BIOLOGICAL ASSESSMENT
FOR
A COMBINED CYCLE POWER PLANT AT THE
LA PALOMA ENERGY CENTER, LLC
CAMERON COUNTY, TEXAS

Submitted To:

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

Submitted For:

LA PALOMA ENERGY CENTER, LLC
ELECTRIC GENERATING FACILITY
24684 F.M. 1595
HARLINGEN, TEXAS 78550

Submitted By:

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

MARCH 2013

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
HRSG	heat recovery steam generator
LAER	Lowest Achievable Emission Rate
LPEC	La Paloma Energy Center
LRGV	Lower Rio Grande Valley
MMPA	Marine Mammal Protection Act
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NH_3	ammonia
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
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
Pb	lead
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
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
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

La Paloma Energy Center, LLC (La Paloma) is seeking a greenhouse gas (GHG) Prevention of Significant Deterioration (PSD) permit to authorize construction of a new natural gas-fired combined cycle electric generating plant, La Paloma Energy Center (LPEC) in Cameron County, Texas. LPEC 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, the Siemens SGT6-5000F(4), and the Siemens SGT6-5000F(5). The final selection of the combustion turbine model will not be made until the after the permit is issued.

This biological assessment (BA) is an evaluation of the associated potential environmental impacts that the proposed 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 and endangered species of Cameron County listed by U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA). 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: Eskimo curlew, interior least tern, northern aplomado falcon, piping plover, Rio Grande silvery minnow, jaguar, Gulf Coast jaguarundi, ocelot, West Indian manatee, Atlantic hawksbill sea turtle, green sea turtle, Kemp's Ridley sea turtle, leatherback sea turtle, loggerhead sea turtle, south Texas ambrosia, star cactus, Texas ayenia, and NOAA managed listed species including smalltooth sawfish, blue whale, fin whale, humpback whale, Sei whale, and sperm whale. 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 farmland, brush shrubland, and maintained/landscaped lawns.

LPEC 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 1.63 miles (2.64 kilometers) was established around the proposed project construction area.

Construction of the proposed project will have no direct impact on federally-listed species habitat. LPEC 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**
Eskimo Curlew	USFWS	No effect
Interior Least Tern	USFWS	No effect
Northern Aplomado Falcon	USFWS	May affect, not likely to adversely affect
Piping Plover	USFWS	No effect
Rio Grande silvery minnow	USFWS	No effect
Jaguar	USFWS	No effect
Gulf Coast Jaguarundi	USFWS	May affect, not likely to adversely affect
Ocelot	USFWS	May affect, not likely to adversely affect
West Indian manatee	USFWS	No effect
South Texas ambrosia	USFWS	No effect
Star cactus	USFWS	No effect
Texas ayenia	USFWS	No effect
Atlantic hawksbill sea turtle	USFWS/NOAA	No effect
Green sea turtle	USFWS/NOAA	No effect
Kemp's Ridley sea turtle	USFWS/NOAA	No effect
Leatherback sea turtle	USFWS/NOAA	No effect
Loggerhead sea turtle	USFWS/NOAA	No effect
Smalltooth sawfish	NOAA	No effect
Blue whale	NOAA	No effect
Fin whale	NOAA	No effect
Humpback whale	NOAA	No effect
Sei whale	NOAA	No effect
Sperm whale	NOAA	No effect

1.0 INTRODUCTION

La Paloma Energy Center, LLC (La Paloma) is seeking a GHG PSD permit to authorize construction of a new natural gas-fired combined cycle electric generating plant at LPEC in Cameron County, Texas. (Figure 1-1, Appendix A). LPEC will consist of two natural gas-fired combustion turbines, each exhausting to a fired 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, 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 24684 F. M. 1595, Harlingen, Texas 78550, and north of E. Harrison Avenue and west of the Port of Harlingen. 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 ($PM_{2.5}$), and GHG. The site-wide emissions are summarized in the following table.

Sitewide Emission Summary								
VOC (ton/yr)	**NOx** (ton/yr)	**CO** (ton/yr)	**PM** (ton/yr)	**PM_{10}** (ton/yr)	**$PM_{2.5}$** (ton/yr)	**SO2** (ton/yr)	**H2SO4** (ton/yr)	**CO2e** (ton/yr)
157.3	263.3	420.7	259.3	227.9	220.9	39.3	18.0	3,292,810

This BA is an evaluation of the associated potential environmental impacts that the proposed 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 and 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, as well as the cumulative effects 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 Cameron County (where the LPEC plant is proposed to be located) is designated nonattainment; therefore Cameron 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. The dispersion modeling procedure for the PSD increments is a similar process except that only specified "increment consuming" emission sources are modeled and a background level is not added to the modeling result.

The TCAA establishes the TCEQ and its regulatory and permitting requirements to accomplish the TCAA purpose 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 health, welfare, animal life, vegetation or property the TCEQ has established an effects evaluation process using 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 and the NOAA-National Marine Fisheries Service (NOAA-NMFS). "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 this project is to construct a new combined cycle electric generating plant, LPEC, in Cameron County, Texas. LPEC will consist of two natural gas-fired combustion turbines, each exhausting to a fired HRSG to produce steam to drive a shared steam turbine. The proposed project is located at 24684 F.M. 1595, Harlingen, Texas 78550 (Figure 3-1, Appendix A). Benchmark UTM Zone 14N, 637054.41mE, 29003.69mN.

Project location information:

USGS Quad	*Latitude/Longitude*
Harlingen and Rio Hondo	*26.212685°N, -97.625834°W*

3.2 CONSTRUCTION INFORMATION

Construction of the LPEC, associated infrastructure, and auxiliary equipment will take place within the proposed 80 acre project site. Additional earth disturbances will be limited to the installation of a 345-kV transmission line, a water supply pipeline, a wastewater discharge pipeline, and a natural gas pipeline. The construction area is shown on Figure 3-2 (Appendix A).

The projected construction start date is July 1, 2013. The projected operation start date is November 1, 2015.

3.2.1 Construction Activities

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

Approximately 80 acres of existing irrigated farmland will be converted to industrial purposes.

1. Clear and grade site to design elevation
2. Place concrete for turbine generators, HRSG's, pumps, buildings, steel, etc.
3. Erect turbine generators, HRSG's, pumps, buildings, steel, piping; electrical, instrumentation installation
4. Erection of transmission towers and overhead conductors
5. Pipeline excavation, installation, and backfilling
6. Insulation
7. 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, 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. Section 7.0 (Conservation Measures) provides specific information on the project emission controls.

3.3 OPERATION AND MAINTENANCE INFORMATION

3.3.1 Operation

LPEC 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 air pollutant emissions at the site, are listed below:

- Two natural gas-fired combustion turbines equipped with lean pre-mix low-NOx combustors
- Two natural gas-fired duct burner systems
- Lube oil vents for the turbine lube oil recirculation systems
- Two selective catalytic reduction (SCR) systems for additional NO_x emissions control for the combustion turbine units
- Aqueous ammonia storage and handling equipment to support the SCR systems
- Two oxidation catalyst systems for additional CO/VOC emissions control for the combined cycle units
- Natural gas piping and metering
- One diesel fuel-fired emergency electrical generator engine
- One diesel fuel-fired fire water pump engine
- Two diesel fuel storage tanks, one serving the emergency generator and one serving the firewater pump engine
- One natural gas-fired auxiliary boiler
- Generator circuit breakers insulated with sulfur hexafluoride
- High voltage switchyard

3.3.2 Water Use

One of the factors in siting the LPEC plant is the availability of reclaimed water from the City of Harlingen to be used as cooling water at the plant. LPEC will utilize the effluent discharge from the local waste water treatment facility to provide both the cooling water and the boiler make-up water requirements. It is expected that the LPEC 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 and land with light commercial development. The Valley International Airport is located approximately 1.2 miles to the west north west of the site. The nearest potential natural habitat areas (i.e., sensitive receptors) are fields to the southeast, located approximately 0.83 miles (1,341 meters) from the Project Site. Therefore, noise levels from construction or operation of the proposed project are not expected to impact listed species.

3.3.4 Infrastructure-related Effects

Land use impacts of the construction and operation of the project will be limited to the project site and the rights-of-way for the electric transmission lines as well as the water and natural gas pipelines. Any increased noise, dust, and traffic from construction will be short-term for the duration of the project.

3.3.5 Human Activity Effects

Construction and operation of the 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 Farm to Market 1595. No additional effects to wildlife are expected due to increased human activity from the project.

3.4 WASTE WATER AND STORM WATER INFORMATION

The water discharge from boiler blowdown and cooling tower blowdown from the LPEC will be pumped back through a pipeline and connected to a point in the City of Harlingen 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, LPEC 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 La Paloma 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 turbines and water/wastewater pipelines, natural gas pipeline, and electric transmission line 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).

The Action Area was determined to extend up to 1.4 miles (2.26 kilometers) from the Project Site (see Figures 4-1 through 4-9, Appendix A) as well as the areas that are the proposed rights-of-way for the electric transmission lines, water/wastewater pipelines, and the natural gas pipelines. The potential impacts to federally threatened and endangered species and designated critical habitat were evaluated within the identified Action Area. 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.

The Action Area has been modified for the project to include construction of the natural gas and wastewater pipelines and the 345 kV electric transmission line that will be constructed in support of the project.

The facility will be supplied with water from the local wastewater treatment operated by the Harlingen Water Works System (HWWS). The plant is located approximately 1.5 miles to the south of the project site. La Paloma will secure a right-of-way to construct a reclaimed water pipeline and a return wastewater line between the two facilities and will be approximately 30 feet wide. The right-of-way has been identified by the HWWS and will begin at the wastewater treatment plant and routed along 56th Street to E. Harrison Ave. It will continue to the east approximately ½ mile to FM509 where it will turn north and be routed another ½ mile to the irrigation channel. The rights-of-way along the roadways is currently mowed and maintained.

When the pipeline reaches the irrigation channel it turns to the east for ¼ mile and to the north for another ¾ mile to the project site. Where the pipelines are routed along the irrigation canal, the terrain can be describe as generally flat and developed for row-crops. Two ephemeral drainages will be traversed by the pipelines. Both exhibit native stands of brush on either side of the drainages. Both of these features will be directionally drilled to avoid impacts to the drainages and adjacent native vegetation. Normal burial depth of the pipeline will be between 3 feet and 6 feet below the surface.

The natural gas pipeline that will support the project is proposed to be constructed along the same roadways and the same irrigation canal identified for the reclaimed and wastewater pipelines. It is anticipated that the 40-feet gas pipeline ROW can be constructed in the same ROW as the water pipelines or one immediately adjacent to them. As stated earlier, this terrain can be described as generally flat and is currently developed for row crops.

The existing 345kV electric transmission line is located approximately ½ mile to the east of the project site. A short extension of this transmission line will be extended to the project site and routed along a right-of-way adjacent to County Road 1595. Similar to a proposed cross-valley transmission project to be constructed by the transmission service provider, Electric Transmission Texas (ETT), the right-of-way for a 345kV transmission line will be 150 feet wide and will be constructed over property that is currently plowed cropland. The height of the transmission towers will be approximately 140 feet tall and will be dependent upon the final design considering electrical load and spans between the towers. Since the electric transmission line will be located in row-cropland adjacent to the county road ROW, no vegetation or habitats resembling those utilized by any of the federally-listed species for Cameron County will be removed or impacted by its construction.

4.2.1 Ambient Air Dispersion Modeling

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 model included the operation of two turbines. 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 2.6 kilometers (1.6 miles) from the Project Site (centered on new turbine stack number one) and is located entirely within Cameron 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
LA PALOMA ENERGY CENTER
COLLECTIVE MAXIMUM PREDICTED CONCENTRATION FOR TWO TURBINES[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	8.96	0.6
	Annual	100	100	---	1	1.61	1.0
CO	1-Hour	40,000	None	---	2,000	22.6	0
	8-Hour	10,000	None	---	500	10.0	0
SO_2	30-Minutes	---	---	715	---	4.85	0
	1-Hour	196	None	---	7.8	4.85	0
	3-Hour	None	1300	---	25	4.40	0
	24-Hour	365	None	---	5	1.29	0
	Annual	80	None	---	1	0.25	0
PM_{10}	24-Hour	150	150	---	5	11.5	0.9
	Annual	None	None	---	1	2.67	---
$PM_{2.5}$	24-Hour	35	35	---	1.2	5.71	2.4
	Annual	15	15	---	0.3	1.68	2.4
H_2SO_4	1-Hour	---	---	50	---	2.21	1.1
	24-Hour	---	---	15	---	0.55	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
LA PALOMA ENERGY CENTER
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	2.97	50	5.9%	0
	Annual	0.152	5	3.0%	0
Ammonia	1-hour	16.0	170	9.4%	0
	Annual	1.76	17	10.3%	0.6
1,3-Butadiene	1-hour	7.27E-04	510	<0.1%	0
	Annual	7.43E-05	9.9	<0.1%	0
Acetaldehyde	1-hour	0.0676	90	<0.1%	0
	Annual	0.00692	45	<0.1%	0
Acrolein	1-hour	0.0108	3.2	0.3%	0
	Annual	0.00111	0.15	0.7%	0
Benzene	1-hour	0.0203	170	<0.1%	0
	Annual	0.00207	4.5	<0.1%	0
Ethylbenzene	1-hour	0.0541	740	<0.1%	0
	Annual	0.00553	570	<0.1%	0
Formaldehyde	1-hour	0.341	15	2.3%	0
	Annual	0.0349	3.3	1.1%	0
Polycyclic Aromatic Hydrocarbons (PAH)	1-hour	0.00592	0.5	1.2%	0
	Annual	0.00501	0.05	10.0%	0
Propylene Oxide	1-hour	0.0490	70	<0.1%	0
	Annual	0.00501	7	<0.1%	0
Toluene	1-hour	0.220	640	<0.1%	0
	Annual	0.0225	1200	<0.1%	0
Xylenes	1-hour	0.108	350	<0.1%	0
	Annual	0.011	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 site is located east of the City of Harlingen in Cameron County, Texas, approximately 30 miles (48 km) from the Gulf of Mexico. The site is in the heart of the Rio Grande Valley of south Texas, within the Lower Rio Grande Alluvial Floodplain of the Western Gulf Coastal Plain (City of Harlingen, Texas Accessed July 3, 2012).

The climate of the western gulf coastal plain is mild, rainfall averages about 28 inches annually in Cameron County and the growing season is approximately 365 days per year. The area is drained by The Rio Grande and the Arroyo Colorado. The majority of the land has been developed for agricultural use. Cameron County is one of the most productive agricultural areas in the nation.

The original vegetation in the Lower Rio Grande Alluvial floodplain is described as the Matamoran district of the Tamaulipan Biotic Province (Jahrsdoerfer, 1988). The proposed site is located within the Mid-Delta Thorn Forest, one of 11 vegetation types within the Matamoran district. The Mid-Delta Thorn Forest was once a dense community that spanned much of the Rio Grande delta (Jahrsdoerfer, 1988). It was dominated by mesquite (*Prosopis glandulosa*) and granjeno (*Celtis pallida*) mixed with Texas ebony *(Pithecellobium flexicaule),* anacua *(Ehretia anacua)* and brasil *(Condalia hookeri)*. Approximately 5% of the original vegetation remains, with all remaining areas having been developed for row crops, industrial/commercial and residential use (Jahrsdoerfer, 1988). Appendix B contains photographs of the proposed site and surrounding area. Appendix C contains a summary of field notes collected during the habitat assessment.

5.1.2 Land Use

The majority of land use in Cameron County is devoted to cropland and pastures. Dominant crops include cotton, corn, grain sorghum, sugar cane, melons and several varieties of citrus (HCC, 2012).

Other land uses throughout Cameron County include residential, commercial and industrial developments. The nearby City of Harlingen was established early on as a distribution, shipping and industrial center (TSHA, 2012). The Valley International Airport, Port of Harlingen, Free Trade Bridge, and the Gulf Intracoastal Waterway connect the region to the rest of the USA as well as northern Mexico, providing transport for local industries and international trade (HEDC, 2012).

Based on the background review, land use and land cover within the Action Area is mainly cropland with minor uses as rangeland (USGS, 2012). Figure 5-1 (Appendix A) demonstrates land uses within and near the Action Area.

5.1.3 Topography

Cameron County is situated in the Lower Rio Grande Valley at the southernmost tip of Texas along the border of Mexico and the Gulf of Mexico. The majority of the county overlies the alluvial floodplain of the Rio Grande which consists of gentle, northeast sloping topography. Elevations range from sea level at the coast to approximately 70 feet at the highest point with an average elevation of 45 feet (USDA Soil Survey, 1977). Slight changes in topography are reminiscent of abandoned stream channels where natural levees remain and few relict dune mounds (Beck, 1941).

According to the Federal Emergency Management Agency (FEMA) flood insurance rate map (FIRM), the proposed project site is located in Zone X – an area of minimal flood hazard above the 500-year floodplain. Areas surrounding the project site also fall within the designated 500-year floodplain as 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 unconsolidated Quaternary-age deposits of the Beaumont Formation and Rio Grande Alluvium (Barnes, 1976). Sediments of the Beaumont Formation consist mostly of grey clays and mud with interbedded lenses of yellow-orange to brown sand, silt and minor gravel layers. The younger Rio Grande Alluvium is identified by yellow to brown-grey quartz sand and silt formed by Rio Grande delta deposits.

Surface geology in Cameron County reflects coastal facies similar to the current coastal environment such as tidal flats, levees, point bars, meander belts, barrier islands and old deltas of the Rio Grande (USDA Soil Survey, 1977). Geologic resources in the area include oil and gas developments as well as extensive agricultural use.

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 5-1
GEOLOGIC UNITS SUMMARY

Map Unit	Formation Name	Description
Qam	Rio Grande Alluvium	Subdivided areas of mud dominated floodplain alluvium
Qas	Rio Grande Alluvium	Subdivided areas predominantly of sand
Qb (s,c)	Beaumont Formation	Subdivided into areas of dominantly sand or clay

5.1.5 Soils

Soils found in Cameron County are dominated by clays, silty clays, silty clay loams and fine sandy loams (USDA 2012). Most are gently sloping, deep, poorly draining, 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 5-2
NRCS SOIL UNITS SUMMARY

NRCS Map Unit Name	NRCS Unit Characteristics	USDA Classification				NRCS Hydric Soil
		Depth	Drainage	Permeability	Landform	
Hidalgo – HO	Sandy clay loam	Deep	Well drained	Moderate	Uplands	no
Mercedes Clay – MEA	0-1% slopes	Very deep	Moderately well	Very slow	Sloping uplands	no
Mercedes Clay – MEB	0-1% slopes	Very deep	Moderately well	Very slow	Sloping uplands	no
Raymondville – RE	Clay loam, 0-5% slopes	Deep	Moderately well	Slow	Sloping uplands	no

5.1.6 Vegetation

Dominant vegetation within the construction site and Action Area is described a cultivated farmland. Approximately 99% of the Action Area at the time of inspection was being utilized for cultivation of grains, fruit, vegetables, or ornamental trees. Native vegetation was only observed on a tract located on the southeastern boundary of the Action Area. Dominant species included: huisache (*Acacia minuata*), honey mesquite (*Prosopis glandulosa*), Texas ebony (*Chloroleucon ebano*), palo blanco (*Celtis laeviagata*) and Texas palmetto (*Sabal mexicana*).

5.1.7 Water Resources

Located at the southern tip of the Texas Gulf Coast, the eastern portion of Cameron County is dominated by bays, marshes, lakes and lagoons. The Laguna Madre is the prominent bay and is separated from the Gulf of Mexico by South Padre Island. Cameron County is drained by the Rio Grande which flows directly into the Gulf of Mexico and the Arroyo Colorado, an old distributary of the Rio Grande, which flows into Laguna Madre. According to the Texas Water Development Board (TWDB), The Gulf Coast aquifer underlies the southwestern portion of Cameron County (McCoy, 1990).

There are no natural water features within the construction site or Action Area. There are several irrigation canals within the Action Area. There are no major or minor aquifers underlying the construction site or Action Area (McCoy, 1990). According to USFWS National Wetland Inventory (NWI) maps, there are no wetlands located on the construction site or within the Action Area (see Figure 5-5 in Appendix A).

5.1.8 Climate

Cameron County's climate is described as subtropical and subhumid, with hot summers and mild winters. The mean annual precipitation in the region is 28.24 inches. The mean annual growing season is 365 days a year. Winter time average temperatures range from 58.4˚F to 67.1˚F with extreme lows down to 15˚F. Average summertime temperatures range from 92.6˚F to 95˚F with extremes up to 106˚F (NRCS, 2012). Prevailing winds are from the southeast to south-southeast except when cold fronts enter the area during winter. Relative humidity decreases from the coast inland and averages between 50 to 70 percent (USDA Soil Survey, 1977).

At the time of this review, the U.S. Drought Monitor indicated the study area drought intensity as a D1 (moderate - USDM, 2012), while the Long-term Palmer Drought Severity Index rates this area as a severe drought (less 3 to 3.9 inches- CPC, 2012). According to the National Weather Service/Advanced Hydrologic Prediction Service (NWS/AHPS), the region has received approximately 1.5 to 3 inches rain within the 30 days prior to this review. This is approximately 2 to 3 inches below the average rainfall for this time of year (NWS/AHPS, 2012).

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

TABLE 5-3
ALL SPECIES LISTED BY USFWS/NOAA AS HAVING THE POTENTIAL TO OCCUR IN CAMERON COUNTY

Common Name	Scientific Name	Federal Status	Agency
Eskimo Curlew	*Numenius borealis*	LE	USFWS
Interior Least Tern	*Sterna antillarum athalassos*	LE	USFWS
Northern Aplomado Falcon	*Falco femoralis septentrionalis*	LE	USFWS
Piping Plover	*Charadrius melodus*	LT	USFWS
Rio Grande silvery minnow	*Hybognathus amarus*	LE	USFWS
Jaguar	*Panthera onca*	LE	USFWS
Gulf Coast Jaguarundi	*Herpailurus yaguarondi*	LE	USFWS
Ocelot	*Leopardus pardalis*	LE	USFWS
West Indian manatee	*Trichechus manatus*	LE	USFWS
South Texas ambrosia	*Ambrosia cheiranthifolia*	LE	USFWS
Star cactus	*Astrophytum asterias*	LE	USFWS
Texas ayenia	*Ayenia limitaris*	LE	USFWS

Common Name	Scientific Name	Federal Status	Agency
Atlantic hawksbill sea turtle	*Eretmochelys imbricata*	LE	USFWS/NOAA
Green sea turtle	*Chelonia mydas*	LT	USFWS/NOAA
Kemp's Ridley sea turtle	*Lepidochelys kempii*	LE	USFWS/NOAA
Leatherback sea turtle	*Dermochelys coriacea*	LE	USFWS/NOAA
Loggerhead sea turtle	*Caretta caretta*	LT	USFWS/NOAA
Smalltooth sawfish	*Pristis pectinata*	LE	NOAA
Blue whale	*Balaenoptera musculus*	LE	NOAA
Finback whale	*Balaenoptera physalus*	LE	NOAA
Humpback whale	*Megaptera novaeangliae*	LE	NOAA
Sei whale	*Balaenoptera borealis*	LE	NOAA
Sperm whale	*Physeter macrocephalus*	LE	NOAA

LE = Listed Endangered
LT = Listed Threatened
USFWS = US Fish and Wildlife Service
NOAA = National Oceanic and Atmospheric Administration

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

5.2.1 Eskimo Curlew

The Eskimo curlew is about 12 inches in length and is generally brown with white speckles. They have long, dark green, dark brown, or dark grey-blue legs.

Historically, huge flocks of Eskimo Curlew landed on the gulf coast after crossing the Gulf of Mexico while migrating north from wintering grounds in South America to their nesting grounds in the Alaskan and Canadian Arctic. Grasshoppers and other insects are the curlew's main food source during migration. Important habitats for the curlews include Arctic tundra while nesting and open grasslands for the remainder of the year. Hunting pressure followed by conversion of native grasslands to cropland, throughout the wintering and migration habitat, is thought to be the reason for the birds' decline (USFWS, 2011a). There is currently no designated critical habitat for the species.

5.2.2 Interior Least Tern

Least Terns are the smallest North American terns averaging 8 to 10 inches in length, with a 20 inch wingspan as an adult. Adults are gray above and white below, with a black cap, black nape and eye stripe, white forehead, yellow bill with a black or brown tip, and yellow to orange legs.

Interior Least Terns breed from April to August on bare or sparsely vegetated sand, shell, and gravel beaches, sandbars, islands, and salt flats associated with rivers and reservoirs. The birds prefer open habitat, and tend to avoid thick vegetation and narrow beaches. Sand and gravel bars within a wide unobstructed river channel, or open flats along shorelines of lakes and reservoirs, provide favorable nesting habitat (Texas Parks and Wildlife Department Interior

Least Tern (Sterna antillarum athalassos) http://www.tpwd.state.tx.us/huntwild/wild/species/leasttern/ (accessed 7/26/12a).

Primarily a fish-eater, the Interior Least Tern is migratory, breeding along inland river systems in the U.S. and wintering along the Central American coast and the northern coast of South America from Venezuela to northeastern Brazil. There is currently no designated critical habitat for the species.

5.2.3 Northern Aplomado Falcon

The aplomado falcon has a steel grey back, red breast, black "sash" on its belly, and striking black markings on the top of its head, around its eyes, and extending down its face.

Aplomado falcons are usually seen in pairs. They use stick nests built by other birds instead of building a nest. Aplomados hunt as pairs and eat mostly birds and insects. They are fast fliers, and often chase prey animals as they try to escape into dense grass.

Aplomado falcons inhabit open grassland or savannah from Texas to Arizona and south and to the southern tip of South America. Recent re-introduction efforts within south Texas Counties have re-established breeding populations of the species (Texas Parks and Wildlife Department Northern Aplomado Falcon (Falco femoralis) http://www.tpwd.state.tx.us/huntwild/wild/species/aplomfal/ (accessed 7/26/12b). There is currently no designated critical habitat for the species.

Since 1997, over 100 captive-reared young have been released annually by The Peregrine Fund along the Texas Gulf Coast including Laguna Atascosa National Wildlife Refuge located approximately 18 miles east of the project site. This program has resulted in the establishment of at least 37 Aplomado pairs that have produced over 92 young in the wild http://www.tpwd.state.tx.us/huntwild/wild/species/aplomfal/ (accessed 7/26/12b). As of 2011, approximately 26 aplomado falcon territories have been identified within Laguna Atascosa NWR (Peregrine Fund, 2001).

Aplomado falcon territories are generally situated in open grasslands and savannahs near the Texas Coast where tall cacti, yuccas and taller oaks grow in open stands. Due to conversion of habitat, the aplomado falcon is restricted to protected preserves or large ranching tracts with sufficient acreage of their necessary habitat. Generally, these areas are located to the north and east of the proposed construction site and action area.

5.2.4 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. Designated critical habitat exists along south side of the Brownsville Ship Channel and northward in designated areas along coasts and barrier islands surrounding Laguna Madre (USFWS Critical Habitat for Threatened & Endangered Species http://criticalhabitat.fws.gov/crithab/ access 7/20/2012a).

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.

5.2.5 Rio Grande Silvery Minnow

The Rio Grande silvery minnow is a small, relatively heavy-bodied minnow with few noticeable differences between the sexes. Adults may reach 3.5 inches length. Live specimens are light greenish-yellow dorsally and light cream to white ventrally. Fins are moderate in length and variable in shape; dorsal and pectoral fins are rounded at tips. Scales above the lateral line are sometimes outlined, suggesting a diamond grid pattern. The head and snout are moderately pigmented. The body is fully scaled. The snout is rounded and overhangs the upper lip.

Rio Grande silvery minnow historically occupied approximately 2,400 miles in New Mexico and Texas. It was found in the Rio Grande from central, New Mexico, down through Texas to the Gulf of Mexico. It was also found in the Pecos River, from southern New Mexico, downstream to its confluence with the Rio Grande in Texas.

Currently, the Rio Grande silvery minnow is believed to occur only in one reach of the Rio Grande in New Mexico in addition to a section of the river within Big Bend National Park where it has been re-introduced.

In general, the species most often uses silt substrates in areas of low or moderate water velocity. Throughout much of its historic range, the decline of the Rio Grande silvery minnow may be attributed in part to destruction and modification of its habitat due to dewatering and diversion of water, water impoundment, and modification of the river (channelization). Competition and predation by introduced non-native species, water quality degradation, and other factors may also have contributed to its decline. Critical habitat for the species was

designated by the Service in 2003. The critical habitat encompassing 157 miles of the middle Rio Grande, in New Mexico has been designated by USFWS (USFWS, 2009).

5.2.6 Jaguar

The jaguar is the largest felid in the western hemisphere measuring up to 8 feet in length and weighing up to 350 pounds. Males are typically larger than females. Jaguars have a relatively robust head, compact but muscular body, short limbs and tail, and powerfully built chest and forelegs. The overall coat of a jaguar is typically pale yellow, tan, or reddish yellow above, and generally whitish on the throat, belly, insides of the limbs, and underside of the tail, with prominent dark rosettes or blotches throughout.

Jaguars may breed year-round rangewide; however, at the southern and northern ends of their range there is evidence for a breeding season. Litters usually consist of two cubs. Cubs remain with their mother for 1.5 to 2 years. The lifespan of the jaguar in the wild is estimated to be approximately 10-15 years.

Known prey include, but are not limited to, peccaries, capybaras, pacas, agoutis, deer, opossum, rabbits, armadillos, caimans, turtles, livestock, and various other reptiles, birds, and fish. Jaguars have relatively large home ranges which vary based on topography, available prey, and population dynamics.

Jaguars are known from a variety of vegetation communities including swampy savannas or tropical rain forests, thornscrub, desertscrub, lowland desert, mesquite grassland, Madrean oak woodland, and pine-oak woodland. The more open, dry habitat of southwestern U.S. has been characterized as marginal in terms of water, cover, and prey densities. Major habitat requirements appear to be a closed vegetative structure (USFWS, 2012b). There is currently no designated critical habitat for the species.

5.2.7 Gulf Coast Jaguarundi

The jaguarundi is a small, short, rusty-brown or charcoal gray cat historically found from Argentina to Arizona. Within the US, jaguarundis were most often reported in the brushlands of South Texas where they were reported to hunt for birds and rodents within the dense brush. Generally, jaguarundis are solitary except during the mating season of November and December (USFWS, 1990).

It is generally assumed that jaguarundis are endangered in the USA because the dense brush that provided habitat has been cleared for farming or for the growth of cities. The last confirmed sighting of a jaguarundi was in Brownsville in 1986, though there have been many reported sightings in various areas of Texas. There is currently no designated critical habitat for the species.

Jaguarundis are believed to occur in the Lower Rio Grande Valley (LRGVE) based on historic records and recent unverified reports. It is believed that they occupy territories centered around the scattered clumps of native brush still present within the LRGV. It is also believed that jaguarundis travel between the clumps of brush by following vegetated corridors including drainages and irrigation ditches to hunt and breed. An irrigation canal which appears to be mowed and maintained is present within the action area and adjacent to the construction site. This canal may potentially provide a travel corridor for jaguarundis from the construction site south to potential clumps of brush.

5.2.8 Ocelot

The ocelot is a small spotted cat that historically ranged from Arizona to Argentina. Within the USA, ocelots were most commonly reported from the brushlands of South Texas. Prior to 1900, ocelots could be found in the cedar brakes of the Texas Hill Country as well as the dense thickets of east Texas (USFWS, 1990).

Ocelots hunt at night for rabbits, rodents, and small birds and spend the day resting. Ocelots are endangered because their preferred habitat, dense brush has been cleared for farming and growth of cities. Approximately 120 ocelots are believed to still occur within the USA. About 35 of these are found at Laguna Atascosa National Wildlife Refuge (18 miles away). There is currently no designated critical habitat for the species.

Previous studies conducted by Dr. Mike Tewes at Texas A&M-Kingsville University have determined that ocelots utilize vegetated corridors to travel between clumps of brush habitat to hunt and breed. An irrigation canal which appears to be mowed and maintained is present within the action area and adjacent to the construction site. When not mowed, this canal may potentially provide a travel corridor for ocelots from the construction site south to potential clumps of brush.

5.2.9 West Indian Manatee

The West Indian manatee is a large, grayish, nearly hairless aquatic mammal with a broad rounded tail and paddle-like front limbs. West Indian manatees are found in rivers, estuaries, and coastal areas of the tropical and subtropical New World from the southeastern United States coast along Central America and the West Indies to the northern coastline of South America. Historically, manatees were at least season migrants to the Laguna Madre.

These animals occur chiefly in the larger rivers and brackish water bays. They are able to live in salt waters of the sea, however, and travel from one island to another or from place to place along the coast. Manatees are opportunistic, aquatic herbivores that feed exclusively on aquatic vegetation. Wild manatees seem to prefer submerged vegetation, followed by floating and emergent species. Manatees consume 30-50 kg of food per day. In saline waters, they feed on seagrasses. Manatees occur in loosely knit groups, but are not gregarious by nature. Breeding and calving occurs year round with the gestation period lasting 12-13 months.

They are extremely sensitive to cold and may be killed by a sudden drop in the temperature of the water to as low as 8°C. Their irregular occurrence along the Texas coast suggests that they do considerable wandering - specimens observed in south Texas probably represent migrants from coastal Mexico (West Indian Manatee http://www.nsrl.ttu.edu/tmot1/tricmana.htm accessed 7/20/12) while those observed in the central and upper Texas coast are likely from Florida populations Deutsch, C.J. et. al. 2008. Designated critical habitat for the species exists in Florida.

5.2.10 Atlantic Hawksbill Sea Turtle

The USFWS describes the hawksbill sea turtle as a small to medium-sized marine turtle commonly 2.5 feet in length and weighing between 95 to 165 pounds.

Hawksbill hatchlings are ocean going, and often found in the weedlines that accumulate at convergence zones. Juveniles will return to a coastal environment when their carapace reaches approximately 20-25 centimeters in length. Juveniles and adults will spend most of their time foraging on sponges in coral reefs (NOAA – Office of Protected Resources, Hawksbill Turtle (*Eretmochelys imbricata*), http://www.nmfs.noaa.gov/pr/species/turtles/hawksbill.htm, Accessed 7/20/2012b).

Hawksbill turtle nesting occurs between April and November on low and high energy beaches in tropical oceans. Nesting habitat is often shared with green sea turtles. Hawksbills are typically associated with rocky areas and coral reefs in water less than 65 feet. Mexico is now considered the most important region for hawksbills in the Caribbean yielding 3,000 to 4,500 nests/year. The Hawksbill is an occasional visitor to the Texas coast Designated critical habitat for the species exists near Puerto Rico.

5.2.11 Green Sea Turtle

Green Sea Turtles range throughout the tropical ocean regions. During the day, Green Sea Turtles feed in the seagrass beds that grow in shallow waters with small amounts of sponges, crustaceans, sea urchins, and mollusks. The turtles migrate from nesting areas to feeding grounds, which are sometimes several thousand miles away. The major nesting beaches are always found in places where the seawater temperature is greater than 25 C.

Adults reach sexual maturity between 8 and 13 years of age. Adults mate every 2 to 3 years during the nesting season just off the nesting beaches. Green sea turtles are reported to live for 50 years or more and can grow to 850 pounds.

Sharks and humans are predators of the Green Sea Turtle. Exploitation of the nesting grounds either by human interference or pollution poses the greatest threat to these turtles (NOAA – Office of Protected Resources, Green Turtle (Chelonia mydas), http://www.nmfs.noaa.gov/pr/species/turtles/green.htm, accessed 7/20/2012c). In the past, Green

Sea Turtles were often killed in large shrimp trawl nets. The Green Sea Turtle is an occasional visitor to the Texas coast. Designated critical habitat for the species exists near Puerto Rico.

5.2.12 Kemp's Ridley Sea Turtle

The Kemp's Ridley sea turtle is considered the smallest sea turtle with an olive-gray carapace and a triangular shaped head and a hooked beak. Adults can grow to about two feet in length and weigh up to 100 pounds. This turtle is a shallow water benthic feeder with a diet consisting primarily of shrimp, jellyfish, snails, sea stars, and swimming crabs.

Most nesting occurs on the eastern coast of Mexico, however a small number consistently nest at Padre Island National Seashore in Texas and various other locations along the Gulf and lower Atlantic coasts. Nesting occurs from May to July during daylight hours (NOAA – Office of Protected Resources, Kemp's Ridley Turtle (Lepidochelys kempii), http://www.nmfs.noaa.gov/pr/species/turtles/kempsridley.htm, accessed 7/20/2012d). Large numbers of females emerge for a synchronized nesting event referred to as "arribada". Arribadas are thought to be caused by female pheromone release, offshore winds, and/or lunar cycles. Females nest up to 4 times per season at intervals of 10 to 28 days. The preferred nesting beaches are adjacent to extensive swamps or large bodies of open water.

The Kemp's Ridley turtles range includes the Gulf coasts of Mexico and the U.S., and the Atlantic coast of North America as far north as Nova Scotia and Newfoundland. There is currently no designated critical habitat for the species.

5.2.13 Leatherback Sea Turtle

The leatherback sea turtle is the largest sea turtle. The adult leatherback can get up to 8 feet in length and up to 2000 pounds. The turtle lacks a "normal" turtle shell and is covered by firm, rubbery skin that is approximately 4 inches thick. Coloration is predominantly black with varying degrees of pale spotting; including a notable pink spot on the dorsal surface of the head in adults. Diet is primarily jellyfish and salp, but it is also known to feed on sea urchins, squid, crustaceans, tunicates, fish, blue-green algae, and floating seaweed.

Leatherbacks are highly migratory and the most pelagic of all sea turtles. Females prefer high energy, sandy beaches with vegetation immediately upslope and a beach sloped sufficiently so the crawl to dry sand is not too far. Preferred beaches have deep, unobstructed oceanic access on continental shorelines.

In the United States, nesting occurs from March to July. Females nest on average 6 times per season at 10-day intervals. Most leatherbacks return to their nesting beaches at 2- to 3-year intervals. eNOAA – Office of Protected Resources, Leatherback Turtle (Dermochelys coriacea), http://www.nmfs.noaa.gov/pr/species/turtles/leatherback.htm, accessed 7/20/2012e).

Distribution is worldwide in tropical and temperate waters of the Atlantic, Pacific, and Indian Oceans. The leatherback is also found in small numbers as far north as British Columbia, Newfoundland, and the British Isles and as far south as Australia and Argentina. The leatherback has a small presence in the U.S. with most nesting occurring on the Florida east coast, Sandy Point, U.S. Virgin Islands, and Puerto Rico. Designated critical habitat for the species exists near the U.S. Virgin Islands.

5.2.14 Loggerhead Sea Turtle

The loggerhead sea turtle is reddish-brown marine turtle characterized by a large head with blunt jaws. Adults can be up to 500 pounds and 4 feet in length. Adult loggerheads feed on jellyfish, floating egg clusters, flying fishes, mollusks, crustaceans, and other marine animals.

The nesting season in the U.S. is May through August. Nesting occurs every 2 to 3 years and is mostly nocturnal. Females can nest up to 5 times per season at intervals of approximately 14 days. Hatchling emergence is mostly nocturnal. Loggerheads nest on oceanic beaches between the high tide line and dune fronts and occasionally on estuarine shorelines with suitable sand. Females prefer narrow, steeply sloped, coarse grained beaches.

Distribution of the loggerhead includes the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. Although the majority (-80%) of the U.S. nesting activity occurs in south Florida, loggerheads nest along the Gulf and Atlantic coastlines from Texas to Virginia (NOAA – Office of Protected Resources, Loggerhead Turtle (*Caretta caretta*), http://www.nmfs.noaa.gov/pr/species/turtles/loggerhead.htm, accessed 7/20/2012f). Loggerheads are considered an occasional visitor to Texas. There is currently no designated critical habitat for the species.

5.2.15 South Texas Ambrosia

A member of the aster family, south Texas ambrosia is an erect, silvery to grayish-green, perennial, herbaceous plant, 4 to 12 inches in height. Its simple leaves, about 3 inches long and 1.5 inches wide, are usually opposite on the lower portion of the plant and alternate above. Male and female flowers are separate but occur on the same plant. Male flowers are in heads arranged along a terminal, elongated stem. Flower stalks contain 10-20 small, yellowish, bud-like flowers, about 1/4 inch across and shaped like hanging bowls. Female flowers are in small clusters at the leaf bases below the male flowering stalks.

South Texas ambrosia blooms in late summer and fall, but its flowers are not showy and may be missed by the casual observer. It spreads through rhizomes (underground stems), and a single individual plant may be represented by hundreds of stems forming close-spaced colonies. The plant occurs in open grasslands or savannas with soils ranging from clay loam to sandy loam commonly associated with Texas gama, Texas wintergrass and buffalo grass. Today the species occurs at six known locations in Nueces and Kleberg counties (USFWS, 2011c). There is currently no designated critical habitat for the species.

5.2.16 Star Cactus

The star cactus is a small, spineless, disk or dome-shaped cactus. It is 3.6 inches across, and 3 inches tall. Star cactus is dull green-to-brown in color, often speckled with a covering of tiny white scales. The body is divided into eight, vaguely triangular sections. During periods of adequate moisture, star cactus is usually a dull green color; however, during droughts, the cactus becomes brownish and loses fullness so that it becomes flush with the ground and almost perfectly camouflaged. Flowers are yellow with orange centers, and up to 6 inches in diameter. The fruits of star cactus are green to grayish-red, oval, and fleshy when mature.

Currently, a small number of sites are known to support the species in varying numbers in Texas and Mexico. One population composed of two subpopulations is present on private land in Starr County, Texas; several populations exist in Tamaulipas, Mexico; and one population has been documented in Nuevo Leon, Mexico. Other populations likely exist in the United States and Mexico but remain undocumented due to difficulty in gaining access for surveys on private land (USFWS, 2003).

The star cactus grows in the grasslands and thorn shrub of the Rio Grande. The species is found on gravelly clays or loams overlaying the Tertiary Catahoula and Frio formations in the United States and on soils of limestone origin overlaying Cenozoic to Mesozoic marine sediments in Tamaulipas, Mexico. The introduction of cattle and the suppression of fire have reduced the grassland component of this province while increasing the woody species component. Star cactus individuals are occasionally found in the open, but typically occur within the partial shade of other plants or rocks.

Star cactus has been observed flowering in the wild from March through May, with fruiting occurring from April through June. Star cactus is likely insect pollinated, but specific pollinators have not been observed. There is currently no designated critical habitat for the species.

5.2.17 Texas Ayenia

Texas ayenia is a thornless medium-sized shrub, two to five feet tall. The leaves are 1 1/2-3 inches long, simple, alternate, and hairy. They have toothed margins and are shaped like an inverted teardrop. The flowers are small and clustered in the upper leaves, with five green, pink, or cream colored petals. The fruit is a round, five-celled capsule about 1/4 inches in diameter and covered with short, curvy, sharp prickles.

Little is known about the reproductive biology of this species, a member of the chocolate family. Texas ayenia may be dependent on flooding for nutrient deposition and seed dispersal. Plants growing in association with Texas ayenia include coma, brasil, mesquite, lotebush, granjeno, colima, and snake-eyes. This plant community was once an extensive thicket that covered much of the Rio Grande delta; however, most of the habitat has been converted to farmland and residential areas. The majority of currently known habitats exist mainly along fence rows,

highway right-of-ways, canals, and ditch banks in Coahuila and Tamaulipas in Mexico. Today, Texas ayenia exists in the United States in only one small population of about 20 individuals in Hidalgo County (http://www.tpwd.state.tx.us/huntwild/wild/species/ayenia/, accessed on 7/27/12c for Texas ayenia). There is currently no designated critical habitat for the species.

5.3 DOCUMENTED OCCURRENCES WITHIN THE VICINITY OF THE ACTION AREA

On April 25, 2012, Zephyr forwarded a request to TPWD to provide Texas Natural Diversity Database information for reports of element occurrence (EO) data (TPWD and USFWS listed-species) within the Action Area and surrounding vicinity. On May 4, 2012, TPWD forwarded ArcGis shapefiles for all reported listed-species on the Harlingen, Paso Real, Rio Hondo, and Willamar SW 7.5-minute USGS quadrangle maps. A review of those shapefiles indicates that only one federally listed species has been reported within the Action Area since 1928 which is the earliest year for a reported EO within the Action Area.

In 1946, a jaguar was reported in the area. Very little information is provided in the description of the report. An exact location is not given for the report. It likely refers to a jaguar killed in Olmito, Texas approximately 10 miles to the south within that time period. In summary, other than the jaguar, no other federally listed plant or animal species has been reported in the vicinity of the Action Area.

Regional occurrences of the Northern Aplomado falcon, the Ocelot, and the Gulf Coast jaguarundi prompted the USFWS to state that there is a potential for these species in the project vicinity.

5.4 LISTED SPECIES MANAGED BY NOAA

Listed species managed by NOAA within the Texas portion of the Gulf of Mexico that are not also listed by the USFWS include the smalltooth sawfish and five whale species (blue whale, fin whale, humpback whale sei whale, and sperm whale). These species require deep-water marine habitats. There are no marine habitats present within the action area. There is currently no designated critical habitat for any NOAA managed species within the State of Texas.

5.4.1 Smalltooth Sawfish

Sawfish get their name from their "saws"--long, flat snouts edged with pairs of teeth which are used to locate, stun, and kill prey. Their diet includes mostly fish but also some crustaceans. Smalltooth sawfish is one of two species of sawfish that inhabit U.S. waters. Smalltooth sawfish commonly reach 18 ft (5.5 m) in length, and may grow to 25 ft (7 m). Little is known about the life history of these animals, but they may live up to 25-30 years, maturing after about 10 years.

Sawfish species inhabit shallow coastal waters of tropical seas and estuaries throughout the world. They are usually found in shallow waters very close to shore over muddy and sandy

bottoms. They are often found in sheltered bays, on shallow banks, and in estuaries or river mouths. Designated critical habitat for smalltooth sawfish exists along the Florida gulf coast.

Juvenile sawfish use shallow habitats with a lot of vegetation, such as mangrove forests, as important nursery areas. Many such habitats have been modified or lost due to development of the waterfront in Florida and other southeastern states. The loss of juvenile habitat likely contributed to the decline of this species.

Smalltooth sawfish have been reported in the Pacific and Atlantic Oceans, and Gulf of Mexico; however, the U.S. population is found only in the Atlantic Ocean and Gulf of Mexico. Historically, the U.S. population was common throughout the Gulf of Mexico from Texas to Florida, and along the east coast from Florida to Cape Hatteras. The current range of this species has contracted to peninsular Florida, and smalltooth sawfish are relatively common only in the Everglades region at the southern tip of the state (http://www.nmfs.noaa.gov/pr/species/fish/smalltoothsawfish.htm accessed 7/20/2012a).

Sawfish are extremely vulnerable to overexploitation because of their propensity for entanglement in nets, their restricted habitat, and low rate of population growth.

The decline in smalltooth sawfish abundance has been caused primarily by catch in various fisheries, especially in gill nets. Because adults can grow very large, and potentially damage fishing gear of even pose a threat to fishermen, many incidentally captured sawfish were killed before they were removed from fishing gear, even if the fishermen had no interest in keeping them.

5.4.2 Blue Whale

The blue whale is the largest of the whales with bluish dorsal side and paler yellowish sides. Estimated weight is up to 100 metric tons.

Blue whales occur in all oceans of the world. There are only two records from the Gulf of Mexico, both of questionable occurrence. The current North Atlantic population is estimated to number 100-1,500 animals.

Generally, blue whales migrate northward to arctic feeding grounds in the spring and summer. Small, shrimp-like crustaceans known as "krill" predominate in the diet, tremendous amounts of which are required to sustain a single whale. In fall and winter the whales move back to temperate waters where mating and nursing of young take place. Blue whales from the northern hemisphere and southern hemisphere do not interbreed.

Female blue whales give birth to a single calf in temperate or equatorial waters during the winter months. Gestation is about 11 months and females bear young every other year (Blue whale http://www.nsrl.ttu.edu/tmot1/balamusc.htm)

5.4.3 Fin Whale

The fin whale is a large, slender whale similar to the blue whale but with a V-shaped head instead of U-shaped. The upperparts of a fin whale are gray while the underparts are pure white. There are numerous grooves on the throat which extend beyond the navel. Weights in excess of 59 metric tons have been reported.

The fin whale is rare in Texas waters with only a single stranded animal reported for the state. Fin whales move to high latitude feeding grounds during spring and summer and return to southerly, temperate waters for mating and calving during autumn and winter. As with other migratory whales, northern and southern hemisphere populations do not interbreed.

Like other baleen whale species, fin whales feed mainly on krill but also eat schooling fish including herring, cod, mackerel, pollock, sardine, and capelin when available.

The reproductive habits of fin whales are largely unknown. Females are thought to give birth at 3-year intervals with calving occurring from November to March in temperate waters after an 11 month gestation period (Fin whale http://www.nsrl.ttu.edu/tmot1/balaphys.htm).

5.4.4 Humpback Whale

Humpback whales typically reach lengths of approximately 45-feet and weigh up to 41 metric tons. Females are usually slightly larger than males. For their size, humpbacks tend to be greater in girth than the other baleen whales.

Humpback whales are generally black overall with irregular white markings on the throat, sides, abdomen, and occasionally dorsally. The flippers are very long and narrow. The flippers typically are white below but range from black to patterns of black and white dorsally, or even entirely white.

Humpback whales occur in all oceans of the world. Currently, about 800-1,000 humpback whales are believed to survive in the western North Atlantic. The only known occurrence along the Texas Coast is of a young, immature animal observed in 1992. No population estimates are available for Gulf humpbacks.

Humpbacks migrate to northern waters during the spring and summer and return south into Caribbean waters for mating and calving during the fall and winter.

Often congregating in groups of 20-30 to perhaps 100-200, humpbacks produce a number of unusual sounds arranged into complex and predictable patterns known as "songs." Humpback songs are thought to be broadcast by sexually mature, lone males and may have some purpose in mating rituals. Like other baleen whales, humpback whales eat krill and other schooling fish.

Every other year, female humpbacks give birth to a single calf in tropical or subtropical waters in winter after an 11 month gestation period (Humpback whale http://www.nsrl.ttu.edu/tmot1/meganova.htm).

5.4.5 Sei Whale

Sei whales (pronounced "say" or "sigh") are members of the baleen whale family and can reach lengths of about 40-60 ft and weigh 100,000 lbs. Sei whales have a long, sleek body that is dark bluish-gray to black in color and pale underneath.

Sei whales are usually observed singly or in small groups of 2-5 animals, but are occasionally found in larger (30-50) loose aggregations. Sei whales are capable of diving 5-20 minutes to opportunistically feed on plankton (e.g., copepods and krill), small schooling fish, and cephalopods (e.g., squid) by both gulping and skimming.

Females breed every 2-3 years, and after gestation period of 11-13 months and give birth to a single calf during the winter in equatorial waters. Sei whales prefer deeper subtropical waters on the continental shelf edge and slope worldwide.

Little is known regarding Sei whale distribution and movements, however they appear to have a cosmopolitan distribution and occur in subtropical, temperate, and subpolar waters around the world. This species may unpredictably and randomly occur in a specific area, sometimes in large numbers. These events may occur suddenly and then not occur again for long periods of time. Sei whales may seasonally migrate toward the lower latitudes during the winter and higher latitudes during the summer. Scientists estimate that worldwide Sei whale population is approximately 80,000; however, there are no current estimates for the stocks of Sei whales in the western North Atlantic (Sei whale http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/seiwhale.htm).

5.4.6 Sperm Whale

The sperm whale is a large, blackish-brown toothed whale with a large head. Males are generally larger with reported total lengths up to 20 m and weights of up to 39 metric tons.

Sperm whales in all oceans, but are primarily found in temperate and tropical waters of the Atlantic and Pacific Oceans. Sperm whales are the most numerous of the great whales in the Gulf of Mexico and sightings near the Texas coast are relatively common. Current estimates of sperm whale numbers in the Gulf of Mexico are approximately 1600 animals (NOAA, 2010).

Male sperm whales are highly migratory. Solitary adult males move into high latitude temperate waters during summer, while females remain grouped in tropical or subtropical waters. In winter, the bulls return to lower latitudes for mating.

Sperm whales regularly dive to depths of 1,000 m but are known to reach depths of over 2,100 m to hunt their primary prey - squid. These whales are known to produce a variety of "click sounds" occurring in sequence and termed "codas." Such sounds are probably used in echolocation and may play an important role in locating prey while feeding. Other than squid, these whales occasionally consume other deepwater prey including octopus, lobsters, crabs, jellyfish, sponges, and several varieties of fish.

Breeding behavior in sperm whales is similar to harem formation - a single, dominant male accompanies a group of females and defends the group against competing males. Twenty to thirty females may comprise a harem. Female sperm whales may give birth as infrequently as once every five years based upon an observed 15 months gestation period and an inferred three year nursing and weaning of the calf before breeding again (Sperm whale http://www.nsrl.ttu.edu/tmot1/physmacr.htm).

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 6.4.22.3. 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 APRV 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/m^3)	AQRV Screening Concentration[1] (µg/m^3)	PSD Class II Increment Consumption (µg/m^3)	Maximum Predicted Concentration (µg/m^3)	NAAQS (µg/m^3)
SO_2	1-Hour	4.85	917	---	Not Required[2]	196
	3-Hour	4.40	786	512	Not Required[2]	1,300
	24-Hour	1.29	> 18[3]	91	Not Required[2]	365
	Annual	0.25	18	20	Not Required[2]	80
NO_2	1-Hour	8.96	>3,760[3]	---	59.7	188
	4-Hour	< 8.96	3,760	---	---	---
	8-Hour	< 8.96	3,760	---	---	---
	1-Month	< 8.96	564	---	Not Required[2]	---
	Annual	1.61	100	---	9.31	100
CO	1-Hour	22.6	>1,800,000[3]	---	Not Required[2]	40,000
	8-Hour	10.0	>1,800,000[3]	---	0	10,000
	1-Week	< 10.0	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/m^3)	Maximum Predicted Concentration[1] (µg/m^3)	NAAQS[2] (µg/m^3)
PM_{10}	24-Hour	11.5	70.2	150
$PM_{2.5}$	24-Hour	5.71	29.9	35
	Annual	1.68	12.3	15

[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 LPEC will result in the conversion of approximately 80 acres of cultivated farmland to approximately 40 acres of industrial use combined with approximately 40 acres of maintained and landscaped habitats. The construction of the water, wastewater, and natural gas pipelines will take place on approximately 25 acres of right-of-way between the water and natural gas sources, which are approximately 1.5 miles from the project site. The electric transmission lines will be constructed in a right-of-way of approximately 6 acres.

Where the water, wastewater, and natural gas pipelines are routed along the irrigation canal, the terrain can be describe as generally flat and developed for row-crops. No existing utility ROW's were observed within the proposed ROW paths during the onsite inspection with the exception of the irrigation canal, Grimes Road, Farm to Market (FM) 509, and East Harrison Avenue. All portions of the proposed ROW path have been significantly impacted by row-crop production, household lawn maintenance, or roadway construction. No vegetation or habitats resembling those utilized by any of the federally-listed species for Cameron County will be removed or impacted by construction of the water lines. Two ephemeral drainages (near the intersection of FM 509 and East Harrison Avenue) will be traversed by the pipelines. Both exhibit native stands of brush on either side of the drainage. Both of these features will be directionally drilled for constructability purposes and to avoid impacts to natural resources. Directional drilling of the features avoids impacts to the drainages and adjacent native vegetation. No vegetation or habitats resembling those utilized by any of the federally-listed species for Cameron County will be removed or impacted by directional drilling of the drainages. Normal burial depth of the pipeline will be between 3 feet and 6 feet below the surface.

The electric transmission line will be located in row-cropland adjacent to the county road ROW, no vegetation or habitats resembling those utilized by any of the federally-listed species for Cameron County will be removed or impacted by its construction.

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 (combustion turbines, steam turbines, HRSG casings, cooling tower, and fuel conditioning equipment) will be guaranteed to have a sound pressure level of 85 dBA at 3 feet from the equipment. Additionally, the sound pressure levels from the HRSG stacks are anticipated to be 115 dBA. Based on the site arrangement and the proximity to the nearest potential natural habitat, a cumulative sound pressure level of approximately 55 dBA is expected. This can be compared to the sound pressure in a quiet office building. For areas closer to the site, i.e. the property boundary, the expected sound pressure level will be 65 dBA to 70 dBA which can be compared to the sound pressure levels of normal conversational speech.

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 LPEC facility will require a significant increase of human activity when compared to the current, regularly-occurring operational and maintenance activities of the cultivated farmland. 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 located on and surrounded entirely by cultivated farmland. Habitats present in the area of the construction site are not significant and do not support significant populations of wildlife due to the dynamic nature of cultivated land being plowed, harvested, allowed to go fallow, and then plowed for the next crop. No additional effects to wildlife are expected due to increased human activity from the project.

6.4 FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES HABITAT EVALUATION

6.4.1 Eskimo Curlew

6.4.1.1.1 Potential of Occurrence

Within Texas, the Eskimo curlew was a spring migrant only. Flocks of the bird would pass through Texas on their migration from wintering grounds in South America to nesting grounds in the arctic. The birds would stop in the native prairies to feed on insects before continuing north. Conversion of the native prairies to other uses has been cited as one reason for the species decline. Currently, the Eskimo curlew is considered nearly extinct.

Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. The habitat necessary for the survival of this species (native prairie) does not occur within the Action Area. There are no documented occurrences of the Eskimo curlew within or near the Action Area (TXNDD 2012). The last confirmed reports of Eskimo curlew in Cameron County occurred in 1889 (TBRC website accessed 11/12/12).

6.4.1.1.2 Potential Effect

As described above, there is no preferred or potential habitat for the Eskimo curlew in the Action Area, and furthermore, emissions, noise, and dust resulting from the planned construction and operation would not be expected to have any impact on Eskimo curlew habitat. In addition, no impact is expected on the Eskimo curlew by direct effects such as noise, dust or human activities, or by indirect effects such as acidification or eutrophication of aquatic habitats associated with construction and operation of the project.

6.4.1.1.3 Recommended Determination of Effect

The proposed action will have no effect on the Eskimo curlew.

6.4.2 Interior Least Tern

6.4.2.1.1 Potential of Occurrence

Interior Least Terns winter along the Texas Gulf Coast. Terns utilize bare, sparsely vegetated sand, shell, and gravel beaches, sandbars, islands, and salt flats in Cameron County as wintering sites. Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. The habitat necessary for the survival of this species (bare sandbars and gravel beaches) does not occur within the Action

Area. There are no documented occurrences of the Interior Least Tern within or near the Action Area (TXNDD 2012).

6.4.2.1.2 Potential Effect

As described above, there is no preferred or potential habitat for the Interior Least Tern in the Action Area, and furthermore, emissions, noise, and dust resulting from the planned construction and operation would not be expected to have any impact on Interior Lease Tern habitat. In addition, no impact is expected on the Interior Lease Tern by direct effects such as noise, dust or human activities, or by indirect effects such as acidification or eutrophication of aquatic habitats associated with construction and operation of the project.

6.4.2.1.3 Recommended Determination of Effect

The proposed action will have no effect on the Interior Least Tern.

6.4.3 Northern Aplomado Falcon

6.4.3.1.1 Potential of Occurrence

Northern aplomado falcons inhabit open grassland or savannahs of south Texas. Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. The habitat necessary for the survival of this species (grasslands or savannas) does not occur within the Action Area. There are no documented occurrences of the Aplomado falcon within or near the Action Area (TXNDD 2012). However, according to the USFWS, recent releases of these birds of prey at Laguna Atascosa NWR 18 miles away may increase the future potential of occurrence.

6.4.3.1.2 Potential Effect

As described above, there is no preferred habitat for the northern aplomado falcon in the Action Area, and furthermore, emissions, noise, and dust resulting from the planned construction and operation would not be expected to have an impact on the northern aplomado falcon or its habitat. No impact is expected on the northern aplomado falcon by direct effects such as noise, dust or human activities, or by indirect effects such as acidification or eutrophication of aquatic habitats associated with construction and operation of the project. However, construction and extension of overhead power lines in the area could potentially directly affect the aplomado falcon.

6.4.3.1.3 Recommended Determination of Effect

The proposed action may affect, but not likely to adversely affect the northern aplomado falcon.

6.4.4 Piping Plover

6.4.4.1.1 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 Cameron County as wintering sites. Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. The habitat necessary for the survival of this species (sandbars and gravel beaches) does not occur within the Action Area. There are no documented occurrences of the piping plovers within or near the Action Area (TXNDD 2012).

6.4.4.1.2 Potential Effect

As described above, there is no preferred or potential habitat for the piping plover in the Action Area, and furthermore, emissions, noise, and dust resulting from the planned construction and operation would not be expected to have any impact on piping plover habitat. In addition, no impact is expected on the piping plover by direct effects such as noise, dust or human activities, or by indirect effects such as acidification or eutrophication of aquatic habitats associated with construction and operation of the project.

6.4.4.1.3 Recommended Determination of Effect

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

6.4.5 Rio Grande Silvery Minnow

6.4.5.1.1 Potential of Occurrence

The Rio Grande Silvery Minnow requires riverine habitats with silt substrates in areas of low or moderate water velocity for survival. Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. The habitat necessary for the survival of this species (perennial free-flowing water) does not occur within the Action Area.

Irrigation canals present within the Action Area are not consistently flooded. Additionally, the Rio Grande silvery minnow is no longer believed to survive in this portion of the Rio Grande watershed. The lack of a reliable source population in nearby perennial water bodies eliminates the possibility of occasional use of the canals by the Rio Grande silvery minnow. There are no

documented occurrences of the Rio Grande silvery minnow within or near the Action Area (TXNDD 2012).

6.4.5.1.2 Potential Effect

Throughout much of its historic range, the decline of the Rio Grande silvery minnow may be attributed in part to destruction and modification of its habitat due to dewatering and diversion of water, water impoundment, and modification of the river (channelization). Competition and predation by introduced non-native species, water quality degradation, and other factors may also have contributed to its decline. As described above, there is no preferred or potential habitat for the Rio Grande silvery minnow in the Action Area, and furthermore, emissions, and dust resulting from the planned construction and operation would not be expected to have any impact on Rio Grande silvery minnow habitat. In addition, no impact is expected on the Rio Grande silvery minnow by direct effects such as dust or human activities, or by indirect effects such as acidification or eutrophication of aquatic habitats associated with construction and operation of the project.

6.4.5.1.3 Recommended Determination of Effect

The proposed action will have no effect on the Rio Grande silvery minnow.

6.4.6 Jaguar

6.4.6.1.1 Potential of Occurrence

A 1946 occurrence of the jaguar within the Action Area was indicated by the TXNDD review. However, since that date, jaguars have generally been assumed to be extirpated from Texas (USFWS, 1990 & 1997), (Tewes et. al., 1999). The nearest known population of jaguars is approximately 150 miles to the south in Tamaulipas Mexico (Moore, 2009) and would have to travel through significant human population centers in northern Mexico to enter the LRGV. Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. The brush shrubland habitat within the action area is small and isolated from similar habitats. Jaguars require thousands of acres of contiguous unmodified native brush shrubland habitats to survive. Habitats within the action area are significantly modified for agriculture, commercial/industrial, and residential purposes. There is no preferred or potential jaguar habitat in the action area.

6.4.6.1.2 Potential Effect

The likelihood of the occurrence of this species in the Action Area is discountable (i.e., extremely unlikely to occur). Additionally, emissions, noise, and dust resulting from the planned

construction and operation would not be expected to have any impact on jaguar habitat. In addition, no impact is expected on the jaguar by direct effects such as noise, dust or human activities, or by indirect effects such as acidification or eutrophication to any habitats associated with construction and operation of the project.

6.4.6.1.3 Recommended Determination of Effect

The proposed action will have no effect on the jaguar.

6.4.7 Gulf Coast Jaguarundi

6.4.7.1.1 Potential of Occurrence

Little is known about the habitat of Gulf Coast jaguarundis in Texas. It is thought that they occur in the same dense thorny brush shrublands as the ocelot. Previous to 1970, Gulf Coast jaguarundis were occasionally killed by hunters in the LRGV. After 1970, a Gulf Coast jaguarundi was not confirmed in the U.S. until a road-killed individual was discovered near Brownsville in 1986. Since that time, there have been several reports of Gulf Coast jaguarundi in Arizona, California, Florida, and Texas. However, none of the reports have been confirmed with a pelt or photographic evidence. Sunquist and Sunquist 2002, in “Wild Cats of the World” and Caso 2007 (Caso et. al. 2008) stated that the species is probably extinct in the U.S. Approximately 150 miles south of the Action Area, Gulf Coast jaguarundis are still encountered by hunters and a problem for poultry farmers.

Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation.

While there is an effort underway in the LRGV by USFWS and other conservation agencies to create and restore viable habitat for the Gulf Coast jaguarundi, there is no verified evidence that this effort has prevented the extirpation of the Gulf Coast jaguarundi in the LRGV or led to an increase in jaguarundis numbers within the LRGV. There are no documented occurrences of the Gulf Coast jaguarundi within or near the Action Area (TXNDD 2012). However, according to USFWS, there is a potential for the Gulf Coast jaguarundi to utilize the grassdominated irrigation canal along the western boundary of the proposed construction site as a travel corridor. Refer to site photographs in Appendix B which illustrate the grassland vegetation adjacent to the irrigation canal. Appendix C provides field observations made during the site reconnaissance which documented the dominate plant species present near the irrigation the canal.

6.4.7.1.2 Potential Effect

In Mexico, approximately 150 miles south of the Action Area, the Gulf Coast jagaurundi and ocelot have been found to utilize similar habitats and exhibit overlapping home ranges (Caso,

1994). Jaguarundis were found to utilize tall grass grasslands for hunting and return to brushy areas when disturbed or threatened (Caso, 1994).

Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial or commercial use as well as a small area (39 acres) still dominated by brush scrubland vegetation. Tall grass grasslands generally do not occur within or near to the Action Area. Additionally, the 39 acres of brush shrubland within the Action Area is much smaller than previously reported jaguarundi home ranges (Caso 1994).

As described above, the necessary mix of habitats (brush and tall grass grasslands) required by the jaguarundi is generally not present within the Action Area. However, regional development may be pressuring the jaguarundi to utilize previously undesirable areas. While the likelihood of the occurrence of this species in the Action Area is very low, USFWS believes that the onsite canal and associated vegetation may function as a potential travel corridor through the area for the Gulf Coast jaguarundi. As such, if left unmitigated, emissions, noise, lighting, and vehicular traffic resulting from the planned construction and operation may interfere with the utilization of the corridor by jaguarundis. Indirect effects to the jaguarundi and its habitat such as acidification or eutrophication associated with construction and operation of the project are not anticipated.

6.4.7.1.3 Recommended Determination of Effect

The proposed action may affect, but not likely to adversely affect the Gulf Coast jaguarundi.

6.4.8 Ocelot

6.4.8.1.1 Potential of Occurrence

In south Texas, the ocelot inhabits dense thornscrub communities in south Texas. The ocelot requires dense vegetation (>75% canopy cover), with 95% cover of the shrub layer preferred in Texas where it hunts rabbits, rodents, birds, and lizards. More than 95% of the dense thornscrub habitat in the Lower Rio Grande Valley has been converted to agriculture, rangelands, or urban land uses. Approximately 25 ocelots are believed to reside at Laguna Atascosa National Wildlife Refuge approximately 18 miles east of the Action Area.

Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. Canopy cover and shrub layer coverage within the brush stand is less than 75% and 95% respectively. This area is much smaller than previously reported ocelot home ranges (Caso 1994).

A review of Figure 5-4 (Appendix A) indicates that native brush within the Action Area is situated solely on Mercedes clay (0-1% slope). Rosamond 2009, in defining habitat for the recovery of ocelots (*Leopardus pardalis*) in the United States, found Mercedes clay and the native brush

growth associated with it to be avoided. Zero (0) radio-collared ocelots were located in brush stands associated with Mercedes clay while the expected number of locations within those areas was 175. Raymondville clay loam (also within the Action Area, but not exhibiting native brush within the Action Area) was determined to be avoided also. There are no documented occurrences of the ocelot within or near the Action Area (TXNDD 2012).

According to USFWS, there is a potential for the Ocelot to utilize the grass-dominated irrigation canal along the western boundary of the proposed construction site as a potential travel corridor through the area. Refer to site photographs in Appendix B which illustrate the grassland vegetation adjacent to the irrigation canal. Appendix C provides field observations made during the site reconnaissance which documented the dominate plant species present near the irrigation the canal.

6.4.8.1.2 Potential Effect

As described above, there is no preferred habitat (dense brush shrubland) for the ocelot in the Action Area. However; regional development is may be pressuring the ocelot to utilize previously undesirable areas. While the likelihood of the occurrence of this species in the Action Area is very low, USFWS believes that the onsite canal and associated vegetation may function as a potential travel corridor through the area for the ocelot. As such, if left unmitigated, emissions, noise, lighting, and vehicular traffic resulting from the planned construction and operation may interfere with the utilization of the corridor by ocelots. Indirect effects to the ocelot and it habitat such as acidification or eutrophication associated with construction and operation of the project are not anticipated.

6.4.8.1.3 Recommended Determination of Effect

The proposed action may affect, but not likely adversely affect the ocelot.

6.4.9 West Indian Manatee

6.4.9.1.1 Potential of Occurrence

The West Indian manatee requires marine and riverine habitats for survival. Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. There is no preferred or potential habitat for the West Indian manatee in the Action Area, and there are no documented occurrences of the manatee within or near the Action Area (TXNDD 2012).

6.4.9.1.2 Potential Effect

As described above, there is no preferred or potential habitat for the West Indian manatee in the Action Area, therefore, there is no potential to affect the West Indian manatee.

6.4.9.1.3 Recommended Determination of Effect

The proposed action will have no effect on the West Indian manatee.

6.4.10 Atlantic Hawksbill Sea Turtle

6.4.10.1.1 Potential of Occurrence

The Atlantic hawksbill sea turtle requires marine habitat for survival. Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. There is no preferred or potential habitat for Atlantic hawksbill sea turtle in the Action Area, and there are no documented occurrences of the Atlantic hawksbill sea turtle within or near the Action Area (TXNDD 2012).

6.4.10.1.2 Potential Effect

As described above, there is no preferred or potential habitat for the Atlantic hawksbill sea turtle in the Action Area, therefore there is no potential to affect the Atlantic hawksbill sea turtle.

6.4.10.1.3 Recommended Determination of Effect

The proposed action will have no effect on the Atlantic hawksbill sea turtle.

6.4.11 Green Sea Turtle

6.4.11.1.1 Potential of Occurrence

The green sea turtle requires marine habitat for survival. Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. There is no preferred or potential habitat for green sea turtles in the Action Area, and there are no documented occurrences of the green sea turtle within or near the Action Area (TXNDD 2012).

6.4.11.1.2 Potential Effect

As described above, there is no preferred or potential habitat for the green sea turtle in the Action Area, therefore, there is no potential to affect the green sea turtle.

6.4.11.1.3 Recommended Determination of Effect

The proposed action will have no effect on the green sea turtle.

6.4.12 Kemp's Ridley Sea Turtle

6.4.12.1.1 Potential of Occurrence

The Kemp's Ridley sea turtle requires marine habitat for survival. Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. There is no preferred or potential habitat for the Kemp's Ridley sea turtles in the Action Area, and there are no documented occurrences of the Kemp's Ridley sea turtle within or near the Action Area (TXNDD 2012).

6.4.12.1.2 Potential Effect

As described above, there is no preferred or potential habitat for the Kemp's Ridley sea turtle in the Action Area, therefore there is no potential to affect the Kemp's Ridley sea turtle.

6.4.12.1.3 Recommended Determination of Effect

The proposed action will have no effect on the Kemp's Ridley sea turtle.

6.4.13 Leatherback Sea Turtle

6.4.13.1.1 Potential of Occurrence

The leatherback sea turtle requires marine habitat for survival. Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. There is no preferred or potential habitat for the leatherback sea turtles in the Action Area, and there are no documented occurrences of the leatherback sea turtle within or near the Action Area (TXNDD 2012).

6.4.13.1.2 Potential Effect

As described above, there is no preferred or potential habitat for the leatherback sea turtle in the Action Area, therefore there is no potential to affect the leatherback sea turtle.

6.4.13.1.3 Recommended Determination of Effect

The proposed action will have no effect on the leatherback sea turtle.

6.4.14 Loggerhead Sea Turtle

6.4.14.1.1 Potential of Occurrence

The loggerhead sea turtle requires marine habitat for survival. Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. There is no preferred or potential habitat for the loggerhead sea turtles in the Action Area, and there are no documented occurrences of the loggerhead sea turtle within or near the Action Area (TXNDD 2012).

6.4.14.1.2 Potential Effect

As described above, there is no preferred or potential habitat for the loggerhead sea turtle in the Action Area, therefore there is no potential to affect the loggerhead sea turtle.

6.4.14.1.3 Recommended Determination of Effect

The proposed action will have no effect on the loggerhead sea turtle.

6.4.15 South Texas Ambrosia

6.4.15.1.1 Potential of Occurrence

South Texas ambrosia occurs at low elevations in open clay-loam and sandy-loam prairies and savannas. Today the species occurs at six known locations in Nueces and Kleberg counties (USFWS 2008). Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. All habitats within the Action Area are either significantly modified for farming and maintained lawns or exhibit brush shrubland habitats and are unsuitable for the South Texas Ambrosia. Soils within the mostly unmodified area of brush shrubland are described by NRCS as “clay throughout” (NRSC Series Description, accessed November 16, 2012). There is no preferred or potential habitat for south Texas ambrosia identified in the Action Area, and there are no documented occurrences of the

south Texas ambrosia within or near the Action Area (TXNDD 2012). According to USFWS, South Texas ambrosia does not occur in the area.

6.4.15.1.2 Potential Effect

As described above, there is no preferred or potential habitat for the south Texas ambrosia in the Action Area, and furthermore, emissions, and dust resulting from the planned construction and operation would not be expected to have any impact on south Texas ambrosia habitat. In addition, no impact is expected on the south Texas ambrosia by direct effects such as dust or human activities, or by indirect effects such as acidification of habitats associated with construction and operation of the project.

6.4.15.1.3 Recommended Determination of Effect

The proposed action will have no effect on the south Texas ambrosia.

6.4.16 Star Cactus

6.4.16.1.1 Potential of Occurrence

Star cactus grows on sparsely vegetated areas in gravelly, saline clays or loams at low elevations in the Rio Grande Plains. The species is found on gravelly clays or loams overlaying the Tertiary Catahoula and Frio formations. The geologic units which outcrop within the Action Area include the unconsolidated Quaternary-age deposits of the Beaumont Formation and Rio Grande Alluvium. Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. All habitats within the Action Area are either significantly modified for farming and maintained lawns or exhibit brush shrubland habitats and are unsuitable for the star cactus. Soils within the mostly unmodified area of brush shrubland are described by NRCS as “clay throughout” without a gravelly component and not suitable for the star cactus (NRCS Series Description, accessed November 16, 2012). There is no preferred or potential habitat for star cactus identified in the Action Area, and there are no documented occurrences of the star cactus within or near the Action Area (TXNDD 2012).

6.4.16.1.2 Potential Effect

As described above, there is no preferred or potential habitat for the star cactus in the Action Area, and furthermore, emissions, and dust resulting from the planned construction and operation would not be expected to have any impact on star cactus habitat. In addition, no impact is expected on the star cactus by direct effects such as dust or human activities, or by indirect effects such as acidification of habitats associated with construction and operation of the project.

6.4.16.1.3 Recommended Determination of Effect

The proposed action will have no effect on the star cactus.

6.4.17 Texas Ayenia

6.4.17.1.1 Potential of Occurrence

Texas ayenia is an inhabitant of dense subtropical thickets and woodlands on river terraces and floodplains of the Rio Grande. Habitats within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation.

Historic Cameron County populations of the species were destroyed in the early 1960's. No new populations have been identified in Cameron County. Five separate searches for the plant within Hidalgo and Cameron County have located only a single population within Hidalgo County. No other populations are known or believed to exist within the U.S.
The small portion of the Action Area exhibiting native brush does not experience the required inundation reported as necessary for the species survival. There is no preferred or potential habitat for Texas ayenia identified in the Action Area, and there are no documented occurrences of the Texas ayenia within or near the Action Area (TXNDD 2012). According to USFWS, the Texas ayenia does not occur in the area.

6.4.17.1.2 Potential Effect

As described above, there is no preferred or potential habitat for the Texas ayenia in the Action Area, and furthermore, emissions, and dust resulting from the planned construction and operation would not be expected to have any impact on Texas ayenia habitat. In addition, no impact is expected on the Texas ayenia by direct effects such as dust or human activities, or by indirect effects such as acidification of habitats associated with construction and operation of the project.

6.4.17.1.3 Recommended Determination of Effect

The proposed action will have no effect on the Texas ayenia.

6.4.18 Listed Species Managed by NOAA

6.4.18.1.1 Potential of Occurrence

The species exclusively managed by NOAA within Cameron County coastal waters include the smalltooth sawfish and five whale species which require marine habitat for survival. Habitats

within the Action Area are generally described as dominated by cultivated farmland with minor portions developed for industrial/commercial use with a small area (39 acres) still dominated by brush shrubland vegetation. There is no potential habitat for any listed species managed by NOAA in the Action Area, and there are no documented occurrences of any listed species managed by NOAA within or near the Action Area (TXNDD 2012).

6.4.18.1.2 Potential Effect

As described above, there is no marine habitat in the Action Area, therefore there is no potential to affect any of the NOAA managed species.

6.4.18.1.3 Recommended Determination of Effect

The proposed action will have no effect on any listed species managed by NOAA.

6.5 CONSERVATION MEASURES

The USFWS – Corpus Christi Ecological Field Office indicated the proposed project may affect the northern aplomado falcon, the Gulf Coast jaguarundi, and the ocelot, and as mitigation to potential impacts provided the following conservation recommendations:

1) Provide downshield lighting to illuminate facility or parking areas.
2) Protect riparian areas or canals from construction and/or use.
3) If possible, limit construction to daylight hours to mitigate noise impacts.
4) Educate construction workers and staff on potential endangered species in the area, including species identification, habitat, and measures to avoid or minimize impacts.
5) Reduce vehicle speeds to on facility construction site to avoid or minimize potential road mortality.
6) Mark transmission lines, if possible, and/or follow recommendations for raptors during the construction and design of such lines.
7) Notify the Service's Alamo ES Suboffice (956-784-7506) or Rio Grande Valley NWR if an endangered species is observed or impacted.
8) The site is located on a cleared farm cropland, however, if additional infrastructure will require the removal of thick vegetation, please contact the Service for further assistance.

Construction contracts will be written with specific requirements to educate construction personnel regarding the potential for occurrence of endangered species and require the contractor's environmental representatives to contact the local offices of the Fish and Wildlife Service in the event any of those species are encountered. In addition, contractors will be required to protect the areas near the canal that may function as a potential travel corridor from an unnecessary disturbance. Protective actions may include construction of fencing and/or barricades. La Paloma does not anticipate the removal of any thick vegetation through the

course of construction, however, in the event that construction activities will require the removal of such vegetation, La Paloma will contact the U.S. Fish and Wildlife Service for assistance.

For the safety and security of the construction workers, the majority of construction activities will take place during daylight hours. The baseline construction schedules have been developed to reflect this philosophy and the contractors will be required to minimize night-time construction activities. This will also result in a reduction of noise emissions in the area during nighttime hours. The facility will be designed such that no direct lighting will be used to illuminate areas near the canal at night. The reduction of vehicle speeds on public roadways is regulated by Texas Department of Transportation and/or local authorities, however; a reduced speed limit may be posted on the facility construction site to reduce vehicle speed. La Paloma will also work with the transmission line owner to install bird diverters on the conductors to minimize potential collisions and to discourage nesting or roosting on the structures or towers.

6.6 DESIGNATED CRITICAL HABITAT ANALYSIS

Designated critical habitat for the piping plover is present along the eastern and western shores of the Laguna Madre in Cameron County. The Action Area is located a minimum of 17 miles west of the nearest designated piping plover habitat. Designated critical habitat does not exist for any other species within Cameron County (USFWS, 2012a).

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
Eskimo Curlew	USFWS	No effect
Interior Least Tern	USFWS	No effect
Northern Aplomado Falcon	USFWS	May affect, not likely to adversely affect
Piping Plover	USFWS	No effect
Rio Grande silvery minnow	USFWS	No effect
Jaguar	USFWS	No effect
Gulf Coast Jaguarundi	USFWS	May affect, not likely to adversely affect
Ocelot	USFWS	May affect, not likely to adversely affect
West Indian manatee	USFWS	No effect
South Texas ambrosia	USFWS	No effect
Star cactus	USFWS	No effect
Texas ayenia	USFWS	No effect
Atlantic hawksbill sea turtle	USFWS/NOAA	No effect
Green sea turtle	USFWS/NOAA	No effect
Kemp's Ridley sea turtle	USFWS/NOAA	No effect
Leatherback sea turtle	USFWS/NOAA	No effect
Loggerhead sea turtle	USFWS/NOAA	No effect
Smalltooth Sawfish	NOAA	No effect
Blue whale	NOAA	No effect
Fin whale	NOAA	No effect
Humpback whale	NOAA	No effect
Sei whale	NOAA	No effect
Sperm whale	NOAA	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, La Paloma 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, La Paloma 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

During construction of the proposed additions, La Paloma 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 LPEC will be pumped back through a pipeline and connected to a point in the City of Harlingen treatment

plant. Therefore, there will be no impacts to surface waters from process water. LPEC 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 LITERATURE CITED

Beck, M. W. (Miles Walter), et al. Soil Survey of Cameron County, Texas, Book, 1941; digital images, (http://texashistory.unt.edu/ark:/67531/metapth19806/: accessed August 02, 2012), University of North Texas Libraries, The Portal to Texas History, http://texashistory.unt.edu; crediting UNT Libraries Government Documents Department, Denton, Texas.

Caso, A. 1994. Home range and habitat use of three neotropical carnivores in northeast Mexico. Thesis, Texas A&M University-Kingsville, Kingsville, TX. Caso, A., Lopez-Gonzalez, C., Payan, E., Eizirik, E., de Oliveira, T., Leite-Pitman, R., Kelly, M. & Valderrama, C. 2008. *Puma yagouaroundi*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2. <www.iucnredlist.org>. Downloaded on 14 February 2013.

Climate Prediction Center (CPC) 2012. In 2012 Drought Severity Index by Division (Long-Term Palmer) Archive- 6/30/2012. Accessed July 6, 2012. http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer/2012/.

Connolly, Amy R. 2009. Defining Habitat for Recovery of Ocelots (Leopardus pardalis) in the United States. Undergraduate Thesis- Texas State University December 2009. Supervisor Thomas R. Simpson. 48 pp.

Deutsch, C.J., Self-Sullivan, C. & Mignucci-Giannoni, A. 2008. *Trichechus manatus*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2. <www.iucnredlist.org>. Downloaded on 14 February 2013.

Dudley, N. and Stolton, S. 1996. Air Pollution and Biodiversity: A Review. World Wildlife Fund, International (WWF), Switzerland.

Geologic Atlas of Texas (GAT). 1994. V. E. Barnes, Project Director, McAllen-Brownsville Sheet, by J. L. Brewton, F. Owen, S. Aronow, and V. E. Barnes. Arthur Carleton Trowbridge Memorial Edition. 1976; reprinted 1994.

Harlingen Economic Development Corporation (HEDC). (2012). Citing website. In International Opportunity. Accessed July 5, 2012. http://www.harlingenedc.com/InternationalOpportunity.

Harlingen, City of. 2012. Welcome to Harlingen, Texas – City of Harlingen, Texas. Accessed July 3, 2012. http://www.myharlingen.us/.

Jahrsdoerfer, S. E., and D. M. Leslie, Jr. 1988. Tamaulipan Brushland of the Lower Rio Grande Valley of South Texas: Description, Human Impacts, and Management Options. U.S. Fish Wildlife Service, Biological Report. 88(36). 63 pp.

Lovett GM and Tear TH. 2008. Threats from Above, Air Pollution Impacts on Ecosystems and Biological Diversity in the Eastern United States. Institute of Ecosystem Studies and The Nature Conservancy.

McCoy, T.W., 1990. Evaluation of ground-water resources in the Lower Rio Grande Valley, Texas: TWDB Rept. 316, 48 p.

Moore, Richard. 2009. The Nature Report: Jaguars in Tamaulipas- Jaguar Study in Tamaulipas, Northern Mexico. Accessed August 1, 2012. http://easterncougar.org/CougarNews/?p=692

National Cooperative Soil Survey (NCSS) Series Description, November, 2005, https://soilseries.sc.egov.usda.gov/OSD_Docs/M/MERCEDES.html, Accessed November 16, 2012.

National Oceanic and Atmospheric Administration (NOAA). 2010 National Marine Fisheries Services, Sperm Whale (*Physeter macrocephalus*): Northern Gulf of Mexico Stock.

National Oceanic and Atmospheric Administration (NOAA). 2012a. Office of Protected Resources- Smalltooth Sawfish (Pristis pectinata). Accessed July 20, 2012. http://www.nmfs.noaa.gov/pr/species/fish/smalltoothsawfish.htm .

National Oceanic and Atmospheric Administration (NOAA). 2012b. Office of Protected Resources- Hawksbill Turtle (Eretmochelys imbricata). Accessed July 20, 2012. http://www.nmfs.noaa.gov/pr/species/turtles/hawksbill.htm.

National Oceanic and Atmospheric Administration (NOAA). 2012c. Office of Protected Resources- Green Turtle (Chelonia mydas). Accessed July 20, 2012. http://www.nmfs.noaa.gov/pr/species/turtles/green.htm/

National Oceanic and Atmospheric Administration (NOAA). 2012d. Office of Protected Resources- Kemp's Ridley Turtle (Lepidochelys kempii). Accessed July 20, 2012. http://www.nmfs.noaa.gov/pr/species/turtles/kempsridley.htm/

National Oceanic and Atmospheric Administration (NOAA). 2012e. Office of Protected Resources- Leatherback Turtle (Dermochelys coriacea). Accessed July 20, 2012. http://www.nmfs.noaa.gov/pr/species/turtles/leatherback.htm/

National Oceanic and Atmospheric Administration (NOAA). 2012f. Office of Protected Resources- Loggerhead Turtle (Caretta caretta). Accessed July, 20 2012. http://www.nmfs.noaa.gov/pr/species/turtles/loggerhead.htm/

National Weather Service- Advanced Hydrologic Prediction Service (NWS-AHPS) 2012. In Texas: June, 2012. Accessed July 6, 2012. http://water.weather.gov/precip/.

Natural Resources Conservation Services (NRCS) – National Weather and Climate Center (WCC). In Climate data from 1971 to 2002 in Harlingen, TX. Accessed July 6, 2012 http://hurricane.ncdc.noaa.gov/climatenormals/clim20/tx/413943.pdf

Natural Science Research Laboratory (NSRL) Texas Tech University. 2011. In Mammal Database Search Engine-Texas Mammals-West Indian Manatee (Trichechus manatus). Accessed July 20, 2012. http://www.nsrl.ttu.edu/tmot1/tricmana.htm/

Peregrine Fund, The. 2011 Aplomado Falcon Territory Occupancy Survey Summary - South Texas, Paul Juergens- 05 June 2011 - in Aplomado Falcon Restoration, accessed 2/13/2013, http://blogs.peregrinefund.org/article/711 .

Redwine, J.S., Lacey, R. E., Mukhtar, S., and Carey, J. B. 2002. Concentration and Emissions of Ammonia and Particulate Matter in Tunnel- Ventilated Broiler Houses Under Summer Conditions in Texas. American Society of Agricultural Engineers. Volume 45(4) p. 1101-1109. ISSN 0001-2351.

Smith AE and Levenson JB. 1980. A Screening Procedure for the Impacts of Air Pollution on Plants, Soils, and Animals. Argonne National Laboratory, Argonne, Illinois, USA.

Sunquist, M., & Sunquist, F. 2002. Wild Cats of the World. University of Chicago Press. August 15, 2002. ISBN: 0-226-77999-8. 462 pp.

Tewes, M.E., G. Portes, and A. Caso. 1999. Management and conservation of wild cats in northeast Mexico. Pages 241-248 in W. Hamilton and C.J. Villareal, editors. Proceeding 4th Wildlife Conservation and Management. Universidad Autonoma Agraria “Antonio Narro”, Saltillo, Coahuila, Mexico. Accessed July 20, 2012. http://cnrit.tamu.edu/cgrm/whatzhot/saltillo/tewes.html.

Texas Bird Records Committee (TBRC), http://texasbirds.org/tbrc/eskimo2.html, 1997. Accessed November 16, 2012.

Texas Parks and Wildlife Department (TPWD) - Texas Natural Diversity Database (TXNDD). 2012. Request to Bob Gottfried- TXNDD Administrator for Cameron County. ESRI Shapefile - May 4, 2012.

Texas Parks and Wildlife Department (TPWD) 2012b. Northern Aplomado Falcon (Falco femoralis). Accessed July 26, 2012. www.tpwd.state.tx.us/huntwild/wild/species/aplomfal/.

Texas Parks and Wildlife Department (TPWD) 2012c. Texas Ayenia (Ayenia limitaris). Accessed July 26, 2012. http://www.tpwd.state.tx.us/huntwild/wild/species/ayenia/.

Texas Parks and Wildlife Department (TPWD). 2012a. Interior Least Tern (Sterna antillarum athalassos) Accessed July 26, 2012. http://www.tpwd.state.tx.us/huntwild/wild/species/leasttern/.

The Mammals of Texas NOAA Fisheries – Office of Protected Resources, Sei Whale. Accessed 2/25/2013. http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/seiwhale.htm

The Mammals of Texas - Online Edition. Accessed 2/25/2013. http://www.nsrl.ttu.edu/tmot1/balamusc.htm

The Mammals of Texas - Online Edition. Accessed 2/25/2013. http://www.nsrl.ttu.edu/tmot1/balaphys.htm

The Mammals of Texas – Online Edition. Accessed 2/25/13. http://www.nsrl.ttu.edu/tmot1/meganova.htm

The Mammals of Texas – Online Edition. Accessed 2/25/13. http://www.nsrl.ttu.edu/tmot1/physmacr.htm

U. S. Fish and Wildlife Service (USFWS). 1997. Federal Register / Vol. 62, No. 140 50 CFR Part 17 , Final Rule To Extend Endangered Status for the Jaguar in the United States. U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico. 59 pp.

U. S. Drought Monitor (USDM). (2012). In U.S. Drought Monitor- Texas. Accessed July 5, 2012. http://droughtmonitor.unl.edu/DM_state.htm?TX/

U. S. Fish and Wildlife Service (USFWS). 2011a. Federal Register Volume 76, Number 120, 50 CFR Part 17 –Endangered and Threatened Wildlife and Plants; Eskimo Curlew; Initiation of 5-Year Status Review. Docket No. FWS–R7–ES–2011–N086; 70120–1113–0000–C4. p. 36491-36493.

U. S. Fish and Wildlife Service (USFWS). 2012b. Recovery Outline for the Jaguar (Panthera onca). U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico. 59 pp.

U.S. Fish and Wildlife Service (USFWS). 1990. Listed Cats of Texas and Arizona Recovery Plan (With Emphasis on the Ocelot). U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 131 pp.

U.S. Fish and Wildlife Service (USFWS). 2003. Recovery Plan for Star Cactus (Astrophytum asterias).

U.S. Fish and Wildlife Service (USFWS). 2009. Rio Grande Silvery Minnow (Hybognathus amarus) Recovery Plan. Albuquerque, NM. xiii + 175 pp.

U.S. Fish and Wildlife Service (USFWS). 2010. Draft Ocelot (Leopardus pardalis) Recovery Plan, First Revision. U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico. 170pp.

U.S. Fish and Wildlife Service (USFWS). 2011c. 5-Year Review: Summary and Evaluation - South Texas Ambrosia (Ambrosia cheiranthifolia). Corpus Christi Ecological Services Field Office Corpus Christi, Texas. Accessed July 20, 2012. http://www.fws.gov/southwest/es/Documents/R2ES/South_Texas_Ambrosia_5-Year_Review_Jan2011.pdf.

U.S. Fish and Wildlife Service (USFWS). 2012a. FWS Critical Habitat for Threatened and Endangered Species Online Mapper. Accessed July 20, 2012. http://criticalhabitat.fws.gov/crithab/.

United States Department of Agriculture (USDA). 1977. Soil Survey of Cameron County, Texas. Accessed July 6, 2012 from http://soils.usda.gov/survey/online_surveys/texas/TX061/cameron.pdf

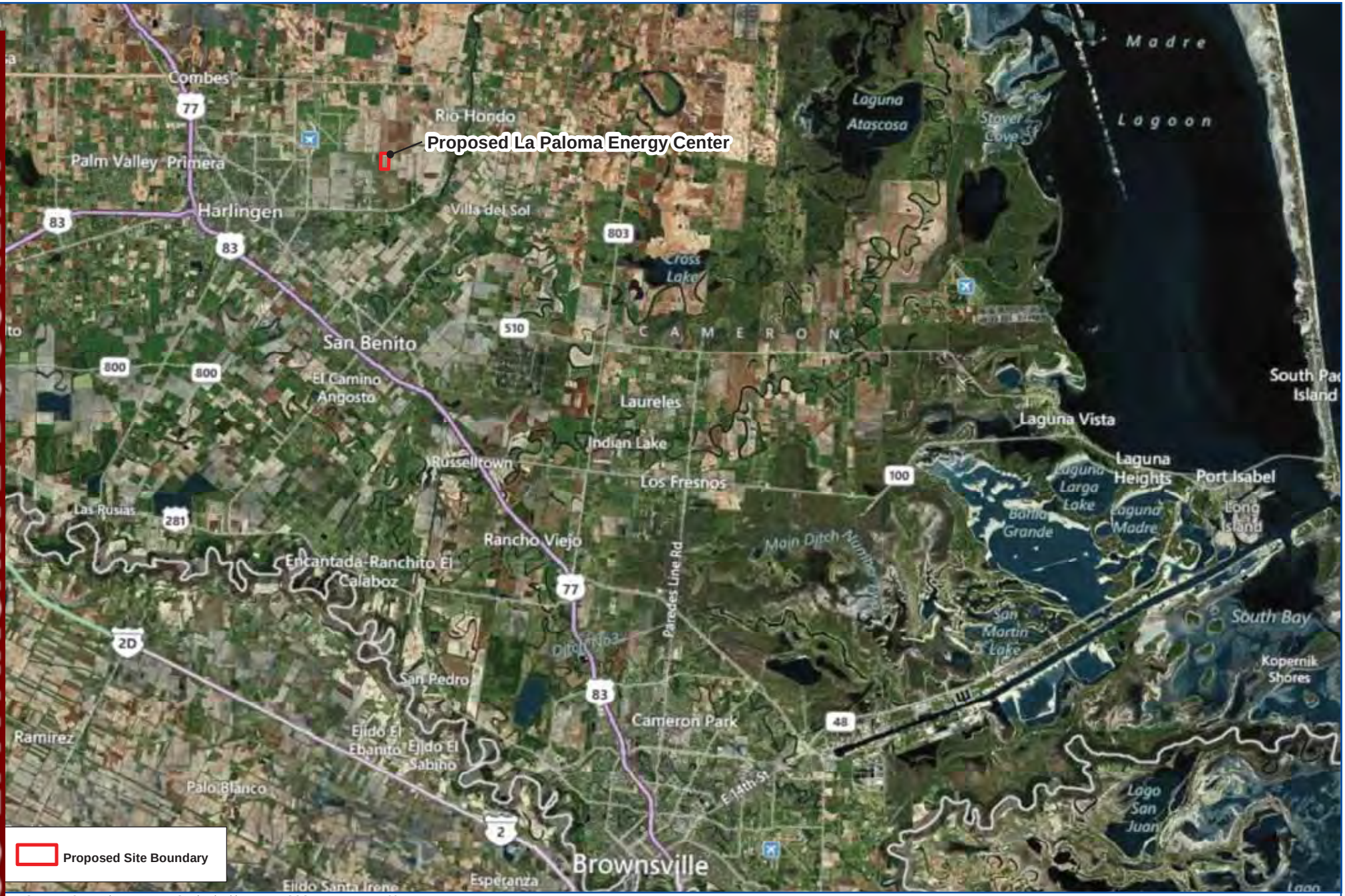
United States Department of Agriculture (USDA). 2012. Natural Resources Conservation Service (NRCS) Soil Survey Division- Official Soil Series Descriptions. Accessed July 6, 2012. https://soilseries.sc.egov.usda.gov/osdnamequery.asp

United States Geological Survey (USGS). 2012. Enhanced Historical Land-Use and Land-Cover Data Sets of the U.S. Geological Survey: Data Source Index Polygons. Accessed July 3, 2012. http://water.usgs.gov/GIS/dsdl/ds240/index.html.

9.0 LIST OF PREPARERS

- David Castro, Senior Project Engineering Associate, Zephyr Environmental Corporation
- Clay V. Fischer, Project /Scientist, Zephyr Environmental Corporation
- Jennifer N. Knowles, Staff Scientist, Zephyr Environmental Corporation
- Steven R. McVey, P.G., Principal, Zephyr Environmental Corporation
- Larry A. Moon, P.E., Principal, Zephyr Environmental Corporation
- Scott Stringfellow, Coronado Ventures LLC

APPENDIX A
SITE MAPS



Data Sources: Coronado Ventures; ESRI i-cubed imagery, USGS. Datum: NAD 83

Scale 1:250,000 1 inch = 20,833 feet

0 5 10 Kilometers

0 5 10 Miles

zephyr

FIGURE 1-1: PROJECT LOCATION

La Paloma Energy Center
Harlingen, Cameron County,Texas

H:\Coronado Ventures\011368 Harlingen Application\Biologic Assessment\Figures

Drafted By:	Reviewed by:	Project No.:	Date:
J. Knowles	C. Fischer	11368.004	08/06/2012

Data Sources: Coronado Ventures; ESRI i-cubed imagery, USGS. Datum: NAD 83

Scale 1:40,000 1 inch = 3,333 feet

0 1 2 Kilometers

0 1 2 Miles

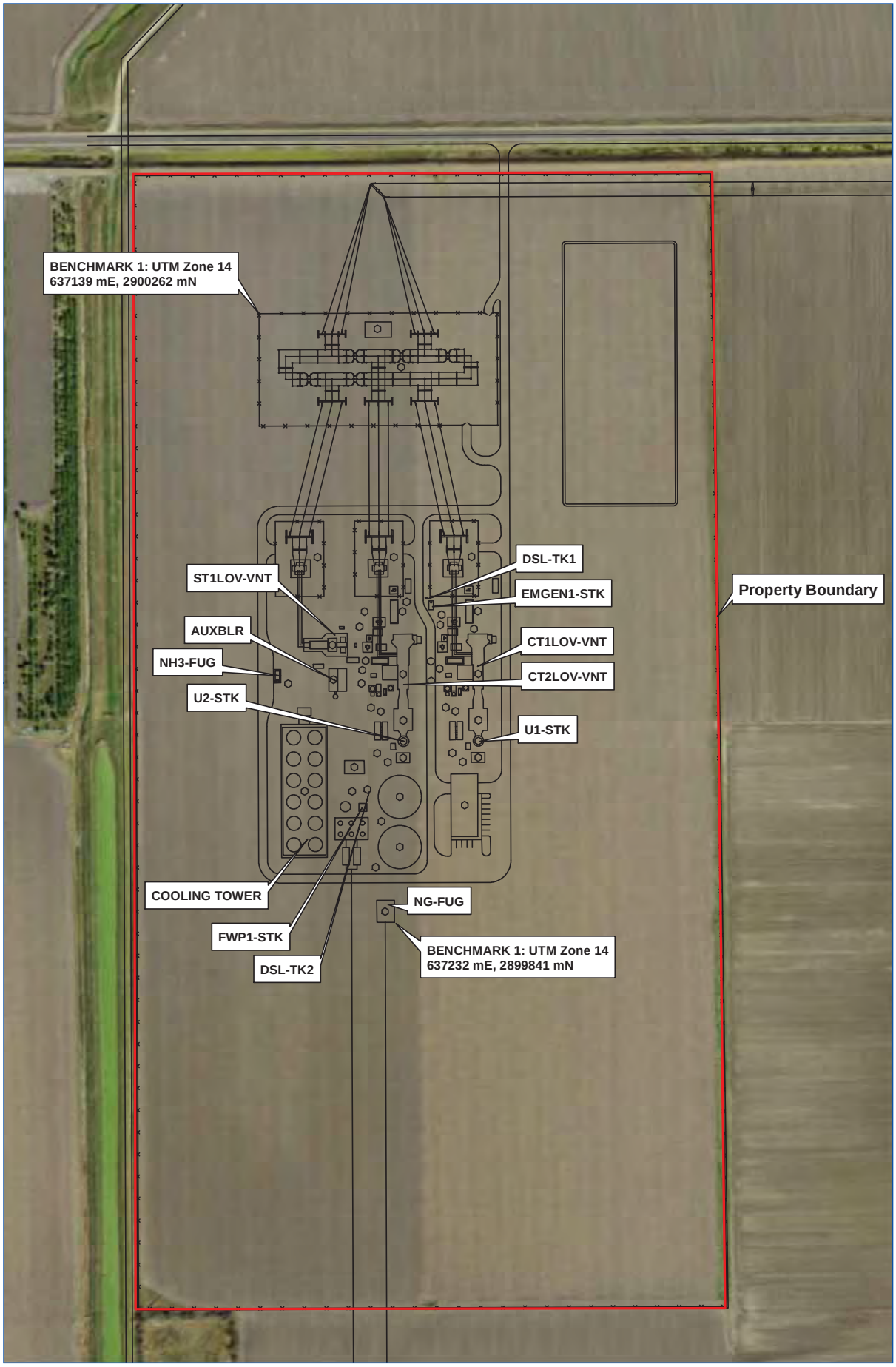
zephyr

FIGURE 3-1: PROPOSED PROJECT SITE

La Paloma Energy Center
Harlingen, Cameron County,Texas

H:\Coronado Ventures\011368 Harlingen Application\Biologic Assessment\Figures

Drafted By:	Reviewed by:	Project No.:	Date:
J. Knowles	C. Fischer	11368.004	08/06/2012



Data Sources:
ESRI i-cubed imagery; Coronado Ventures
Datum: GCS NAD 83 UTM Zone 14

Scale 1:2,500 1 in = 208 ft

0 75 150 Meters

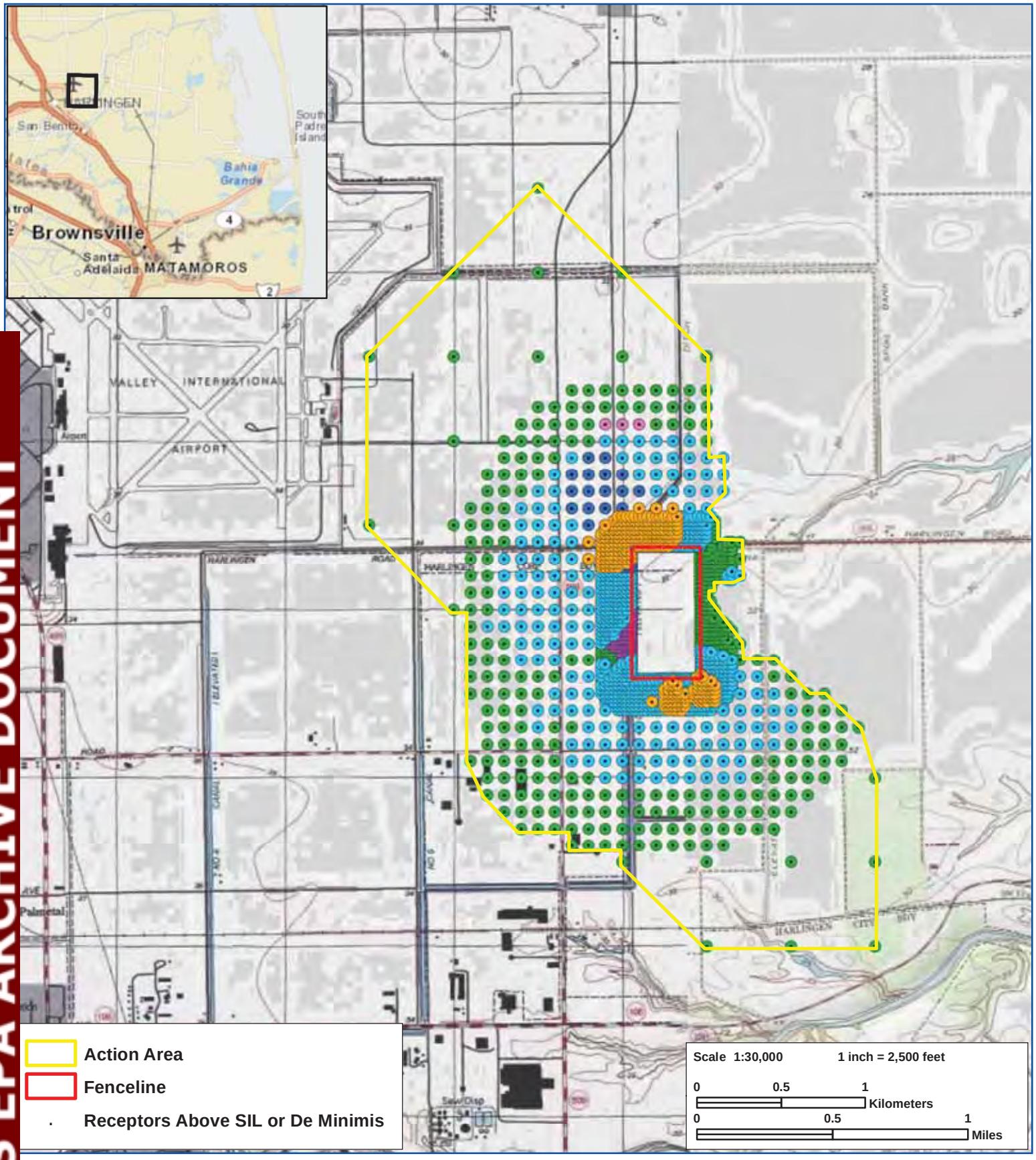
0 250 500 Feet

zephyr

FIGURE 3-2: PLOT PLAN
La Paloma Energy Center
Harlingen, TX

H:\Coronado Ventures\011368 Harlingen NSR Application\Graphics\Plot Plan

Drafted by:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	011368	03/09/2012



Datum: GCS NAD 1983 UTM Zone 14
Map Sources: ESRI USGS Topographic Basemap; Coronado Ventures

SITE LOCATION

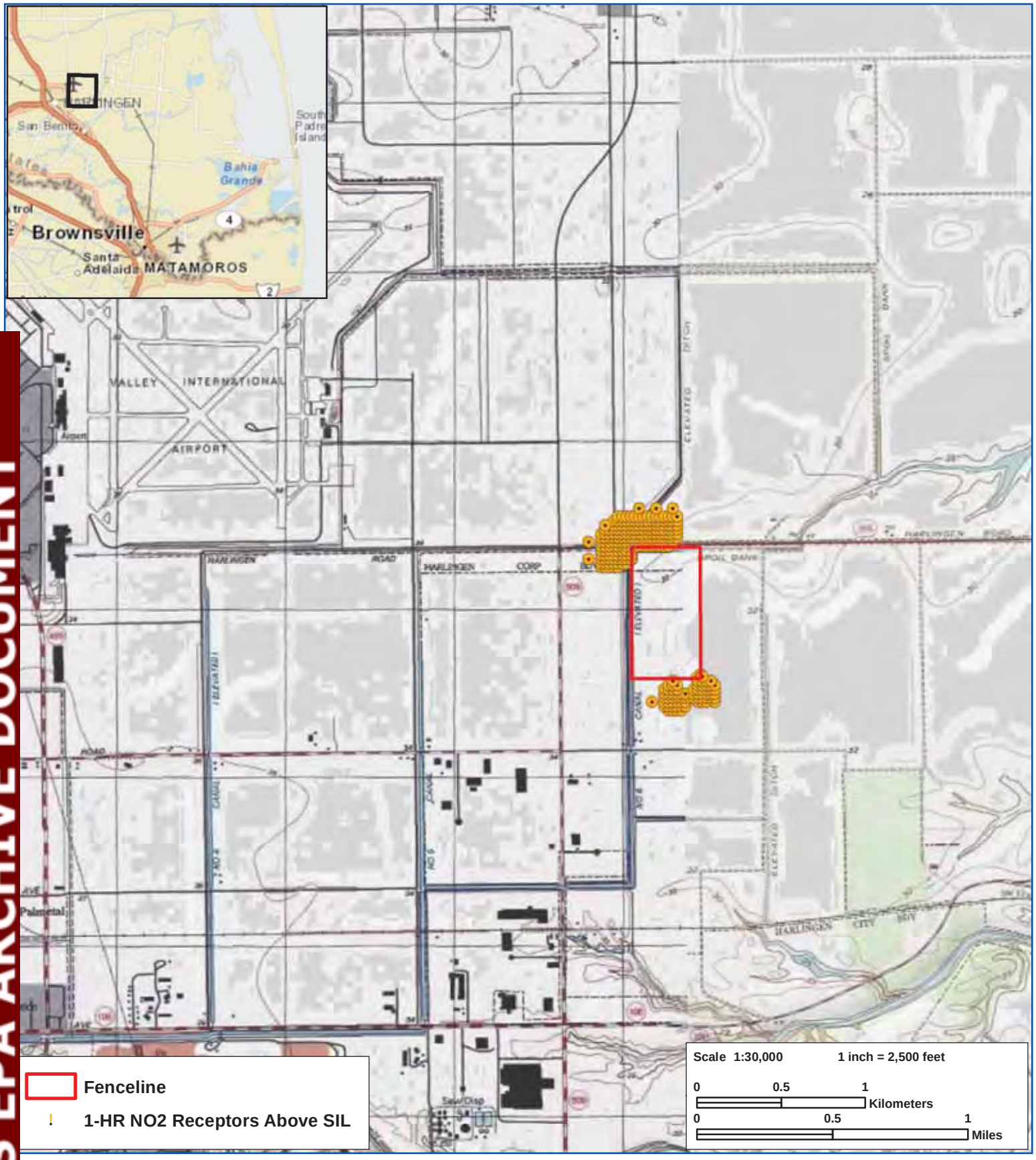
zephyr

FIGURE 4-1: ACTION AREA
Receptors Above SIL or De Minimis

La Paloma Energy Center
Harlingen, Texas

H:\Coronado Ventures\011368 Harlingen Application\Biologic Assessment\Figures\Receptor Figures

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	011368.004	08/08/2012



Datum: GCS NAD 1983 UTM Zone 14
Map Sources: ESRI USGS Topographic Basemap; Coronado Ventures

SITE LOCATION

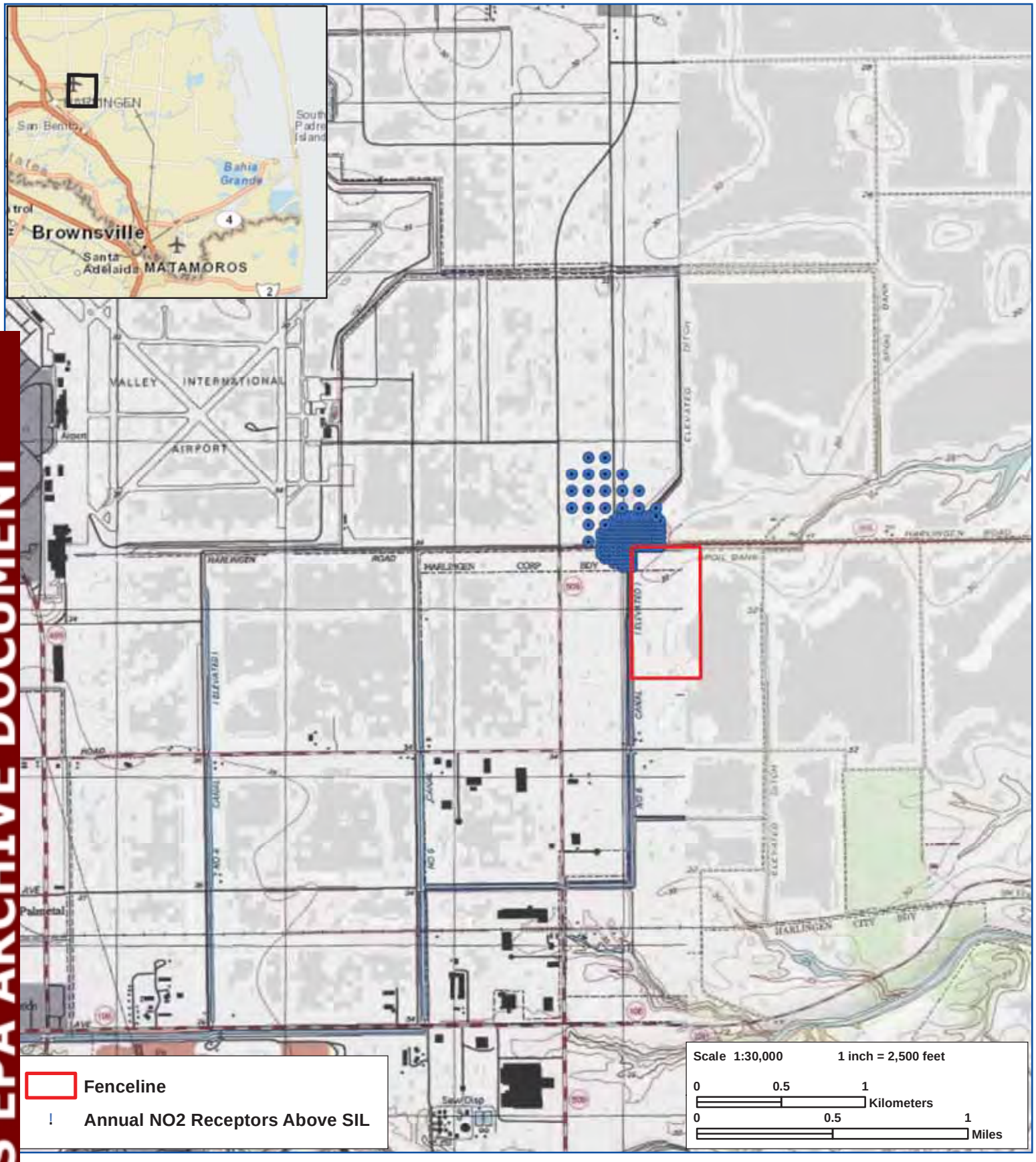
zephyr

FIGURE 4-2
1-HR NO2 Receptors Above SIL

La Paloma Energy Center
Harlingen, Texas

H:\Coronado Ventures\011368 Harlingen Application\Biologic Assessment\Figures\Receptor Figures

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	011368.004	08/08/2012



Datum: GCS NAD 1983 UTM Zone 14
Map Sources: ESRI USGS Topographic Basemap; Coronado Ventures

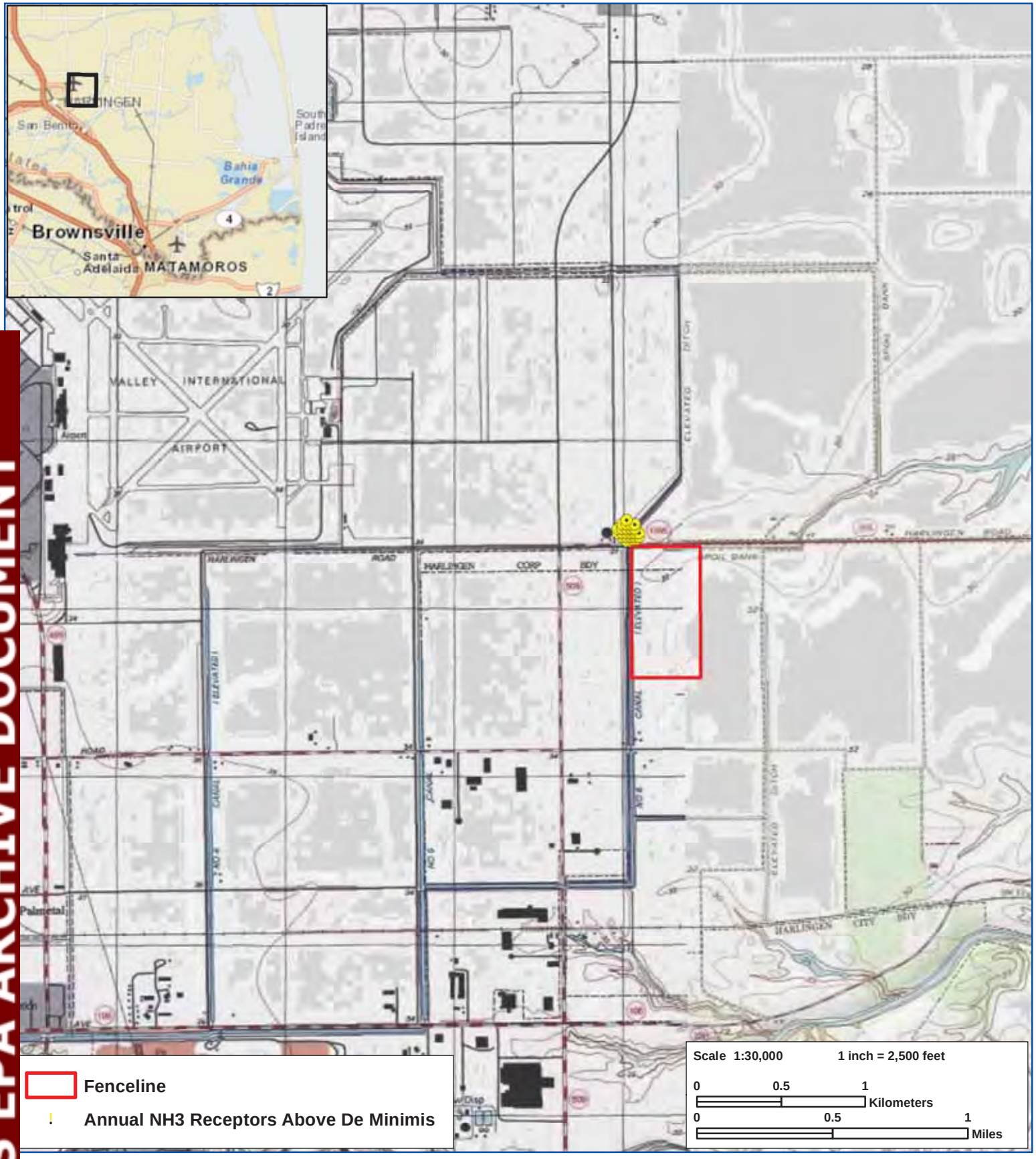
SITE LOCATION

zephyr

FIGURE 4-3
Annual NO2 Receptors Above SIL
La Paloma Energy Center
Harlingen, Texas

H:\Coronado Ventures\011368 Harlingen Application\Biologic Assessment\Figures\Receptor Figures

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	011368.004	08/08/2012



Datum: GCS NAD 1983 UTM Zone 14
Map Sources: ESRI USGS Topographic Basemap; Coronado Ventures

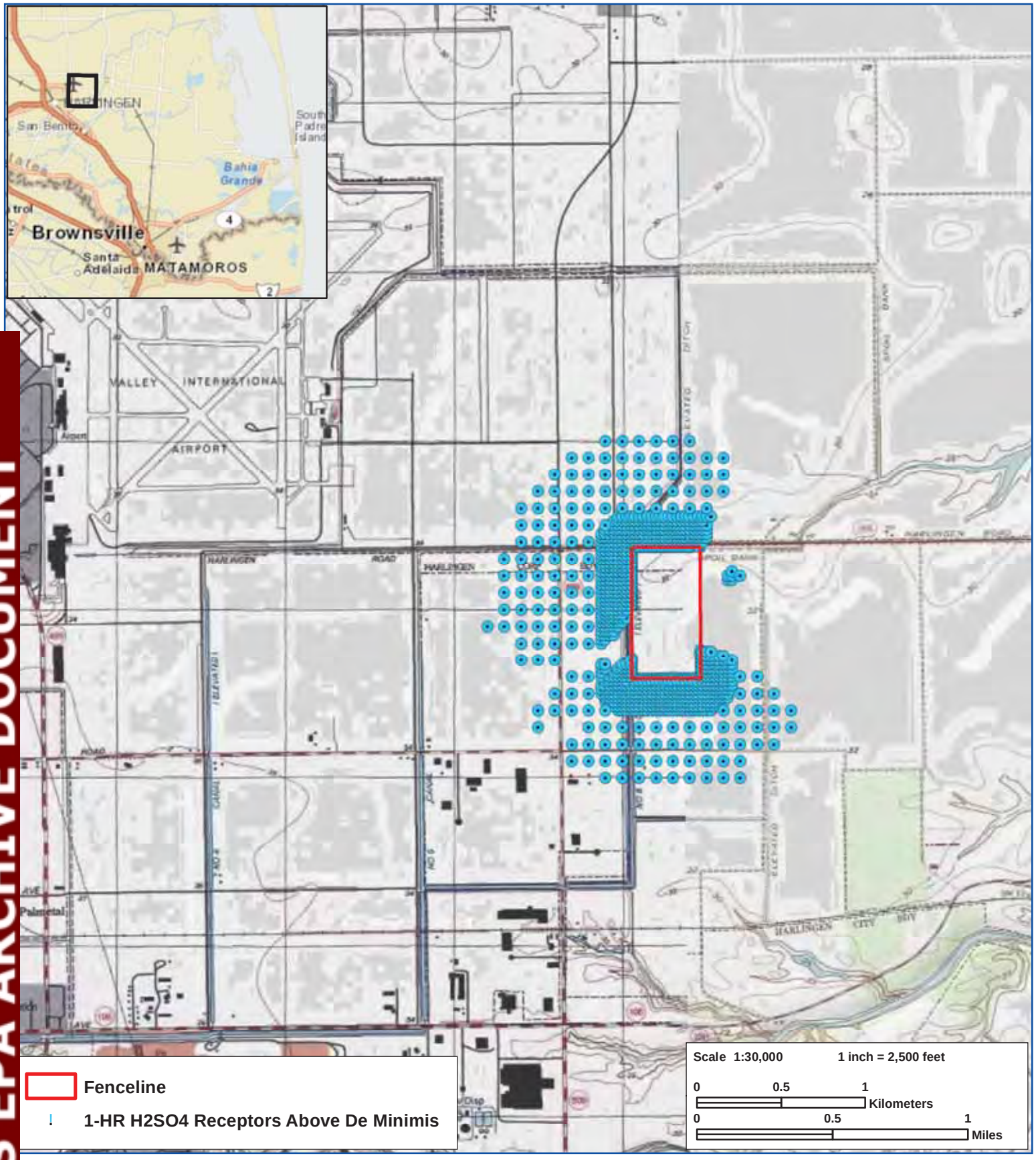
SITE LOCATION

zephyr

FIGURE 4-4
Annual NH3 Receptors Above De Minimis
La Paloma Energy Center
Harlingen, Texas

H:\Coronado Ventures\011368 Harlingen Application\Biologic Assessment\Figures\Receptor Figures

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	011368.004	08/08/2012



Datum: GCS NAD 1983 UTM Zone 14
Map Sources: ESRI USGS Topographic Basemap; Coronado Ventures

SITE LOCATION

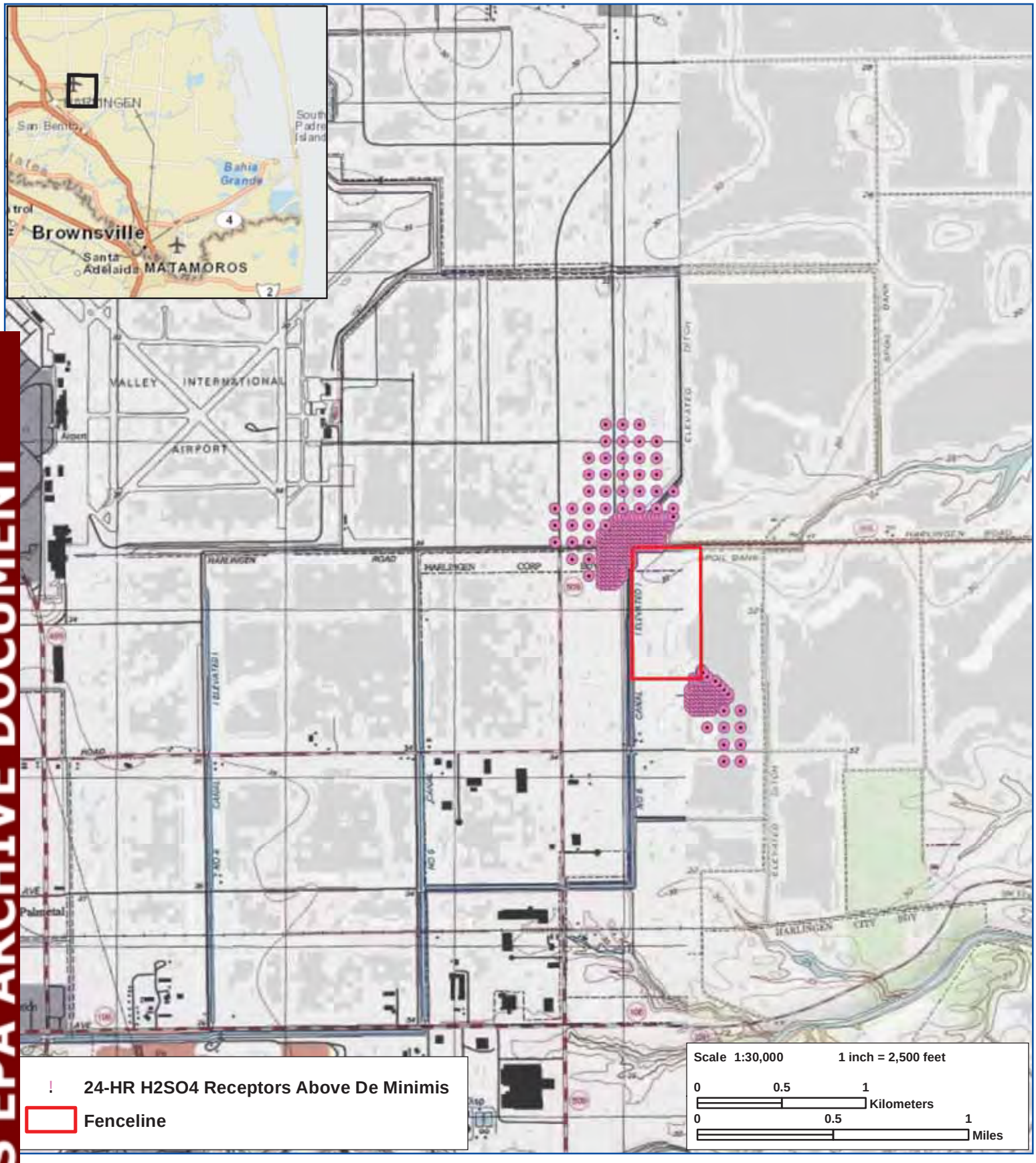
zephyr

FIGURE 4-5
1-HR H2SO4 Receptors Above De Minimis

La Paloma Energy Center
Harlingen, Texas

H:\Coronado Ventures\011368 Harlingen Application\Biologic Assessment\Figures\Receptor Figures

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	011368.004	08/08/2012



Datum: GCS NAD 1983 UTM Zone 14
Map Sources: ESRI USGS Topographic Basemap; Coronado Ventures

SITE LOCATION

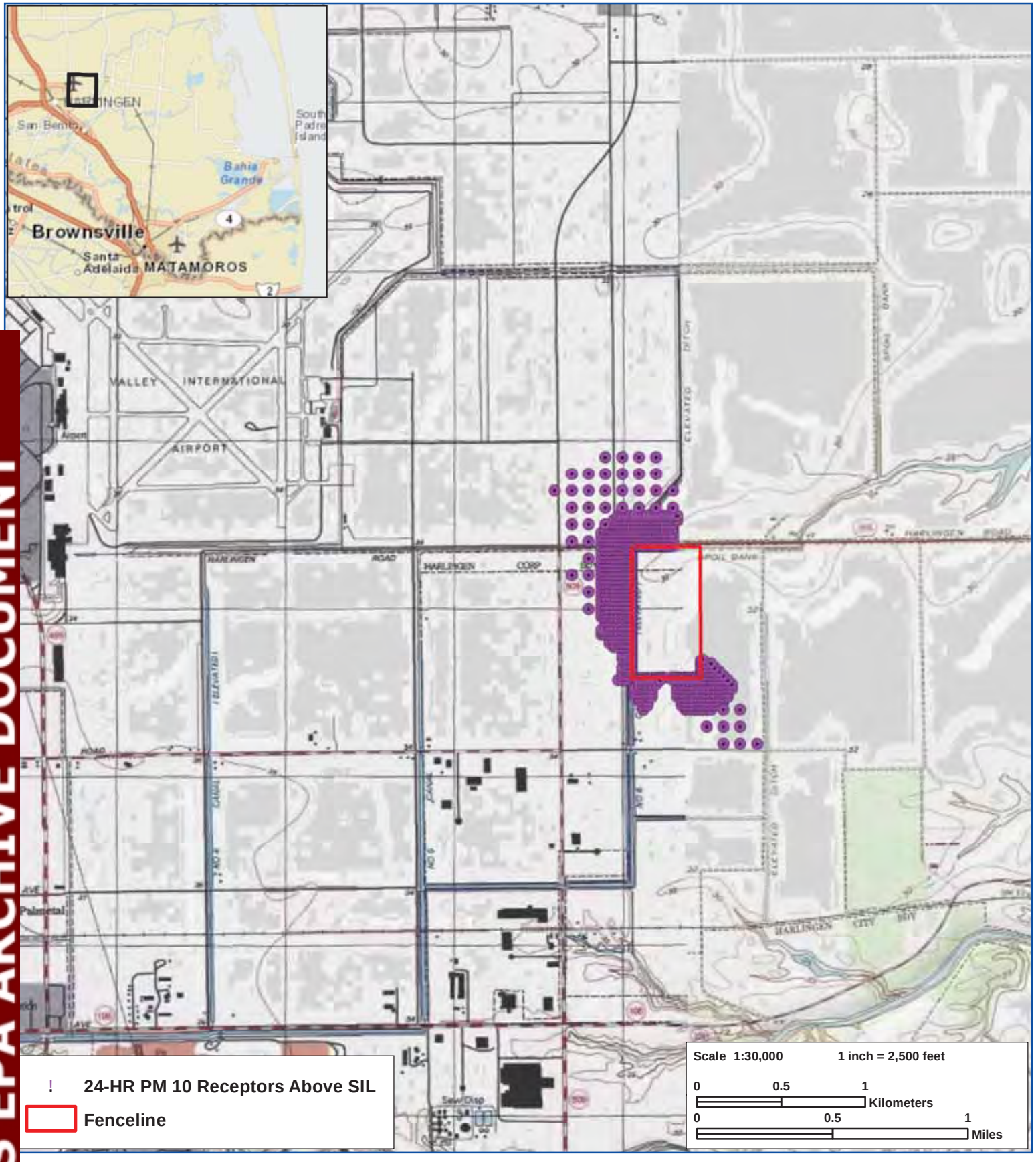
zephyr

FIGURE 4-6
24-HR H2SO4 Receptors Above De Minimis

La Paloma Energy Center
Harlingen, Texas

H:\Coronado Ventures\011368 Harlingen Application\Biologic Assessment\Figures\Receptor Figures

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	011368.004	08/07/2012



Datum: GCS NAD 1983 UTM Zone 14
Map Sources: ESRI USGS Topographic Basemap; Coronado Ventures

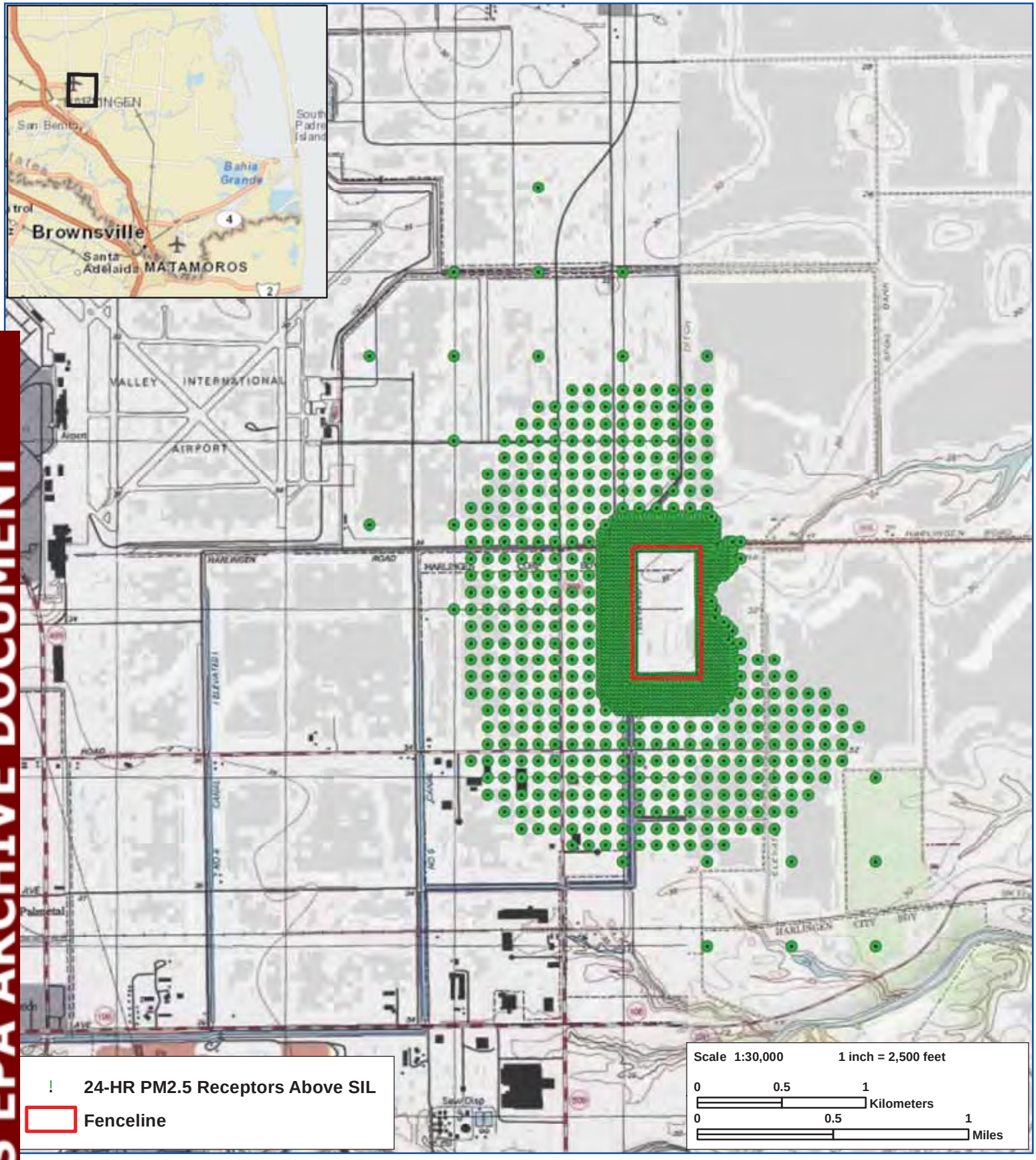
SITE LOCATION

zephyr

FIGURE 4-7
24-HR PM 10 Receptors Above SIL
La Paloma Energy Center
Harlingen, Texas

H:\Coronado Ventures\011368 Harlingen Application\Biologic Assessment\Figures\Receptor Figures

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	011368.004	08/07/2012



Datum: GCS NAD 1983 UTM Zone 14
Map Sources: ESRI USGS Topographic Basemap; Coronado Ventures

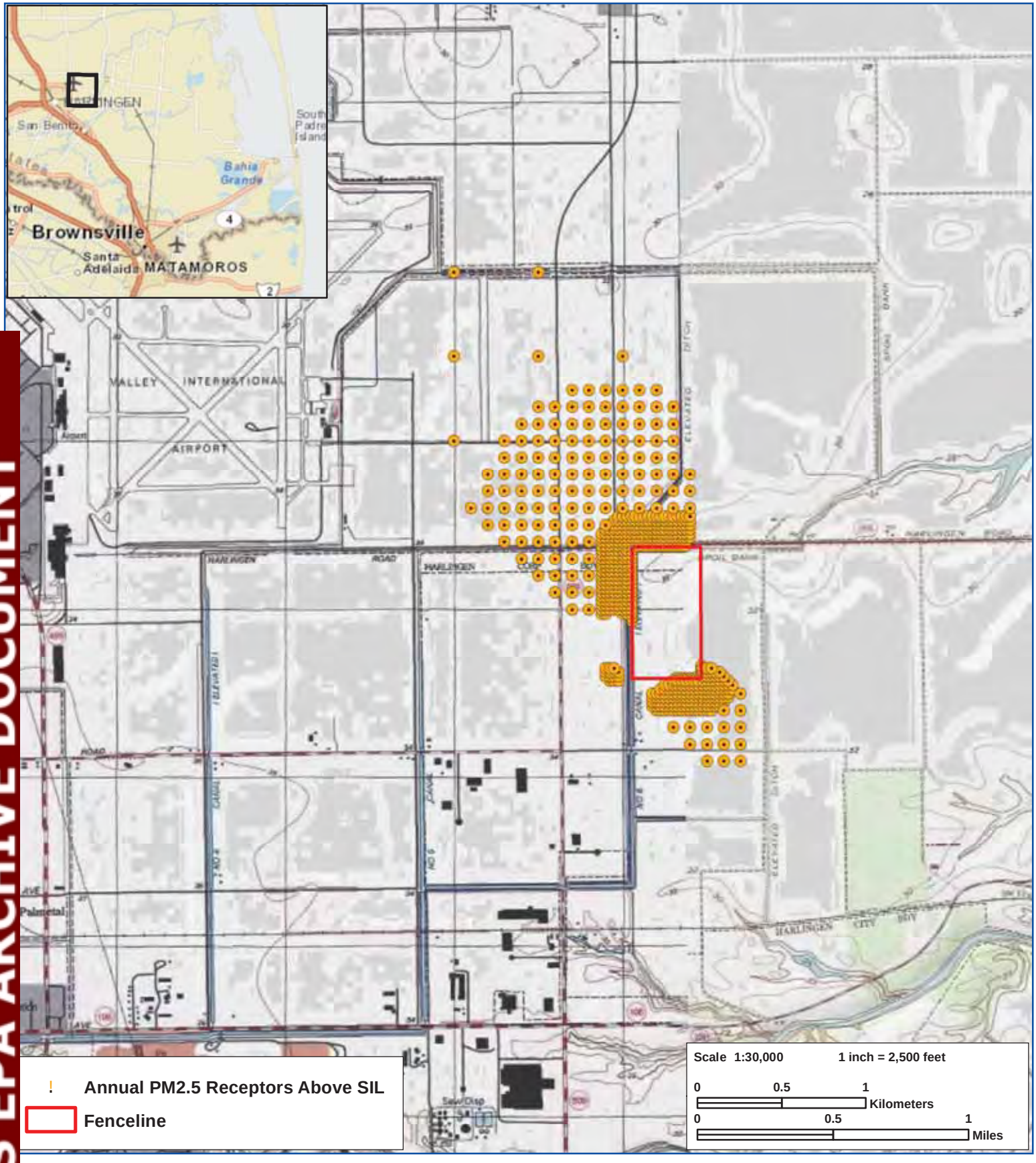
SITE LOCATION

zephyr

FIGURE 4-8
24-HR PM2.5 Receptors Above SIL
La Paloma Energy Center
Harlingen, Texas

H:\Coronado Ventures\011368 Harlingen Application\Biologic Assessment\Figures\Receptor Figures

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	011368.004	08/07/2012



Datum: GCS NAD 1983 UTM Zone 14
Map Sources: ESRI USGS Topographic Basemap; Coronado Ventures

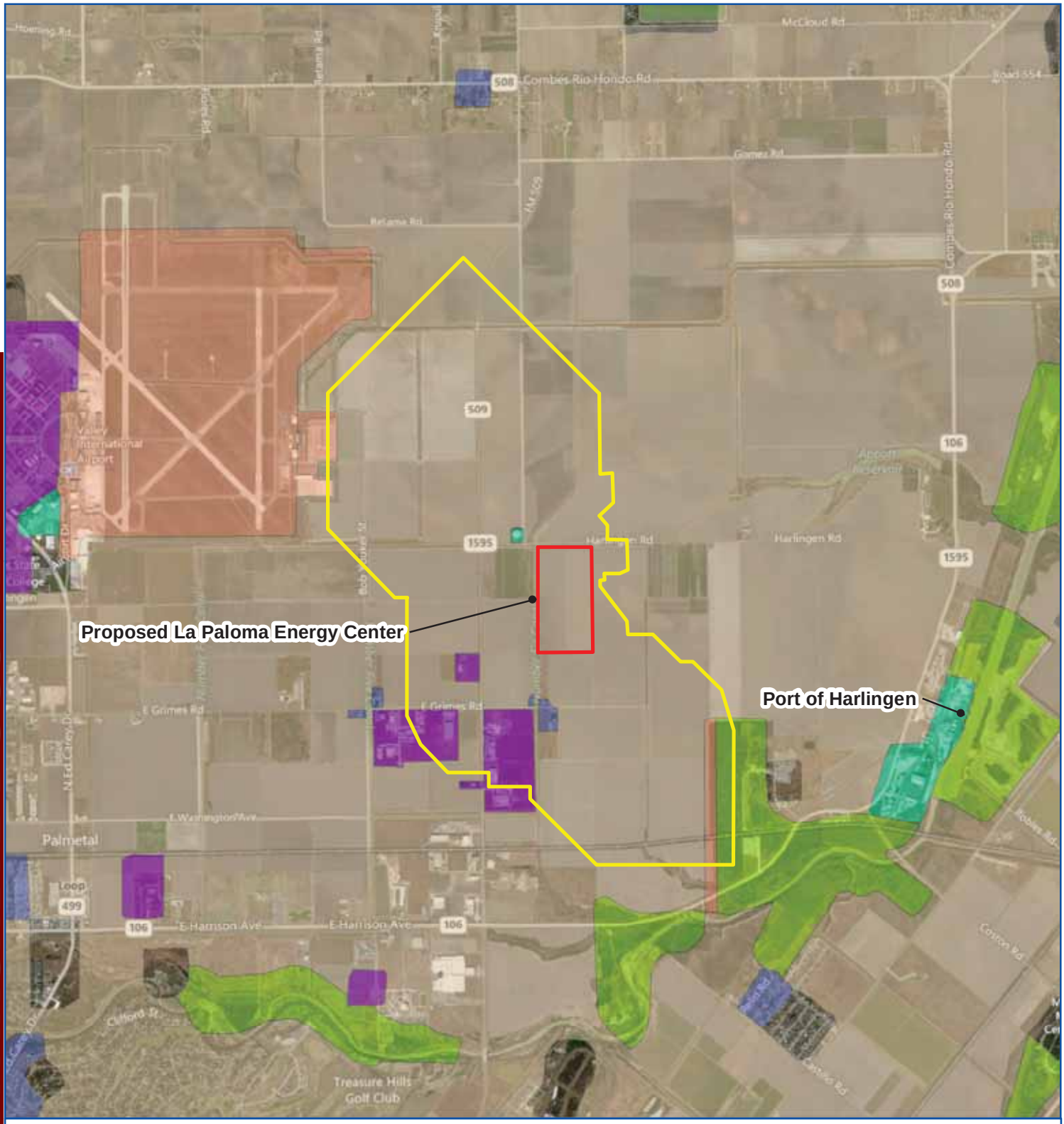
SITE LOCATION

zephyr

FIGURE 4-9
Annual PM2.5 Receptors Above SIL
La Paloma Energy Center
Harlingen, Texas

H:\Coronado Ventures\011368 Harlingen Application\Biologic Assessment\Figures\Receptor Figures

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	011368.004	08/07/2012



Proposed Site Boundary
Action Area

Land Use Within Action Area

- Commercial and Services
- Cropland and pasture
- Industrial
- Residential
- Shrub-brushland rangeland
- Transportation and communications

Data Sources: USGS, ESRI USA layers and i-cubed imagery.
Datum: GCS NAD 83

Scale 1:40,000 1 inch = 3,333 feet

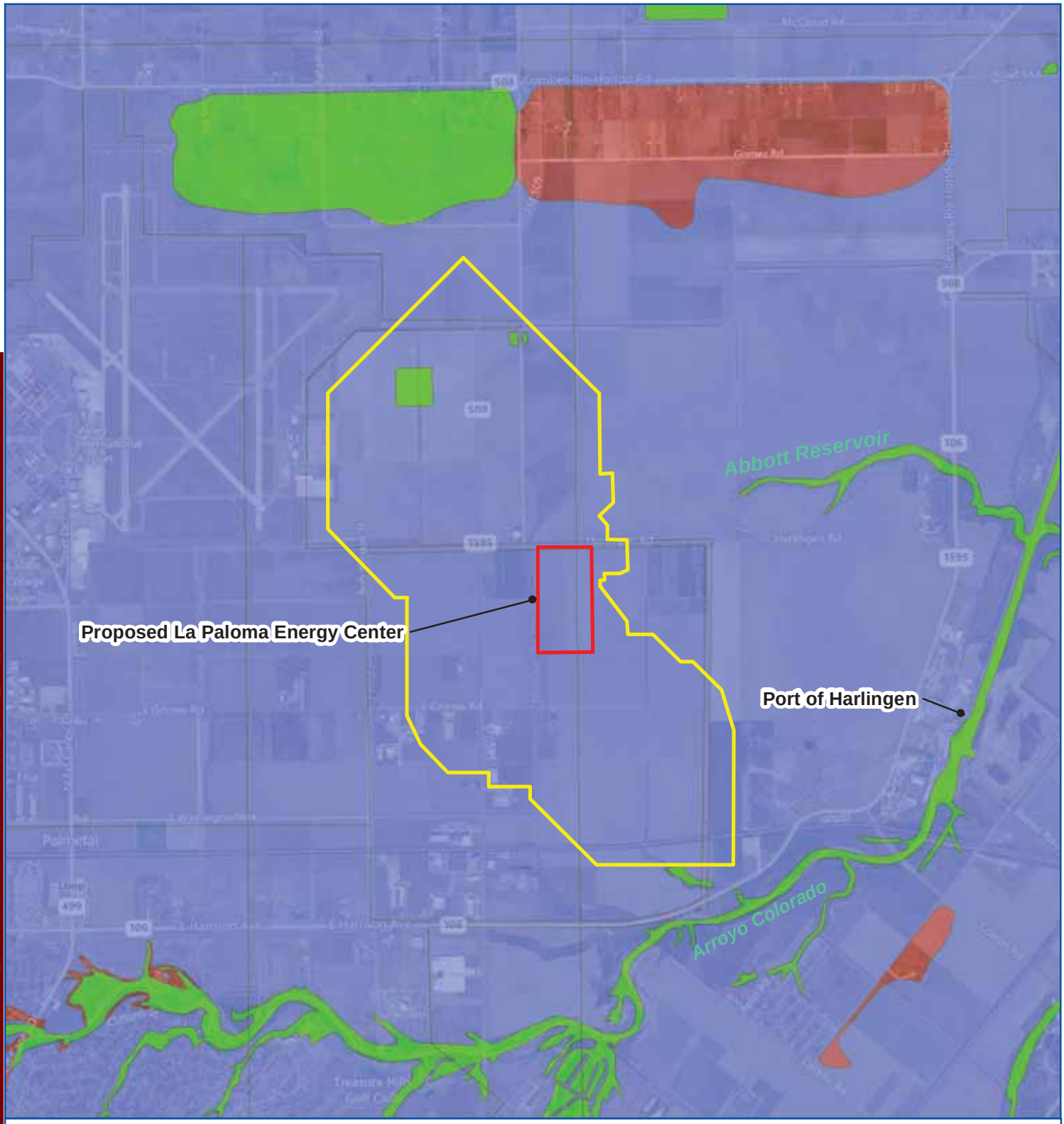
Kilometers
0 0.5 1

Miles
0 0.5 1

zephyr

FIGURE 5-1
Land Use / Land Cover
La Paloma Energy Center - Harlingen, TX

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	S. McVey	011368.004	09/20/2012



Proposed Site Boundary

Action Area

FEMA Zones Within Action Area

A- Areas subject to inundation by the 1-%-annual-chance flood event

X- Areas outside the 500-year floodplain

Data Sources:
ESRI Bing Maps Hybrid Basemap;
FEMA Q3 Flood Data.
Datum: GCS NAD 83

Scale 1:40,000 1 inch = 3,333 feet

Kilometers
0 0.5 1

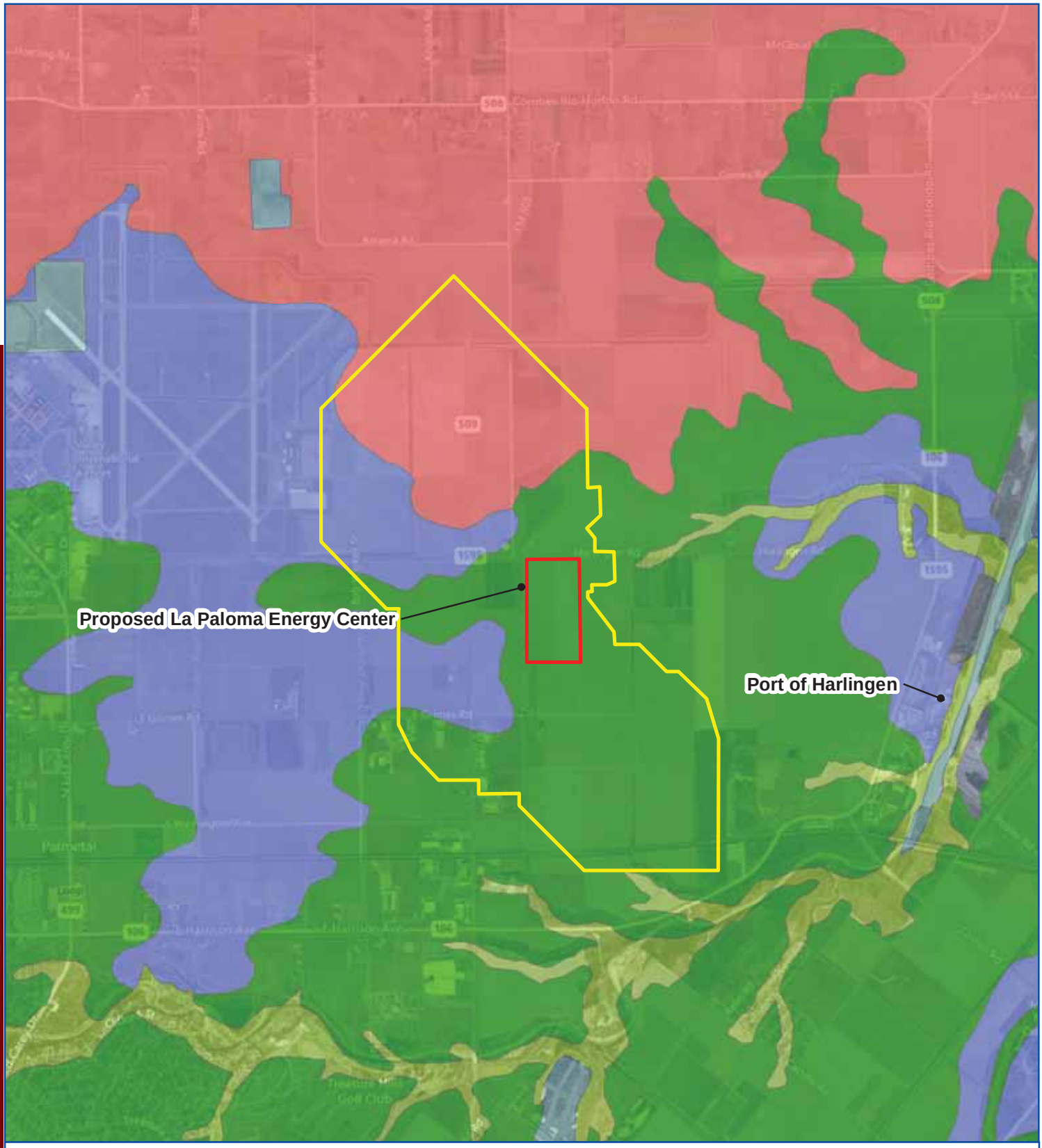
Miles
0 0.5 1

zephyr

FIGURE 5-2
FEMA Zones

La Paloma Energy Center - Harlingen, TX

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	S. McVey	011368.004	09/20/2012



Data Sources:
ESRI-Bing Maps Hybrid Basemap,
Geologic Atlas of Texas
Datum: GCS NAD 83

Proposed Site Boundary
Action Area

Geologic Units Within Action Area
Qam
Qas
Qb

Scale 1:40,000 1 inch = 3,333 feet

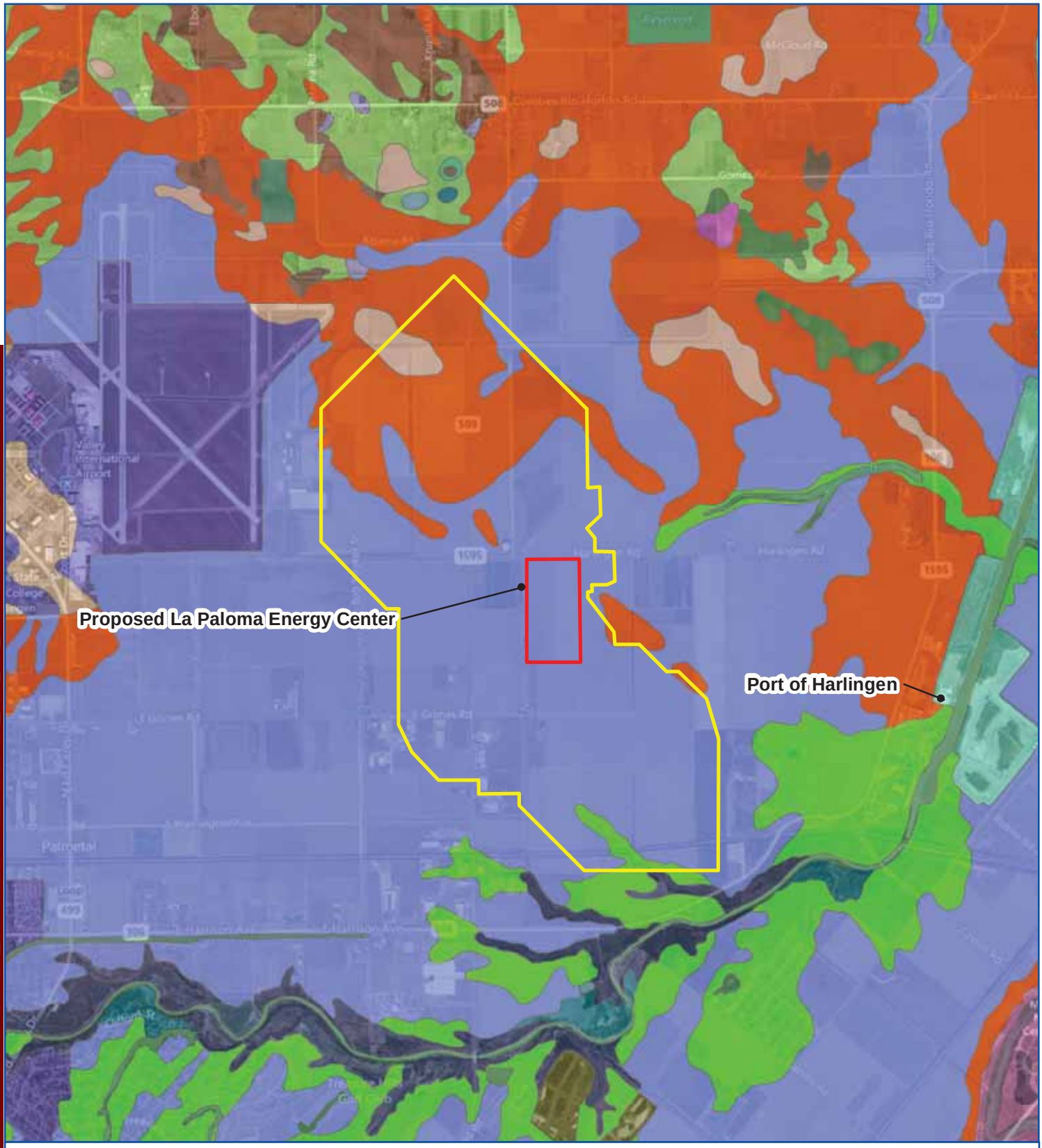
Kilometers
0 0.5 1

Miles
0 0.5 1

zephyr

FIGURE 5-3
Geology
La Paloma Energy Center - Harlingen, TX

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	S. McVey	011368.004	09/20/2012



Data Sources:
ESRI-Bing Maps Hybrid Basemap,
NRCS- Soil Data
Datum: GCS NAD 83

Proposed Site Boundary
Action Area

Soils Within Action Area
HO
MEA
MEB
RE

Scale 1:40,000 1 inch = 3,333 feet

Kilometers
0 0.5 1

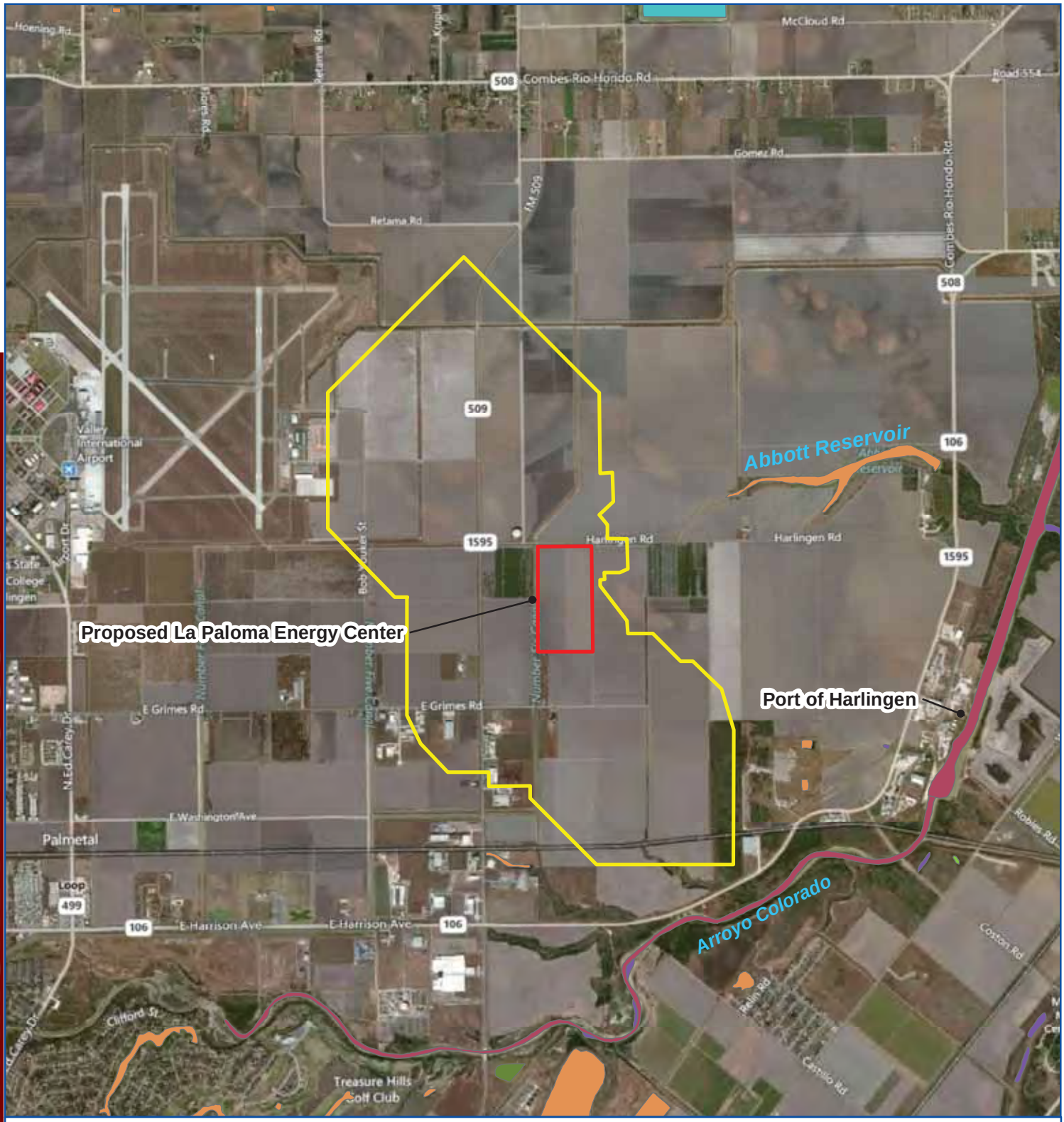
Miles
0 0.5 1

zephyr

FIGURE 5-4
Soils

La Paloma Energy Center - Harlingen, TX

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	S. McVey	011368.004	09/20/2012



Proposed Site Boundary
Action Area

NWI Wetlands
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Other
Riverine

Data Sources:
ESRI-Bing Maps Hybrid Basemap,
National Wetlands Inventory
Datum: GCS NAD 83

Scale 1:40,000 1 inch = 3,333 feet

Kilometers
0 0.5 1

Miles
0 0.5 1

zephyr

FIGURE 5-5
Water Resources
La Paloma Energy Center - Harlingen, TX

Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	S. McVey	011368.004	09/20/2012

APPENDIX B
SITE PHOTOGRAPHS

Photograph 1: June 7, Looking southeast across proposed construction site from NW corner.

Photograph 2: June 7, 2012 Looking east across proposed construction site from NW corner.

Photograph 3: June 7, 2012 Looking north from NW corner of proposed construction site.

Photograph 4: June 7, 2012 Typical view of industrial facilities between Point Comfort and northern shore of Lavaca Bay.

Photograph 5: June 7, 2012 Looking east near SW corner of proposed construction site.

Photograph 6: June 7, 2012 Looking south from SW corner of proposed construction site.

Photograph 7: June 7, 2012 Typical view of action area.

Photograph 8: June 7, Typical view of industrial park in SW portion (FM 509 and Grimes Ave.) of action area.

Photograph 9: June 7, 2012 Typical view of action looking northeast from industrial park.

Photograph 10: June 7, 2012 View of established infrastructure to NW of proposed construction site.

Photograph 11: June 7, 2012 Typical view of brushland in SE corner of action area.

Photograph 12: June 7, 2012 Looking northwest from brushland in SE corner of action area.

Photograph 13: June 7, 2012 Looking southwest from northern portion of action area.

Photograph 14: June 7, 2012 Looking west on Grime Ave. from intersection of FM 509 and Grimes Ave.

Photograph 15: June 7, 2012 Looking west from FM 509 in the northern portion of the action area.

Photograph 16: June 7, 2012 Looking east into the action area near CR 1595.

APPENDIX C
FIELD NOTES SUMMARY

June 7, 2012

Weather: High temperature 96°F, Average humidity 68%, clear, wind speed 5 - 18 mph, no rain

Site inspection of La Paloma Energy Center Action Area
Surveyors: Clay V. Fischer and Robert Fisher

Performed a windshield and pedestrian survey of portions of La Paloma Energy Center action area. The action area is dominated by cultivated farmland with minor portions developed for commercial/industrial use and a small area dominated by native brush shrubland.

Latitude	Longitude	Summary
26.2161	-97.6282	Northwest corner of construction site-cotton field
26.213	-97.6283	Air quality permit on west boundary of construction site
26.2126	-97.6282	Looking south along west side of construction site
26.2161	-97.6282	Harlingen waste water facility just NW of construction site
26.1945	-97.6112	Photo of vegetation along FM 106 in SE corner of action area.
26.2056	-97.62	Typical agriculture
26.2056	-97.6323	Industrial park and agriculture
26.2257	-97.6409	Cotton fields in NW portion of action area
26.2255	-97.643	Looking at irrigation and abandoned pump station in NW corner of action area
26.2315	-97.6325	Farmland and irrigation canal in portion of action area
26.2172	-97.6451	Fence line of LRGV International Airport

		along western boundary of action area.
26.2121	-97.6409	Agriculture and LRGV International Airport along western boundary of action area.

TERRESTRIAL FAUNA

Within the Project area, significant or sensitive wildlife habitats have been identified as those that provide habitat for Tamaulipan brushland dependent species. The majority of the action area is comprised of cultivated farmland with minor portions developed for commercial/industrial use as well as a small area dominated by native brush shrubland.

The native brush shrubland component of the action area consisted of approximately 80 acres in the extreme southeastern boundary of the action area. This tract is separated from a larger brush tract by FM 106. It appears as though portions of the tract have had brush removed for installation of an over-head transmission power line as well as for the development of a commercial business.

No open waters, rivers, or streams are included within the action area. However, there are some irrigation canals constructed to assist cultivation in the area. These features do not exhibit herbaceous wetlands. They are often dry and do not carry water continuously.

Review of TXNDD data revealed the presence of the following species within the action area:

FLORA

Analysis of Action Area vegetation indicated the presence of three distinct habitat/community types. The habitat/community types have been classified as upland forest, cultivated farmland, and commercial/industrial land. The extent of each habitat/community type was identified during field reconnaissance and/or review of available aerial photography. Lists of representative plant species that occur in each of the remaining cover/habitat types are provided below.

The dominant species found in cultivated farmlands within the Action Area (the proposed construction site is composed entirely of cultivated farmland) include:

- Cotton (*Gossypium sp.*)
- Sorghum (*Sorghum vulgare*)

- Mexican fan palm (*Washingtonia sp.*)
- Lettuce (*Lactuca sativa*)
- Johnson grass (*Sorghum halepense*)
- Giant ragweed (*Ambrosia trifida*)

The dominant species found in commercial/industrial lands within the action area include, but are not limited to the following species:

- Bermuda grass (*Cynodon dactylon*)
- King Ranch bluestem (*Bothriochloa ischaemum*)
- Three-awn grasses (*Aristida sp.)*
- Knotroot bristle grass (*Setaria geniculata*)

Vegetation in action area native brush shrubland communities includes woody tree and shrub species growing in unsaturated conditions. Dominant species found in upland forests include, but are not limited to, the following species:

- Mesquite (Prosopis glandulosa)
- Granjeno (Celtis pallida)
- Texas ebony (Pithecellobium flexicaule)
- Anacua (Ehretia anacua)
- Brazil (Condalia hookeri)

FAUNA

Animal species observed within the Action Area were all avian and include the following:

- Black-bellied Whistling-Duck
- Great Blue Heron
- Cattle Egret
- Turkey Vulture
- Red-tailed Hawk
- Mourning Dove
- Western Kingbird
- Great-tailed Grackle