQS, Secondary NAAQS, and TCEQ property line standards (Table 4-1). The predicted concentrations of non-criteria pollutants were compared with TCEQ ESL de minimis levels (Table 4-2). All short term modeling concentrations correspond to the maximum proposed emission rates during normal operations.

All annual modeling concentrations correspond to the proposed annual emission rates. The boundaries of the area of interest (AOI) for a given pollutant and averaging period are defined by the number of modeling receptors for which predicted concentrations are greater than the respective de minimis levels. The Action Area for the biological assessment is the cumulative number of modeling receptors for all pollutants and averaging periods for which predicted concentration are greater than the respective de minimis levels. The results of these modeling efforts are summarized in Table 4-1. As the table indicates, the Action Area extends up to 2.62 kilometers (1.63 miles) from the Project Site (centered on new turbine stack number one) and is located entirely within Angelina County. It is important to note that the Action Area is not defined by compliance with the NAAQS but rather the SILs and TCEQ de minimis levels, which are but a small fraction of the NAAQS, TCEQ Standards, and TCEQ ESL guideline values. The Action Area is identified on Figure 4-1 (Appendix A).

TABLE 4-1
AREA OF INTEREST ANALYSIS RESULTS FROM PRELIMINARY MODELING[1]

Pollutant	Averaging Period	NAAQS		TCEQ Property Line Standard[2]	Significant Impact Level (SIL)	AOI Modeling Results	
		Primary	Secondary			Maximum Predicted Concentration	Distance to Furthest Receptor Within Area of Significant Impacts (AOI)
		($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	(km)
NO_2	1-Hour	188	None	---	7.5	5.60	0
	Annual	100	100	---	1	0.49	0
CO	1-Hour	40,000	None	---	2,000	44.7	0
	8-Hour	10,000	None	---	500	6.93	0
SO_2	30-Minutes	---	---	715	---	3.87	0
	1-Hour	196	None	---	7.8	3.87	0
	3-Hour	None	1300	---	25	3.53	0
	24-Hour	365	None	---	5	0.75	0
	Annual	80	None	---	1	0.09	0
PM_{10}	24-Hour	150	150	---	5	14.3	2.5
	Annual	None	None	---	1	2.54	0
$PM_{2.5}$	24-Hour	35	35	---	1.2	8.08	2.3
	Annual	12	15	---	0.3	1.61	1.2
H_2SO_4	1-Hour	---	---	50	---	6.13	1.9
	24-Hour	---	---	15	---	1.43	1.2

[1]TCEQ de minimis value for TCEQ Property Line Standards is defined as being "about 2 percent of the standard," Air Dispersion Modeling Guidelines, RG 25, Feb. 1999.

TABLE 4-2
IMPACTS FROM NON-CRITERIA POLLUTANTS[1]

Pollutant	Averaging Period	Maximum Predicted Concentration[2]	TCEQ ESL	% of ESL	Distance to Furthest Receptor within Area of Significant Impacts (AOI)[3]
		(µg/m^3)	(µg/m^3)		(km)
Ammonium Sulfate	1-hour	0.853	50	1.7%	0
	Annual	0.0574	5	1.1%	0
Ammonia	1-hour	12.0	170	66.2%	0
	Annual	0.853	17	5.0%	0.6
1,3-Butadiene	1-hour	5.76E-04	510	<0.1%	0
	Annual	1.23E-04	9.9	<0.1%	0
Acetaldehyde	1-hour	0.0535	90	<0.1%	0
	Annual	0.0114	45	<0.1%	0
Acrolein	1-hour	0.00857	3.2	0.3%	0
	Annual	0.00183	0.15	1.2%	0
Benzene	1-hour	0.0161	170	<0.1%	0
	Annual	0.00343	4.5	<0.1%	0
Ethylbenzene	1-hour	0.0428	740	<0.1%	0
	Annual	0.00916	570	<0.1%	0
Formaldehyde	1-hour	0.270	15	1.8%	0
	Annual	0.0578	3.3	1.8%	0
Polycyclic Aromatic Hydrocarbons (PAH)	1-hour	0.00468	0.5	0.9%	0
	Annual	0.00830	0.05	16.6%	0
Propylene Oxide	1-hour	0.0388	70	<0.1%	0
	Annual	0.00830	7	<0.1%	0
Toluene	1-hour	0.174	640	<0.1%	0
	Annual	0.0372	1200	<0.1%	0
Xylenes	1-hour	0.0857	350	<0.1%	0
	Annual	0.0183	180	<0.1%	0

[1]*De minimis* for emission increases of non-criteria pollutants with no federal or TCEQ ambient standards is 10% of the ESL (TCEQ, Modeling and Effects Review Applicability, APDG 5874, July 2009).

5.0 EXISTING CONDITIONS

5.1 NATURAL RESOURCES

5.1.1 Regional Setting

The proposed expansion site is located northeast of the City of Lufkin in Angelina County, Texas. The site is in the heart of the East Texas Timberlands Resource Area and the Piney Woods Ecoregion of East Texas (Gould, 1960). The woodlands here are dense with a great variety of pine and hardwoods supporting the counties large production of lumber products. The climate here is warm and wet due to its proximity to the Gulf Coast. Rainfall averages 47 inches annually and the growing season is approximately 244 days per year. The Angelina and Neches Rivers drain the northern and southern portions of the county, respectively, and the Sam Rayburn Reservoir provides recreation and water resources for Angelina and neighboring counties. Resources produced from the soils and bedrock include mineral clays, lignite coal, natural gas and oil. The majority of the counties' agriculture is livestock, but crops grown here include grasses, potatoes, tomatoes, melons, peaches and pecans (TSHA, 2012).

5.1.2 Land Use

Angelina County is located in the East Texas Timberlands Land Resource Area. Approximately one-third of the county is dedicated to the Angelina National Forest in the south along the Sam Rayburn Reservoir. The woodlands have driven the economy and have been the main focus of land use through time (TSHA, 2012). The lumber industry continues to thrive as well as fabrication industries and food products. The majority of land dedicated to agricultural use is for livestock but county farmers grow potatoes, tomatoes, watermelon, peached and pecans (THSA, 2012). Land uses throughout Angelina County include residential, recreational, agricultural, commercial and industrial developments.

Based on the background review and remote mapping, land uses and land cover within the Action Area include forest land, cropland and pasture, residential and mixed urban uses. Figure 5-1 (Appendix A) demonstrates land uses within and near the Action Area.

TABLE 5-1
LAND USE WITHIN THE ACTION AREA

Land Use	Acres	Percent
Commercial and Services	11.5	1.16
Cropland and pasture	110.24	11.15
Evergreen forest land	30.56	3.09

TABLE 5-1
LAND USE WITHIN THE ACTION AREA

Land Use	Acres	Percent
Industrial	1.45	0.15
Mixed Forest Land	313.20	31.68
Mixed Urban or Built-Up Land	53.44	5.41
Other Urban or Built-Up Land	46.24	4.68
Residential	257.11	26
Transitional Area	136.65	13.82
Transportation, Communication and Services	26.01	2.63
Water	2.24	0.23
TOTALS	**988.64**	**100**

5.1.3 Topography

Angelina County is located in the Piney Woods region of central East Texas. The county is bordered by the large drainage systems of the Angelina and Nueces Rivers in the northern and southern areas of the county while the central areas are gently sloping with poorly defined drainages (USDA Soil Survey, 1988). Changes in elevation range from 460 feet in the north to 100 feet in the south, sloping towards the Gulf of Mexico.

According to the Federal Emergency Management Agency (FEMA) flood insurance rate map (FIRM), the majority of the proposed project site is located in Zone X – an area of minimal flood hazard above the 500-year floodplain. The westernmost portion of the proposed site is located within Zone A - the 100-year floodplain. Flood zone designations within and surrounding the project site are demonstrated in Figure 5-2 (Appendix A).

5.1.4 Geology

The Geologic Atlas of Texas (GAT) indicates the proposed project area is underlain by the Eocene-age Yegua Formation of the Claiborne Group. Major beds within the Yegua Formation consist of mudstone, claystone and sandstone with minor beds of fossiliferous limestone, lignite coal and volcanic ash. Sediments of the Yegua Formation reflect terrestrial and marine facies of a regressive coastal environment (USDA Soil Survey, 1988).

Geologic resources in Angelina County include coal, natural gas, oil, bentonite clay, fire clay and drilling mud. The geologic units found within the proposed project area are listed and described below in Table 5 and illustrated in Figure 5-3 (Appendix A).

TABLE 5-2 GEOLOGIC UNITS SUMMARY		
Map Unit	Formation Name	Description
Qal	Quaternary Alluvium	Recent stream deposits of clay, silt, sand and cobbles
Ey	Yegua Formation	Eocene-clay w/ minor beds of sandstone, limestone & coal

5.1.5 Soils

Soils in Angelina County are dominated by loams and fine sandy loams (USDA Soil Survey, 1988). Most are deep, gently sloping, poor to moderately well-drained, slowly permeable soils. The Natural Resources Conservation Service (NRCS) soil units mapped within the proposed project area are listed and described below in Table 3 and illustrated in Figure 5-4 (Appendix A).

TABLE 5-3
NRCS SOIL UNITS SUMMARY

NRCS Map Unit Name	NRCS Unit Characteristics	USDA Classification				NRCS Hydric Soil
		Depth	Drainage	Permeability	Landform	
Alazan (AaB)	very fine sandy loam, 0-4% slopes	Deep	Somewhat poor	Moderate	Terraces and low uplands	Yes
Alazan-Besner complex (Ab)	Gently undulating fine sandy loam to loam at depth	Deep	Alazan-poor; Besner-well	Moderate	Wind-modified sediments on river terraces	Yes
Alazan urban land complex (AcB)	fine sandy loam to loam at depth, 0-4% slopes	Deep	Somewhat poor	Moderate	Broad stream terraces	No
Fuller (FfA)	Fine sandy loam, 0-1% slopes	Deep	Somewhat poor	Very slow	Low, slightly concave slopes	Yes
Fuller (FfB)	Fine sandy loam, 1-4% slopes	Deep	Somewhat poor	Very slow	Broad interstream divides	Yes
Fuller-Urban land complex (FuB)	Fine sandy loam	Deep	Somewhat poor	Very slow	Slightly concave to smooth uplands	No
Keithville-Sawtown complex (Kb)	Gently undulating silty/fine sandy loam	Deep	Keithville-somewhat poor; Sawtown-moderately well	Slow to moderately slow	Mounded terrace & wind modified	No
Keltys (KcB)	Fine sandy loam, 1-5% slopes	Deep	Moderately well	Slow	Broad, low ridges	No
Keltys (KcD)	Fine sandy loam, 5-15% slopes	Deep	Moderately well	Slow	Strongly sloping low hills	No
Keltys-Urban land complex (KdB)	Fine sandy loam, gently sloping	Deep	Moderately well	Slow	Broad interstream divides	No

TABLE 5-3
NRCS SOIL UNITS SUMMARY

NRCS Map Unit Name	NRCS Unit Characteristics	USDA Classification				NRCS Hydric Soil
		Depth	Drainage	Permeability	Landform	
Koury-Urban land complex (Ks)	Loam to silty loam	Deep	Moderately well	Moderately slow	Flood plains	Yes
Kurth (KuB)	Fine sandy loam, 0-4% slopes	Deep	Moderately well	Slow	Long, low ridges	No
Kurth -Urban land complex (KwB)	Fine sandy to sandy clay loam, 0-4% slopes	Deep	Somewhat poor	Slow	Broad interstream divides	No
Moswell-Urban land complex (MuB)	Loam surface to clay at depth, 1-5% slopes	Deep	Moderately well	Very slow	Broad interstream divides	No
Pits (Pa)	Quarries and excavated areas					No
Rosenwall (RoB)	Fine sandy loam, 1-5% slopes	Moderately deep	Moderately well	Very slow	Uplands	No
Rosenwall (RoD)	Fine sandy loam 5-15%	Moderately deep	Moderately well	Very slow	Strongly sloping hills	No
Sacul (SaB)	Fine sandy loam, 1-5% slopes	Deep	Moderately well	Slow	Head of drainage ways	No

5.1.6 Vegetation

Three vegetation communities were observed within the Action Area. The vegetation types include upland pasture, upland mixed pine/hardwood forest and urban mixed pine/hardwood forest. All communities are highly fragmented due to urban encroachment and no community is representative of a climax community. Dominant species observed within each community are outlined below. Species found in one community will often appear in neighboring communities with varying levels of dominance.

The proposed project area is dominated by an upland pasture community. The project area is highly disturbed and the dominant species present within this community represent low forage value, opportunistic species with small areas of native grasses. Dominant species observed included prairie broomweed (*Amphiachyris dracunculoides*), Bermuda grass (*Cynodon dactylon*), Texas croton (*Croton texensis*), wooly croton (*Croton capitatus*), plains lovegrass (*Eragrostis intermedia*), little bluestem (*Schizachyrium scoparium*) and Johnson grass (S*orghum halepense*).

Forested areas within the Action Area are representative of a young mixed pine/hardwood community. Dominant species within this community include loblolly pine (*Pinus taeda*), shortleaf pine (*Pinus echinata*), sweetgum (*Liquidamber styraciflua*), Chinese tallow (*Sapium*

sebeferum) water oak (*Quercus nigra*), live oak (*Quercus virginiana*) southern red oak (*Quercus falcata*), eastern red cedar (*Juniperus virginiana*), greenbriar (*Smilax rotundifolia*), and southern dewberry (*Rubus argutus*).

Urban mixed pine/hardwood communities within the Action Area, including maintained turf grass areas, are dominated by St. Augustine grass (*Stenotaphrum secundatum*), Bermuda grass, Johnson grass, bahia grass (*Paspalum notatum*), live oak, southern red oak, water oak, loblolly pine, shortleaf pine, Chinese tallow, crepe myrtle (*Lagerstroemia indica*) and rattlebox (*Sesbania punicea*).

5.1.7 Water Resources

Located in central east Texas, Angelina County is bordered by the Angelina and Neches Rivers which drain the north and east, and south and west portions of the county, respectively. The Sam Rayburn Reservoir, fed by the Angelina River, is the largest body of water in the county and the region. The reservoir offers water resources for agricultural, municipal and industrial uses as well as recreation and fishing (THSA, 2012). Major and minor aquifers within the county include the Carrizo, Queen City, Sparta and Yegua Jackson aquifers (TWDB, 2006).

Natural water features within the construction site or Action Area include few wetlands and an unnamed fork of Paper Mill Creek. According to USFWS National Wetland Inventory (NWI) and USGS topographic maps, the unnamed creek eminates from a wetland area on the west side of the construction site (see Figure 5-5 in Appendix A).

5.1.8 Climate

Angelina County has long, hot summers and mild winters due to moist, tropical air from the Gulf of Mexico. Precipitation is heavy and the mean annual precipitation in the region is 46.65 inches. The mean annual growing season is approximately 244 days a year. Temperatures in the winter range from 38˚F to 64˚F with extreme lows down to 2˚F. Average summertime temperatures range from 71.2˚F to 93.6˚F with extremes up to 110˚F (NRCS, 2012). Prevailing winds are from the south-southeast with an average speed of 9 mph. Relative humidity averages between 60 to 90 percent (USDA Soil Survey, 1988).

At the time of this review, the U.S. Drought Monitor indicated the study area has no drought conditions (USDM, 2012), while the Long-term Palmer Drought Severity Index rates this area as near normal (less 1.9 to 1.9 inches- CPC, 2012). According to the National Weather Service/Advanced Hydrologic Prediction Service (NWS/AHPS), the region has received approximately 2 to 3 inches rain within the 30 days prior to this review. This is approximately 1 inch below the average rainfall for this time of year (NWS/AHPS, 2012).

5.2 FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES OF POTENTIAL OCCURRENCE WITHIN ANGELINA COUNTY, TEXAS

The following table lists all species that are threatened or endangered species with the potential to occur within Angelina County.

TABLE 5-4
ALL SPECIES LISTED BY USFWS AS HAVING THE POTENTIAL TO OCCUR IN ANGELINA COUNTY

Species	Scientific Name	Federal Status	State Status
Piping plover	*Charadrius melodus*	Threatened	Threatened
Red-cockaded woodpecker	*Picoides borealis*	Endangered	Endangered
Louisiana black bear	*Ursus americanus luteolus*	Threatened	Threatened
Red wolf	*Canis rufus*	Endangered	Endangered

A brief description of these species and their habitat requirements are included below.

5.2.1 Piping Plover

Piping Plover are small, migratory shorebirds approximately 5-7 inches in length with a wingspan of approximately 15 inches. These birds have a short, black and orange bill that varies in color depending on the time of year, orange legs, pale gray back and dorsal wings, white undersurface, black breast band, and white collar.

Studies have shown that birds from the Great Lakes and Northern Great Plains nesting regions primarily winter along the Gulf Coast with an occasional bird from the Atlantic Coast population. Few birds remain on the Texas coast year round, but they are thought to be non-breeders.

Wintering habitat includes foraging and roosting habitat types. Most preferred foraging habitats are dynamic systems that fluctuate with the tide and wind such as wet sand in the wash zone, bare to sparsely vegetated, intertidal ocean beaches, wrack lines, shorelines of streams, ephemeral ponds, lagoons, salt marshes, emergent seagrass beds, wash-over passes, mudflats, sandflats, or algal flats. Preferred roosting habitat can also be dynamic but with more clutter and debris. These areas include sandy beaches, with driftwood, seaweed clumps, small dunes, and debris. Also utilized are spoil islands along the Intracoastal Waterway.

Plovers forage on exposed beach substrates, feeding on marine worms, beetles, flies, spiders, aquatic invertebrates, crustaceans, and mollusks, as well as their eggs and larvae.

5.2.2 Red-cockaded woodpecker

The red-cockaded woodpecker is a non-migratory black and white woodpecker with distinctive white bars on its back creating a ladder pattern. The head is black with white cheek patches, and the chest is dull white with small black spots. Red-cockaded woodpeckers require open

pine woodlands and savannahs with large old pines for nesting and roosting habitat (clusters). Large old pines are required as cavity trees because the cavities are excavated completely within inactive heartwood, so that the cavity interior remains free from resin that can entrap the birds. Also, old pines are preferred as cavity trees, because of the higher incidence of the heartwood decay that greatly facilitates cavity excavation. Cavity trees must be in open stands with little or no hardwood midstory and few or no overstory hardwoods. Hardwood encroachment resulting from fire suppression is a well-known cause of cluster abandonment. Redcockaded woodpeckers also require abundant foraging habitat. Suitable foraging habitat consists of mature pines with an open canopy, low densities of small pines, little or no hardwood or pine midstory, few or no overstory hardwoods, and abundant native bunchgrass and forb groundcovers (USFWS 2003).

The degradation and elimination of old-growth pine forest has limited the potential of the red-cockaded habitat to smaller parcels and isolated fragments. Fire suppression has resulted in hardwood mid-story encroachment, which in turn has become the leading cause of red-cockaded woodpecker cavity abandonment (USFWS 2003).

5.2.3 Louisiana Black Bear

Louisiana black bears range from 120-400 lbs with adult males being larger than adult females. Louisiana black bears are primarily inhabitants of bottomland hardwoods and floodplain forests, but also can also be found in upland hardwoods, mixed pine/hardwoods, coastal flatwoods, and marshes.

Females have a litter or 1 to 3 cubs every other winter while denning, and the cubs usually spend their first 1.5 to 2 years with their mother before dispersing. Bears emerge from dens in April and remain active until November, during the summer they eat mostly berries, insects, and carrion. In order to gain weight for the winter, bears eat nuts such as acorns and pecans which are high in carbohydrates and fats. They hibernate in the winter in large hollow trees, downed logs, or in ground nests which are shallow depressions lined with vegetation. Denning bears exhibit varying degrees of awareness, but most can easily be roused if disturbed. Although not true hibernators, bears generally do not eat, drink, urinate or defecate in winter. They have a unique metabolic process to recycle waste products during winter dormancy.

Habitat loss has been the main reason for the bear's decline. Reservoir construction has flooded many miles of former bottomland hardwood habitat. In addition, many bottomlands forests have been cut and converted to agricultural areas or housing developments.

5.2.4 Red Wolf

A rather small, slender, long-legged wolf resembling the coyote in color but often blackish; typically larger, with wider nose pad, larger feet and coarser pelage; smaller and more tawny than the gray wolf.

Formerly, red wolves ranged throughout the southeastern USA but their numbers and range quickly declined under pressure of intensive land use. Also, land management practices allowed the coyote to expand its range east; hybrid offspring of interbreeding red wolves and coyotes more closely resembled coyotes and the genetic identity of the red wolf was gradually lost.

Red wolves inhabited brushy and forested areas, as well as the coastal prairies where they preyed upon rabbits, deer, rodents, prairie chickens, fish and crabs, as well as upon domestic livestock, especially free-ranging pigs.

The red wolf was apparently extinct in the wild by 1980. The last six pure blood red wolves that could be found were captured in southeast Texas and moved to a canine breeding facility. Eventually, after the successful breeding of pure blood red wolves was accomplished, small packs were re-established upon barrier islands of North and South Carolina. Additional re-introduction efforts have occurred with the goal of creating a viable red wolf population large enough so that the red wolf can be removed from the endangered species list.

5.2.5 Natural Diversity Database Results

On October 8, 2012, Zephyr forwarded a request to TPWD to provide Texas Natural Diversity Database information for reports of listed-species for all of Angelina County. On October 12, 2012, TPWD forwarded ArcGis shapefiles for all reported listed-species in Angelina County. A review of those shapefiles indicates that no federally-listed species have been reported within the Action Area.

6.0 EFFECTS OF PROPOSED ACTION

6.1 AIR POLLUTION EFFECTS BACKGROUND RESEARCH

Zephyr performed an extensive search for research regarding the potential effects of air emissions on various flora and fauna. The various studies addressed general effects of airborne pollutants, but no research was found that quantified the toxicological effects of air emissions on any of the specific threatened or endangered species addressed in this biological assessment. The search was broadened to include taxonomical equivalents to those protected species occurring within the Action Area. The results of this search were limited to a study of poultry within confined animal feeding operations. The related purpose of the research conducted by Redwine, et. al. (2002) was to characterize particulate matter less than 10µm (PM_{10}). The conclusions from that research are discussed in Section 6.2. A study prepared by Smith and Levenson (1980) resulted in the creation of a screening procedure to assess the potential for air emissions to cause significant impacts on flora and fauna. The study determined that concentrations of airborne pollutants which exceed the screening concentrations may have adverse impacts on plants or animals. This study may be the most applicable of available research to assess the potential to impact the environment. This study is discussed further in the following section.

Another publication (Dudley and Stolton, 1996) summarized that the effects of air pollution on biodiversity, indicate generally, that air pollution has a greater impact on lower life forms such as: lichens, mosses, fungi, and soft-bodied aquatic invertebrates. Impacts to higher life forms are typically linked with food loss and reproductive effects, rather than to direct toxic effects on adults. Possible secondary impacts include acidification, changes in food or nutrient supply, or changes to biodiversity and competition. The study also suggested that plant communities are generally less adaptable to changes in air pollution than animals. However, lower order animals, such as amphibians and fish, are known to be impacted by acidification as a result of the subsequent release of metals into water. Higher order animals often have the ability to move to more favorable conditions.

Possible effects of airborne nitrogen dioxide on aquatic ecosystems include acidification and eutrophication (Lovett and Tear, 2007). Acidification effects water quality by increasing acidity, reducing acid neutralization capacity which results in hypoxia and the mobilization of aluminum. Larger aquatic ecosystems generally have a considerable buffering capacity. Increased acidity may result in increased algal growth by reducing organic carbon which allows increased light penetration and visibility of the water column. Eutrophication of an aquatic system can result from excess algal growth. Decomposition of the excess algae can result in a decrease in dissolved oxygen levels, which can be harmful to many aquatic organisms. Estuaries, bays, and salt marshes are generally not severely impacted by acid deposition than other aquatic ecosystems. However, they are subject to eutrophication caused by increased nitrogen which usually often results in increased plant growth.

6.2 IMPACTS OF AIR POLLUTION ON PLANTS, SOIL, AND ANIMALS

A detailed literature review was conducted to identify any documentation, data, or research of the potential effects of air emissions on flora and fauna and specifically on the threatened and endangered species of potential occurrence in the Action Area. The methods and results of the literature review are presented above in Sections 6.1.

Guidance from *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals, EPA 450/2-81-078, December 12, 1980* (*Screening Procedure*) was followed to assess the potential for the project has for adversely affecting air quality related values (AQRV). *Screening Procedure* provides minimum levels at which adverse effects have been reported in the literature for use as screening concentrations. These screening concentrations can be concentrations of pollutants in ambient air, in soils or in aerial plant tissues. A summary of the *Screening Procedure* requirements follow:

- Estimate the maximum ambient concentrations for averaging times appropriate to the screening concentration for pollutants emitted by the source. Include background concentrations when appropriate
- To determine potential effects from airborne pollutants, check the maximum predicted ambient concentrations against the corresponding AQRV screening concentration, PSD increments or NAAQS – whichever is most restrictive
- To determine potential effects from trace metals, calculate the concentration deposited in the soil from the maximum annual average ambient concentrations assuming all deposited metals are soluble and available for uptake by plants
- Compare the increase in metal concentration in the soil to the existing endogenous concentrations,
- Calculate the amount of trace metal potentially taken up by plants
- Compare the concentrations from Steps 3 and 5 with the corresponding screening concentrations,
- Reevaluate the results of the Step 4 and 6 comparisons using estimated solubilities of elements in the soil recognizing that actual solubilities may vary significantly from the conservatively estimated values
- If ambient concentration modeling results are unavailable, the significant levels for emissions may be used

No trace metals are associated with the combustion of natural gas in turbines. Therefore, only Steps 1 and 2 of the *Screening Procedure* guidance were required for this analysis.

The results from the ambient air modeling analyses conducted in support of the PSD and State NSR modeling analysis are summarized in Table 6-1 for pollutants included in *Screening Procedure*. The predicted concentrations were compared with the AQRV screening concentrations.

TABLE 6-1
SCREENING ANALYSIS – IMPACTS ON PLANTS, SOIL, AND ANIMALS – DIRECT IMPACTS

Pollutant	Averaging Period	Project Sources, Only			Project Sources, Nearby Sources Plus Background Concentration	
		Maximum Predicted Concentration (µg/m³)	AQRV Screening Concentration[1] (µg/m³)	PSD Class II Increment Consumption (µg/m³)	Maximum Predicted Concentration (µg/m³)	NAAQS (µg/m³)
SO_2	1-Hour	3.87	917	---	Not Required[2]	196
	3-Hour	3.53	786	512	Not Required[2]	1,300
	24-Hour	0.75	> 18[3]	91	Not Required[2]	365
	Annual	0.09	18	20	Not Required[2]	80
NO_2	1-Hour	5.60	>3,760[3]	---	59.7	188
	4-Hour	< 5.60	3,760	---	---	---
	8-Hour	< 5.60	3,760	---	---	---
	1-Month	< 5.60	564	---	Not Required[2]	---
	Annual	0.49	100	---	9.31	100
CO	1-Hour	44.7	>1,800,000[3]	---	Not Required[2]	40,000
	8-Hour	6.93	>1,800,000[3]	---	0	10,000
	1-Week	< 6.93	1,800,000	---	---	---

[1]Table 3.1, *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals, EPA 450/2-81-078, December 12, 1980 – (Smith & Levenson, 1980)*
[2]Project source concentrations are *de minimis* (insignificant) for this pollutant and averaging period. NAAQS modeling was not required.
[3]No AQRV screening value for this averaging period. Conservatively listing the AQRV for the next (longer) averaging period.

Screening Procedure (Smith and Levenson 1980) states that "no useable information other than that used to develop the ambient standards...was found in the review literature" for TSP matter and "EPA's current procedure for TSP should suffice for the review of generic TSP." The EPA's "current procedure" for TSP review corresponds to demonstrating compliance with the PM_{10} and $PM_{2.5}$ NAAQS. As discussed in Section 2.2, the Secondary NAAQS were developed to protect "public welfare" which includes effects on soils, water, crops and wildlife. *Screening Procedure* (Smith and Levenson, 1980) also states that "trace metals in TSP may have greater impacts on vegetation and soils than the total amount of particulates." However, no trace metals are associated with the combustion of natural gas in turbines. The results from the PM_{10} and $PM_{2.5}$ NAAQS modeling analysis conducted in support of the PSD modeling analysis are summarized in Table 6-2.

TABLE 6-2
NAAQS MODELING RESULTS

Pollutant	Averaging Period	Project Sources, Only	Project Sources, Nearby Sources Plus Background Concentration	
		Maximum Predicted Concentration (µg/m³)	Maximum Predicted Concentration[1] (µg/m³)	NAAQS[2] (µg/m³)
PM_{10}	24-Hour	<11.4	43.4	150
$PM_{2.5}$	24-Hour	6.13	28.0	35
	Annual	1.43	9.84	12

[1]This is a conservative estimate. The background concentrations utilized in the analysis included contributions from existing sources that were included in the modeling analysis (i.e. a double counting of their effects).
[2] Primary and Secondary NAAQS (have the same value).

The predicted concentrations associated with the proposed project are less than the AQRV screening concentrations, PSD Class II increment consumption concentrations, Primary NAAQS

and Secondary NAAQS. Therefore, according to the results of the analysis shown above, the proposed project will not cause significant impacts on soils, water, crops or wildlife.

6.3 CONSTRUCTION EFFECTS

6.3.1 Onsite habitat Effects

Construction of the Pinecrest facility will result in the conversion of approximately 82.5 acres of undeveloped yet disturbed property. As previously described, the proposed site has been cleared and disturbed in the past. Current habitat located within the facility is not ideal compared to the adjacent forests' and those that were cleared previously. Grasses and other introductory species have grown on the site since it was cleared. Other portions of the site are still bare spots where vegetation has not grown back due to erosion and other factors. Construction of the proposed facility would have no impact on sensitive habitat types, or any habitat preferred by federally listed species.

The proposed utility lines would be located within existing easements and construction of these lines would not have any effect on habitat for any federally listed species. These existing easements have already been cleared and are routinely maintained.

6.3.2 Noise Effects

Few pieces of equipment required for the construction have the potential to exceed 85 decibels (dBA) at 50 feet from the source (crane derrick, jack hammer, paver, pile driver, rail saw, rock drill, and scraper). The best available technology will be used to maintain noise levels during construction below 85 dBA measured at a distance of 50 feet from the source as much as practical. The contractor will be required to utilize equipment that is well maintained and fitted with sound attenuation equipment that is in good working order. Construction activities are positioned at reasonable distances from property boundaries. When a number of machines are in use, arrangement of these machines is strategically staged or grouped with barriers and absorbent material.

During operation of the proposed facility, the equipment will be guaranteed to have a sound pressure level of 85 dBA at 3 feet from the equipment. The steam turbine and the cooling tower are approximately 350 feet from the west property fence line. At this distance the calculated sound pressure level is approximately 42 dBA each. The two combustion turbines are approximately 600 feet and 750 feet away from that property line and result in sound pressure levels of approximately 39 dBA and 37 dBA. A cumulative sound pressure level for the point along the western property line is approximately 48 dBA. This can be compared to the sound pressure in a typical office.

Based on the 1974 EPA Noise Levels Document, outdoor noise levels for conclusions of no effect to humans is 55 decibels (dBA) averaged over a year. The 1990 Federal-Aid High

Program Manual (FHPM) allow for higher levels of 67 dBA and 70 dBA during rush hour and other high traffic time periods. Area conditions for the expansion project are within these criteria.

The noise from construction and operations will be perceptible to humans and wildlife to some extent immediately adjacent to the facility. Noise levels from project activities should be comparable to noise levels typical to an office environment. Based on these calculated levels no effect to wildlife is expected to result from construction or operation of the proposed facility.

6.3.3 Dust Effects

Dust mobilization will be minimized during construction and operations by routinely employed BMPs, and is expected to be negligible.

6.3.4 Human Activity

Construction of the PCEC facility will require a significant increase of human activity when compared to the current lack of activity at the site. This significant increase will be temporary. Once construction is complete, human activity levels in the area will decrease, since construction of the facility requires more personnel than operation. The proposed construction site is surrounded by forests, highways, and a light industrial facility. Habitats present in the area of the construction site do support several species of wildlife, even though the property is disturbed. Most of the wildlife entering the property is assumed to come from the surrounding forested areas. Construction would likely prevent most wildlife from entering the property and keep most wildlife in the adjacent forested areas. No additional effects to wildlife are expected due to increased human activity from the expansion project. Increased human activity would have no effect to any federally listed species.

6.4 FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES HABITAT EVALUATION

6.4.1 Piping Plover

6.4.1.1.1 Potential of Occurrence

Piping plovers winter along the Texas Gulf Coast. Plovers utilize bare, sparsely vegetated sand, shell, and gravel beaches, sandbars, islands, and salt flats in Coastal areas as wintering sites. Habitats within the Action Area are generally described as terrestrial open and previously disturbed. The preferred habitat for this species does not occur within the Action Area. There are no documented occurrences of the piping plovers within the Action Area (TXNDD 2012). Due to lack of habitat and recorded sightings, there is no potential for the occurrence of the piping plover within the Action Area.

6.4.1.1.2 Potential Effect

As mentioned above, there is no preferred habitat for the piping plover within or near the Action Area. Due to lack of habitat, neither construction nor operation of the proposed facilities is expected to have any impact on the piping plover directly or indirectly.

6.4.1.1.3 Recommended Determination of Effect

The proposed action will have no effect on the piping plover.

6.4.2 Red-cockaded Woodpecker

6.4.2.1.1 Potential of Occurrence

The Action Area does not have any potential or preferred habitat of the red-cockaded woodpecker. A thorough review of the pine forest within the Action Area (primarily on the northern portion) shows that the pines are not old growth pines nor are they in a younger stage where they may be used for foraging by the woodpecker. These forests are more of a mixed pine/hardwood forest with hardwoods resembling approximately 30% to 40% of the vegetation. These forests also have a lot of understory growth also not preferred by the red-cockaded woodpecker.

There are no documented occurrences of the red-cockaded woodpecker within or near the Action Area (TXNDD 2012). Due to lack of preferred habitat such as old growth continuous pine forests, there is no potential for occurrence of the red-cockaded woodpecker within the Action Area.

6.4.2.1.2 Potential Effect

As mentioned above, there is no preferred habitat for the red-cockaded woodpecker within any portion of the Action Area. Due to lack of habitat and the absence of documented occurrences in the Action Area, neither construction nor operation of the proposed facility is expected to have any impact on the red-cockaded woodpecker directly or indirectly.

6.4.2.1.3 Recommended Determination of Effect

The proposed action will have no effect on the red-cockaded woodpecker.

6.4.3 Louisiana Black Bear

6.4.3.1.1 Potential of Occurrence

Louisiana black bears are primarily inhabitants of bottomland hardwoods and floodplain forests, but also can also be found in upland hardwoods, mixed pine/hardwoods, coastal flatwoods, and marshes. Some portions in the northern section of the Action Area are a mix of pine/hardwoods, but are isolated tracts and not continuous enough to support this species. There is no preferred habitat for the Louisiana black bear within the Action Area. There are no documented occurrences of the black bear within or near the Action Area (TXNDD, 2012).

6.4.3.1.2 Potential Effect

As mentioned above, there is no preferred habitat for the Louisiana black bear within the Action Area. Due to lack of habitat, neither construction nor operation of the proposed facility is expected to have any impact on the Louisiana black bear directly or indirectly.

6.4.3.1.3 Recommended Determination of Effect

The proposed action will have no effect on the Louisiana black bear.

6.4.4 Red Wolf

6.4.4.1.1 Potential of Occurrence

The red wolf is extirpated from Texas and there is no potential of occurrence in the Action Area. There are no documented occurrences of the red wolf within or near the Action Area (TXNDD 2012).

6.4.4.1.2 Potential Effect

Because the red wolf is extirpated in Texas, neither construction nor operation of the proposed facilities will have any impact on the red wolf directly or indirectly.

6.4.4.1.3 Recommended Determination of Effect

The proposed action will have no effect on the red wolf.

6.5 DESIGNATED CRITICAL HABITAT ANALYSIS

There are no designated critical habitats for any of the listed species within or near the Action Area. There would be no effect to designated critical habitat directly or indirectly during construction or operation of the Pinecrest Energy Center.

7.0 CONCLUSIONS

The following section provides a summary of recommended determination of effect for all federally protected species and a description of conservation measures designed to avoid and/or minimize potential impacts to the environment and its associated habitats.

7.1 DETERMINATION OF EFFECT

The recommended determination of effect for all federally protected species, with the potential to occur within the Action Area, is summarized below in Table 7.

TABLE 7
SUMMARY OF RECOMMENDED DETERMINATIONS OF EFFECT

Federally-listed Species	Listing/Managing Agency	Recommended Determination of Effect
Piping plover	USFWS/TPWD	No Effect
Red-cockaded woodpecker	USFWS/TPWD	No Effect
Louisiana black bear	USFWS/TPWD	No Effect
Red wolf	USFWS/TPWD	No Effect

7.2 POLLUTION CONTROLS

7.2.1 Air Emissions

The proposed facility will utilize appropriate technologies to control emissions and avoid and/or minimize potential impacts to the environment and its associated habitats. The corresponding technologies to be utilized are discussed below.

7.2.1.1 NO_x Emissions

Dry low NO_x (DLN) combustors and SCR technology will be used to control NO_x emissions to 2.0 parts per million by volume, dry basis (ppmvd) corrected to 15% O_2, on a 24-hour rolling average, except during periods of startup/shutdown. This meets BACT requirements for the State and PSD NSR air permit for NO_x emissions from the combined cycle generation units.

7.2.1.2 CO Emissions

Due to higher CO emissions during quick load transitions, Pinecrest will equip each HRSG with an oxidation catalyst. With these operational measures, CO emissions associated with the combustion turbine should not exceed 2.0 ppmvd in the HRSG exhausts over a rolling 24 hour period (on a dry basis at 15% O_2), excluding periods of startup, shutdown, and reduced load operations less than 60% of base load.

7.2.1.3 VOC Emissions

The use of natural gas and maintenance of optimum combustion conditions and practices is considered BACT for the control of VOC emissions from the combined cycle combustion turbines. VOC emissions from the combustion turbine unit are designed to meet 2.0 ppmvd at 15% O_2 for a rolling 3-hour period.

7.2.1.4 $PM/PM_{10}/PM_{2.5}$ Emissions

Because the combined cycle generation units will only fire gaseous fuel, $PM/PM_{10}/PM_{2.5}$ emissions are anticipated to be relatively low. The use of gaseous fuel and the application of good combustion controls meet BACT requirements for the air permit for $PM/PM_{10}/PM_{2.5}$ emissions from the combined cycle generation units.

7.2.1.5 Sulfur Compound Emissions

The formation of SO_2, H_2SO_4 and $(NH_4)_2SO_4$ will be minimized by using pipeline-quality natural gas with a sulfur content not exceeding 1.0 grains sulfur per 100 standard cubic feet on the short term and 0.25 grains sulfur per 100 standard cubic feet on an annual average. The use of gaseous fuel meets BACT requirements for the air permit for SO_2, H_2SO_4 and $(NH_4)_2SO_4$ emissions from the combustion turbine.

7.2.1.6 NH_3 Emissions

LPEC will operate the SCR system in such a manner that ammonia (NH_3) slip (i.e., the emission of unreacted ammonia to the atmosphere) is minimized while ensuring that the NO_x emissions limits are met. Careful control of the ammonia injection system and operating parameters will be maintained to control ammonia slip in the turbine/heat recovery steam generator exhaust stream to levels not exceeding 7 ppmvd on a rolling 24-hour basis and 7 ppmvd on an annual average basis (corrected to 15% O_2). This level of emissions control meets BACT requirements for the air permit for ammonia slip for combined cycle combustion turbines.

7.2.1.7 Turbine Oil Mist Vent Emissions

The venting of turbine lubrication oil is a minor source of VOC emissions. These emissions will be controlled with the use of oil mist eliminators. The use of oil mist eliminators meets BACT requirements for the air permit for VOC emissions from these turbine lubrication oil vents.

7.2.1.8 Fugitive Emissions from Gas and Ammonia Piping Components

To ensure that fugitive emissions from the piping components in ammonia service are adequately controlled, Pinecrest Energy Center will follow an audio, visual, and olfactory (AVO) inspection and maintenance program, performing periodic inspections. These measures meet BACT requirements for the air permit for VOC and ammonia emissions from piping components.

7.2.2 Wastewater and Storm Water

7.2.2.1 Mitigation of Construction Related Impacts to Surface Water

Construction of the proposed Pinecrest Energy Center will follow the TCEQ requirement to obtain a construction storm water permit for the proposed project. The site will employ best management practices to prevent contamination due to storm water runoff, including erosion control and stabilization, minimization of offsite vehicle tracking and dust generation, and other practices as warranted by site specific conditions. The site will also follow the notification, recordkeeping, and reporting requirements of TCEQ's construction storm water management program.

7.2.2.2 Mitigation of Operational Impacts to Surface Water

The water discharge from boiler blowdown and cooling tower blowdown from the PCEC will be pumped back through a pipeline and connected to a point in the City of Lufkin treatment plant. Therefore, there will be no impacts to surface waters from process water. PCEC will obtain a General Permit to Discharge under the Texas Pollutant Discharge Elimination System for Facilities That Discharge Storm Water Associated with Industrial Activity. The Storm Water permit will require best management practices and structural controls designed to protect storm water quality.

8.0 LIST OF PREPARERS

Robert Fisher, Project Scientist, Biologist, Primary Author

Jennifer Knowles, Staff Scientist, GIS Specialist, Secondary Author

D. Lance Gillaspie, Staff Scientist, Biologist, Field Support

Steve McVey, Principal, Geologist, Project Manager

Larry Moon, Principal, Engineer, Project Director

David Castro, Senior Project Engineer, Modeler

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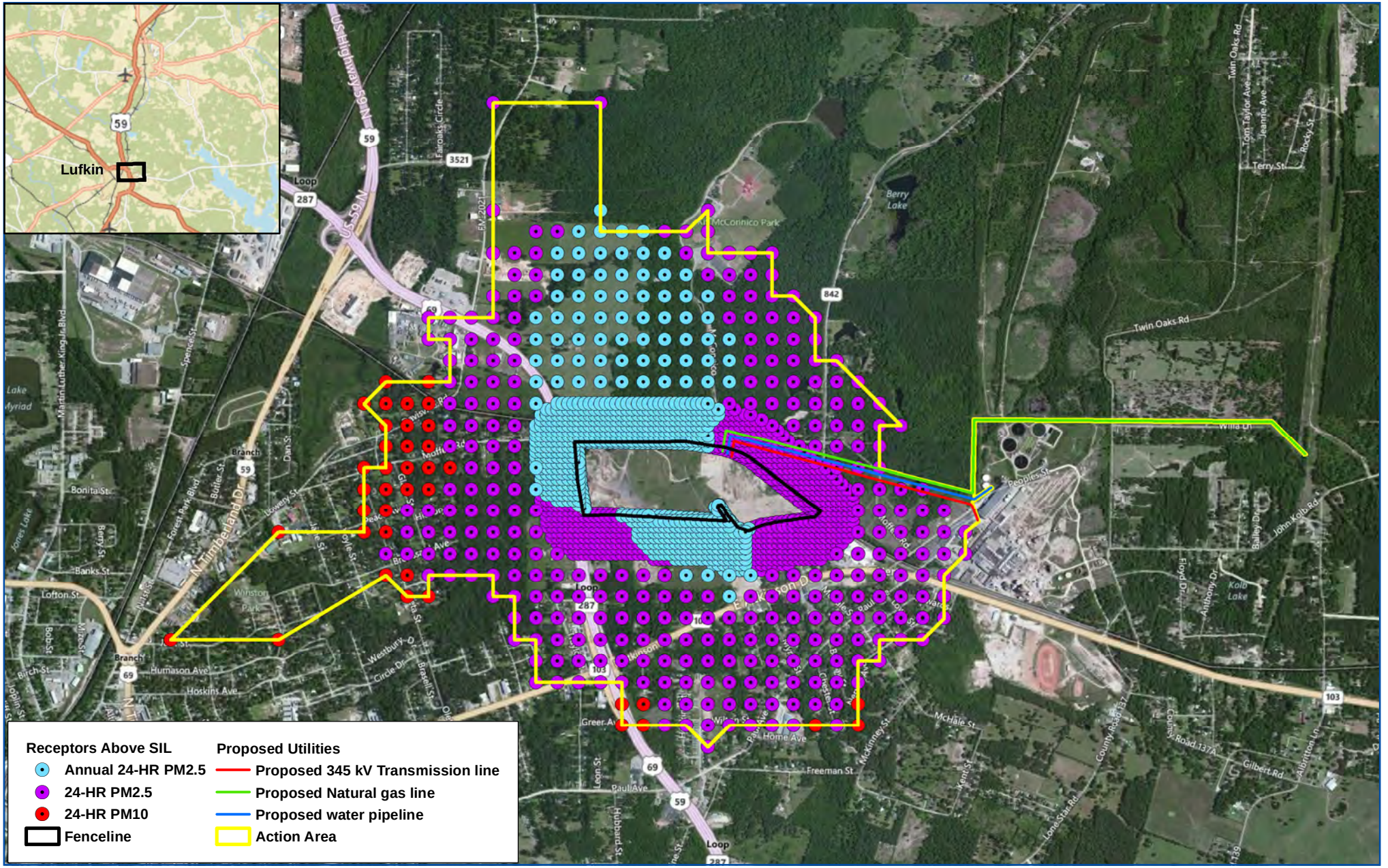
APPENDIX A
SITE MAPS



Datum:
GCS NAD 1983
Map Sources:
ESRI-USGS Topographic
& Streets Basemaps

0 0.5 1 Kilometers

0 0.5 1 Miles

SITE LOCATION

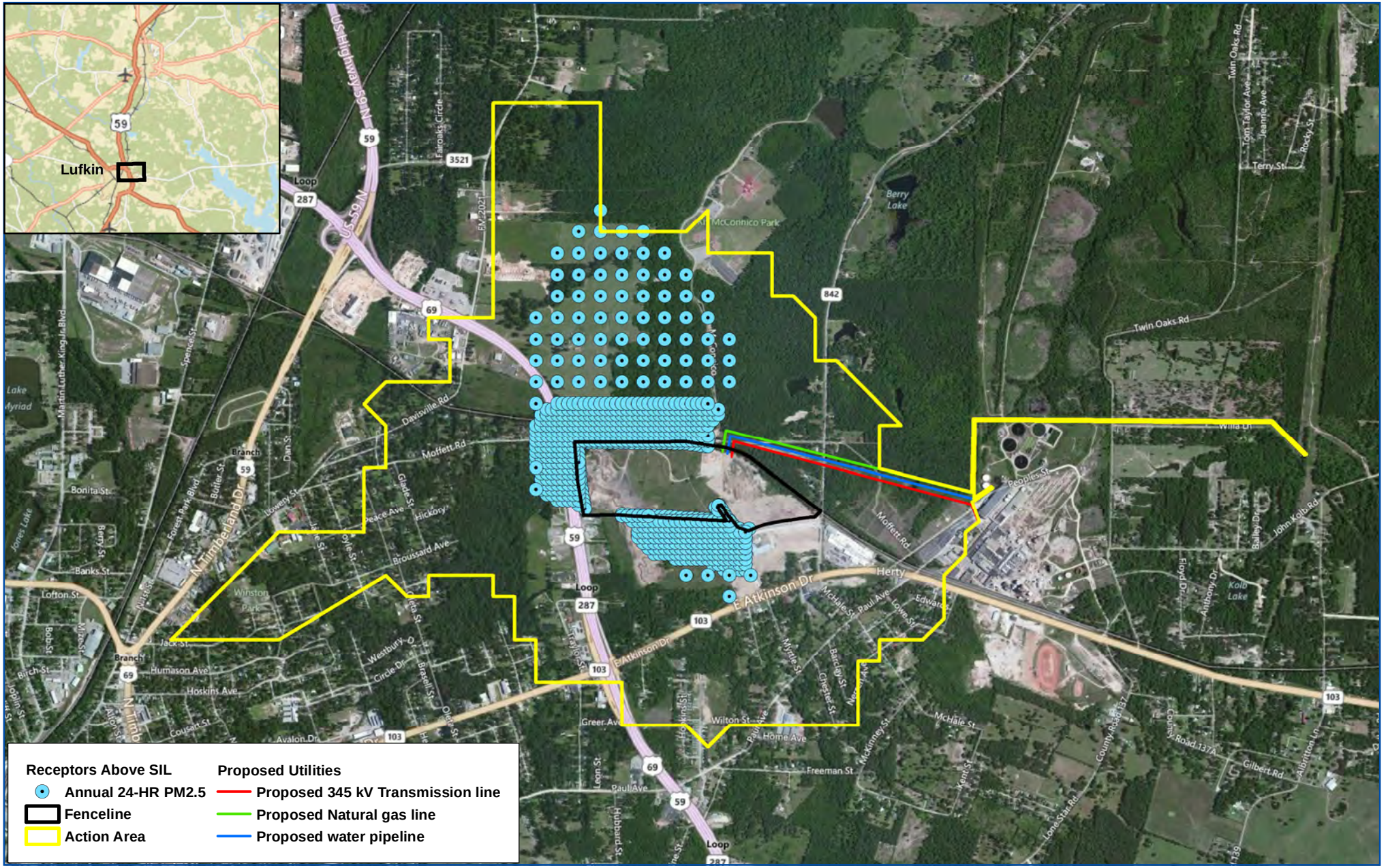
zephyr

FIGURE 4-1
ACTION AREA

Pinecrest Energy Center,LLC
Lufkin, Texas

H:\Coronado Ventures\012205 Pinecrest Energy Center\Graphics\BA Action Area

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	S. McVey	012205.002	04.02.2014



Datum:
GCS NAD 1983
Map Sources:
ESRI-USGS Topographic
& Streets Basemaps

0 0.5 1 Kilometers

0 0.5 1 Miles

SITE LOCATION

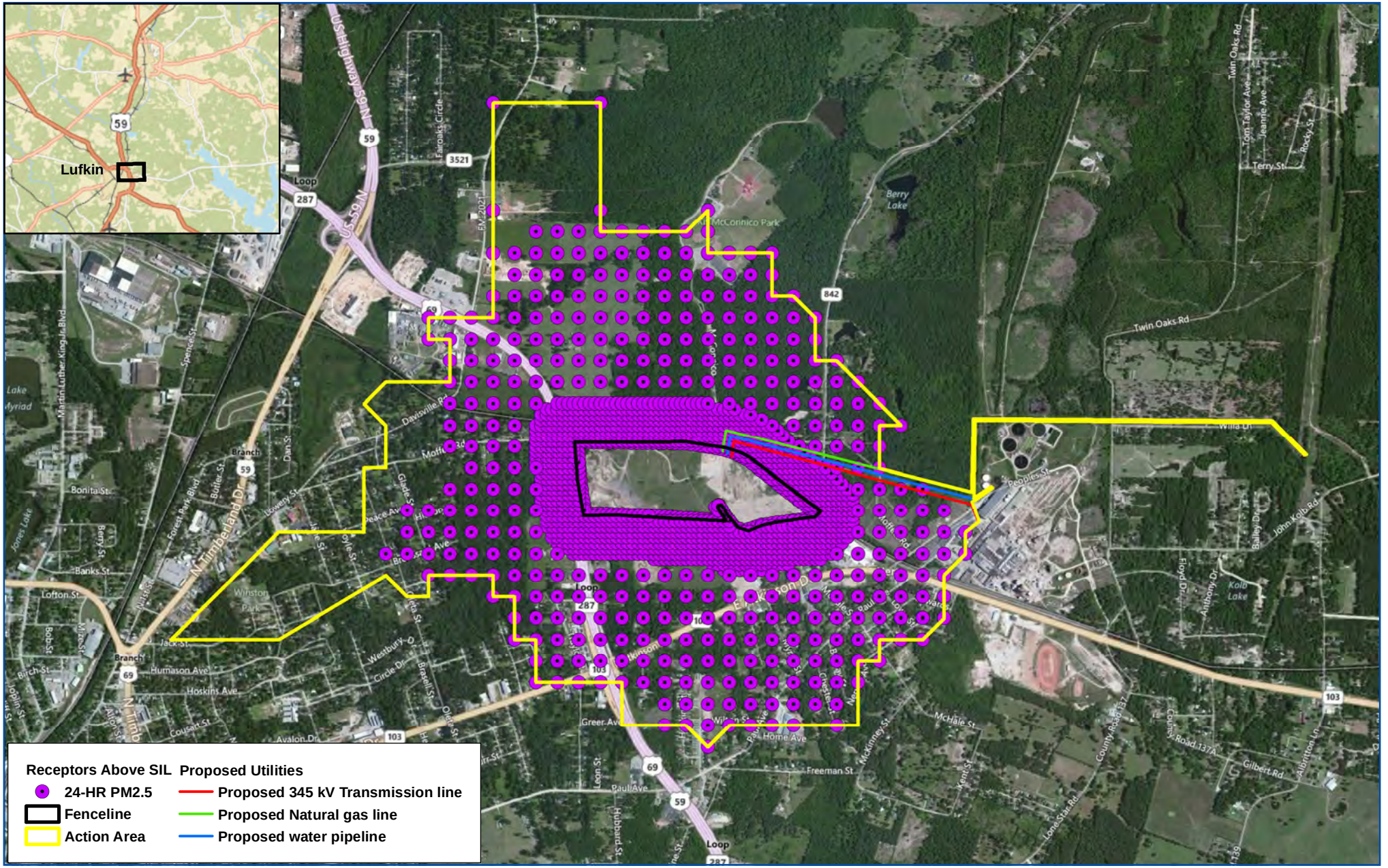
zephyr

FIGURE 4-2
Annual 24-HR PM2.5 Receptors Above SIL

Pinecrest Energy Center,LLC
Lufkin, Texas

H:\Coronado Ventures\012205 Pinecrest Energy Center\Graphics\BA Action Area

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	S. McVey	012205.002	04.02.2014



Datum:
GCS NAD 1983
Map Sources:
ESRI-USGS Topographic
& Streets Basemaps

0 0.5 1 Kilometers

0 0.5 1 Miles

SITE LOCATION

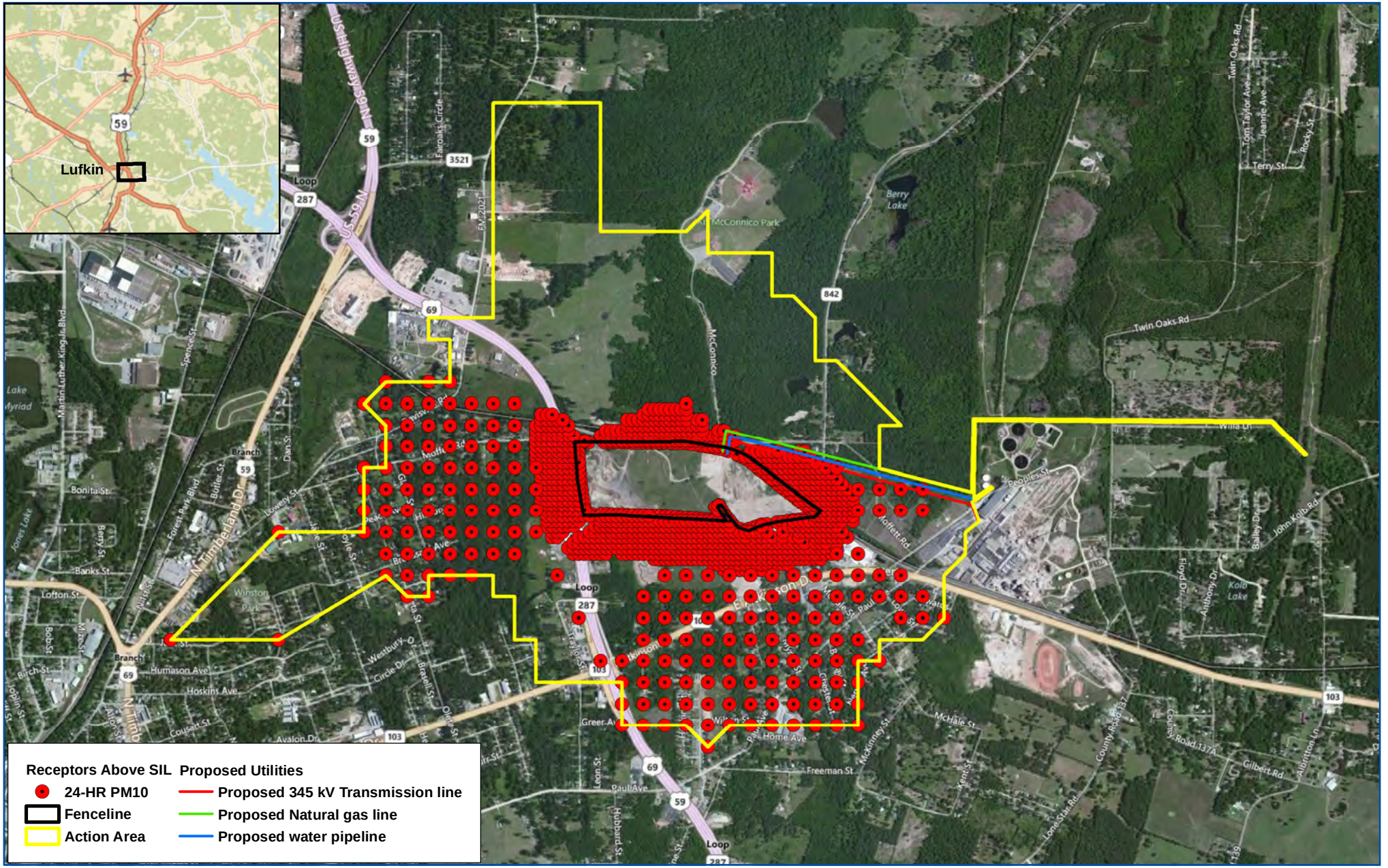
zephyr

FIGURE 4-3
24-HR PM2.5 Receptors Above SIL

Pinecrest Energy Center,LLC
Lufkin, Texas

H:\Coronado Ventures\012205 Pinecrest Energy Center\Graphics\BA Action Area

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	S. McVey	012205.002	04.02.2014



Datum:
GCS NAD 1983
Map Sources:
ESRI-USGS Topographic
& Streets Basemaps

0 0.5 1 Kilometers

0 0.5 1 Miles

SITE LOCATION

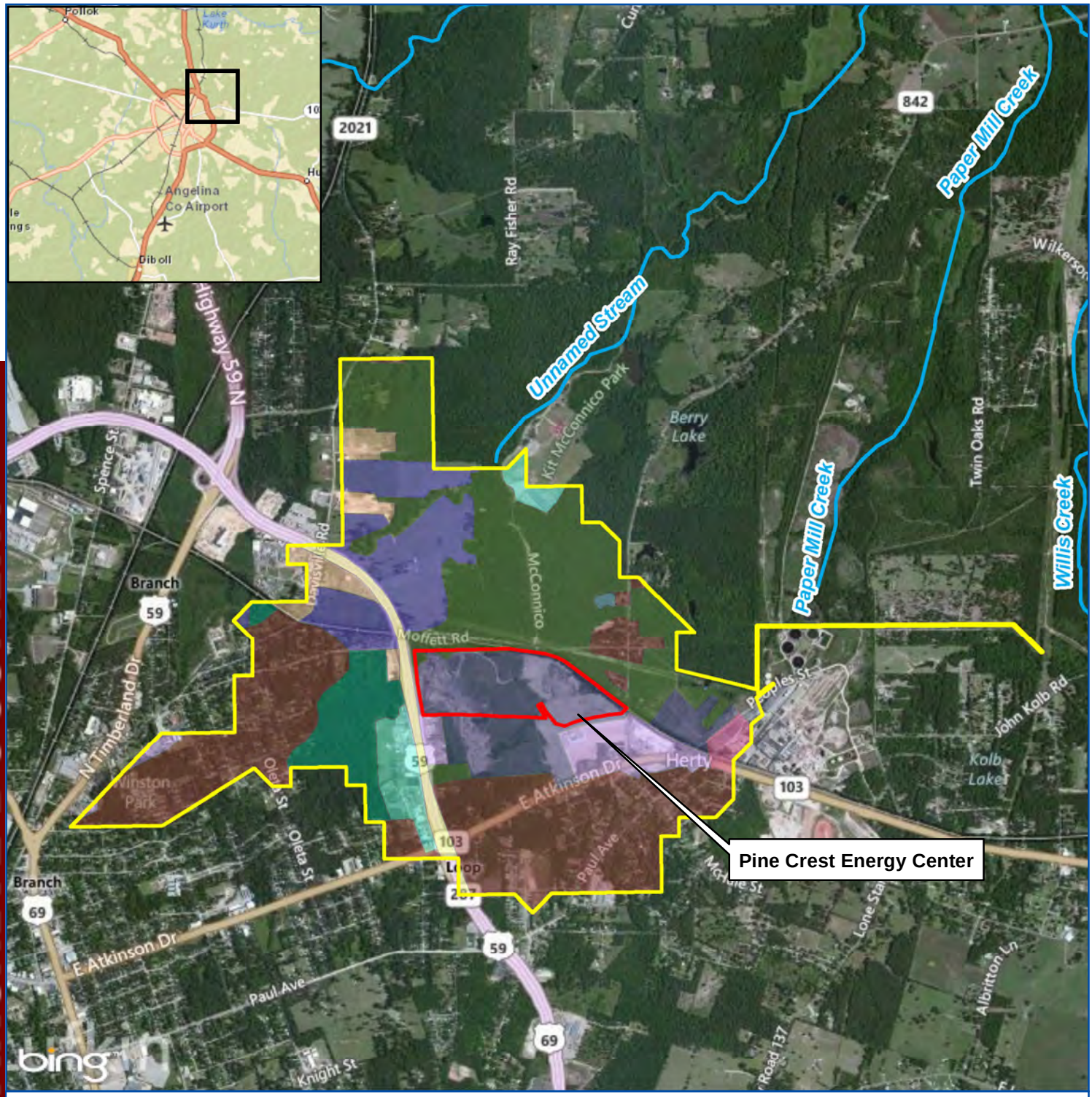
zephyr

FIGURE 4-4
24-HR PM10 Receptors Above SIL

Pinecrest Energy Center,LLC
Lufkin, Texas

H:\Coronado Ventures\012205 Pinecrest Energy Center\Graphics\BA Action Area

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	S. McVey	012205.002	04.02.2014



Map Sources:
ESRI-Bing Hybrid & Streets Basemaps;
Datum: GCS NAD 1983
*Land Use approximated remotely using aerial imagery

- Site Boundary
- Action Area
- Stream
- *LAND USE
- Commercial and Services
- Cropland and pasture
- Deciduous forest land
- Evergreen forest land
- Industrial
- Mixed forest land
- Mixed urban/ built-up land
- Other urban/ built-up land
- Residential
- Transitional Area
- Transportation/ communications
- Water

N

Scale 1:35,000

0 0.5 1 Kilometers

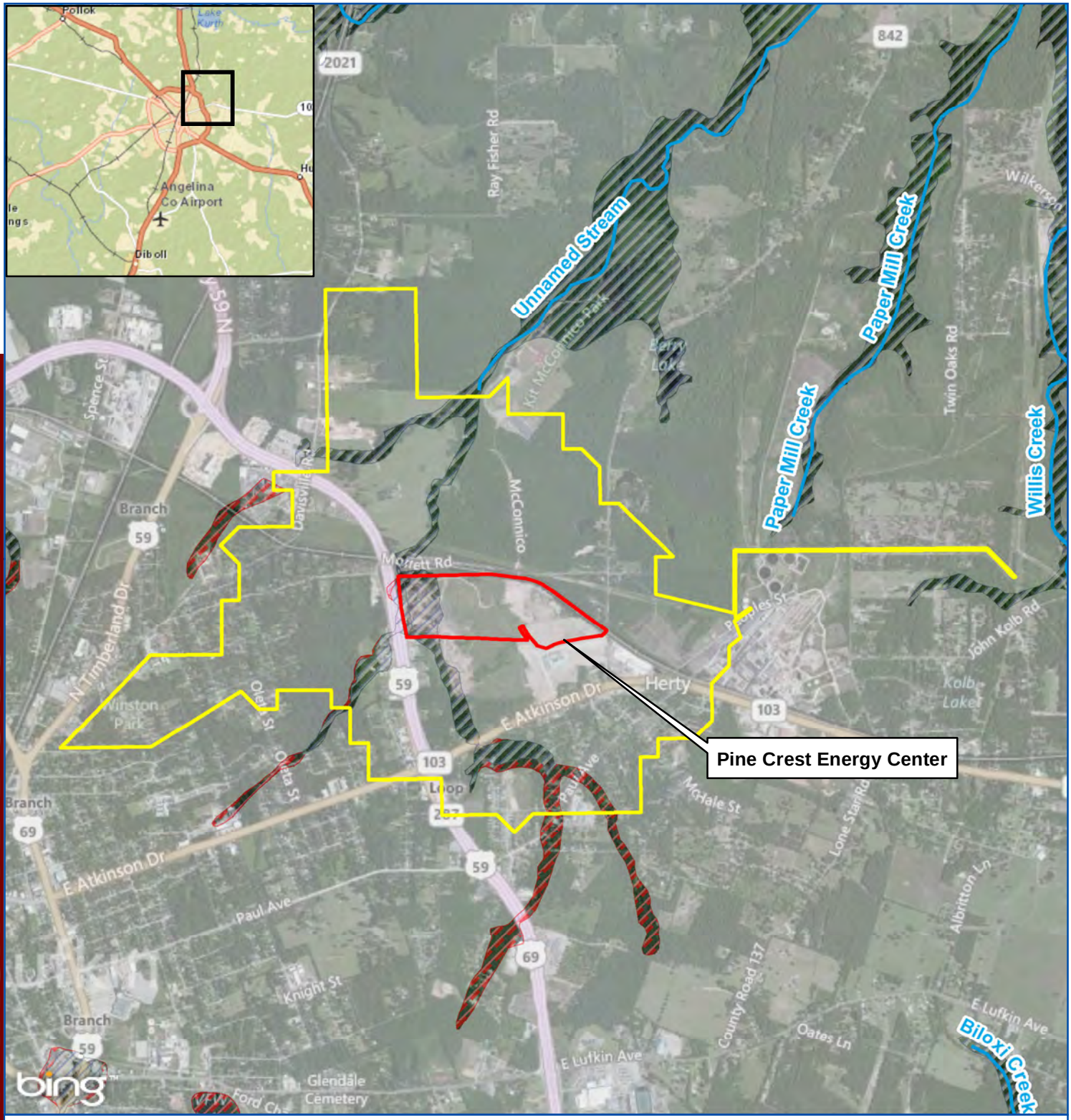
0 0.5 1 Miles

zephyr

FIGURE 5-1
Land Use

Pinecrest Energy Center , LLC
Lufkin, Texas

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	12205.004	04.02.2014



Map Sources: ESRI-Bing Hybrid & Streets Basemaps; FEMA Q3 Floodplain Data-Angelina Quadrant (TNRIS); Datum: GCS NAD 1983

- Site Boundary
- Action Area
- Stream

FEMA Zone Designation

- A- 100-Year floodplain
- X- Areas outside floodplain
- X500- 500-Year floodplain

N

Scale 1:35,000

0 0.5 1 Kilometers

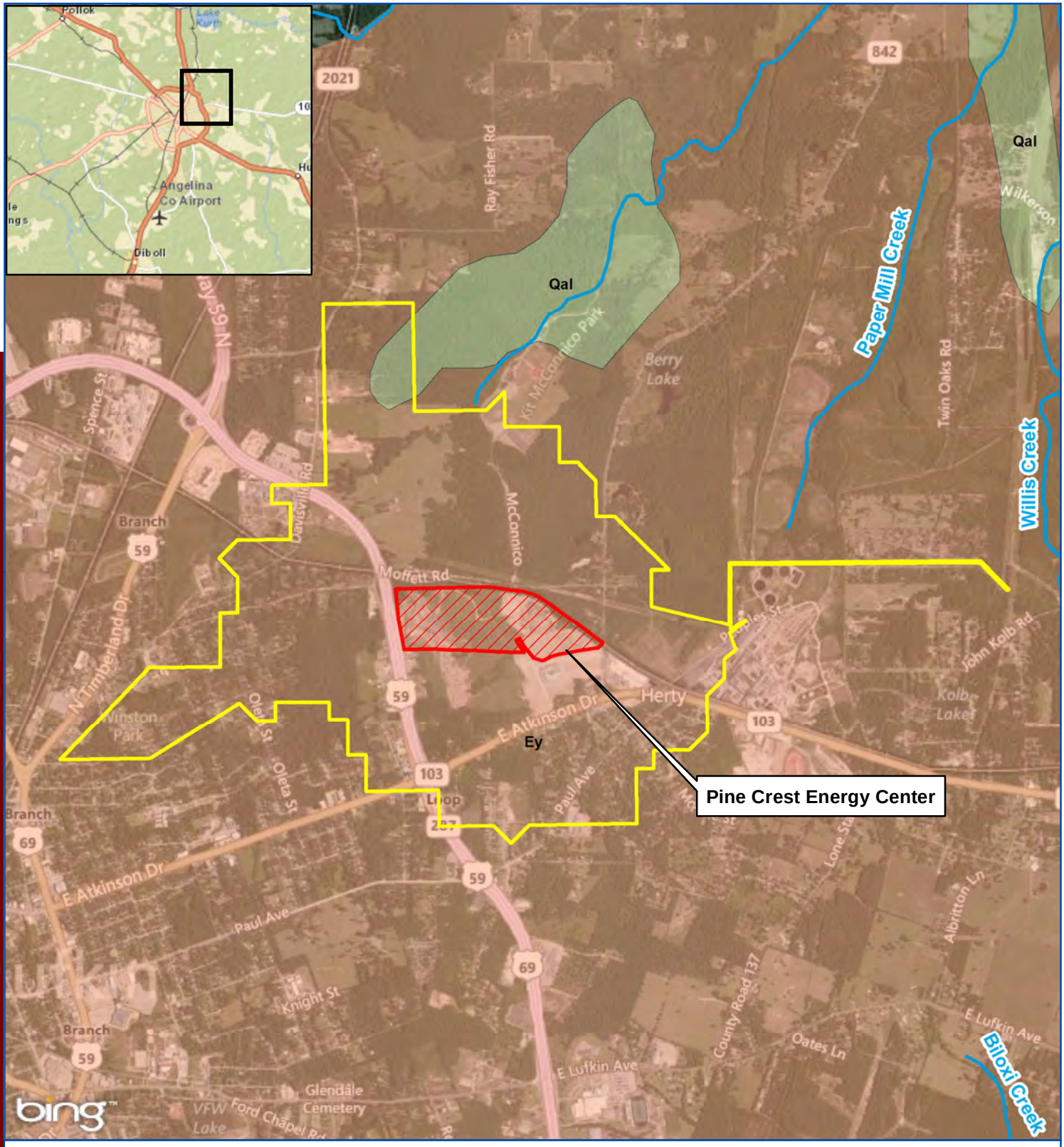
0 0.5 1 Miles

zephyr

FIGURE 5-2
FEMA - Floodplain Zones

Pinecrest Energy Center , LLC
Lufkin, Texas

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	12205.004	04.02.2014



Map Sources:
ESRI-Bing Hybrid & Streets Basemaps;
Geologic Atlas of Texas
Datum: GCS NAD 1983

Stream
Site Boundary
Action Area

Geologic Units
Qal
Ey

N

Scale 1:35,000

0 0.5 1 Kilometers

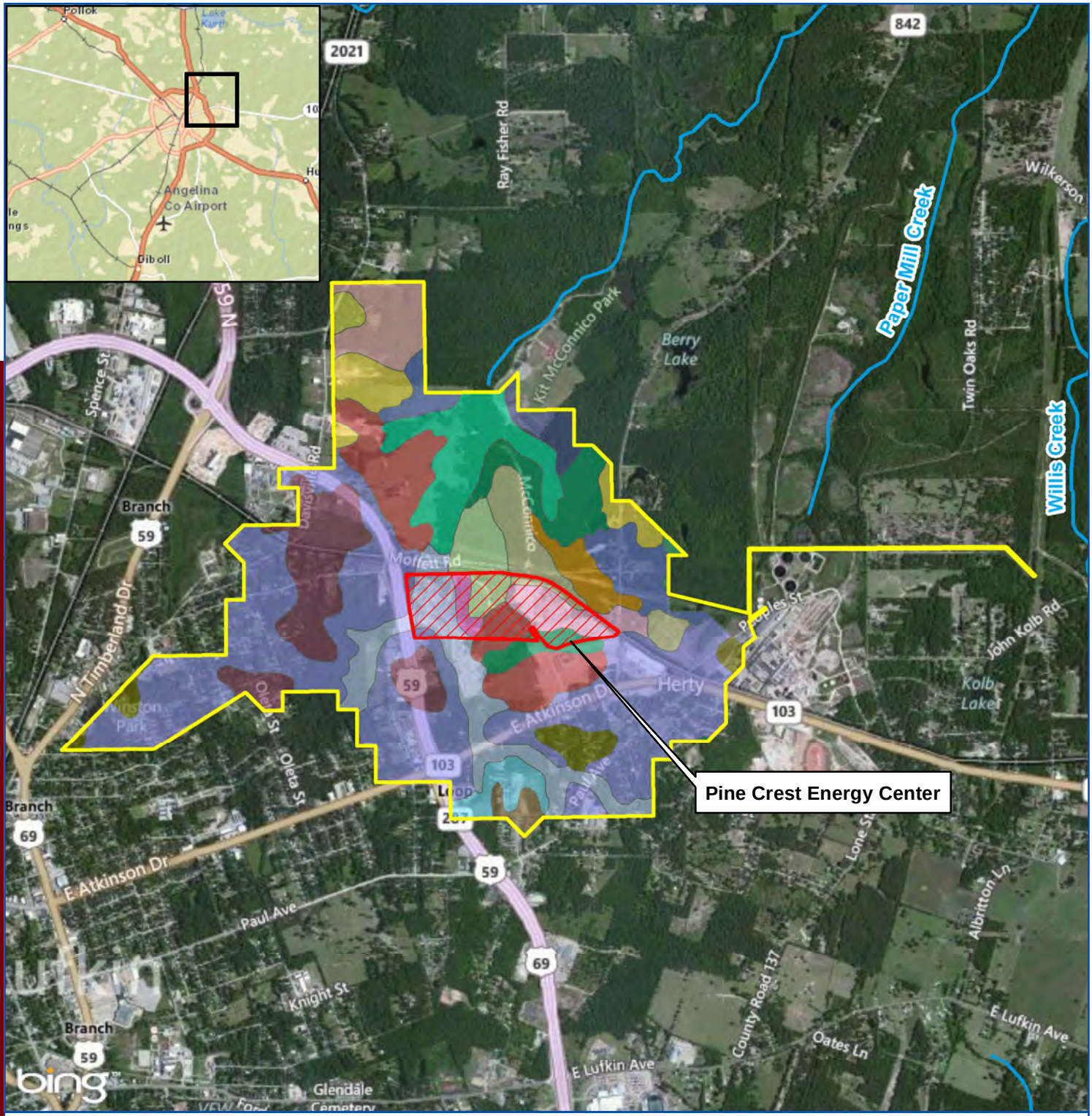
0 0.5 1 Miles

zephyr

FIGURE 5-3
Geology

Pinecrest Energy Center , LLC
Lufkin, Texas

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	12205	04.02.2014



Map Sources:
ESRI-Bing Hybrid & Streets Basemaps; Natural Resources Conservation Service (NRCS) Soil Data;
Datum: GCS NAD 1983

Stream
Site Boundary
Action Area

Soils: AaB, Ab, AcB, BaB, FfA, FfB, FuB, Kb, KcB, KcD, KdB, Ko, Ks, KuB, KwB, MuB, Pa, RoB, RoD, SaB, SaD, W

N

Scale 1:35,000

0 0.5 1 Kilometers

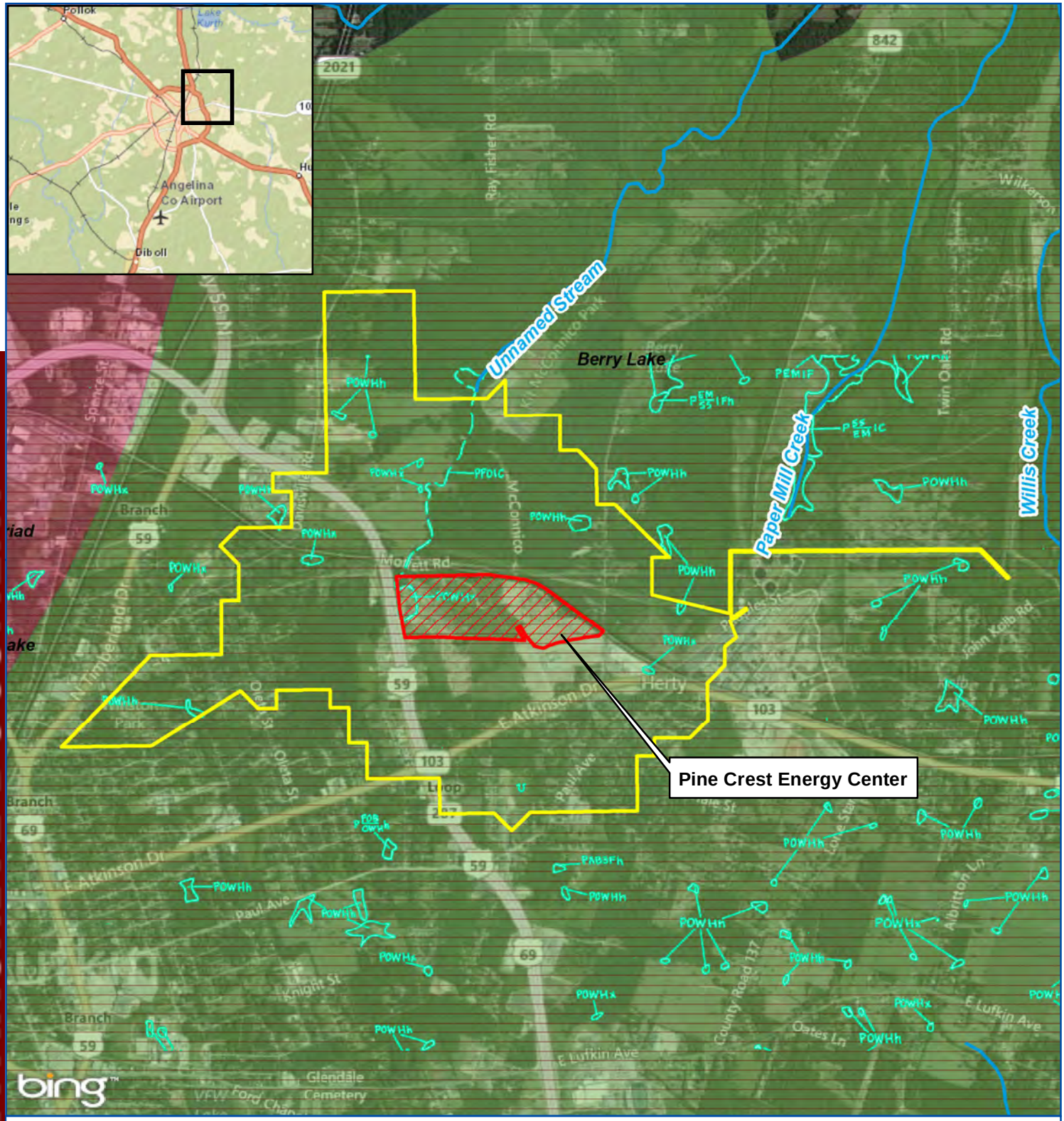
0 0.5 1 Miles

zephyr

FIGURE 5-4
Soils

Pinecrest Energy Center , LLC
Lufkin, Texas

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	12205	04.02.2014



Map Sources:
ESRI-Bing Hybrid & Streets Basemaps; TWDB Aquifers of TX National Wetlands Inventory, Datum: GCS NAD 1983

- Site Boundary
- Action Area
- Stream
- NWI - Wetlands
- Major Aquifer
  - Carrizo
- Minor Aquifer
  - SPARTA
  - YEGUA JACKSON

N

Scale 1:35,000

0 0.5 1 Kilometers

0 0.5 1 Miles

zephyr

FIGURE 5-5
Water Resources

Pinecrest Energy Center , LLC
Lufkin, Texas

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	12205	04.02.2014

APPENDIX B
SITE PHOTOGRAPHS

1) West side of proposed project boundary area looking east

2) Northern portion of proposed project area looking southeast

3) Northern portion of proposed project area looking southeast

4) Center of proposed project area looking southwest

5) Proposed project area looking south

6) Creek located just south of the project boundary looking northeast

7) Just south of project boundary looking north near Commerce Center Road

8) Typical residential area south of Atkinson Rd. looking north

9) Typical residential area south of Atkinson Rd. looking south

10) Public school located in the neighborhood south of Atkinson Rd.

11) Looking north from Atkinson road toward the project area

12) Small residential street located on the western end of the Action Area

13) Highway 287 looking north on the west side of the Action Area

14) Industrial area located just east of the proposed project

15) Farm/Ranch property located on the northwest portion of the Action Area looking southeast

16) Typical mixed pine/hardwood forest located north of the project area

17) Typical mixed pine/hardwood forest located north of the project area

18) Kit McConnico Park located north of the project area

19) Intersection of Moffett Road and Kit McConnico Road looking west

20) Entrance to Commerce Center Drive south of the project area looking north

21) Trailer Park located on the south east portion of the Action Area looking south

APPENDIX C
FIELD NOTES SUMMARY

Site inspection of Pinecrest Energy Center Action Area
Surveyor: Robert Fisher and Lance Gillaspie

November 27th and 28th, 2012

Weather: High temperature 68°F, clear

On November 27th and 28th, 2012, Zephyr performed a windshield and pedestrian survey of the Pinecrest Action Area as described in the Biological Assessment. The purpose of the survey was to observe as much of the Action Area as possible to gain further knowledge of the regional setting within and around the proposed Pinecrest facility. The survey concentrated primarily on threatened and endangered species and habitats, land use (Appendix A), and any other sensitive receptors that could be located within the Action Area. Appendix B includes photos and a photo log of the representative areas that were observed which included residential, light industrial areas, parks, forested areas and open grasslands.

TERRESTRIAL FAUNA

The Action Area is quite large and includes several different habitat types. These habitat types provide potential for many different species to inhabit the area. The only locations where typical wildlife would not exist within the Action Area are several small portions on the west side near the freeway and industrial locations on the east near the project site.

Residential areas are still heavily wooded and are located on larger lots that are still conducive to multiple species. The project site itself, although disturbed, is still considered habitat for multiple species that may forage on the grasses and other small shrubs. Although the project site itself may not be used for permanent residence, it is surrounded by wooded areas to the north and east that many different species utilize and it was evident that these species come within the project area. There was no evidence of any federally listed species located within the Action Area and all wildlife were typical species known to inhabit this part of east Texas. The Texas Natural Diversity Database (TXNDD 2012) did not identify any protected species within or near -the Action Area.

Although none of the sensitive species or were observed or have been recorded, typical wildlife observed or known to inhabit the Action Area includes:

- Turkeys
- White wing dove
- Mourning dove
- Red tailed hawk
- Turkey vulture
- American Crow
- Rock pigeon
- Eastern screech-owl
- Raccoons
- Opossums
- Cottontail rabbit
- Coyotes
- Rodents
- Cottonmouth/other snake species
- Eastern box turtle
- Red-eared slider turtle
- White-tailed deer
- Feral Hogs
- Eastern Fox/Gray Squirrel
- Striped Skunk
- Bobcats
- Red Fox

FLORA

Three vegetation communities were observed within the Action Area. The vegetation types include upland pasture, upland mixed pine/hardwood forest and urban mixed pine/hardwood forest. All communities are highly fragmented due to urban encroachment and no community is representative of a climax community. Dominant species observed within each community are outlined below. Species found in one community will often appear in neighboring communities with varying levels of dominance.

The proposed project area is dominated by an upland pasture community. The project area is highly disturbed and the dominant species present within this community represent low forage value, opportunistic species with small areas of native grasses. Dominant species observed included prairie broomweed (Amphiachyris dracunculoides), Bermuda grass (Cynodon dactylon), Texas croton (Croton texensis), wooly croton (Croton capitatus), plains lovegrass (Eragrostis intermedia), little bluestem (Schizachyrium scoparium) and Johnson grass (Sorghum halepense).

Forested areas within the Action Area are representative of a young mixed pine/hardwood community. Dominant species within this community include loblolly pine (Pinus taeda), shortleaf pine (Pinus echinata), sweetgum (Liquidamber styraciflua), Chinese tallow (Sapium sebeferum) water oak (Quercus nigra), live oak (Quercus virginiana) southern red oak (Quercus falcata), eastern red cedar (Juniperus virginiana), greenbriar (Smilax rotundifolia), and southern dewberry (Rubus argutus).

Urban mixed pine/hardwood communities within the Action Area, including maintained turf grass areas, are dominated by St. Augustine grass (Stenotaphrum secundatum), Bermuda grass, Johnson grass, bahia grass (Paspalum notatum), live oak, southern red oak, water oak, loblolly pine, shortleaf pine, Chinese tallow, crepe myrtle (Lagerstroemia indica) and rattlebox (Sesbania punicea).