WHITENTON group environmental consultants

Biological Assessment

Lon C. Hill Power Station Project
Nueces County, Texas

Prepared for

Lon C. Hill, LP

Prepared by

Whitenton Group, Inc.

June 2014

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Houston, Texas 77002

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WGI Project No. 1352

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ACRONYMS

°F	Degrees Fahrenheit
AOI	Area of Impact
BA	Biological Assessment
BACT	Best Available Control Technology
eSPARC	CAMS eSPARC, LLC
CO	Carbon Monoxide
EO	Element of Occurrence
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESLs	Effects Screening Levels
FAA	Federal Aviation Adminstration
FEMA	Federal Emergency Management Agency
GHG	Greenhouse Gas
GLCmax	Maximum Ground Level Concentration
gpm	Gallons per Minute
GTG	Gas Turbine Generator
H_2SO_4	Sulfuric Acid
HRSG	Heat Recovery Steam Generator
ISA	Integrated Science Assessment
Lon C. Hill	Lon C. Hill, LP
mAOI	Maximum Area of Impact
MGD	Million Gallons per Day
MMBtu	Million British Thermal Units
MW	Megawatts
NAAQS	National Ambient Air Quality Standards
NMFS	National Marine Fisheries Service
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NO_x	Nitrogen Oxides
NSR	New Source Review
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter less than 2.5 microns in diameter
PM_{10}	Particulate Matter less than 10 microns in diameter
ppt	Parts per Trillion
PSD	Prevention of Significant Deterioration
SIL	Significant Impact Level
SO_2	Sulfur Dioxide
TCEQ	Texas Commission on Environmental Quality
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department

tpy	Tons Per Year
US	United States
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
VOC	Volatile Organic Compound
WGI	Whitenton Group, Inc

1.0 EXECUTIVE SUMMARY

Lon C. Hill, LP (Lon C. Hill) proposes to construct, own, and operate a new 2x2x1 combined cycle power plant in Nueces County, Texas. The new power plant will be referred to as the Lon C. Hill Power Station. It will consist of 2 natural gas-fired combustion turbines, 2 heat recovery steam generators, and 1 steam turbine. The combined cycle unit will exclusively fire natural gas. The facility's nominal capacity will be between 625-740 megawatts (MW).

The proposed power plant project is located near the Calallen District in the City of Corpus Christi, Nueces County, Texas (Figures 1-8 – Appendix A). The proposed project is approximately 0.75 miles south of Interstate Highway 37 and about a mile east of United States (US) Highway 77. The proposed project will be constructed on a site that previously hosted a four unit generation facility that ceased operations in 2002 and was demolished within the last 2 years.

The proposed project is located in Nueces County, which is classified as in attainment for all National Ambient Air Quality Standards (NAAQS). Since the proposed project is a fossil fuel-fired steam electric facility that produces more than 250 million British thermal units (MMBtu), it is considered a new major source for nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), and particulate matter ($PM_{2.5}$/PM_{10}). Therefore, the proposed project requires a New Source Review (NSR) permit and Prevention of Significant Deterioration (PSD) review. The Texas Commission on Environmental Quality (TCEQ) is responsible for issuance of the NSR permit and PSD review of NAAQS criteria pollutants. Additionally, greenhouse gas (GHG) emissions are expected to exceed 75,000 tons per year (tpy) of carbon dioxide equivalent, thus trigging PSD review for GHG. The US Environmental Protection Agency (EPA) is currently responsible for issuing GHG PSD permits in Texas.

This Biological Assessment (BA) is a complete evaluation of the potential environmental effects the proposed project may have on federally-listed species and/or their potential habitat. Federally-listed species evaluated in this document include federal threatened, endangered, and candidate species. Candidate species are not specifically protected by the Endangered Species Act (ESA) but were evaluated in this BA. This BA includes a field survey and an evaluation of potential environmental effects based on air quality modeling results, construction and

operations information, and storm water and wastewater information provided by CAMS eSPARC, LLC (eSPARC), Lon C. Hill's air permitting consultant for the proposed project.

Construction of the proposed project will take place on a disturbed industrial site, previously utilized as a power station, within the property boundaries of the existing facility. Construction will take place within an area referred to as the "Project Area," approximately 45.5 acres in size. One existing pipeline will be upgraded to a larger diameter pipe. This proposed pipeline replacement will be located within the Project Area. The proposed project will utilize existing power lines. No linear projects are proposed outside of the Project Area. The project will utilize existing permitted wastewater and storm water outfall structures. No additional earth disturbance will be required outside of the Project Area.

Species considered in this BA include the green sea turtle, hawksbill sea turtle, Kemp's Ridley sea turtle, leatherback sea turtle, loggerhead sea turtle, smalltooth sawfish, Gulf Coast jaguarundi, ocelot, red wolf, West Indian manatee, blue whale, finback whale, humpback whale, sei whale, sperm whale, Eskimo curlew, northern aplomado falcon, piping plover, red knot, yellow-billed cuckoo, whooping crane, slender rush-pea, South Texas ambrosia, golden orb, and Sprague's pipit. Three field surveys were completed: a pedestrian protected-species habitat evaluation of the proposed Project Area and immediate surrounding area; a windshield habitat evaluation of all publicly-accessible habitats within the Action Area; and an aerial habitat evaluation of all areas within the Action Area. Data were collected to describe resident vegetation communities and assess the potential for habitat and occurrence of federally-listed species.

In support of this BA, eSPARC performed dispersion modeling of air pollutants that will be emitted by the proposed project in accordance with PSD Permit requirements. The project's maximum ground level concentration (GLCmax) values are less than the Significant Impact Level (SIL) for the following: 1-hour nitrogen dioxide (NO_2), annual NO_2, 3-Hour sulfur dioxide (SO_2), annual SO_2, 1-Hour CO, 8-Hour CO, and annual PM_{10}. Accordingly, these predicted criteria pollutants are considered insignificant based on EPA's SIL analysis method with screening levels set to protect sensitive populations.

Projected impacts for the following ten out of 15 pollutants and averaging periods are greater than the designated SIL: 24-hour PM_{10}, 24-hr $PM_{2.5}$, annual $PM_{2.5}$, 30-minute SO_2, 1-hour SO_2, 24-

hour SO_2, 1-hour sulfuric acid (H_2SO_4), and 24-hour H_2SO_4. The significant areas of impact (AOI) located the farthest distance from the source in all directions were plotted to determine a maximum AOI (mAOI). Since this mAOI boundary includes the Project Area and existing outfall locations, the Action Area for the BA was defined as the mAOI boundary. The Action Area encompasses areas in both Nueces and San Patricio counties, Texas. Therefore, federally-listed species for both these counties were considered.

The Action Area has a maximum radius of approximately 3.4 miles. Nine habitat types were observed in the Action Area: herbaceous, woodland, riparian, grassland, cropland, wetland, riverine (tidal and non-tidal), and open water. Habitat characteristics with the potential to support select protected species were observed within portions of the Action Area. However, these species may or may be likely to occur within the Action Area. The habitat analysis and potential for these species to occur within the Action Area is described in Section 9.7.

Based on the information gathered for this BA and presented in Section 9.0, Whitenton Group, Inc. (WGI) biologists recommend a finding of no effect for 20 out of 21 federally-listed species. A determination of may affect, but not likely to adversely affect is recommended for the whooping crane. The red knot and the yellow-billed cuckoo are currently listed as proposed threatened. These 2 species may potentially be listed as threatened within the year 2014. Since these 2 species are not yet federally listed, no determination of effect is recommended at this time. No determination of effect is recommended for the listed candidate species: Sprague's pipit and golden orb.

2.0 INTRODUCTION

Lon C. Hill proposes to construct, own, and operate a new 2x2x1 combined cycle power plant in Nueces County, Texas. The new power plant will be referred to as the Lon C. Hill Power Station. It will consist of 2 natural gas-fired combustion turbines, 2 heat recovery steam generators, and 1 steam turbine. The combined cycle unit will exclusively fire natural gas. The facility's nominal capacity will be between 625-740 MW.

The proposed power plant project is located near the Calallen District in the City of Corpus Christi, Nueces County, Texas (Figures 1-8 – Appendix A). The proposed project is

approximately 0.75 miles south of Interstate 37 and about a mile east of US Highway 77. The proposed project will be constructed on a site that previously hosted a four unit generation facility that ceased operations in 2002 and was demolished within the last 2 years.

The proposed power plant project is located in Nueces County, which is classified as in attainment for all NAAQS. Since the proposed project is a fossil fuel-fired steam electric facility that produces more than 250 MMBtu, it is considered a new major source for NO_x, CO, VOCs, and $PM_{2.5}$ /PM_{10}. Therefore, the proposed project requires a NSR permit and PSD review. The TCEQ is responsible for issuance of the NSR permit and PSD review of NAAQS criteria pollutants. Additionally, GHG emissions are expected to exceed 75,000 tpy of carbon dioxide, thus trigging PSD review for GHG. The EPA is currently responsible for issuing GHG PSD permits in Texas.

BAs in support of the PSD GHG permit application are recommended by the EPA to evaluate the potential for impacts to federally-listed species from a project for which federal authorization must be obtained. This BA documents the complete evaluation of the potential effects of the proposed project on federally-listed species and/or their potential habitat. Federally-listed species evaluated in this document include threatened, endangered, proposed threatened, and candidate species. Federal agency regulations for listed species evaluated in this BA are described in Section 4.0.

The purpose of this BA is to research, evaluate, analyze, and document the potential for direct and indirect effects, interdependent and interrelated actions, and cumulative effects on federally-listed species as a result of the proposed project. This BA includes a pedestrian species habitat evaluation of the Project Area, a windshield and aerial habitat evaluation of the Action Area, and an evaluation of potential environmental impacts based on air quality modeling results, construction information, operation information, and wastewater and storm water information provided by eSPARC.

The conclusion of this BA will include a recommended determination of effect on federally-listed endangered and threatened species and their habitat: "no effect," "may affect, not likely to adversely affect," or "may affect, likely to adversely affect." These 3 possible determinations, in accordance with guidance offered by the US Fish and Wildlife Service (USFWS) for the

purpose of Biological Assessments and Evaluations, are described in Section 4.1. A recommended determination of effect will not be included for species listed as candidate.

3.0 ACTION AREA

The BA process requires identification of the proposed project's "Action Area" within which the potential for effects on federally-listed species and their habitats are to be evaluated. "Action Area" is defined in 50 CFR Section 402.02 as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The limits of the project's Action Area were determined based on the dispersion modeling results, the earth disturbance footprint, and any wastewater and storm water discharge locations, which is consistent with prior EPA precedent.

EPA has established SILs for each NAAQS. SILs are concentrations significantly below their corresponding NAAQS and constitute a *de minimis* threshold at or below which a potential impact is considered to be insignificant[1]. From the dispersion modeling, the coordinates of each receptor with modeled concentrations greater than the SIL for each pollutant were plotted to delineate the significant AOIs. The significant AOIs located the farthest distance from the source in all directions were plotted to create a mAOI (theoretical) boundary. Based on the results of modelling described below in Section 8.1, the furthest distance from the project where concentrations of emissions were above the SIL was approximately 3.4 miles.

One existing pipeline will be upgraded to a larger diameter pipe. This proposed pipeline replacement will be located within the Project Area. The proposed project will utilize existing power lines. No linear projects are proposed outside of the Project Area. The proposed project will utilize existing permitted wastewater and storm water outfall structures. No additional earth disturbance will be required outside of the Project Area.

This mAOI boundary was used to define the Action Area for the BA. The mAOI boundary encompasses the Project Area, the proposed pipeline replacement, and wastewater and storm water discharge locations (Figures 2-4 – Appendix A).

This Action Area was used to analyze the potential impacts to listed species and/or their habitat by the proposed project and is demonstrated in Figures 3-7 (Appendix A). The results of the analysis of potential impacts to federally-listed species are presented in Section 9.0 below.

4.0 AGENCY REGULATIONS

4.1 ENDANGERED SPECIES ACT

The USFWS and the National Oceanic and Atmospheric Administration - National Marine Fisheries Service (NOAA-NMFS) implement the ESA of 1973. "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[2]. Candidate species are those "the USFWS has enough information to warrant proposing them for listing but is precluded from doing so by higher listing priorities[3]." Candidate species are not specifically protected by the ESA but were evaluated in this BA.

Section 9 of 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[4]."

BAs include one of 3 recommended determinations of effect on federally-listed endangered and threatened species and their habitat: "no effect," "may affect, not likely to adversely affect," or "may affect, likely to adversely affect." These 3 possible determinations, in accordance with guidance offered by the USFWS for the purpose of Biological Assessments and Evaluations, are summarized below[5]. A recommended determination of effects is not provided for candidate species.

1. No effect – A "no effect" determination means that there are absolutely no effects from the proposed action, positive or negative, to listed species. A "no effect" determination does not include effects that are insignificant (small in size),

discountable (extremely unlikely to occur), or beneficial. "No effect" determinations do not require written concurrence from the Service unless the National Environmental Policy Act analysis is an Environmental Impact Statement.

2. May affect, not likely to adversely affect – A "may affect, not likely to adversely affect" determination may be reached for a proposed action where all effects are beneficial, insignificant, or discountable. Beneficial effects have contemporaneous positive effects without any adverse effects to the species or habitat (i.e., there cannot be a "balancing," where the benefits of the proposed action would be expected to outweigh the adverse effects – see below). Insignificant effects relate to the size of the effects and should not reach the scale where take occurs. Discountable effects are those that are extremely unlikely to occur. This conclusion is usually reached through the informal consultation process, and written concurrence from the USFWS exempts the proposed action from formal consultation.

3. May affect, likely to adversely affect - A "may affect, likely to adversely affect" determination means that all adverse effects cannot be avoided. A combination of beneficial and adverse effects is still "likely to adversely affect" even if the net effect is neutral or positive. Section 7 of the ESA requires that the federal action agency request initiation of formal consultation with the USFWS when a "may affect, likely to adversely affect" determination is made.

4.2 CLEAN AIR ACT REGULATIONS AND STANDARDS

The Clean Air Act requires air quality standards be maintained to protect public health and the environment. These standards are the NAAQS and are established by the EPA. Ambient air is the air to which the general public has access, as opposed to air within the boundaries of an industrial facility. The NAAQS are concentration limits of pollutants in ambient air within a specific averaging time. The NAAQS are classified into 2 categories: primary and secondary standards. Primary standards are set to protect public health, including "sensitive" populations. Secondary standards are set to protect public welfare, including the environment[6].

The EPA has established NAAQS for 6 air pollutants, which are commonly referred to as "criteria pollutants". These 6 criteria pollutants are NO_2, ozone, SO_2, PM, CO, and lead6. 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[7].

The Clean Air Act also requires the EPA to establish regulations to prevent significant deterioration of air quality in attainment areas. The EPA established PSD Increments to satisfy this requirement. A PSD Increment is a measure of the maximum allowable increase in ambient air concentrations of a criteria pollutant from a baseline concentration after a specified baseline date. A SIL represents a *de minimis* or insignificant concentration resulting from the emissions from a proposed project below which the project is not considered to cause or contribute to a violation of NAAQS or PSD Increment for a criteria pollutant[1]. If the proposed project involves an increase in emissions that results in predicted ambient concentration impacts greater than the established SIL for a pollutant, the permit applicant is required to perform additional analyses to demonstrate that the project emissions will not cause or contribute to a violation of a NAAQS or PSD Increment for that pollutant[8].

The air quality analysis to demonstrate compliance with NAAQS and PSD Increments is performed using computer models to simulate the dispersion of the emitted pollutants into the atmosphere and predict ground level concentrations at specified receptor locations in the area around the source of emissions. If the modeled concentration for a given pollutant and averaging period is less than the EPA-specified SIL, the project is determined to have no significant impact on ambient air quality and no further analysis is required for that pollutant and averaging period. If the SIL is predicted by the model to be exceeded for a given pollutant, further modeling of the project emissions combined with existing emission sources in the area is required to estimate total ambient concentrations. The modeling must demonstrate that the total concentration, including an appropriate background, does not exceed the applicable NAAQS and PSD Increment.

5.0 PROJECT DESCRIPTION

5.1 PROJECT PURPOSE AND LOCATION

Lon C. Hill proposes to construct, own, and operate a new 2x2x1 combined cycle power plant in Nueces County, Texas. The new power plant will be referred to as the Lon C. Hill Power Station. It will consist of 2 gas turbine generators (GTG)s, 2 heat recovery steam generators (HRSG), and 1 steam turbine. The combined cycle unit will exclusively fire natural gas. The facility's nominal capacity will be between 625-740 MW. The proposed project will be constructed on a site that previously hosted a four unit generation facility that ceased operations in 2002 and was demolished within the last 2 years. A simplified process flow diagram is provided in Appendix B.

Specifically, the proposed project will include:

- Two GTGs with nominal gross output of approximately 195 to 240 MW and possibly, an inlet chilling system or evaporative cooling system
- Steam turbine with nominal capacity of approximately 230 to 290 MW
- Two HRSGs
- Two Selective Catalytic Reduction catalysts
- Two CO catalysts
- Auxiliary boiler
- Emergency generator
- Firewater pump
- Two cooling towers
- Water treatment facility, including a water tank
- Two diesel fuel storage tanks
- Replacement of natural gas fuel pipeline
- Ammonia feed and control systems
- Aqueous ammonia storage
- Warehouse and administration buildings

The proposed power plant project is located near the Calallen District in the City of Corpus Christi, Nueces County, Texas (Figures 1-8 – Appendix A). The proposed project is

approximately 0.75 miles south of Interstate 37 and about a mile east of US Highway 77. The preliminary plot plan is provided in Appendix C.

Project location information:

USGS Quad	Latitude/Longitude
Annaville	27.847864, -97.614628

5.2 CONSTRUCTION INFORMATION

5.2.1 CONSTRUCTION DESCRIPTION

Construction of the proposed power station will take place on approximately 45.5 acres of Lon C. Hill's property. The site of the proposed project is hereafter referred to as the "Project Area."

No additional earth disturbance will be required outside of the Project Area.

The proposed project will include the installation of 2 gas turbine generators, 2 heat recovery steam generators, 1 steam turbine, and ancillary equipment. One linear project will be required for the project. One existing pipeline will be upgraded to a larger diameter pipe. This proposed pipeline replacement will be located within the Project Area. The proposed project will utilize existing power lines. One existing pipeline will be upgraded to a larger diameter pipe. This proposed pipeline replacement will be located within the Project Area. The proposed project will utilize existing power lines. No linear projects are proposed outside of the Project Area. No additional earth disturbance will be required outside of the Project Area. The Project Area is shown on Figure 2 (Appendix A). The preliminary plot plan is provided in Appendix C.

The approximate heights of proposed infrastructure include:

- Two GTGs (30 feet tall)
- Steam turbine (30 feet tall)
- Two HRSGs and associated stacks (86 and 152 feet tall, respectively)
- Firewater tank (48 feet tall)
- Two cooling towers (41 and 45 feet tall)
- Water tank (40 feet tall)

- Ammonia tank (43 feet tall)

The projected construction start date (pending necessary permit approvals) is May 2015. The total estimated time for construction is approximately 21 months. The projected start of operation date is April 2017.

5.2.2 CONSTRUCTION ACTIVITIES AND SCHEDULE

The total time estimated to complete construction of the project is approximately 21 months. The construction schedule will be 12-hour work days (2 shifts of 12 hours each), 7 days per week until completion. The following general construction activities are included:

- Site dirt work
- Installation of drilled shaft foundations and spread footings or driven piles (approximately 700-1000 piles)
- Installation of pipe rack and other pipe supports
- Setting of major equipment items (gas turbines, steam turbine, generators, HRSGs, auxiliary boiler, cooling tower, etc.)
- Installation of rack piping and interconnecting pipe between major equipment
- Replacement of existing natural gas pipeline with larger diameter pipe to be completed by a third party (gas transportation provider)
- Installation of Motor Control Center building and associated wiring to equipment motors
- Installation of instrument devices and associated wiring
- Post-erection cleaning and pressure testing of various piping systems
- Installation of insulation
- Controls checkout
- Plant start-up and commissioning
- Touch-up painting

The estimated number of personnel required for construction of the proposed project will average 80 personnel with a maximum of 250.

5.2.3 CONSTRUCTION EQUIPMENT REQUIRED

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

- One large crane (550 tons) for major lifts – 14 months
- One large crane (250 tons) for tailing of major lifts – 2 months
- Small cranes (80 tons) – 21 months for one, 9 months for one
- Two 4-wheel drive fork lifts – 21 months for one, 14 months for one
- Six utility vehicles – 21 months
- One backhoe – 21 months
- One mini excavator—6 months
- Two air compressors – 18 months
- Three JLG lifts – two for 18 months, one for 6 months
- One scissor lift – 6 months
- Two ground compactors (jumping jacks) – 6 months
- One dump truck – 6 months
- Seven welding machines and generators – 18 months
- Six portable lighting plants – 21 months

The maximum height for construction equipment is estimated at 230 feet.

5.2.4 STORM WATER

Erosion and sedimentation controls will be utilized to protect water quality during the construction and operation of the proposed project, in accordance with Section 401 of the Clean Water Act and 30 Texas Administrative Code Chapter 279, and as prescribed in the Storm water Pollution Prevention Plan required for construction.

5.2.5 CONSTRUCTION NOISE LEVELS

During construction, the best available technology will be used to maintain noise levels below 75 decibels measured at the property line.

5.3 OPERATION AND MAINTENANCE INFORMATION

5.3.1 OPERATION DESCRIPTION

The proposed power plant will be constructed within Lon C. Hill's property boundaries. The proposed project will produce up to 740 MW of electricity. The plant is expected to be in operation for 30 years. Dry low-NO_x combustors will be used to control emissions at the turbine exhaust, and duct burners will be fitted with low-NO_x burners. Selective Catalytic Reduction with aqueous ammonia will be used to reduce stack exhaust NO_x emissions, and CO catalyst will be used to reduce CO emissions.

The maximum operating schedule is 24 hours per day, 7 days per week, and 52 weeks per year. Roughly, 15-22 full-time personnel will be required for operation.

Additional required maintenance associated with the proposed project will include the following:

- Combustion Inspections, Hot Gas Path and Major Inspections will be performed on the gas turbines at manufacturer recommended intervals.
- Inspections of the steam turbine at manufacturer's recommended frequency.
- Water wash of the gas turbines will be performed on a semiannual basis.
- Gas turbine inlet filters will require replacement at nominal 2-3 year intervals.
- Major inspection of the generator will be required at nominal 6-year intervals with minor repair as required.
- Inspection of the HRSGs will be required on an annual basis with repair as required.
- Inspection, overhaul and minor repair of new auxiliary and support equipment for the proposed project will be performed as required or at intervals recommended by the equipment manufacturer.

5.3.2 WATER USE

Water, including gray water, may be obtained from the City of Corpus Christi for the operation of the proposed project. If necessary, other sources of water may be explored.

Water consumption is dependent on the final construction design. With evaporative cooling installed and operational on the gas turbine inlets, water use for the proposed project is estimated at 3,332 gallons per minute (gpm).

Water use for the proposed project would be 3,940 gpm with inlet chilling installed and operational on both gas turbines.

5.3.3 WASTEWATER

The proposed project would operate under the Lon C. Hill Plant's existing Texas Pollutant Discharge Elimination System (TPDES) permit (TPDES Permit No. WQ0001255000). This permit is currently inactive and will be updated to reflect the proposed project.

On average, 1.098 million gallons per day (MGD) of wastewater would be discharged via existing outfalls (Outfalls 001 and 002) into a vegetated drainage ditch (Figure 2 – Appendix A). Discharged wastewater will flow into a Nueces County drainage ditch; thence into a Nueces County drainage ditch (tidal); and, thence into the Nueces River (Tidal Segment 2101), which is more than a mile north of the existing outfalls. No new outfalls will be constructed.

Wastewater will primarily consist of cooling tower blowdown and will not exceed the current TPDES permit limits. The wastewater and storm water will pass through an oil/water separator prior to discharge and effluent will be monitored. Effluent will be discharged into a vegetated drainage ditch that is dry except during flood events.

5.3.4 STORM WATER

Storm water within the facility will be routed through drainage ditches to the existing permitted wastewater outfall structures (Figure 2 – Appendix A). Per the TPDES permit conditions, the wastewater and storm water combined effluent will be monitored regularly.

5.3.5 OPERATION NOISE LEVELS

The best available technology will be used to maintain operational noise levels below 75 decibels as measured at the property boundary.

6.0 BACKGROUND INFORMATION

6.1 GENERAL ENVIRONMENTAL INFORMATION

This section provides applicable environmental characteristics for the general region in which the project is located.

6.1.1 GENERAL REGION INFORMATION

The proposed construction site is within the Southern Subhumid Gulf Coastal Prairie of the Western Gulf Coastal Plain ecoregion of Texas[9]. The area in which the project is located is typical for this ecoregion.

This region borders a portion of the Gulf Coast in the state of Texas. The Gulf of Mexico influence creates multiple dynamic ecosystems within this ecoregion including bays, estuaries, salt marshes, and tidal flats. Inland ecosystems are composed of mixed brush and grassland communities. These ecosystems are home to a variety of nongame wildlife including several endangered species[10]. This region is prime wintering grounds for migratory birds[11]. The bays and estuaries are invaluable breeding grounds and fish hatcheries[12].

The majority of river basins in Texas drain towards the Gulf of Mexico, however the limited amount of rainfall in west Texas reduces the amount of fresh water inflow experienced along the southern Gulf Coast of Texas[13]. This ecoregion also experiences more drought than other coastal areas to the north. Nonetheless, this region is ecologically diverse, particularly in areas adjacent to the coastline. Freshwater wetlands, marshes, swamps, inland prairies and scrub/shrub habitat are typical in the area[9].

Because of the abundant water resources, the rich soils, and the proximity to the coast, this area is commonly converted to cropland, ranchland, and industrial development[9]. These land uses have reduced and fragmented the natural habitats throughout the region.

6.1.2 LAND USE

Nueces and San Patricio counties are located within the Southern Subhumid Gulf Coast Prairies with the majority of land classified as farmland and pastureland. Much of the natural areas have been converted to produce sorghum, cotton, hay, wheat, corn, watermelons, peaches, and

pecans. Cattle are also raised for beef and dairy. Urban and industrial developments have increased in recent years, partly in response to the growth of oil and gas in the region[14,15]. Land use types within the survey area consist of agriculture, urban development, potential wetlands, riverine, scrub-shrub, and woodland habitats (Figure 3 – Appendix A).

6.1.3 CLIMATE

Nueces and San Patricio counties have a sub-humid tropical climate with an average annual rainfall of 30-31 inches. The mean temperature in July is 93 degrees Fahrenheit (°F) and 47 °F in January. The growing season lasts roughly 309 days per year in Nueces and 303 days in San Patricio[14,15].

As of 11 March 2014 the US Drought Monitor indicated the survey area was in D1 – Moderate Drought[16]. According to the National Weather Service/Advanced Hydrologic Prediction Service, the area had received approximately 1-3 inches of rain within the 30 days prior to the field survey conducted on 28 March 2014. This amount is 2 inches below normal up to 1 inch above normal average rainfall for this area[17].

The NOAA – National Climatic Data Center's Hydrological Drought Index indicates that Nueces County has been impacted by drought four of the past 6 years (in March). The watersheds that contribute to the project region have been impacted by significant drought conditions for five out of the past 6 years[18]. Long-term drought conditions have weakened many ecosystems across Texas. While the coastline has not experienced as severe a deficiency in direct precipitation as have other areas of Texas, it is affected by the limited influx of freshwater from Texas' river basins[19].

6.1.4 TOPOGRAPHY

Nueces and San Patricio counties are located along the Gulf Coast of Texas with a generally flat terrain, elevations ranging from sea level to approximately 180 feet above sea level[14,15]. The Project Area is flat with an elevation of approximately 75 feet above sea level (Figure 4 – Appendix A).

According to the Federal Emergency Management Agency (FEMA) floodplain data, the Project Area is not within a designated 100-year floodplain. FEMA floodplain designation is demonstrated in Figure 5 (Appendix A)[20].

6.1.5 GEOLOGY

The specific geologic formation found in the area is the Beaumont Formation primarily composed of sand or silt from the late Pleistocene Epoch[21,22].

6.1.6 SOILS

The soils in Nueces County vary from very dark loams to black clayey soils in the central region; light to dark loamy surfaces with clayey subsoils in the west; sandy soils located along the coast; and dark, clayey soils in marshes[14]. The soils of San Patricio consist of light to dark loam on the surface, with clayey subsoils[15]. The Natural Resources Conservation Service soil units[23] mapped within the Action Area are demonstrated in Figure 6 (Appendix A) and listed in Table 1 (Appendix D).

6.1.7 WATER RESOURCES

Nueces and San Patricio counties have abundant water resources, with their borders on the Gulf of Mexico and extensive coastal lakes, marshes, estuaries and rivers. The Project Area is a part of the Corpus Christi Bay/Nueces River Basin, which includes prominent water features such as the Nueces Bay and Corpus Christi Bay/Ship Channel. The low, flat topography is prone to flooding. Surface waters in the general area include Nueces River, Oso Creek, and Rincon Bayou[24].

Based on the background review, the water resources surrounding the Project Area include lakes, freshwater ponds, freshwater emergent wetlands, estuarine and marine deepwater, estuarine and marine wetlands, and freshwater forested/shrub wetlands[25].

The USFWS National Wetlands Inventory data within and immediately adjacent to the proposed Project Area is demonstrated in Figure 5 (Appendix A)[25].

6.1.8 VEGETATION

Vegetation of the Southern Subhumid Gulf Coastal Prairie includes *Schizachyrium scoparium* (little bluestem), *Sorghastrum nutans* (yellow indiangrass), *Sporobolus* spp. (tall dropseed), *Bouteloua* spp. (grama), *Buchloe* spp. (buffalograss), *Eragrostis* spp. (lovegrass), *Hilaria* spp.

(curly-mesquite), *Setaria* spp. (bristlegrass), *Prosopis glandulosa* (mesquite), and *Acacia farnesiana* (huisache). Mesquite and huisache are invasive species that are encroaching into the region[9].

Agriculture and urban and industrial development have replaced most of the native coastal prairie[26]. Remaining native vegetation consists of fragmented remnants of natural habitat.

6.2 FEDERALLY-LISTED SPECIES

6.2.1 THREATENED OR ENDANGERED SPECIES LIST

The USFWS, NOAA-NMFS, and the Texas Parks and Wildlife Department (TPWD) maintain lists of federally-listed species by county in Texas. Table 2 is a list of federal candidate, threatened, and endangered species identified by these agencies as having the potential to occur in Nueces and San Patricio counties [27, 28, 29, 30]. For the purposes of this BA, federally-listed species mentioned by these 3 agencies will be discussed. State-listed species are not included in this report.

Table 2. List of Federal Threatened, Endangered, and Candidate Species for Nueces and San Patricio Counties, Texas[27,28,29,30]

Common Name	Scientific Name	Species Group	County	USFWS List Status	NOAA List Status	TPWD List Status
Green sea turtle	*Chelonia mydas*	reptiles	Nueces and San Patricio	T	T	LT
Hawksbill sea turtle	*Eretmochelys imbricata*	reptiles	Nueces and San Patricio	E	E	LE
Kemp's ridley sea turtle	*Lepidochelys kempii*	reptiles	Nueces and San Patricio	E	E	LE
Leatherback sea turtle	*Dermochelys coriacea*	reptiles	Nueces and San Patricio	E	E	LE
Loggerhead sea turtle	*Caretta caretta*	reptiles	Nueces and San Patricio	T	T	LT
Smalltooth sawfish	*Pristis pectinata*	fishes	Nueces and San Patricio	-	E	LE

Common Name	Scientific Name	Species Group	County	USFWS List Status	NOAA List Status	TPWD List Status
Gulf Coast jaguarundi	*Herpailurus yagouaroundi cacomitli*	mammals	Nueces and San Patricio	E	-	-
Ocelot	*Leopardus pardalis*	mammals	Nueces and San Patricio	E	-	LE
Red wolf	*Canis rufus*	mammals	Nueces and San Patricio	-	-	LE
West Indian manatee	*Trichechus manatus*	mammals	Nueces and San Patricio	E	E	LE
Blue whale	*Balaenoptera musculus*	mammals	Nueces and San Patricio	-	E	-
Finback whale	*Balaenoptera physalus*	mammals	Nueces and San Patricio	-	E	-
Humpback whale	*Megaptera novaeangliae*	mammals	Nueces and San Patricio	-	E	-
Sei whale	*Balaenoptera borealis*	mammals	Nueces and San Patricio	-	E	-
Sperm whale	*Physeter macrocephalus*	mammals	Nueces and San Patricio	-	E	-
Eskimo curlew	*Numenius borealis*	birds	Nueces and San Patricio	-	-	LE
Northern aplomado falcon	*Falco femoralis septentrionalis*	birds	Nueces and San Patricio	E	-	LE
Piping plover	*Charadrius melodus*	birds	Nueces and San Patricio	T	-	LT
Red knot	*Calidris canutus rufa*	birds	Nueces and San Patricio	PT	-	-
Yellow-billed cuckoo	*Coccyzus americanus*	birds	Nueces and San Patricio	PT	-	-
Whooping crane	*Grus americana*	birds	Nueces and San Patricio	E	-	LE
Slender rush-pea	*Hoffmannseggia tenella*	plants	Nueces	E	-	LE

Common Name	Scientific Name	Species Group	County	USFWS List Status	NOAA List Status	TPWD List Status
South Texas ambrosia	*Ambrosia cheiranthifolia*	plants	Nueces	E	-	LE
Golden orb	*Quadrula aurea*	mussels	San Patricio	-	-	C
Sprague's pipit	*Anthus spragueii*	birds	Nueces and San Patricio	C	-	C

Note: USFWS and NOAA List Status symbols: E - Endangered, T - Threatened, PT – Proposed Threatened, C - Candidate
TPWD List Status Symbols: LE - Listed Endangered, LT - Listed Threatened, C - Candidate

6.2.2 PROPOSED THREATENED, THREATENED, OR ENDANGERED SPECIES DESCRIPTIONS

According to the USFWS, there is no designated critical habitat for any of the federally-listed threatened and endangered species within 15 miles of the Project Area[31]. The nearest critical habitat is for piping plovers, which is located approximately 15 miles northeast of the Project Area[31].

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

Green Sea Turtle

The green sea turtle can grow to 4 feet in length and reported weights vary from 350-450 pounds. The carapace is smooth and keelless, and the color varies with shades of black, gray, green, brown, and yellow. Adults are herbivorous. Hatchlings are omnivorous[32,33].

Green sea turtles occupy 3 ecosystems according to their life stage: high-energy oceanic beaches, convergence zones in the pelagic habitat, and benthic feeding grounds in relatively shallow, protected waters. Females briefly occupy high-energy oceanic beaches during nesting and hatching activities. Hatchlings move out to the convergence zone until their carapace reaches approximately 7.8-9.8 inches in length. Juveniles and adults primarily occupy benthic feeding grounds in shallow, protected waters. Preferred feeding grounds include pastures of seagrasses and/or algae. They are also found over coral reefs, worm reefs, and rocky bottoms[33].

The nesting season in the southeastern US is June through September. Nesting is nocturnal and occurs in 2, 3, or 4-year intervals. Females may lay up to 9 clutches per season at 13-day intervals. Hatchlings typically emerge at night. Nesting occurs on high energy oceanic beaches with a sloping platform and minimal disturbance. Green sea turtles return to the same nesting site and are known to travel long distances between foraging areas and nesting beaches. Green sea turtles have a worldwide distribution in tropical and subtropical waters[32, 32].

Hawksbill Sea Turtle

The hawksbill sea turtle is a small to medium-sized marine turtle with a reddish-brown carapace. The head is relatively small with a distinctive hawk-like beak. The adult hawksbill is commonly 2.5 feet in length and weighs between 95 to 165 pounds[34,35].

Hawksbill hatchlings live in a pelagic environment, specifically in the weedlines that accumulate at convergence zones. Juveniles will return to a coastal environment when their carapace reaches approximately 7.8-9.8 inches in length. Juveniles, subadults, and adults will spend most of their time in their primary foraging habitat, coral reefs. Hawksbills primarily feed on on a variety of invertebrates including sponges, molluscs, and crustaceans. Hawkbills are typically associated with rocky areas and coral reefs in water less than 65 feet[34,35].

Hawksbill turtle nesting occurs between April and November yielding 140-200 eggs per clutch. Nesting is nocturnal and occurs 4 to 5 times per season every 2 to 3 years. During the nesting season, mating occurs approximately every 14 days. Preferred nesting habitat includes low and high energy beaches in tropical oceans with close proximity to coral reefs. Nesting habitat is often shared with green sea turtles. Hawksbill sea turtles have a tolerance for a variety of nesting substrates and often build their nests under vegetation. Southeast Mexico and Cuba are now considered the most important productive sites for hawksbill nesting in the Caribbean[34,34].

The hawksbill is found in tropical and subtropical waters of the Atlantic, Pacific, and Indian Oceans. The hawksbill sea turtle is an occasional visitor to the Texas coast[34,34].

Kemp's Ridley Sea Turtle

The Kemp's ridley sea turtle is considered the smallest sea turtle with an olive-gray carapace, a triangular shaped head, and a hooked beak. Adults can grow to 2 feet in length and weigh between 70-108 pounds. This turtle is a shallow water benthic feeder with a diet consisting primarily of crustaceans (i.e., shrimp and swimming crabs), jellyfish, snails, and sea stars[36,37].

Kemp's ridleys occupy 3 ecosystems according to life stage: terrestrial beaches, nearshore marine environment, and the pelagic habitat of the open sea. Terrestrial beaches are occupied briefly during nesting and hatching activities. Hatchlings move out to the open sea for an average of 2 years. Juveniles and adults primarily occupy the nearshore marine environment[36,36].

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 April to July during daylight hours. Large numbers of females emerge for a synchronized nesting event referred to as "arribada". Arribadas are thought to be caused by female pheromone release, strong offshore winds, lunar cycles, and changes in barometric pressure. On average, females nest 2.5 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[36,36].

The Kemp's ridley turtles range includes the Gulf of Mexico and the Atlantic coast of North America as far north as Nova Scotia and Newfoundland[36,36].

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 2,000 pounds. The turtle lacks scales and is covered by firm, rubbery skin several 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 tunicates, but it is also known to feed on sea urchins, squid, crustaceans, fish, blue-green algae, and floating seaweed[38,39].

In the US, nesting occurs from March to July. Females prefer sandy beaches lined with vegetation and sloped sufficiently, minimizing the distance to dry sand. Preferred beaches have deep, unobstructed oceanic access on continental shorelines. 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[39].

Leatherbacks are highly migratory and the most pelagic of all sea turtles. 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 US with most nesting occurring on the Florida east coast, Sandy Point, US Virgin Islands, and Puerto Rico[38,38].

Loggerhead Sea Turtle

The loggerhead sea turtle is a 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[40,41].

Loggerheads occupy 3 ecosystems according to life stage: terrestrial beaches, nearshore marine environment, and the pelagic habitat of the open sea. The terrestrial zone is occupied briefly during nesting and hatching activities. Hatchlings move out to the open zone until their carapace reaches approximately 15-24 inches in length. Juveniles and adults primarily occupy nearshore marine environments[40,40].

The nesting season in the US is April through September. Nesting occurs every 2-3 years and is mostly nocturnal. Females can nest up to 5 times per season, yielding as many as 190 eggs per clutch, 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[40,40].

Distribution of the loggerhead includes the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. Primary nesting sites in the US occur in south

Florida and along the Gulf and Atlantic coastlines from Texas to Virginia. Loggerheads are considered an occasional visitor to Texas[40,40].

Smalltooth Sawfish

Smalltooth sawfish are large elasmobranchs. They have a body similar to shark with ventral gill slits like a ray. Most notable is the long, flat snouts with pairs of teeth along the edges. The toothed snout is used to locate, stun, and kill fish and crustaceans. Smalltooth sawfish can grow up to 25 feet in length[42]. These sawfish are ovoviviparous, usually with litters of 15-20 pups[43].

Preferred habitat includes shallow coastal seas and estuaries with muddy and sandy bottoms. They are typically found close to shore, in sheltered bays and on shallow banks[42,43].

The US population of smalltooth sawfish is found in the Gulf of Mexico and Atlantic Ocean. Historically, these sawfish could be found throughout the Gulf of Mexico. Today, their range has shrunk to peninsular Florida[43].

Gulf Coast Jaguarundi

Jaguarundis are diurnal small cats, weighing between 8-20 pounds. They have a slender build, long neck, short legs, a long tail, and a small, flattened head. Their fur may be either red or gray colored[44].

Gulf Coast jaguarundis are solitary, except during the mating season from November to December. They may have up to 2 litters per year, each with 1-4 young. Jaguarundis are predators with a diverse diet of birds, small mammals, and reptiles[44].

They inhabit dense, thorny brushlands/woodlands and adjacent bunchgrass pastures. Jaguarundis have been observed spending half their time in tall, dense grass habitats. Typical thorn-scrub habitat consists of the following species: *Condalia hookeri* (brasil), *Schaefferia cuneifolia* (desert yaupon), *Lycium berlandieri* (wolfberry), *Ziziphus obtusifolia* (lotebush), *Castela erecta* (amargosa), *Aloysia gratissima* (white-brush), *Acacia greggii* (catclaw), *Acacia rigidula* (blackbrush), *Lantana achyranthifolia* (lantana), *Guajacum angustifolium* (guayacan), *Leucophyllum frutescens* (cenizo), *Forestiera angustifolia*

(elbowbush), and *Diospyros texana* (Texas persimmon). Trees that may be interspersed within the thornscrub include mesquite, *Quercus virginiana* (live oak), *Ebenopsis ebano* (ebony), and *Celtis laevigata* (hackberry). River and creek riparian habitat may also be used[44].

Historically, the Gulf Coast jaguarundi was found from the Lower Rio Grande Valley in southern Texas to Veracruz, Mexico[44].

Ocelot

Ocelots are a medium-sized cat comparable in size to the bobcat. These cats weigh between 15–35 pounds and are up to 41 inches long. The short fur of the ocelot varies from pale gray to cinnamon. The undersides of the cat are white. Blotched spotting on the fur is bordered with black or solid black. Black stripes run from the eyes to the back of the head and across the cheeks. The tail is ringed or marked with dark bars[45].

Ocelots prefer dense, thorny thickets and rocky areas. Individuals have varying home ranges, estimated between 500-4,500 acres in size. Ocelots are carnivores that feed on small mammals, birds, and some reptiles. Females create their dens in caves, hollow trees, or dense brush and will give birth every other year to 1-2 kittens. Kittens will stay with the mother for up to 2 years. Ocelots hunt at night and spend the day with their young or resting[45].

Historically ocelots were found throughout south Texas, the southern Edwards Plateau, and the coastal plains. Currently, their distribution in the US is limited to the extreme southern tip of Texas and Arizona. The range of the ocelot is greatly reduced due to continued habitat loss. The estimated population of ocelots in Texas is approximately 50 individuals[46].

Red Wolf

The red wolf is one of the world's most endangered canids. Their fur is a reddish color and they are smaller in size than the gray wolf. The average adult red wolf grows up to 5 feet in length and weighs 45-80 pounds[47].

Red wolves feed on rabbits, deer, raccoon, and rodents (rats and mice). They live in packs of 5-8, which typically consist of 1 breeding pair and their offspring. Breeding season is once per year, January through March; up to 9 pups are born 63 days later in April or May. Pups remain with their parents until they find a mate of their own, usually at about 2 years of age. Red wolves are generally monogamous, and will remain with the same mate for many years[48,49].

Red wolves are thought to prefer warm, moist, and densely vegetated habitat. They also can be found in pine forests, bottomland hardwood forests, coastal prairies, and marshes. Little information is available describing red wolf preferred habitat characteristics[48].

Originally, the red wolves were found throughout the southeastern US. The USFWS declared the red wolf extinct in the wild in 1980. In 1987, captive individuals were released to the wild in North Carolina. This reintroduced population is estimated at 100-120 individuals[47].

West Indian Manatee

The West Indian manatee is a large, fusiform-shaped, marine mammal. The adult manatee may grow up to 10 feet in length and up to 2,200 pounds. The manatee has dark gray, rubber-like skin. Manatees have forelimbs shaped like a paddle, no hind limbs, and a horizontal, flat, spatulate tail. Manatees breathe surface air with nostrils located on the upper snout. Manatees also have very small eyes and minute ears. Manatees are herbivores and opportunistic. Their diet consists of a wide variety of submerged, floating, and emergent vegetation. Seagrasses appear to be a dominant food source in coastal areas[50].

Manatees prefer depths ranging from 3-7 feet, but can be found in shallow areas down to 1.5 feet. Preferred feeding grounds are shallow grassbeds adjacent to deep channels in both coastal and riverine habitats. Manatees will seek freshwater drinking sources, but are not dependent upon fresh drinking water[50].

West Indian manatees have both opportunistic and predictable migration patterns, which are dependent on water temperature. They are able to travel long distances,

typically in a north-south direction, according to seasonal temperature changes. In autumn and winter when water temperatures drop below 68 °F, manatees congregate in natural and artificial warm-water refuges. Most manatees return to the same warm water refuges each year. During mild winters, manatees will leave the warm-water refuge to feed on nearby grassbeds. As the water temperature rises in spring and summer, some manatees will remain near their wintering grounds and others will migrate up the coast or into river and canal systems[50].

Mating and calving are not seasonally or habitat dependent. One or more males are attracted to females in heat to form a mating herd for up to 4 weeks. Length of gestation is thought to be between 11-14 months. Typical litter size is one and calves remain with the mother for 1-2 years after birth. Manatees reach sexual maturity at approximately age 5 years and can live in excess of 50 years[50].

Distribution is limited to warm coastal waters in the Gulf of Mexico including the US and Mexico, Central America, the north and northeastern coast of South America, and islands throughout the Caribbean Sea[51]. Manatee protection is not as well-supported in areas outside of the US, which results in smaller populations. The Florida coast supports the largest known population of West Indian manatees of any location within the species range[50].

Blue Whale

Blue whales are considered baleen whales and are the largest of all whales. These whales may weigh up to 330,000 pounds and reach lengths up to 108 feet. Females tend to be larger than the males. Blue whales have a long, slender body mottled with a gray pattern that appears light blue when seen through the water. Key identifying characteristics of the blue whale include a broad, flat rostrum and a proportionately smaller dorsal fin than other baleen whales[52,53].

Blue whales use the keratinized transverse plates, their baleens, to filter water for food (i.e., zooplankton). Euphausiids (krill) comprise the largest component of their diet. Fish and other select crustaceans (copepods) are also consumed in small amounts[52,53].

Mating and parturition occur in temperate waters during winter months. Typically, 1 calf is born after a 10-12 month gestation period, and it is nursed for 6-7 months. It is reasoned that sexual maturity occurs between 5-15 years of age[52,53].

Little information is available concerning the life history of blue whales. Blue whales are thought to inhabit all oceans but occurrence is likely influenced by the presence of food. Blue whales may occur in coastal waters but are believed to more frequently use off-shore waters. Blue whales are migratory, moving to colder waters during the spring and summer and to more temperate waters in the fall and winter[52,53].

Few records exist that demonstrate occurrence in the Gulf of Mexico. Sightings in the Gulf of Mexico consist of stranded whales with the most recent observation in 1940 along the coast of Texas[54].

Finback Whale

Finback whales are the second-largest species of whale, weighing between 80,000-160,000 pounds and have lengths between 75-85 feet. These baleen whales have sleek, streamlined bodies, a V-shaped head, and a tall, curved dorsal fin. They are large, fast swimmers. Finback whales are dark gray with a white underbelly. The lower jaw and the baleen plates are bi-colored with gray or black on the left side and cream white on the right side. The tongue is oppositely colored. Many individuals have several light-gray, V-shaped "chevrons" behind their head. Individuals can be identified by the size and shape of their dorsal fin and by the pattern of chevrons and streaks of lighter coloration on their back[55,56.]

During the summer, finback whales will consume large amounts of prey at higher latitudes, and then fast or selectively feed when at lower latitudes in the winter. Their diet primarily consists of krill, squid, and small, schooling fish such as *Mallotus villosus* (capelin), *Clupea harengus* (herring), and *Ammodytes* spp. (sand lance). Finback whales' distribution along the eastern US is strongly correlated with the availability of sand lance. Fish are more often consumed during pre-spawning, spawning, and post-spawning adult stages on the continental shelf and in coastal waters[55,56].

Although social and mating systems of finback whales are not well known, finback whales are known to form social groups of 2-7 whales. Reproduction maturity is believed to occur between 6-12 years and females give birth at 3-year intervals. Mating and calving occur from November to March. Females give birth to a single calf, after 11 months of gestation[55,56].

Finback whales are found in deep, offshore waters of all major oceans, most often in the temperate to polar latitudes. They are rarely found within the tropics. There are distinct populations in the North Atlantic Ocean, North Pacific Ocean, and Southern Hemisphere and these populations are thought to rarely, if ever, interact. These populations differ in the amount of travel that they exhibit, which may be directly related to local food abundance. Fin whales have a complex, not completely understood migratory pattern. The consensus is that these whales move into and out of high-latitude feeding areas. Movement may be affected by prey availability, climate, reproductive condition, or other factors[55,56].

Finback whales are not abundant in the Gulf of Mexico. One young individual was stranded on the beach in Gilchrist, Chambers County, Texas on 21 February 1951. This is the only recorded observation of finback whales in Texas[57].

Humpback Whale

Humpback whales are characterized by long pectoral fins, which can reach up to 15 feet in length, a thick body, and fewer throat grooves as compared to other baleen whales. Humpback whales may weigh between 50,000-80,000 pounds and have a length up to 60 feet. Adult females are typically larger than males. Their body and baleen plates are grayish-black; however white pigmentation may be present on their pectoral fins, belly, and tail flukes. The pigmentation on the undersides of their tail flukes can be used to identify individual whales. Humpback whales also have numerous knobby structures, called dermal tubercles, on the dorsal surface of the snout, chin, and mandible[58,59,60].

Humpback whales' diet consists of krill, herring, sand lance, and capelin. It also includes *Scomber sombrus* (mackerel), *Pollachius virens* (small pollock), and *Melanogrammus aeglefinus* (haddock). Humpback whales have unique means of foraging by using techniques such as "bubble netting" and synchronized feeding lunges. Bubble netting is

when humpback whales expel columns of air bubbles to concentrate krill or fish for easier consumption. They may also opportunistically feed on prey around fishing boats[58,59,60].

Humpback whales congregate in groups of up to 200 individuals and mate, which usually occurs once every 2 years. Gestation lasts for about 11 months, and weaning occurs between 6-10 months after birth. Calving grounds are commonly near offshore reef systems, islands, or continental shores[58,59,60].

Humpback whales inhabit all major oceans particularly over continental shelves. Humpback whales occur at higher latitudes during the summer and in temperate and tropical zones during winter. They may migrate long distances between winter and summer habitats or migrate throughout their summer range. Generally humpback whales stay near the surface of the ocean during migration. During the winter and reproductive periods, humpback whales tend to demonstrate site fidelity to mate and reproduce. Shallow waters are most often used while feeding and calving[58,59].

Humpback whales are known to frequently breach the surface water. They commonly slap their tail flukes on the surface and are known to spyhop, a behavior where an individual lifts its head out of the water in order to look around. These displays of behavior may be a form of communication[59].

Humpback whales from the Atlantic population may infrequently stray into the Gulf of Mexico during the breeding season or on their return migration northward. The only known occurrence along the Texas Coast is of a young, immature individual observed at the inshore side of Bolivar Jetty near Galveston, Texas in 1992[58].

Sei Whale

Sei whales are members of the baleen whale family and can reach lengths of 40-60 feet and weigh up to 100,000 pounds. Sei whales have long, slender bodies that is dark bluish-gray dorsally and pale-colored ventrally. They often have mottling or white spots on the body that may be the result of pits or wounds. Sei whales have very fine bristles on the baleen, short ventral grooves, and prominent, curved-backward dorsal fins. Sei

whales have 30-65 ventral pleats. Sei whales differ from other whales by rarely raising their flukes above water and never breaching[61,62].

Sei whales's diet consists primarily of zooplankton and micronekton, which includes calanoid copepods and krill. They may dive for up to 20 minutes looking for food and use gulping and skimming as foraging strategies. Feeding typically occurs at dawn[61,62].

Sei whales reach sexual maturity at 6-12 years of age. Gestation lasts approximately 11-13 months, and parturition typically occurs in November-December. Females typically breed every 2-3 years and will give birth to a single calf. Calves are weaned in the summer/fall months, approximately 6-9 months after birth[61,62].

Sei whales are widely distributed across the globe; however they are not known to stay in any particular area year-round. Sei whales tend to migrate to higher latitudes during the summer for feeding and to temperature or subtropical waters during the summer, although the polar latitudes are not as high as other baleen whales. Sei whales are highly mobile and their occurrences in an area are unpredictable. These whales may travel singly or in groups of 2-50 individuals. The North Atlantic population is usually observed in deeper waters over the continental slope and tends to avoid semi-enclosed waters, such as the Gulf of Mexico[61,62].

Sperm Whale

Sperm whales are classified as odontocetes or toothed whales. Males are significantly larger than females and may weigh up to 125,000 pounds and reach lengths up to 52 feet. Sperm whales have a disproportionately large head, which can make up one third of the total body length. They are also distinguished by a blowhole on the left side of the head and a rod-shaped lower jaw with many teeth. No functional teeth are present on the upper jaw. The bodies of sperm whales are dark gray on their back and white on the underside. Their dorsal fin is short and thick. It is not pointed or curved and there are knuckles along the spine. They have the largest brain of any animal on Earth[63,64].

Sperm whales will dive deeply to forage for cephalopods (squids and octopus), bottom-dwelling fish, *Cyclopterus lumpus* (lumpsuckers), rays, sharks, and many other bony fishes[63,64].

Breeding season occurs from March to June in the North Atlantic. Females sexually mature between 7-13 years of age and males do not mature until they reach their twenties. Females enter estrous synchronously which maximizes the reproductive success for traveling males. Gestation is approximately 15 months, resulting in the birth of a single calf. Birthing intervals are approximately every 4-6 years[64].

Sperm whales have strong family bonds, particularly between the females. Typically, 12 females will form a pod while males are more likely to separate themselves from the family unit. Young males will leave the family unit between 4-21 years of age[63,64].

Sperm whales are cosmopolitan in all deep ice-free waters and are thought to inhabit the entire Atlantic basin, including the Gulf of Mexico. Occurrence in the Gulf of Mexico is strongly correlated with mesoscale physical features, such as Loop Current eddies and Mississippi Canyon. Female sperm whales and their young are more often found in lower latitudes while males can often be found at polar latitudes during parts of the year. Distribution is dependent on their food source and suitable conditions for breeding, and varies with the sex and age composition of the group[64]. Research suggests these whales move along the shelf break in the Gulf of Mexico and may be present year-round[65].

Eskimo Curlew

The Eskimo curlew is a migratory bird that is approximately 12-14 inches long with a slightly down-curved bill. These birds have brown feathers with streaking on the sides of the face and neck. The undersides of their wings have cinnamon-colored feathers[66].

Its breeding habitat consists of treeless dwarf shrub-graminoid tundra and grassy meadow habitat. Non-breeding birds utilize a variety of habitats, including grasslands, pastures, plowed fields, intertidal flats, and sand dunes[66].

Eskimo curlews migrate from nesting grounds in the Alaskan and Canadian Arctic across the North American prairies to South America. This species is known to migrate north through the mid-western US, including Texas during the spring. Their diet consists of *Empetrium nigrum* (crowberry), *Vaccinium* sp. (blueberries), Orthopterans (grasshoppers), Annelids (earthworms), and other insects[66].

Northern Aplomado Falcon

The northern aplomado falcon has a steel grey back, black "sash" on its belly, and striking black markings on the top of its head, around its eyes, and extending down its face. They have a long banded black and white tail, are smaller than *Falco peregrines* (peregrine falcon) and larger than *Falco sparverius* (American kestrel). They average 15-18 inches in length and their wingspans average 36 inches. Northern aplomado falcons are most often seen in pairs. Sexes are similar in appearance. Its diet is mostly birds and insects, but also small mammals and reptiles. The birds are capable of long pursuits of prey, such as *Columba livia* (pigeons) and *Zenaida* spp. (doves). Mated pairs remain together year-round and hunt cooperatively[67,68].

Aplomado falcons nest in bromeliads or abandoned stick platforms of corvids and other raptors. Eggs are laid between March and June with both parents incubating the nest. The average clutch size is 3 eggs. Radio-tagged fledglings in south Texas suggest that most pairs use the vicinity of previous season's nesting platform as hunting, roosting, and display area throughout the year. Mated pairs remain together year-round and hunt cooperatively. The birds tend to perch on inner branches of trees and chase terrestrial prey on foot. The bird displays great speed in long aerial pursuits of doves and pigeons and hovers briefly over trapped prey[67].

Open grassland terrain with scattered trees, relatively low ground cover, an abundance of small to medium-sized birds, and a supply or suitable nesting platforms, particularly yucca and mesquite, comprise the preferred habitat of northern aplomado falcons. They use woody vegetation, fence posts, and telephone poles as perches. In Texas, northern aplomado falcons are found in the South Texas and Trans-Pecos regions[67,69].

Piping Plover

Piping plovers 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, and black breastband[70].

Three main breeding populations of piping plovers have been distinguished by geographic region within the US: Great Lakes, Northern Great Plains, and Atlantic Coast. These 3 populations winter on beaches and barrier islands in the South Atlantic, Gulf of Mexico, and Caribbean coasts, including the Bahamas and West Indies. Piping plovers from these 3 regions primarily winter along coastal areas of the US from North Carolina to Texas[71]. Piping plovers generally begin arriving on the Texas coast in mid-July and begin leaving for the breeding grounds in late February. It is believed that the migration to and from wintering grounds is a non-stop effort. Few birds remain on the Texas coast year round, but those that do are believed to be non-breeders[72].

Wintering habitat includes foraging and roosting habitat types. Foraging habitat includes 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. Most foraging habitats are dynamic systems that fluctuate with the tide and wind. These shorebirds forage on exposed beach substrates pecking for prey at or just below the surface. They feed on invertebrates such as marine worms, fly larvae, beetles, crustaceans, and mollusks as well as their eggs and larvae[70].

Piping plovers demonstrate high winter site fidelity[70]. Preferred roosting habitat is adjacent to foraging habitat and includes sandy beaches, often with cover such as driftwood, seaweed clumps, small dunes, and debris that is used for shelter from wind and extreme temperatures[73]. Critical habitat for wintering piping plovers has been designated in several areas along the Texas coast[74]. Piping plovers are known to occupy similar habitats as other shorebirds such as *Tringa semipalmata* (willets), *Arenaria interpres* (ruddy turnstones), *Limnodromus scolopaceus* (dowitchers), *Calidris* spp. (sandpipers), *Haematopus palliatus* (American oystercatchers), and other plovers[73].

Red Knot

Red knots are medium-sized migratory shorebirds with a wingspan of 20 inches, short thick legs, and a tapered straight bill. Its plumage is gray during the non-breeding season, but its head and breast turn a reddish color during the breeding season[75,76].

During the breeding season, males and females simultaneously arrive at breeding areas. Males scrape multiple cup-shaped depressions for nesting. The female then chooses the most suitable nest site. Nest sites are typically found on dry, slightly elevated tundra locations, on wind-swept ridges or slopes with little vegetation, and near wetlands. The clutch size is usually 4 eggs. The breeding season occurs from May to July[75].

Red knots travel long-distances (i.e., several thousands of miles) bi-annually between their breeding areas in the central Canadian Arctic and wintering areas in southern South America. Red knots use a limited number of stopover sites during migration. These stopover locations are essential to the survival of the species as they provide access to necessary food sources for sustained flight. High proportions of the entire population are known to congregate at a single migration stopover site. Stopover habitat includes intertidal, marine habitats that are near coastal inlets, estuaries, and bays. Red knots travel in large single-species flocks (>50 individuals) typically taking flight a few hours before twilight on sunny days. The diet of migrating red knots includes *Limulus polyphemus* (horseshoe crab) eggs, bivalves, polychaete worms, amphipods, and crustaceans[75].

Red knots may be found in Texas anytime of the year even during summer months. The greatest numbers of Red Knots are found in Texas during winter (January) and during spring passage (April to May). Between 1985 and 1996, approximately 3,000 individuals were recorded on the Bolivar flats. This population has declined significantly to about 300 individuals. Red knots inhabit sandy beaches, tidal mudflats, and salt marshes in Texas[76].

Yellow-billed Cuckoo

The yellow-billed cuckoo is an insectivorous, migratory, medium-sized songbird characterized by a zygodactyl foot (2 toes point forward and 2 toes point backwards), a blue-black bill with yellow on the base of the mandible, and a narrow yellow eye ring. It is 12 inches in length and weighs approximately 2 ounces[77].

East of the continental divide, yellow-billed cuckoos breed from the north-central US and south-central Canada to the southeastern US, Greater and Lesser Antilles, and northern Mexico. Yellow-billed cuckoos nest between June and August. Clutch size is

typically 2-3 eggs per season and the young fledge approximately 17 days after hatching. Yellow-billed cuckoos usually raise their own young, but they are also known to be facultative brood parasites where they lay eggs in other cuckoos or bird species nests[77].

Nesting habitat includes large patches of riparian habitat that is comprised of *Populus* spp. (cottonwoods), *Salix* spp. (willows), and a dense understory. The eastern population is believed to use more habitat types, which include other broad-leaved woodlands. The western population is restricted to narrow riparian zones. Yellow-billed cuckoos migrate to South America for the winter[77].

This species is thought to be declining in west Texas; however it is considered to be widespread and uncommon to common in central and east Texas[77].

Whooping Crane

The whooping crane is a large bird that stands approximately 5 feet tall with a wingspan of approximately 7 feet and weighs between 14-16 pounds. Adult birds have long necks and legs, a white body, a red crown, black primary feathers, and a long, pointed beak. Juveniles are reddish-cinnamon in color. Whooping cranes are omnivorous with a diet of crustaceans, mollusks, amphibians, fish, acorns, and berries[78,79].

Whooping cranes demonstrate high site fidelity during the breeding season using the same areas each year. Nests are typically constructed within tall rushes or sedges of marshes, sloughs, or along lake margins. Females usually lay 2 eggs per clutch and one clutch per year in April to May. Parents share rearing duties although the female takes the primary role in raising the young[78,79].

The whooping cranes main population breeds in Wood Buffalo National Park in Alberta, Canada (April to October) and winters on the Texas coast (November to March). Migration occurs twice per year during daylight hours. The main population typically remains within a 200-mile migration pathway from Canada to Texas, and they regularly stop to feed and rest along the way. Whooping cranes use a variety of habitats during migration, including inland marshes, lakes, wetlands, ponds, wet meadows, rivers, and agricultural fields[78,79].

The wintering population primarily occupies habitat in or near the Aransas National Wildlife Refuge near Rockport, Texas. However, the birds have been expanding their winter range possibly due to population increases and climate change[80]. Winter habitat includes brackish bays, marshes, and salt flats[78,79].

Slender Rush-pea

The slender rush-pea is a perennial legume, 3-6 inches tall with spreading stems. Three to 5 salmon to orange-colored flowers about 0.2 inches long occur on each flowering stalk. Flowers bloom from March to June. Legumes are straight, 0.4-0.6 inches long, and contain 2-4 seeds. Leaves are bipinnately compound, have tiny oblong leaflets 0.08-0.16 inches long and 0.04-0.08 inches wide, are are hairy on the underside[81,82].

Slender rush-pea is found in bare patches or among low native grasses in disturbed clayey soils of blackland prairies and creek banks of the Gulf Coastal Prairie[81]. It is also found along right-of-ways[82]. Commonly associated shrub and tree species include blackbrush, huisache, amargosa, *Celtis pallida* (spiny hackberry), brasil, *Parkinsonia aculeate* (retama), mesquite, desert yaupon, and *Yucca treculeana* (spanish dagger). Associated cacti include *Opuntia leptocaulis* (tasajillo), *Opuntia engelmannii* (prickly pear), and *Ferocactus setispinus* (twisted rib). Native grasses associated with the slender rush-pea include *Bouteloua rigidiseta* (Texas grama), buffalo grass, and *Stipa leucotricha* (Texas speargrass). It sometimes occurs in association with another endangered species, South Texas ambrosia[81,82].

The slender rush-pea is known only from Texas, specifically from 4 populations in Nueces and Kleberg counties. The slender rush-pea is negatively affected by encroachment of competing plant species, such as *Bothriochloa ischaemum var. songarica* (King Ranch bluestem), *Dichanthium annulatum* (Kleberg bluestem), and *Cynodon dactylon* (bermudagrass)[82].

South Texas Ambrosia

The South Texas ambrosia is a perennial, herbaceous plant in the Asteraceae family. It stands 4-12 inches in height. The plant has silvery to grayish-green leaves about 3 inches long and 1.5 inches wide. Flowers bloom in late summer and flower heads are

inconspicuous terminal racemes. South Texas ambrosia spreads via rhizomes that allow a single individual to be represented by hundreds of stems forming close-spaced colonies[83,84].

South Texas ambrosia occurs in open grasslands or savannahs on soils varying from clay loams to sandy loams. This plant can be associated with the federally-listed species, slender rush-pea. Associated native grasses include Texas grama, buffalograss, *Nassella leucotricha* (Texas wintergrass), and *Pleuraphis mutica* (tobosa). Associated native woody species can include mesquite, huisache, *Acacia schaffneri* (huisachillo), brasil, spiny hackberry, and lotebush[83].

Mowing, with consideration to cut height and frequency, is believed to promote growth of South Texas ambrosia. Fire may also promote growth. Tall grasses and non-native vegetation negatively affects the growth of South Texas ambrosia. Currently, South Texas ambrosia is known from only 6 locations in Nueces and Kleberg counties[83].

6.2.3 CANDIDATE SPECIES DESCRIPTIONS

Golden Orb

The golden orb is a freshwater mussel and has been located almost exclusively in flowing waters in moderately-sized rivers. The golden orb is small, usually less than 3.2 inches, with an oval to nearly round, smooth, and unsculptured shell, except for concentric growth rings. External shell coloration varies from yellow-brown, gold, or orangish-brown to dark brown or black, and some individuals may show faint greenish rays. Internally, the nacre is white to bluish-white[85].

Adult freshwater mussels are suspension feeders but will also feed on organic matter in the sediment[86]. Adults feed on algae, bacteria, detritus (dead organic material), microscopic animals, and dissolved organic matter. Mussels tend to grow relatively rapidly for the first few years, and then slow appreciably at sexual maturity, when energy presumably is being diverted from growth to reproductive activities. As a group, mussels are extremely long lived, living from two to several decades[85,86].

It has been found in 1 reservoir in the lower Nueces River (Lake Corpus Christi). The golden orb is endemic to nearly the entire lengths of the Guadalupe, San Antonio, and

Nueces-Frio River basins in central Texas, including the Guadalupe, Medina, San Antonio, Frio, and Nueces Rivers and Cibolo Creek[85].

Sprague's Pipit

Sprague's pipits are small, migratory passerines with a slender shape and relatively narrow bill. The upper mandible is dark and contrasts with the pale lower mandible. Their underparts are buffy with broad black streaks. Legs are yellowish to pale brown[87].

Preferred habitat includes well drained, open grasslands with native midgrasses of intermediate thickness and with moderate litter depths. Preferred grasslands are undisturbed. Grazing, prescribed burning, or mowing can be tolerated after a one year recovery. In Texas, preferred wintering habitat includes grass-forb prairies dominated by little bluestem and *Andropogon* spp. (bluestem) grasses that are about 8 inches in height. Pipit's have also been observed in Texas in old rice fields that have been re-planted with bermudagrass on turf grass farms, golf courses, and recently burned pastures. Food primarily consists of arthropods and sometimes seeds.Food primarily consists of arthropods, but occasionally seeds[87,88].

Cup-shaped nests are constructed of woven dried grasses on the ground. Average clutch size is 4.6 eggs and young are cared for by the female for approximately 25 days until fledging[87].

The only population of Sprague's pipit occurs within North America. Known breeding sites are located in Canada, Montana, North and South Dakota, and Minnesota. Wintering grounds are located in Arizona, New Mexico, Texas, Oklahoma, Arkansas, Louisiana, and Mexico. Migration occurs in April to May and September to November[87].

6.2.4 TEXAS NATURAL DIVERSITY DATABASE RESULTS

A records review of the Texas Natural Diversity Database[89] was completed for the survey area by the TPWD on 3 March 2014. An Element of Occurrence (EO) for the slender rush-pea (EO ID 4299) was identified approximately 2.2 miles southwest of the Project Area. Additionally, 2 separate records of South Texas ambrosia (EO ID 1470 and 7644) were identified approximately 3.9 miles south and southwest from the Project Area. No other federally-listed threatened or

endangered species were recorded within the Action Area (maximum radius of approximately 3.4 miles).

7.0 FEDERALLY-LISTED SPECIES HABITAT EVALUATION

WGI completed a listed species habitat evaluation on 28 March 2014 to determine if habitat within the Action Area was likely to support any of the federally-listed species potentially occurring in Nueces and San Patricio Counties. The field survey included a pedestrian survey of the proposed Project Area. The field surveys also included a windshield survey of all terrestrially accessible habitats visible from public areas within a 3.5-mile radius of the Action Area. An aerial survey of the 3.5-mile radius was conducted to observe and assess inaccessible areas for listed species habitat within the Action Area. Data were collected to describe resident vegetation communities and assess the potential for occurrence of listed species. The dominant habitats observed are described below and are demonstrated in Figure 7 (Appendix A). Photographs of the proposed Action Area are included as Appendix E. A summary of the field survey data is provided as Appendix F.

7.1 PLANT COMMUNITIES OBSERVED

The Project Area is in a previously disturbed industrial area consisting of herbaceous habitat and old industrial infrastructure and building foundations. The soils were a mixture of clay and gravel, caliche, asphalt, and concrete.

The area to the northeast, west, and east is predominantly residential, commercial, and industrial development. To the southwest, south, and southeast, the area is mostly cropland with some residential development. Two segments of the Nueces River, one tidally-influenced and one non-tidal, are located within the northern portion of the Action Area, approximately 1.3 miles to the north of the Project Area.

The dominant habitats observed in the Action Area include: herbaceous, woodland, riparian, grassland, cropland, wetland, riverine (tidal and non-tidal), and open water.

Herbaceous – The majority of the Project Area consisted of herbaceous habitat. This habitat was also found in fragmented parcels, including along right-of-ways, within the

Action Area. Dominant species observed included King Ranch bluestem, bermudagrass, *Trifolium campestre* (field clover), *Rubus trivialis* (dewberry), *Parthenium hysterophorus* (false ragweed), *Helianthus annuus* (sunflower), *Oenothera speciosa* (evening primrose), *Vicia americana* (purple vetch), *Lolium multiflorum* (annual rye), and *Lepidium virginicum* (Virginia pepperweed).

Woodland – This habitat occurred in small fragmented parcels within the Action Area. Dominant species included mesquite, hackberry, huisache, and *Ehretia anacua* (anacua).

Riparian – This habitat was noted around streams and rivers. It was highly fragmented. Dominant vegetation included hackberry, mesquite, huisache, and *Vitis mustangensis* (mustang grape).

Grassland – This habitat type was predominantly located north of the Nueces River. Dominant vegetation included huisache, mesquite, and live oak.

Cropland – A large portion of the Action Area encompassed croplands. This area was recently plowed and no vegetation was noted at the time of survey.

Wetland – Large wetlands were noted adjacent to the Nueces River. A portion of this habitat includes tidal flats within the Nueces River Delta. Dominant vegetation included *Schoenoplectus americanus* (bulrush) and *Typha latifolia* (cattail).

Riverine (Non-tidal and tidal) – Riverine habitat included tidal and non-tidal portions of the Nueces River. The shoreline included the following vegetation species: *Baccharis halimifolia* (Eastern baccharis), bermudagrass, mesquite, and evening primrose. Non-tidal riverine habitat also included streams with the following plant species along the shoreline: mesquite, hackberry, huisache, and mustang grape.

Open Water – This habitat included stock and industrial ponds. Eastern baccharis was a dominant species along the edges.

7.2 FEDERALLY-LISTED SPECIES HABITAT ANALYSIS

The Project Area is within a previously disturbed industrial area consisting of herbaceous habitat and old industrial infrastructure. The soils are a mixture of clay and gravel, caliche,

asphalt, and concrete. Slender rush-peas and South Texas ambrosia are typically associated with clay soils in slightly disturbed areas. The substrate within the Project Area is heavily disturbed and regularly mowed. Therefore, the habitat within the Project Area is not likely to support the slender rush-pea and South Texas ambrosia. This potential is described in more detail in Section 9.7.

Agricultural and industrial practices have historically impacted much of the habitats within the Action Area. The dominant habitats observed in the Action Area include: herbaceous, woodland, riparian, grassland, cropland, wetland, riverine (tidal and non-tidal), and open water.

Herbaceous habitat in the Action Area is highly fragmented and restricted to the right-of-ways or small parcels of land. In addition, the habitat was impacted by neighboring agricultural and residential development. Select herbaceous habitats had the potential to support the slender rush-pea, South Texas ambrosia, and Sprague's pipit. This potential is described in more detail in Section 9.7.

The woodland habitat areas consist of small, fragmented tracts. Some of the woodland tracts have characteristics that could potentially support the yellow-billed cuckoo. This potential is described in more detail in Section 9.7.

The riparian habitat is highly fragmented habitat along streams or rivers. Portions of this habitat possess traits that could potentially support the yellow-billed cuckoo. This potential is described in more detail in Section 9.7.

The grassland habitat was noted mostly on the north side of the Nueces River and 1 small tract south of the river. This habitat has the potential to support Sprague's pipits and migrating whooping cranes. This potential is described in more detail in Section 9.7.

Cropland habitat consisted of plowed fields. This habitat may offer forage to migrating whooping cranes. This potential is analyzed more specifically in Section 9.7.

Large wetland complexes, including tidal flats of the Nueces River Delta, were observed around the Nueces River. The potential exists for migrating whooping cranes, red knots, and piping plovers to utilize this habitat. This potential is analyzed more specifically in Section 9.7.

The riverine (tidal) habitat includes a portion of the Nueces River. This habitat has characteristics with the potential to support migrating red knots. This potential is analyzed more specifically in Section 9.7.

The riverine (non-tidal) habitat includes a portion of the Nueces River and streams within the Action Area. This habitat has the potential to support golden orbs. This habitat was often associated with riparian woodlands that are suitable for the yellow-billed cuckoo. This potential is analyzed more specifically in Section 9.7.

Open water habitat, such as ponds, was noted in the Action Area. Most of the observed open water possessed few characteristics that could potentially support federally-listed species for Nueces and San Patricio Counties.

8.0 AIR QUALITY ANALYSIS

eSPARC completed detailed pollutant emission calculations for the proposed project in support of the PSD review and GHG permit. Table 1(a) (Appendix G) is the Emission Point Summary provided in the application that was submitted to the TCEQ for a permit to authorize non-GHG emissions for the proposed project.

eSPARC performed dispersion modeling of the proposed emissions of air pollutants from the proposed project to support the BA. This section provides the results and evaluation of the dispersion modeling.

8.1 AIR DISPERSION MODELING RESULTS

An AOI analysis was conducted as part of the required State NAAQS review for the emissions of NO_2, CO, SO_2, H_2SO_4, and PM/$PM_{2.5}$/PM_{10}. A health effects evaluation was performed for emissions of non-criteria pollutants from the proposed new sources using TCEQ effects screening levels (ESLs)[90].

The predicted emissions were compared to the SILs for all NAAQS constituents[91]. A SIL is a concentration, established by the EPA, below which the project emissions are considered to have no significant contribution to the total ambient air quality concentration. If the GLCmax

predicted by the modeling of the project emissions is below the SIL, no further analysis is required for the pollutant and averaging period. If the predicted project GLCmax is above the SIL, further analysis is typically necessary to demonstrate that the project will not cause or contribute to the violation of an applicable standard. Air pollution standards are shown in Table 3[92].

8.1.1 CRITERIA POLLUTANT DISPERSION MODELING RESULTS AND EVALUATION

Table 3 shows the maximum predicted off-property GLCmax from the proposed project for each pollutant and averaging period.

Table 3. Maximum Predicted Criteria Pollutant Concentrations

Pollutant	Averaging Period	Project GLCmax (µg/m3)	SIL (µg/m3)	Less Than SIL?
NO_2	1-hour	5.3	7.5	Yes
	Annual	0.87	1	Yes
CO	1-hour	6.78	2000	Yes
	8-hour	3.99	500	Yes
PM_{10}	24-hour	7.71	5	No
	Annual	0.54	1	Yes
$PM_{2.5}$	24-hour	6.13	1.2	No
	Annual	0.47	0.3	No
SO_2	30-min	20.82	20.4	No
	1-hour(1)	17.8	7.8	No
	3-hour	17.64	25	Yes
	24-hour	8.88	5	No
	Annual	0.05	1	Yes
H_2SO_4	1-hour	3.18	1	No
	24-hour	1.36	0.3	No

(1) The EPA AERMOD model calculates concentrations for a minimum time interval of 1-hour. According to TCEQ Air Quality Modeling Guidelines (AQMG) (Revised, February 1999, RG-25) guidance, the model-predicted 1-hour concentration is compared to the 30-minute standard.

Seven of the predicted project GLCmax values are less than the SILs applicable to the following: 1-hour NO_2, annual NO_2, 3-Hour SO_2, annual SO_2, 1-Hour CO, 8-Hour CO, and annual PM_{10}.

These GLCmax values for the proposed project are considered insignificant, as SILs are a small fraction of the NAAQS levels, which are set to protect the most sensitive human populations. Therefore, GLCmax values less than the SILs are not expected to impact federally-listed species and will be excluded from further analysis.

Projected impacts for the following 8 out of 15 pollutants and averaging periods are greater than the designated SIL: 24-hour PM_{10}, 24-hr $PM_{2.5}$, annual $PM_{2.5}$, 30-minute SO_2, 1-hour SO_2, 24-hour SO_2, 1-hour H_2SO_4, and 24-hour H_2SO_4. For these pollutants and averaging periods, the full dispersion modeling analysis required by the TCEQ/PSD air permit must demonstrate that the project emissions combined with existing emissions in the area do not result in a violation of the applicable NAAQS or PSD increment.

The dispersion model conducted by eSPARC predicts concentrations at specific downwind receptor locations outside of the property boundary for each pollutant and averaging period. The coordinates of each receptor with modeled concentrations greater than the SIL for each pollutant were plotted to delineate the AOI. Note: The significant AOIs do not infer that the maximum concentration predicted for each pollutant averaging period will reach each location for each emission. Accordingly, the AOI identifies locations where the SILs may be exceeded for one or more pollutants some of the time, but does not infer a frequency of occurrence.

The locations with impacts above the SILs located the farthest distance from the source in all directions were plotted to create a mAOI boundary. The furthest distance in any direction from the project emissions sources to concentrations above the SIL for these pollutants was determined to be 3.4 miles. Since this mAOI boundary encompasses the Project Area, wastewater and storm water outfalls, and the pipeline replacement project, the Action Area for the BA was defined as the mAOI boundary.

8.1.2 NON-CRITERIA POLLUTANTS MODELING RESULTS AND EVALUATION

In addition to the air quality analysis performed for criteria pollutants, eSPARC assessed the emissions increases for other pollutants (non-criteria) that will be emitted by the proposed project. This effects evaluation was performed in accordance with TCEQ air permitting guidelines for the assessing non-criteria pollutants. The predicted concentrations were compared with TCEQ ESLs[90].

The objective of an effects evaluation is to establish off-property GLC_{max} of constituents resulting from the proposed emissions and to evaluate these GLCs for the potential to cause adverse health or welfare effects. Air dispersion modeling is used to predict the GLCmax of a constituent that could occur during a 1-hour (short-term) period, and the annual (long-term) average GLCmax. The maximum possible level of emissions (worst-case scenario emissions) is modeled in order to evaluate maximum potential exposure levels.

ESLs are not standards or emission limits, but rather are guideline concentrations that TCEQ has developed to evaluate off-property ambient air concentrations of constituents. ESLs are very conservatively based on a constituent's potential to cause adverse health effects, odor nuisances, vegetation effects, or materials damage. Health-based ESLs are set at levels lower than levels reported to produce adverse health effects, and are set to protect the general public, including sensitive subgroups such as children, the elderly, or people with existing respiratory conditions. In developing ESLs, TCEQ factors in a margin of safety to account for potential cumulative exposure (exposure to multiple airborne constituents) and aggregate exposure (exposure to a single airborne constituent multiple times or from multiple sources). If an air concentration of a constituent is below the ESLs for a given constituent, adverse effects are not expected. If the concentration of a constituent is above the ESLs, it is not indicative that an adverse effect will occur, but rather that further evaluation is warranted, as described in *Modeling and Effects Review Applicability: How to Determine the Scope of Modeling and Effects Review for Air Permits*[91].

A comparison of the modeled concentrations of the project's non-criteria pollutant emissions to TCEQ established ESLs is shown in Table 4 below. Based on these results, the maximum predicted concentrations of all modeled pollutants from project emissions are below the respective ESLs and 3 of the 4 are well below the first screening level of 10% of the ESLs. Short-term predicted concentrations for ammonia from project emissions were at 63% of the TCEQ's ESLs. TCEQ requires additional evaluation for projects whose non-criteria pollutant impacts exceed 10% of the ESLs. The final results of that evaluation will demonstrate that predicted concentrations are not expected to cause or contribute to adverse human health or welfare effects in order for the TCEQ air permit authorization to be issued. Accordingly, no adverse welfare impacts are expected to occur within the Action Area as the result of the additional emissions of these pollutants.

Table 4. Non-Criteria Pollutant Modeling Results

Compound	CAS	Averaging Period	Model Results		
			ESLs (µg/m³)(1)	Project GLCmax (µg/m³)	ESLs %*
Formaldehyde	50-00-0	1-Hour	15	0.11	<1
		Annual	3.3	0.007	<1
Ammonia	7664-41-7	1-Hour	170	107.4	63
		Annual	17	0.89	5

*If project impact is less than 10% of ESLs, then it is insignificant and no further analysis is required.
(1)The ESLs obtained from the TCEQ's ESLs list dated February 1, 2013.

9.0 EFFECTS OF THE PROPOSED ACTION

This section presents the results of the analysis of potential effects on federally-listed species as a result of the proposed project. The following potential effects sources are included in the analysis: air quality, water quality, noise pollution, infrastructure-related disturbance, human-related disturbance, and federally-listed species effects. This analysis is based on total emissions and dispersion modeling data provided by eSPARC, field survey and background review data collected by WGI, and literature review and research of potential effects of known pollutants on flora and fauna.

9.1 AIR EMISSIONS EFFECTS BACKGROUND RESEARCH

Resources were searched extensively for data, documentation, or research regarding the potential effects of NO_2, PM, and SO_2 (criteria pollutants with potential depositional impacts) on flora and fauna. WGI biologists also specifically searched for information regarding concentrations and length of time of exposure at which flora and/or fauna are impacted. Additional research included, but was not limited to, documentation of long-term and short-term exposure to airborne pollutants, accumulation of pollutants in surface water, accumulation of pollutants in various ecosystems and habitat types, the potential for pollutants to affect vegetation composition, and potential impacts to the food chain. Information regarding the general impacts airborne pollutants can have on a variety of ecosystems is included. However,

very little information was located regarding specific concentrations at which potential effects occur on a long-term or short-term basis. A list of research resources is available upon request.

Air emissions effects vary greatly between regions due to differences in biota, climate, geochemistry, and hydrology. Therefore, the estimation of potential impacts on flora and fauna is highly variable and dependent upon site-specific conditions[93].

According to a publication focused on the effects of air emissions on biodiversity, in general, air emissions have a greater impact on lower life forms than higher life forms. Lower life forms that would likely be the first impacted would include lichens, bryophytes, fungi, and soft-bodied aquatic invertebrates. Impacts to adult higher life forms are typically the result of secondary impacts to the food chain and reproduction, with the exception of extreme exposure. Potential secondary impacts include acidification, changes in food or nutrient supply, or changes to biodiversity and competition. Plant communities are generally less adaptable to changes in air quality than animals. Animals typically have the ability to migrate away from unfavorable conditions. 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[94].

Nitrogen Dioxide and Sulfur Dioxide

According to the EPA's Integrated Science Assessment (ISA) for Oxides of Nitrogen and Sulfur, sufficient evidence is present to demonstrate a causal relationship between deposition of nitrogen and sulfur, acidification, and effects on biogeochemistry related to terrestrial and aquatic ecosystems and to biota in these systems[95]. The Nature Conservancy and the Institute of Ecosystem Studies have published 2 documents that describe the known effects of airborne nitrogen, sulfur, and other airborne pollutants on various ecosystems in the eastern US. Airborne NO_2 and SO_2 are known to be converted into acid particles or acid precipitation. Both forms are deposited onto soils, vegetation, and surface waters[96,97].

The potential effects of airborne SO_2 on flora are acute. The SO_2 gas is absorbed into the leaves and causes reducing conditions, which is toxic when the gas concentration exceeds the capacity of the tissue. The toxic conditions kill the local plant cells. The limiting concentration is similar for many diverse species, including aquatics. Generally, significant concentrations of SO_2 gas can be added to plant systems before toxicity occurs. Depending of the extent of injury, uninjured tissue maintains or regains function and develops normally[98].

The potential effects of airborne NO_2 and SO_2 on terrestrial ecosystems are generally long-term effects as opposed to short-term effects. Many soils are buffered against acid inputs and biodiversity changes are not immediately evident for vegetation species with a longer lifespan. The deposition of sulfur can result in sulfate leaching, which can cause acidification of soils and surface waters as well as the release of calcium, and magnesium. The deposition of nitrogen can result in nitrate leaching, which can cause acidification of soils and surface waters as well as the release of aluminum, calcium, and magnesium[97]. Soil inhabiting arthropods with high-calcium needs can be impacted by soil acidification. The release of aluminum into soil water can harm plant roots. The leaching of aluminum into surface waters can be toxic to aquatic plants, fish, and other aquatic organisms[96]. The accumulation of nitrogen can impact plant species competition, thereby impacting plant species composition. Nitrogen accumulation can also lead to nitrogen saturation, which impacts microorganisms, plant production, and nitrogen cycling[97,99]. Additional potential terrestrial ecosystem effects include reduced forest productivity and increased vulnerability to pests and pathogens[97].

The potential effects of airborne NO_2 and SO_2 on aquatic ecosystems include acidification and eutrophication. The effects of acidification on water quality, whether introduced by direct acid deposition or leaching from adjacent terrestrial ecosystems, include increased acidity, reduced acid neutralization capacity, hypoxia, and mobilization of aluminum[97]. Stream and lake acidification can be chronic or episodic and both can be damaging. In general, larger aquatic ecosystems have a greater buffering capacity than smaller systems. Increased acidity can reduce dissolved organic carbon and increase light penetration and visibility through the water column. Increased light penetration can result in increased macrophyte and algal growth. Increased visibility can alter the predator-prey balance. Low alkalinity waters are more susceptible to adverse effects from acidification. A pH value of 6.0 is often considered the level below which biota are at risk from acidification. Biological effects are primarily attributable to a combination of low pH and high inorganic aluminum concentration (between 2.0 and 7.5 micromoles per liter).

Eutrophication is the over enrichment of nutrients into an aquatic system, which can result in excess algal growth. Decomposition of excess algae by aerobic bacteria can result in a decrease in dissolved oxygen. Low dissolved oxygen can be harmful to fish and other aquatic organisms. Wetlands, estuaries, bays, and salt marshes are generally less impaired by acid deposition than other aquatic ecosystems. However, in estuarine ecosystems, nitrogen from atmospheric and

non-atmospheric sources contributes to increased phytoplankton and algal productivity, leading to eutrophication. Estuary eutrophication is an ecological problem indicated by water quality deterioration, resulting in numerous adverse effects including hypoxic zones, species mortality, and harmful algal blooms. Increased sulfur concentrations can increase the production of specific bacteria, which can convert inorganic mercury to methyl-mercury, especially in wetlands. Methyl-mercury does not appear to impact flora, but is toxic to fauna[97]. Methyl-mercury is a powerful toxin that can accumulate to toxic amounts in food webs at higher trophic levels (e.g., bass and perch, otters, or kingfishers).

Particulate Matter

PM is a mixture of airborne particles resulting from fossil fuel combustion or a breakdown of crustal matter, and residual water soluble materials after evaporation of water from aqueous aerosols. The atmosphere can also transform VOCs, NO_2, and SO_2 into PM. PM is a broad term referring to an assortment of particles that vary in their formation, chemical properties, size, mass, toxicity, and atmospheric reactivity. The EPA characterizes PM by their size: PM_{10} (particles equal to and less than 10 microns in aerodynamic diameter), $PM_{2.5}$ (fine particles that are 2.5 microns or less in diameter), $PM_{10\text{-}2.5}$ (coarse particles with a diameter between 2.5 and 10 microns), and ultrafine particles (diameter less than 0.1 microns).

Fine particles can remain in the atmosphere for days to weeks and travel through the atmosphere hundreds to thousands of kilometers, while most coarse particles typically deposit to the earth within minutes to hours and within tens of kilometers from the emission source. The potential effects of dispersed particles on aquatic ecosystems include acidification, eutrophication, and impacts to ecosystem diversity[100]. The potential effects of dispersed particles on terrestrial ecosystems include nutrient depletion in soils and damage to crops and sensitive plant species[100]. PM is also responsible for the creation of haze (i.e., reduced visibility) and has been linked to physiological effects, such as respiratory and cardiovascular dysfunctions[101,102]. Other documented adverse effects included the blinding and/or death of cattle by smoke (i.e., PM) and the occurrence of fluorosis, a teeth and bone disease, when exposed to atmospheric fluoride[103]. Mortality of birds and a decrease in nesting has been linked to SO_2, known to be capable of transforming into PM. In addition, a recent study has shown that exposure to PM can affect the genetics of an individual thus resulting in unknown long term

effects[104]. Limited research is available about threshold limit values (e.g., the maximum amount of exposure without adverse effects) on sensitive wildlife populations[102,105].

9.2 AIR QUALITY EFFECTS

9.2.1 EMISSIONS

eSPARC completed detailed pollutant emission calculations for the proposed project in accordance with the Air Permit Application requirements. A summary of the total proposed annual emissions of each pollutant that would be emitted by the project are provided in Table 1(a) (Appendix G).

eSPARC also performed dispersion modeling of the emissions of air pollutants from the proposed Lon C. Hill Power Station project in accordance with the PSD Permit requirements. The results of the modeling are provided as a summary of the maximum predicted concentrations in Table 3 (Section 8.0).

Lon C. Hill will utilize the best available control technology (BACT) to control emissions from the project and thus minimize impacts to the surrounding environment to the maximum extent practicable. The proposed emission limits of each constituent are consistent with both the TCEQ BACT guidance and are considered to be the top level of control available for the proposed facility.

Emissions resulting from gasoline and diesel-fueled vehicles and equipment during construction and maintenance are considered negligible. The project will not require a significant increase in vehicle and equipment use.

9.2.2 FUGITIVE DUST

Dust will be emitted during the construction phase of the project. This emission will be minimal and temporary. Dust emissions are expected to be negligible after the site work activities are completed.

9.2.3 IMPACTS OF AIR POLLUTION SOURCES ON FLORA AND FAUNA

The current secondary NAAQS provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Air pollution effects vary greatly between regions due to differences in biota, climate, geochemistry, and hydrology. Because of this variation, models were developed by the EPA and were based on ecosystems that are considered the most sensitive to nitrogen and/or sulfur deposition effects. For more information regarding these case studies and analysis, refer to the EPA's Risk and Exposure Assessment for Review of the Secondary NAAQS for Oxides of Nitrogen and Oxides of Sulfur[106]. For the purposes of this BA, the most conservative and appropriate information was used to analyze potential impacts within the Project Area.

There is sufficient evidence to infer a causal link between nitrogen/sulfur deposition and the resulting acidification and its effects on biota[95]. The data presented in Table 5 below is derived from the EPA's ISA for Oxides of Nitrogen and Sulfur detailing select exposure rates and related ecological effects. Nitrogen and sulfur deposition may adversely affect aquatic and terrestrial nutrient balances, acidification, availability of methyl mercury, and net primary production. This may result in declines in species fitness and richness, changes in species competition, increased susceptibility to stress/disease, habitat degradation, alterations to fire regimes, etc.

Table 5. Relationships Between Deposition Levels and Ecological Effects[95]

Kilogram Nitrogen/Hectare/Year	Ecological Effect
~1.5	Altered diatom communities in high elevation freshwater lakes and elevated nitrogen in tree leaf tissue high elevation forests in the western US
3.1	Decline of some lichen species in the western US
4	Altered growth and coverage of alpine plant species in the western US
5	Onset of decline of species richness in grasslands of the US and United Kingdom
5.5 - 10	Onset of nitrate leaching in forests of the eastern US

Kilogram Nitrogen/Hectare/Year	Ecological Effect
5-10	Multiple effects in tundra, bogs, and freshwater lakes in Europe
5-15	Multiple effects in arctic, alpine, subalpine and scrub habitats in Europe

The current secondary NAAQS were largely based on the data and models presented in the EPA's ISA and Risk publications seeking to minimize these impacts. Since SILs are concentrations that represent thresholds of insignificant modeled source impacts, the pollutant concentrations predicted to be less than or equal to the SILs are expected to have no significant impact on flora or fauna.

The Action Area is shown in Figures 3-7 (Appendix A). The Action Area has a maximum radius of approximately 3.4 miles and includes 9 observed habitat types: herbaceous, woodland, riparian, grassland, cropland, wetland, riverine (tidal and non-tidal), and open water.

A detailed analysis of potential habitat, occurrence of each federally-listed species, and potential for effect is provided in Section 9.7. No potential habitat or likelihood of potential occurrence of federally-listed species was identified within the Project Area. Select habitats of various quality and varying potential for occurrence of federally-listed species have been identified within the air emissions mAOI. Since the predicted concentrations above the SILs would be short-term and infrequent at any given habitat location, no impacts to federally-listed species are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the federally-listed species are anticipated from project non-criteria pollutant air emissions.

9.3 WATER QUALITY EFFECTS

Erosion and sedimentation controls will be utilized to protect water quality during the construction and operation of the proposed project in accordance with Section 401 of the Clean Water Act and 30 Administrative Code Chapter 279. Erosion and sedimentation controls filter sediment and some pollutants from storm water. They also minimize erosion and slow the flow of storm water, which allows additional time for water to reach ambient temperature and for

sediment to settle out of the water column with the exception of extreme flood events. Appropriate erosion and sedimentation controls are designed to protect water quality; therefore no effects to federally-listed species are anticipated as a result of non-contact, non-point source storm water from the proposed project.

The Lon C. Hill has an existing TPDES permit (TPDES Permit No. WQ0001255000). This permit is currently inactive and will be updated to reflect the proposed project. The proposed project would produce an estimated 1.098 MGD (average) of wastewater, which is within the permitted limits. Wastewater and storm water from the proposed project would be discharged at Outfalls 001 and 002 into a vegetated ditch. Discharged wastewater will flow into a Nueces County drainage ditch; thence into a Nueces County drainage ditch (tidal); and, thence into the Nueces River (Tidal Segment 2101), which is more than a mile north of the existing outfalls. Outfall locations are demonstrated in Figures 2-3 (Appendix A).

Wastewater will primarily consist of cooling tower blowdown and will not exceed the current TPDES permit limits. The wastewater and storm water will pass through an oil/water separator prior to discharge and effluent will be monitored. Effluent will be discharged into a vegetated drainage ditch that is dry except during flood events.

Storm water and wastewater effluents are not anticipated to contribute to significant changes in constituents or temperature to receiving waters more than a mile from the discharge site. Discharged water will flow into a predominately dry, vegetated drainage ditch that will slow and filter the water. No adverse impacts to federally-listed species are anticipated from the proposed project.

9.4 NOISE EFFECTS

Project engineers estimate that noise levels during operation should be comparable to noise levels from maintenance activities that currently take place at the existing Lon C. Hill Power Station.

No noise effects to wildlife are expected as a result of the construction or operation of the proposed project.

9.5 INFRASTRUCTURE-RELATED EFFECTS

The proposed Project Area is a previously disturbed industrial site. The substrate includes clay, gravel, roadbase, asphalt, and concrete. Vegetated areas consist mostly of early successional forbs and nonnative grasses. Federally-listed species are not likely to occur in the Project Area (Refer to Section 9.7). Therefore, no adverse impacts to these species are anticipated from the proposed project.

The Project Area is located on the southeastern edge of the whooping crane migration corridor (Figure 8 – Appendix A). The potential for occurrence of whooping cranes within the Action Area is described in Section 9.7. The potential for whooping crane collision with new infrastructure was considered in the analysis. Whooping cranes are known to avoid existing, well-lit infrastructure and human disturbance[79]. The project is being constructed in an established industrial area, which has historically been utilized as a power station and has existing high-energy transmission lines. The Project Area has historically been utilized as a power station and previously had legacy infrastructure installed consisting of a large turbine building, four cooling towers and four large conventionally fired boilers with stacks. The entire legacy infrastructure has been deconstructed except for a single warehouse. The heights of the new infrastructure will range from 30 to 152 feet and consist of only two stacks and associated lower height equipment. Including the already completed deconstruction of the legacy infrastructure, the project will result in a net decrease in obstructions. No new power lines will be constructed. The new infrastructure will be fitted with safety lighting similar to the previous and existing infrastructure and in accordance with the Federal Aviation Administration (FAA) and USFWS guidelines[107]. In addition, flags will be attached to the boom of construction cranes (maximum 230 feet tall) to increase visibility. FAA lighting will be included on crane booms 200 feet high and higher.

Given the location of the site, pre-existing surrounding industrial development, and known whooping crane locations, it is unlikely new infrastructure poses a risk to migrating whooping cranes. Although whooping cranes have not been observed at or near the facility, measures have been implemented to reduce the likelihood of any potential impacts in the event that they do occur. No infrastructure-related effects to whooping cranes or other federally-listed species are anticipated as a result of the proposed project.

9.6 HUMAN ACTIVITY EFFECTS

Construction and operation of the proposed project will not require significant additional human activity compared to the activity associated with preexisting structure.

No additional effects to federally-listed species are expected as a result of the increase in human activity associated with the proposed project.

9.7 FEDERALLY-LISTED SPECIES EFFECTS

9.7.1 FEDERALLY-LISTED THREATENED AND ENDANGERED SPECIES

9.7.1.1 Green Sea Turtle

Potential to Occur in the Action Area

Nesting occurs on high energy oceanic beaches, primarily on islands with minimal disturbance. Juveniles and adults primarily occupy benthic feeding grounds in shallow, protected waters. Preferred feeding grounds include pastures of seagrasses and/or algae[33].

A tidally-influenced portion of the Nueces River is located within the Action Area, approximately 1.3 miles north of the Project Area at its closest point. Green sea turtles are known to occupy the coastal and bay waters surrounding Corpus Christi, Texas[108]. Therefore, the potential exists for transient green sea turtles to travel upstream to the tidally-influenced section of the Nueces River searching for foraging habitat. The nearest known seagrass beds are located in estuarine and marine wetlands that are slightly more than a tenth of a mile north of the Nueces River at the closest point[109]. Although it is possible for transient sea turtles to swim upstream within a tidally-influenced river, the Action Area is more than 6 miles upstream from Nueces Bay, and it is highly unlikely green sea turtles would occupy this area. Any occurrence within the Action Area would be rare and temporary. The distance from the coast and the lack of accessible seagrasses would serve as a deterrent to green sea turtles. No records were found of green sea turtles occurring in the Nueces River.

A small portion of the Nueces River Delta is located within the northern portion of the Action Area. This habitat includes tidal flats with a maximum water depth reportedly of approximately 1.6 feet[110]. Seagrass beds are mapped within this habitat within the Action Area. However, the

Action Area is greater than 3 miles from estuarine waters deep enough to support foraging sea turtles. No records were found of green sea turtles occurring in the Nueces River Delta portion of the Action Area.

No habitat with the potential to support nesting green sea turtles is located within the Action Area. The closest known green sea turtle nesting location is the Padre Island National Seashore, approximately 33 miles southeast of the Project Area[111]. Designated-USFWS critical habitat for the green sea turtle is Culebra Island, Puerto Rico and its surrounding waters[31].

Potential foraging and nesting habitat for the green sea turtle does not exist within the Project Area. Green sea turtles may incidentally occur in the Nueces River, but the potential occurrence would be rare and temporary.

Potential Effects to Green Sea Turtles

The green sea turtle will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since no potential green sea turtle habitat has been identified within the air emissions mAOI, no impacts to these sea turtles are anticipated from project criteria pollutant air emissions. The maximum frequency of emissions above the SILs with receptors over the tidal portion of the Nueces River within the Action Area is: 1 hour within 1 year (H_2SO_4) and 11 hours within 5 years (SO_2). No other receptors with emissions above the SILs would occur within the Action Area within the Nueces River (tidal). Since the concentration of emissions within the Action Area would be low and infrequent, no impacts to the green sea turtle are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the green sea turtle are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. No impacts to green sea turtles due to wastewater or storm water discharge are anticipated.

No direct or indirect impacts to green sea turtles are anticipated.

Determination of Effect

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

9.7.1.2 Hawksbill Sea Turtle

Potential to Occur in the Action Area

Preferred nesting habitat includes low and high energy, vegetated beaches in tropical oceans with a variety of substrates. Juveniles and adults primarily occupy their primary foraging habitat, coral reefs[34].

A tidally-influenced portion of the Nueces River is located within the Action Area, approximately 1.3 miles north of the Project Area at its closest point. A small portion of the Nueces River Delta is located within the northern portion of the Action Area. This habitat includes tidal flats reportedly with a maximum water depth of approximately 1.6 feet[110].

No coral reefs or other suitable foraging habitat for the hawksbill sea turtle is located within or near the Action Area. No habitat with the potential to support nesting hawksbill sea turtles was observed within or near the Action Area. The most recent recorded observation of hawksbill sea turtles occurred in 1998 when a nest was noted at the Padre Island National Seashore[112]. The USFWS-designated critical habitat for the hawksbill sea turtle are the Mona and Monito Islands, Puerto Rico and their surrounding waters[31]. No observations of hawksbill sea turtles occurring in the Nueces River or Nueces Bay were found.

No habitat with the potential to support the hawksbill sea turtle was observed within the Project Area. Although the potential exists for transient hawksbill sea turtles to swim upstream the Nueces River, the probability is highly unlikely. This species is not likely to occur in the Action Area.

Potential Effects to Hawksbill Sea Turtles

The hawksbill sea turtle will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since no potential hawksbill sea turtle habitat has been identified within the air emissions mAOI, no impacts to these sea turtles are anticipated from project criteria pollutant air

emissions. The maximum frequency of emissions above the SILs with receptors over the tidal portion of the Nueces River within the Action Area is: 1 hour within 1 year (H_2SO_4) and 11 hours within 5 years (SO_2). No other receptors with emissions above the SILs would occur within the Action Area within the Nueces River (tidal). Since the concentration of emissions within the Action Area would be low and infrequent, no impacts to the hawksbill sea turtle are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine concentration will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the hawksbill are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. No impacts to hawksbill sea turtles due to wastewater or storm water discharge are anticipated.

No direct or indirect impacts to hawksbill sea turtles are anticipated.

Determination of Effect

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

9.7.1.3 Kemp's Ridley Sea Turtle

Potential to Occur in the Action Area

Nesting occurs on high energy oceanic beaches, primarily adjacent to extensive swamps or large bodies of open water. This turtle is a shallow water benthic feeder with a diet consisting primarily of shrimp, jellyfish, snails, sea stars, and swimming crabs[36].

A tidally-influenced portion of the Nueces River is located within the Action Area, approximately 1.3 miles north of the Project Area at its closest point. Kemp's ridley sea turtles are known to occupy the coastal and bay waters surrounding Corpus Christi, Texas[108]. Therefore, the potential exists for transient Kemp's ridley sea turtles to travel upstream to the tidally-influenced section of the Nueces River searching for foraging habitat. Although it is possible for transient sea turtles to swim upstream within a tidally-influenced river, the Action Area is more than 6 miles upstream from Nueces Bay, and it is highly unlikely Kemp's ridley

sea turtles would occupy this area. Any occurrence within the Action Area would be rare and temporary. The distance from the coast would serve as a deterrent to these sea turtles. No records were found of Kemp's ridley sea turtles occurring in the Nueces River.

A small portion of the Nueces River Delta is located within the northern portion of the Action Area. This habitat includes tidal flats reportedly with a maximum water depth of approximately 1.6 feet[110]. However, the Action Area is greater than 3 miles from estuarine waters deep enough to support foraging sea turtles. No records were found of Kemp's ridley sea turtles occurring in the Nueces River Delta portion of the Action Area.

No habitat with the potential to support nesting Kemp's ridley sea turtles is located within the Action Area. The closest known Kemp's ridley sea turtle nesting location is at the mouth of the Corpus Christi Ship Channel near Burleson Beach Park, approximately 13 miles east of the Project Area[113]. USFWS-designated critical habitat is not yet designated for this species[31].

No habitat with the potential to support the Kemp's ridley sea turtle was observed within the Project Area. Kemp's ridley sea turtles have the potential to incidentally occur in the Nueces River. Any incidental occurrence is likely to be rare and temporary. No potential nesting habitat was identified within the Action Area.

Potential Effects to Kemp's Ridley Sea Turtles

The Kemp's ridley sea turtle will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since no potential Kemp's ridley sea turtle habitat has been identified within the air emissions mAOI, no impacts to these sea turtles are anticipated from project criteria pollutant air emissions. The maximum frequency of emissions above the SILs with receptors over the tidal portion of the Nueces River within the Action Area is: 1 hour within 1 year (H_2SO_4) and 11 hours within 5 years (SO_2). No other receptors with emissions above the SILs would occur within the Action Area within the Nueces River (tidal). Since the concentration of emissions within the Action Area would be low and infrequent, no impacts to the Kemp's ridley sea turtle are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no

emissions of mercury or other heavy metals are anticipated, no impacts to the Kemp's ridley are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. No impacts to Kemp's ridley sea turtles due to wastewater or storm water discharge are anticipated.

No direct or indirect impacts to Kemp's ridley sea turtles are anticipated.

Determination of Effect

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

9.7.1.4 Leatherback Sea Turtle

Potential to Occur in the Action Area

Nesting habitat includes high energy, sandy beaches with vegetation immediately upslope and a beach sloped sufficiently so the crawl to dry sand is minimal. Nesting beaches tend to have deep, unobstructed oceanic access on continental shorelines. Juveniles and adults are pelagic and primarily occupy deep water habitat[38].

A tidally-influenced portion of the Nueces River is located within the Action Area, approximately 1.3 miles north of the Project Area at its closest point. A small portion of the Nueces River Delta is located within the northern portion of the Action Area. This habitat includes tidal flats reportedly with a maximum water depth of approximately 1.6 feet[110]. Neither habitat offers potential nesting or foraging habitat suitable for leatherback sea turtles.

The nearest known nesting site for leatherback sea turtles was identified in 2008 at Padre Island National Seashore, more than 68 miles south of the Project Area[111]. This is the only known nesting site for a leatherback sea turtle in Texas since the 1930s[114]. USFWS-designated critical habitat for the leatherback sea turtle includes the coastal waters adjacent to Sandy Point, St. Croix, the US Virgin Islands, and the US West Coast[31].

No habitat with the potential to support the leatherback sea turtle was observed within the Project Area. No recent observations of leatherback sea turtles occurring in Corpus Christi Bay

or the Nueces River were found. Although highly unlikely, the potential exists for leatherback sea turtles to incidentally occur within the Nueces River. Any incidental occurrence of leatherback sea turtles within the Nueces River would be rare and temporary.

Potential Effects to Leatherback Sea Turtles

The leatherback sea turtle will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since no potential leatherback sea turtle habitat has been identified within the air emissions mAOI, no impacts to these sea turtles are anticipated from project criteria pollutant air emissions. The maximum frequency of emissions above the SILs with receptors over the tidal portion of the Nueces River within the Action Area is: 1 hour within 1 year (H_2SO_4) and 11 hours within 5 years (SO_2). No other receptors with emissions above the SILs would occur within the Action Area within the Nueces River (tidal). Since the concentration of emissions within the Action Area would be low and infrequent, no impacts to the leatherback sea turtle are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the leatherback are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. No impacts to leatherback sea turtles due to wastewater or storm water discharge are anticipated.

No direct or indirect impacts to leatherback sea turtles are anticipated.

Determination of Effect

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

9.7.1.5 Loggerhead Sea Turtle

Potential to Occur in the Action Area

Nesting occurs on oceanic beaches between the high tide line and dune fronts and occasionally on estuarine shorelines with suitable sand. Females use narrow, steeply sloped, coarse-grained beaches. This turtle is a shallow water benthic feeder with a diet consisting primarily of shrimp, jellyfish, snails, sea stars, and swimming crabs[40].

A tidally-influenced portion of the Nueces River is located within the Action Area, approximately 1.3 miles north of the Project Area at its closest point. Loggerhead sea turtles are known to occupy the coastal and bay waters surrounding Corpus Christi, Texas[108]. Therefore, the potential exists for transient loggerhead sea turtles to travel upstream to the tidally-influenced section of the Nueces River searching for foraging habitat. Although it is possible for transient sea turtles to swim upstream within a tidally-influenced river, the Action Area is more than 6 miles upstream from Nueces Bay, and it is highly unlikely loggerhead sea turtles would occupy this area. Any occurrence within the Action Area would be rare and temporary. The distance from the coast would serve as a deterrent to these sea turtles. No records were found of loggerhead sea turtles occurring in the Nueces River.

A small portion of the Nueces River Delta is located within the northern portion of the Action Area. This habitat includes tidal flats reportedly with a maximum water depth of approximately 1.6 feet[110]. However, the Action Area is greater than 3 miles from estuarine waters deep enough to support foraging sea turtles. No records were found of loggerhead sea turtles occurring in the Nueces River Delta portion of the Action Area.

No habitat with the potential to support nesting loggerhead sea turtles is located within the Action Area. The closest known loggerhead sea turtle nesting location is on Mustang Island, approximately 29 miles east of the Project Area[111]. USFWS-designated critical habitat is not yet designated for this species[31].

No habitat with the potential to support the loggerhead sea turtle was observed within the Project Area. Loggerhead sea turtles have the potential to incidentally occur in the Nueces River. Any incidental occurrence would be rare and temporary.

Potential Effects to Loggerhead Sea Turtles

The loggerhead sea turtle will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since no potential loggerhead sea turtle habitat has been identified within the air emissions mAOI, no impacts to these sea turtles are anticipated from project criteria pollutant air emissions. The maximum frequency of emissions above the SILs with receptors over the tidal portion of the Nueces River within the Action Area is: 1 hour within 1 year (H_2SO_4) and 11 hours within 5 years (SO_2). No other receptors with emissions above the SILs would occur within the Action Area within the Nueces River (tidal). Since the concentration of emissions within the Action Area would be low and infrequent, no impacts to the loggerhead sea turtle are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations are below TCEQ guideline levels and no emissions of mercury or other heavy metals will be anticipated, no impacts to the loggerhead are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. No impacts to loggerhead sea turtles due to wastewater or storm water discharge are anticipated.

No direct or indirect impacts to loggerhead sea turtles are anticipated.

Determination of Effect

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

9.7.1.6 Smalltooth Sawfish

Potential to Occur in the Action Area

Habitat for the smalltooth sawfish includes shallow coastal seas and estuaries with muddy and sandy bottoms. They are typically found close to shore, in sheltered bays and on shallow banks. Known locations of smalltooth sawfish are restricted to portions of southern Florida[42].

No habitat with the potential to support the smalltooth sawfish was observed within the Project Area. Although some habitat characteristics that could potentially support the smalltooth sawfish, such as estuaries with a muddy or sandy bottom, were observed in the Nueces River and a portion of the Nueces River Delta habitats, this species population has been severely impacted to where it is known only from the southern tip of Florida. No recent observations of the smalltooth sawfish has been found in or near Corpus Christi Bay. No USFWS-designated critical habitat is located in Texas[31].

Suitable habitat for the smalltooth sawfish was noted in the Action Area; however, smalltooth sawfish are highly unlikely to occur within the Action Area.

Potential Effects to Smalltooth Sawfish

The smalltooth sawfish will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since no potential smalltooth sawfish habitat has been identified within the air emissions mAOI, no impacts to these sawfish are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the smalltooth sawfish are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. No impacts to smalltooth sawfish due to wastewater or storm water discharge are anticipated.

No direct or indirect impacts to smalltooth sawfish are anticipated.

Determination of Effect

The proposed action will have no effect on the smalltooth sawfish.

9.7.1.7 Gulf Coast Jaguarundi

Potential to Occur in the Action Area

Gulf Coast jaguarundis inhabit dense, thorny brush with adjacent grasslands. They can be found in the South Texas Brush Country and Rio Grande Plains. Gulf Coast jaguarundis have a limited range within south Texas because of habitat loss and fragmentation[44].

No habitat with the potential to support Gulf Coast jaguarundis was observed in the Action Area. Habitats in the area have been severely impacted by agriculture and residential development. No shrublands were observed. USFWS-designated critical habitat is not yet designated for this species[31].

Gulf Coast jaguarundis would not likely occur within the Action Area.

Potential Effects to the Gulf Coast Jaguarundi

Gulf Coast jaguarundis will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since no potential jaguarundi habitat has been identified within the air emissions mAOI, no impacts to jaguarundis are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to jaguarundis are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. No impacts to jaguarundis due to wastewater or storm water discharge are anticipated.

No direct or indirect impacts to jaguarundis are anticipated.

Determination of Effect

The proposed action will have no effect on the Gulf Coast jaguarundi.

9.7.1.8 Ocelot

Potential to Occur in the Action Area

Ocelots typically occur in dense, thorny thickets and rocky areas. They feed on small mammals, birds, and some reptiles. Females create their dens in caves, hollow trees, or dense brush[45].

No habitat with the potential to support the ocelot was observed within the Action Area. Habitats in the area have been severely impacted by agriculture and residential development. No shrublands were noted. USFWS-designated critical habitat is not yet designated for this species[31].

Ocelots would not likely occur within the Action Area.

Potential Effects to Ocelot

The ocelot will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since no potential ocelot habitat has been identified within the air emissions mAOI, no impacts to ocelots are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the ocelot are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. No impacts to ocelots due to wastewater or storm water discharge are anticipated.

No direct or indirect impacts to ocelots are anticipated.

Determination of Effect

The proposed action will have no effect on the ocelot.

9.7.1.9 Red Wolf

Potential to Occur in the Action Area

Red wolves are a very rare species in the wild. Only 1 known population exists in the wild and is located in North Carolina. Red wolves are thought to use brushland, forests, swamps, and prairies[48].

No habitat with the potential to support the red wolf was observed within the Action Area. Habitats in the area have been severely impacted by agriculture and residential development. USFWS-designated critical habitat is not yet designated for this species[31]. Red wolves are known to be limited in the wild to select locations in North Carolina[49]. No recent observations of the red wolf in or near the Action Area have been found.

Red wolves would not likely occur within the Action Area.

Potential Effects to Red Wolves

The red wolf will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since no potential red wolf habitat has been identified within the air emissions mAOI, no impacts to these wolves are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the red wolf are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. No impacts to red wolves due to wastewater or storm water discharge are anticipated.

No direct or indirect impacts to red wolves are anticipated.

Determination of Effect

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

9.7.1.10 West Indian Manatee

Potential to Occur in the Action Area

West Indian manatees are found in shallow, slow-moving rivers, estuaries, saltwater bays, canals and coastal areas. Typically, they occur in Florida, but they may migrate during the summer months as far west as Alabama and as far north as Virginia, dependent on water temperature[115]. Manatees typically are found at depths ranging from 3-7 feet, but can also be found in shallow areas down to 1.5 feet. Preferred feeding grounds are shallow grassbeds adjacent to deep channels in both coastal and riverine habitats. Manatees are herbivores feeding on over 60 different species of aquatic plants[116].

Habitat with the potential to support manatees is not located within the Project Area. A tidally-influenced portion of the Nueces River is located within the Action Area, approximately 1.3 miles north of the Project Area at its closest point. The potential exists for transient manatees to travel upstream to the tidally-influenced section of the Nueces River searching for foraging habitat. However, the Action Area is more than 6 miles upstream from Nueces Bay, and it is highly unlikely manatees would occupy this area. Any occurrence within the Action Area would be rare and temporary. The distance from the coast would serve as a deterrent to these sea turtles. No records were found of loggerhead sea turtles occurring in the Nueces River. The nearest mapped seagrass beds are located less than a tenth of a mile north of the Nueces River (at its closest point) and are not directly accessible from the river. It is extremely unlikely for a manatee to occur in the Nueces River. Manatees have been recorded in Corpus Christi Bay but such events are uncommon. The most recent sighting of a manatee in Corpus Christi Bay occurred in September 2012[117]. According to the Texas Marine Mammal Stranding Network, less than 10 manatees have been recovered in Texas since the 1980s[118].

A small portion of the Nueces River Delta is located within the northern portion of the Action Area. Within the Action Area, this habitat includes tidal flats with a small area of surface water reportedly with a maximum depth of approximately 1.6 feet[110]. Seagrass beds are mapped within this habitat within the Action Area. The Action Area is greater than 3 miles from preferred foraging habitat. No records were found of manatees occurring in the Nueces River Delta portion of the Action Area.

West Indian manatees have the potential to incidentally occur in the Nueces River. Any incidental occurrence would be rare and temporary.

Potential Effects to West Indian Manatee

The West Indian manatee will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since no potential manatee habitat has been identified within the air emissions mAOI, no impacts to these manatees are anticipated from project criteria pollutant air emissions. The maximum frequency of emissions above the SILs with receptors over the tidal portion of the Nueces River within the Action Area is: 1 hour within 1 year (H_2SO_4) and 11 hours within 5 years (SO_2). No other receptors with emissions above the SILs would occur within the Action Area within the Nueces River (tidal). Since the concentration of emissions within the Action Area would be low and infrequent, no impacts to the West Indian manatee are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the manatee are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. No impacts to manatees due to wastewater or storm water discharge are anticipated.

No direct or indirect impacts to West Indian manatees are anticipated.

Determination of Effect

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

9.7.1.11 Whales

Potential to Occur in the Action Area

For this BA, the whales listed in this report have been combined into a single category for analysis (i.e., impacts were not distinguished between species). In general, whales are found in

marine open water at varying depths and in different proximities to the coastal shelf. Depending on the specific species, their diets may include fish, plankton, cephalopods, sharks, skates, crustaceans, and krill. Whales associated with Texas are found in the Gulf of Mexico[54,57,58,62,65].

No habitat with the potential to support whales was observed within the Action Area. The Nueces River is more than 30 miles from the Gulf of Mexico. No records of whales occurring in the surrounding Corpus Christi bays or the Nueces River were found.

No habitat with the potential to support whales is present within the Action Area. Therefore, whales will not occur in the Action Area.

Potential Effects to Whales

Whales will not be directly impacted by construction activities, noise pollution, or human disturbance associated with the completion of the Power Station project. Since no potential whale habitat was identified within or adjacent to the Action Area, no impacts to whales are anticipated from the project's storm water and wastewater effluent emissions.

Since no potential whale habitat has been identified within the air emissions mAOI, no impacts to whales are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the whales are anticipated from project non-criteria pollutant air emissions.

No direct or indirect impacts to whales are anticipated.

Determination of Effect

The proposed action will have no effect on whales.

9.7.1.12 Eskimo Curlew

Potential to Occur in the Action Area

Eskimo curlews are migratory birds that breed in Canada and the northern US and winter in South America. Therefore, breeding and wintering habitat were excluded from this analysis.

Non-breeding birds utilize a variety of habitats, including grasslands, pastures, plowed fields, and less frequently, marshes and mud flats[66].

Although some habitat characteristics that could support the Eskimo curlew such as grasslands, emergent wetlands, and plowed fields were observed within the Action Area, Eskimo curlews are extremely rare. It is estimated that the population is less than 50 individuals and may even be extinct[119]. There are no known extant populations of Eskimo curlews. The last confirmed record of an Eskimo curlew in Texas was in 1962 in Galveston County, Texas[120]. Another possible sighting was noted in 1981 of a flock of 23 birds in Galveston Bay on Atkinson Island[121]. USFWS-designated critical habitat is not yet designated for this species[31].

Given the extreme rarity of Eskimo curlews, Eskimo curlews would not likely occur within the Action Area.

Potential Effects to Eskimo Curlew

The Eskimo curlew will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since the Eskimo curlew is highly unlikely to occur within the air emissions mAOI and the concentration of emissions within the mAOI would be low and infrequent, no impacts to these birds are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the curlew are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. No impacts to Eskimo curlews due to wastewater or storm water discharge are anticipated.

No direct or indirect impacts to Eskimo curlews are anticipated.

Determination of Effect

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

9.7.1.13 Northern Aplomado Falcon

Potential to Occur in the Action Area

Northern aplomado falcons are found in desert grasslands, savannahs, and coastal prairies in Latin America and in Texas, New Mexico, and Arizona[122]. This falcon requires open grasslands with scattered trees or shrubs. They do not build their own nests but use stick nests constructed by other birds[67].

No suitable habitat for the northern aplomado falcon was observed in the Project Area. This habitat was primarily herbaceous habitat with disturbed soils.

Habitat within the Action Area is comprised primarily of croplands and residential areas, which are not typical habitats used by northern aplomado falcons. Remnant herbaceous habitat and grasslands present within the Action Area could potentially support the northern aplomado falcon.

The northern aplomado falcon has declined significantly along the Texas coast due mostly to the loss of native grassland prairies. Efforts have been made to reintroduce this species to King Ranch in Kleberg County (more than 25 miles southwest of the Project Area), to Laguna Atascosa National Wildlife Refuge in Cameron County, and to Mustang Island State Park in Nueces County (approximately 33 miles east of the Project Area)[123]. The nearest record of a northern aplomado falcon is more than 15 miles southeast of the Project Area[124]. Although potential habitat for this species exists within select portions of the Action Area, these habitat areas are immediately adjacent to residential and industrial disturbance and the current population is primarily restricted to specific areas associated with the reintroduction efforts. The probability of northern aplomado falcons occurring in the Action Area is extremely low. USFWS-designated critical habitat is not yet designated for this species[31].

Northern aplomado falcons are not likely to occur in the Action Area.

Potential Effects to Northern Aplomado Falcon

The northern aplomado falcon will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since these falcons are unlikely to occur within the air emissions mAOI and the concentration of emissions within the mAOI would be low and infrequent, no impacts to these birds are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the falcons are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. No impacts to northern aplomado falcons due to wastewater or storm water discharge are anticipated.

No direct or indirect impacts to northern aplomado falcons are anticipated.

Determination of Effect

The proposed action will have no effect on the northern aplomado falcon.

9.7.1.14 Piping Plover

Potential to Occur in the Action Area

Piping plovers are migratory birds and their breeding habitat is known to be the northern US and Canada. Therefore, the consideration of potential nesting habitat was excluded from this analysis. Potential habitat within the Action Area would be limited to wintering habitat (foraging and roosting). Foraging habitat includes bare to sparsely vegetated beaches, salt marshes, emergent seagrass beds, wash-over passes, mudflats, sandflats, or algal flats. Typical foraging habitats are dynamic systems that fluctuate with the tide and wind. Roosting habitat includes sandy beaches, often with cover such as driftwood, seaweed clumps, small dunes, and debris[74].

No habitat with the potential to support the piping plover was observed within the Project Area. Suitable foraging and roosting habitat for piping plovers was not observed within the Nueces River within the Action Area. The Action Area is more than 6 miles upstream from Nueces Bay. The end of the tidally-influenced portion of the Nueces River is immediately north

of the Action Area. The Nueces River within the Action Area does not experience significant water level fluctuations. The shoreline of the river is vegetated and developed.

A small portion of the Nueces River Delta is located within the northern portion of the Action Area. This habitat includes tidal flats reportedly with a maximum water depth of approximately 1.6 feet[110]. However, the Action Area is greater than 3 miles from the Nueces Bay and this area does not experience significant water level fluctuations. This habitat may offer low quality foraging and roosting habitat.

One observation of a piping plover was reported at Hazel Bazemore Park, approximately 1.8 miles northwest of the Project Area[125]. The closest USFWS-designated critical habitat for piping plovers is approximately 15 miles east of the Project Area[31]. The Action Area is located within the piping plover migration corridor. The potential exists for incidental occurrence within the Action Area. Preferred foraging and roosting habitat is along the coast, which is at least 11 miles east of the Action Area. Piping plovers would not likely utilize low quality habitats within the Action Area when preferred wintering habitats are accessible and nearby.

Piping plovers may occur, but are unlikely to occur within the select portions of the Action Area. Any potential occurrence would be rare and temporary.

Potential Effects to Piping Plovers

The piping plover will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since only low quality potential piping plover habitat has been identified within the air emissions mAOI and these birds are unlikely to occur within the mAOI, no impacts to these birds are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to these plovers are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. No impacts to piping plovers due to wastewater or storm water discharge are anticipated.

No direct or indirect impacts to piping plovers are anticipated.

Determination of Effect

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

9.7.1.15 Whooping Crane

Potential to Occur in the Action Area

Whooping cranes are migratory birds and their breeding habitat is known to be in the northern US and Canada[79]. Therefore, the consideration of potential nesting habitat was excluded from this analysis. In the winter, whooping cranes are found in estuarine marshes, shallow bays, and tidal flats[126]. Their wintering habitat is known to be limited to the Aransas National Wildlife Refuge and surrounding areas near Rockport, Texas (approximately 33 miles northeast of Project Area). Whooping cranes are reported to be broadening their winter range to include additional coastal habitats in part to increasing population numbers and in response to climate/habitat change[127]. During migration, whooping cranes opportunistically utilize stopover habitat. Migrating cranes feed and roost in wetlands, rivers, and upland grain fields[79]. Migration flights generally occur between 1,000-6,000 feet during day-time hours, however they will fly at low altitudes during brief rest periods and at the start and end of a daily flight[128]. Potential habitat within the Action Area would be limited to temporary foraging and roosting habitat during migration.

Whooping cranes are a rare species in the wild. In 2014, the number of birds was estimated at 304 individuals at Aransas National Wildlife Refuge[129].

The Project Area is located approximately 33 miles southwest of the Aransas National Wildlife Refuge and is within the designated migration corridor. Whooping cranes have not been recorded and are not known to occur within or near the Action Area[130]. The closest recorded observation to the Project Area of a whooping crane is approximately 34 miles to the east in Port Aransas, Texas (Figure 8 – Appendix A)[127]. No suitable habitat for migrating whooping cranes was noted within the Project Area. However, the potential exists from whooping cranes to fly over the Project Area.

In the Action Area, upland grain fields and a portion of the Nueces River Delta offer low quality foraging habitat. However, these habitats are located within and adjacent to heavy residential and industrial development. Whooping cranes would not likely utilize low quality forage habitats within the Action Area when preferred wintering habitats are accessible and nearby. Although the Action Area is located within the whooping crane migration path, whooping cranes have not been recorded and are not known to occur within the Action Area. Whooping cranes have the potential to fly over the Action Area.

Whooping cranes are unlikely to occur within the Action Area. Any potential occurrence would be rare and temporary.

Potential Effects to Whooping Cranes

Whooping cranes have the potential to fly over the Action Area during migration, although any incidental occurrence would be rare and temporary. The Action Area is located at the south and west edge of the migration corridor; therefore, the potential for whooping crane collision with new infrastructure was considered (Figure 8 – Appendix A).

Low light conditions may increase the potential for whooping crane collisions with new tall, narrow infrastructure such as flares, communication towers, and extended crane booms. The majority of recorded collisions are associated with powerlines and fencelines[131]. No records of collisions with existing or preexisting facilities have been found. Further, whooping cranes are known to avoid existing, well-lit infrastructure and human disturbance[131].

Although whooping cranes have not been observed at or near the facility, measures have been implemented to reduce the likelihood of any potential impacts in the event that they do occur. The project is being constructed in an established industrial area with existing high-energy transmission lines. The Project Area has historically been utilized as a power station and previously had legacy infrastructure installed consisting of a large turbine building, four cooling towers and four large conventionally fired boilers with stacks. The entire legacy infrastructure has been deconstructed except for a single warehouse. The heights of the new infrastructure will range from 30 to 152 feet and consist of only two stacks and associated lower height equipment. Including the already completed deconstruction of the legacy infrastructure, the project will result in a net decrease in obstructions. The new infrastructure will be fitted with safety lighting similar to the previous and existing infrastructure and in accordance with

the FAA and USFWS guidelines[107]. In addition, flags will be attached to the boom of construction cranes (maximum 230 feet tall) to increase visibility. FAA lighting will be included on crane booms 200 feet high and higher.

No direct effects from noise pollution or human disturbance are anticipated. Since the whooping crane is unlikely to occur within the air emissions mAOI and the concentration of emissions within the mAOI would be low and infrequent, no impacts to these birds are anticipated from the project's criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emissions concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the whooping crane are anticipated from the project's non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. Whooping cranes will not be impacted by storm water or wastewater effluent as a result of the proposed project.

No direct or indirect effects to whooping cranes or their habitats are anticipated from the proposed project.

Determination of Effect

Based on the location of the project within the whooping crane migration corridor, the proposed action may affect, but is not likely to adversely affect whooping cranes.

9.7.1.16 Slender Rush-pea

Potential to Occur in the Action Area

The slender rush-pea is an early successional perennial. It is typically found in barren openings or in areas with low native grasses on clayey soils of blackland prairies and creek banks of the Gulf Coastal Prairie[81]. It can be found in prairies, roadsides, or open areas with shrubs, cacti, and low growing grasses. Non-native species, such as King Ranch bluestem or bermudagrass, typically out-compete the slender rush-pea[82].

Habitat characteristics with the potential to support slender rush-pea were not identified within the Project Area. Although the Project Area possessed clay soils and herbaceous habitat, previous industrial site work heavily impacted the soils. In addition, adjacent property was primarily residential and plowed agricultural land, which further reduced the likelihood that rush-pea seeds could potentially occur in the Project Area.

Select habitats within the Action Area have the potential to support the slender rush-pea. The slender rush-pea has been recorded within the Action Area, approximately 2.3 miles southwest of the Project Area[89]. This record was from a type specimen collected in 1931, and follow-up surveys in the 1980s failed to confirm an extant population in the area. There are 2 known extant populations located in the southern portion of Nueces County, which is more than 14 miles south of the Project Area. USFWS-designated critical habitat is not yet designated for this species[31].

The slender rush-pea may occur, but is highly unlikely to occur within the Action Area.

Potential Effects to Slender Rush-pea

The slender rush-pea will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since the slender rush-pea is unlikely to occur within the air emissions mAOI, no impacts to slender rush-peas are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to slender rush-peas are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. The slender rush-pea will not be impacted by storm water or wastewater effluent as a result of the proposed project.

No direct or indirect impacts to the slender rush-pea are anticipated.

Determination of Effect

The proposed action will have no effect on the slender rush-pea.

9.7.1.17 South Texas Ambrosia

Potential to Occur in the Action Area

South Texas ambrosia occurs in open grasslands or savannahs on soils varying from clay loams to sandy loams. Its current distribution is known in only 6 locations within Nueces and Kleberg counties, Texas[84]. Texas ambrosia is thought to be intolerant to plowing, blading, or discing, but lesser disturbance activities, such as mowing and fire, may enhance growth[83].

Habitat with the potential to support the South Texas ambrosia was not observed within the Project Area. Although the Project Area possessed clay soils and herbaceous habitat, previous industrial site work heavily impacted the soils. In addition, adjacent property was primarily residential and plowed agricultural land, which further decreased the likelihood that ambrosia seeds could potentially occur in the Project Area.

Habitat characteristics with the potential to support South Texas ambrosia were identified in select habitats within the Action Area. These habitat characteristics were observed within the select grassland habitat areas and mowed public road right-of-ways, excluding those subject to grading maintenance. These habitats are small and fragmented. The nearest known occurrences of the South Texas ambrosia are located outside of the Action Area, approximately 3.9 miles south and southwest of the Project Area at 2 distinct locations[89]. The species was last observed at these 2 locations in 1993 and 2009, respectively. USFWS-designated critical habitat is not yet designated for this species[31].

The South Texas ambrosia may occur, but is highly unlikely to occur within the Action Area.

Potential Effects to South Texas Ambrosia

The South Texas ambrosia will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since the South Texas ambrosia is unlikely to occur within the air emissions mAOI, no impacts to the South Texas ambrosia are anticipated from project criteria pollutant air emissions. The

maximum frequency of emissions above the SILs with receptors over the grassland habitat within the Action Area is: 2 hours within 1 year (H_2SO_4), 21 hours within 5 years ($PM_{2.5}$), and 12 hours within 5 years (SO_2). No other receptors with emissions above the SILs would occur within the Action Area within the grassland habitat. Since the concentration of emissions within the Action Area would be low and infrequent, no impacts to the South Texas ambrosia are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to these ambrosias are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. The South Texas ambrosia will not be impacted by storm water or wastewater effluent as a result of the proposed project.

No direct or indirect impacts to the South Texas ambrosia are anticipated.

Determination of Effect

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

9.7.2 FEDERALLY-LISTED PROPOSED THREATENED AND CANDIDATE SPECIES

9.7.2.1 Golden Orb

Potential to Occur in the Action Area

The golden orb is endemic to nearly the entire lengths of the Guadalupe, San Antonio, and Nueces-Frio river basins in central Texas, including the Guadalupe, Medina, San Antonio, Frio, and Nueces Rivers and Cibolo Creek[86]. The golden orb is found almost exclusively in flowing waters of medium-sized rivers. The lower portion of the Guadalupe River basin (within 75 miles of the coast) currently harbors all four of the large, presumably reproducing populations of golden orb. It is found in substrates of firm mud, sand, and gravel and does not tolerate loose sand or silt[86].

Habitat with the potential to support the golden orb was not observed within the Project Area.

The Action Area encompasses a portion of the Nueces River, which includes both tidally-influenced and non-tidal section of the river. The tidal limit is designated at the Calallen Dam, which is located immediately north of the Action Area. The Action Area is approximately 6 miles upstream from Nueces Bay. The golden orb is a freshwater mussel with an unknown tolerance for salinity. However, *Dreissena polymorpha* (zebra mussel) is a resilient freshwater mussel species that has a salinity tolerance of less than 5 parts per trillion (ppt)[132]. It is assumed that the golden orb is also intolerant of salinities above 5 ppt. Salinity tests conducted at the monitoring station SALT05 demonstrated salinity ranges in the Nueces River between 8-23 ppt within the past year[133]. Therefore, the tidally-influenced portion of the Nueces River within the Action Area would not likely qualify as potential golden orb habitat.

The non-tidal portion of the Nueces River within the Action Area is not currently flowing. This region has experienced extreme drought for many years and the flow of the Nueces River is limited by Lake Corpus Christi upstream of the Action Area. The Calallen Dam is located immediately north of the Action Area and limits the river flow. Select habitat characteristics may have the potential to support the golden orb within the non-tidal portion of the Nueces River. However, no observations of the golden orb downstream of Lake Corpus Christi have been found.

The golden orb may occur, but is highly unlikely to occur within the Action Area.

Potential Effects to Golden Orbs

The golden orb will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since the golden orb is unlikely to occur within the mAOI and no receptors for emissions above the SILs were located over the Nueces River (nontidal), no impacts to these mussels are anticipated from the project's criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the golden orb are anticipated from the project's non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-

listed species was not identified within or near the ditch. The golden orb will not be impacted by storm water or wastewater effluent as a result of the proposed project.

No direct or indirect impacts to golden orbs are anticipated.

9.7.2.2 Sprague's Pipit

Potential to Occur in the Action Area

Sprague's pipits are migratory birds and their breeding habitat is within the northern US and Canada. Therefore, the consideration of potential nesting habitat was excluded from this analysis. Potential habitat within the Action Area would be limited to wintering habitat (foraging and roosting). Preferred habitat includes grass-forb prairies dominated by bluestem grasses that are about 8 inches in height. They will also use old rice fields, turf grass farms, golf courses, and recently burned pastures[87].

Select herbaceous habitats within the Action Area have the potential to support the Sprague's pipit. The Project Area was a previously disturbed industrial site that currently includes predominantly herbaceous habitat, consisting mostly of non-native grasses and forbs. The potential exists for Sprague's pipits to utilize the Project Area; however, the level of previous disturbance and lack of native plant species may serve as deterrents to Sprague's pipits.

The majority of the Action Area consisted of plowed agricultural land and developed properties, which do not possess characteristics capable of supporting Sprague's pipits. However, suitable habitat for the Sprague's pipit was observed adjacent to and north of the Nueces River. Therefore, the potential exists for Sprague's pipits to occur in the Action Area.

One observation of Sprague's pipit was recorded at Hazel Bazemore Park, approximately 1.9 miles northwest of the Project Area[134]. However, few observations of Sprague's pipits are recorded within the area. Only 3 observations were recorded within 10 miles of the Project Area.

Sprague's pipits may occur, but are unlikely to occur within the Action Area.

Potential Effects to Sprague's Pipit

Given the historical disturbance of the site and unlikelihood of occurrence, the Sprague's pipit will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since the Sprague's pipit is unlikely to occur within the air emissions mAOI, no impacts to these birds are anticipated from the project's criteria pollutant air emissions. The maximum frequency of emissions above the SILs with receptors over the wetland habitat north of the Nueces River within the Action Area is: 2 hours within 1 year (H_2SO_4) and 11 hours within 5 years (SO_2). No other receptors with emissions above the SILs would occur within the Action Area within the wetland habitat north of the Nueces River. Since the concentration of emissions within the Action Area would be low and infrequent, no impacts to the Sprague's pipit are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine and MSS emissions concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the pipit are anticipated from the project's non-criteria pollutant air emissions.

No habitat suitable for Sprague's pipits was identified near the outfalls. Therefore, no impacts to Sprague's pipits from the project's wastewater or storm water effluents are anticipated. Sprague's pipits will not be impacted by storm water or wastewater effluent as a result of the proposed project.

No direct or indirect effects to Sprague's pipits are anticipated.

9.7.2.3 Red Knot

Potential to Occur in the Action Area

Red knots are long-distance migrants between the arctic (breeding habitat) and South America (winter habitat). Since their breeding range is not within the Action Area, consideration of potential nesting habitat was not included in this analysis. Some red knots may remain in Texas during the winter; however most use the area only during migration. Red knots demonstrate strong site fidelity during migration, using the same sites each year. This includes the Bolivar peninsula in Texas. In general, they use sandy beaches, tidal mudflats, and salt marshes[76].

No habitat with the potential to support red knots was observed in the Project Area. Suitable foraging and roosting habitat for red knots was not observed within the Nueces River within the Action Area. The Action Area is more than 6 miles upstream from Nueces Bay. The end of the tidally-influenced portion of the Nueces River is immediately north of the Action Area. The Nueces River within the Action Area does not sandy shorelines, mudflats, or marsh habitat. The shoreline of the river is vegetated and developed.

A small portion of the Nueces River Delta is located within the northern portion of the Action Area. This habitat includes tidal flats reportedly with a maximum water depth of approximately 1.6 feet[110]. However, the Action Area is greater than 3 miles from the Nueces Bay and this area does not experience significant water level fluctuations. This habitat may offer low quality foraging habitat.

One observation of a red knot was recorded at the Hazel Bazemore Park, located approximately 1.9 miles northwest of the Project Area. USFWS-designated critical habitat is not yet designated for this species[31]. The Action Area is located within the red knot migration corridor. The potential exists for incidental occurrence within the Action Area. Preferred foraging and roosting habitat is along the coast, which is at least 11 miles east of the Action Area. Red knots would not likely utilize low quality habitats within the Action Area when preferred habitats are accessible and nearby.

Red knots may occur, but are unlikely to occur within the select portions of the Action Area. Any potential occurrence would be rare and temporary.

Potential Effects to Red Knots

The red knot will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since only low quality potential red knot habitat has been identified within the air emissions mAOI and these birds are unlikely to occur within the mAOI, no impacts to these birds are anticipated from project criteria pollutant air emissions. The maximum frequency of emissions above the SILs with receptors over the wetland habitat north of the Nueces River within the Action Area is: 2 hours within 1 year (H_2SO_4) and 11 hours within 5 years (SO_2). No other receptors with emissions above the SILs would occur within the Action Area within the wetland

habitat north of the Nueces River. Since the concentration of emissions within the Action Area would be low and infrequent, no impacts to the Sprague's pipit red knots are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the red knot are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. No impacts to red knots due to wastewater or storm water discharge are anticipated.

No direct or indirect impacts to red knots are anticipated.

9.7.2.4 Yellow-billed Cuckoo

Potential to Occur in the Action Area

Yellow-billed cuckoos are migratory birds that breed in the US, Canada, and northern Mexico. These cuckoos migrate to South America for the winter; therefore, wintering habitat was not considered in this analysis. Nesting habitat includes large patches of riparian or broad-leaved woodland habitat that is comprised of cottonwoods, willows, and a dense understory[77].

Habitat with the potential to support yellow-billed cuckoos was not observed in the Project Area. The Project Area was primarily herbaceous habitat with no dense cover.

Habitats characteristics that are associated with the yellow-billed cuckoo (i.e., dense woodlands near streams) were identified within portions of the Action Area. However, these habitats are located within and adjacent to heavy residential and industrial development. Several yellow-billed cuckoo observations have been reported within the Action Area. The nearest record of a yellow-billed cuckoo is approximately 0.8 miles north of the Project Area[135]. No records of nesting yellow-billed cuckoos have been found within the Action Area. USFWS-designated critical habitat is not yet designated for this species[31].

Yellow-billed cuckoos are known to occur within the Action Area.

Potential Effects to Yellow-billed Cuckoos

The yellow-billed cuckoo will not be directly impacted by construction activities associated with the completion of the proposed project, noise pollution, or human disturbance.

Since the concentration of emissions above the SILs within the mAOI would be low, short-term, and infrequent, no impacts to the yellow-billed cuckoos are anticipated from project criteria pollutant air emissions. The maximum frequency of emissions above the SILs with receptors over the woodland habitat within the Action Area is: 7 hours within 1 year (H_2SO_4) , 97 hours within 5 years ($PM_{2.5}$), and 20 hours within 5 years (SO_2). No other receptors with emissions above the SILs would occur within the Action Area within the woodland habitat. Since the concentration of emissions within the Action Area would be low and infrequent, no impacts to the yellow-billed cuckoos are anticipated from project criteria pollutant air emissions. Since the predicted non-criteria pollutant routine emission concentrations will be below TCEQ guideline levels and no emissions of mercury or other heavy metals are anticipated, no impacts to the yellow-billed cuckoo are anticipated from project non-criteria pollutant air emissions.

All wastewater and storm water associated with construction and operation of the proposed project will be discharged into a dry, vegetated drainage ditch. Potential habitat for federally-listed species was not identified within or near the ditch. No impacts to yellow-billed cuckoos due to wastewater or storm water discharge are anticipated.

No direct or indirect impacts to yellow-billed cuckoos are anticipated.

10.0 CONCLUSIONS

This section is a summary of WGI's recommended determination of effect for all federally-listed species, a description of any interdependent and interrelated actions, and a description of any anticipated cumulative effects resulting from the proposed project.

10.1 DETERMINATION OF EFFECT

The recommended determinations of effect for all federally-listed threatened or endangered species with the potential to occur within Nueces and San Patricio counties, Texas are summarized below in Table 6.

Table 6. Determination of Effect Summary

Federally-Listed Species	Determination of Effect
Green sea turtle	No Effect
Hawksbill sea turtle	No Effect
Kemp's Ridley sea turtle	No Effect
Leatherback sea turtle	No Effect
Loggerhead sea turtle	No Effect
Smalltooth sawfish	No Effect
Gulf Coast jaguarundi	No Effect
Ocelot	No Effect
Red wolf	No Effect
West Indian manatee	No Effect
Blue whale	No Effect
Finback whale	No Effect
Humpback whale	No Effect
Sei whale	No Effect
Sperm whale	No Effect
Eskimo curlew	No Effect
Northern aplomado falcon	No Effect
Piping plover	No Effect
Whooping crane	May Affect, Not Likely to Adversely Affect
South Texas ambrosia	No Effect
Slender rush-pea	No Effect

10.2 INTERDEPENDENT AND INTERRELATED ACTIONS

The proposed project includes the construction of a 2x2x1 combined cycle power plant and the replacement of an existing pipeline as outlined in Section 4.0. No additional interdependent or interrelated actions are proposed at this time.

10.3 CUMULATIVE EFFECTS

The Project Area is located in a previously disturbed industrial facility that is primarily surrounded by agriculture and residential development.

The area surrounding the proposed Lon C. Hill Power Station project includes many existing industrial facilities. According to the EPA Region 6 air permits website, there are 2 additional proposed projects within 5 miles of the Lon C. Hill Power Station project that have applied for GHG permits. These include an olefins plant expansion and a refinery expansion project. Given the attainment status of the region, no significant cumulative air emission effects are anticipated.

As with the proposed power station project, any new proposed developments may have the potential to impact federally-listed species. However, WGI is not aware of any additional projects planned for this area at this time.

10.4 CONSERVATION MEASURES

Lon C. Hill plans to utilize the BACT to the project control emissions and thus minimize impacts to the surrounding environment to the maximum extent practicable.

Measures will be implemented to minimize potential whooping crane collisions during the construction and operation of the proposed project. The new infrastructure will be fitted with safety lighting similar to the previous and existing infrastructure and in accordance with the FAA and USFWS guidelines[107] and flags will be attached to the boom of construction cranes to increase visibility. FAA lighting will be included on crane booms 200 feet high and higher.

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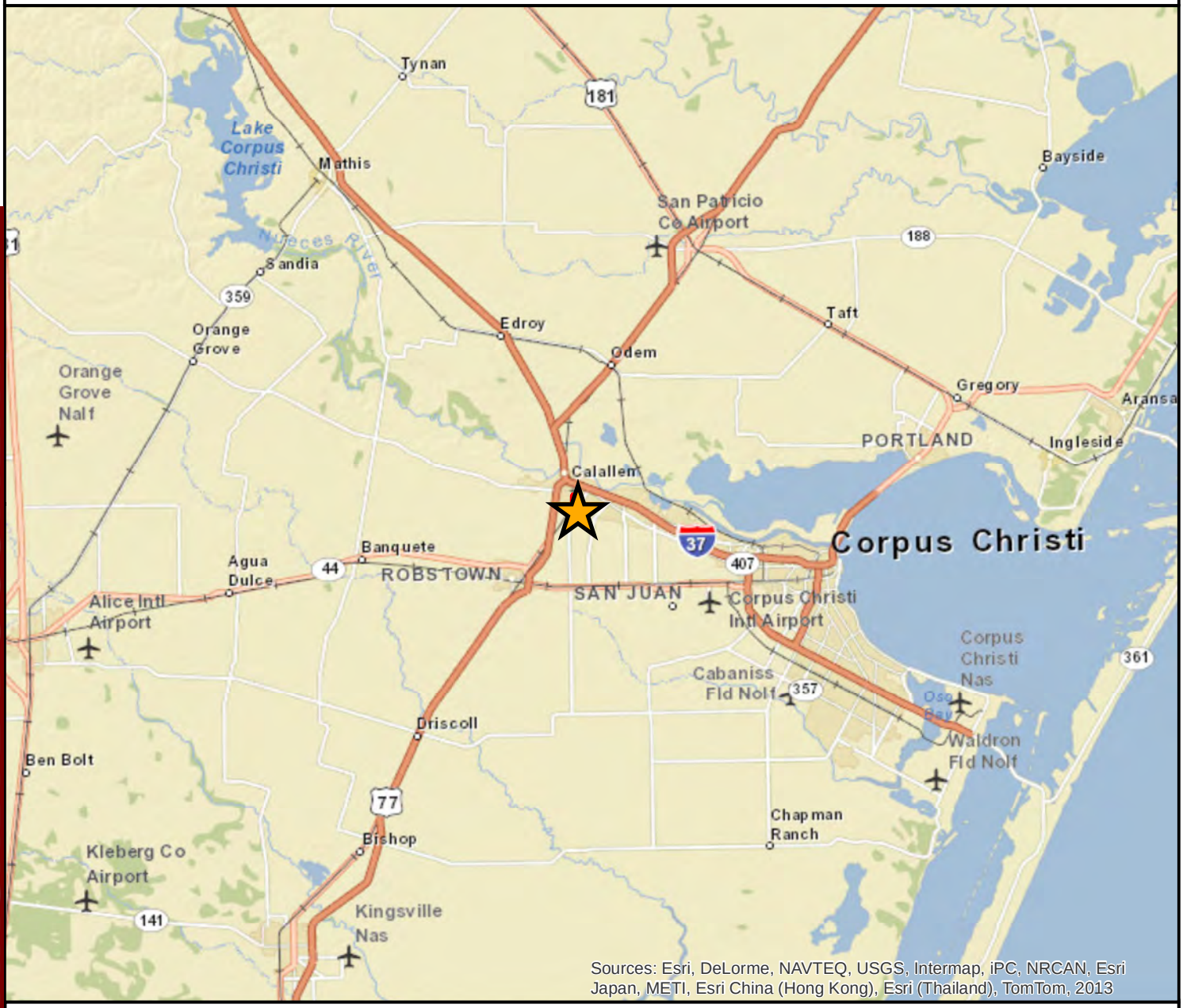
12.0 LIST OF PREPARERS

Jayme A. Shiner, Senior Ecologist	PWS, B.S. General Biology
Debbie A. Scott, Wildlife Biologist	AWB, M.S., Wildlife Biology
Donna Hertlein, Wildlife Biologist	M.S., Zoology and Ecology

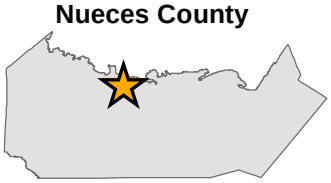
APPENDIX A

FIGURES 1-8

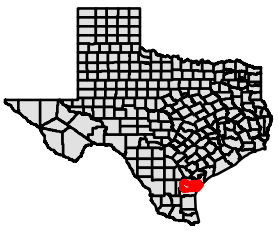
Figure 1
Project Location
Lon C. Hill Power Station Project
Nueces County, Texas



Nueces County



Project Location



Background Resources: World Street Map	Surveyor(s): Jayme Shiner PWS Debbie Scott AWB Bryan Whisenant	Project Number and Information: 1352 Lon C. Hill Power Station Project Biological Assessment	WHITENTON group environmental consultants 3413 Hunter Road San Marcos Texas 78666
GPS and Coordinate Type: Trimble Geo XH 6000 Series UTM NAD 1983 Zone 14 North	Map Created: 04/10/2014 by D. Scott		0 5 10 Miles N

Figure 2
Project Area and Outfall Structures
Lon C. Hill Power Station Project
Nueces County, Texas

Outfall

Project Area (~45.5 Acres)

Background Resources: ESRI Aerial Imagery Basemap	Surveyor(s): Jayme Shiner PWS Debbie Scott AWB Bryan Whisenant	Project Number and Information: 1352 Lon C. Hill Power Station Project Biological Assessment	WHITENTON group environmental consultants 3413 Hunter Road San Marcos Texas 78666
GPS and Coordinate Type: Trimble Geo XH 6000 Series UTM NAD 1983 Zone 14 North	Map Created: 04/10/2014 by JS		0 200 400 Feet

Figure 3
Project Area, Outfall Structures, and Discharge Route
Lon C. Hill Power Station Project
Nueces County, Texas

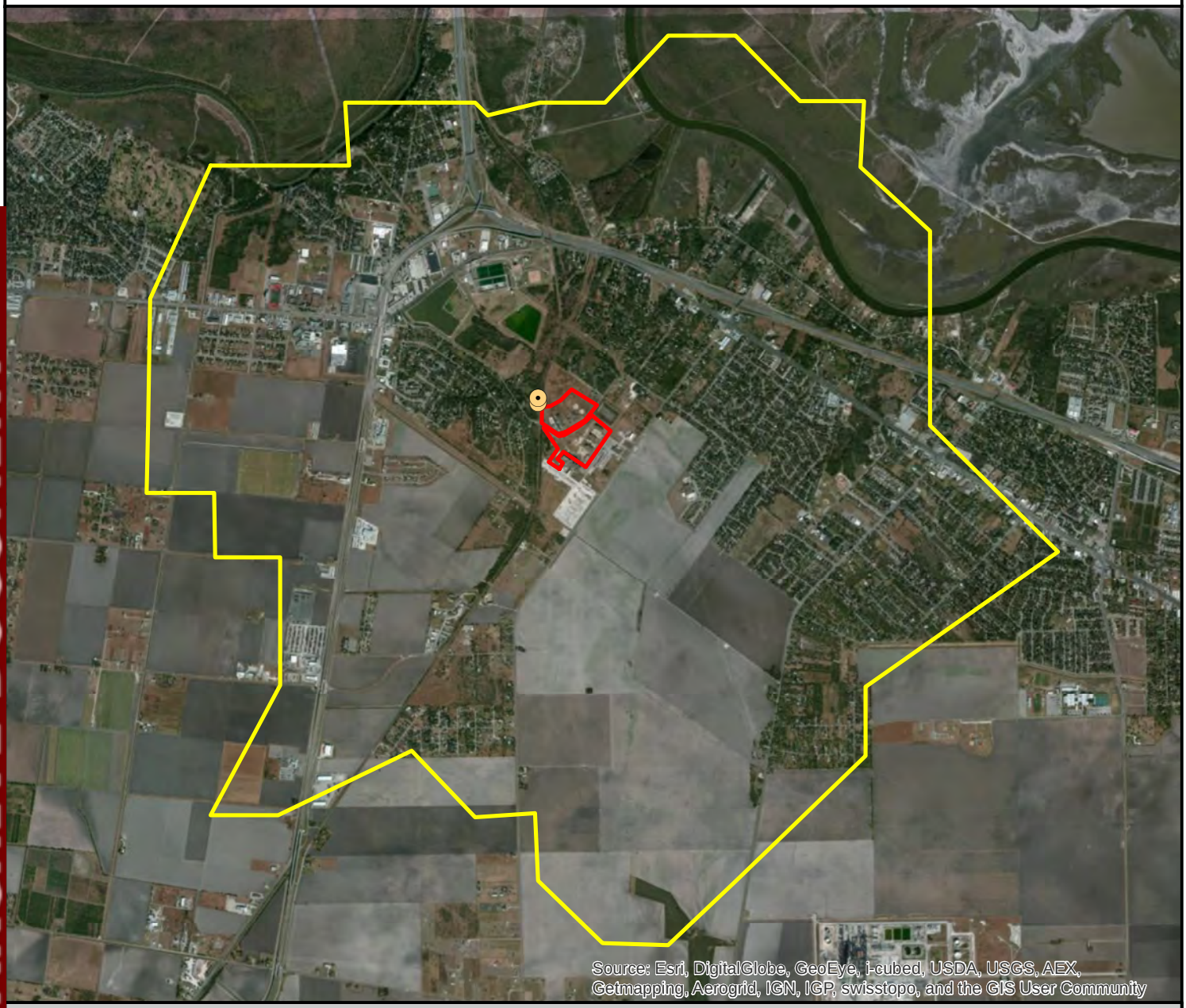
Outfall

Project Area (~45.5 Acres)

Wastewater and Storm Water Discharge Route

Background Resources: ESRI Aerial Imagery Basemap	Surveyor(s): Jayme Shiner PWS Debbie Scott AWB Bryan Whisenant	Project Number and Information: 1352 Lon C. Hill Power Station Project Biological Assessment	WHITENTON group environmental consultants 3413 Hunter Road San Marcos Texas 78666
GPS and Coordinate Type: Trimble Geo XH 6000 Series UTM NAD 1983 Zone 14 North	Map Created: 04/10/2014 by JS		0 1,000 2,000 Feet N

Figure 4
Project and Action Areas - Aerial Map
Lon C. Hill Power Station Project
Nueces County, Texas



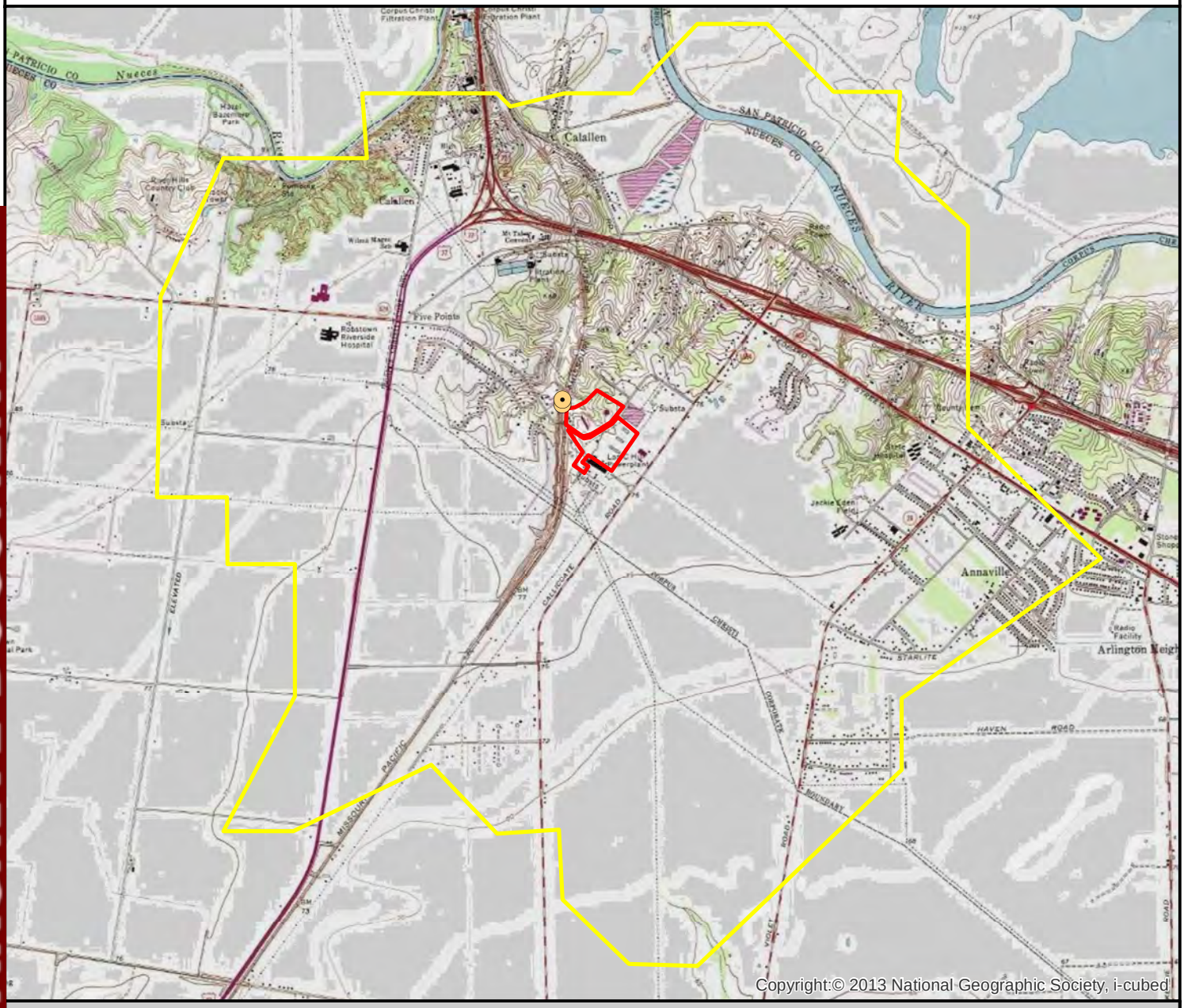
Outfall

Project Area (~45.5 Acres)

Action Area (~2.54-Mile Maximum Radius)

Background Resources: Bing Hybrid Aerial Basemap	Surveyor(s): Jayme Shiner PWS Debbie Scott AWB Bryan Whisenant	Project Number and Information: 1352 Lon C. Hill Power Station Project Biological Assessment	WHITENTON group environmental consultants 3413 Hunter Road San Marcos Texas 78666
GPS and Coordinate Type: Trimble Geo XH 6000 Series UTM NAD 1983 Zone 14 North	Map Created: 04/10/2014 by D. Scott		0 0.5 1 Miles N

Figure 5
Project and Action Areas - Topographic Map
Lon C. Hill Power Station Project
Nueces County, Texas



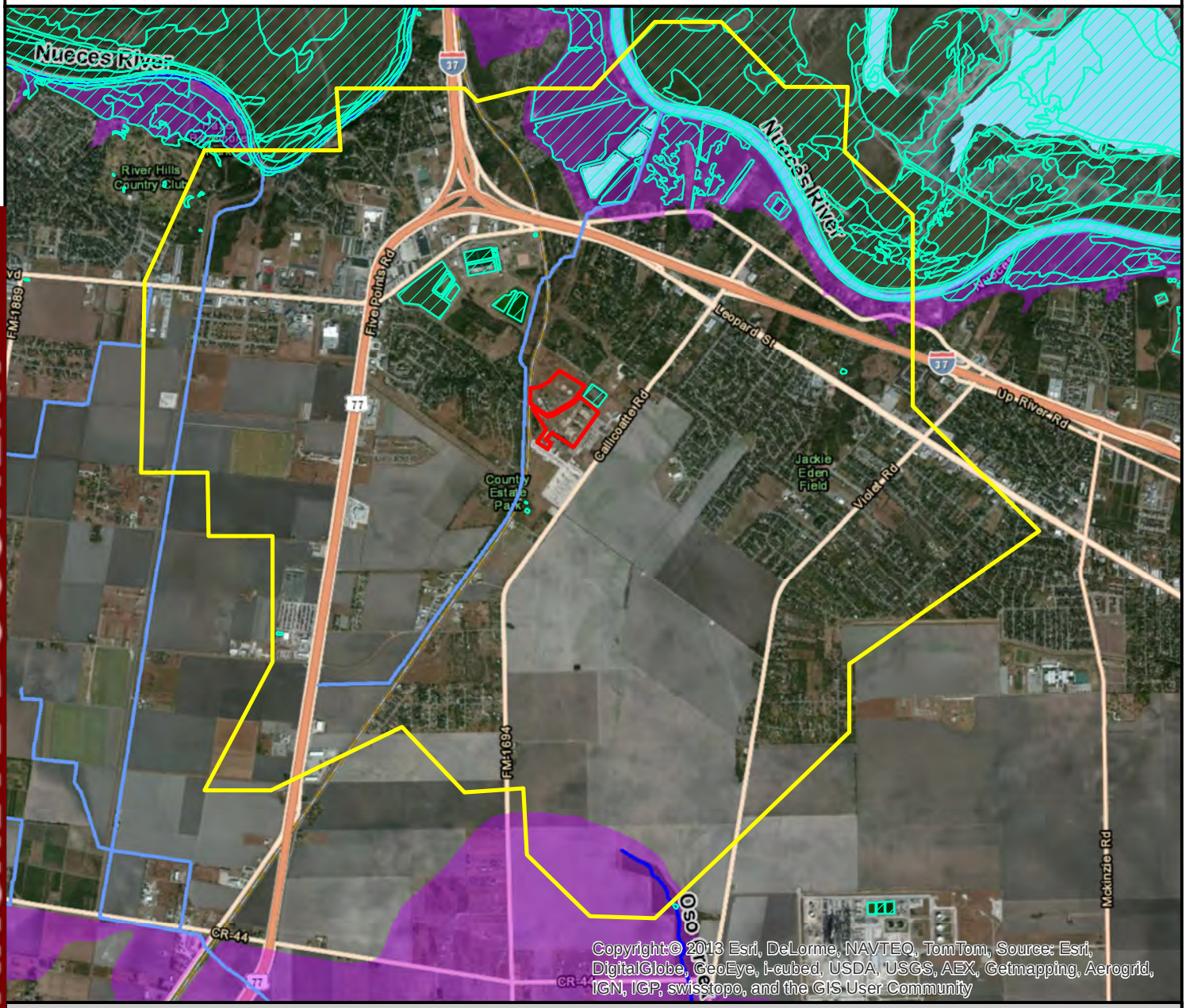
Outfall

Project Area (~45.5 Acres)

Action Area (~2.5-Mile Maximum Radius)

Background Resources: USA Topo Basemap	Surveyor(s): Jayme Shiner PWS Debbie Scott AWB Bryan Whisenant	Project Number and Information: 1352 Lon C. Hill Power Station Project Biological Assessment	WHITENTON group environmental consultants 3413 Hunter Road San Marcos Texas 78666
GPS and Coordinate Type: Trimble Geo XH 6000 Series UTM NAD 1983 Zone 14 North	Map Created: 04/10/2014 by D. Scott		0 0.5 1 Miles

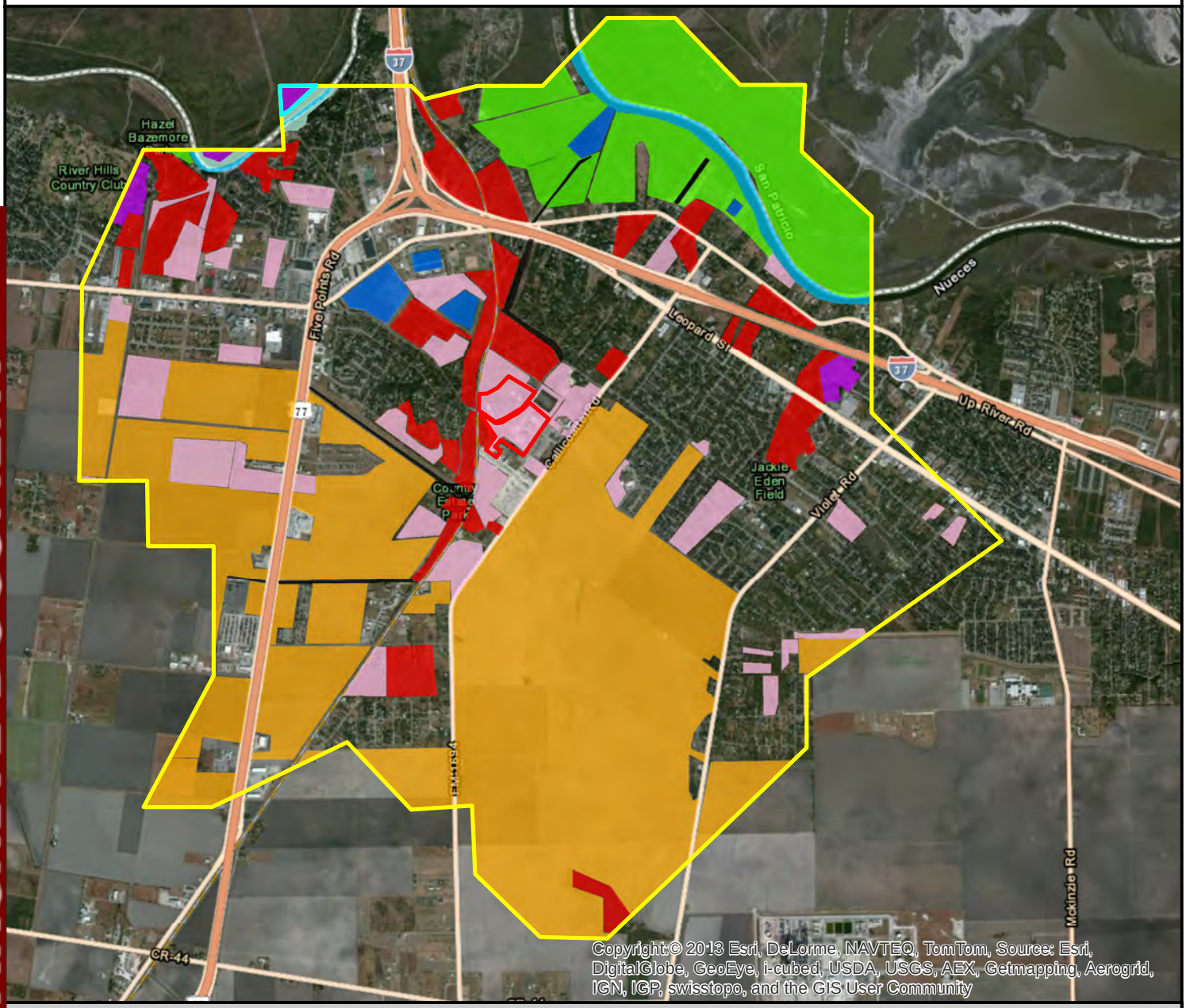
Figure 6
National Wetlands Inventory, National Hydrography, and FEMA Floodplain Data
Lon C. Hill Power Station Project
Nueces County, Texas



Project Area (~45.5 Acres)	FEMA 100-Year Floodplain	NHD Stream
Action Area (~2.5-Mile Maximum Radius)	NHD Waterbody	NHD Canal/Ditch
NWI Polygon		

Background Resources: ESRI Aerial Imagery Basemap NWI Data NHD FEMA Floodplain Data	Surveyor(s): Jayme Shiner PWS Debbie Scott AWB Bryan Whisenant	Project Number and Information: 1352 Lon C. Hill Power Station Project Biological Assessment	WHITENTON group environmental consultants 3413 Hunter Road San Marcos Texas 78666
GPS and Coordinate Type: Trimble Geo XH 6000 Series UTM NAD 1983 Zone 14 North	Map Created: 04/10/2014 by D. Scott		0 0.5 1 Miles

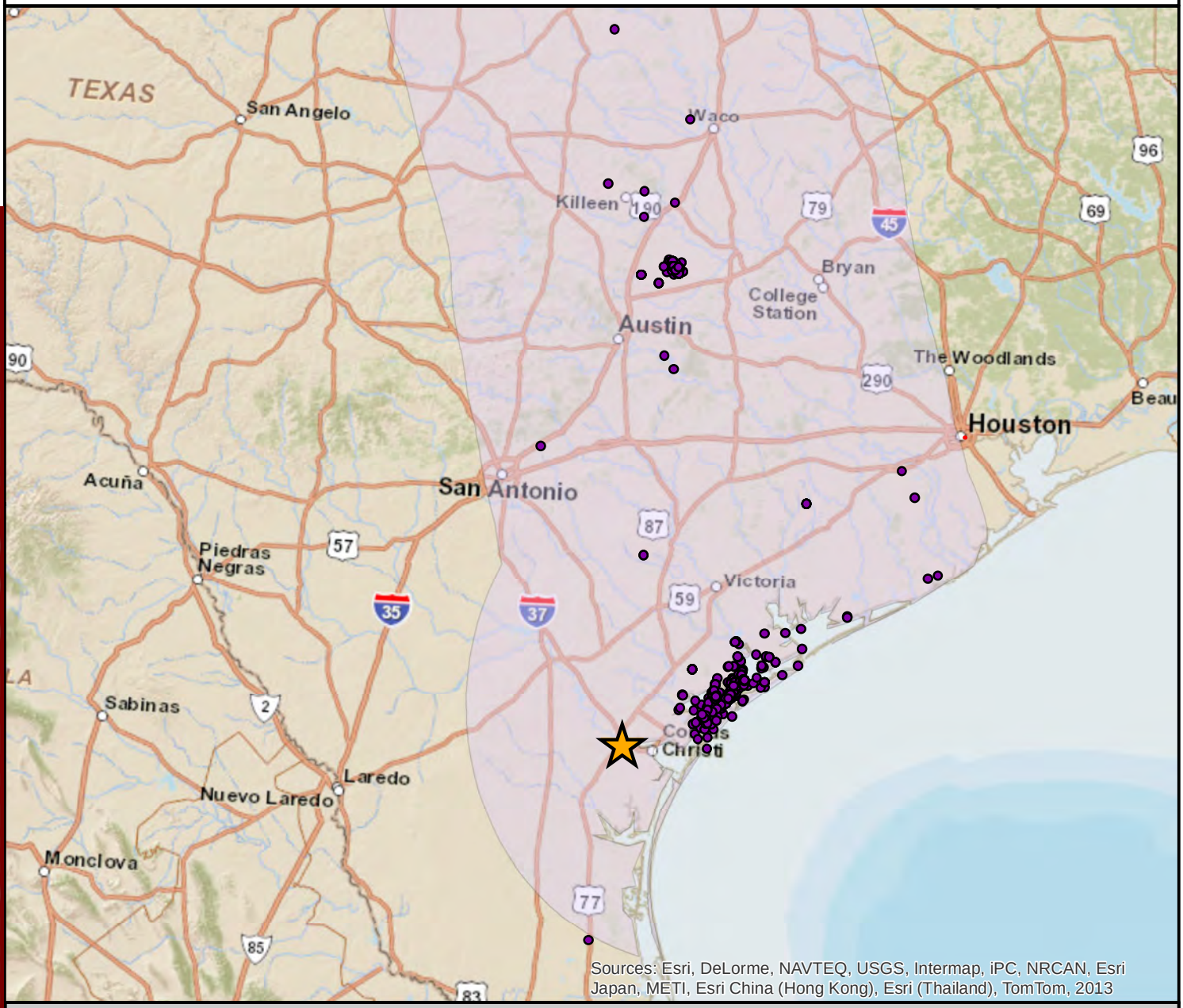
Figure 7
Observed Habitats
Lon C. Hill Power Station Project
Nueces County, Texas



- Action Area (~2.5-Mile Max Radius)
- Project Area (~45.5 Acres)
- Riverine
- Open Water
- Riparian
- Wetland
- Herbaceous
- Grassland
- Woodland
- Cropland
- Drainage Ditch

Background Resources: ESRI Aerial Imagery Basemap	Surveyor(s): Jayme Shiner PWS Debbie Scott AWB Bryan Whisenant	Project Number and Information: 1352 Lon C. Hill Power Station Project Biological Assessment	WHITENTON group environmental consultants 3413 Hunter Road San Marcos Texas 78666
GPS and Coordinate Type: Trimble Geo XH 6000 Series UTM NAD 1983 Zone 14 North	Map Created: 04/10/2014 by D. Scott		0 0.5 1 Miles

Figure 8
Whooping Crane Data
Lon C. Hill Power Station Project
Nueces County, Texas



Project Location

Whooping Crane Sightings

Whooping Crane Migration Corridor

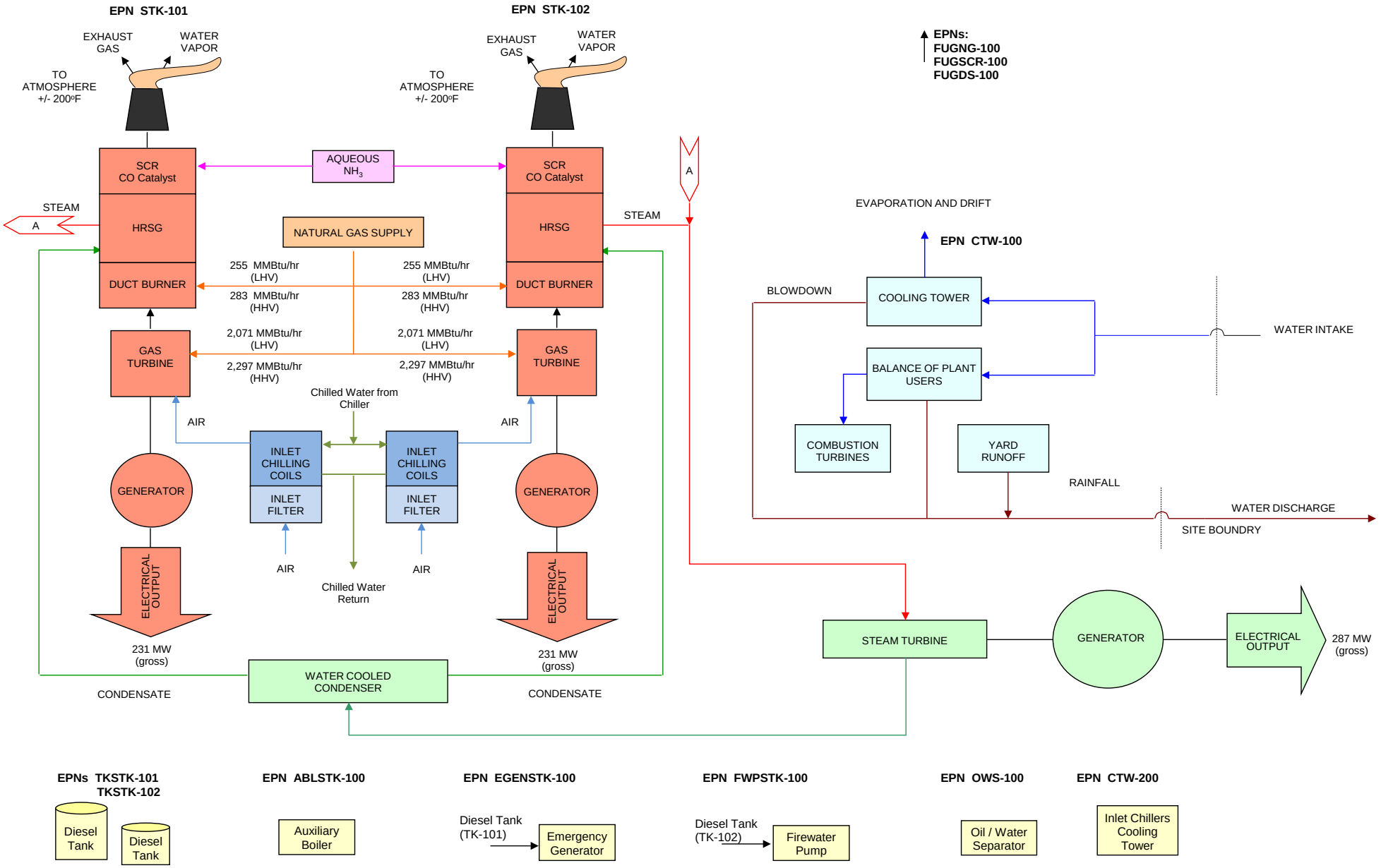
Background Resources: ESRI Street Basemap	Surveyor(s): Jayme Shiner PWS Debbie Scott AWB Bryan Whisenant	Project Number and Information: 1352 Lon C. Hill Power Station Project Biological Assessment	WHITENTON group environmental consultants 3413 Hunter Road San Marcos Texas 78666
GPS and Coordinate Type: Trimble GEO XH 6000 Series UTM NAD 83 Zone 14 North	Map Created: 04/10/2014 by D. Scott		0 50 100 Miles

APPENDIX B

FLOW DIAGRAM

LON C HILL REDEVELOPMENT PROJECT
LON C. HILL, LP

PROCESS FLOW DIAGRAM



EPNs TKSTK-101 TKSTK-102
Diesel Tank
Diesel Tank

EPN ABLSTK-100
Auxiliary Boiler

EPN EGENSTK-100
Diesel Tank (TK-101) → Emergency Generator

EPN FWPSTK-100
Diesel Tank (TK-102) → Firewater Pump

EPN OWS-100
Oil / Water Separator

EPN CTW-200
Inlet Chillers Cooling Tower

APPENDIX C

PRELIMINARY PLOT PLAN

Lon C Hill Power Station
Corpus Christi, Nueces County, Texas

Figure 2: Plot Plan

Datum: WGS 84

eSPARC Consolidated Asset Management Services
CAMS eSPARC
1110 Nasa Pkwy, Suite 212
Houston, TX

APPENDIX D

TABLE 1 - SOILS

Table 1 - NRCS Soils Data
Lon C. Hill Power Station Project

NRCS Map Unit Symbol	NRCS Map Unit Name	NRCS Hydric Soil	Potential T&E Species Habitat
Nueces County Soils			
Ba	Edroy clay	Yes	Yes*^
Bn	Edroy clay, 0 to 1 percent slopes	Yes	Yes*^
CcA	Raymondville complex, 0 to 1 percent slopes	No	Yes*^
CcB	Raymondville complex, 1 to 3 percent slopes	No	Yes*^
CcC	Raymondville complex, 3 to 5 percent slopes	No	Yes*^
Cd	Aransas clay	Yes	Yes*^
HaB	Hidalgo fine sandy loam	No	No
Lo	Aransas clay, saline	Yes	No
MgC	Miguel fine sandy loam, 3 to 5 percent slopes	No	Yes^
Of	Orelia fine sandy loam	No	Yes^
Pt	Point Isabel clay	No	Yes^
Sa	Comitas fine sand	No	Yes^
Tc	Aransas clay, occassionally flooded	Yes	No
VcA	Victoria clay, 0 to 1 percent slopes	Yes	Yes^
Vd2	Monteola clay, eroded	No	No
WaB	Willacy fine sandy loam, 1 to 4 percent slopes	No	Yes^
San Patricio County Soils			
As	Aransas clay, saline	Yes	No
Na	Narta fine sandy loam	Yes	No
Sn	Sinton loam	Yes	No
W	Water	-	-

* Slender rush-pea ^South Texas ambrosia

APPENDIX E

PHOTOGRAPHIC LOG

WHITENTON group environmental consultants

PHOTOGRAPHIC LOG 1

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Southwest view of the proposed Project Area south of Hearn Road.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Northeast view of the proposed Project Area south of Hearn Road.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Northwest view of the proposed Project Area south of Hearn Road.

WHITENTON group environmental consultants

PHOTOGRAPHIC LOG 2

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Southeast view of the proposed Project Area south of Hearn Road.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: North view of the proposed Project Area north of Hearn Road.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: West view of proposed Project Area north of Hearn Road.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: West view of proposed Project Area south of Hearn Road.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Northeast view of herbaceous habitat within the proposed Project Area north of Hearn Road.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Northwest view of proposed Project Area north of Hearn Road.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: West view of proposed Project Area north of Hearn Road.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Representative photograph (facing east) of cropland habitat within the Action Area.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Representative photograph (facing southwest) of woodland habitat within the Action Area.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Representative photograph (facing northeast) of grassland habitat within the Action Area.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Representative photograph (facing northeast) of wetland habitat within the Action Area.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Representative photograph (facing northwest) of grassland habitat and the riverine habitat within the Action Area.

WHITENTON group environmental consultants

PHOTOGRAPHIC LOG **6**

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Representative photograph (facing north) of drainage canals within the Action Area.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Representative photograph (facing north) of a palm plantation within the Action Area.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Representative photograph (facing east) of the Nueces River (tidal) within the Action Area.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Aerial view of the proposed Project Area.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Aerial view of cropland on the east side of the proposed Project Area.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Aerial view of grassland and cropland on the southwest side of the proposed Project Area.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Aerial view of residential development on the north side of the proposed Project Area.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

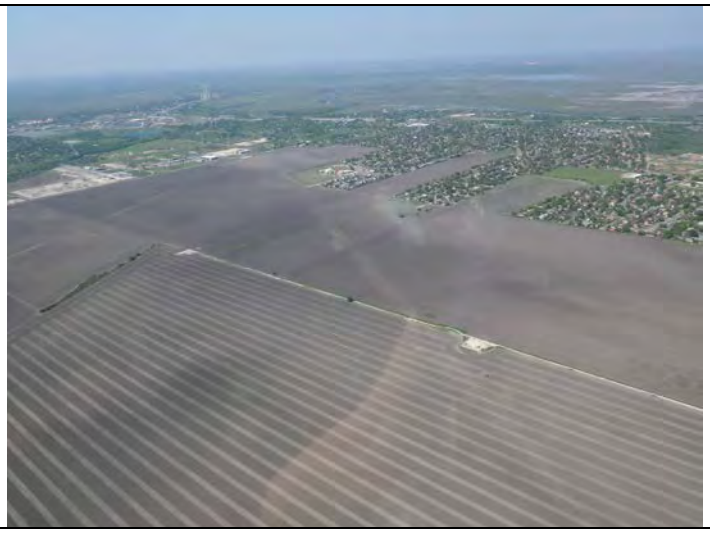
View: Aerial view of grassland habitat on the north side of the proposed Project Area.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Aerial view of residential development and cropland on the east side of the proposed Project Area.



Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Aerial view of grassland and cropland on the west side of the proposed Project Area.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Aerial view of the Nueces River (tidal) and associated wetlands on the northeast side of the proposed Project Area.

Lon C. Hill Power Station Expansion Project

3/28/2014

Nueces County, Texas

View: Aerial view of woodland habitat on the north side of the proposed Project Area.

APPENDIX F

FIELD SURVEY DATA SUMMARY

FIELD SUMMARY FOR THE LON C. HILL POWER STATION PROJECT, NUECES COUNTY, TEXAS

Survey Date: 28 March 2014

Surveyors: Jayme Shiner PWS, Debbie Scott AWB, Bryan Whisenant

Activities: Pedestrian survey (listed species habitat evaluation) at the Lon C. Hill Power Station in Nueces County, TX; Windshield and aerial surveys within a 3.5-mile radius around the Lon C. Hill Power Station.

1.0 INTRODUCTION

Whitenton Group, Inc. (WGI) surveyed the Action Area plus a 3.5-mile radius around the project site for the Lon C. Hill Power Station in Nueces County, Texas. The following notes for 28 March 2014 describe general habitat descriptions. The listed species habitat evaluation included a pedestrian survey of the proposed Project Area and windshield and aerial surveys for all vegetated portions of the Action Area. The Project Area is a previously disturbed industrial site. The soils are a mixture of clay and industrial composite of gravel, caliche, pavement, and concrete. A diversity of herbaceous vegetation has grown on top of the less disturbed areas. No vegetation was observed on previous foundations from old structures.

2.0 PEDESTRIAN SURVEY METHODS AND RESULTS

WGI personnel walked and photographed the entire proposed Project Area. The southeast side of the Project Area consisted of a mixture of disturbed soils (clay, fill material, roadbase). Herbaceous vegetation was observed in areas excluding existing infrastructure and foundations. The following species were noted: *Bothriochloa ischaemum var. songarica* (King Ranch bluestem), *Cynodon dactylon* (bermudagrass), *Trifolium campestre* (field clover), *Rubus trivialis* (dewberry), *Parthenium hysterophorus* (false ragweed), *Helianthus annuus* (sunflower), *Oenothera speciosa* (evening primrose), *Vicia americana* (purple vetch), and *Lepidium virginicum* (Virginia pepperweed).

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3.0 WINDSHIELD SURVEY METHODS AND RESULTS

From the Project Area, WGI drove north on Callicoate Road. The observed habitats included agriculture land (plowed), herbaceous right-of-way, and woodland habitat. Vegetation in the right-of way included: bermudagrass and field clover.

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The woodland vegetation included: *Prosopis glandulosa* (mesquite), *Celtis laevigata* (hackberry), *Acacia farnesiana* (huisache), and *Ehretia anacua* (anacua).

Turned east on Leopard Street. The area was predominantly developed. Fragmented riparian woodland habitat and one perennial stream were observed. Vegetation observed is the same as noted above. In addition, *Vitis mustangensis* (mustang grape) was observed.

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Turned north on East Harrington. Observed residential development and fragmented woodlands. Observed vegetation same as above.

Headed west on North Harrington and north on McKinzie Road. Observed development and fragmented woodlands.

Turned east on Upriver Road. Observed fragmented herbaceous and woodland habitat. Observed woodland vegetation is same as mentioned above. Herbaceous habitat included King Ranch bluestem and *Lolium multiflorum* (annual rye).

Turned north on Carbon Plant Road and turned west on McKinzie Lane. Observed fragmented woodland habitat with vegetation as mentioned above.

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Turned south on 57A and west on Upriver Road. Observed the Nueces River, fragmented woodland habitat, vegetated drainage ditches/canals, and housing developments. The shoreline of the Nueces River is partially undeveloped. Vegetation along the Nueces River shoreline included *Baccharis halimifolia* (eastern baccharis), bermudagrass, mesquite, and evening primrose. Woodland vegetation is the same as mentioned above. The vegetated drainage ditch had the following species: *Schoenoplectus americanus* (American bulrush) and evening primrose.

Turned north on Sharpsburg Road. Observed fragmented woodland habitat and an emergent wetland. Woodland vegetation same as above. Emergent wetland vegetation included American bulrush and *Typha latifolia* (cattail).

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Turned west on Ripple Street and south on NW Trail. Viewed the Nueces River and savannah habitat. The savannah vegetation included huisache, mesquite, and *Quercus virginiana* (live oak).

Turned south on Calallen Road, west on Teague Lane, and south on River Canyon Drive. Observed residential development.

Turned west on Northwest Blvd. and north on Interstate Highway 69. Toured the Hazel Bazemore Park. Observed vegetated drainage ditches/canal, woodlands, open water, and grassland.

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Turned west on CR 624 and south on CR 1889. Observed agriculture and housing.

East on CR 44. Observed a palm plantation, agricultural land, and housing.

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Turned south on IH 69 and then east on State Highway 44. Observed agriculture land and a stream. Headed to airport for aerial survey.

4.0 AERIAL SURVEY METHODS AND RESULTS

Proceeded from airport to the Project Area from the east side. Conducted 2 circular flights (inner circle and outer circle) around the Project Area and within the Action Area. Aerial survey started from the east, then south, west, and finally north. Viewed areas that were not accessible from public roadways. Observed wetland, savannah, pastureland, woodland, riverine, and agricultural habitats.

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APPENDIX G

TABLE 1(A) EMISSION POINT SUMMARY

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	February 28, 2014	Permit No.:	114911 - PSDTX1380	Regulated Entity No.:	RN100215979
Area Name:	Lon C Hill Power Station			Customer Reference No.:	CN602656688

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA			EMISSION POINT DISCHARGE PARAMETERS										
1. Emission Point			4. UTM Coordinates of Emission Point			Source							
						5. Building Height (Ft.)	6. Height Above Ground (Ft.)	7. Stack Exit Data			8. Fugitives		
EPN (A)	FIN (B)	Name (C)	Zone	East (Meters)	North (Meters)			Diameter (Ft.) (A)	Velocity (FPS) (B)	Temperature (°F) (C)	Length (Ft.) (A)	Width (Ft.) (B)	Axis Degrees (C)
STK-101	CC-101	Unit 101 Combined Cycle (GT+HRSG)	14	636481	3080988		152.0	22.0	44.6	195			
STK-102	CC-102	Unit 102 Combined Cycle (GT+HRSG)	14	636441	3081016		152.0	22.0	44.6	195			
LOVSTK-101	CC-101	Unit 101 GT Lube Oil Vent	14	636443	3080919		6.8	0.5	12.7	amb.			
LOVSTK-102	CC-102	Unit 102 GT Lube Oil Vent	14	636403	3080947		6.8	0.5	12.7	amb.			
LOVSTK-103	ST-103	ST Lube Oil Vent	14	636362	3080977		6.8	0.5	12.7	amb.			
ABLSTK-100	ABL-100	Auxiliary Boiler	14	636499	3081008		14.0	2.5	78.3	400			
EGENSTK-100	EGEN-100	Emergency Generator	14	636472	3081077		10.0	0.5	60.0	200			
FWPSTK-100	FWP-100	Firewater Pump	14	636499	3081113		10.0	0.5	60.0	200			
CTW-100	CTW-100	Cooling Tower 1	14	636271	3081221	41.0	59.0	28.0	34.6	107.5			
CTW-200	CTW-200	Cooling Tower 2	14	636302	3081306	45.0	50.0	12.0	44.3	106.7			
OWS-100	OWS-100	Oil Water Separator	14	636542	3081152		5.0	TBD	TBD	amb.			
TKSTK-101	TK-101	Diesel Tank (Emergency Generator)	14	636457	3081084		6.0	TBD	TBD	amb.			
TKSTK-102	TK-102	Diesel Tank (Firewater Pump)	14	636497	3081112		5.0	TBD	TBD	amb.			
TKSTK-103	TK-103	Gasoline Tank	14	636250	3080871		5.0	TBD	TBD	amb.			
FUGNG-100	FUGNG-100	Fugitive Natural Gas Service	14	636436	3080966					amb.	TBD	TBD	TBD
FUGSCR-100	FUGSCR-100	Fugitive Ammonia Service	14	636475	3081023					amb.	TBD	TBD	TBD
FUGDS-100	FUGDS-100	Fugitive Diesel Service	14	636474	3081095					amb.	TBD	TBD	TBD
PURG-100	PURG-100	MSS Fuel Purging Emissions	14	636436	3080966					amb.	TBD	TBD	TBD
OFFWASH-100	CC-101 and CC-102	MSS Offline Turbine Washing	14	636436	3080966					amb.	TBD	TBD	TBD
WELD	WELD	MSS Soldering, Welding, Brazing	14	636349	3081089					amb.	TBD	TBD	TBD

EPN = Emission Point Number
FIN = Facility Identification Number