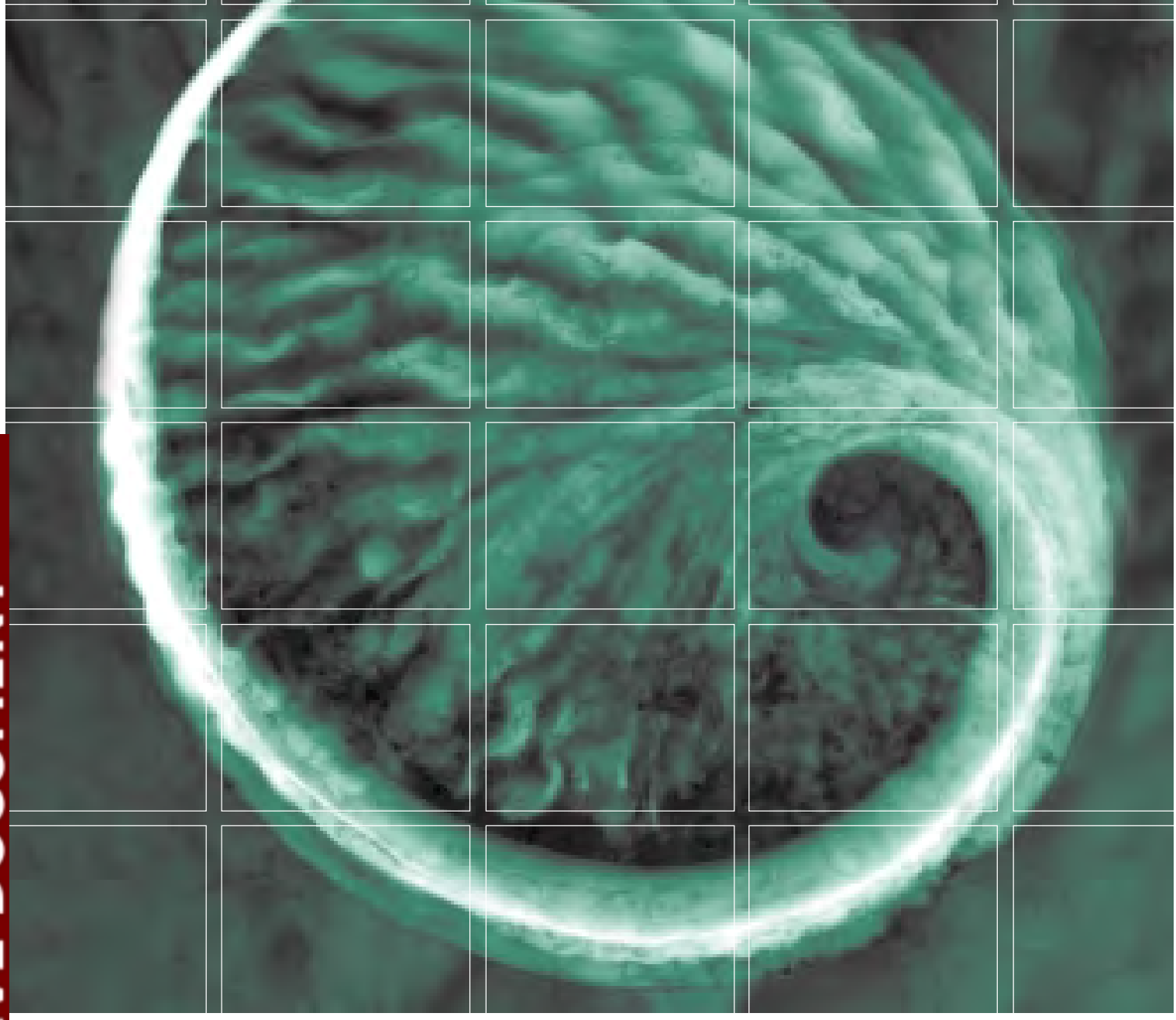

Biological Assessment:

Tenaska Brownsville Generating Station Project

Tenaska Brownsville Partners, LLC.
Cameron County, Texas

May 20, 2014

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Tenaska Brownsville Partners, LLC

Biological Assessment:
Tenaska Brownsville Generating Station Project

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Project No. 0185680
Cameron County, Texas

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ACRONYMS

BACT	Best Available Control Technology
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
BPUB	Brownsville Public Utility Board
CCCT	Combined Cycle Combustion Turbines
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalents
dB	Decibels
dBA	Adjusted Decibels
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ERM	Environmental Resources Management
ESA	Endangered Species Act
ESL	Effects Screening Levels
GHG	Greenhouse Gas
GIS	Geographic Information Systems
GMFMC	Gulf of Mexico Fisheries Management Council
HAP	Hazardous Air Pollutants
HUD	US Department of Housing and Urban Development
MBTA	Migratory Bird Treaty Act
MGD	Million Gallons per Day
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NAAQS	National Ambient Air Quality Standards
NASS	National Agriculture Statistics Service
NMFS	National Marine Fisheries Service
NO_2	Nitrogen Dioxide
NO_X	Nitrogen Oxides
NRCS	National Resource Conservation Service
OHWM	Ordinary High Water Mark
OSHA	Occupational Safety and Health Administration
Pb	Lead
PM	Particulate Matter
PSD	Prevention of Significant Deterioration
RO	Reverse Osmosis
ROI	Radius of Impact
RPW	Relatively Permanent Waterbody
SCR	Selective Catalytic Reduction
SIL	Significant Impact Level
SO_2	Sulfur Dioxide
SWWTP	South Wastewater Treatment Plant
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department

TXNDD	Texas Natural Diversity Database
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Service
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile Organic Compounds

In accordance with the Prevention of Significant Deterioration (PSD) provisions of the Clean Air Act and the implementing regulations at 40 CFR 52.21, Tenaska Brownsville Partners, LLC (Tenaska) submitted on February 15, 2013 a Greenhouse Gas (GHG) PSD Permit Application for a proposed electric generating station, (the Project) in Cameron County, Texas known as the Tenaska Brownsville Generating Station (Generating Station). Tenaska plans to initiate construction of the Project in early 2015, and begin operation by mid-2017.

The purpose of this Biological Assessment (BA) is to provide the results of an assessment of the potential impacts of the Project on species protected by the Endangered Species Act (ESA) as outlined in the requirements under Section 7 of the ESA as it relates to PSD permits issued by the United States Environmental Protection Agency (EPA). The information provided in this BA is presented for utilization in informal consultation with the appropriate supporting federal agencies. Accordingly, this analysis provides recommendations for the U.S. Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS) determinations of effect for each federally listed species, as outlined in the table below.

TABLE ES-1: Summary of Anticipated Effects on Federally Listed Species Potentially Occurring in the Project Site and Action Area

Federally Listed Species	*Listing Agency*	*Recommended Determination of Effect for the Generating Station*	*Recommended Determination of Effect for the Water Discharge Pipeline*	*Recommended Determination of Effect for the Transmission Interconnect Line*	*Recommended Determination of Effect for the BPUB Water Reuse Pipeline Project*[2]	*Recommended Determination of Effect for the BPUB Natural Gas Transmission Pipeline*[2]
Eskimo curlew (*Numenius borealis*)	*USFWS*	No effect	No effect	No effect	No effect	No effect
Interior least tern (*Sterna antillarum athalassos*)	*USFWS*	No effect	No effect	No effect	No effect	No effect
Northern aplomado falcon (*Falco femoralis septentrionalis*)	*USFWS*	May affect, but is not likely to adversely affect	May affect, but is not likely to adversely affect	May affect, but is not likely to adversely affect	No effect	No effect
Piping plover (*Charadrius melodus)*	*USFWS*	No effect	No effect	No effect	No effect	No effect

Federally Listed Species	*Listing Agency*	*Recommended Determination of Effect for the Generating Station*	*Recommended Determination of Effect for the Water Discharge Pipeline*	*Recommended Determination of Effect for the Transmission Interconnect Line*	*Recommended Determination of Effect for the BPUB Water Reuse Pipeline Project*[2]	*Recommended Determination of Effect for the BPUB Natural Gas Transmission Pipeline*[2]
Rio Grande silvery minnow (*Hybognathus amarus)*	*USFWS*	No effect	No effect	No effect	No effect	No effect
Smalltooth sawfish (*Pristis pectinata*)	NOAA	No effect	No effect	No effect	No effect	No effect
Jaguar (*Panthera onco*)	USFWS	No effect	No effect	No effect	No effect	No effect
Jaguarundi (*Herpailurus yagouaroundi* (var. *Herpailurus yagouaroundi cacomitli*)	USFWS	May affect, but is not likely to adversely affect	May affect, but is not likely to adversely affect	No effect	No effect	May affect, but is not likely to adversely affect
Ocelot (*Leopardus pardalis*)	USFWS	May affect, but is not likely to adversely affect	May affect, but is not likely to adversely affect	No effect	No effect	May affect, but is not likely to adversely affect
West Indian manatee (*Trichechus manatus*)	USFWS	No effect	No effect	No effect	No effect	No effect
Atlantic hawksbill sea turtle (*Eretmochelys imbricate*)	USFWS/NOAA	No effect	No effect	No effect	No effect	No effect
Green sea turtle (*Chelonia mydas*)	USFWS/NOAA	No effect	No effect	No effect	No effect	No effect
Kemp's Ridley sea turtle (*Lepidochelys kempii*)	USFWS/NOAA	No effect	No effect	No effect	No effect	No effect
Leatherback sea turtle (*Dermochelys coriacea*)	USFWS/NOAA	No effect	No effect	No effect	No effect	No effect

Federally Listed Species	*Listing Agency*	*Recommended Determination of Effect for the Generating Station*	*Recommended Determination of Effect for the Water Discharge Pipeline*	*Recommended Determination of Effect for the Transmission Interconnect Line*	*Recommended Determination of Effect for the BPUB Water Reuse Pipeline Project*[2]	*Recommended Determination of Effect for the BPUB Natural Gas Transmission Pipeline*[2]
Loggerhead sea turtle (*Caretta caretta*)	USFWS/NOAA	No effect	No effect	No effect	No effect	No effect
South Texas ambrosia (*Ambrosia cheiranthifolia*)	USFWS	No effect	No effect	No effect	No effect	No effect
Star cactus (*Astrophytum asterias*)	USFWS	No effect	No effect	No effect	No effect	No effect
Texas ayenia (*Ayenia limitaris*)	USFWS	No effect	No effect	No effect	No effect	No effect
Walker's manioc (*Manihot walkerae*)	USFWS	N/A[1]	N/A	N/A	N/A	No effect

1. *N/A – Species not listed in Cameron County, Texas. Only the natural gas transmission pipeline crosses into Hidalgo County where this species is listed.*
2. *Notwithstanding the independent utility of these BPUB regional projects, supplemental assessments of the natural gas line and water reuse pipeline are included for the purpose of advancing EPA's consideration of Tenaska's GHG PSD permit pending receipt of a formal determination that the scope of the project does not include these regional projects.*

Tenaska is proposing the following commitments for mitigating potential impacts to the identified threatened and endangered species and migratory birds associated with Project activities.

1. Educate construction personnel regarding the potential for occurrence of endangered species;
2. Require Contractor's environmental representatives to report any encounters with endangered species to the owner/owner's representatives, who will then contact the local offices of USFWS;
3. Protect areas near the waterbodies that may function as a potential travel corridor from unnecessary disturbance (i.e., fencing and/or barricades);
4. Conduct majority of construction activities during daylight hours;
5. Reduction of noise emissions during night-time hours by minimizing night-time construction activities;
6. No direct lighting will be used to illuminate areas near the ditches or large waterways at night;
7. Reduced speed limit posted on the facility construction site;

8. Install bird diverters on the conductors on the transmission line to minimize potential collisions and to discourage nesting or roosting on the structures or towers;
9. Avoid vegetation or removal activities (shrubs/trees) during the peak nesting period of March through August, except as noted in item 10 below, to avoid destruction of individuals, nests or eggs; and,
10. If project activities must be conducted during the peak nesting period, survey for nests prior to commencing work and if a nest is found, maintain a minimum 50 foot buffer of vegetation around the nest until the young have fledged or the nest is abandoned.

1.0 INTRODUCTION

Tenaska Brownsville Partners, LLC (Tenaska) intends to build and operate an electric generating station, (the Project) in Cameron County, Texas, known as the Tenaska Brownsville Generating Station (Generating Station) (Figure 1-1). Tenaska submitted a comprehensive Biological Assessment (BA) on August 2, 2013. The BA fully addressed the direct and indirect impacts associated with the Generating Station at the Project site and over a broad Action Area. The Action Area evaluated encompassed the locations of linear interconnect elements that are part of, or interrelated with, the Generating Station. These Project elements include the transmission interconnect line, the water discharge pipeline, and the short interconnects to the Project site for potable water and sanitary waste. As the precise locations of these Project elements have been defined, assessment of direct impacts of their locations is provided in Attachments 1 and 2 as a supplement.

In addition, the Brownsville Public Utility Board (BPUB) will own and operate a regional natural gas line and a water reuse pipeline for its broader economic development purposes. These BPUB regional projects are intended to serve multiple customers, not merely the Generating Station. Tenaska and BPUB believe those regional projects are independent, and not interrelated, actions and not properly considered part of the Project for purposes of this assessment, as set forth in letters from BPUB to EPA dated April 18 and 26, 2013. Accordingly, Tenaska submitted a BA that did not address the natural gas line and reclaimed water line to be developed by BPUB, though like the project elements described above, they will largely be located within the Action Area.

Notwithstanding the independent utility of these BPUB regional projects, Attachments 3 and 4 provide supplemental assessments of the natural gas line and water reuse pipeline for the purpose of advancing EPA's consideration of Tenaska's GHG PSD permit pending receipt of a formal determination that the scope of the project does not include these regional projects. Tenaska and BPUB maintain that these regional projects are beyond the scope of the Generating Station project.

1.1 PROPOSED ACTION

Tenaska is proposing to permit two project designs: a 1-on-1 or a 2-on-1 combined cycle combustion turbine (CCCT) configuration. The Generating Station will be designed to have an estimated nominal power generation summer condition output capacity of approximately 400 megawatts (MW) for the 1-on-1 configuration and 800 MW for the 2-on-1 configuration. Tenaska intends to install Mitsubishi (MHI) 501GAC combustion turbine generator(s) which will be equipped with a heat recovery steam generator (HRSG) with supplemental 250 million British thermal units per hour (MMBtu/hr, higher heating value [HHV]) natural gas-fired "duct" burners. Steam from the HRSG(s) will serve a single steam turbine generator. Exhaust gases from each combustion

turbine and associated duct burner will pass through the associated HRSG and exit a common exhaust stack. Therefore, these are represented as a single emission point for each CCCT. The CCCTs will be fueled by pipeline-quality natural gas only. Selective catalytic reduction (SCR) will be employed as the Best Available Control Technology (BACT) for emissions of nitrogen oxides (NO_X) from the CCCTs. Oxidation Catalyst will be employed as the BACT for emissions of carbon monoxide (CO) and volatile organic compounds (VOC) from the CCCTs. Construction of the proposed plant is projected to commence in early 2015 and the plant is proposed to begin commercial operations in mid-2017.

The Project will include the following emission sources:

- One (1) or two (2) Natural Gas-fired Combustion Turbines with duct burners, including planned maintenance, start-up, and shutdown (MSS) activities;
- One (1) Cooling Tower;
- One (1) Diesel Fire Pump Engine;
- One (1) Diesel Emergency Generator;
- One (1) Auxiliary Boiler; and
- Two (2) Diesel Storage Tanks.

Components of the Project considered essential to the operation of the Generating Station and included as part of the biological assessment evaluation are the following (Figure 1-2):

- Generating and Auxiliary Equipment;
- Storm Water Retention Pond(s);
- Storm Water Outfall Structure(s);
- Transmission Interconnect Line;
- Natural Gas Transmission Pipeline;
- Water Discharge Pipeline and Outfall;
- Water Reuse Pipeline;
- Potable Water and Sanitary Sewer Interconnect Line(s);
- Access Roads; and
- Construction Laydown Areas.

This BA provides a review and evaluation of the Generating Station and interrelated linear elements that fall within the Action Area defined by the Project in Section 1.2 of this document; those elements include the water discharge pipeline and the transmission interconnect line. As previously mentioned, there are independent and non-interrelated regional BPUB projects that will provide services to the Project and that are located within the Action

Area, including the BPUB water reuse pipeline and the BPUB natural gas transmission pipeline. These regional BPUB projects were preliminarily evaluated in this BA via desktop and windshield surveys. BAs were completed for each of the Project elements as well as the independent BPUB regional projects and are included in Attachments 1 through 4 of this document:

- Water Discharge Pipeline (Attachment 1);
- Transmission Interconnect Line (Attachment 2);
- BPUB Water Reuse Pipeline (Attachment 3); and
- BPUB Natural Gas Transmission Pipeline - "Cross Valley Pipeline Project" (Attachment 4).

1.2 DEFINITION OF STUDY AREAS

Throughout this document, two different study areas are referenced: the Project site and the Action Area (Figure 1-3). The Project site includes 275 acres of land located immediately north of the city of Brownsville near the intersection of FM 511 and Old Alice Road.

An Action Area is defined in 50 CFR 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 Action Area was determined by identifying the maximum area in which the proposed project may result in significant direct and indirect impacts in and around the Project site. Both construction and operation phases of the proposed project were considered. Indirect impacts to surrounding areas may include noise, lighting, dust, erosion, stream sedimentation, air emissions, and physical disturbances. Because air emissions have the potential for widest impact away from the project site, the Action Area was based on determining a de minimis effects boundary. The Action Area for this project was determined by using the Significant Impact Levels (SILs) analysis from the air quality modeling conducted in support of the PSD air permit application for criteria pollutants and submitted to the Texas Commission on Environmental Quality (TCEQ). The SILs analysis was used to determine the distance to the farthest receptor at which any SIL could be exceeded and was determined to be approximately 11.7 km and the Action Area was defined to be approximately 88 sq. miles (228 sq. km) around the Project site. For the purposes of this study this Action Area will serve as the potential area of impact for completing the effects determination for threatened and endangered species.

1.3 AGENCY REGULATIONS

Development of the Project will require Tenaska to obtain a GHG PSD Permit and the following sections provide more details on applicable agency regulations.

1.3.1 *National Ambient Air Quality Standards*

Air pollutants can be categorized as primary or secondary. Primary pollutants include nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter (PM), volatile organic compounds (VOCs), lead (Pb) greenhouse gases and hazardous air pollutants. These pollutants are directly emitted by specific emission sources. Secondary pollutants are formed when primary pollutants react with atmospheric compounds (e.g. water, nitrogen, oxygen) under various atmospheric conditions (e.g., temperature, humidity, and light intensity). An example of a secondary pollutant is ground-level ozone, which is formed when the primary, or precursor, pollutants of NO_x and VOCs chemically react in the presence of sunlight. The EPA has established National Ambient Air Quality Standards (NAAQS) for six different pollutants: SO_2, nitrogen dioxide (NO_2), CO, PM (that with aerodynamic diameters of less than or equal to 10 micrometers and 2.5 micrometers, or PM_{10} and $PM_{2.5}$, respectively), Pb, and ozone.

Cameron County is designated "attainment" for all pollutants because ambient concentrations of these pollutants are less than their respective NAAQS. Because of this, the Project is required to submit a PSD permit application to the TCEQ.

New facilities with GHG emissions over 100,000 tons per year of carbon dioxide equivalent are required to obtain PSD permits based on EPA regulations promulgated under the federal Clean Air Act. Because Texas does not have a GHG permitting program at this time, EPA issues GHG PSD permits for Texas facilities and Tenaska has applied to EPA for such a permit.

1.3.2 *Threatened, Endangered, and Other Protected Species*

The Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 50 CFR 17) provides for the conservation of ecosystems upon which endangered species of fish, wildlife, and plants depend. The Act;

- Authorizes the determination and listing of species as endangered and threatened;
- Prohibits unauthorized taking, possession, sale, and transport of endangered species; and
- Authorizes the assessment of civil and criminal penalties for violating the Act or regulations.

Further, Section 7 of the Endangered Species Act requires federal agencies to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species.

When the action of a federal agency may affect a protected species, that agency is required to consult with either the National Marine Fisheries Service (NMFS) or the US Fish and Wildlife Service (USFWS), depending upon the protected species that may be affected. The USFWS maintains an online database that may be utilized in a preliminary desktop assessment to determine which, if any, threatened or endangered species may have the potential to occur near the Project site. If it is determined the Project could potentially impact these species, species-specific surveys may be performed on-site.

Information regarding the potential for impact to threatened and endangered species is being provided as a supplement to the GHG permit application. The EPA will utilize the information in the permit applications to make an official determination of the potential for the Project to impact protected species at the site. If adverse impacts are likely, the EPA may include mitigation or avoidance measures as permit conditions.

1.3.3 Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. The MBTA makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to federal regulations. The USFWS is responsible for administering and enforcing the MBTA, and issues permits to qualified applicants for the following types of activities: falconry, raptor propagation, scientific collecting, special purposes (rehabilitation, educational, migratory game bird propagation, and salvage), take of depredating birds, taxidermy, and waterfowl sale and disposal. A list of the 1,007 species of birds protected by the MBTA is available at 50 CFR 10.13.

The two species of eagles that are native to the United States have additional protection under the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668(a); 50 CFR 22). Under the BGEPA, the USFWS issues permits to take, possess, and transport bald and golden eagles (*Haliaeetus leucocephalus* and *Aquila chrysaetos*) for scientific, educational, and Indian religious purposes, depredation, and falconry (golden eagles). Federal regulations set forth in 50 CFR § 22.26 provide for issuance of permits to take bald eagles and golden eagles where the taking is associated with but not the purpose of the activity and cannot practicably be avoided (incidental take). However, currently no permits are available for golden eagles east of the 100th meridian, which includes the Corpus Christi area. No permit authorizes the sale, purchase, barter, trade, importation, or exportation of eagles, or their parts or feathers. The regulations governing eagle permits can be found in 50 CFR part 13 and 50 CFR part 22.

1.3.4 Magnuson – Stevens Act and Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801-1884) was originally established in 1976, and was recently amended in 2007. The MSA is the primary law governing marine fisheries management in United States federal waters. The purposes of the MSA include:

- Conservation of fishery resources;
- To support the enforcement of international fishery agreements;
- To promote domestic commercial and recreational fishing under sound conservation and management principles;
- To provide for the preparation and implementation of fishery management plans, which will achieve and maintain optimum yield from each fishery;
- To establish Regional Fishery Management Councils to prepare, monitor, and revise fishery management plans under circumstances that enable participation by the States, fishing industry, consumer and environmental organizations, and other interested parties, and which take into account the social and economic needs of the States;
- To encourage development of underutilized fisheries; and
- To promote the protection of essential fish habitat (EFH).

The MSA defines EFH as those waters and substrate necessary to fish for spawning, feeding, breeding, or growth to maturity. When the action of a federal agency may affect essential fish habitat, that agency is required to consult with the NMFS. The NMFS maintains an online database that may be utilized in a preliminary desktop assessment to determine which, if any, EFH may have the potential to occur near the Project site. If it is determined that the Project could potentially impact EFH, species-specific habitat surveys may be performed onsite.

Information regarding the potential for impact to EFH is being provided as a supplement to the GHG permit application. The NMFS and EPA will utilize the information in the permit applications to provide an official determination of the potential for the Project to impact protected species at the Project site. If a potential impact is deemed possible, the NMFS will typically recommend mitigation or avoidance measures as permit conditions.

1.3.5 Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) (16 U.S.C. 1361-1423) was originally written in 1972, and amended in 1994. The MMPA confers federal protection on all marine mammals in U.S. federal waters and placed a moratorium on the "take" and import, with certain exceptions, of marine mammals and marine mammal products. The term "take" is defined as "to hunt, harass, capture, or kill." The purposes of the MMPA include:

- The conservation and protection of marine mammals;
- Establishment of the Marine Mammal Commission;
- Authorization and establishment of the International Dolphin Conservation Program;
- Establishment of the Marine Mammal Health and Stranding Response Network; and
- Protection of polar bears.

The term "harassment" as it refers to this law means any act of pursuit, torment, or annoyance which has the potential to injure or disturb a marine mammal or marine mammal stock. The MMPA is enforced by the National Oceanic and Atmospheric Administration Office of Law Enforcement.

2.0 PROJECT DESCRIPTION

Tenaska is planning to build and operate a natural gas-fueled, combined cycle combustion electric generation station with a nominal capacity of approximately 800 megawatts. Additionally, Tenaska proposes an alternative version with a nominal capacity of 400 megawatts. The Project includes two combustion turbines with supplementary fired heat recovery steam generators, one steam turbine generator, one cooling tower, auxiliary equipment, storm water retention structure(s), storm water outfall(s), one transmission interconnect line, one water discharge pipeline and outfall, access roads, and construction laydown area.

The Generating Station will consist of approximately 100 acres of new construction within the 275-acre Project site, plus additional acreage associated with access roads and construction laydown areas. Development of access roads and construction laydown areas will be a part of the Project and may include both temporary and permanent locations within the Project boundary.

Wastewater will be discharged through an approximate 11-mile long, up to 20-inch diameter water discharge pipeline extending from the Project site to a proposed outfall, located on the Brownsville Ship Channel. Non-contact storm water runoff from the Project site will drain into a drainage ditch via storm water outfall(s) located along the southern boundary of the property, which is owned and operated by Cameron County Drainage District. The BA detailing the Project specifics and evaluating the effects of the proposed action are presented in Attachment 1 of this document.

Potable water and sanitary sewer water will be provided by BPUB via separate interconnect lines from the Southmost Regional Water Authority Treatment Plant located immediately south of the Project site.

Electricity from the Generating Station will be conveyed into the Electric Reliability Council of Texas (ERCOT) grid via transmission interconnect line extending to the Loma Alta Substation located, approximately 11-miles east of the Project site. The transmission interconnect line will be constructed, owned and operated by BPUB and export power will be distributed from Loma Alta into the Cross Valley system. The BA detailing the project specifics and evaluating the effects of the proposed action are presented in Attachment 2 of this document.

The Project will be served by certain BPUB regional infrastructure developments. Water supply for the Generating Station will be provided by an approximately 7-mile long, up to 30-inch diameter pipeline (Water Reuse Pipeline) that will transport treated wastewater effluent from BPUB Robindale Wastewater Treatment Plant to the Project site. The Water Reuse Pipeline will be designed to meet BPUB's future development and has independent utility beyond the service provided to the Project. The Project estimates an average make-up water demand of 5-6 million gallons per day (MGD) with a peak

demand of 8 MGD. The BA detailing the specifics of this BPUB regional project and evaluating its effects is presented in Attachment 3 of this document.

The natural gas transmission pipeline will be constructed, owned, and operated by BPUB. A proposed 24-inch diameter natural gas pipeline, known as the Cross Valley Pipeline Project, will originate from near Edinburg, Texas and extend southeasterly for approximately 50-miles through the Project site then to the Port of Brownsville. The natural gas pipeline will be designed to meet BPUB's future development and has independent utility beyond the service provided to the Project. An interconnect line will be constructed from the Project site to the BPUB line to provide natural gas to the Generating Station. The BA detailing the specifics of this BPUB regional project and evaluating its effects is presented in Attachment 4 of this document.

2.1 PROJECT SCHEDULE

Tenaska plans to initiate construction of the Project in early 2015, and commercial operation of the Generating Station is currently targeted for mid-2017.

2.2 PROJECT LOCATION

The Project is located within the City of Brownsville, Cameron County, Texas. The Generating Station will be constructed on a 275 acre tract of undeveloped land which is located near the intersection of FM 511 and Old Alice Road (Figure 1-1). The latitude and longitudinal coordinates for the site are:

USGS Topographic Map Quad(s): Los Fresnos, Olmito

Latitude/Longitude: 26° 1'37.36"N
97°30'8.17"W

2.3 REGIONAL CHARACTERISTICS

The Project site is situated in the Lower Rio Grande Alluvial Floodplain within the Western Gulf Coastal Plain. The Western Gulf Coastal Plain is distinguished by its relatively flat topography and mainly grassland natural vegetation. Inland from this region the plains are older, more irregular, and have mostly forest or savanna-type vegetation potentials (Griffith et al. 2004).

The Lower Rio Grande Alluvial Floodplain ecoregion includes the Holocene-age alluvial sands and clays of the Rio Grande floodplain that are now almost completely in cropland or urban land cover. The soils are deep, loamy and clayey. The Rio Grande's water is mostly diverted from its channel for irrigation and urban use, and little or no flow reaches the Gulf of Mexico. Both the Central and Mississippi flyways funnel through the southern tip of Texas and many species of birds reach their extreme northernmost range in this region. Nearly

500 bird species, including neotropical migratory birds, shorebirds, raptors and waterfowl, can be found there (Griffith et al. 2004).

2.4 SITE DESCRIPTION

The Project site is centrally located within Cameron County in south Texas, approximately 140 miles south of Corpus Christi. The county covers 905 square miles include nine towns and eight incorporated cities (Garza, 2013). According to the Natural Resources Conservation Service (NRCS) soils survey, the county is dominated by clay and clay loam soils, specifically Laredo silty clay loam, Raymondville clay loam, Harlingen clay, Sejita silty clay loam, Lomalta clay, Barradda clay and Olmito silty clay (Figures 2-1: 1 through 2-1: 11). Hydrological features stem primarily from various tributaries of the Rio Grande River and by a series of canals/drainage ditches that provide flood relief and supply water for agriculture use. Land cover surrounding the Project site is comprised predominantly by agricultural croplands, shrubland, and developed lands. At the time of the January, 2013 site visit, the Project site consisted of undeveloped land that is dominated by mesquite on the western half of the property and herbaceous shrubland and grasses on the eastern half (Figure 2-2).

2.5 SITE HISTORY

Based on review of historic aerial and topographic maps (available under separate cover as Appendix A in the Supplemental Information); the Project site has been associated with agricultural land use dating back to the 1950s. Earliest known point in time at which the Project site was no longer being used for agriculture is 1995. Over the last ten years the property has been cleared and leveled for potential residential development by other parties; however, within the last five years the land has become overgrown with shrubland and herbaceous vegetation. Information about this period of time indicates that the landowner removed soil from the far eastern portion of the Project site in an effort to elevate and displace out of the 100-yr floodplain. The area from which soil was taken is now characterized as a wetland area and transitional area and is depicted in Figure 2-3.

Evidence from topographic maps dating back to 1930 indicate that the Olmito Branch Drainage Ditch No. 3 (drainage ditch No. 3) adjacent to and south of the Project site has been used to support agricultural land use for the region. Current observations of the drainage ditch no. 3 indicate that recent modifications to increase size and flow have occurred within the last couple of years. The bank slopes have been scraped and graded, portions of the channel have been cleaned out and reshaped, and vegetation was very limited along the banks. The drainage ditch no. 3 originates approximately 2-miles west of the Project site near the town of Olmito and extends northeast where it drains into Main Ditch No. 2 and flows east and drains into San Martin Lake.

2.6 EMISSIONS CONTROLS

Cameron County is currently in attainment status; therefore, this Project will need to meet the requirements of the PSD regulations.

Per 30 TAC §116.111(a)(2)(c), new or modified major facilities must utilize Best Available Control Technology (BACT), with consideration given to the technical and economic feasibility of available technologies.

The Project will utilize BACT to control emissions and minimize impacts to the surrounding environment. The majority of the emissions will result from the combined cycle combustion turbines (CCCTs) and duct burners. Low NO_x burners and selective catalytic reduction (SCR) will be employed as BACT for controlling emissions of nitrogen oxides (NO_X). Oxidation Catalyst will be employed as BACT for emissions of carbon monoxide (CO) and volatile organic compounds (VOCs). Other emission sources include:

- One (1) Cooling Tower;
- One (1) Diesel Emergency Fire Pump Engine;
- One (1) Diesel Emergency Generator;
- One (1) Auxiliary Boiler;
- Two (2) Diesel Storage Tanks;
- Fugitive emissions from fuel and ammonia piping components; and
- Miscellaneous Maintenance/Startup/Shutdown activities.

Predicted emissions rates from the Project are shown in Table 2-1 below:

TABLE 2-1: Maximum Emissions for all Pollutants Associated with the Project

Pollutant	*Maximum Emission Rate [1] (lb/hour)*		*Annual Emission Rate (ton/year)*	
	1 on 1 Scenario [2]	*2 on 1 Scenario[2]*	*1 on 1 Scenario[2]*	*2 on 1 Scenario*
PM	17.21	28.21	58.44	92.34
PM_{10}	13.03	24.03	40.10	74.00
$PM_{2.5}$	11.97	22.97	35.46	69.37
NO_x	239.70	439.70	164.50	324.94
SO_2	4.50	8.90	9.40	18.68
CO	3,030.53	6,050.53	1,145.87	2,275.23
CO_2	385,850	756,285	1,598,744	3,169,143
CO_2e	389,382	763,289	1,647,254	3,265,993
VOC	1,131.43	2,261.43	431.89	862.64
NH_3	42.31	84.61	179.25	358.47
Ammonium Sulfate	4.00	8.00	7.87	15.74
H_2SO_4 Mist	3.60	7.20	7.17	14.34
Total HAP	2.03	4.07	8.11	16.22

1. Hourly emission rates provided are the maximum hourly emissions, and take into account Maintenance, Startup, and Shutdown (MSS) and normal operating emissions.
2. The Project consists of two designs: 1 on 1 scenario and 2 on 1 scenario. Therefore, potential emissions are provided for both scenarios.

Additional detail on air emissions modeling is provided in Section 3.0 of this report and analysis of potential effects of emissions on sensitive receptors is detailed in Section 5.0.

2.7 NOISE

Noise is defined as unwanted sound that interferes with normal human activities. Sound is defined by the loudness (measured in decibels) and the frequency (measured in hertz). In noise impact analyses with regard to human receptors, the combined effect of loudness and frequency is measured as adjusted decibels (dBA). The Occupational Safety and Health Administration (OSHA) regulates occupational noise exposure under 29 CFR 1910.95. Employers are required to implement a hearing conservation program including noise monitoring, employee notification, and employee hearing testing if the 8-hour time-weighted average exceeds 85 dBA of noise exposure.

Exposure to impulsive or impact noise should not exceed 140 decibels (dB) peak sound pressure level. The U.S. Department of Housing and Urban Development (HUD) outlines noise criteria and standards in 24 CFR Part 51. HUD considers exterior noise at sensitive receptors to be "acceptable" if it does not exceed a day and night average sound level of 65 dB, "normally unacceptable" between 65 dB and 75 dB, and "unacceptable" above 75 dB.

The City of Brownsville has adopted noise control regulations as outlined in the TX Code of Ordinances. Chapter 46, Article 3, Section 46-76 defines unreasonable noise as:

"any disturbing and unnecessary noise which is at an excessive sound level and which is of such character, intensity and duration as is reasonably calculated to be detrimental to the life or health of any ordinary reasonable person or offend the sensibilities of any ordinary reasonable person."

Section 46-78 outlines "enumeration of excessive sound levels" to include:

- "Sound from a moving vehicular source located within the public right-of-way shall not exceed 80 decibels on the "A" weighting scale (dB(A)), except that sound from a vehicle with a manufacturer's gross weight rating of 10,000 pounds and above operated on a prescribed truck route at all times or elsewhere within the city during the hours of 7:00 a.m. to 6:00 p.m. on Monday through Saturday may exceed eight (8) dB(A) but shall not exceed eighty-eight (88) dB(A). Such sound shall be measured at a distance of at least 25 feet from a vehicle located within the public right-of-way."
- "Sound from any source, other than a moving vehicular source located within the public right-of-way, shall not exceed any of the following limits for its appropriate zone:
    - The zone limits prescribed by this section are set forth in the following table:

Zoning Designation of the Property (source) on Which the Sound is Received	Maximum Number of Decibels Permitted from 8:00 a.m. until 12:00 a.m.	Maximum Number of Decibels Permitted from 12:00 a.m. to 8:00 a.m.
D, DR, A	63 dB(A)	50 dB(A)
1C, 2C, 3C, 4C, 5C, 6C	70 dB(A)	60 dB(A)
7C, 8C, 9C	72 dB(A)	65 dB(A)

    - Sound from construction work for which a building permit has been issued shall be permitted in an industrial zoning district during the hours of 7:00 a.m. to 5:00 p.m. for work of any type, and until 9:00 p.m. for light construction work that uses only hand tools and power tools (but not including nail guns) with no more than five horsepower. Under no circumstances shall amplified sound be considered as construction work activity."

Actions outside the parameters described above may require special approvals, environmental reviews, and attenuation measures.

2.8 DUST

The deposition of particulate emissions and dust from construction and operation of the Project has the potential to adversely affect the resources within the Action Area.

Dust accumulation as a result of construction activity and vehicle traffic may affect vegetation by covering the surface of the plant including flowers, leaves,

and stems. This has the potential to impede critical biological processes by blocking pores and light receptor cells on the plant's surface, inhibiting plant growth (Coffin, 2007). Airborne dust also reduces air breathability for both humans and wildlife, and may also spread chemicals or pathogens if contaminated, which can cause health problems when inhaled (Kruse, 2004).

Tenaska will employ dust control measures during construction of the Project to minimize generation of fugitive dust. These measures will be outlined in accordance with a construction storm water permit that will be obtained prior to construction of the Project. Any dust generated from construction activities will be temporary, minimized using best management practices (BMPs) as required by the construction storm water permit, and impacts are expected to be negligible. Most vehicular traffic areas will be paved.

Given these mitigative steps, no effects from dust on threatened or endangered species or critical habits are anticipated to result from the Project.

2.9 WATER AND WASTEWATER

2.9.1 Water Sourcing and Water Rights

The Generating Station will utilize reclaimed municipal treated effluent from the BPUB Robindale Wastewater Treatment Plant located approximately 8-miles southeast of the Project site. The Project estimates an average make-up water demand of 5-6 MGD with a peak demand of 8 MGD. Use of this water will eliminate the need to have long term water rights from the State of Texas and significantly reduce potential impacts to local water resources. Temporary water use for dust control, concrete batching, and other on-site construction uses will be provided by local public water sources provided by BPUB. At this time, Tenaska is not planning to acquire any water rights or temporary water use permits for the Project.

2.9.2 Wastewater Discharge

Wastewater will be discharged via a 20-inch diameter water discharge pipeline that will carry wastewater approximately 11-miles east and discharge into the Port of Brownsville Ship Channel. A single outlet outfall structure will be located in the ship channel. The discharge of wastewater will meet effluent requirements as established by the TCEQ in a to-be-issued TPDES Permit No. WQ0005005000.

Non-contact storm water runoff from the Project site will drain into Olmito Drainage Ditch No. 3, located along the southern boundary of the Project site, which is owned and operated by Cameron County Drainage District.

A significant majority of the Project's effluent discharge will be non-process waste streams, primarily non-contact cooling tower blowdown, but also including boiler and evaporative cooler blowdown and water treatment wastes.

Service water, boiler blowdown, and evaporative cooler wastes will be utilized as feed water to the cooling tower.

The Project's effluent discharge will also include minor low volume wastewater streams captured by facility drains and contact storm water which will be routed to an oil/water separator for treatment. Plant service water and reverse osmosis (RO) reject water will also be included in the low volume wastewater streams.

Based on these water management actions, no effects from storm water or wastewater discharges on threatened or endangered species or critical habits are anticipated to result from the Project.

3.0 IDENTIFICATION OF THE ACTION AREA

3.1 ACTION AREA DEFINED

The Action Area is defined in 50 CFR 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." Potential impacts from the Project include physical disturbances associated with construction and operation, noise, light, dust, erosion, sedimentation, air emissions, and wastewater discharges to surface water. Air emissions were determined to impact the largest area on and surrounding the Project site. Accordingly, the boundaries of the Action Area were determined based upon air emission dispersion modeling results.

Air dispersion modeling indicated that an Action Area consisting of the Project site and a buffer extending approximately 88 square miles surrounding the Project site would encompass any potential impacts to threatened and endangered species and designated critical habitat due to the construction and operation of the Project (Figure 1-3). For the purposes of this BA, the Action Area was determined and delineated by identifying the maximum area that could potentially be impacted by construction and operation as an area greater than the SIL-derived radius of impact (ROI).

3.2 ACTION AREA DELINEATION METHODOLOGY AND RESULTS

The boundary of the Action Area was delineated by air quality impact analysis (modeling) and includes all receptors in the modeling domain with impacts above the SILs and a buffer component. The air quality impact levels are determined by performing a detailed air dispersion modeling analysis using the EPA and TCEQ guidelines appropriate to the source and emissions. A detailed modeling protocol is included with the TCEQ PSD Pre-Construction Air Permit Application.

Tenaska used the current guideline model (AERMOD) following the EPA- and TCEQ-approved modeling protocol to perform the modeling analysis. The analysis takes into account local terrain, actual meteorological data (provided by TCEQ), Generating Station design, including stack and building parameters and worst-case maximum emission rates from the individual sources proposed by this application.

3.2.1 Significant Impact Level Dispersion Modeling

Using approved air dispersion modeling techniques, the maximum predicted concentration due to the Project for each pollutant and averaging period are included below in comparison to the respective SILs.

TABLE 3-1: Summary of Project Criteria Pollutant Air Dispersion Modeling

Pollutant	Standard	Averaging Period	Max Off-site Concentration ($\mu g/m^3$)	SIL ($\mu g/m^3$)	Less than SIL?
NO_2	NAAQS	1-hour	28.91	7.5 [1]	No
		Annual	1.64	1	No
CO	NAAQS	1-hour	1,562.04	2,000	Yes
		8-hour	300.04	500	Yes
PM_{10}	NAAQS	24-hour	6.17	5	No
		Annual	1.60	1	No
$PM_{2.5}$	NAAQS	24-hour	2.97	1.2	No
		Annual	0.40	0.3	No
SO_2	NAAQS	1-hour	2.56	7.8 [1]	Yes
		3-hour	2.15	25	Yes
		24-hour	1.28	5	Yes
		Annual	0.20	1	Yes

The SIL is a threshold level set by the EPA. If a maximum concentration value is less than the SIL, the modeled source impacts are generally considered to not cause or significantly contribute to a violation of a NAAQS or PSD Increment for that pollutant and averaging period. The maximum concentration values (for all averaging periods) for SO_2 and CO emissions are less than the respective SIL. However, maximum concentration values for all other pollutants and averaging periods are higher than the respective SILs. Therefore, a cumulative analysis including surrounding sources was performed for these pollutants and averaging periods.

The dispersion model predicts concentrations at specific downwind receptor locations for various averaging periods. For all pollutants with maximum concentration values exceeding the respective SIL, the Action Area is based on the distance from the facility center to the receptor located furthest from the facility with a modeled impact equal to or greater than the SIL. The pollutant and averaging period with the largest impact distance (1-hr NO_2 at 11.7 km) is used to establish the Action Area.

The Action Area was used to analyze the potential impacts to protected species and/or their habitat by the project. The results of the analysis of potential impacts to protected species are presented in sections below.

3.2.2 Other Contaminants

In addition to the emission rates calculated for criteria pollutants, emission rates were calculated for other pollutants that may be emitted by the Project. This analysis was performed in accordance with TCEQ guidelines on the modeling of non-criteria pollutants. The predicted increases in concentrations of ammonia and ammonium sulfate were compared to the TCEQ effects screening levels (ESLs). ESLs are not ambient air standards, but instead are screening concentrations used by TCEQ to assess the potential of the emissions to impact

public health and welfare. ESLs are set by TCEQ at a level well below which adverse health effects on humans have been observed to occur. In addition to human health effects, ESLs are based on the potential for odors to be a nuisance and effects on vegetation. Therefore, if predicted concentrations of a constituent do not exceed an ESL, adverse health or welfare effects are not expected. In the first level of analysis conducted for permitting of new emission sources, the predicted increase in concentration of a pollutant is compared to 10% of the ESL. If the predicted concentration increase is less than this level, no further analysis is required and it is concluded that the emissions of that pollutant from the project pose no significant additional impact on public health and welfare. If the predicted concentration increase is greater than 10% of the ESL, site-wide modeling may be required. Because this is a greenfield site, site-wide modeling is performed, thus calling for a comparison of maximum ground level concentrations to the ESL rather than to 10% of the ESL.

An additional air quality dispersion modeling analysis for sulfuric acid mist (1-hour and 24-hour) was performed to demonstrate compliance with the State Property Line standards for net ground-level concentration of sulfuric acid mist. The State Property Line modeling analysis includes all the Project sources that emit sulfuric acid mist. The maximum predicted ground level concentration at each receptor is compared to the applicable State Property Line standard.

A comparison of the modeled concentrations of the Project's non-criteria pollutant emissions to TCEQ established ESLs and State Property Line standards is shown in Table 3-2 below. Based on these results, the maximum predicted concentrations of all modeled pollutants are well below the respective ESL or State Property Line standard. Accordingly, no adverse welfare impacts are expected to occur within the action area as the result of the additional emissions of these pollutants.

TABLE 3-2: Comparison of Pollutant Air Dispersion Modeling with TCEQ ESL or State Property Line standard

Pollutant	CAS	Averaging Period	Max Concentration ($\mu g/m^3$)	ESL ($\mu g/m^3$)	% ESL consumption
NH_3	7664-41-7	1-Hour	21.76	170	12.80
		Annual	1.86	17	10.91
Ammonium Sulfate	7783-20-2	1-Hour	2.06	50	4.11
		Annual	0.17	5	3.48
H_2SO_4 Mist	7664-93-9	1-Hour	1.85	50	3.70
		24-Hour	1.03	15	6.87

4.0 FEDERALLY LISTED SPECIES AND DESIGNATED CRITICAL HABITAT THAT MAY POTENTIALLY OCCUR IN THE PROJECT AREA

The USFWS and Texas Parks and Wildlife Department (TPWD) threatened and endangered species databases and Texas Natural Diversity Database (TXNDD) occurrence data were reviewed to determine which, if any, federally-listed species may have the potential to occur on the Project site or within the Action Area. The species that are federally listed on both the TPWD and USFWS lists for Cameron County are presented in Table 4-1 below.

4.1 FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES

TABLE 4-1: Federally Listed Threatened and Endangered Species Potentially Occurring in Cameron County

Common Name	*Scientific Name*	*Federal Status*	*State Status*
Birds			
Eskimo curlew	*Numenius borealis*	LE*	E
Interior least tern	*Sterna antillarum athalassos*	LE	E
Northern aplomado falcon	*Falco femoralis septentrionalis*	LE	E
Piping plover	*Charadrius melodus*	LT	T
Fish			
Rio Grande silvery minnow	*Hybognathus amarus*	LE*	E
Smalltooth sawfish	*Pristis pectinata*	LE*	E
Mammals			
Jaguar	*Panthera onca*	LE*	E
Jaguarundi	*Herpailurus yagouaroundi* (var. *Herpailurus yagouaroundi cacomitli*)	LE	E
Ocelot	*Leopardus pardalis*	LE	E
West Indian manatee	*Trichechus manatus*	LE	E
Reptiles			
Atlantic hawksbill sea turtle	*Eretmochelys imbricata*	LE	E
Green sea turtle	*Chelonia mydas*	LT	T

Common Name	*Scientific Name*	*Federal Status*	*State Status*
Kemp's Ridley sea turtle	*Lepidochelys kempii*	LE	E
Leatherback sea turtle	*Dermochelys coriacea*	LE	E
Loggerhead sea turtle	*Caretta caretta*	LT	T
Plants			
South Texas ambrosia	*Ambrosia cheiranthifolia*	LE	E
Star cactus	*Astrophytum asterias*	LE*	E
Texas ayenia	*Ayenia limitaris*	LE	E

LE = Listed Endangered (Federal)
LT= Listed threatened (federal)
E = Endangered (State)
T = Threatened (State)

4.1.1 Eskimo Curlew

Large flocks of Eskimo curlew once migrated northward from South America through the North American prairies to nesting grounds in the Alaskan and Canadian Artic (TPWD 2012b). Between 1870-1980, intensive market and sport hunting, the conversion of prairie habitat to agriculture, and the extinction of the Rocky Mountain grasshopper contributed to the rapid decline of the Eskimo curlew. The last sighting confirmed by physical evidence took place in Barbados in 1963. The USFWS believes that the likelihood that Eskimo curlew is extant is extremely low (USFWS 2011a) but does list that it is believed to occur within the Lower Rio Grande Valley National Wildlife Refuge, which falls within the Action Area.

4.1.2 Interior Least Tern

With a 20-inch wingspan, and length of between 8 and 10 inches, the interior least tern is the smallest North American Tern. Sexually mature males and females are similar in appearance, with a black cap, a grey and white countershading, black nape and eye stripe, white forehead, a yellow bill that is tipped either black or brown, and legs that can be either yellow or orange. They are extremely streamlined fliers due to their pointed wings. New hatchlings are yellow with brown mottling, and are rather small (TPWD, 2013c).

The interior least tern prefers open areas and their preferred nesting areas include islands, sandbars near unobstructed river channel, salt flats, various beaches, and shorelines of lakes. With human development threatening natural nesting sites, interior least terns have started selecting some manmade sites including sand or gravel pits, shorelines of reservoirs, and ash disposal areas

from power plants. The interior least terns prey on small fishes, which necessitate shallow waters close to the nesting habitats (TPWD, 2013c).

While the interior least tern does breed inland along the Missouri, Mississippi, Colorado, Arkansas, Red, and Rio Grande Rivers, it has recently been evidenced that these subspecies may interbreed with the coastal populations. The interior least tern is migratory, and breeding occurs in the United States during the springtime, with the bird wintering along the Central American Coastline (TPWD, 2013c).

4.1.3 Northern Aplomado Falcon

The northern aplomado falcon is a medium-sized bird of prey, approximately 14-18 inches in length with a wingspan of 31-40 inches. Adults have a steel gray back, a white buffy upper breast with a dark band and a cinnamon-colored belly. They have a white streak over the eye, a dark brown head, and narrow banded tail (TPWD 2012f).

The northern aplomado falcon ranges through most of South America, Mesoamerica, and formerly inhabited desert grasslands and coastal prairies of Texas, New Mexico, and Southeastern Arizona. Preferred habitat consists of open terrain with scattered trees or shrubs. In the U.S., they were found along yucca-covered sand ridges in coastal prairies, riparian woodlands in open grasslands, and in desert grasslands with scattered mesquite and yucca. Northern aplomado falcons do not build their own nests, but in the period from March to June have been known to take over old or freshly constructed nests of other raptors. Declines of U.S. populations began in the 1930s, the species was considered extirpated in the 1950s, and was listed as federally endangered in 1986. More than 1,142 captive-bred northern aplomado falcons have been released in southern and west Texas (US Dept. of Defense and USFWS 2007).

4.1.4 Piping Plover

Piping plovers are small, migratory shorebirds about 7 inches long with a wingspan of about 15 inches. Piping plovers have white undersides, a tan colored upper body, and orange legs year round. During the breeding season, adults develop a black tipped orange beak, dark narrow breast band, and a dark strip across the forehead (TPWD 2007).

Once widespread throughout North America, remnant populations of piping plovers breed in three distinct populations: Atlantic Coast, Great Lakes, and Northern Great Plains. Piping plovers were listed as federally endangered in 1986 (USFWS 2001b). They winter along Gulf Coast beaches from Mexico to Florida, along the Atlantic Coast, and on Caribbean islands. An estimated 35% of the known population of piping plovers winter in Texas (TPWD 2007).

Piping plovers winter along the Gulf Coast from mid-July to April. The preferred wintering habitat is bare or very sparsely vegetated intertidal ocean

beach, wash-over passes, wrack lines, ephemeral ponds, lagoons, salt marshes, tidal mudflats, sandflats, and algal flats. These are areas periodically covered by water and then exposed by tides or wind. The soft sand, mud, or algae supports the invertebrates that comprise the plovers' diet. Piping plovers are visual predators that feed on marine worms, insects, crustaceans, mollusks, and other small marine animals and their eggs and larvae. Piping plovers feed primarily during the day and forage most aggressively during the falling tide (TPWD 2007). Piping plovers roost and preen on sandy beaches, in wash-over passes, or on tidal flats near their foraging territory. Seaweed, small dunes, and driftwood provide cover (USFWS 2001b).

4.1.5 Rio Grande Silvery Minnow

The range of the Rio Grande silvery minnow is largely concentrated downstream of the Acacia Dam, with over 90 percent of the population residing in this 96-kilometer stretch. However, its full range includes parts of the Rio Grande from a northwestern boundary of Espanola, New Mexico, to all of Texas, and Mexico, to the southernmost boundary of the Gulf of Mexico.

The maximum size of the Rio Grande silvery minnow is approximately 90 millimeter. The dorsal region of this Rio Grande silvery minnow is brown to olive in coloration and is marked with a broad, dark mid-dorsal stripe. The lateral region is silver in color with some dark pigmentation forming a diffuse mid-lateral stripe (Texas State Department of Biology, 2013). The Rio Grande silvery minnow's diet is similar to other minnows in that they feed on diatoms, algae, larval insect skins, and plant material scraped from ooze in bottom sediment (Sublette et al., 1990).

The habitat in which the Rio Grande silvery minnow live tends to vary with their size; smaller individuals will occur in pools, backwaters, or eddies formed by debris, while the larger minnows reside in main and side channel runs (USFWS 2007). However, regardless of body size, they do not reside in water with high flow, and tend to be located at a depth of 20 centimeters or less during much of the year. Their median residence depth may change in the winter time, when they will most commonly be located at depths of 31-40 centimeters. In the winter, the Rio Grande silvery minnow may also relocate to eddies formed by in-stream debris piles.

4.1.6 Smalltooth Sawfish

The smalltooth sawfish is a tropical marine and estuarine elasmobranch fish that can reach 25 feet in length. They are distinguished by their long, narrow, flattened snout lined with teeth (NMFS 2009).

The smalltooth sawfish is reported to have a circumtropical range. It is unsure whether populations in the pacific are truly smalltooth sawfish or a closely related species. Once common throughout the western Atlantic, the current range of this species has contracted to peninsular Florida. The preferred habitat

is shallow coastal waters usually very close to shore over muddy and sandy bottoms. They are often found in estuaries, river mouths, mangroves, sheltered bays and on shallow banks. Smalltooth sawfish require water temperatures no lower than 16-18 °C and the availability of appropriate coastal habitat (NMFS 2009).

Smalltooth sawfish were once reportedly common in the Gulf of Mexico. Since 1971, there have been only three published reports of smalltooth sawfish captured from this region (published in 1978, 1979, 1984), and all have been from Texas (NMFS 2009).

4.1.7 Jaguar

The jaguar is the largest and most robust of the spotted American cats. They inhabit the dense chaparral and timbered areas of the New World Tropics and show a fondness for waterside habitats. Large males may weigh up to 200 pounds and grow as long as seven feet. The jaguar's food habits are not well known, but they are known to prey on peccaries in Mexico and catch fruit-eating fish in the Amazon region. They will also prey on deer and large ground-dwelling birds when available. The jaguar is believed to be extirpated from Texas and is extremely unlikely this cat will be seen, although a rare visit by a wanderer from Mexico is possible (Davis 2000).

4.1.8 Jaguarundi

The jaguarundi is slightly larger than a domestic cat and has a dark gray-brown uniform coat. The body is similar in appearance to a large weasel, is long and low with short legs, a small flattened head, and narrow brown eyes (USFWS 2012c).

There is little information available concerning the biology of the jaguarundi in Texas. They are very rare in the dense, shrub thickets of South Texas (Davis and Schmidly 1994). Scientists speculate that their habitat requirements are similar to that of the ocelot. Tracts of at least 100 acres of isolated dense brush or 75 acres of brush interconnected to other tracts of habitat by brush corridors are considered important habitat.

4.1.9 Ocelot

The ocelot is a predatory feline that weighs up to 35 pounds and reaches 4 feet in length. Their color varies from pale to tawny browns with brown spots with black borders. Ocelots are distributed from Texas and Arizona to Mexico, and Central and South America (USFWS 2010).

These nocturnal predators prefer dense cover. In Texas, ocelots occur in dense thorny shrub lands with 75-95% coverage of species including spiny hackberry, brasil, desert yaupon, wolfberry, lotebush, amargosa, white brush, catclaw, blackbrush, lantana, guayucan, cenizo, elbowbush, and Texas persimmon.

Tracts of at least 100 acres of isolated dense brush or 75 acres of brush interconnected to other tracts of habitat by brush corridors are considered important habitat (TPWD 2012g).

Fewer than 100 ocelots exist in the U.S., and they are concentrated in south Texas at the Lower Rio Grande Valley National Wildlife Refuge and Santa Ana National Wildlife Refuge (both near Alamo, TX), Laguna Atascosa National Wildlife Refuge near Brownsville, and on a private ranch several miles away from Brownsville (USFWS 2010).

4.1.10 West Indian Manatee

West Indian manatees are large, seal-shaped marine mammals with paired flippers and a round, paddle-shaped tail. They are typically grey in color, and adults average nine feet in length and weigh about 2,000 pounds (USFWS 2001a). West Indian manatees range between marine and freshwater habitats, living in rivers, bays and coastal areas from the southeastern coast of the United States to the northern coast of South America (USFWS 2001a).

As opportunistic herbivores, West Indian manatees prefer shallow grass beds in coastal and riverine areas as feeding habitat. They require sources of freshwater and are sensitive to cold. In winter, they are drawn to natural and anthropogenic sources of warm water such as springs or power plant outfalls (USFWS 2012a). Canals and boat basins, where warmer water temperatures persist as temperatures in adjacent bays and rivers decline, may also be used as temporary thermal refuges (USFWS 2001a).

Occurrences of West Indian manatees in Texas are rare; however, they occasionally wander into the Texas Gulf Coast and bay systems. They are most common in river mouth and estuarine habitats in shallow waters off the coasts of Florida, Mexico, and Central America. The evidence suggests that West Indian manatees are rare in Texas waters, but not unprecedented along the southernmost Texas coast at Port Isabel. Three live specimens were captured in 1911, one specimen was found in the mouth of the Rio Grande in 1955 and a badly decomposed specimen was recovered at South Padre Island in December 1992. There is no evidence of a breeding population in the area, and the animals that have been seen in the area appear to have wandered north from the Mexican populations further south (Coastal Impact Monitoring Program 1995).

4.1.11 Atlantic Hawksbill Sea Turtle

The Atlantic hawksbill is listed as endangered throughout its range (USFWS 2012d). It is a small to medium-sized turtle averaging 2.5 feet in length and weighing 176 pounds or less. They have an elongated oval shell with thick overlapping scutes (similar to plates or scales) on the carapace, flippers with two claws, and a hawk-like beak (USFWS 2012d). The plastron (flat under portion of the shell) is yellowish while the carapace (convex upper portion of the shell) is

patterned with streaks of brown and black on an amber background (NMFS 1993).

Atlantic hawksbill sea turtles nest in low density on small beaches, usually at night, where the female digs a hole and deposits an average of 140 eggs. They have a 6-month nesting season in which they nest an average of 4.5 times at intervals of approximately 14 days (NMFS 1993). Remigration intervals (i.e., intervals between successive nesting years) average 2 to 3 years (USFWS 2012d, NMFS 1993). Age at sexual maturity is estimated at 20 years or more in the Caribbean. Nesting occurs sometime between April and November and varies slightly with locality (USFWS 2012d). As with other sea turtles, post-hatchlings take shelter in the weed or drift lines that accumulate at convergence zones in the pelagic environment (NMFS 1993). Drift lines are linear piles of natural and man-made material that accumulate at convergence zones on the ocean surface and are often associated with *Sargassum spp.* communities.

Atlantic hawksbills are carnivorous and consume mostly sponges, a unique and specific feeding habit that ties them to the needs of their prey, which require a hard substrate. As juveniles and adults they are associated with coral reefs, shallow coastal areas, lagoons, oceanic islands, and narrow creeks or passes (USFWS 2012d).

The Atlantic hawksbill is distributed in tropical and subtropical seas of the Atlantic, Pacific, and Indian Oceans. About 15,000 females are estimated to nest each year throughout the world, with the Caribbean accounting for 20 to 30 percent of the world's hawksbill population (USFWS 2012d). Within the continental U.S., nesting is restricted to the southeastern coast of Florida (NMFS 1993). Atlantic hawksbills have been sighted in all the Gulf States and along the eastern seaboard as far north as Massachusetts, although sightings north of Florida are rare (NMFS 1993).

There has only been one documented Atlantic hawksbill nesting on the Texas Coast in 1998 at Padre Island National Seashore (NPS 2012b). They are observed with some regularity in Florida and Texas. Sightings of small turtles in Texas are believed to originate from nesting beaches in Mexico (NMFS 1993). Critical habitat has been designated in three small islands associated with Puerto Rico: Mona, Culebra, and Vieques (USFWS 2012d), but none in the continental U.S.

Atlantic hawksbills nest on small beaches, exhibit a wide tolerance for nesting substrate, and typically place their nests under vegetation (NMFS 1993). As previously mentioned, post-hatchlings spend months floating in weed-lines in the pelagic environment (NMFS 1993, USFWS 2012d). Adults are associated with coral reefs, rocky outcrops and shoals, which are optimum sites for sponge growth (NMFS 1993). They are seldom seen in water deeper than 65 feet (USFWS 2012d).

4.1.12 Green Sea Turtle

The breeding populations of green turtles in Florida are listed as endangered, all other populations in the U.S. are listed as threatened. The green sea turtle is classified as threatened in the state of Texas (TPWD 2012c).

The green sea turtle is a large sea turtle, whose carapace averages 3-4 feet in length and can weigh over 400 pounds (USFWS 2012b, NMFS 1991). They have a heart-shaped shell, smooth carapace, and flippers with one claw, (USFWS 2012b). The plastron is yellowish white while the carapace changes in color from solid black to a variety of shades of green, grey, brown, and black in irregular patterns (NMFS 1991).

Green sea turtles nest on beaches with turbulent surf, usually at night. The female deposits 75-200 eggs, with mean clutch size of the Florida population reported at 136 eggs (USFWS 2012b, NMFS 1993). Green sea turtles deposit one to eight clutches (average is 3.3) per season at intervals of 12-14 days (NMFS 1991). Nesting occurs at intervals of 2, 3, 4 or more years (NMFS 1991). Age at sexual maturity varies greatly throughout the range, and is estimated at 20-50 years. Nesting season varies with locality. In the Southeastern U.S., it is June through September (USFWS 2012b).

Adult green sea turtles are primarily herbivorous; however, there are reports of consumption of various invertebrates such as mollusks, sponges, crustaceans, and jellyfish (NMFS 1991, NatureServe 2012a). As sub-adults and adults, green sea turtles migrate to shallow, relatively protected, benthic feeding grounds, commonly pastures of sea grasses and or algae (NMFS 1991).

The green sea turtle is distributed in tropical and subtropical seas around the world. Within U.S. Atlantic waters, they are found around Puerto Rico, the U.S. Virgin Islands, and the continental United States from Texas to Massachusetts (NMFS 1991). Within the continental U.S., green sea turtles nest in small numbers in Georgia, South Carolina, and North Carolina, and in larger numbers in Florida and Hawaii. An estimated 5,000 females nested in Florida in 2010 (USFWS 2012b). Critical habitat was designated in 1998 around Culebra Island, Puerto Rico (NOAA 2012).

The historical decline in the green sea turtle is attributed to disease, degradation of habitat, overexploitation by man for food, and other factors (NMFS 1991, NPS 2012d). A commercial fishery for green turtles existed in Texas at the turn of the nineteenth century, and turtles were primarily harvested in Aransas Bay, Matagorda Bay, and Laguna Madre (NMFS 1991).

Green sea turtles nest on high energy beaches with minimal human disturbance, usually on islands (NMFS 1991). Post-hatchlings spend months floating in weed-lines in the pelagic environment (NMFS 1993, USFWS 2012b). Adults are associated with shallow waters (except when migrating) inside reefs, bays, inlets, and shoals with abundant vegetation (USFWS 2012b, NatureServe 2012a).

In Texas, sightings of green sea turtles are rare. South Padre Island is the only location on the Texas coast where green sea turtle nesting has been documented. In the last few years, one to five nests have been reported each year. Most green sea turtles found in Texas waters are juveniles (NPS 2012d).

4.1.13 Kemp's Ridley Sea Turtle

The Kemp's Ridley sea turtle was listed as endangered throughout its range in 1970 (NMFS 2011). They are one of the smallest sea turtles, reaching about 2 feet in length and weighing up to 100 pounds. Adults have an oval carapace that is almost as wide as it is long (USFWS 2012e). The coloration changes throughout development from the overall gray-black color of hatchlings to the lighter grey-olive carapace and cream white to yellowish plastron of adults (NMFS 2011).

After hatching, juvenile Kemp's Ridley sea turtles spend an average of 2 years in the Gulf of Mexico pelagic environment and may associate with floating *Sargassum* communities. The majority of these juveniles remain with Gulf of Mexico currents while others are transported to the Gulf Stream of the Northwest Atlantic (NMFS 2011).

After reaching a carapace size of approximately 8 inches, juveniles occupy the neritic zone of the northern Gulf of Mexico (USFWS 2012e). During the juvenile developmental stage, Kemp's Ridley sea turtles prefer areas that are somewhat protected, with temperate waters, shallower than 50 meters. There appears to be seasonal, temperature induced movement between shallow coastal feeding grounds and offshore areas. As adults, they utilize shallow, nearshore waters of less than 37 meters; however, it is not uncommon for them to venture over deeper water (NMFS 2011). They are primarily carnivorous, (i.e. consuming crabs and other crustaceans). Habitat associations appear to coincide with distributions of preferred prey species but defined habitat preferences remain to be defined (NWFS 2011).

The Kemp's Ridley turtle has a range along the Gulf of Mexico and the Atlantic Coast as far north as Nova Scotia (USFWS 2012e). Nesting is essentially limited to the western Gulf of Mexico, primarily in Tamaulipas and Veracruz, Mexico. Nesting also occurs regularly in Texas and infrequently in a few other U.S. states (NMFS 2011).

The Kemp's Ridley is the most endangered species of sea turtle. Their populations suffered a precipitous decline due to over-harvest of eggs and loss of juveniles and adults to commercial fishing (NPS 2012c). An international effort focused on the protection of nesting sites, has led to an exponential increase in the nesting population (NMFS 2011).

Kemp's Ridley turtles have a highly restricted nesting area within the western Gulf of Mexico. They nest on fine grain beaches, usually during daylight, and deposit an average clutch of 100 eggs. They nest an average of 2.5 times per season at intervals of 14-28 day. Nesting occurs at intervals of 2, 3, 4 or more

years (NMFS 2011). Age at sexual maturity is estimated at 12 years (USFWS 2012e). Nesting occurs from April to July in synchronized emergences (NMFS 2011). The primary nesting sites are in Tamaulipas, Mexico, with consistent nesting events in Veracruz and Texas (USFWS 2012e). Nesting in Texas occurs primarily at Padre Island National Seashore, and has been steadily increasing since surveys began in 1987(NPS 2012c). A total of 911 nests were documented on the Texas coast from 2002-2010 (NMFS 2011).

From 1978-1988 an international, multiagency project was undertaken to create a secondary nesting colony for Kemp's Ridley sea turtles at Padre Island National Seashore, Texas. Since 1986, systematic efforts to detect and protect nests along the Texas coast have led to increased awareness and exponential increase in the number of Kemp's Ridley sea turtle hatchlings along the Texas coast. In 2011, there were 199 nests documented and protected on the Texas coast and 16,092 hatchlings released (NPS 2012c). From 1980-1991, in the area around Corpus Christi Bay, 126 Kemp's Ridley sea turtles were sighted. The vast majority of which were strandings along the Gulf side of North Padre and Mustang Island (Manzella and Williams 1992). No critical habitat within the U.S. has been designated, although petitions to do so along the Texas coast have been submitted (WEG 2010). Twenty-two Kemp's Ridley sea turtle strandings were reported for Cameron County in the most recent year of available data, 2007 (STSSN 2007).

4.1.14 Leatherback Sea Turtle

The Leatherback sea turtle was listed as endangered throughout its range in 1970 (USFWS 2012f). They are the largest of all sea turtles, reaching up to 8 feet in length and weighing over 1,200 pounds. Unlike other sea turtles, leatherback sea turtles do not have hard, bony shells, but rather a mosaic of small bones covered by firm, rubbery skin with seven longitudinal ridges (USFWS 2012f). Their front flippers are proportionally longer than other sea turtles, and both front and rear flippers lack claws (NMFS 1992). Their color is slate black to bluish-black spotted by irregular pale patches (NPS 2012e).

Leatherback sea turtles nest on sandy beaches, primarily at night, and deposit 80-95 eggs per clutch. Female leatherback sea turtles nest an average of 5-7 times per season at intervals of 9-10 days. Nesting occurs at intervals of 2-3 years and sexual maturity is believed to occur around 16 years. Nesting in the U.S. occurs from about March to July (NMFS 1992, USFWS 2012f).

After hatching, Leatherback sea turtles are thought to move offshore to the pelagic environment (TEWG 2007). They are the most pelagic, migratory and wide-ranging of all sea turtles (USFWS 2012f). Adult leatherback sea turtles are highly migratory, travel hundreds of miles from marine feeding grounds to nesting beaches (NMFS 1992).

The Leatherback sea turtle has a worldwide distribution, in tropical and temperate waters of the Atlantic, Pacific, and Indian Oceans. In 1980, the nesting

population was estimated at 115,000, and by 1995 this number was reduced to an estimated 34,500. However, recent population estimates for the North Atlantic alone, range from 34,000-94,000 adult leatherback sea turtles. Important nesting areas in the Atlantic occur in Gabon, Africa, and French Guiana, with nesting sites under U.S. jurisdiction in the U.S. Virgin islands, Puerto Rico and Florida. The only major nesting site in the continental U.S. is along the southeastern Florida coast. From 2006-2010, the number of nests along Florida beaches varied between 540 and 1,747 per year (USFWS 2012f).

The most serious threat to leatherback sea turtles is the disturbance of nesting grounds (TPWD 2012e). The crash of the Pacific leatherback sea turtle population is thought to be a result of exploitation of humans, incidental fisheries take and loss and degradation of nesting habitat (USFWS 2012f).

Leatherback sea turtles nest on tropical and subtropical sloping sandy beaches, backed by vegetation. Preferred nesting beaches are in proximity to deep water, generally rough seas, and lack a fringing reef (NMFS 1992, USFWS 2012f, NatureServe 2012b).

Habitat requirements for juveniles and post hatchlings remain unknown. The leatherback sea turtle diet consists almost entirely of jellyfish (NPS 2012e, NMFS 1992). Adults utilize the pelagic environment, move hundreds of thousands of miles between nesting beaches and distant feeding grounds, and seldom approache land, except for nesting (NatureServe 2012b).

Leatherback seat turtles are rare visitors to the Texas Gulf Coast (TPWD 2012e). A 1956 sighting from a low-flying airplane of 100 individuals near Port Aransas coincided with a dense school of cabbage head jellyfish (Leary 1957). In 2008, a single leatherback nest was located at Padre Island National Seashore. Prior to this nesting, only historical records of nesting occurred in Texas from the 1920s and 1930s. No nests have been detected since 2008 (NPS 2012e).

4.1.15 Loggerhead Sea Turtle

The Loggerhead sea turtle was initially listed as threatened throughout its range in 1970. In 2011, the listing was revised and nine distinct population segments were defined, four as threatened and five as endangered (USFWS 2012g).

The loggerhead sea turtle is a medium to large turtle, their carapace averages 3 feet in length and weighs between 170- 350 pounds (NPS 2012a). Loggerhead sea turtles are characterized by a large head with blunt jaws. The thick bony carapace is covered by non-overlapping scutes. The carapace and flippers are reddish brown while the plastron is yellow (NMFS 2008, USFWS 2012g).

Loggerhead sea turtles nest on high energy beaches, usually at night, and deposit a mean clutch size of 100-126 eggs along the southeastern U.S. coast. They deposit one to seven clutches (average is 4.1) per season at intervals of approximately 14 days. Nesting occurs at 2-3 year intervals and sexual maturity

is believed to be around 32-35 years. The U.S. nesting season is April to September with a peak in June and July (USFWS 2012g).

After hatching, loggerhead sea turtles spend weeks or months in the pelagic zone of neritic waters along the continental shelf and then transition to drift lines. These occur commonly in convergence zones and are associated with floating *Sargassum* communities. Post-hatchlings float and forage as omnivores. Juveniles enter an oceanic phase thought to last 7-11.5 years before transitioning to the neritic zone. Juveniles in the North Atlantic inhabit estuarine environments and essentially all continental shelf waters (NMFS 2008). Juveniles and adult loggerhead sea turtles utilize both neritic and oceanic environments. Adults utilize open ocean areas in the neritic zone and consume a variety of organisms, primarily mollusks and benthic crabs (NMFS 2008).

Adult loggerhead sea turtles are primarily carnivorous. They consume a variety of organisms found in the neritic zone, primarily mollusks and benthic crabs (NMFS 2008).

The loggerhead sea turtle is distributed in the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. They are commonly found throughout the North Atlantic including the Gulf of Mexico, northern Caribbean, Bahamas, east to West Africa, and the Mediterranean. Only two loggerhead sea turtle nesting aggregations have more than 10,000 nesting females per year: Masirah, Oman and South Florida in the U.S. In the U.S., loggerhead sea turtles nest from Texas to Virginia, and about 80% of loggerhead nesting in the U.S. occurs in six Florida counties (NMFS 2008).

Loggerhead sea turtles are less valued for eating; therefore hunting has not been as great a factor in their decline as other sea turtles. The loss of eggs (due to humans and predators), and mortality due to fishing have had the most severe effects on loggerheads (NPS 2012a).

Loggerhead sea turtles nest on steeply sloped, relatively narrow, coarse-grained beaches. Nests are laid between the high tide line and dune front, usually on ocean beaches, but occasionally on appropriate estuarine shorelines (NMFS 2008).

There is no critical habitat designated in the U.S. In Texas, a relatively stable number of 1-6 loggerhead sea turtle nests are found annually. These nests have been found statewide with the greatest occurrence on the Padre Island National Seashore (NPS 2012a). Fourteen strandings were reported for Cameron County in the most recent year of available data, 2007 (STSSN 2007).

4.1.16 South Texas Ambrosia

The South Texas ambrosia is a grey-green/silvery, perennial, herbaceous plant that ranges from 4 to 12 inches in height. It has simple leaves that are approximately 3 inches long and 1.5 inches wide. They are typically alternate

facing leaves above and opposite facing leaves on the lower part of the plant. Male and female flowers are on the same plant but in different locations. The female flowers are formed in small clusters at the base of the leaves below the male flowering stalks. The male flowers contain 10-20 small, yellow bowl-shaped flowers. The South Texas ambrosia is found in open grasslands or savannas in clay-loam or sandy-loam soils (TPWDb).

The South Texas ambrosia has historically been found in Cameron, Jim Wells, Kleberg, and Nueces counties in South Texas and currently occurs in six locations in Nueces and Kleberg counties. It has also been found in Tamaulipas, Mexico however its current state there is unknown (TPWDb).

4.1.17 Star Cactus

The star cactus is a small, circular, spineless cactus that resembles a sand dollar or sea urchin. The dome-shaped body is 2 to 6 inches in diameter and 1 to 2 inches tall. They are usually brown to dull green in color and often have speckled appearances. The star cactus has white, fuzzy hairs extruding from between each of its eight, triangular shaped sections. When blooming, the star cactus will possess a 2 to 3 inch tall, waxy, flower with an orange center and yellow edges (TPWD, 2013d).

Historically, the star cactus was known from Cameron, Hidalgo, and Starr Counties in south Texas, and the border states of Nuevo Leon and Tamaulipas in Mexico. Presently, this species is known from one population each in Starr County and Tamaulipas (TPWD, 2013d).

4.1.18 Texas Ayenia

The Texas ayenia is a thornless shrub, between 2 and 5 feet tall. The leaves are approximately 1.5 inches long, simple, alternate, and hairy. The inverted teardrop shaped leaves have toothed margins and the small clusters of petals in the upper leaves can be colored green, pink, or cream. Its fruit is a small capsule (0.25 inches in diameter), and has curved sharp prickles. The Texas ayenia grows in moist, dense, subtropical riparian woodlands (TPWD, 2013a).

Texas ayenia historically occurred in Cameron and Hidalgo Counties in South Texas, and in the states of Coahuila and Tamaulipas in Mexico. Currently, the Texas ayenia only exists in one small population of 20 individuals in Hidalgo County (within the United States) (TPWD, 2013a).

4.2 DESIGNATED FEDERAL CRITICAL HABITAT

There is no designated federal critical habitat on the Project site or in the defined Action Area. The nearest designated federal critical habitat is for the piping plover and is located approximately 24.4 km (15.2 mi) east of the Project site and 13.8 km (8.57 mi) east of the Action Area.

4.3 TEXAS NATURAL DIVERSITY DATABASE

A request was submitted to the TPWD to obtain information from the TXNDD. The TXNDD, established in 1983, is the TPWD's most comprehensive source of information on which includes rare, threatened, and endangered plants, animals, invertebrates, exemplary natural communities, and other significant features (elements). The TXNDD is continually updated, providing current or additional information on statewide status and locations of these unique elements of natural diversity. However, the data is not all-inclusive, as there are gaps in coverage and species data. This deficiency is a result of insufficient access to land and/or data, and shortage of staff and resources needed to collect and process data on all rare and significant resources. Although it is based on the best data available to TPWD regarding rare species, these data do not provide a definitive statement as to the presence, absence, or condition of special species, natural communities, or other significant features in any area. Nor can these data substitute for on-site evaluation by qualified biologists. The TXNDD information is intended to assist users in avoiding harm to rare species or significant ecological features.

Response to the TXNDD request included an element occurrence listing, element occurrence report, and geographic information systems (GIS)-compatible shapefile of element occurrence boundaries. Figure 4-1 depicts an aerial map of the Project site vicinity overlain with the shapefile obtained from TXNDD. Element occurrence records corresponding with the boundaries depicted in Figure 4-1 are available under separate cover as Appendix B in the Supplemental Information. No occurrences of federally-listed threatened or endangered species have been documented in the Project site; however, listed species have been documented within the Action Area, primarily in the southern portion near the Rio Grande River.

According to TXNDD, a number of listed species have been documented within the region. The northern aplomado falcon was last observed within the eastern portion of the Action Area [in 2002], as well as just east of the Action Area. The jaguar was observed in the northwest portion of the Action Area in 1946. The jaguarundi was observed in the Resaca de la Palma State Park in the southwest portion of the Action Area in 1990 and 1992. The ocelot was observed a south of the site [1991] and can be found in similar habitats as the jaguarundi. The Texas Ayenia was observed in the southern portion of the Action Area [2002]. The Rio Grande silvery minnow can be found in the Rio Grande. Only a very small portion of silvery minnow habitat is within the Action Area and more abundant habitat can be found further south.

5.0 EFFECTS ANALYSIS

The following sections discuss the methods and results of the desktop review and field surveys performed to determine the ecological receptors present within the Project site and the Action Area, as well as the potential effects on these receptors from the Project.

5.1 METHODS

5.1.1 Desktop and Literature Review

As presented in Section 4.0, the USFWS and TPWD threatened and endangered species databases and TXNDD occurrence data were reviewed to determine which, if any, federally-listed or state-listed species may have the potential to occur on or near the Project site. No federally-listed threatened or endangered species were shown to occur on the Project site; however, federal listed species have been known to occur within the Action Area. No occurrences of threatened or endangered species at the Project site or objections to construction were mentioned by TPWD in the TXNDD response.

5.1.2 Habitat Assessment and Field Surveys

Subsequent to the desktop and literature review, a field reconnaissance visit was performed January 14–18, 2013. This field survey documented the presence or absence of threatened and endangered species, as well as provided characterization of habitats and land use within the Project Site and Action Area.

The field survey conducted at the Project site consisted of the assessing the habitat throughout, broken into 30 north-south transects (Figure 5-1). The field survey conducted within the Action Area consisted of a detailed windshield survey confirming habitat types for every property within a 3-km radius of the site and a windshield survey study area for the majority of properties (those with roadway access) within the Action Area, as accessible by visual assessment methods. In order to facilitate the windshield survey and detailed habitat surveys, a grid map system was designed throughout the Action Area, which separated the entire vicinity into 11 different grids. Figure 5-2 shows the grid overview map and the detailed results of the habitat survey are shown in Figures 5-3: 1 through 5-3:11.

Information obtained during desktop review was visually checked in the field to "ground-truth" the data and to provide the most comprehensive analysis of the existing conditions at the subject site. All vegetation and wildlife observed were identified to the species level of taxonomy, if possible. A photographic log of the conditions observed at the Project site is available under separate cover as Appendix C in the Supplemental Information.

5.2 *RESULTS*

The following sections provide the results of the background information, field observations, and analysis performed to evaluate the potential for the proposed action to affect the federally listed threatened and endangered species that have the potential to occur in the Project site and Action Area.

5.2.1 *Background Research*

Prior to conducting the field survey ERM performed a desktop study of the Survey Area by reviewing available information from the following sources:

- U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps;
- USFWS National Wetlands Inventory (NWI) Maps;
- Federal Emergency Management Agency (FEMA) Flood Hazard Maps;
- Aerial photographs (December, 2010); and
- U.S. Department of Agriculture (USDA), NRCS County Soil Surveys.

Review of these documents assisted in the planning and execution of the field surveys and provided a baseline for determining the overall conditions within the Project site.

Data identified during the desktop analysis were used to assess and evaluate potential jurisdictional status of identified wetlands and waterbodies and to provide a summary of those features potentially impacted by the development of the Project. Jurisdictional status was determined based on several factors:

- Using Ordinary High Water Mark (OHWM), if present, in each of the stream features;
- Evaluating USGS topographic maps to determine the drainage status of streams (i.e. if a blue line or blue dashed line is present on topographic maps then a stream feature is considered jurisdictional and then further evaluated in the field); and
- Evaluating wetlands based on relatively permanent waterbody (RPW) and/or significant nexus.

5.2.2 *Habitats in the Project Site and Action Area*

This section provides a description of the potential habitat at the Project site and Action Area to provide context to evaluate the potential for occurrence and effects determinations for the listed threatened and endangered species.

5.2.2.1 *Overview of Habitats at the Project Site*

A review of USGS topographic quadrangle maps and aerial photographs of the area indicate that the property has been associated with agricultural land use dating to the 1950s. Agricultural use of the site ceased around 1995. Over the

last ten years the property has been cleared and leveled for potential residential development by other parties; however, within the last five years the land has become overgrown with shrubland and herbaceous habitat. Evidence of activities on the Project site during this time indicates soil from the far eastern portion of the property had been removed and placed in adjacent central or western portions of the property in an effort to level those portions of the Project site and elevate them out of the 100-yr floodplain. This soil borrow area is now identified by a wetland and transitional area visible in Figure 2-3.

Evidence from topographic maps dating to 1930 indicates that the Olmito Branch Drainage Ditch No. 3 has been used to support agricultural land use for the region. Flow in the drainage ditch at the time of survey and on subsequent field visits indicate the ditch is ephemeral along the western portion of the Project site and then becomes perennial on the eastern portion. This shift from ephemeral to perennial is attributed to a water outfall located on the south bank of the drainage ditch which contributes large volumes of water. The outfall belongs to the Southmost Regional Water Authority facility located south of the Project site.

During field observations in January 2013, the Project site was noted to contain areas of dense mesquite and grassland habitats on the west side of the Project site and herbaceous and grassland habitat on the east side. A palustrine wetland and a transitional wetland area were each also identified and delineated on the eastern portion of the Project site, Figure 5-5.

Palustrine Emergent Wetlands

A desktop review of the soils located within the Project site was performed to identify key soils series and soil types that may indicate development of wetlands. According to the USDA, NRCS Soil Surveys for Cameron County, the entire survey area is considered partially hydric. Geography and topography are primary factors influencing wetland hydrology. Topography within the Project site is relatively flat. USFWS NWI Maps provide an overview of NWI-mapped wetlands within the Project site. Review of these maps along with FEMA floodplain maps prior to field mobilization indicated no potential wetland areas within the Project site (Figure 5-4).

No NWI-mapped wetlands were documented or associated with the Project site (Figure 5-4). During the site visit, one palustrine wetland was identified and delineated within the Project site (Figure 5-5). In addition, a transitional wet area was identified adjacent to the wetland. This area was characterized by wetland vegetation and wetland hydrology parameters that met the wetland criteria; however, the soils did not contain parameters that met the criteria. Therefore, the area was not determined be a wetland at the time of the field survey.

Soil test pits (approximately 10 inches in diameter and 14 to 20 inches deep) were dug using a shovel in the identified wetland and associated upland area. The hydric soil indicator found in the wetland area consisted of a depleted matrix.

No hydric soil indicators were identified in the transitional area. Note that soils in the transitional area are considered fill materials, which may have resulted in the soils not meeting the hydric criteria.

Dominant species observed in the wetland included: camphor daisy (*Haplopappus phyllocephalus*), shoregrass (*Monanthochloe littoralis*) and slender seapurselane (*Sesuvium maritimum*).

The wetland feature is adjacent to the perennial portion of the Olmito Branch Drainage Ditch No. 3.

The wetland habitat has the potential to serve as a stopover habitat for threatened and endangered species such as the interior least tern and piping plover.

Dense Mesquite

The majority of the Project site (approximately two-thirds) consists of dense mesquite habitat. This habitat encompassed the western portion of the Project site and the following dominant vegetation was observed during the site visit: honey mesquite (*Prosopis glandulosa*), prickly pear (*Opuntia stricta*), crucita (*Eupatorium odoratum*), Dahlia hedgehog cactus (*Echinocereus poselgeri*), torpedo grass (*Panicum repens*), fall panicum (*Panicum dichotomiflorum*), Kleberg bluestem (*Dichanthium annulatum*) Angleton bluestem (*Dichanthium aristatum*) and buffelgrass (*Pennisetum ciliare*).

Based on the habitat criteria listed for the jaguarundi, ocelot, and the star cactus, the habitat identified in the western portion of the Project site could provide for suitable use and coverage for these three species. In addition, the habitat is conducive to providing foraging habitat for northern aplomado falcon.

Herbaceous to Low Shrubland Habitat

This habitat was observed on the eastern portion of the Project site. This habitat was found in a transition area between the wetland and the dense mesquite. Dominant vegetation encountered in the herbaceous to low shrubland habitat included: sea ox-eye daisy (*Borrichia frutescens*), gulf cordgrass (*Spartina spartinae)*, honey mesquite (*Prosopis glandulosa*) and huisache (*Acacia farnesiana*).

This habitat may be suitable to support threatened and endangered species such as the jaguarondi, ocelot, and the star cactus.

Drainage Ditch

One waterbody was identified during the field survey. The Olmito Branch Drainage Ditch No. 3 is located adjacent to and south of the Project site. Flow within the drainage ditch is from the west to the east where it eventually drains into Main Drainage Ditch No. 2 and then east into San Martin Lake. As previously

mentioned, flow patterns in the drainage ditch no. 3 suggest that it is ephemeral along the western portion of the Project site and then becomes perennial along the eastern portion of the Project site due to water discharges from the Southmost Regional Water Authority facility. An OHWM identified within the drainage ditch was determined using vegetation growth patterns and distinct water lines associated with silt deposits.

No threatened or endangered species were observed in the drainage ditch during the site visit; however, the following species were observed while on-site: kingfisher, tri-color heron, and great egret.

Although, the drainage ditch provides a good water source for a variety of species, habitats within it are limited, appear to be disturbed, and would not provide suitable long term habitat to support threatened and endangered species.

5.2.2.2 Overview of Habitats in the Action Area

A review of the USGS topographic quadrangle maps, aerial photographs and the windshield survey completed of the area indicate that Action Area contains a variety of habitats (Figure 5-3). According to the USDA National Agriculture Statistics Service (NASS) Cropland Land Use Data, the majority of the Action Area consists of shrubland, cropland /agriculture, developed land (residential and industrial) and wetlands/water.

Additional detail on each of these habitat areas as observed during field reconnaissance is presented below, and a photographic log is available under separate cover as Appendix C in the Supplemental Information.

Shrubland

Shrubland habitat is the most dominant habitat associated identified within the Action Area. These habitats consist of a mixture of short shrub tree species that can form dense colonies and provide significant cover. Species such as mesquite, huisache, lotebush, Jerusalem thorn are the common shrubs present. Many of these habitats are also covered with a mix of grassland communities and other scrub species such as prickly pear. Most of the shrubland habitats were found in the central and eastern portions of the Action Area.

Cropland / Agriculture

This habitat was observed as recently-harvested or fallow fields that are likely utilized for sorghum or cotton production. The western portion of the Action Area is mostly associated with the cropland/agricultural habitats. Dense shrubland habitats typically align the edges of these fields which could potentially serve as a foraging areas and transient pathways for threatened and endangered species such as the aplomado falcon, jaguarondi, and the ocelot.

Developed Lands

The City of Olmito is located in the western portion of the Action Area. Residences of the City of Olmito fall within the southwestern portion of the Action Area. The nearest residence is located approximately 1/10-mile southwest of the southwestern boundary of the Project site. Additional residences are located approximately 1/3-mile west of the western boundary of the Project site. There is a school (Rancho Verde Elementary School) located directly south of the Project site and is adjacent to the Southmost Regional Water Authority facility.

There are also playgrounds and sports fields associated with the Rancho Verde Elementary School. The Brownsville Border Patrol Station is located approximately 1/5-mile south of the Project site.

Other key residential areas within the Action Area include: Los Fresnos, Rancho Viejo, and northern Brownsville.

Wetlands/water

Wetland habitats are interspersed throughout the Action Area with most of them being represented by emergent or shrubland wetlands. The eastern portion of the Action Area does contain significant areas of relic coastal marsh wetland communities. However, many of these habitats have been disturbed by long-term cattle use or other development activities.

5.2.3 Potential for Occurrence and Recommended Determination of Effect for Federally Listed Species

5.2.3.1 Eskimo Curlew

The last verified eskimo curlew sighting in Texas occurred in 1962. The species is assumed to be extirpated from Texas and possibly its entire range (USFWS 2011a); however, if still present, the USFWS believes they may occur within the Lower Rio Grande Valley National Wildlife Refuge.

Based on the lack of sightings, extremely low potential for the eskimo curlew to be extant in Texas, and minimal amount of habitat available in the Action Area, it is not expected that the project will have any direct or indirect impacts on this species from the planned construction and operation of the generating station.

The Project will have "*No effect*" on the eskimo curlew.

5.2.3.2 Interior Least Tern

The interior least tern prefers open areas associated with sandbars and tidal flats. They are known to utilize manmade sites, including sand or gravel pits and cleared lands that have barren soils. The interior least tern prefers nesting areas, such as islands, sandbars near unobstructed river channel, salt flats, various

beaches, and shorelines of lakes. Due to its known range (least tern migrate and breed inland along the Rio Grande River corridor and near the coast), there is the potential for the tern to occur as a transient within the vicinity of the Project.

The Project site contains one wetland with sandbars and sandy soil habitats suitable habitat for this species. Additionally, other wetland areas were identified throughout the Action Area. No observations of the interior least tern were documented during any of the field survey activities on the Project site or within the Action Area.

Due to the potential for this species to migrate and breed inland along the Rio Grande River corridor, there is the potential for it to occur within the Action Area as a transient utilizing habitats as stopover or resting locations. However, it is anticipated that Project construction activities will not occur in or near any wetlands containing preferred habitat for the interior least tern. Therefore, no impacts directly from construction, noise, dust or lighting are expected.

A determination of *"No effect"* is recommended for this species in the Action Area.

5.2.3.3 Northern Aplomado Falcon

The northern aplomado falcon was once distributed throughout the Trans-Pecos region and southern coastal prairies of Texas, but has been considered extirpated in South Texas since the 1950s. Historically, its preferred habitat in southern Texas was coastal prairie and marsh habitats that supported open grasslands with scattered small trees and shrubs or grasslands adjacent to woodlands associated with freshwater drainages and estuaries (TPWD, 2012f).

The northern aplomado falcon is considered non-migratory throughout its range, thus migration through the Project site and Action Area by the reintroduced populations is not likely. The USFWS lists this species as potentially occurring in Cameron County, and considers this falcon to have the potential to occur within the county and the Lower Rio Grande Valley National Wildlife Refuge Area, which is located throughout the western and southern portions of the Action Area.

Based on the presence of this habitat, albeit constrained to a small portion of the Action Area, a determination of *"May affect, not likely to adversely affect"* is recommended for this species for the Action Area.

5.2.3.4 Piping Plover

Although the piping plover occurs in Cameron County, there are no documented occurrences of piping plovers in the Action Area (TXNDD 2012). Piping plovers are typically present at the Texas coast between mid-July and April although a few birds can be found along the coast year round (TPWD 2007). Approximately 435 acres of designated critical habitat occurs in Cameron

County which includes areas of wide, flat, open, sandy beaches with very little grass or other vegetation (USFWS 2001b). The nearest designated federal critical habitat is for the piping plover and is located approximately 24.4 km (15.2 mi) east of the Project site and 13.8 km (8.57 mi) east of the Action Area.

Piping plovers prefer bare or very sparsely vegetated intertidal ocean beach, wash-over passes, wrack lines, ephemeral ponds, lagoons, salt marshes, tidal mudflats, sandflats, and algal flats. Due to the minimal amount of potential habitat in the Project site and Action Area, any presence of piping plovers in the Action Area is expected to be temporary and transient in nature. No observations of the piping plover were documented during any of the field survey activities on the Project site or within the Action Area.

Due to the lack of preferred habitat within the Project site and Action Area, and the low potential for piping plovers to enter or utilize habitat within these areas, a determination of "*No effect*" is recommended for this species.

5.2.3.5 Rio Grande Silvery Minnow

The range of the Rio Grande silvery minnow is largely concentrated downstream of the Acacia Dam, with over 90 percent of the population residing in this 96km stretch. Its full range includes parts of the Rio Grande from a northwestern boundary of Espanola, New Mexico, to all of Texas, and Mexico, to the southernmost boundary of the Gulf of Mexico. TXNDD data shows one observation of the Rio Grande silvery minnow along the SW edge of the Action Area in the 1920s.

Due to the restrictive range of Rio Grande silvery minnow populations and the fact that the generating station does not include their habitats it is anticipated that the activities associated with the Project will not have a direct or indirect impact on the Rio Grande silvery minnow.

A determination of "*No effect*" is recommended for this species.

5.2.3.6 Smalltooth Sawfish

The smalltooth sawfish is a tropical marine and estuarine elasmobranch fish that can reach 25 feet in length. The preferred habitat is shallow coastal waters usually very close to shore over muddy and sandy bottoms. They are often found in estuaries, river mouths, mangroves, sheltered bays and on shallow banks (NMFS 2009).

The Action Area is located approximately 12 km (7.5 mi) from the nearest bay waters and no direct connection to open ocean waters is present. The potential for smalltooth sawfish to occur within the Project site or Action Area is negligible to nonexistent.

The Project will not have direct or indirect impacts to the smalltooth sawfish and a determination of "*No effect*" is recommended for this species.

5.2.3.7 Jaguar

The jaguar inhabits dense chaparral and timbered areas and show a fondness for waterside habitats. The jaguar is believed to be extirpated from Texas and is extremely unlikely this cat will be seen, although a rare visit by a wanderer from Mexico is possible (Davis 2000). TXNDD data shows one observation within the Action Area of a jaguar spotted in 1946. No other observations were recorded.

Due to the rarity of the jaguar and the amount of time since it was last observed in the region, a determination of *"No effect"* is recommended for the species.

5.2.3.8 Jaguarundi

There is little information concerning the biology and habitat requirements of the jaguarundi in Texas, it is believed that their habitat requirements of dense brush cover are similar to that of the ocelot. Tracks of at least 100 acres of isolated dense brush or 75 acres of brush interconnected to other tracts of habitat by brush corridors are considered important habitat. The jaguarundi is listed on the species lists for the Lower Rio Grande Valley National Wildlife Refuge and TXNDD records state it was observed in the Resaca de la Palma Wildlife Management Area in 1990 and 1992.

Dense thorny shrub lands were observed across the Site and within the Action Area. The Resaca de la Palma Wildlife Management Area and portions of the Lower Rio Grande Valley National Wildlife Refuge are located within the Action Area and potentially support habitat for the jaguarondi and suggest the species could be present in the Action Area. However, due to the extensive development and conversion of lands to cropland between these areas and the Project site, habitat use should be limited to transient uses.

A determination of *"May affect, but is not likely to adversely affect"* is recommended for the species.

5.2.3.9 Ocelot

The ocelot has the potential to occur in the dense thorny shrub lands with 75-95% coverage of species including spiny hackberry, brasil, desert yaupon, wolfberry, lotebush, amargosa, white brush, catclaw, blackbrush, lantana, guayucan, cenizo, elbowbush, and Texas persimmon. Tracts of at least 100 acres of isolated dense brush or 75 acres of brush interconnected to other tracts of habitat by brush corridors are considered important habitat (TPWD 2012d).

There are fewer than 100 ocelots in the U.S., all of which are concentrated in south Texas at the Lower Rio Grande Valley National Wildlife Refuge and Santa Ana National Wildlife Refuge (both near Alamo, TX), Laguna Atascosa National

Wildlife Refuge near Brownsville, and on a private ranch several miles away from Brownsville (USFWS 2010).

Dense thorny shrub lands were observed across the Site and within the Action Area. The Resaca de la Palma Wildlife Management Area and portions of the Lower Rio Grande Valley National Wildlife Refuge are located within the Action Area and potentially support habitat for the ocelot and suggest the species could be present in the Action Area. However, due to the extensive development and conversion of lands to cropland between these areas and the Project site, habitat use within the site should be limited to transient uses.

A determination of *"May affect, but is not likely to adversely affect"* is recommended for the species.

5.2.3.10 West Indian Manatee

West Indian manatees are marine mammals and require warm water with a freshwater influx and shallow seagrass for feeding. They are most common in river mouth and estuarine habitats. West Indian manatees typically occur in shallow waters off the coasts of Florida, Mexico, and Central America.

Direct impacts from the Generating Station are not anticipated due to the lack of manatee habitat within the Project site. The Action Area is located approximately 2.5 km (1.7 mi) from the nearest saltwater and no direct connection to tidal waters is present. There is potential for wastewater discharges to occur in open water habitats associated with the West Indian manatee in the Port of Brownsville Ship Channel. Impacts associated with the water discharge pipeline and the outfall structure is discussed in the BA in Attachment 1 of this document.

Due to not having a connection to tidal waters, the West Indian manatees will not be present within the Project site or Action Area, and therefore, they will not be directly or indirectly impacted by activities associated with the Project.

A determination of *"No effect"* is recommended for this species.

5.2.3.11 Atlantic Hawksbill Sea Turtle

The Atlantic hawksbill sea turtle nests on small, oceanic beaches. Within the continental U.S., nesting is restricted to the southeastern coast of Florida (NMFS 1993). They consume primarily sponges, which require a hard substrate, and are therefore often associated with coral reefs, rocky outcrops, lagoons, shoals, and oceanic islands.

The only documented Atlantic hawksbill sea turtle nesting on the Texas Coast occurred in 1998 at Padre Island National Seashore (NPS 2012b). They have been observed with some regularity in Florida and Texas. Sightings of small

Atlantic hawksbill sea turtles in Texas are believed to originate from nesting beaches in Mexico (NMFS 1993).

The Action Area is located approximately 2.5 km (1.7 mi) from the nearest beach and no direct connection to open ocean or tidal waters are present. Due to not having a connection to tidal waters, the potential for Atlantic hawksbill sea turtles to travel through the Project site or Action Area is minimal and therefore they will not be directly or indirectly impacted by activities associated with the Project and a determination of *"No effect"* is recommended for this species.

5.2.3.12 Green Sea Turtle

South Padre Island is the only location on the Texas coast where green sea turtle nesting has been documented. In the last few years, one to five nests have been reported each year. Most green sea turtles found in Texas waters are juveniles (NPS 2012d). Green sea turtles nest on high energy beaches with minimal human disturbance, usually on islands (NMFS 1991).

The Action Area is located approximately 2.5 km (1.7 mi) from the nearest beach and no direct connection to open ocean or tidal waters. Due to not having a connection to tidal waters, the potential for green sea turtles to travel through the Project site or Action Area is minimal and therefore they will not be directly or indirectly impacted by activities associated with the Project and a determination of *"No effect"* is recommended for this species.

5.2.3.13 Kemp's Ridley Sea Turtle

Kemp's Ridley sea turtles are loyal to their nesting sites, which are highly restricted to fine grain beaches along the coast of Veracruz, Mexico and the Padre Island National Seashore in Texas (USFWS 2012e). Padre Island National Seashore is the primary nesting location for Kemp's Ridley sea turtles. The vast majority of which were strandings, along the Gulf side of North Padre and Mustang Island (Manzella and Williams 1992). The proximity of these strandings correlates with the location of the Padre Island National Seashore nesting site and ocean currents that would carry post-hatchlings.

No critical habitat within the U.S. has been designated, although petitions to do so along the Texas coast have been submitted (WEG 2010).

The Action Area is located approximately 2.5 km (1.7 mi) from the nearest beach and no direct connection to open ocean or tidal waters are present. Due to not having a connection to tidal waters, the potential for Kemp's Ridley sea turtles to travel through the Project site or Action Area is minimal and therefore they will not be directly or indirectly impacted by activities associated with the Project and a determination of *"No effect"* is recommended for this species.

5.2.3.14 Leatherback Sea Turtle

Leatherback sea turtles nest on tropical and subtropical sloping, sandy beaches, in proximity to deep water; and are restricted to southern Florida in the continental U.S. (USFWS 2012 f). Leatherback sea turtles feed almost entirely on jellyfish and are highly migratory and pelagic, moving thousands of miles between nesting beaches and feeding grounds. They rarely approach land, except for nesting.

Leatherback sea turtles are rare visitors to the Texas Gulf Coast (TPWD 2012e); however, in 2008, a single nest was located at Padre Island National Seashore. Prior to this nesting, only historical records of nesting occurred in Texas from the 1920s and 1930s. No nests have been detected since 2008 (NPS 2012e).

The Action Area is located approximately 2.5 km (1.7 mi) from the nearest beach and no direct connection to open ocean or tidal waters are present. Due to not having a connection to tidal waters, the potential for leatherback sea turtles to travel through the Project site or Action Area is minimal and therefore they will not be directly or indirectly impacted by activities associated with the Project and a determination of *"No effect"* is recommended for this species.

5.2.3.15 Loggerhead Sea Turtle

Loggerhead sea turtles nest between the high tide line and dune front, usually on ocean beaches, but occasionally on appropriate estuarine shorelines (NMFS 2008) on steeply sloped, relatively narrow, coarse-grained beaches. Juveniles and adult loggerhead sea turtles utilize both neritic and oceanic environments, while adults prefer to utilize open ocean areas (NMFS 2008).

There is no critical habitat designated in the U.S. In Texas, a relatively stable number of 1-6 loggerhead nests are found annually. These nests have been found statewide with the greatest occurrence on the Padre Island National Seashore (NPS 2012a).

The Action Area is located approximately 2.5 km (1.7 mi) from the nearest beach and no direct connection to open ocean or tidal waters are present. Due to not having a connection with tidal waters, the potential for loggerhead sea turtles to travel through the Project site or Action Area is minimal and therefore they will not be directly or indirectly impacted by activities associated with the Project and a determination of *"No effect"* is recommended for this species.

5.2.3.16 South Texas Ambrosia

The South Texas ambrosia has historically been found in Cameron, Jim Wells, Kleberg, and Nueces counties in South Texas and currently occurs in six locations in Nueces and Kleberg counties. It has also been found in Tamaulipas, Mexico; however, its current state there is unknown (TPWDb).

No species were observed and no observations of potential habitat for the South Texas ambrosia were identified within the Project site. Habitats associated with the species may be present within Action Area; however, detailed surveys were not performed to identify those locations. Considering the construction footprint for the generating station and the lack of species and its habitats, a determination of *"No effect"* is recommended for this species.

5.2.3.17 Star Cactus

The star cactus is historically known from Cameron, Hidalgo and Starr Counties in south Texas and the border states of Nuevo Leon and Tamaulipas in Mexico. Presently, this species is known from one population each in Starr County and Tamaulipas (TPWD 2013d).

No species were observed and no observations of potential habitat for the star cactus were identified within the Project site. Habitats associated with the species may be present within Action Area; however, detailed surveys were not performed to identify those locations. Considering the construction footprint for the generating station and the lack of species and its habitats, a determination of "No effect" is recommended for this species.

5.2.3.18 Texas Ayenia

The Texas ayenia grows in moist, dense, subtropical riparian woodlands. It is known to historically occur in Cameron and Hidalgo counties in south Texas and in the states of Coahuila and Tamaulipas in Mexico. It is currently known to exist only in one small population of 20 individuals in Hidalgo County (TPWD 2013a). TXNDD data show the possibility of Texas ayenia to occur along the Mexican border and spanning into the Action Area. The first observation in this area was made in 1945 and the last recorded observation was in 1963 (TXNDD 2013).

No species were observed and no observations of potential habitat for the Texas ayenia were identified within the Project site. Habitats associated with the species may be present within Action Area; however, detailed surveys were not performed to identify those locations. Considering the construction footprint for the generating station and the lack of species and its habitats, a determination of "No effect" is recommended for this species.

5.3 DESIGNATED FEDERAL CRITICAL HABITAT

There is no designated federal critical habitat on the Project site or Action Area. The nearest designated federal critical habitat is for the piping plover and is located approximately 24.4 km (15.2 mi) east of the Project site and 13.8 km (8.57 mi) east of the Action Area.

5.4 INTERDEPENDENT AND INTERRELATED ACTIONS

The Project will have several interconnects considered interdependent and interrelated to the Generating Station. These include the electrical transmission interconnect line, water discharge pipeline, and the potable water and sanitary sewer interconnect lines. All three interconnects will be owned and operated by BPUB.

The transmission interconnect line will be an approximate 11-mile long aboveground line connecting the Generating Station to BPUBs' Loma Alta Substation.

A water discharge pipeline will extend eastward from the Generating Station over to the Port of Brownsville Ship Channel.

Potable water and sanitary sewer interconnect lines will connect to the Generating Station to BPUB's Southmost Regional Water Authority facility located adjacent to and south of the Project site.

Each of these interconnects have been evaluated separately from this BA and are provided in Attachments 1 and 2 of this document.

5.5 INDEPENDENT ACTIONS FOR INFORMATIONAL PURPOSES

Notwithstanding the independent utility of these BPUB regional projects, Attachments 3 and 4 provide supplemental assessments of the natural gas line and water reuse pipeline for the purpose of advancing EPA's consideration of Tenaska's GHG PSD permit pending receipt of a formal determination that the scope of the project does not include these regional projects. Tenaska and BPUB maintain that these regional projects are beyond the scope of the Generating Station project.

5.6 DETERMINATION OF EFFECT SUMMARY

This section provides a summary of the effect determinations made for the Generating Station and the associated interconnects and certain BPUB projects. Table 5-1 below provides a summary of the threatened and endangered species and recommended determination of effects for the major components of the Project and certain BPUB projects.

A total of 15 species were evaluated as part of this BA for the Generating Station and the defined Action Area to determine potential Project impacts on threatened and endangered species. Evaluations for three of the species resulted in a determination of "*may affect, but is not likely to adversely affect*" while the remaining twelve species resulted in "*no effects* "determinations. The three species included the northern aplomado falcon, ocelot, and the jaguarundi.

For the remaining components of the Project and the BPUB projects, the same three species were identified for the water discharge pipeline, while only the northern aplomado falcon was identified for the transmission interconnect line and only the ocelot and jaguarundi were identified the BPUB natural gas transmission pipeline.

It is important to note that the Walker's manioc (*Manihot walkerae*) was an additional species evaluated as part of the BPUB natural gas transmission pipeline, due to it crossing into Hidalgo County. All other species for that BPUB project were the same as those listed in Cameron County.

TABLE 5-1: Summary of Anticipated Effects on Federally Listed Species Potentially Occurring in the Project Site and Action Area

Federally Listed Species	***Listing Agency***	***Recommended Determination of Effect for the Generating Station***	***Recommended Determination of Effect for the Water Discharge Pipeline***	***Recommended Determination of Effect for the Transmission Interconnect Line***	***Recommended Determination of Effect for the BPUB Water Reuse Pipeline Project[2]***	***Recommended Determination of Effect for the BPUB Natural Gas Transmission Pipeline[2]***
Eskimo curlew (*Numenius borealis*)	*USFWS*	No effect	No effect	No effect	No effect	No effect
Interior least tern (*Sterna antillarum athalassos*)	*USFWS*	No effect	No effect	No effect	No effect	No effect
Northern aplomado falcon (*Falco femoralis septentrionalis*)	*USFWS*	May affect, but is not likely to adversely affect	May affect, but is not likely to adversely affect	May affect, but is not likely to adversely affect	No effect	No effect
Piping plover (Charadrius melodus)	*USFWS*	No effect	No effect	No effect	No effect	No effect
Rio Grande silvery minnow (*Hybognathus amarus)*	*USFWS*	No effect	No effect	No effect	No effect	No effect
Smalltooth sawfish (*Pristis pectinata*)	NOAA	No effect	No effect	No effect	No effect	No effect
Jaguar (*Panthera onca*)	USFWS	No effect	No effect	No effect	No effect	No effect

Federally Listed Species	*Listing Agency*	*Recommended Determination of Effect for the Generating Station*	*Recommended Determination of Effect for the Water Discharge Pipeline*	*Recommended Determination of Effect for the Transmission Interconnect Line*	*Recommended Determination of Effect for the BPUB Water Reuse Pipeline Project*[2]	*Recommended Determination of Effect for the BPUB Natural Gas Transmission Pipeline*[2]
Jaguarundi (*Herpailurus yagouaroundi* (var. *Herpailurus yagouaroundi cacomitli*)	USFWS	May affect, but is not likely to adversely affect	May affect, but is not likely to adversely affect	No effect	No effect	May affect, but is not likely to adversely affect
Ocelot (*Leopardus pardalis*)	USFWS	May affect, but is not likely to adversely affect	May affect, but is not likely to adversely affect	No effect	No effect	May affect, but is not likely to adversely affect
West Indian manatee (*Trichechus manatus*)	USFWS	No effect	No effect	No effect	No effect	No effect
Atlantic hawksbill sea turtle (*Eretmochelys imbricate*)	USFWS/NOAA	No effect	No effect	No effect	No effect	No effect
Green sea turtle (*Chelonia mydas*)	USFWS/NOAA	No effect	No effect	No effect	No effect	No effect
Kemp's Ridley sea turtle (*Lepidochelys kempii*)	USFWS/NOAA	No effect	No effect	No effect	No effect	No effect
Leatherback sea turtle (*Dermochelys coriacea*)	USFWS/NOAA	No effect	No effect	No effect	No effect	No effect
Loggerhead sea turtle (*Caretta caretta*)	USFWS/NOAA	No effect	No effect	No effect	No effect	No effect
South Texas ambrosia (*Ambrosia cheiranthifolia*)	USFWS	No effect	No effect	No effect	No effect	No effect
Star cactus (*Astrophytum asterias*)	USFWS	No effect	No effect	No effect	No effect	No effect

Federally Listed Species	*Listing Agency*	*Recommended Determination of Effect for the Generating Station*	*Recommended Determination of Effect for the Water Discharge Pipeline*	*Recommended Determination of Effect for the Transmission Interconnect Line*	*Recommended Determination of Effect for the BPUB Water Reuse Pipeline Project*[2]	*Recommended Determination of Effect for the BPUB Natural Gas Transmission Pipeline*[2]
Texas ayenia (*Ayenia limitaris*)	USFWS	No effect	No effect	No effect	No effect	No effect
Walker's manioc (*Manihot walkerae*)	USFWS	N/A[1]	N/A	N/A	N/A	No effect

1. *N/A – Species not listed in Cameron County, Texas. Only the natural gas transmission pipeline crosses into Hidalgo County where this species is listed.*
2. *Notwithstanding the independent utility of these BPUB regional projects, supplemental assessments of the natural gas line and water reuse pipeline are included for the purpose of advancing EPA's consideration of Tenaska's GHG PSD permit pending receipt of a formal determination that the scope of the project does not include these regional projects.*

6.0 CONSERVATION AND MITIGATION MEASURES

The construction and operation of the Project will likely have no direct or indirect adverse impact on federally-protected species or their habitat. Tenaska will utilize BACT to control emissions and thus minimize impacts to the surrounding environment. The proposed emissions of each pollutant subject to PSD review are consistent with both the TCEQ BACT guidance and the limits in the EPA's RACT/BACT/LAER Clearinghouse (RBLC); and, are considered to be the top level of control available for new and modified facilities.

Tenaska has located the Project site within an area that will avoid and minimize impacts to federally-protected species and their habitats. Furthermore, Tenaska will utilize additional measures, such as Best Management Practices (BMP's) that will avoid adverse impacts during construction and operation of project. Selected BMPs will be matched and adapted to meet the site-specific requirements of the project and local environment. Examples of BMPs may include use of silt fences and hay bales to reduce and prevent sedimentation and erosion, use of water trucks to control airborne dust from construction vehicles, use of low intensity lights and hood or direct lights downward to prevent avian impacts.

6.1 Threatened and Endangered Species

Based on field reconnaissance and assessment of potential impacts to species and their available habitats, no loss of threatened or endangered species and/or critical habitat is expected to result from construction or operation of the Project. No protected species were observed or have been documented within the Project site. Suitable habitat to support the transient movements and foraging for the ocelot, jaguarundi, and the northern Aplomado falcon were identified in the Project site and the Action Area.

6.2 Fisheries Conservation

The nearest area with designated essential fish habitat by the Gulf of Mexico Fishery Management Council (GMFMC) is located in the Brownsville Ship Channel approximately 11 miles east of the Project site. EFH present in this location include red drum, stone crab, shrimp, reef fish and coastal migratory pelagics. Impact to any species within this EFH area is not expected to result from construction or operation of the Project, due to there being no connectivity, such as tidal waters, between the Project site and the nearest designated EFH.

6.3 Mitigation Commitments

Tenaska is proposing the following commitments for mitigating potential impacts to the identified threatened and endangered species and migratory birds associated with Project activities.

1. Educate construction personnel regarding the potential for occurrence of endangered species;
2. Require Contractor's environmental representatives to report any encounters with endangered species to the owner/owner's representatives, who will then contact the local offices of USFWS;
3. Protect areas near the waterbodies that may function as a potential travel corridor from unnecessary disturbance (i.e., fencing and/or barricades);
4. Conduct majority of construction activities during daylight hours;
5. Reduction of noise emissions during night-time hours by minimizing night-time construction activities;
6. No direct lighting will be used to illuminate areas near the ditches or large waterbodies at night;
7. Reduced speed limit posted on the facility construction site;
8. Install bird diverters on the conductors on the transmission line to minimize potential collisions and to discourage nesting or roosting on the structures towers;
9. Avoid vegetation or removal activities (shrubs/trees) during the peak nesting period of March through August, except as noted in item 10 below, to avoid destruction of individuals, nests or eggs; and,
10. If project activities must be conducted during the peak nesting period, survey for nests prior to commencing work and if a nest is found, maintain a minimum 50 foot buffer of vegetation around the nest until the young have fledged or the nest is abandoned.

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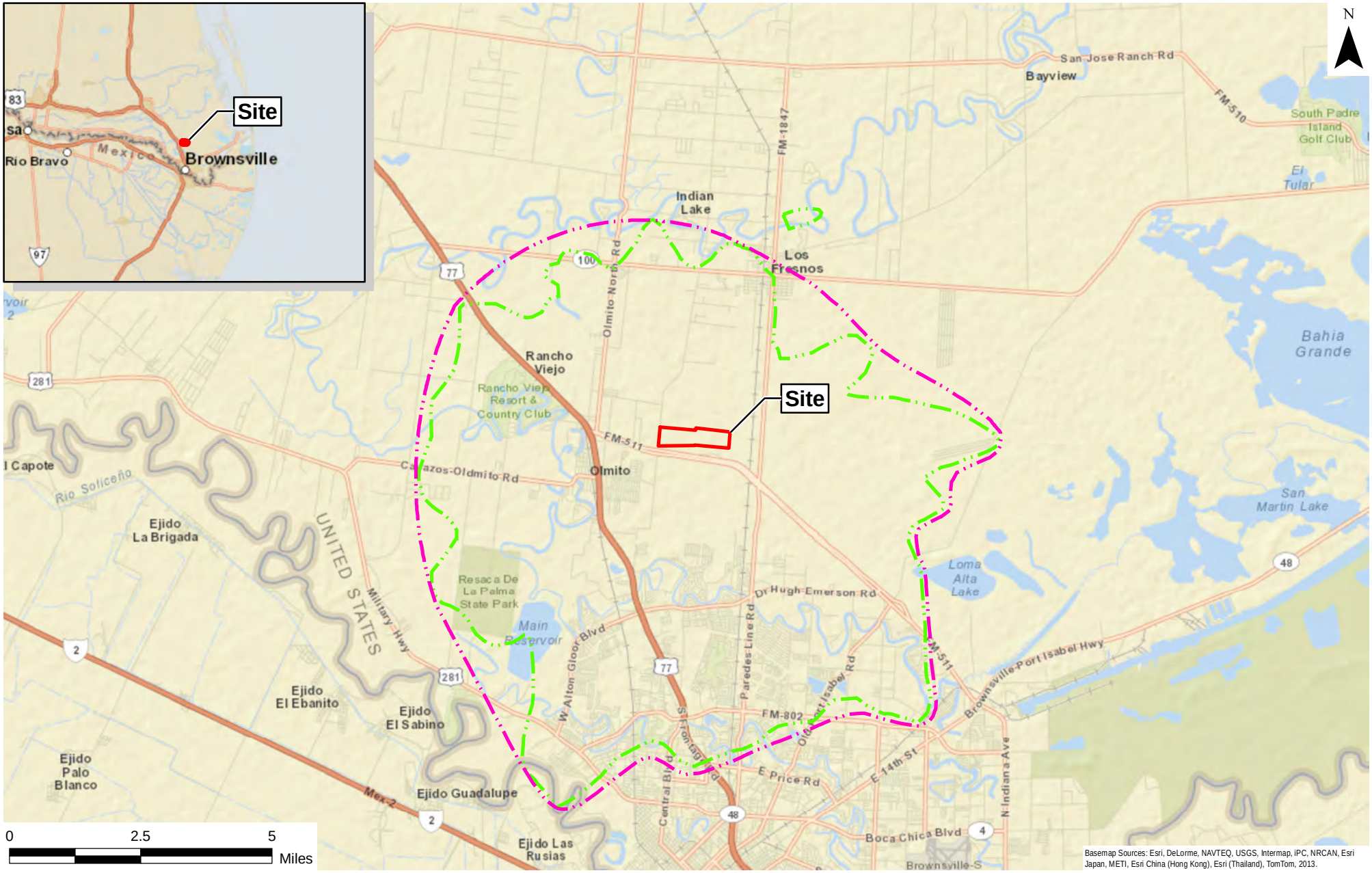
Figures

May 20, 2014
Project No. 0185680

Environmental Resources Management
CityCentre Four
840 West Sam Houston Parkway, Suite 600
Houston, Texas 77024-3920
(281) 600-1000



Environmental Resources Management

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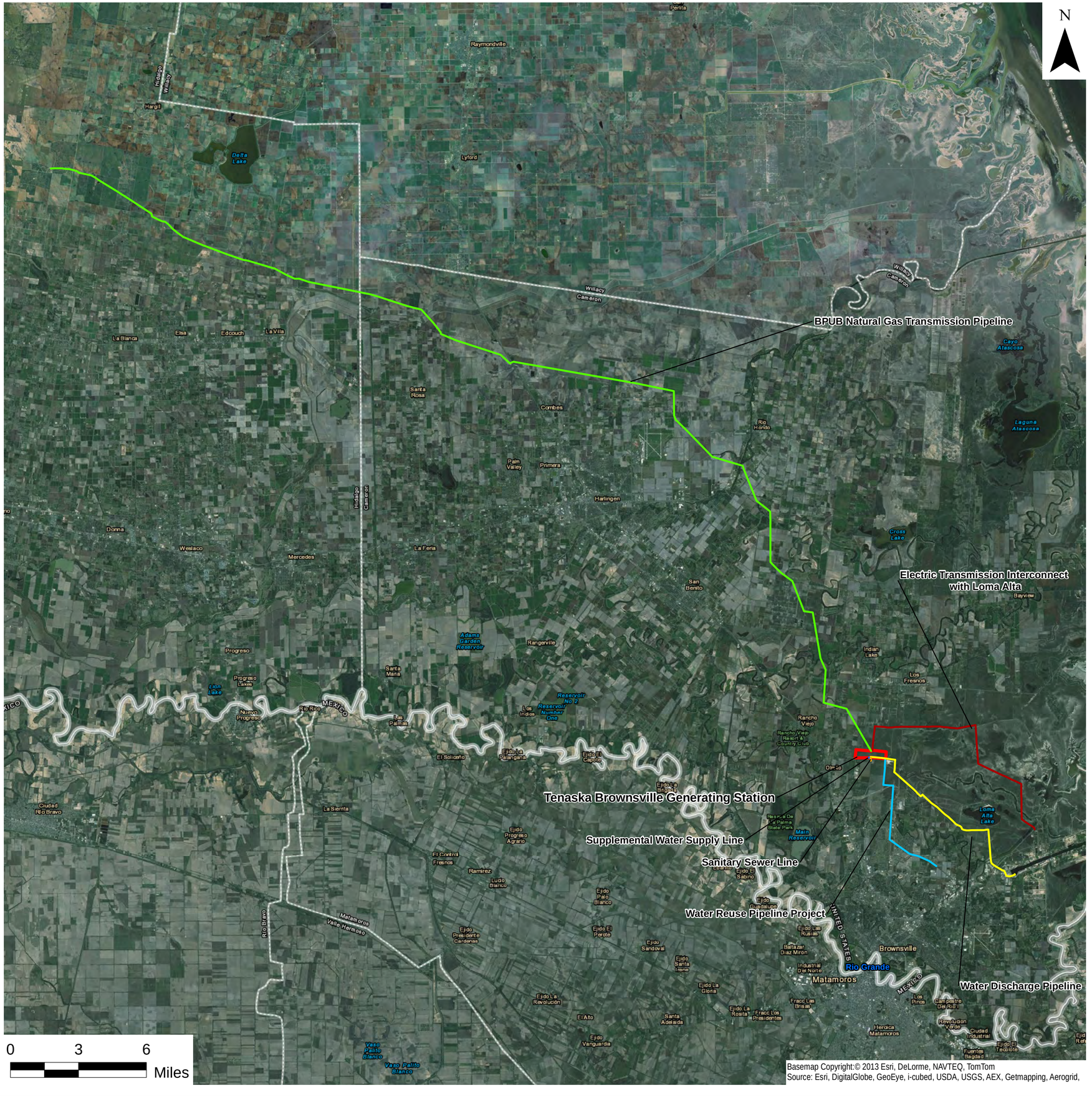
FIGURE 1-1
PROJECT SITE VICINITY MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- ROI analysis using EPA SILs
- Action Area

ERM



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Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid,

Legend

- Generating Station - Property Site
- Water Discharge Pipeline
- Electric Transmission Interconnect with Loma Alta
- BPUB Natural Gas Transmission Pipeline
- Water Reuse Pipeline Project
- Sanitary Sewer Line
- Supplemental Water Supply Line

FIGURE 1-2
PROJECT COMPONENTS MAP

Biological Assessment

Tenaska Brownsville Partners, LLC

Brownsville, Texas

DESIGN:	A Ragatz	DRAWN:	S King
CHECKED:	K Schlicht	DATE:	4/22/2014
SCALE:	AS SHOWN	REVISION:	0

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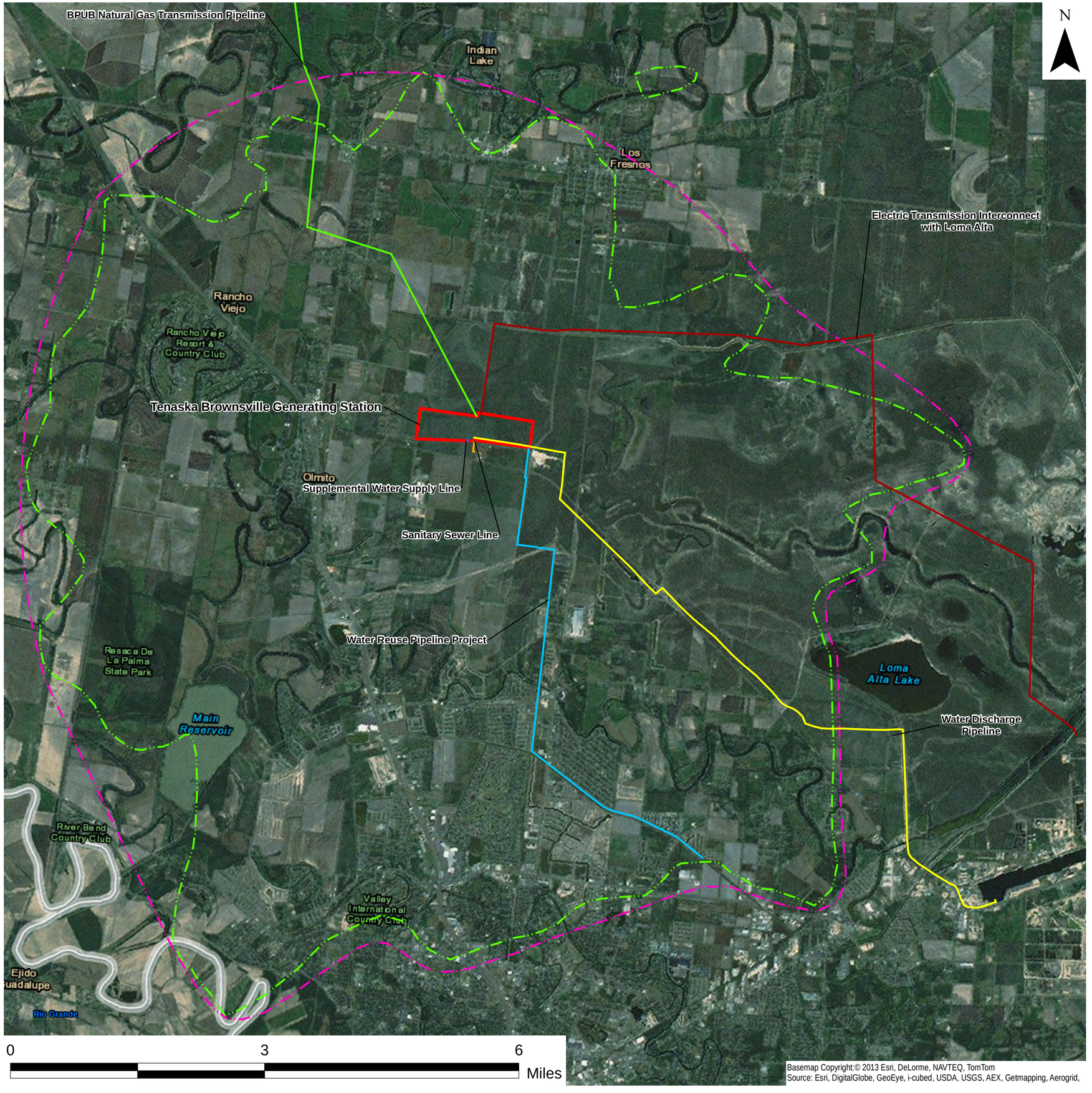
ERM

Environmental Resources Management



Legend

- Generating Station - Property Site
- Water Discharge Pipeline
- Electric Transmission Interconnect with Loma Alta
- BPUB Natural Gas Transmission Pipeline
- Water Reuse Pipeline Project
- Sanitary Sewer Line
- Supplemental Water Supply Line
- Action Area
- ROI analysis using EPA SILs

FIGURE 1-3
STUDY AREA MAP

Biological Assessment

Tenaska Brownsville Partners, LLC

Brownsville, Texas

DESIGN:	A Ragatz	DRAWN:	S King
CHECKED:	K Schlicht	DATE:	4/22/2014
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Environmental Resources Management

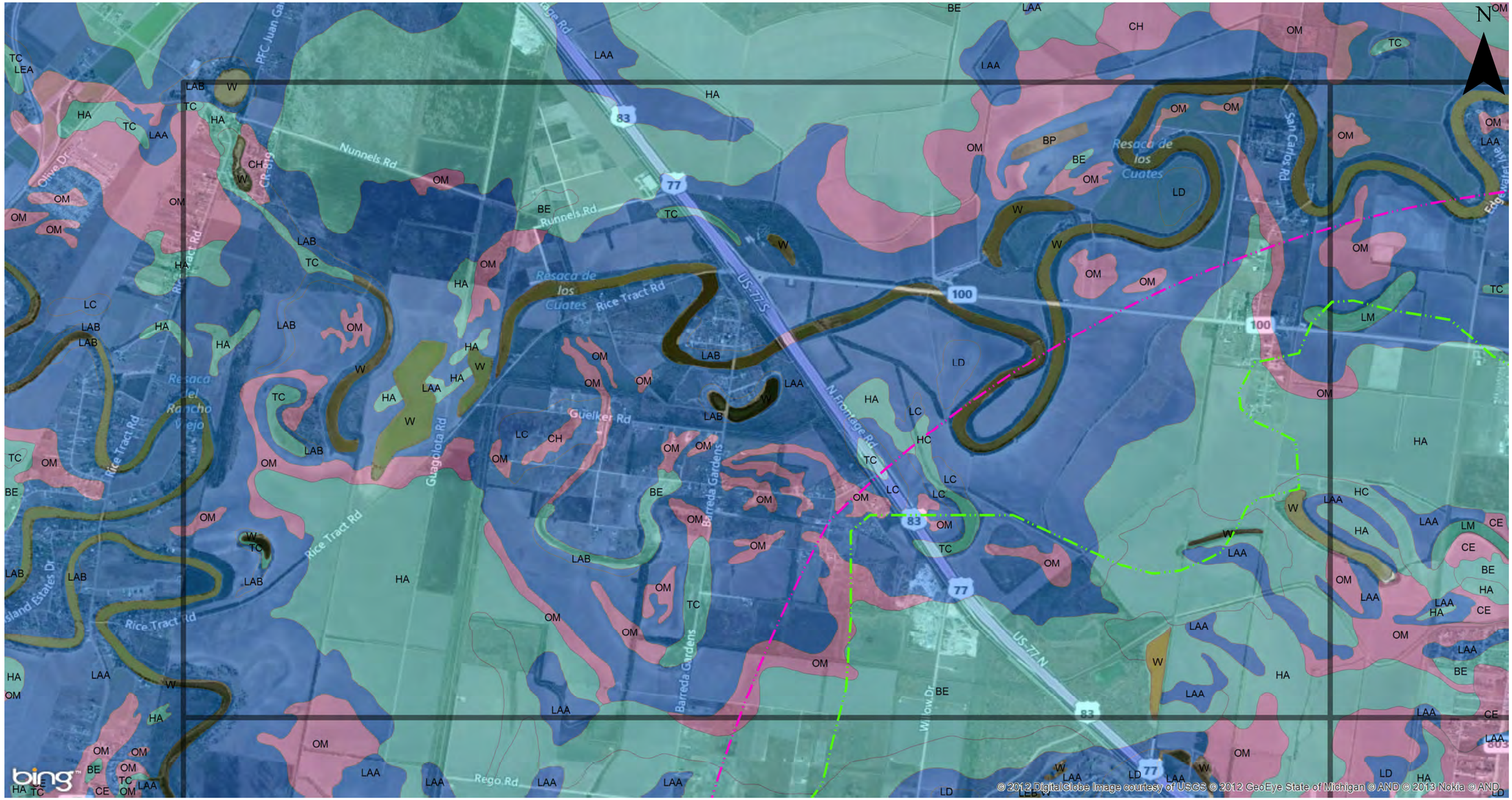

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FIGURE 2-1: GRID 1
NRCS SOILS MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

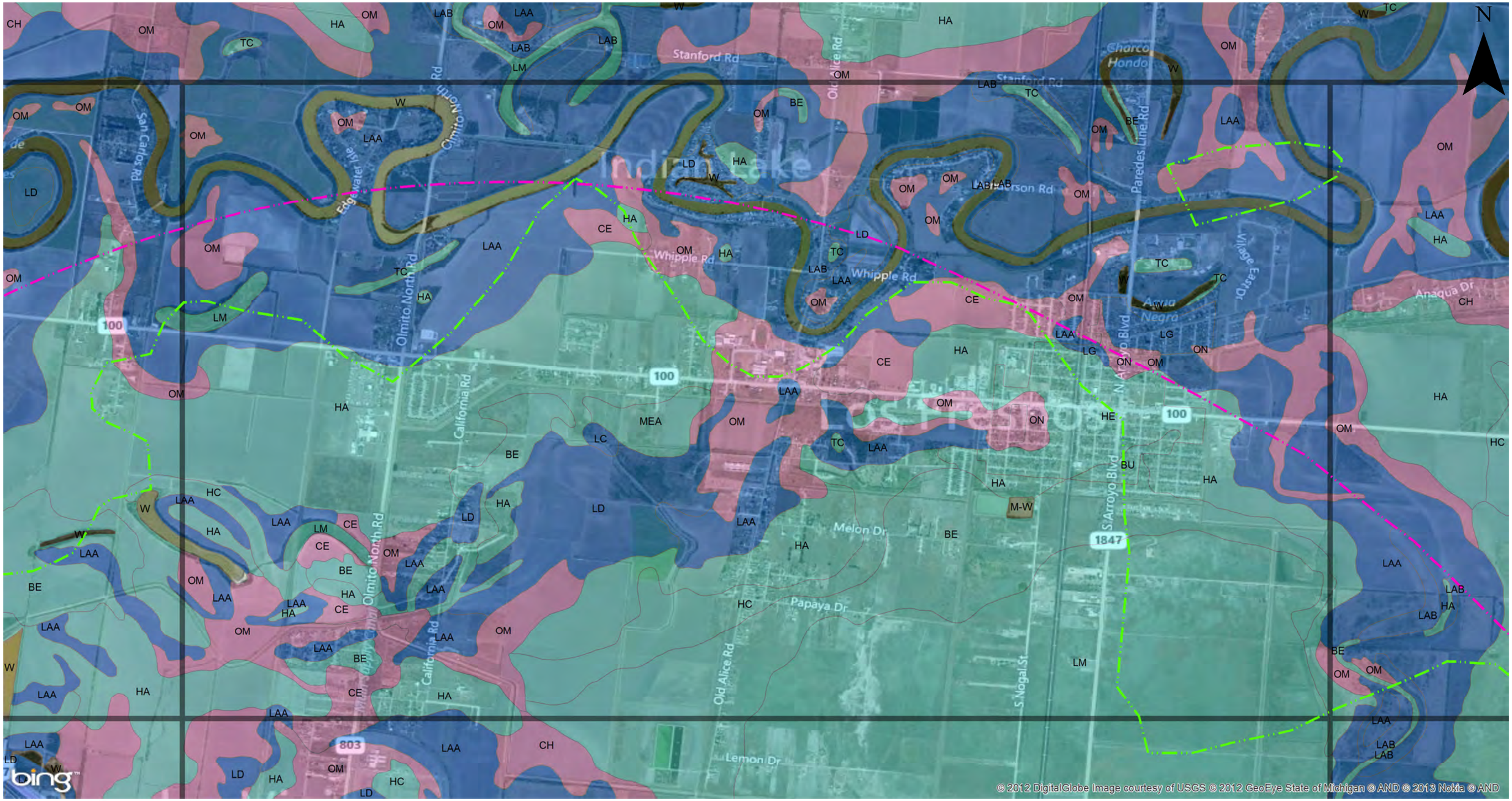
Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid

NRCS Soil Texture

- clay
- clay loam
- fine sand
- fine sandy loam
- silt loam
- silty clay

ERM



Environmental Resources Management

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FIGURE 2-1: GRID 2
NRCS SOILS MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

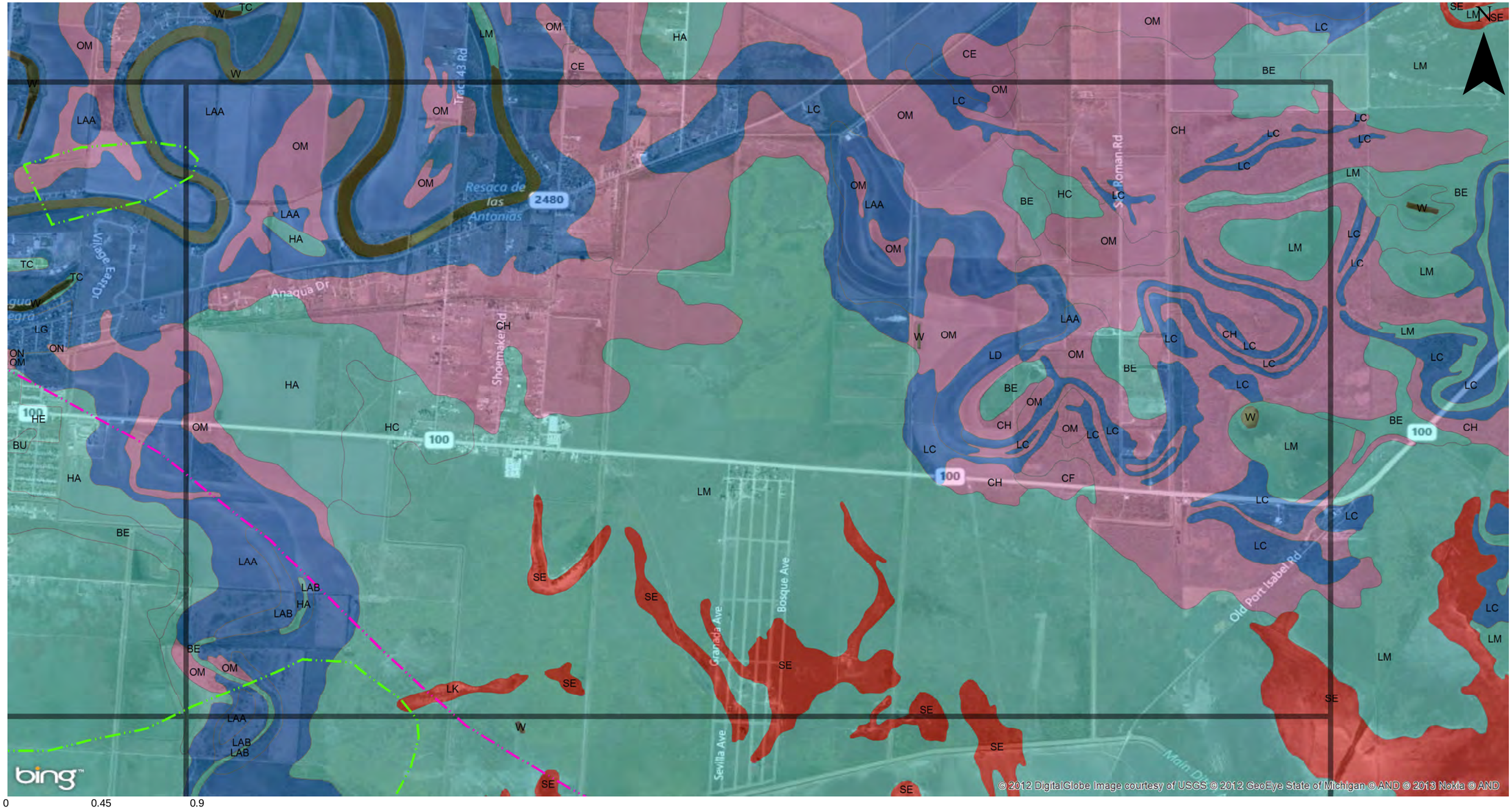
Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid

NRCS Soil Texture

- clay
- clay loam
- fine sand
- fine sandy loam
- silt loam
- silty clay

ERM



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Environmental Resources Management

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FIGURE 2-1: GRID 3
NRCS SOILS MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

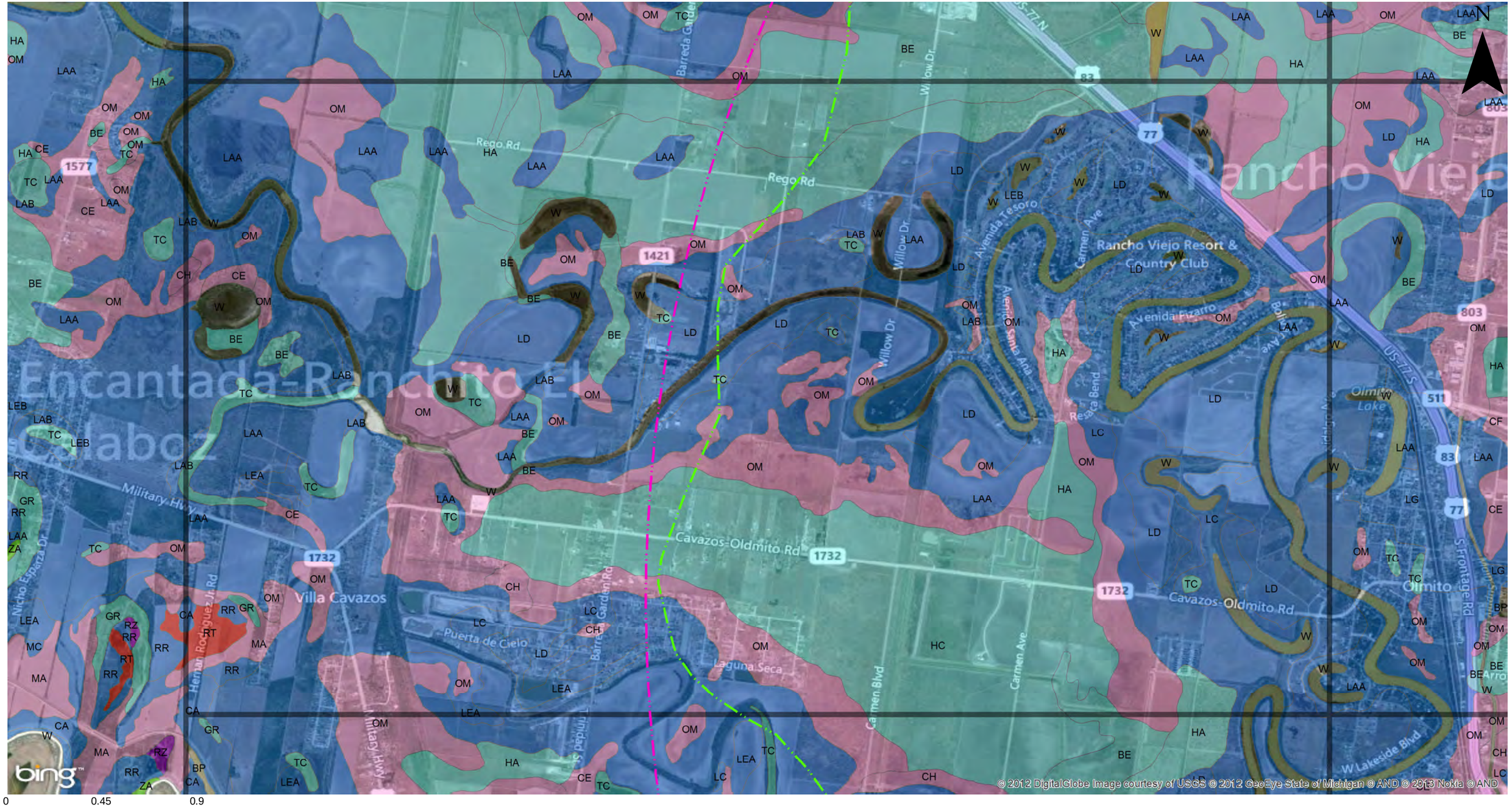
Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid

NRCS Soil Texture

- clay
- clay loam
- fine sand
- fine sandy loam
- silt loam
- silty clay

ERM



Environmental Resources Management

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FIGURE 2-1: GRID 4
NRCS SOILS MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

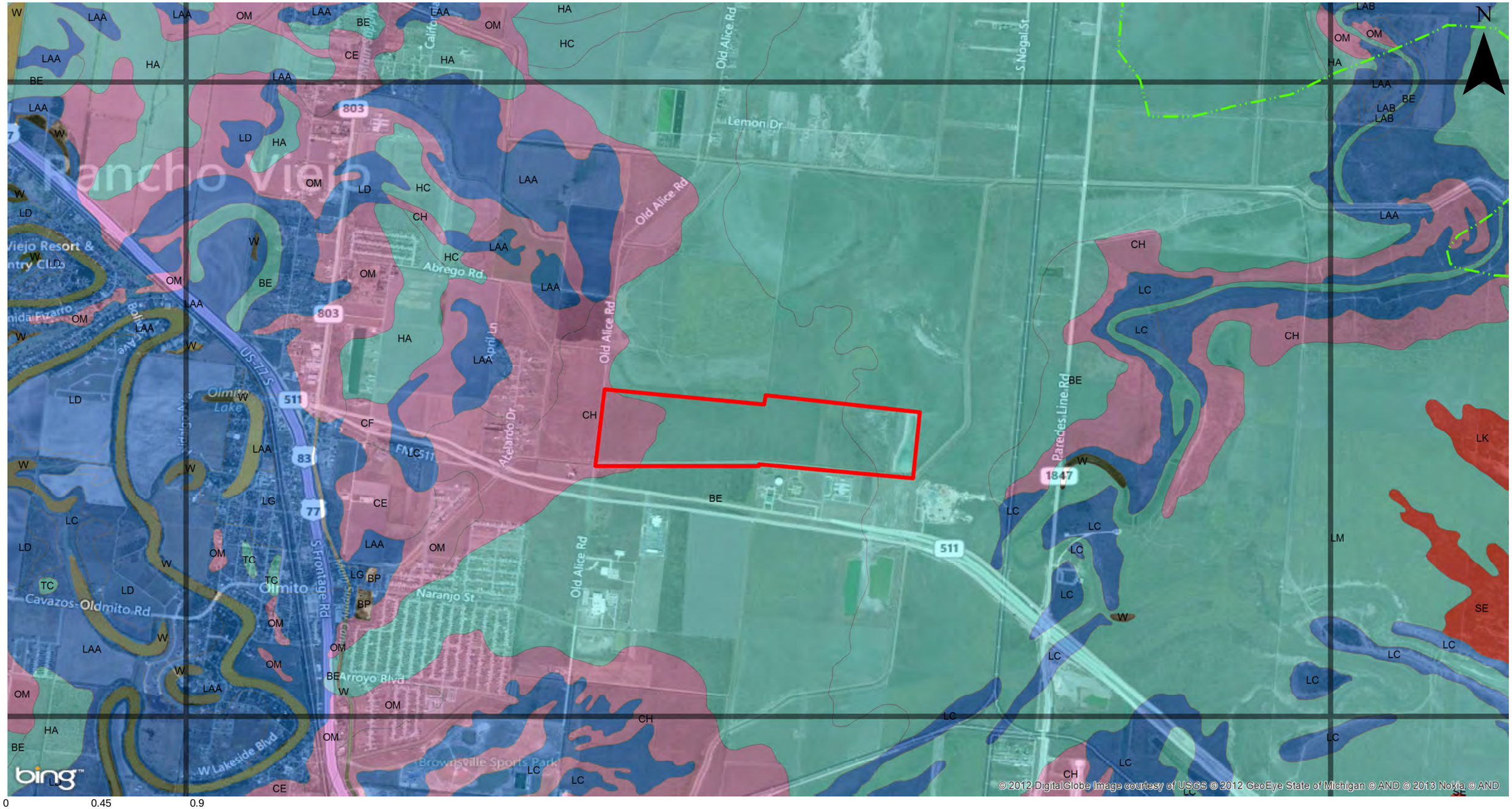
Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid

NRCS Soil Texture

- clay
- clay loam
- fine sand
- fine sandy loam
- silt loam
- silty clay

ERM



Environmental Resources Management

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FIGURE 2-1: GRID 5
NRCS SOILS MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

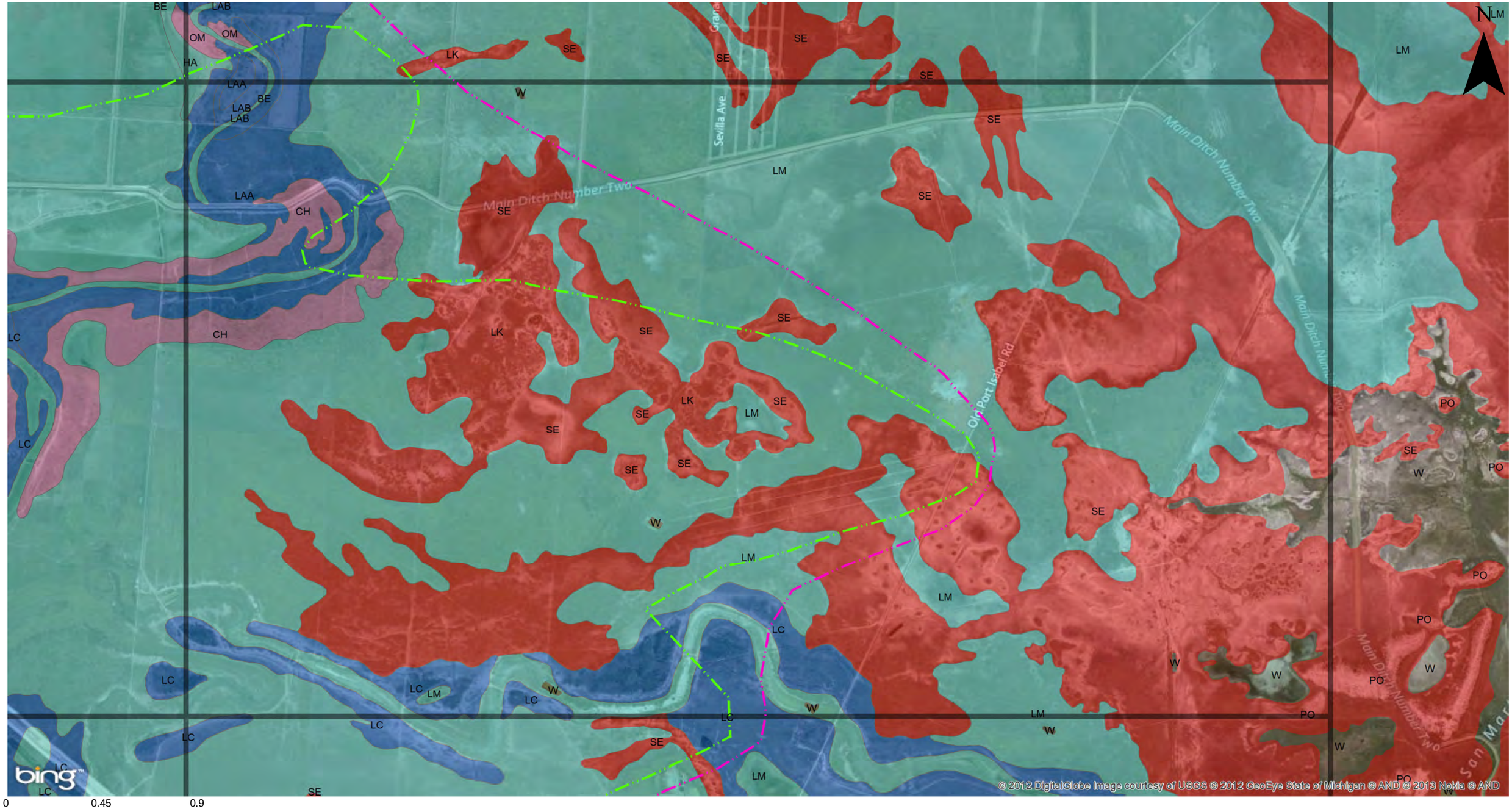
Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid

NRCS Soil Texture

- clay
- clay loam
- fine sand
- fine sandy loam
- silt loam
- silty clay

ERM



Environmental Resources Management

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FIGURE 2-1: GRID 6
NRCS SOILS MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid

NRCS Soil Texture

- clay
- clay loam
- fine sand
- fine sandy loam
- silt loam
- silty clay

ERM

0 0.45 0.9 Miles

Environmental Resources Management

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DATE:	12/16/2013	SCALE:	AS SHOWN	REVISION:	0

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FIGURE 2-1: GRID 7
NRCS SOILS MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid

NRCS Soil Texture

- clay
- clay loam
- fine sand
- fine sandy loam
- silt loam
- silty clay

ERM

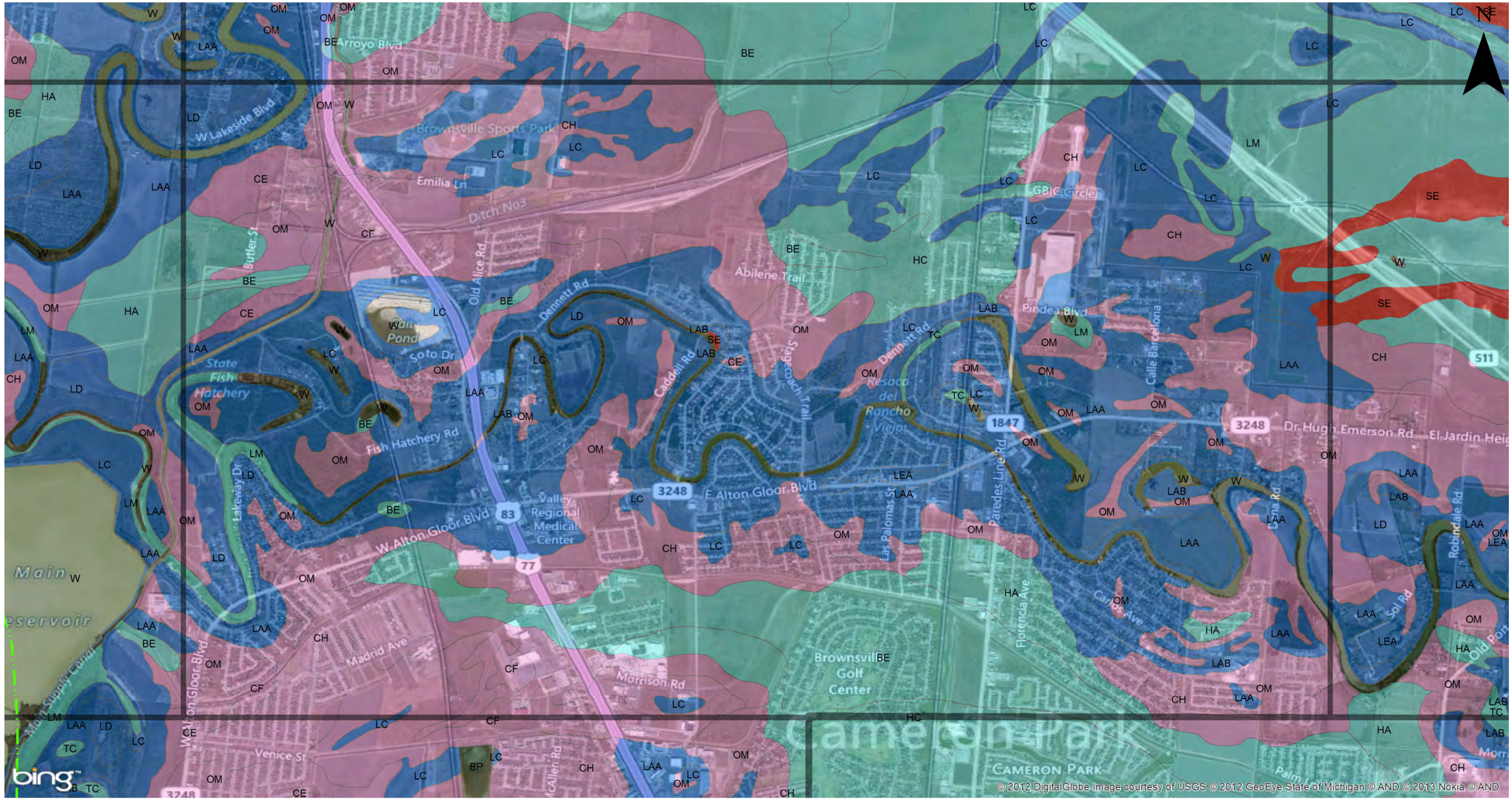

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FIGURE 2-1: GRID 8
NRCS SOILS MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid

NRCS Soil Texture

- clay
- clay loam
- fine sand
- fine sandy loam
- silt loam
- silty clay

ERM

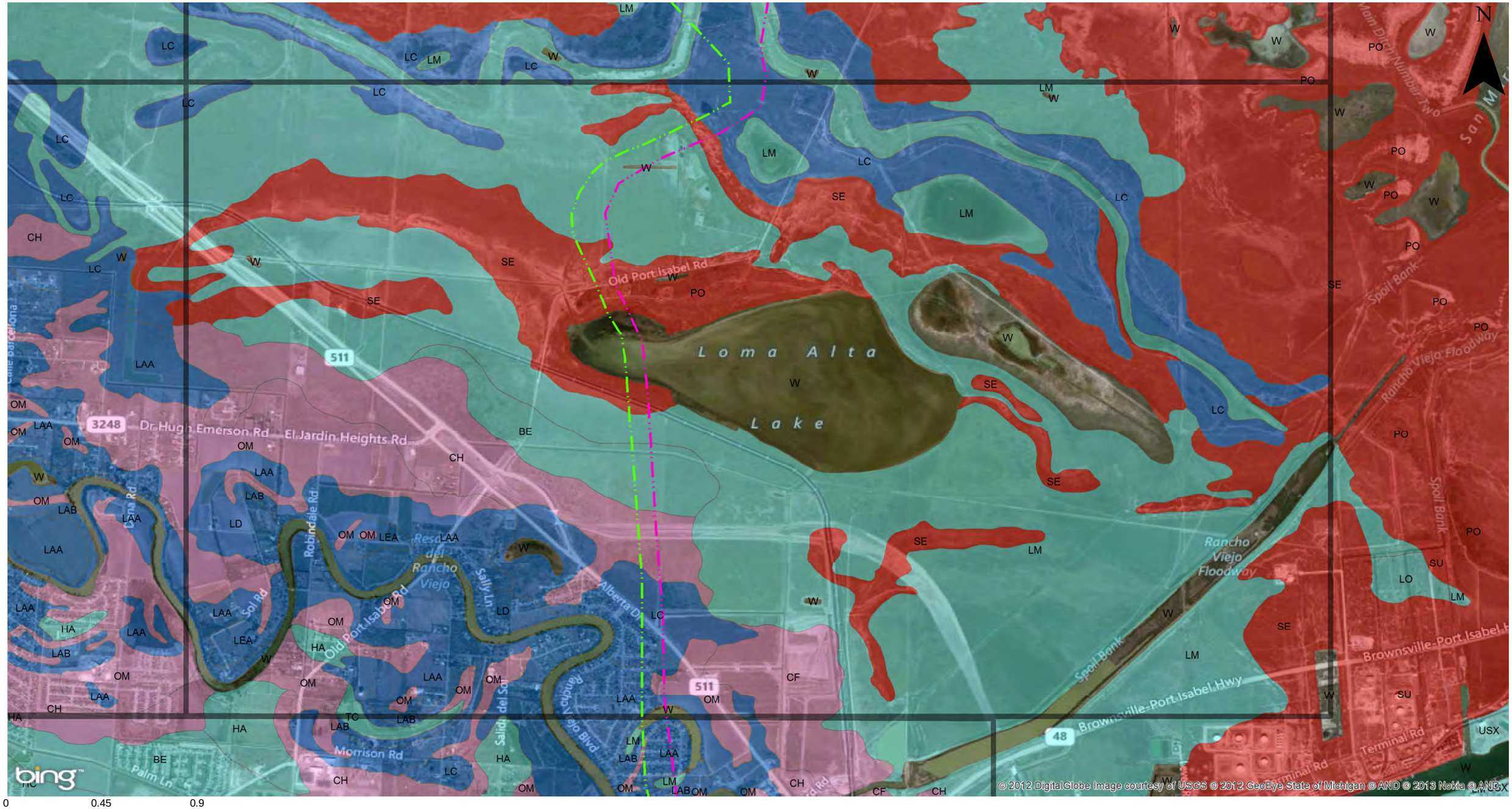

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FIGURE 2-1: GRID 9
NRCS SOILS MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid

NRCS Soil Texture

- clay
- clay loam
- fine sand
- fine sandy loam
- silt loam
- silty clay

ERM

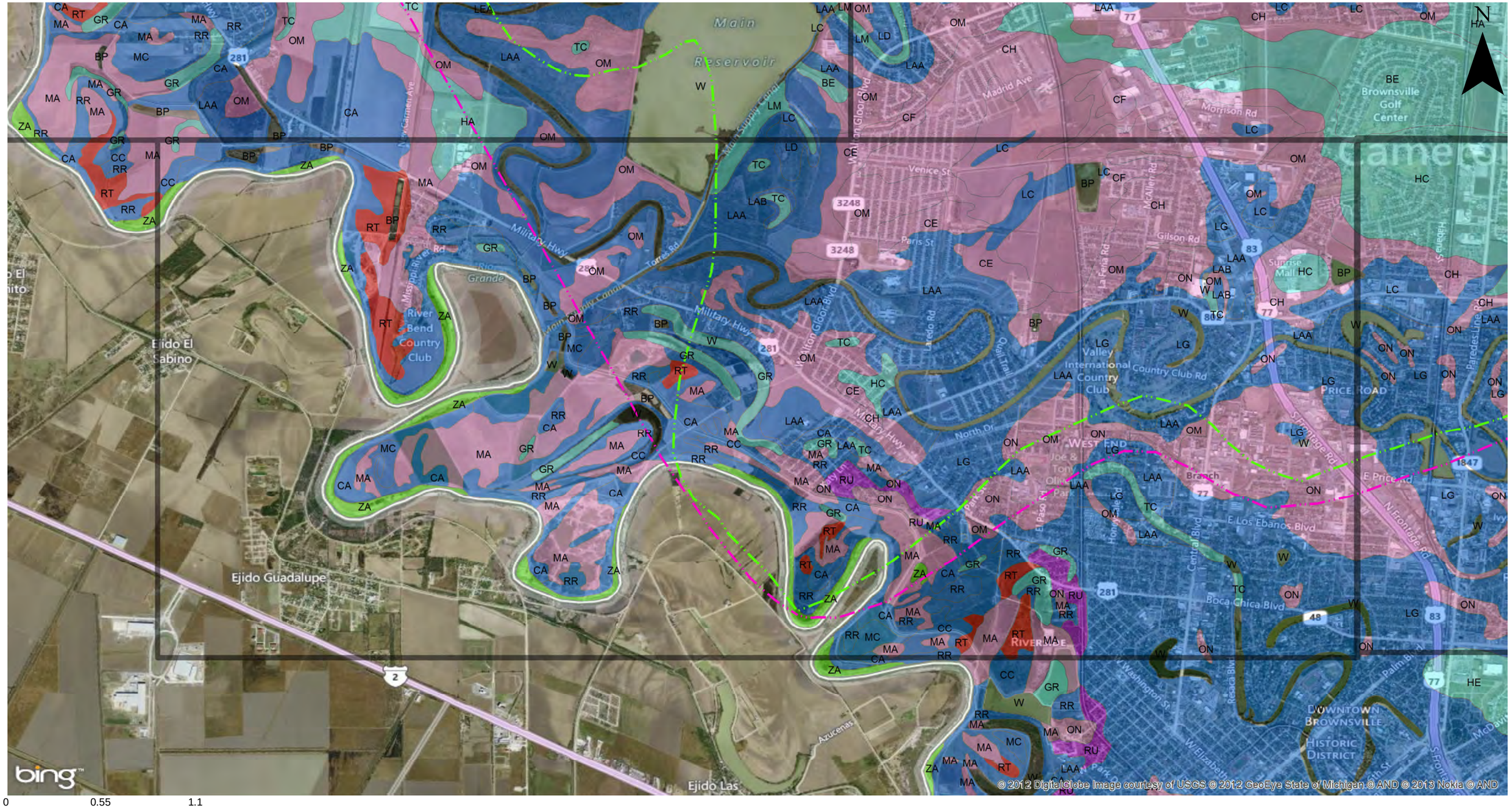

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FIGURE 2-1: GRID 10
NRCS SOILS MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid

NRCS Soil Texture

- clay
- clay loam
- fine sand
- fine sandy loam
- silt loam
- silty clay

ERM

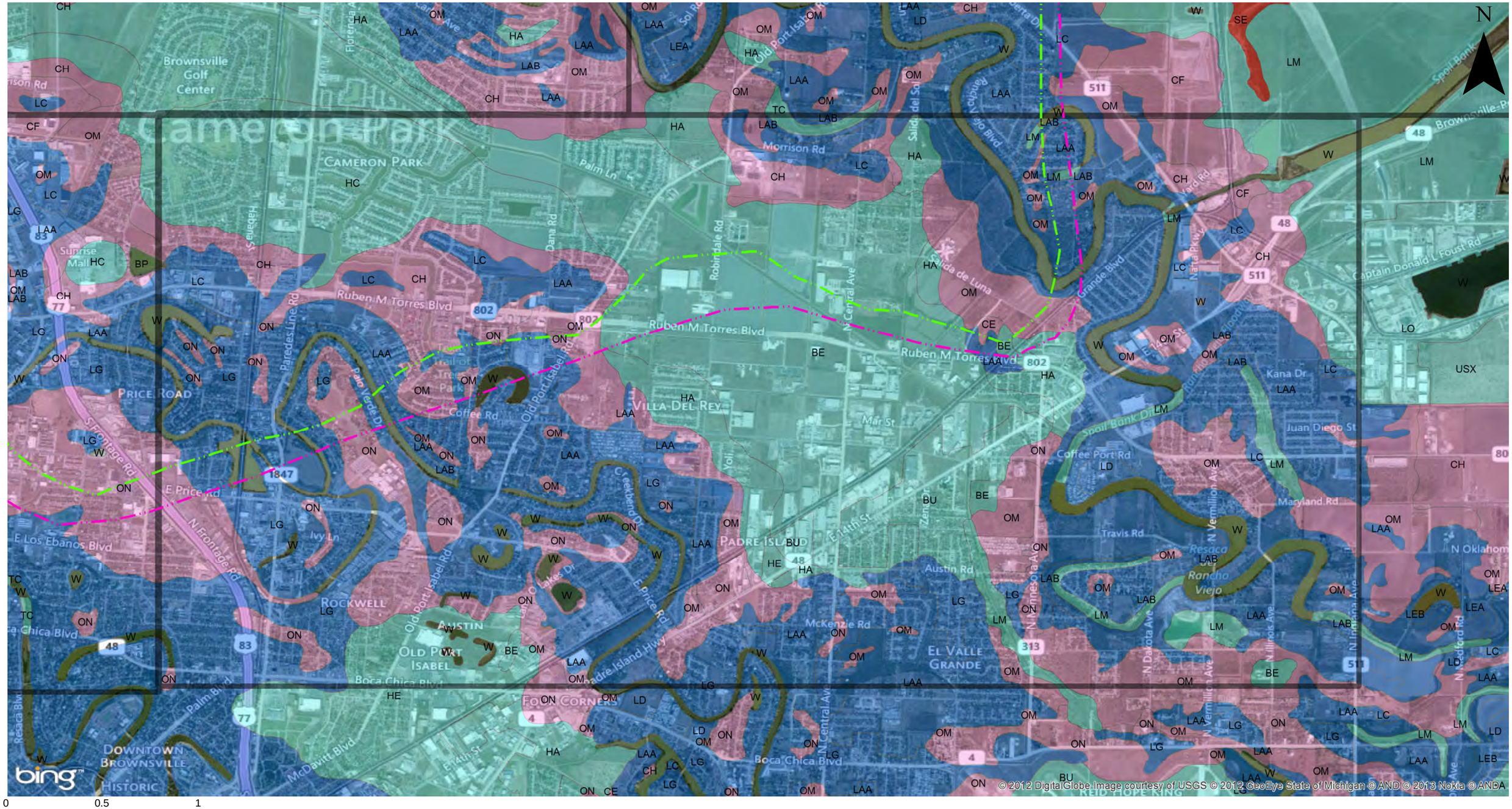

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FIGURE 2-1: GRID 11
NRCS SOILS MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid

NRCS Soil Texture

- clay
- clay loam
- fine sand
- fine sandy loam
- silt loam
- silty clay

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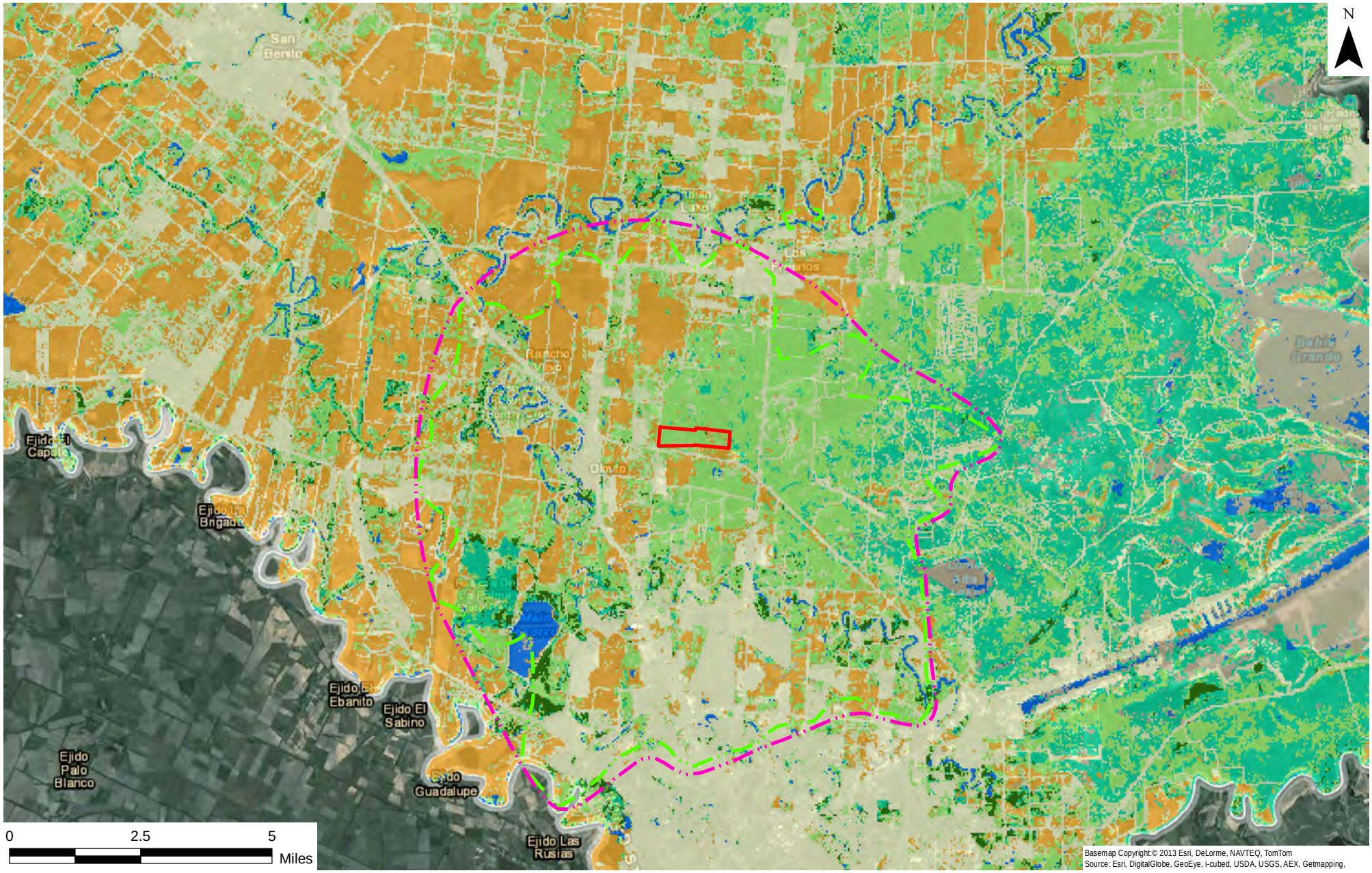

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FIGURE 2-2
LANDCOVER MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs

USDA NASS Cropland Data Layer 2009

- Cropland
- Barren
- Forested
- Developed
- Pasture/Hay/ Grassland
- Wetlands
- Water
- Shrubland

ERM

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
DATE: 12/16/2013	SCALE: AS SHOWN	REVISION: 0

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FIGURE 2-3
PROJECT SITE MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

ERM

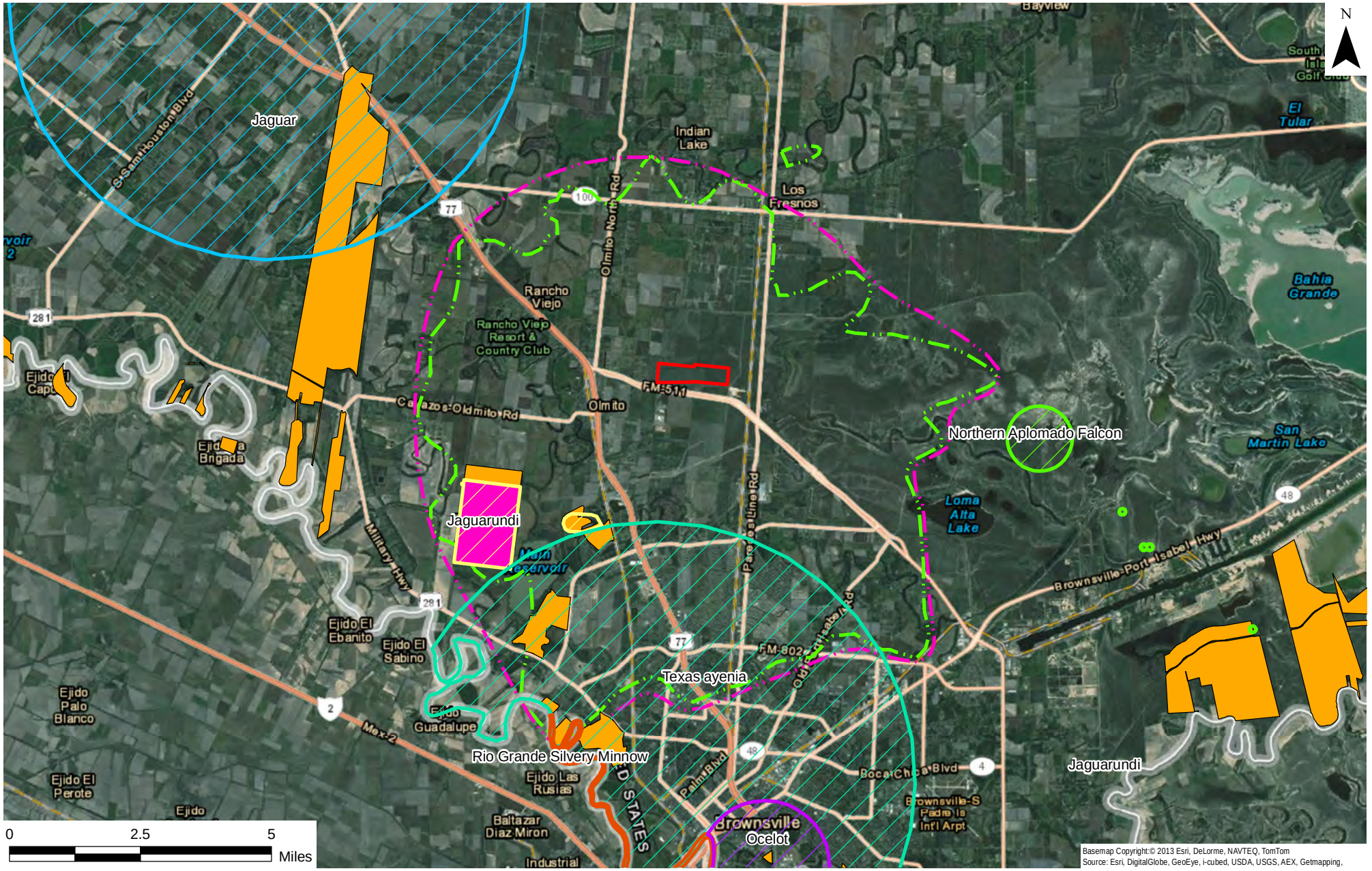

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FIGURE 4-1
TXNDD ELEMENT OCCURRENCE DATA IN THE VICINITY OF THE PROJECT SITE
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

TX NDD Species Element Occurrence
- Jaguar, SH, G3
- Jaguarundi, S1, G4
- Northern Aplomado Falcon, S1, G4T2
- Ocelot, S1, G4
- Rio Grande Silvery Minnow, SX, G1G2
- Texas ayenia, S1, G2

Managed Areas
- Lower Rio Grande Valley National Wildlife Refuge
- Resaca de la Palma State Park World Birding Center
- Generating Station - Project Site
- Action Area
- ROI analysis using EPA SILs

ERM

0 800 1,600
Feet

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
DATE: 12/16/2013	SCALE: AS SHOWN	REVISION: 0
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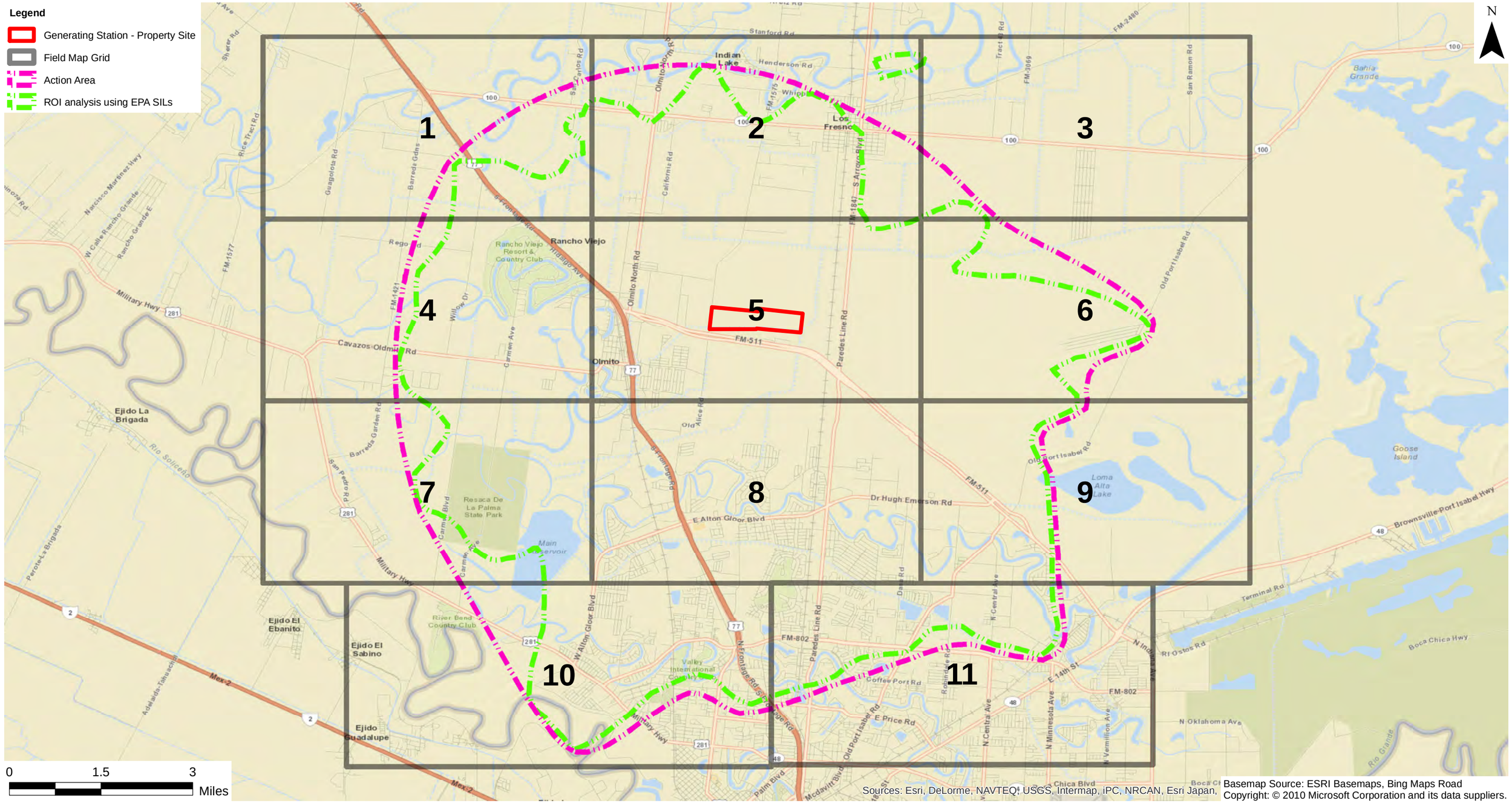
FIGURE 5-1
PROJECT SITE TRANSECT MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

ERM



Environmental Resources Management

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DATE:	12/16/2013	SCALE:	AS SHOWN	REVISION:	0

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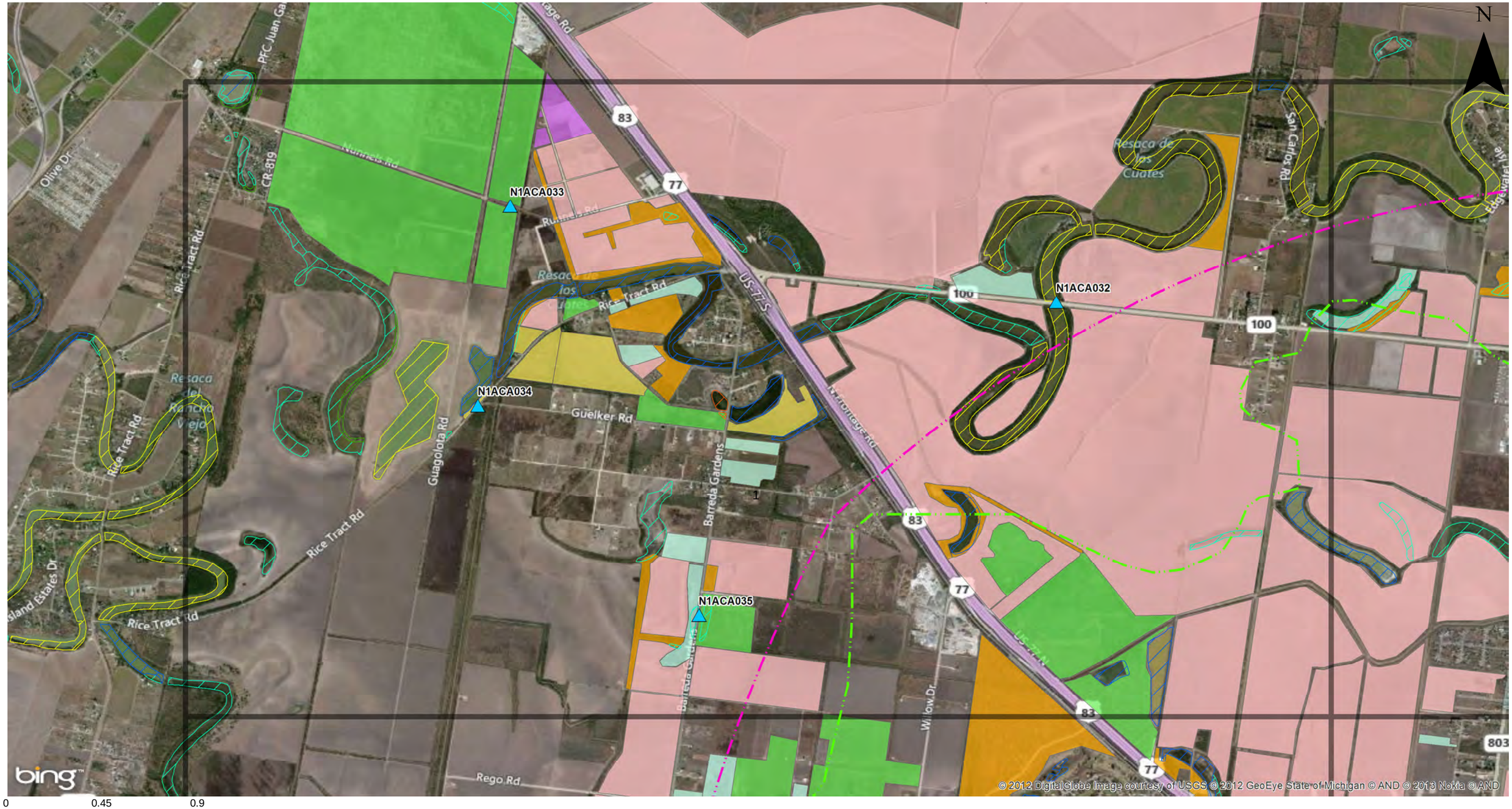
FIGURE 5-2
HABITAT GRID OVERVIEW MAP

Biological Assessment

Tenaska Brownsville Partners, LLC

Brownsville, TX

ERM



0 0.45 0.9 Miles

Environmental Resources Management

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FIGURE 5-3: GRID 1
HABITAT SURVEY
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid
- Habitat Survey Points

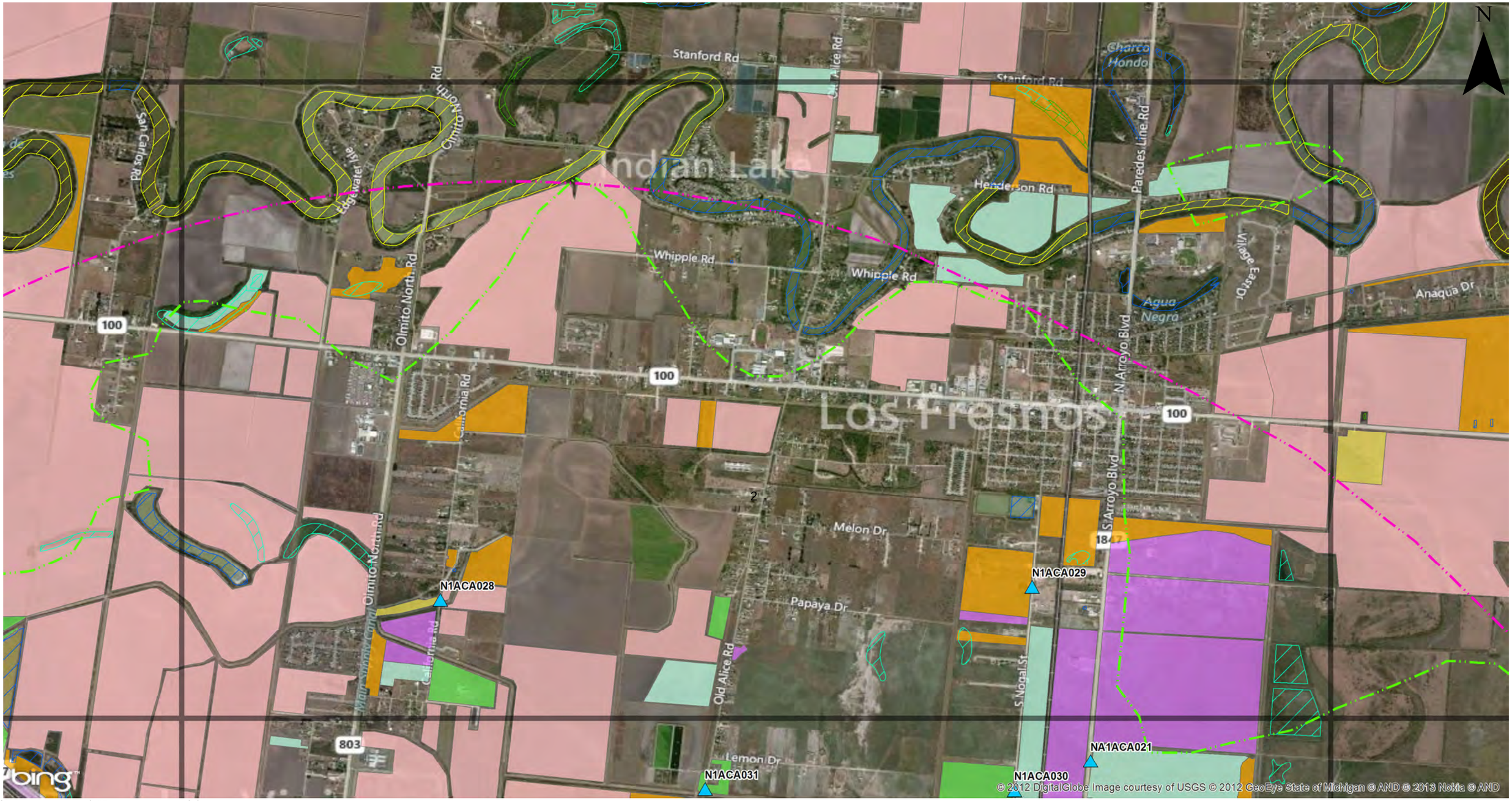
NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM



Environmental Resources Management

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DATE: 12/16/2013	SCALE: AS SHOWN	REVISION: 0
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FIGURE 5-3: GRID 2
HABITAT SURVEY
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid
- Habitat Survey Points

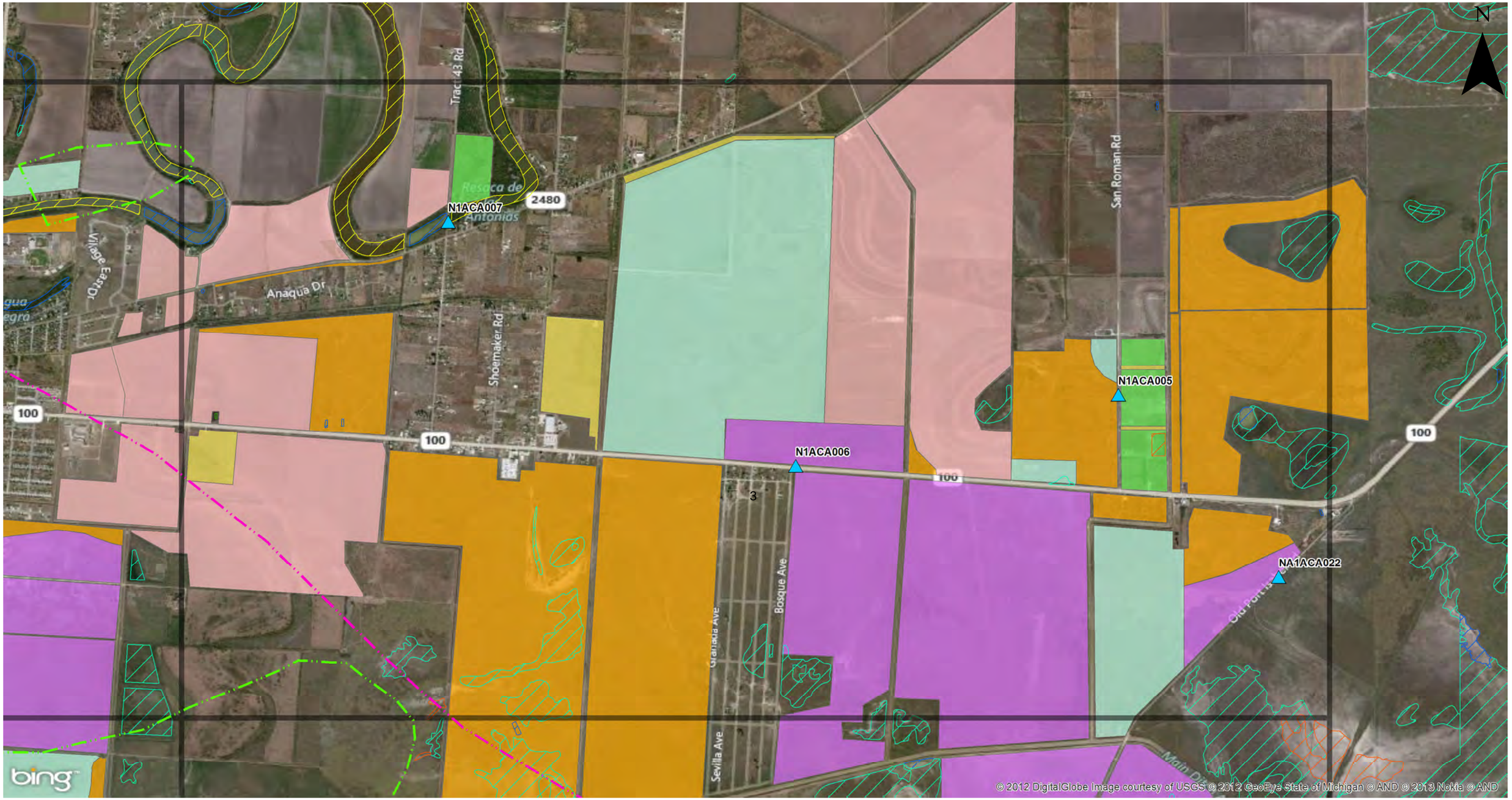
NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM



Environmental Resources Management

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FIGURE 5-3: GRID 3
HABITAT SURVEY
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid
- Habitat Survey Points

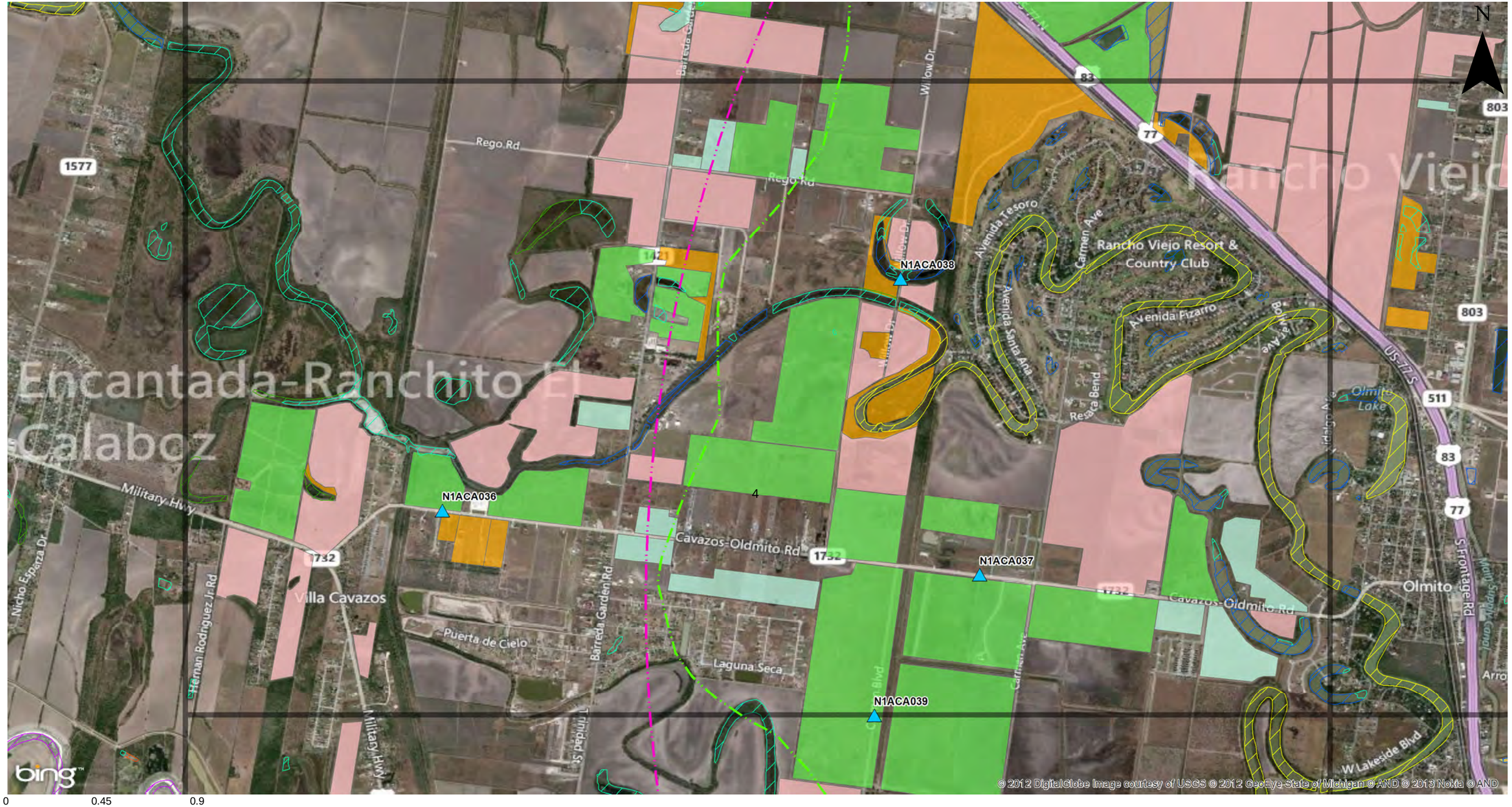
NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM



Environmental Resources Management

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DATE: 12/16/2013	SCALE: AS SHOWN	REVISION: 0

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FIGURE 5-3: GRID 4
HABITAT SURVEY
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid
- Habitat Survey Points

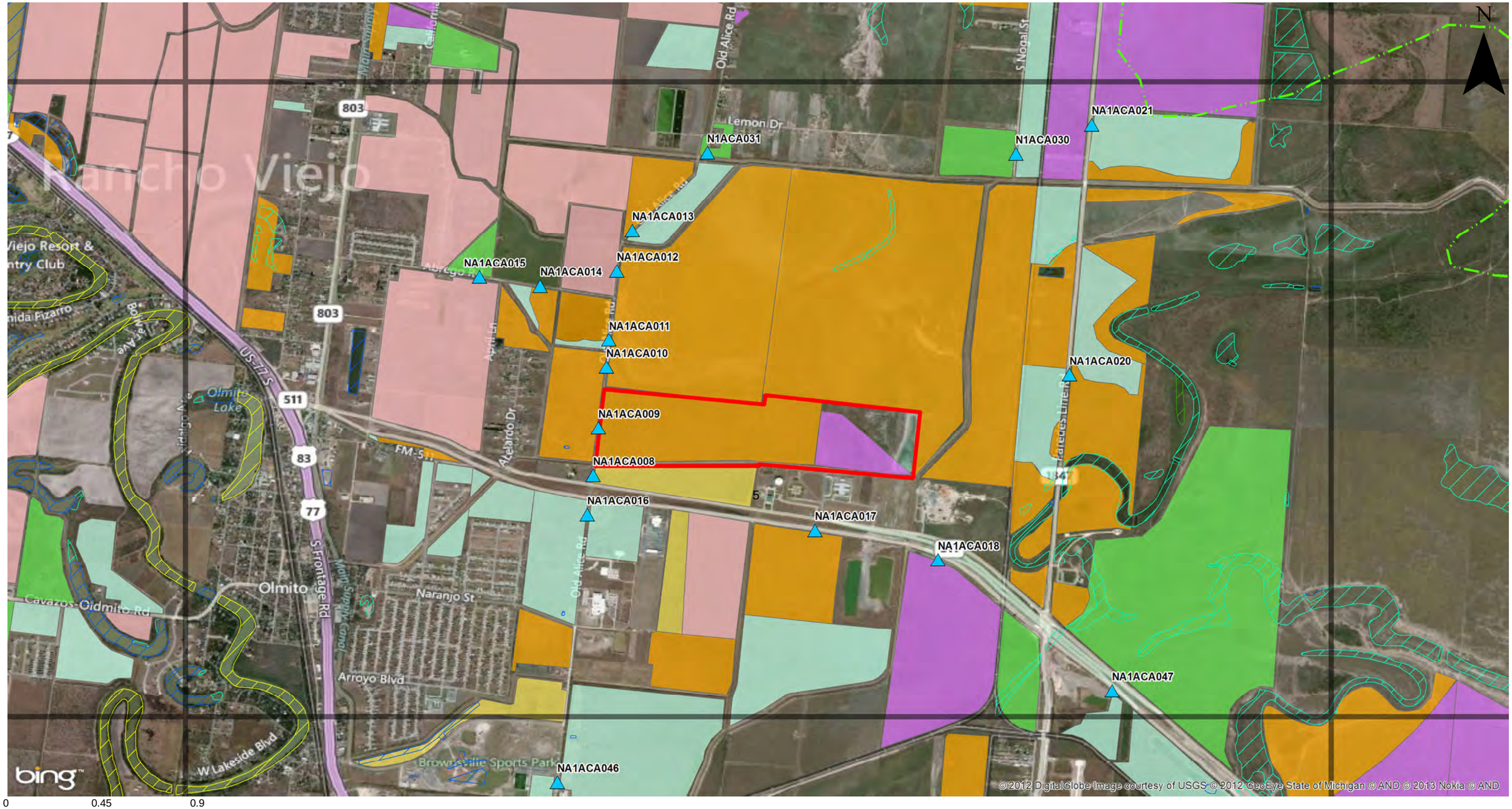
NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM



0 0.45 0.9

Miles

Environmental Resources Management

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DATE: 12/16/2013	SCALE: AS SHOWN	REVISION: 0

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FIGURE 5-3: GRID 5
HABITAT SURVEY
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid
- Habitat Survey Points

NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM

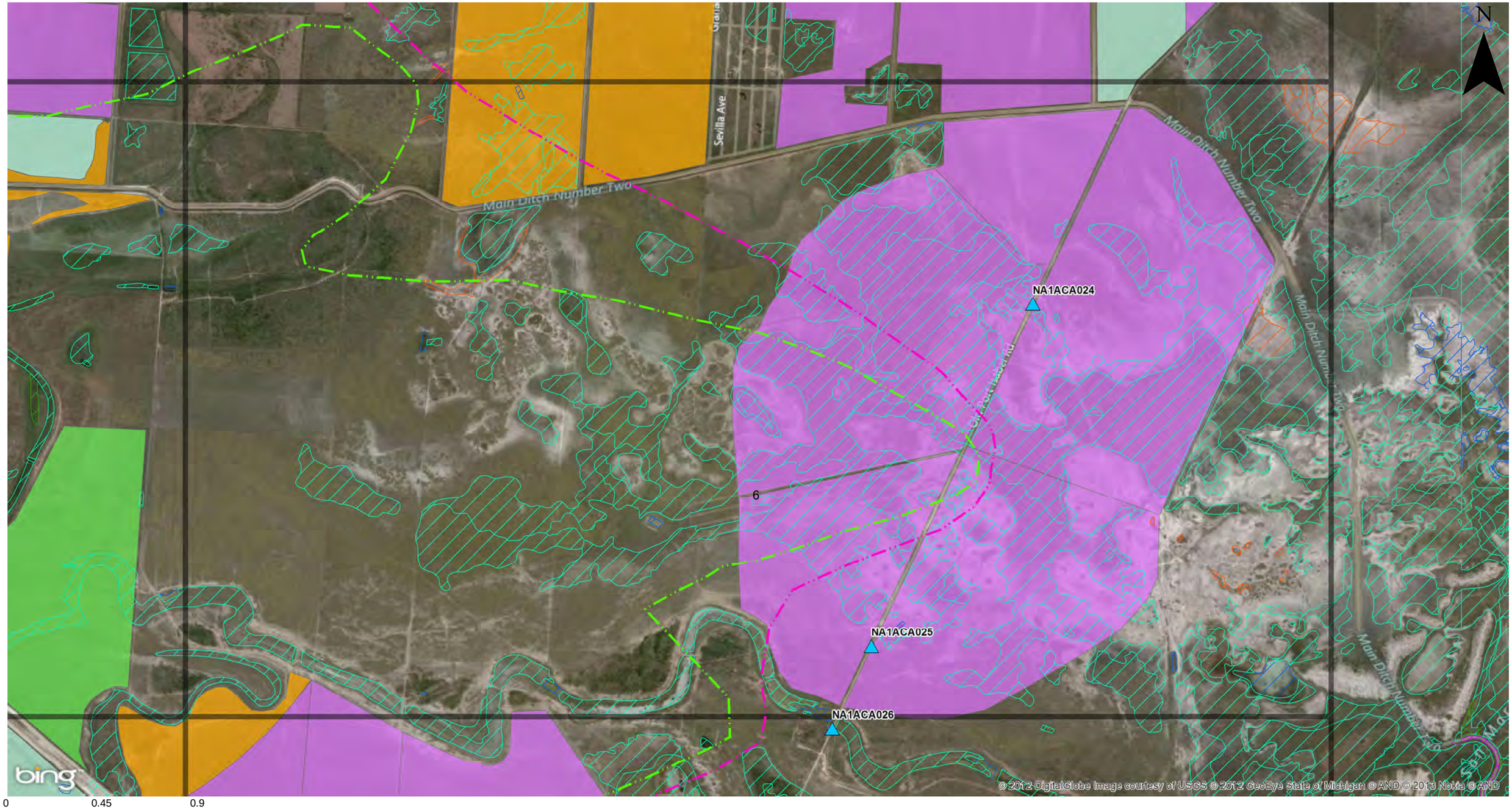

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FIGURE 5-3: GRID 6
HABITAT SURVEY
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid
- Habitat Survey Points

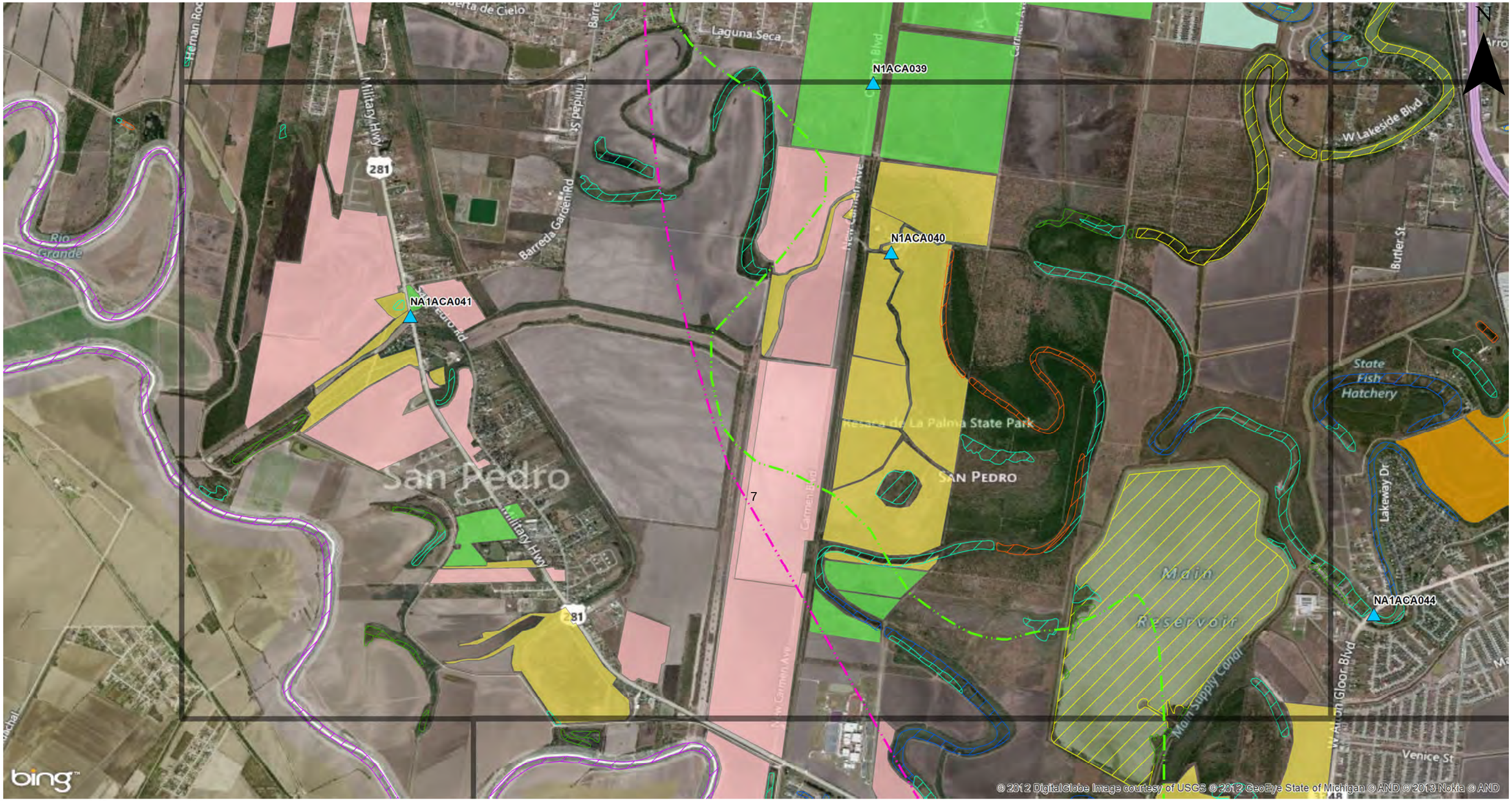
NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM



0 0.45 0.9

Miles

Environmental Resources Management

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DATE:	12/16/2013	SCALE:	AS SHOWN	REVISION:	0

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FIGURE 5-3: GRID 7
HABITAT SURVEY
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid
- Habitat Survey Points

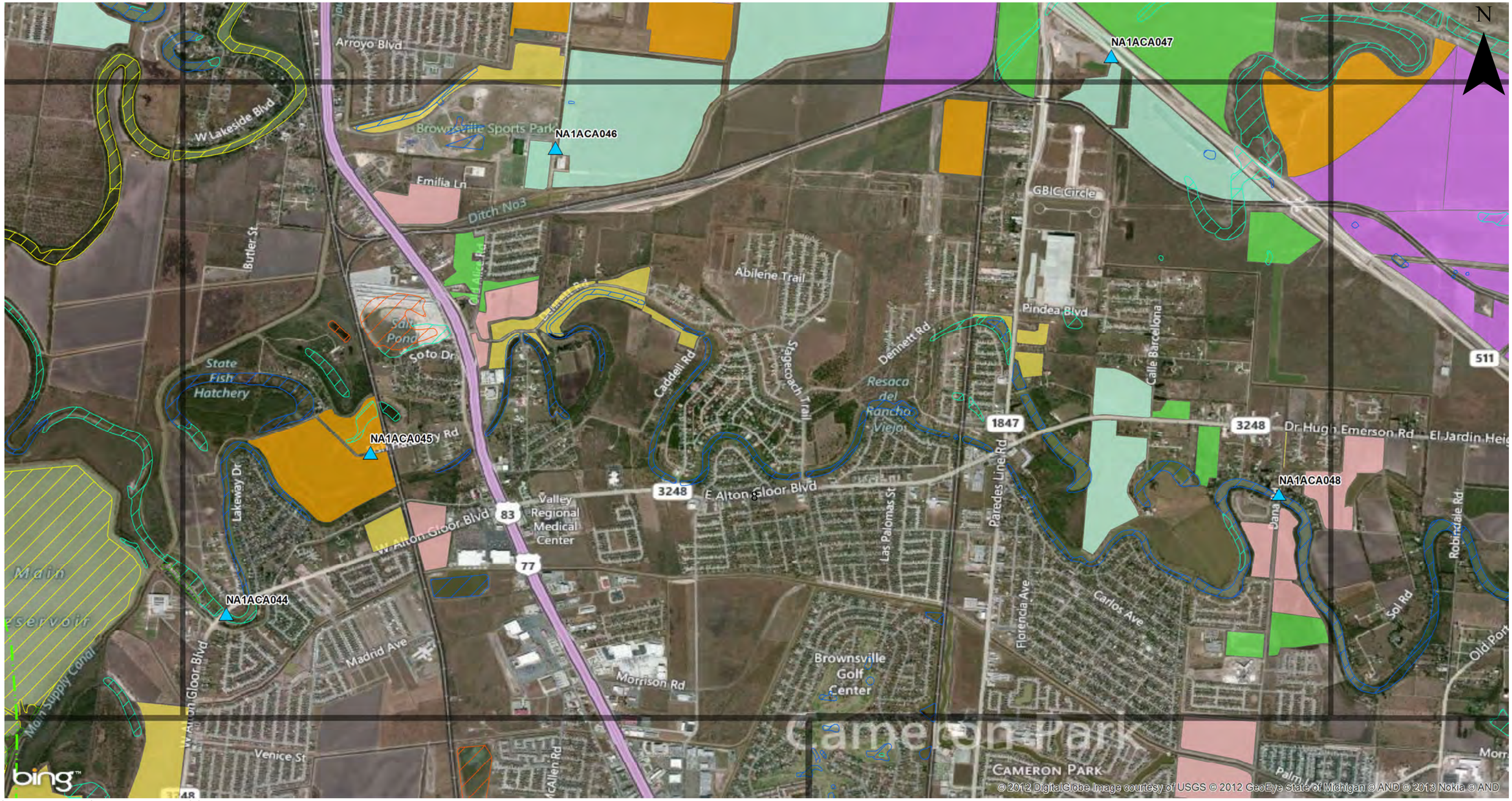
NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM



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DATE:	12/16/2013	SCALE:	AS SHOWN	REVISION:	0

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FIGURE 5-3: GRID 8
HABITAT SURVEY
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid
- Habitat Survey Points

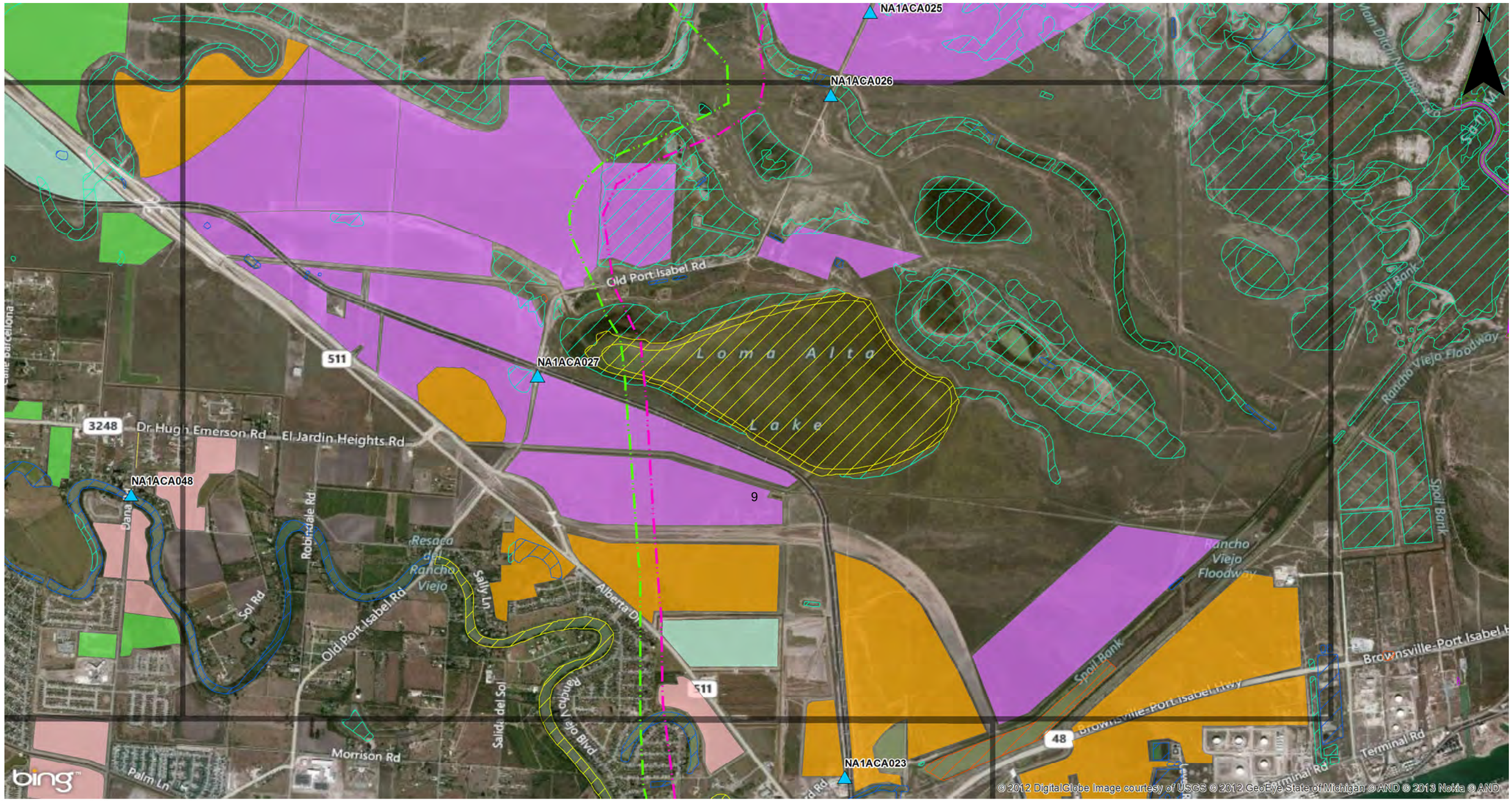
NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM



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DATE: 12/16/2013	SCALE: AS SHOWN	REVISION: 0

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FIGURE 5-3: GRID 9
HABITAT SURVEY
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid
- Habitat Survey Points

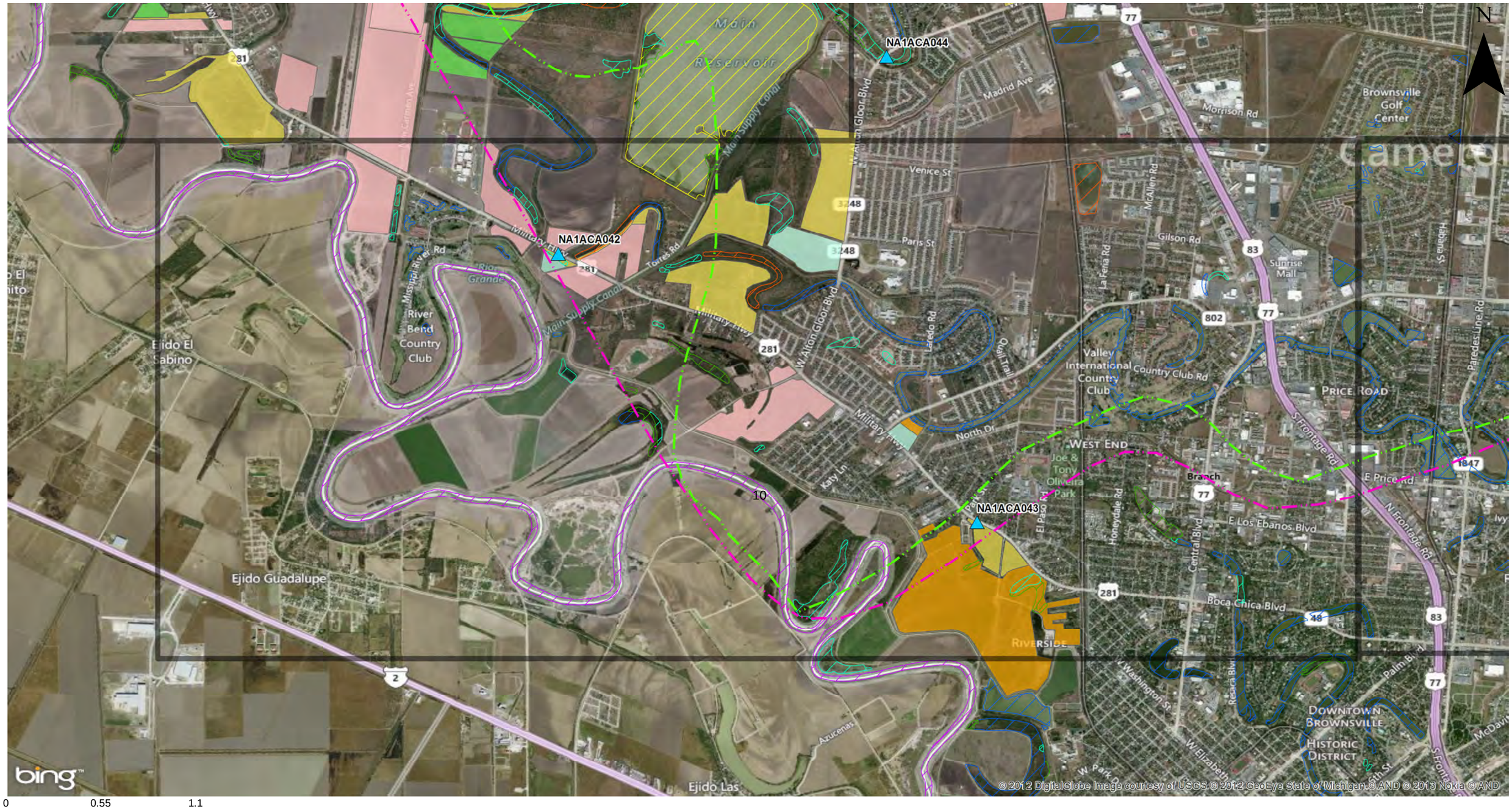
NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM



Environmental Resources Management

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FIGURE 5-3: GRID 10
HABITAT SURVEY
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid
- Habitat Survey Points

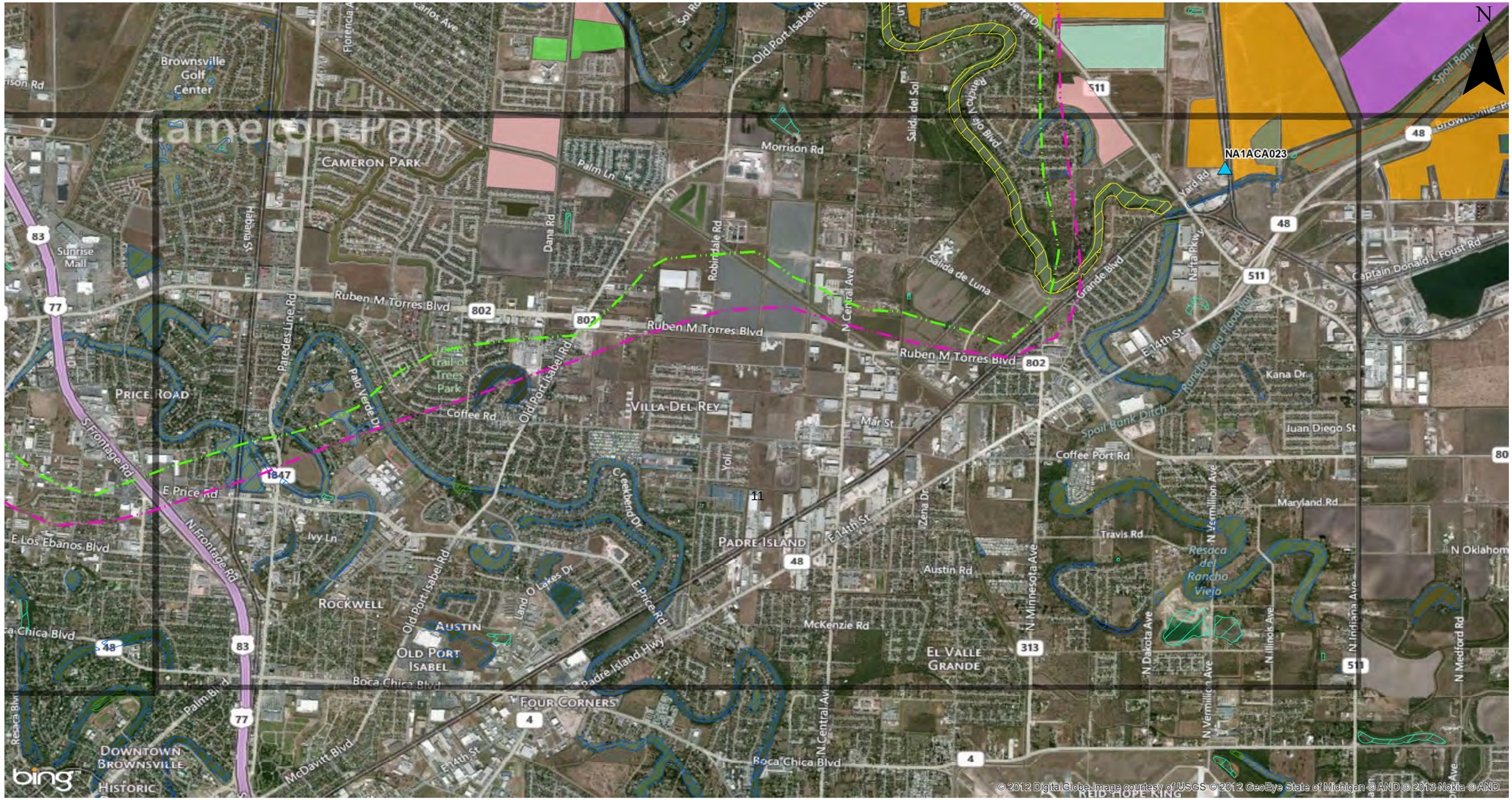
NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM



0 0.5 1 Miles

Environmental Resources Management

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DATE:	12/16/2013	SCALE:	AS SHOWN	REVISION:	0

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FIGURE 5-3: GRID 11
HABITAT SURVEY
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Action Area
- ROI analysis using EPA SILs
- Field Map Grid
- Habitat Survey Points

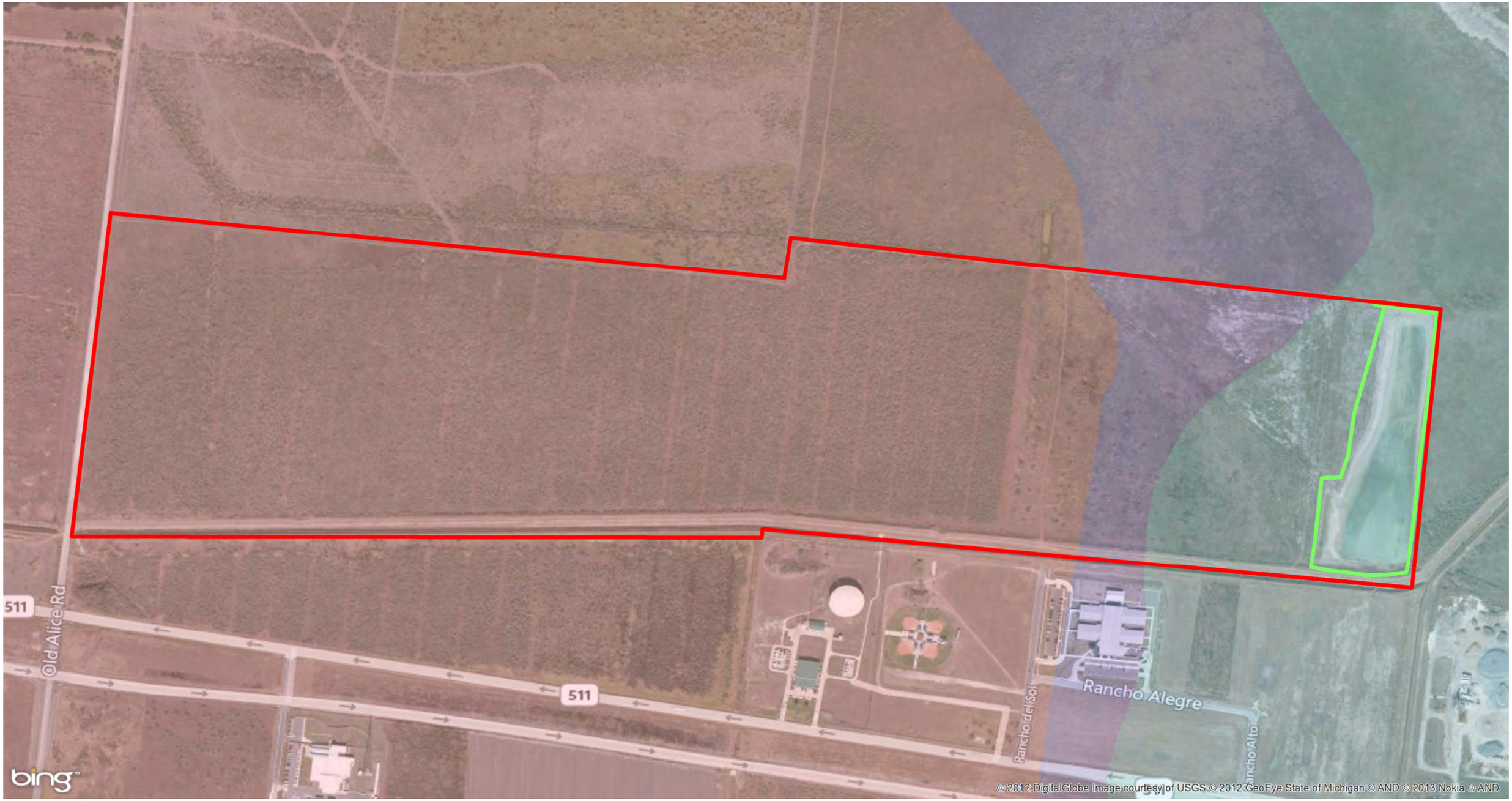
NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM



0 500 1,000
Feet

NOTE:There are no NWI wetlands within the site boundary.

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlict
DATE: 12/16/2013	SCALE: AS SHOWN	REVISION: 0
FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\BA wl_floodplain.mxd		

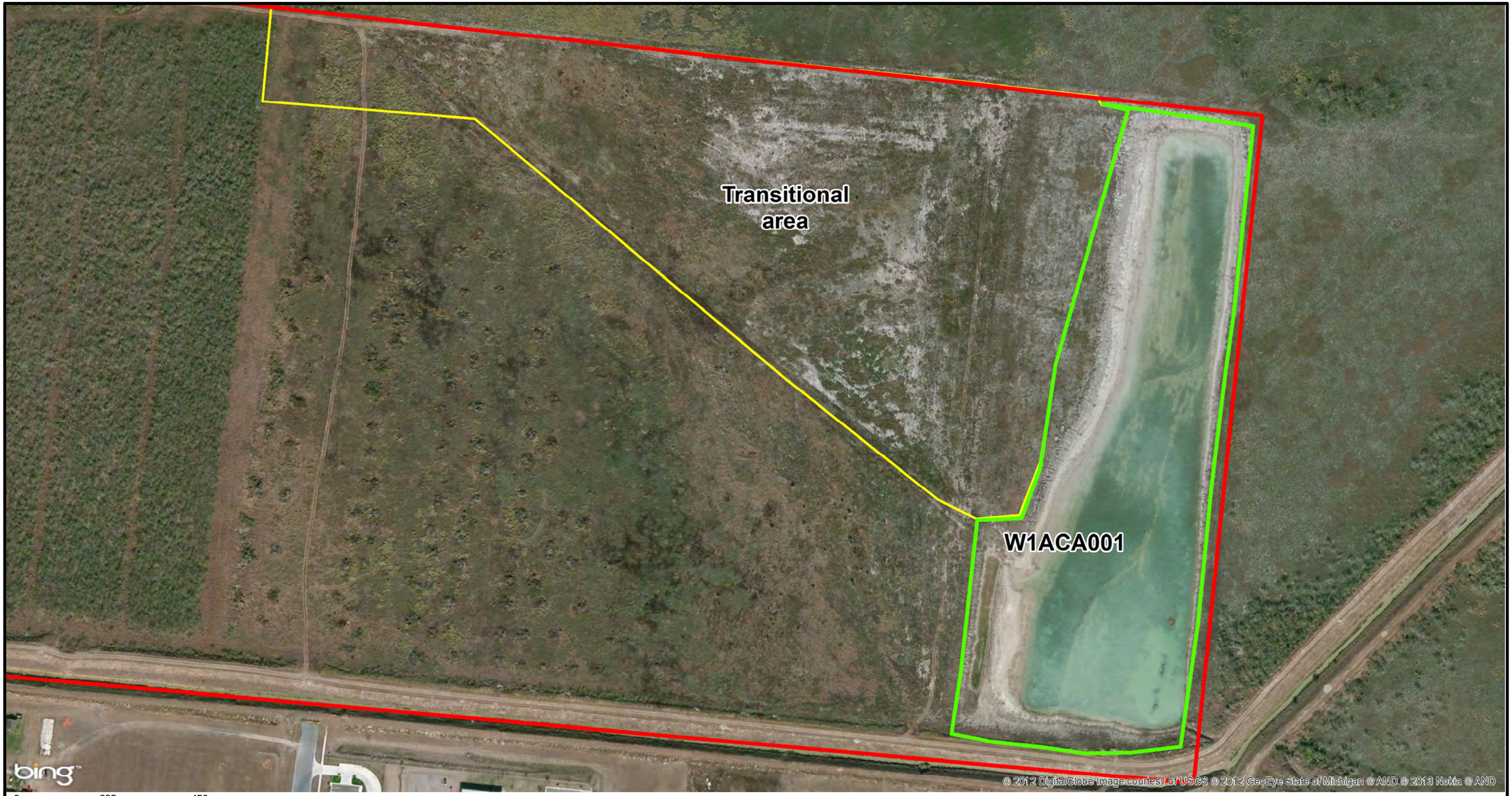
FIGURE 5-4
NWI & FEMA FLOODPLAIN MAP
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

NWI Wetland Type
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine

FEMA Flood Zone
- 100-year floodplain
- 500-year floodplain
- Outside 500-year floodplain
- Delineated Wetland
- Generating Station - Property Site

ERM



0 225 450
Feet

Environmental Resources Management

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FIGURE 5-5
AERIAL MAP WITH DELINEATED WETLAND
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Generating Station - Property Site
- Wetland
- Transitional area

N

ERM

Biological Assessment – Wastewater Discharge Pipeline

Attachment 1

May 20, 2014
Project No. 0185680

Environmental Resources Management
CityCentre Four
840 West Sam Houston Parkway, Suite 600
Houston, Texas 77024-3920
(281) 600-1000

Biological Assessment

Tenaska Brownsville Generating Station: Water Discharge Pipeline

Tenaska Brownsville Partners, LLC.
Cameron County, Texas

May 20, 2014

www.erm.com

Tenaska Brownsville Partners, LLC

Biological Assessment - *Tenaska Brownsville Generating Station: Water Discharge Pipeline*

May 20, 2014

Project No. 0185680
Cameron County, Texas

Peter Belmonte, P.E.
Partner-in-Charge

Kurtis Schlicht
Project Manager

Clarissa Heiner
Project Consultant

Environmental Resources Management
CityCentre Four
840 West Sam Houston Parkway North, Suite 600
Houston, Texas 77024-3920
T: 281-600-1000
F: 281-520-4625

Texas Registered Engineering Firm F-2393

TABLE OF CONTENTS

ACRONYMS

ATWS	Additional Temporary Work Space
BMP	Best Management Practice
BPUB	Brownsville Public Utilities Board
CFR	Code of Federal Regulations
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ERM	Environmental Resources Management
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
GHG	Greenhouse Gas
GIS	Geographic Information Systems
GMFMC	Gulf of Mexico Fisheries Management Council
NASS	National Agriculture Statistics Service
NMFS	National Marine Fisheries Service
NPS	National Park Service
NRCS	National Resource Conservation Service
NWI	National Wetland Inventory
PSD	Prevention of Significant Deterioration
SH	State Highway
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TPDES	Texas Pollutant Discharge Elimination System
TXNDD	Texas Natural Diversity Database
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Service
USFWS	U.S. Fish and Wildlife Service

Environmental Resources Management (ERM) completed a biological assessment for a proposed water discharge pipeline located in Cameron County, Texas, related to the anticipated Tenaska Brownsville Generating Station. In accordance with the Prevention of Significant Deterioration (PSD) provisions of the Clean Air Act and the implementing regulations at 40 CFR 52.21, Tenaska Brownsville Partners, LLC (Tenaska) submitted a Greenhouse Gas (GHG) PSD Permit Application for a proposed electric generating station (the "Project") on February 15, 2013. Tenaska plans to initiate construction of the Project, known as the Tenaska Brownsville Generating Station, in early 2015 and begin operation by mid-2017.

The purpose of this biological assessment is to provide the results of an assessment of the potential impacts of the proposed Project on species protected by the Endangered Species Act (ESA) as outlined in the requirements under Section 7 of the ESA as it relates to PSD permits issued by the United States Environmental Protection Agency (EPA). The information provided in this biological assessment is presented for utilization in informal consultation with the appropriate supporting federal agencies. Accordingly, this analysis provides recommendations for the U.S. Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS) determinations of effect for each federally listed species, as outlined in the table below.

TABLE ES-1: Summary of Anticipated Effects on Federally Listed Species Potentially Occurring along the Route

Federally Listed Species	*Listing Agency*	*Recommended Determination of Effect*
Eskimo curlew (*Numenius borealis*)	*USFWS*	No effect
Interior least tern (*Sterna antillarum athalassos*)	*USFWS*	No effect
Northern aplomado falcon (*Falco femoralis septentrionalis*)	*USFWS*	May affect, but is not likely to adversely affect
Piping plover (Charadrius melodus)	*USFWS*	No effect
Rio Grande silvery minnow (*Hybognathus amarus)*	*USFWS*	No effect
Smalltooth sawfish (*Pristis pectinata*)	NOAA	No effect
Jaguar (*Panthera onca*)	USFWS	No effect

Federally Listed Species	*Listing Agency*	*Recommended Determination of Effect*
Jaguarundi (*Herpailurus yagouaroundi* (var. *Herpailurus yagouaroundi cacomitli*)	USFWS	May affect, but is not likely to adversely affect
Ocelot (*Leopardus pardalis*)	USFWS	May affect, but is not likely to adversely affect
West Indian manatee (*Trichechus manatus*)	USFWS	No effect
Atlantic hawksbill sea turtle (*Eretmochelys imbricate*)	USFWS/NOAA	No effect
Green sea turtle (*Chelonia mydas*)	USFWS/NOAA	No effect
Kemp's Ridley sea turtle (*Lepidochelys kempii*)	USFWS/NOAA	No effect
Leatherback sea turtle (*Dermochelys coriacea*)	USFWS/NOAA	No effect
Loggerhead sea turtle (*Caretta caretta*)	USFWS/NOAA	No effect
South Texas ambrosia (*Ambrosia cheiranthifolia*)	USFWS	No effect
Star cactus (*Astrophytum asterias*)	USFWS	No effect
Texas ayenia (*Ayenia limitaris*)	USFWS	No effect

1.0 INTRODUCTION

PROPOSED ACTION

Environmental Resources Management (ERM) completed a biological assessment for a proposed water discharge pipeline, located in Cameron County, Texas, related to the anticipated Tenaska Brownsville Generating Station. Tenaska Brownsville Partners, LLC (Tenaska) intends to build and operate an electric generating station that will include an approximate 9.5-mile long water discharge pipeline extending from the Project site to a proposed water discharge outfall located on the Brownsville Ship Channel (Figure 1-1). Construction of the proposed generating station is projected to commence in early 2015 and will begin commercial operations in mid-2017.

The proposed water discharge pipeline will consist of a 20 inch diameter corrugated plastic line that will be placed approximately four feet below existing surface elevations. Construction of the pipeline will consist of conventional pipeline methods that include scraping, segregating (where appropriate), and stockpiling of top soil; trenching for the pipeline; placement of the pipe; and then replacing of soils and vegetation along the right-of-way (ROW). The final outfall design has not been completed at this time. However, it is anticipated the outfall will consist of a simple outlet pipe surrounded by rip rap.

Based on review of historic aerial and topographic maps, the proposed water discharge pipeline route traverses mostly developed/disturbed land, with the exception of the northwestern corner of the route which runs through undeveloped land, before following a railroad line right of way south to State Highway 550 (SH550). The route then follows the newly constructed SH550 toll road and the rail line into the Port of Brownsville, where it ends at the proposed water discharge outfall location along the Brownsville Ship Channel.

Development of the water discharge pipeline is considered an interrelated action with the Project and therefore subject to the provisions of the GHG PSD Permit issued by the U.S. Environmental Protection Agency (EPA). When the action of a federal agency may affect a protected species, that agency is required to consult with either the National Marine Fisheries Service (NMFS) or the US Fish and Wildlife Service (USFWS), depending upon the protected species that may be affected. In response to this consultation Tenaska is required to complete a biological assessment (BA) for those federally listed species covered under Section 7 of the Endangered Species Act (ESA) and the BA will provide the basis for evaluating the potential effects of the water discharge pipeline.

This BA covers the site specific environmental field investigations for the water discharge pipeline and includes data captured and evaluated from the desktop study and windshield investigations completed as part of the BA for the Generating Station. Field investigations for the Generating Station were completed separately and are described in the biological assessment submitted on August 2, 2013 and updated on December 18, 2013.

2.0 METHODOLOGY

The following sections describe the survey methods for the desktop review and field biological surveys performed to determine the presence of ecological receptors (or potential habitat) along the proposed water discharge pipeline corridor, including the potential effects on these receptors from the proposed line.

2.1 DEFINITION OF SURVEY AREA

The proposed water discharge pipeline is located within Cameron County, Texas, and consists of a 9.5-mile water discharge pipeline corridor extending from the 275-acre tract of undeveloped land (Project site) located near the intersection of FM 511 and Old Alice Road to the Brownsville Ship Channel (Figure 1-1). The corridor extends primarily to the southeast along SH 511/Toll Road 550 for approximately six miles following existing road and utility easements before it extends south along existing railroad easements to the ship channel. A 100-foot wide work space was evaluated for habitat at the proposed water discharge outfall location, and the shoreline was assessed for potential constructability of the structure.

The survey area and the Action Area for the proposed water discharge pipeline included a 50-foot wide ROW corridor (25 feet on each side of centerline) that followed existing easements for more than nine miles of the proposed corridor. Survey areas were increased to 100-feet at locations where the corridor crosses waterbodies and roadways that would need to be directional drilled or bored under to provide additional temporary work space (ATWS) for construction and staging of equipment and materials. The Action Area for the water discharge pipeline was considered the same area as the survey area based on the entirety of the construction activities taking place within the proposed 50- foot wide corridor. Furthermore, the utility line will be placed underground and all impacts during construction will be temporary. It is important to note the majority of the proposed water discharge pipeline is located within the Action Area, which was defined by the SIL model for the generating station.

A desktop study and fields surveys were conducted specifically for the water discharge pipeline in August 2013 to complete this biological assessment. In addition, the area associated with the proposed water discharge pipeline was evaluated in January 2013 as part of the initial biological assessment performed for the generation station Project Action Area, see the *Biological Assessment: Tenaska Brownsville Generating Station*.

2.2 DESKTOP STUDY

Prior to conducting the field survey for biological resources, ERM performed a desktop study of the survey area by reviewing available information from the following sources:

- Aerial photographs (December, 2010);

- Federal Emergency Management Agency (FEMA) Flood Hazard Maps;
- Gulf of Mexico Fishery Management Council (GMFMC) for Essential Fish Habitat;
- Texas Natural Diversity Database (TXNDD);
- Texas Parks and Wildlife Department (TPWD) and U.S. Fish and Wildlife Service (USFWS) threatened and endangered species databases;
- USFWS National Wetlands Inventory (NWI) Maps;
- U.S. Department of Agriculture (USDA), National Resource Conservation Service (NRCS) County Soil Surveys; and
- U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps.

Review of these documents assisted in the planning and execution of the biological field surveys and provided a baseline for determining the overall biological/ecological conditions along the proposed water discharge pipeline corridor.

2.3 FIELD SURVEY

Field surveys were conducted from August 5 to 9, 2013, by a two-person team consisting of trained biologists, to document the presence or absence of threatened and endangered species, as well as to confirm the baseline characterization of habitats and land use along the proposed water discharge pipeline corridor. Habitat evaluations within the survey area were characterized according to standard land use categories (i.e., wetlands, open land, agricultural land, forested land, industrial/commercial land, residential land, and open water).

The biological field survey consisted of the biological team, escorted by Brownsville Public Utilities Board ("BPUB") representatives, performing a detailed ground survey confirming habitat types along the entire length of the proposed water discharge pipeline corridor. To facilitate the detailed habitat survey, a grid map system was designed along the length of the route, which separated the route into six different grids. Figure 2-1 shows the grid overview map and the detailed results of the habitat survey are described in Section 4 and shown in Figures 4-7a through 4-7f.

Wetland delineations were conducted simultaneously within the survey area and results of this aspect of the field survey are summarized in the *Wetland Delineation Report: Tenaska Brownsville Generating Station Project – Water Discharge Pipeline* (ERM 2013).

3.0 FEDERALLY LISTED SPECIES AND DESIGNATED CRITICAL HABITAT THAT MAY POTENTIALLY OCCUR ALONG THE PROPOSED WATER DISCHARGE PIPELINE

The USFWS and TPWD threatened and endangered species databases and Texas Natural Diversity Database (TXNDD) occurrence data were reviewed to determine which, if any, federally-listed species may have the potential to occur along the proposed water discharge pipeline corridor. The species that are federally-listed on both the TPWD and USFWS lists for Cameron County are presented in Table 3-1 below.

TABLE 3-1: Federally Listed Threatened and Endangered Species Potentially Occurring in Cameron County

Common Name	*Scientific Name*	*Federal Status*	*State Status*
Birds			
Eskimo curlew	*Numenius borealis*	LE*	E
Interior least tern	*Sterna antillarum athalassos*	LE	E
Northern aplomado falcon	*Falco femoralis septentrionalis*	LE	E
Piping plover	*Charadrius melodus*	LT	T
Fish			
Rio Grande silvery minnow	*Hybognathus amarus*	LE*	E
Smalltooth sawfish	*Pristis pectinata*	LE*	E
Mammals			
Jaguar	*Panthera onca*	LE*	E
Jaguarundi	*Herpailurus yagouaroundi* (var. *Herpailurus yagouaroundi cacomitli*)	LE	E
Ocelot	*Leopardus pardalis*	LE	E
West Indian manatee	*Trichechus manatus*	LE	E
Reptiles			
Atlantic hawksbill sea turtle	*Eretmochelys imbricata*	LE	E
Green sea turtle	*Chelonia mydas*	LT	T

Common Name	*Scientific Name*	*Federal Status*	*State Status*
Kemp's Ridley sea turtle	*Lepidochelys kempii*	LE	E
Leatherback sea turtle	*Dermochelys coriacea*	LE	E
Loggerhead sea turtle	*Caretta caretta*	LT	T
Plants			
South Texas ambrosia	*Ambrosia cheiranthifolia*	LE	E
Star cactus	*Astrophytum asterias*	LE*	E
Texas ayenia	*Ayenia limitaris*	LE	E

LE = Listed Endangered (Federal)
LT= Listed threatened (federal)
E = Endangered (State)
T = Threatened (State)
LE* = Listed as Federally Endangered by TPWD County list, though not on USFWS County list;
Source: USFWS, TPWD, 2012

Life histories for the threatened and endangered species listed in Table 3-1 are found in *Biological Assessment: Tenaska Brownsville Generating Station*.

3.1 DESIGNATED FEDERAL CRITICAL HABITAT

Federal designated critical habitat is a term defined and used under Section 4 of the Endangered Species Act (ESA) that describes a specific geographic area(s) that contains physical or biological features essential for the conservation of a threatened or endangered species that may require special management and protection. Critical habitat may include areas not currently occupied by the species, but may be required for its recovery. Critical habitat is not the only habitat area that is of value to threatened and endangered species. Potential habitat can be present whether or not it has been designated as critical habitat. A summary of this data is provided in Section 4.2.1 of this report.

3.2 TEXAS NATURAL DIVERSITY DATABASE

To determine which, if any, federally-listed species may have the potential to occur along the proposed water discharge pipeline corridor, a request was submitted to the TPWD to obtain information from the TXNDD. The TXNDD, established in 1983, is the TPWD's most comprehensive source of information which includes rare, threatened, and endangered plants, animals, invertebrates, exemplary natural communities, and other significant features (elements). The TXNDD is continually updated, providing current or additional information on statewide status and locations of these unique elements of natural diversity. However, the data is not all-inclusive, as there are gaps in coverage and species data. This deficiency is a result of insufficient access to land and/or data, and shortage of staff and resources needed to collect and process data on all rare and significant resources. Although it is based on the best data available to TPWD regarding rare species, these data do not provide a definitive statement as to the presence, absence, or condition of special species, natural communities, or other significant features in any area. Nor can these data substitute for on-site evaluation by qualified biologists. The TXNDD information is intended to assist users in avoiding harm to rare species or significant ecological features. A summary of this data is provided in Section 4.4.2 of this report.

4.0 EFFECTS ANALYSIS

The following sections provide the results of the desktop review, field observations, and analysis performed to evaluate the potential for the proposed action to affect federally-listed threatened and endangered species that have the potential to occur along the proposed water discharge pipeline.

A significant majority of the Project's effluent discharge will primarily consist of noncontact cooling tower blowdown, but it may also include boiler and evaporative cooler blowdown and water treatment wastes. Service water, boiler blowdown, and evaporative cooler wastes will be utilized as feed water to the cooling tower. The Project's effluent discharge will also include low volume wastewater streams captured by facility drains and contact storm water, which will be routed to an oil/water separator for treatment. Plant service water and reverse osmosis reject water will also be included in the low volume wastewater streams.

Non-contact storm water runoff from the Project site will drain into a drainage ditch located along the southern boundary of the property, which is owned and operated by Cameron County Drainage District No. 1.

The proposed water discharge pipeline will carry wastewater from the Project site to the proposed outfall location at the Brownsville Ship Channel. Based on the water management actions, a lack of preferred habitat and a lack of established occurrences of threatened and endangered species at the location of the proposed outfall location, no effects from wastewater discharges on threatened or endangered species or critical habitats are anticipated to result from the proposed Project or the construction activities associated with the proposed water discharge pipeline corridor.

Noise levels (intensity, character, and duration) during construction will be perceptible to human and wildlife in close proximity to the ROW. The noise levels are anticipated to be of short duration and levels will be maintained within the range (55-85 dBA) commonly accepted by EPA. Best available technologies will be implemented to reduce noise levels for large commercial equipment that has the potential to exceed 85dBA. Furthermore, no sensitive habitats supporting protected species were documented within the construction ROW or adjacent to the proposed corridor that would be impacted by increased noise levels.

Construction of the pipeline will be of short duration and will have direct impacts only to those areas within the 50-foot wide corridor. Construction will require removal of topsoils and trenching for placement of the pipeline along the entire length of the ROW. Construction activities within or adjacent to large wetlands or large waterbodies may utilize additional techniques such as boring or horizontal directional drilling to further avoid and minimize impacts. All soils removed from the ROW will be stockpiled along the ROW and will be managed using appropriate BMP's such as silt fencing, tarps and water

dispersion to prevent mobilization. Soils, if segregated, will then be put back into the trench and covered by the topsoil.

4.1 DESKTOP REVIEW

The data sources listed in Section 2 were reviewed to assist in the planning and execution of the field surveys and provided a baseline for determining the overall biological/ecological conditions along the proposed water discharge pipeline corridor.

The NRCS soils shown in Figures 4-1a through 4-1f illustrate that the lands consist primarily of partially hydric soils. According to the USDA National Agriculture Statistics Service (NASS) Cropland Land Use Data, Figures 4-2a through 4-2e, the majority of the land within the vicinity of the proposed water discharge pipeline corridor consists of shrubland, cropland /agriculture, developed land (residential and industrial) and wetlands/water.

USFWS NWI data were used to assess and evaluate wetlands and waterbodies and to provide a summary of those biological/ecological features potentially impacted by construction of the water discharge pipeline. A total of 12 wetlands and 23 waterbodies were identified along the corridor. Detailed results from field studies for wetlands and waterbodies are included in the *Wetland Delineation Report* and summarized in Figure 4-4 of this report.

The USFWS and TPWD threatened and endangered species databases and TXNDD occurrence data were reviewed to determine which, if any, federally-listed species may have the potential to occur within or near the proposed water discharge pipeline corridor. No federally-listed threatened or endangered species were documented along the proposed water discharge pipeline corridor; however, federal imperiled species have the potential for occurrence within the general vicinity (Figure 4-5). No occurrences of threatened or endangered species, or objections to construction, were reported by TPWD in the TXNDD response. The nearest area with any type of federally-designated habitat (essential fish habitat) is located in the Brownsville Ship Channel, which is approximately 7.5 miles northeast of the proposed water discharge outfall location (Figure 4-6).

4.2 FIELD SURVEY

The field surveys began at the proposed water discharge outfall location and then moved from east to west up to the proposed generating station. The entire length of the route was evaluated either on-foot or by vehicle. The proposed water discharge outfall location was confirmed by BPUB representatives and the habitat within a 100-foot by 100-foot wide area around the centerline of the proposed water discharge pipeline was evaluated. The shoreline was lined with concrete mix rip-rap and assorted wood debris and surface drainage appeared to slope toward the Ship Channel. The mean water line observed was approximately 7 to 10 feet below the existing top of bank. Photos of the

proposed outfall location are available under separate cover as Appendix A in the Supplemental Information.

To facilitate the detailed habitat surveys, a grid map system was designed along the length of the proposed water discharge pipeline corridor, which separated the entire route into six different grids. Figure 2-1 shows the grid overview map and the detailed results of the habitat survey are shown in Figures 4-7a through 4-7f. Habitats evaluated within the survey area have previously been described in the *Biological Assessment: Tenaska Brownsville Generating Station* and habitat data sheets that were completed along the proposed water discharge pipeline are available under separate cover as Appendix B in the Supplemental Information.

Vegetation and wildlife observed were identified and reported to the lowest possible taxonomic level (i.e., species). A photographic log of the observed conditions is available under separate cover as Appendix A in the Supplemental Information.

Approximately 6 miles of the proposed water discharge pipeline fall within the previously-surveyed areas evaluated as part of the overall Project Action Area (Figure 1-2). During field observations in August 2013, the water discharge pipeline corridor was found to contain a variety of habitat similar to those described in the *Biological Assessment: Tenaska Brownsville Generating Station* which is summarized in the following sections.

Wetlands and Waterbodies

Twelve palustrine emergent wetlands were identified and delineated within the survey area with the dominant species observed including: camphor daisy (*Rayjacksonia phyllocephala*), shoregrass (*Monanthochloe littoralis*), broad-leaf cat-tail (*Typha latifolia*), brownseed paspalum (*Paspalum plicatulum*), saltgrass (*Distichlis spicata*), honey mesquite (*Prosopis glandulosa*), fall panicum (*Panicum dichotomiflorum*), eastern baccharis (*Baccharis halimifolia*), sea ox-eye daisy (*Borrichia frutescens*), gulf cordgrass (*Spartina spartinae*), huisache (*Acacia farnesiana*) and slender seapurselane (*Sesuvium maritimum*).

Twenty-three (23) waterbodies were identified during the field survey. This included four streams, two ponds, 12 roadside ditches, four constructed ditches and the Brownsville Ship Channel. Of these waterbodies, five are considered perennial, two are intermittent and 16 are ephemeral.

Based on the criteria listed for the interior least tern and the piping plover, wetlands and waterbodies containing sandbars and/or tidal flats can provide suitable habitat for these species. Although many of the wetlands identified are typical of coastal mid-marsh wetlands, none of those identified contained open sandbar or sand flat areas that are conducive to support these species.

Scrub Shrub / Mesquite Savannah

The majority of the upland habitat along the proposed water discharge pipeline was generally characterized as scrub shrub or mesquite savannah. Dominant vegetation encountered in the upland areas included: honey mesquite (*Prosopis glandulosa*), prickly pear (*Opuntia stricta*), huisache (*Acacia farnesia*), torpedo grass (*Panicum repens*), fall panicum (*Panicum dichotomiflorum*), Kleberg bluestem (*Dichanthium annulatum*), bermudagrass (*Cynodon dactylon*), rosemary (*Rosmarinus officinalis*), goatbush (*Castela erecta*), eastern baccharis (*Baccharis halimifolia*), sea ox-eye daisy (*Borrichia frutescens*), leatherleaf (*Maytenus phyllanthoides*), shoregrass (*Monanthochloe littoralis*) and slender seapurselane (*Sesuvium maritimum*).

Based on the habitat criteria listed for the jaguarundi, ocelot, and the star cactus, the habitat identified as being dense mesquite could provide suitable habitat for all three species. In addition, the habitat could also be used as foraging habitat for the Northern Aplomado falcon.

Herbaceous to Low Shrubland Habitat

Herbaceous to low shrubland habitat was found along the proposed water discharge pipeline corridor and within the Project site. Dominant vegetation encountered in the herbaceous to low shrubland habitat included: sea ox-eye daisy (*Borrichia frutescens*), gulf cordgrass (*Spartina spartinae)*, honey mesquite (*Prosopis glandulosa*) and huisache (*Acacia farnesiana*).

This habitat may be suitable to support various threatened and endangered species, such as the jaguarundi, ocelot, star cactus, and south Texas ambrosia.

4.3 POTENTIAL FOR OCCURRENCE AND RECOMMENDED DETERMINATION OF EFFECT FOR FEDERALLY LISTED SPECIES

Life histories for the threatened and endangered species listed below are found in *Biological Assessment: Tenaska Brownsville Generating Station*.

4.3.1 Eskimo Curlew

The last verified Eskimo curlew sighting in Texas occurred in 1962. The species is assumed to be extirpated from Texas and possibly its entire range (USFWS 2011a); however, if still present, the USFWS believes they may occur within the Lower Rio Grande Valley National Wildlife Refuge.

Based on the lack of sightings, extremely low potential for the Eskimo curlew to be extant in Texas, and minimal amount of habitat available within the proposed water discharge pipeline corridor, it is not expected that the project will have any direct or indirect impacts on this species from the planned construction of the water discharge pipeline and operation of the proposed water discharge outfall structure.

The proposed project will have "*No effect*" on the Eskimo curlew.

4.3.2 Interior Least Tern

As identified in the life histories section of the Biological Assessment, the interior least tern prefers open areas associated with sandbars and tidal flats. They are known to utilize manmade sites, including sand or gravel pits and cleared lands that have barren soils. The interior least tern prefers nesting areas, such as islands, sandbars near unobstructed river channel, salt flats, various beaches, and shorelines of lakes. Due to its known range (least tern migrate and breed inland along the Rio Grande River corridor and near the coast), there is the potential for the tern to occur as a transient within the vicinity of the proposed water discharge pipeline.

Twelve delineated wetlands located along the proposed water discharge pipeline and the shoreline near the proposed water discharge outfall location at the ship channel were evaluated for potential piping plover habitat. Despite this field effort, there was no evidence that these areas contained preferred habitat associated with the interior least tern or any evidence that the tern would utilize these areas for common stop over areas as indicated by the TXNDD database. Based on these findings, it is not anticipated the Project will have any direct or indirect impacts on the interior least tern during construction or operation.

A determination of "*No effect*" is recommended for this species.

4.3.3 Northern Aplomado Falcon

The Northern Aplomado falcon was once distributed throughout the Trans-Pecos region and southern coastal prairies of Texas, but has been considered extirpated in South Texas since the 1950s. Historically, its preferred habitat in southern Texas was coastal prairie and marsh habitats that supported open grasslands with scattered small trees and shrubs or grasslands adjacent to woodlands associated with freshwater drainages and estuaries (TPWD, 2012f).

The USFWS lists the falcon as potentially occurring in Cameron County, and considers it to have the potential to occur near the Lower Rio Grande Valley National Wildlife Refuge Area. In addition, the USFWS has reestablished a small population of falcons at the Refuge with some of the individuals being documented in areas outside of the refuge. Furthermore, habitats conducive to supporting the falcon, specifically for feeding purposes, are present along the water discharge pipeline corridor.

A number of factors were considered when determining potential effects for the Northern Aplomado falcon. Currently there are a limited number of birds established within the region and their occurrence is predominantly near the wildlife refuge. Although forage habitat was found in the study area, construction of the pipeline will be restricted to a 50 foot wide corridor, which will limit the amount of forage area that would be disturbed and it is anticipated

that the adjacent open habitats would continue to support the species. Lastly, construction of the pipeline will be during a short period of time, and the pipeline will be located completely underground. Therefore, it is anticipated that construction and operation of the water discharge pipeline will not have a direct impact and any indirect impact would be likely temporary in nature. Given these reasons, a determination of *"May affect, not likely to adversely affect"* is recommended for this species.

4.3.4 Piping Plover

Piping plovers prefer bare or sparsely vegetated intertidal ocean beach, wash-over passes, wrack lines, ephemeral ponds, lagoons, salt marshes, tidal mudflats, sandflats, and algal flats. In Texas, piping plovers are typically present along the coast between mid-July and April, although a few birds can be found along the coast year round (TPWD 2007). Approximately 435 acres of designated critical habitat is found in Cameron County, which includes areas of wide, flat, open, sandy beaches with very little grass or other vegetation (USFWS 2001b). Designated critical habitat is located approximately 16.9 km (10.5 mi) east of the proposed water discharge outfall location. Although the piping plover is found in Cameron County, there have been no documented occurrences of piping plovers in the Action Area or within the proposed water discharge pipeline corridor (TXNDD 2012).

Current field studies found no evidence that these areas contained preferred habitat or any evidence that the plover would utilize these areas for common stop over areas.

Due to the lack of established populations in the area, lack of preferred habitat to support the plover, and no evidence the species utilizes the existing habitats, it is anticipated that construction and operation of the water discharge pipeline and outfall will not impact on the piping plover. A determination of "*No effect*" is recommended for this species.

4.3.5 Rio Grande Silvery Minnow

The range of the Rio Grande Silvery minnow is largely concentrated downstream of the Acacia Dam, with over 90 percent of the population residing in this 96km stretch. Its full range includes parts of the Rio Grande from a northwestern boundary of Espanola, New Mexico, to all of Texas, and Mexico, to the southernmost boundary of the Gulf of Mexico. TXNDD data shows one observation of the Rio Grande silvery minnow to occur, approximately 6 miles away from the proposed water discharge outfall location in the 1920s.

Due to the restrictive range of Rio Grande silvery minnow populations and the project not crossing or impacting known habitats of the minnow, a determination of "*No effect"* is recommended for this species.

4.3.6 *Smalltooth Sawfish*

The smalltooth sawfish is a tropical marine and estuarine elasmobranch fish that can reach approximately 4 to 5 m (13.1- 16.4 feet) in length. The preferred habitat is shallow coastal waters usually very close to shore over muddy and sandy bottoms. They are often found in estuaries, river mouths, mangroves, sheltered bays and on shallow banks (NMFS 2009). To date only a handful of smalltooth sawfish have been documented in south Texas and the last reported occurrence in Texas dates back to 1984 in Aransas Bay (Hendrickson and Cohen 2012).

The proposed water discharge outfall will be located on the Brownsville Ship Channel which connects or lies adjacent to a number of shallow coastal bays that are similar to the habitat described for the smalltooth sawfish. The ship channel is a deep man-made channel that is routinely dredged and has significant marine vessel traffic which is not typical for the sawfish.

Construction and operational impacts from the water discharge pipeline and the water discharge outfall are anticipated to be minimal for this project due to the water discharge pipeline and the outfall not being constructed directly within documented habitat of the sawfish. The proposed outfall location will be constructed above the mean water line and will discharge water into the ship channel. Wastewater will be discharged and mixed within the allowable limits established in the forthcoming applicable Texas Pollutant Discharge Elimination System (TPDES) permit. Given the reported sightings data, a "*No effect*" determination is recommended for this species.

4.3.7 *Jaguar*

The jaguar is found in dense chaparral and timbered areas and often prefers waterside habitats. The jaguar is believed to be extirpated from Texas, but it is possible that it could wander into Texas from Mexico (Davis 2000). TXNDD data identifies one observation of a jaguar within the vicinity of the proposed water discharge pipeline corridor dating back to 1946. However, since that time no other observations have been recorded.

Due to its population size, restricted distribution, and the date of the last known observation for the region, a determination of *"No effect"* is recommended for the species.

4.3.8 *Jaguarundi*

In general, there is little information describing the biology and habitat requirements of the jaguarundi in Texas; it is believed that their habitat requirements of dense brush cover are similar to that of the ocelot. Tracks of at least 100 acres of isolated dense brush or 75 acres of brush interconnected to other tracts of habitat by brush corridors are considered important habitat. The jaguarundi is listed on the species lists for the Lower Rio Grande Valley National

Wildlife Refuge and TXNDD records state it was observed in the Resaca de la Palma Wildlife Management Area in 1990 and 1992. Both of these areas are not located along the proposed water discharge pipeline or proposed water discharge outfall location.

Habitats associated with the jaguarundi are very limited along the water discharge pipeline. Small pockets of brushland were documented near the corridor and therefore could provide cover for transient activities; however, these areas will not be directly impacted by the project. Furthermore, surrounding habitats along the corridor may support small animals commonly used as forage by the jaguarundi. Based on the project's anticipated construction activities, jaguarundi's population size and its restricted distribution/range, a determination of *"May affect, but is not likely to adversely affect"* is recommended for the species.

4.3.9 Ocelot

The ocelot has the potential to occur in dense thorny shrub lands with 75-95% coverage of species including spiny hackberry, brasil, desert yaupon, wolfberry, lotebush, amargosa, white brush, catclaw, blackbrush, lantana, guayucan, cenizo, elbowbush, and Texas persimmon. Tracts of at least 100 acres of isolated dense brush or 75 acres of brush interconnected to other tracts of habitat by brush corridors are considered important habitat for the ocelot (TPWD 2012d).

There are fewer than 100 ocelots in the U.S., all of which are concentrated in south Texas at the Lower Rio Grande Valley National Wildlife Refuge and Santa Ana National Wildlife Refuge (both near Alamo, TX), Laguna Atascosa National Wildlife Refuge near Brownsville, and on a private ranch several miles away from Brownsville (USFWS 2010).

Dense thorny shrub lands commonly associated with the ocelot were not observed along the proposed water discharge pipeline corridor or at the proposed water discharge outfall location. Although small pockets of brushland were documented near the corridor, and surrounding habitats along the corridor may support ocelot prey (small mammals) and cover for transient activities; these areas will not be directly impacted by the project. A determination of *"May affect, but is not likely to adversely affect"* is recommended for the species based on the potential for the ocelot to use some of the existing ROW corridors and nearby habitats as travel corridors.

4.3.10 West Indian Manatee

Manatees are marine mammals and require warm water with a freshwater influx and shallow seagrass for feeding. They are most common in river mouth and estuarine habitats. West Indian Manatees typically occur in shallow waters off the coasts of Florida, Mexico, and Central America.

Given the location of the proposed outfall within the Brownsville Ship Channel, the lack of preferred vegetation for food and cover within the channel, and the outfall structure being constructed above the mean water line, construction of the water discharge pipeline and outfall will not have an impact on the manatee. Wastewater will be discharged and mixed within the allowable limits established in the forthcoming applicable projects TPDES permit. Potential wastewater discharges associated with the operation of the proposed Project and proposed water discharge outfall are not expected to cause direct impacts to the manatee, and a determination of *"No effect"* is recommended for this species.

4.3.11 Atlantic Hawksbill Sea Turtle

The Atlantic hawksbill sea turtle nests on small, oceanic beaches. Within the continental U.S., nesting is restricted to the southeastern coast of Florida (NMFS 1993). Atlantic hawksbill turtles consume primarily sponges, which require a hard substrate, and are therefore often associated with coral reefs, rocky outcrops, lagoons, shoals, and oceanic islands.

The only documented hawksbill nesting on the Texas Coast occurred in 1998 at Padre Island National Seashore (NPS 2012b). Hawksbills are observed with some regularity in Florida and Texas. Sightings of small turtles in Texas are believed to originate from nesting beaches in Mexico (NMFS 1993).

The proposed water discharge outfall is situated on the Brownsville Ship Channel which does not cover any preferred habitat for the hawksbill. Wastewater will be discharged and mixed within the allowable limits established in the forthcoming applicable projects TPDES permit. Potential wastewater discharges associated with the operation of the proposed Project and proposed water discharge outfall are not expected to cause direct impacts to the hawksbill, and a determination of "*No effect*" is recommended for this species.

4.3.12 Green Sea Turtle

South Padre Island is the only location on the Texas coast where green turtle nesting has been documented. In the last few years, one to five nests have been reported each year. Most green sea turtles found in Texas waters are juveniles (NPS 2012d). Green sea turtles nest on high energy beaches with minimal human disturbance, usually on islands (NMFS 1991).

The proposed water discharge outfall is located on the Brownsville Ship Channel, which does not cover any preferred habitat for the green sea turtle. Wastewater will be discharged and mixed within the allowable limits established in the forthcoming applicable projects TPDES permit. Potential wastewater discharges associated with the operation of the proposed Project and proposed water discharge outfall are not expected to cause direct impacts to the green sea turtle, and a determination of "*No effect*" is recommended for this species.

4.3.13 *Kemp's Ridley Sea Turtle*

Kemp's Ridley sea turtles are loyal to their nesting sites, which are highly restricted to fine grain beaches along the coast of Veracruz, Mexico and the Padre Island National Seashore in Texas (USFWS 2012e). Padre Island National Seashore is the primary nesting location for Kemp's Ridley sea turtles. The vast majority of which were strandings, along the Gulf side of North Padre and Mustang Island (Manzella and Williams 1992). The proximity of these strandings correlates with the location of the Padre Island National Seashore nesting site and ocean currents that would carry post-hatchlings.

No critical habitat within the U.S. has been designated, although petitions to do so along the Texas coast have been submitted (WEG 2010).

The proposed water discharge outfall is located on the Brownsville Ship Channel, which does not cover any preferred habitat for the Kemp's Ridley sea turtle. Wastewater will be discharged and mixed within the allowable limits established in the forthcoming applicable projects TPDES permit. Potential wastewater discharges associated with the operation of the proposed Project and proposed water discharge outfall are not expected to cause direct impacts to the Kemp's Ridley sea turtle, and a determination of "*No effect*" is recommended for this species.

4.3.14 *Leatherback Sea Turtle*

Leatherback sea turtles nest on tropical and subtropical sloping, sandy beaches, in proximity to deep water; and are restricted to southern Florida in the continental U.S. (USFWS 2012 f). Leatherback sea turtles feed almost entirely on jellyfish and are highly migratory and pelagic, moving thousands of miles between nesting beaches and feeding grounds. Leatherbacks rarely approach land, except for nesting.

Leatherbacks are rare visitors to the Texas Gulf Coast (TPWD 2012e), in 2008, a single leatherback nest was located at Padre Island National Seashore. Prior to this nesting, only historical records of nesting occurred in Texas from the 1920s and 1930s. No nests have been detected since 2008 (NPS 2012e).

The proposed water discharge outfall is located on the Brownsville Ship Channel, which does not cover any preferred habitat for the leatherback sea turtle. Wastewater will be discharged and mixed within the allowable limits established in the forthcoming applicable projects TPDES permit. Potential wastewater discharges associated with the operation of the proposed Project and proposed water discharge outfall are not expected to cause direct impacts to the leatherback sea turtle, and a determination of "*No effect*" is recommended for this species.

4.3.15 *Loggerhead Sea Turtle*

Loggerhead sea turtles nest between the high tide line and dune front, usually on ocean beaches, but occasionally on appropriate estuarine shorelines (NMFS 2008) on steeply sloped, relatively narrow, coarse-grained beaches. Juveniles and adult loggerheads utilize both neritic and oceanic environments, while adult loggerheads prefer to utilize open ocean areas (NMFS 2008).

There is no critical habitat designated in the U.S. In Texas, a relatively stable number of 1-6 loggerhead nests are found annually. These nests have been found statewide with the greatest occurrence on the Padre Island National Seashore (NPS 2012a).

The proposed water discharge outfall is located on the Brownsville Ship Channel, which does not cover any preferred habitat for the loggerhead sea turtle. Wastewater will be discharged and mixed within the allowable limits established in the forthcoming applicable projects TPDES permit. Potential wastewater discharges associated with the operation of the proposed Project and proposed water discharge outfall are not expected to cause direct impacts to the loggerhead sea turtle, and a determination of "*No effect*" is recommended for this species.

4.3.16 *South Texas Ambrosia*

The South Texas ambrosia has historically been found in Cameron, Jim Wells, Kleberg, and Nueces counties in South Texas and currently occurs in six locations in Nueces and Kleberg counties. It has also been found in Tamaulipas, Mexico; however, its current state there is unknown (TPWD 2013b).

No species were observed during the field surveys and no observations have been recorded in the TXNDD database for this area. Field surveys did identify potential habitat, such as coastal prairie and mesquite shrubland, associated with the South Texas Ambrosia near the proposed water discharge pipeline corridor; however, no sensitive habitats were documented in the ROW.

Construction of the water discharge pipeline will be of short duration and will have temporary impacts on the vegetation and soil within the proposed ROW. These temporary impacts will occur mostly within previously disturbed ROW and no sensitive habitats associated with the south Texas ambrosia will be impacted. Due to this, a determination of *"No effect"* is recommended for this species.

4.3.17 *Star Cactus*

The star cactus is historically known from Cameron, Hidalgo and Starr Counties in south Texas and the border states of Nuevo Leon and Tamaulipas in Mexico. Presently, this species is known from one population each in Starr County and Tamaulipas (TPWD 2013d).

No species were observed during the field surveys and no observations have been recorded in the TXNDD database for this area. Although field surveys did identify thorny shrubland commonly associated with the star cactus near the proposed water discharge pipeline corridor, soils conditions and the terrain were not indicative of the habitats associated with the species. No other sensitive habitats associated with the species were observed.

Construction of the water discharge pipeline will be of short duration and will have temporary impacts on the vegetation and soil within the proposed ROW. These temporary impacts will occur mostly within previously disturbed ROW and no sensitive habitats associated with the star cactus will be impacted. Due to this, a determination of *"No effect"* is recommended for this species.

4.3.18 Texas Ayenia

The Texas ayenia grows in moist, dense, subtropical riparian woodlands. It is known to historically occur in Cameron and Hidalgo counties in south Texas and in the states of Coahuila and Tamaulipas in Mexico. It is currently known to exist only in one small population of 20 individuals in Hidalgo County (TPWD 2013a). TXNDD data show the possibility of Texas ayenia to occur along the Mexican border and within the vicinity of the proposed water discharge pipeline corridor. Observation for the ayenia were first made in 1945 and the last recorded observation was in 1963 (TXNDD 2012).

No species were observed during the field surveys and no observations have been recorded in the TXNDD database for this area. Field surveys did not identify any potential habitat associated with the Texas ayenia near the proposed water discharge pipeline corridor or the outfall location.

Construction of the water discharge pipeline will be of short duration and will have temporary impacts on the vegetation and soil within the proposed ROW. These temporary impacts will occur mostly within previously disturbed ROW and no sensitive habitats associated with the Texas ayenia will be impacted. Due to this, a determination of *"No effect"* is recommended for this species.

4.4 FEDERALLY LISTED SPECIES AND DESIGNATED CRITICAL HABITAT THAT MAY POTENTIALLY OCCUR IN THE PROJECT AREA

Data from USFWS were used to identify locations of designated critical habitats for federally-listed species.

The USFWS and TPWD threatened and endangered species databases and TXNDD occurrence data were reviewed to determine which, if any, federally-listed species may have the potential to occur along the proposed water discharge pipeline. The species that are federally listed on both the TPWD and USFWS lists for Cameron County are presented in Table 3-1.

4.4.1 Designated Federal Critical Habitat

Based on information provided by the USFWS, there is no designated federal critical habitat along the proposed water discharge pipeline corridor. The nearest designated federal critical habitat is for the Piping Plover located approximately 16.9 km (10.5 mi) east of the outfall location. No direct or indirect impacts will occur to federal critical habitat.

4.4.2 Texas Natural Diversity Database

Response to the TXNDD request included an element occurrence listing, element occurrence report, and geographic information systems (GIS)-compatible shapefile of element occurrence boundaries. Figure 4-5 depicts a map of the site vicinity overlain with the shapefile obtained from TXNDD. Element occurrence records corresponding with the boundaries depicted in Figure 4-5 are available under separate cover as Appendix C in the Supplemental Information. Based on the TXNDD data, several listed species have been documented over the years within the vicinity of the proposed water discharge pipeline corridor; however, none have been found specifically within the proposed project.

The Northern Aplomado falcon was last observed approximately 2 miles northeast of the proposed water discharge pipeline in 2002. The jaguarundi was observed in 1992 approximately 3.5 miles southwest of the proposed water discharge pipeline and the Texas Ayenia was observed in 1963 approximately 2 miles southwest of the proposed water discharge pipeline. Additionally, the Rio Grande silvery minnow can be found in the Rio Grande; however, the project does not cross the river nor is habitat specifically associated with the silvery minnow located along the proposed water discharge pipeline.

4.5 DETERMINATION OF EFFECT SUMMARY

A species-specific analysis of potential impacts resulted in a determination of *may affect, but is not likely to adversely affect* for 2 of the 18 threatened and endangered species analyzed in this report for the proposed water discharge pipeline and outfall structure. The remaining 16 species were determined to have a "no effect" from the proposed water discharge pipeline and outfall. A summary of the threatened and endangered species and recommended determination of effects is presented below in Table 4-1.

TABLE 4-1: Summary of Anticipated Effects on Federally Listed Species Potentially Occurring along the Proposed Water Discharge Pipeline

Federally Listed Species	*Listing Agency*	*Recommended Determination of Effect*
Eskimo curlew (*Numenius borealis*)	*USFWS*	No effect
Interior least tern (*Sterna antillarum athalassos*)	*USFWS*	No effect
Northern aplomado falcon (*Falco femoralis septentrionalis*)	*USFWS*	May affect, but is not likely to adversely affect
Piping plover (Charadrius melodus)	*USFWS*	No effect
Rio Grande silvery minnow (*Hybognathus amarus)*	*USFWS*	No effect
Smalltooth sawfish (*Pristis pectinata*)	NOAA	No effect
Jaguar (*Panthera onca*)	USFWS	No effect
Jaguarundi (*Herpailurus yagouaroundi* (var. *Herpailurus yagouaroundi cacomitli*)	USFWS	May affect, but is not likely to adversely affect
Ocelot (*Leopardus pardalis*)	USFWS	May affect, but is not likely to adversely affect
West Indian manatee (*Trichechus manatus*)	USFWS	No effect
Atlantic hawksbill sea turtle (*Eretmochelys imbricate*)	USFWS/NOAA	No effect
Green sea turtle (*Chelonia mydas*)	USFWS/NOAA	No effect

Federally Listed Species	*Listing Agency*	*Recommended Determination of Effect*
Kemp's Ridley sea turtle (*Lepidochelys kempii*)	USFWS/NOAA	No effect
Leatherback sea turtle (*Dermochelys coriacea*)	USFWS/NOAA	No effect
Loggerhead sea turtle (*Caretta caretta*)	USFWS/NOAA	No effect
South Texas ambrosia (*Ambrosia cheiranthifolia*)	USFWS	No effect
Star cactus (*Astrophytum asterias*)	USFWS	No effect
Texas ayenia (*Ayenia limitaris*)	USFWS	No effect

5.0 CONSERVATION AND MITIGATION MEASURES

The construction and operation of the proposed water discharge pipeline and proposed outfall structure is anticipated to have no adverse impact on federally-protected species or their habitat. Tenaska has located the proposed water discharge pipeline and proposed water outfall within areas that avoid and minimize impacts to federally-protected species and their habitats. Construction of the water discharge pipeline will be of short duration and follow standard construction practices that have been proven to avoid and minimize impacts. All areas will be restored to preconstruction conditions and allowed to regrow with natural species of the area. Any impact will be considered to be short-term and temporary.

The Project will implement Best Management Practices (BMP's) to provide protection during construction and operation. Examples of BMP's may include segregation of excavated soils (for correct replacement upon end of construction), trenching completed within surveyed right-of-way, and maintenance of existing shoreline at the proposed outfall location.

5.1 THREATENED AND ENDANGERED SPECIES

Based on field reconnaissance and assessment of potential impacts to species and their available habitats, no loss of threatened or endangered species and/or critical habitat is expected to result from construction or operation of the proposed water discharge pipeline and outfall structure. No protected species were observed or have been documented along the proposed water discharge pipeline or at the outfall location. Suitable habitats that could support three of the listed species was documented in the vicinity of the proposed water discharge pipeline and outfall structure; therefore, these species were listed as having a "may affect, but not likely to adversely affect" determination, see Table 4-1.

5.2 FISHERIES CONSERVATION

The proposed water discharge outfall location will be located along the Brownsville Ship Channel, which is connected with tidal and coastal waters that may support protected species managed under the Magnuson Stevens Act. Data presented in Figure 4-6 show the nearest area with designated essential fish habitat by the Gulf of Mexico Fishery Management Council (GMFMC) is located in the Brownsville Ship Channel approximately 7.5 miles northeast of the proposed water discharge location. Essential Fish Habitat (EFH) included by the habitat designation includes red drum, stone crab, shrimp, reef fish and coastal migratory pelagics. Adverse impacts to species associated with the EFH designated area are not anticipated. The ship channel is a man-made channel that is routinely dredged and has significant marine vessel traffic. It is designed specifically to support industrial development. Natural aquatic habitats are very limited within the channel; however, natural movements of coastal species are expected.

The outfall structure will be constructed in a manner to avoid direct impacts to sensitive species in the ship channel. The anticipated mixing zone will be limited and will not reach those habitats designated as EFH. The discharge of wastewater will meet effluent requirements as established by the Texas Commission on Environmental Quality (TCEQ) in a to-be-issued TPDES Permit No. WQ0005005000. The TCEQ Statement of Basis / Technical summary and Executive Director's Preliminary Decision listed Segment No. 2494 in Cameron County as watershed of high priority for the piping plover. It further documented that the discharge of wastewater into the ship channel from this project would not have an effect on the piping plover. This determination is based on the USFWS biological opinion on the State of Texas authorization of the Texas Pollutant Discharge Elimination System (TPDES; September 14, 1998, October 21, 1998 update).

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Figures

May 20, 2014
Project No. 0185680

Environmental Resources Management
CityCentre Four
840 West Sam Houston Parkway, Suite 600
Houston, Texas 77024-3920
(281) 600-1000

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

Environmental Resources Management

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FIGURE 1-1
PROJECT SITE VICINITY MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

ERM

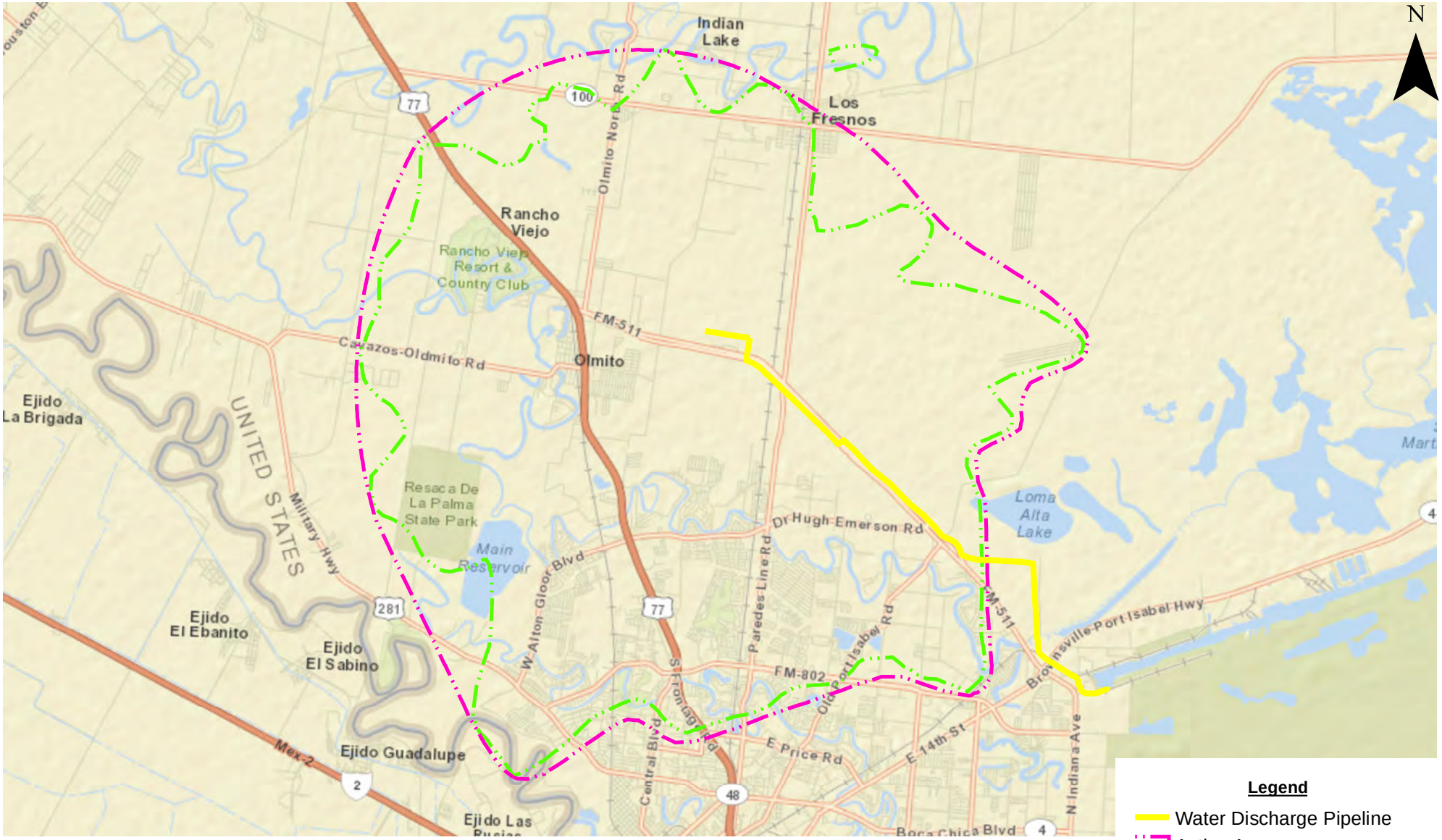

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FIGURE 1-2
ACTION AREA DEFINED BY SIL MODELING
Biological Assessment
Water Discharge Pipeline
Tenaska Brownsville Partners, LLC
Brownsville, Texas

ERM

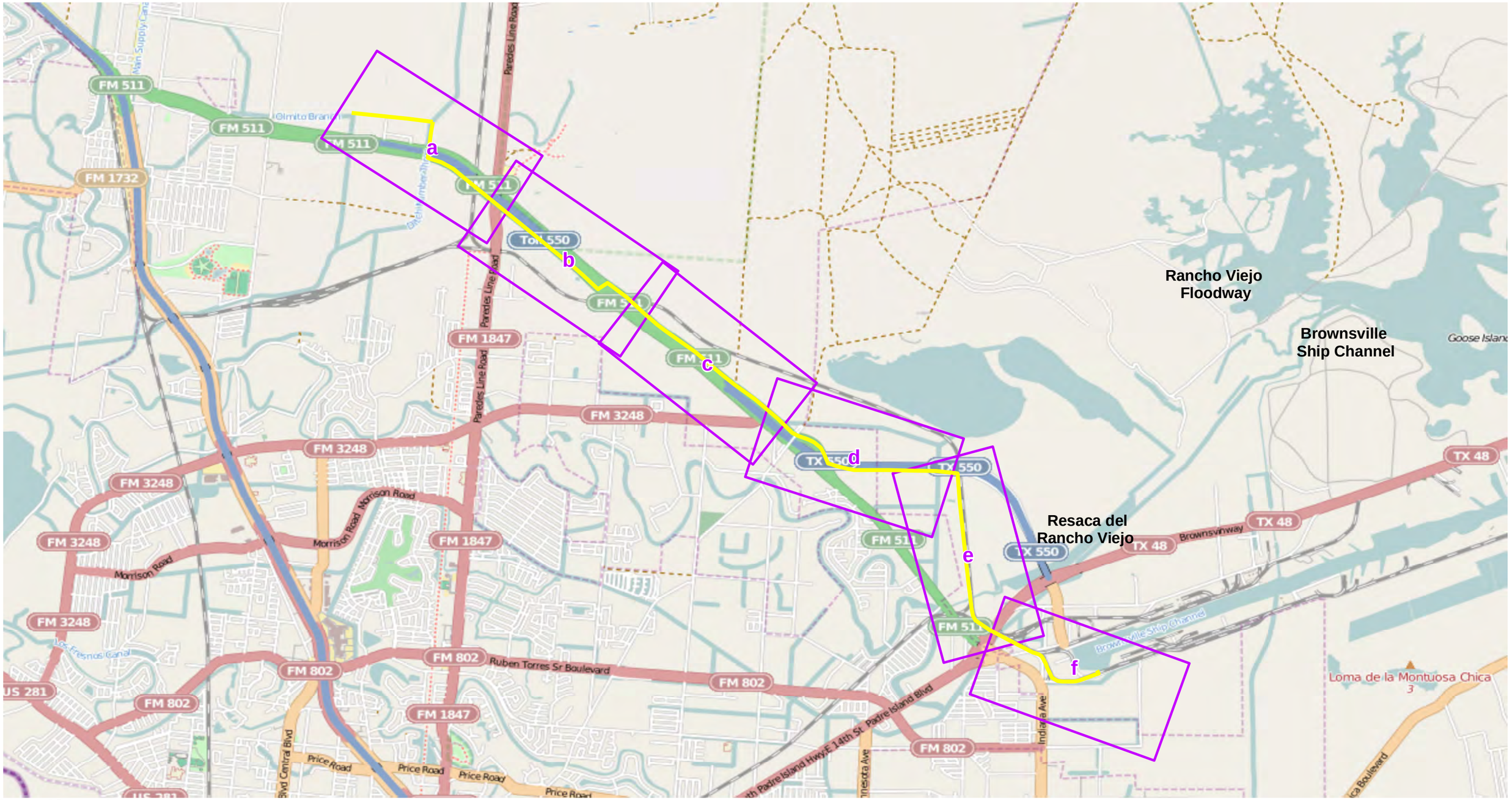

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FIGURE 2-1
OVERVIEW MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Water Discharge Pipeline
- Page Grid

N

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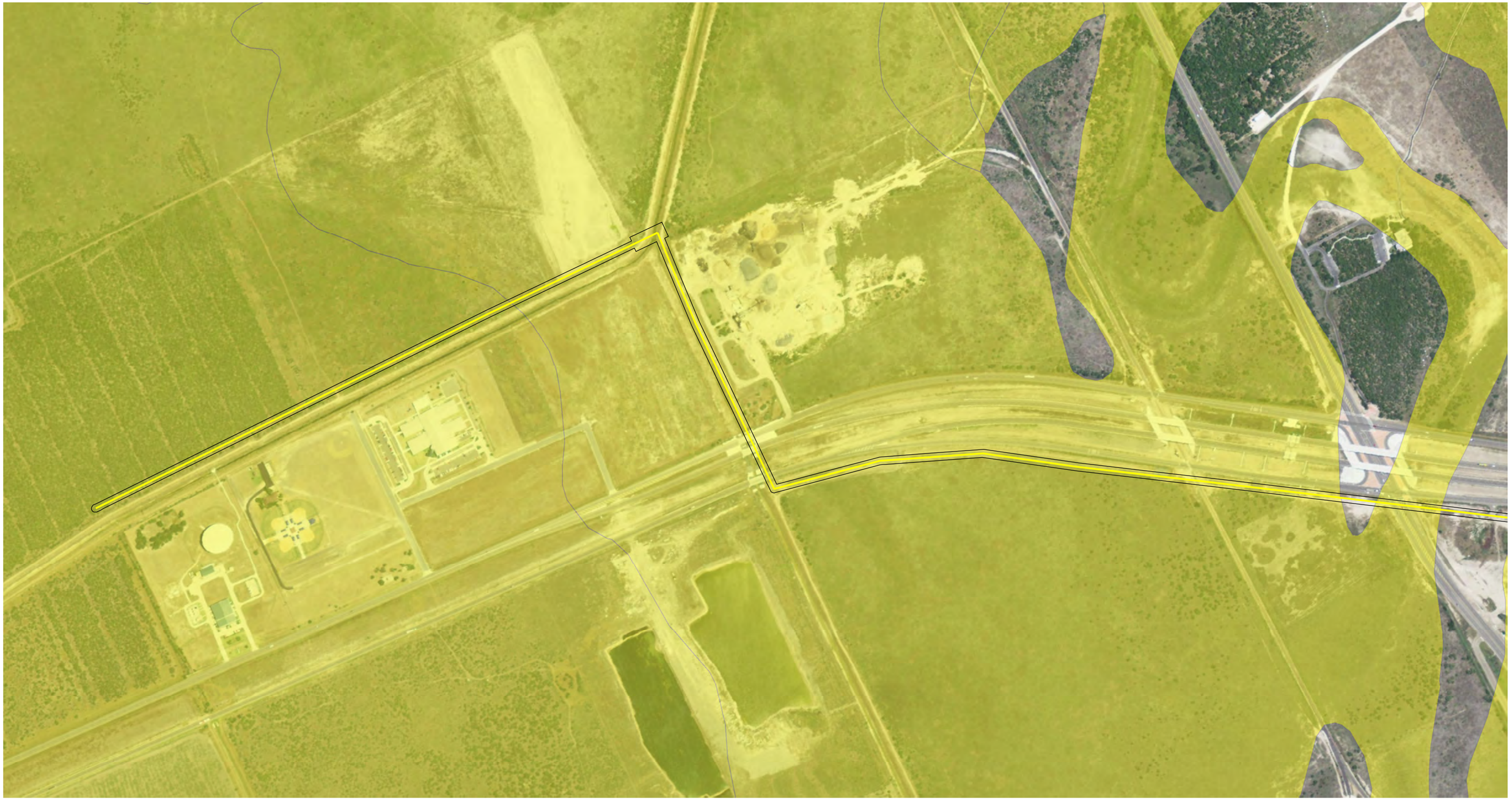

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

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FIGURE 4-1a
NRCS SOILS MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Water Discharge Pipeline
- Survey ROW

NRCS Soils

- All hydric
- Partially hydric

N

ERM

0 600 1,200

Feet

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

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FIGURE 4-1b
NRCS SOILS MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Water Discharge Pipeline
- Survey ROW

NRCS Soils

- All hydric
- Partially hydric

N

ERM

0 600 1,200

Feet

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

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FIGURE 4-1c
NRCS SOILS MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Water Discharge Pipeline
- Survey ROW

NRCS Soils

- All hydric
- Partially hydric

N

ERM

0 600 1,200
Feet

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

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FIGURE 4-1d
NRCS SOILS MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Water Discharge Pipeline
- Survey ROW

NRCS Soils

- All hydric
- Partially hydric

N

ERM

0 600 1,200
Feet

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

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FIGURE 4-1e
NRCS SOILS MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Water Discharge Pipeline
- Survey ROW

NRCS Soils

- All hydric
- Partially hydric

N

ERM

0 600 1,200

Feet

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

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FIGURE 4-1f
NRCS SOILS MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Water Discharge Pipeline
- Survey ROW

NRCS Soils

- All hydric
- Partially hydric

N

ERM

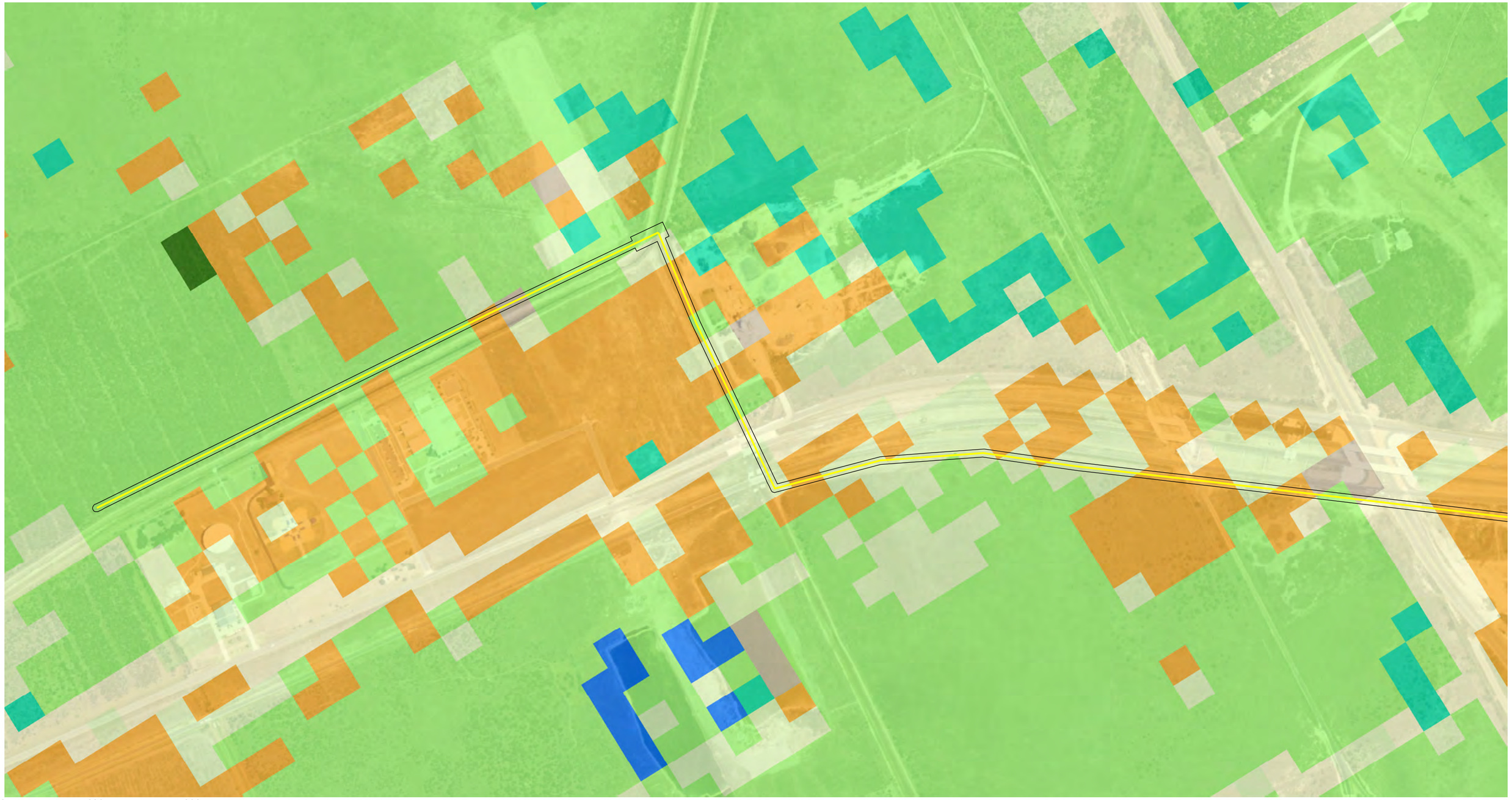

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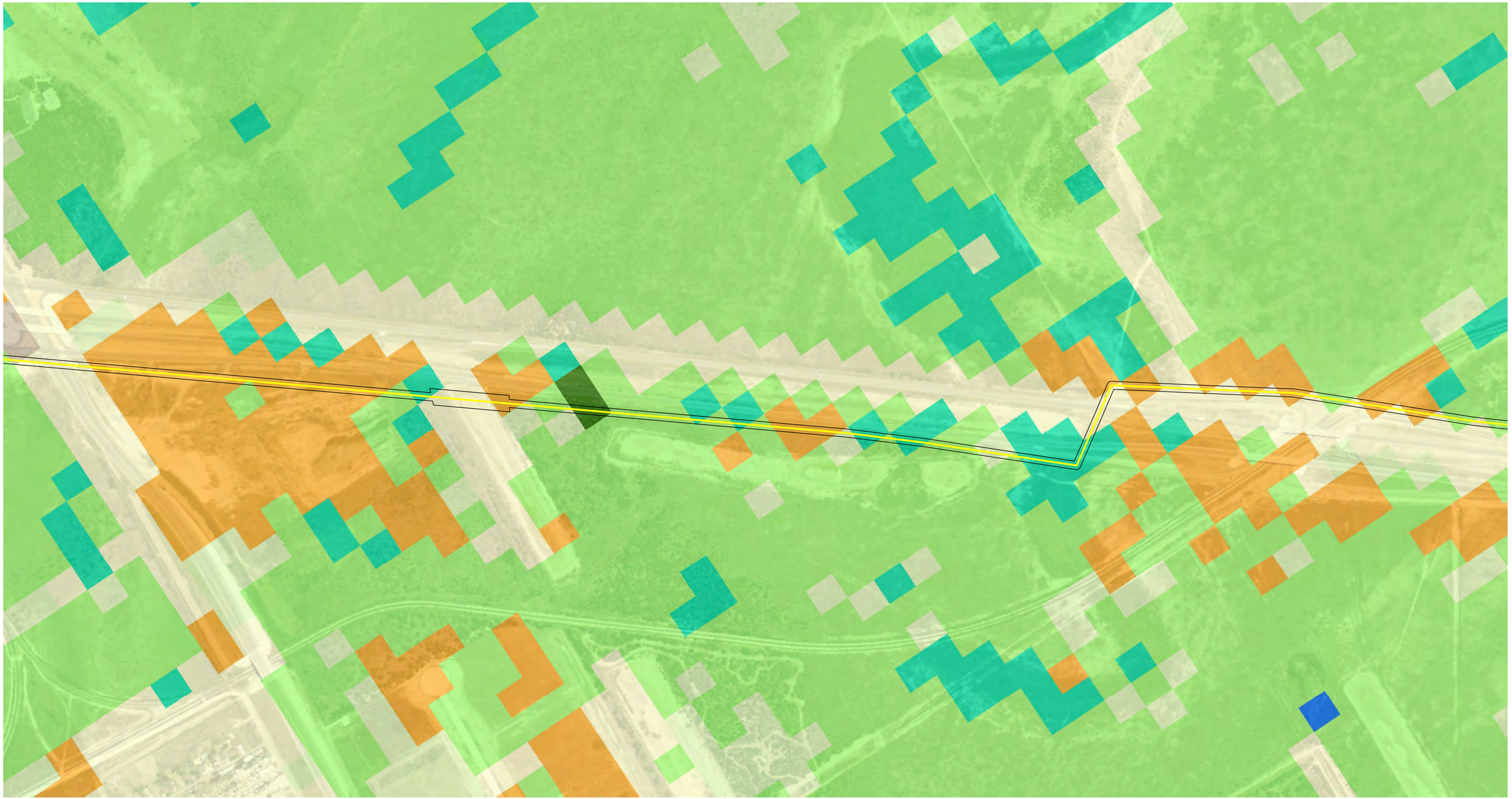
FIGURE 4-2a
LANDCOVER MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

ERM



Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

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FIGURE 4-2b
LANDCOVER MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Water Discharge Pipeline
- Survey ROW

USDA NASS Cropland Data Layer 2009

- Cropland
- Barren
- Forested
- Developed
- Pasture/Hay/ Grassland
- Wetlands
- Water
- Shrubland

N

ERM

0 600 1,200
Feet

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
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FIGURE 4-2c
LANDCOVER MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Water Discharge Pipeline
- Survey ROW

USDA NASS Cropland Data Layer 2009

- Cropland
- Barren
- Forested
- Developed
- Pasture/Hay/ Grassland
- Wetlands
- Water
- Shrubland

N

ERM

0 600 1,200

Feet

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
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FIGURE 4-2d
LANDCOVER MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

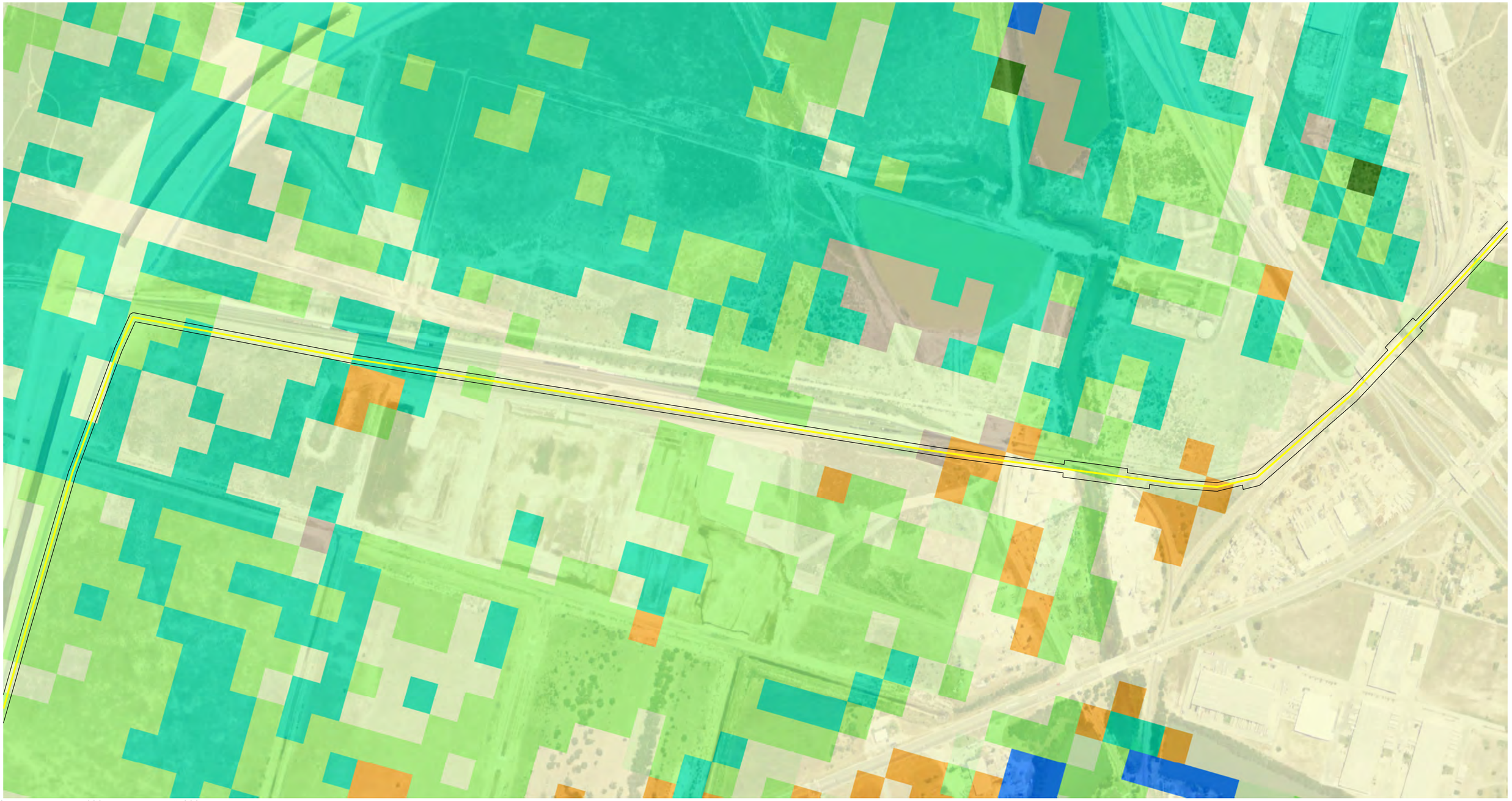
- Water Discharge Pipeline
- Survey ROW

USDA NASS Cropland Data Layer 2009

- Cropland
- Barren
- Forested
- Developed
- Pasture/Hay/ Grassland
- Wetlands
- Water
- Shrubland

N

ERM



Environmental Resources Management

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FIGURE 4-2e
LANDCOVER MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Water Discharge Pipeline
- Survey ROW

USDA NASS Cropland Data Layer 2009

- Cropland
- Barren
- Forested
- Developed
- Pasture/Hay/ Grassland
- Wetlands
- Water
- Shrubland

N

ERM

0 600 1,200
Feet

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Legend

- Water Discharge Pipeline
- Survey ROW

USDA NASS Cropland Data Layer 2009

- Cropland
- Barren
- Forested
- Developed
- Pasture/Hay/ Grassland
- Wetlands
- Water
- Shrubland

N

Environmental Resources Management

DESIGN:	A Ragatz	DRAWN:	S King	CHKD.:	K Schlicht
DATE:	12/11/2013	SCALE:	AS SHOWN	REVISION:	0

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FIGURE 4-2f
LANDCOVER MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

ERM

0 600 1,200

Feet

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

DESIGN:	A Ragatz	DRAWN:	S King	CHKD.:	K Schlicht
DATE:	12/11/2013	SCALE:	AS SHOWN	REVISION:	0

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FIGURE 4-3a
NWI & FEMA FLOODPLAIN MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Water Discharge Pipeline
- Survey ROW

FEMA Flood Zone

- 100-year floodplain

NWI Wetland Type

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other

N

ERM

0 600 1,200
Feet

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
DATE: 12/11/2013	SCALE: AS SHOWN	REVISION: 0
FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-3_nwi_floodplain.mxd		

FIGURE 4-3b
NWI & FEMA FLOODPLAIN MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

Water Discharge Pipeline
Survey ROW

FEMA Flood Zone
100-year floodplain

NWI Wetland Type
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Other

N

ERM

0 600 1,200
Feet

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
DATE: 12/11/2013	SCALE: AS SHOWN	REVISION: 0

FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-3_nwi_floodplain.mxd

FIGURE 4-3c
NWI & FEMA FLOODPLAIN MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Water Discharge Pipeline
- Survey ROW

FEMA Flood Zone

- 100-year floodplain

NWI Wetland Type

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other

N

ERM

0 600 1,200

Feet

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
DATE: 12/11/2013	SCALE: AS SHOWN	REVISION: 0

FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-3_nwi_floodplain.mxd

FIGURE 4-3d
NWI & FEMA FLOODPLAIN MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Water Discharge Pipeline
- Survey ROW

FEMA Flood Zone

- 100-year floodplain

NWI Wetland Type

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other

N

ERM

0 600 1,200
Feet

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
DATE: 12/11/2013	SCALE: AS SHOWN	REVISION: 0
FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-3_nwi_floodplain.mxd		

FIGURE 4-3e
NWI & FEMA FLOODPLAIN MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Water Discharge Pipeline
- Survey ROW

FEMA Flood Zone

- 100-year floodplain

NWI Wetland Type

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other

N

ERM

0 600 1,200

Feet

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Legend

- Water Discharge Pipeline
- Survey ROW

FEMA Flood Zone

- 100-year floodplain

NWI Wetland Type

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other

N

Environmental Resources Management

DESIGN:	A Ragatz	DRAWN:	S King	CHKD.:	K Schlicht
DATE:	12/11/2013	SCALE:	AS SHOWN	REVISION:	0

FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-3_nwi_floodplain.mxd

FIGURE 4-3f
NWI & FEMA FLOODPLAIN MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

ERM

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
DATE: 12/11/2013	SCALE: AS SHOWN	REVISION: 0

FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-4_wetlands_waterbodies.mxd

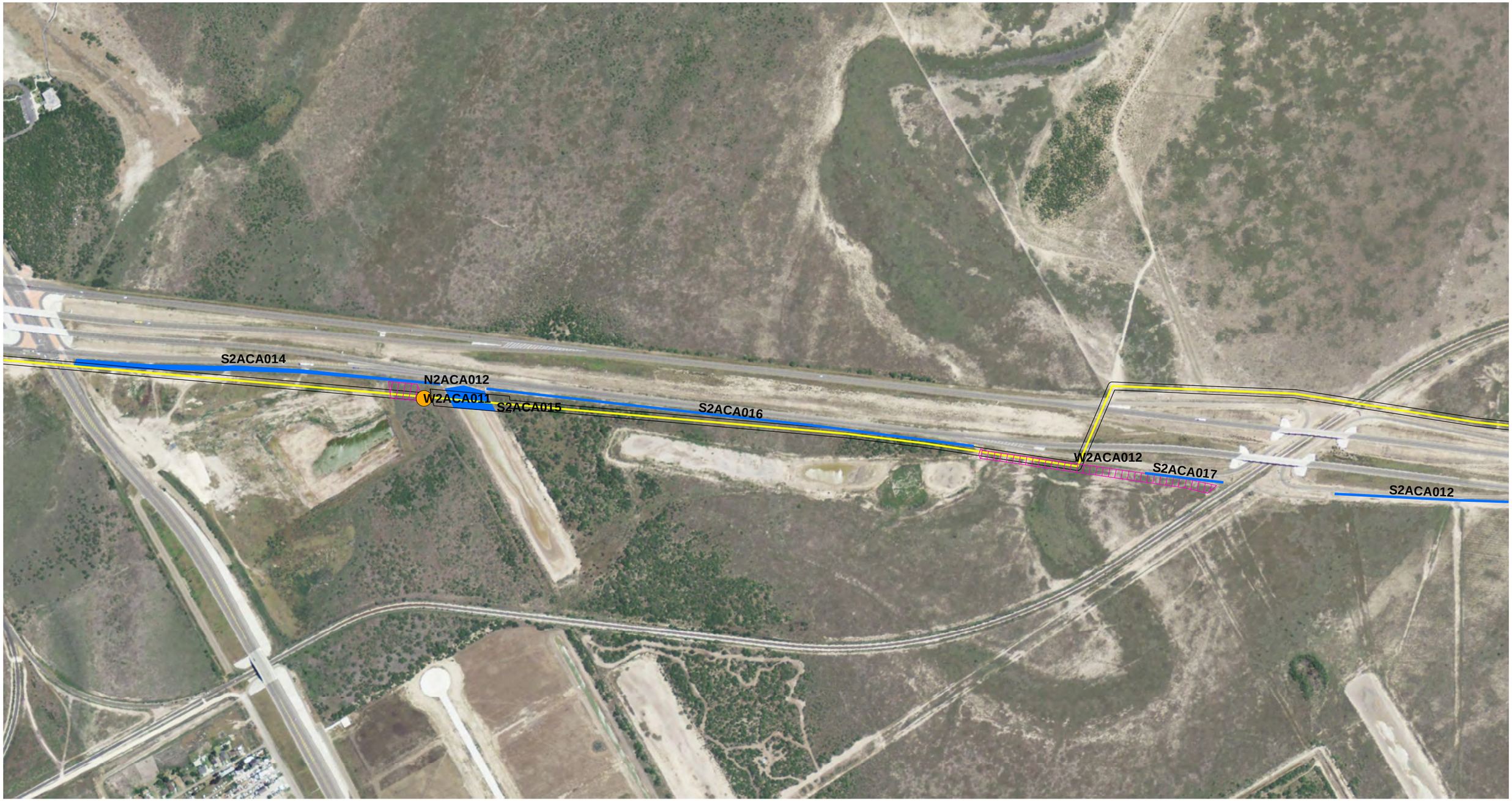
FIGURE 4-4a
AERIAL MAP WITH DELINEATED WETLANDS & WATERBODIES
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Habitat Data Collection Point
- Delineated Waterbody
- Delineated Wetland
- Water Discharge Pipeline
- Survey ROW

N

ERM



Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
DATE: 12/11/2013	SCALE: AS SHOWN	REVISION: 0
FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-4_wetlands_waterbodies.mxd		

FIGURE 4-4b
AERIAL MAP WITH DELINEATED WETLANDS & WATERBODIES
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Habitat Data Collection Point
- Delineated Waterbody
- Delineated Wetland
- Water Discharge Pipeline
- Survey ROW

N

ERM

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
DATE: 12/11/2013	SCALE: AS SHOWN	REVISION: 0

FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-4_wetlands_waterbodies.mxd

FIGURE 4-4c
AERIAL MAP WITH DELINEATED WETLANDS & WATERBODIES
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Habitat Data Collection Point
- Delineated Waterbody
- Delineated Wetland
- Water Discharge Pipeline
- Survey ROW

N

ERM

0 600 1,200
Feet

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
DATE: 12/11/2013	SCALE: AS SHOWN	REVISION: 0

FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-4_wetlands_waterbodies.mxd

FIGURE 4-4d
AERIAL MAP WITH DELINEATED WETLANDS & WATERBODIES
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Habitat Data Collection Point
- Delineated Waterbody
- Delineated Wetland
- Water Discharge Pipeline
- Survey ROW

N

ERM

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

DESIGN:	A Ragatz	DRAWN:	S King	CHKD.:	K Schlicht
DATE:	12/11/2013	SCALE:	AS SHOWN	REVISION:	0

FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-4_wetlands_waterbodies.mxd

FIGURE 4-4e
AERIAL MAP WITH DELINEATED WETLANDS & WATERBODIES
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Habitat Data Collection Point
- Delineated Waterbody
- Delineated Wetland
- Water Discharge Pipeline
- Survey ROW

N

ERM

Basemap: USDA NAIP Texas 2012 1-meter Natural Color

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
DATE: 12/11/2013	SCALE: AS SHOWN	REVISION: 0

FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-4_wetlands_waterbodies.mxd

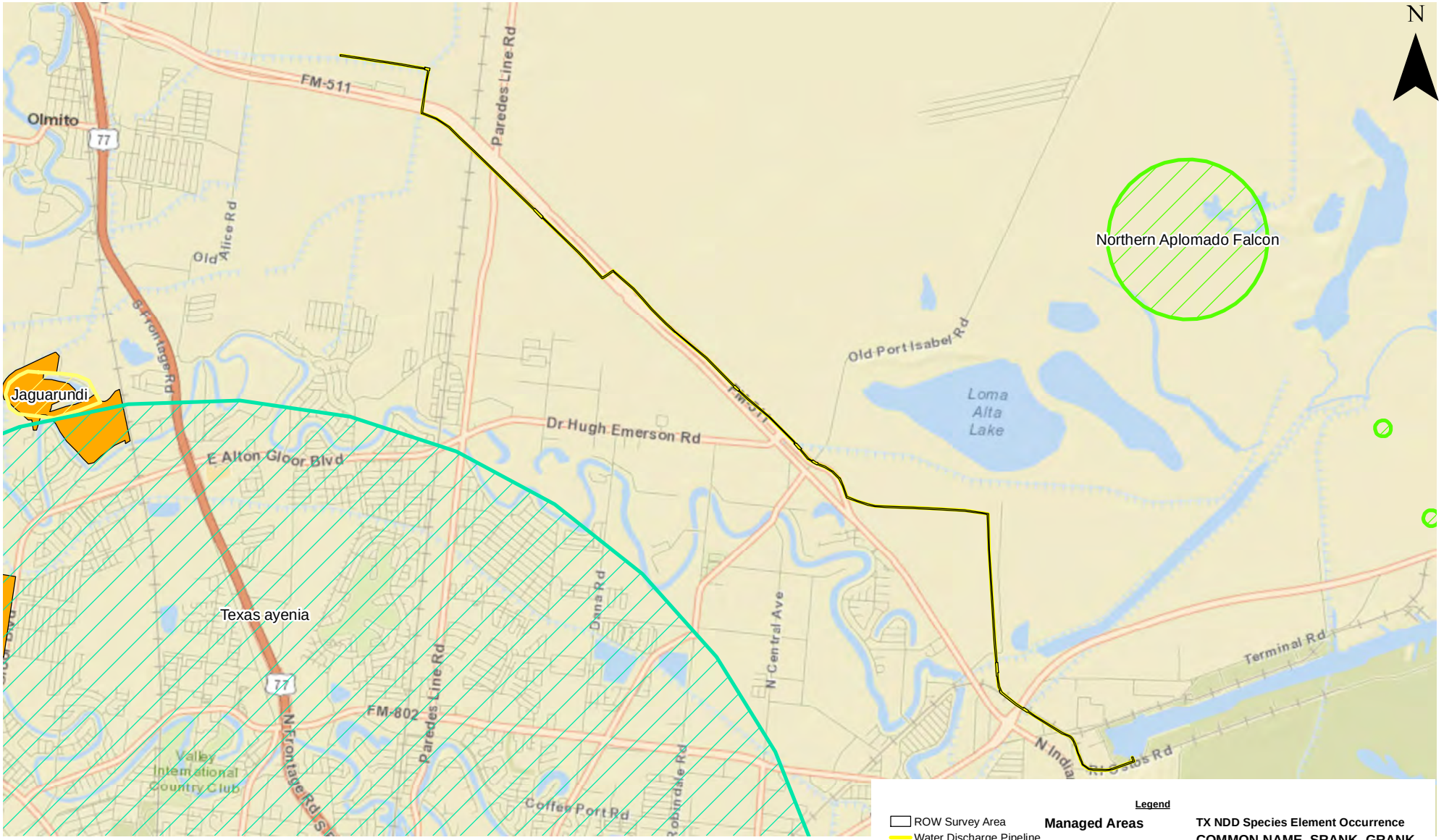
FIGURE 4-4f
AERIAL MAP WITH DELINEATED WETLANDS & WATERBODIES
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Habitat Data Collection Point
- Delineated Waterbody
- Delineated Wetland
- Water Discharge Pipeline
- Survey ROW

N

ERM



Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
DATE: 12/11/2013	SCALE: AS SHOWN	REVISION: 0
FILE:N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-1_txndd.mxd		

FIGURE 4-5
TXNDD ELEMENT OCCURRENCE DATA IN THE VICINITY OF THE PROJECT SITE
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

ERM

Environmental Resources Management

DESIGN:	C Heiner	DRAWN:	A Ragatz	CHKD.:	C Heiner
DATE:	12/11/2013	SCALE:	AS SHOWN	REVISION:	0
FILE:	N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-6_EFH_WWSC.mxd				

FIGURE 4-6
ESSENTIAL FISH HABITAT MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Water Discharge Pipeline
- EFH (Red Drum, Stone Crab, Shrimp, Reef Fish, Coastal Migratory Pelagics)

N

ERM

Environmental Resources Management

DESIGN:	A Ragatz	DRAWN:	S King	CHKD.:	K Schlicht
DATE:	12/11/2013	SCALE:	AS SHOWN	REVISION:	0

FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-8_habitat_survey.mxd

FIGURE 4-7a
HABITAT SURVEY MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Habitat Survey Points
- Water Discharge Pipeline
- Survey ROW

NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM

Environmental Resources Management

DESIGN:	A Ragatz	DRAWN:	S King	CHKD.:	K Schlicht
DATE:	12/11/2013	SCALE:	AS SHOWN	REVISION:	0

FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-8_habitat_survey.mxd

FIGURE 4-7b
HABITAT SURVEY MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Habitat Survey Points
- Water Discharge Pipeline
- Survey ROW

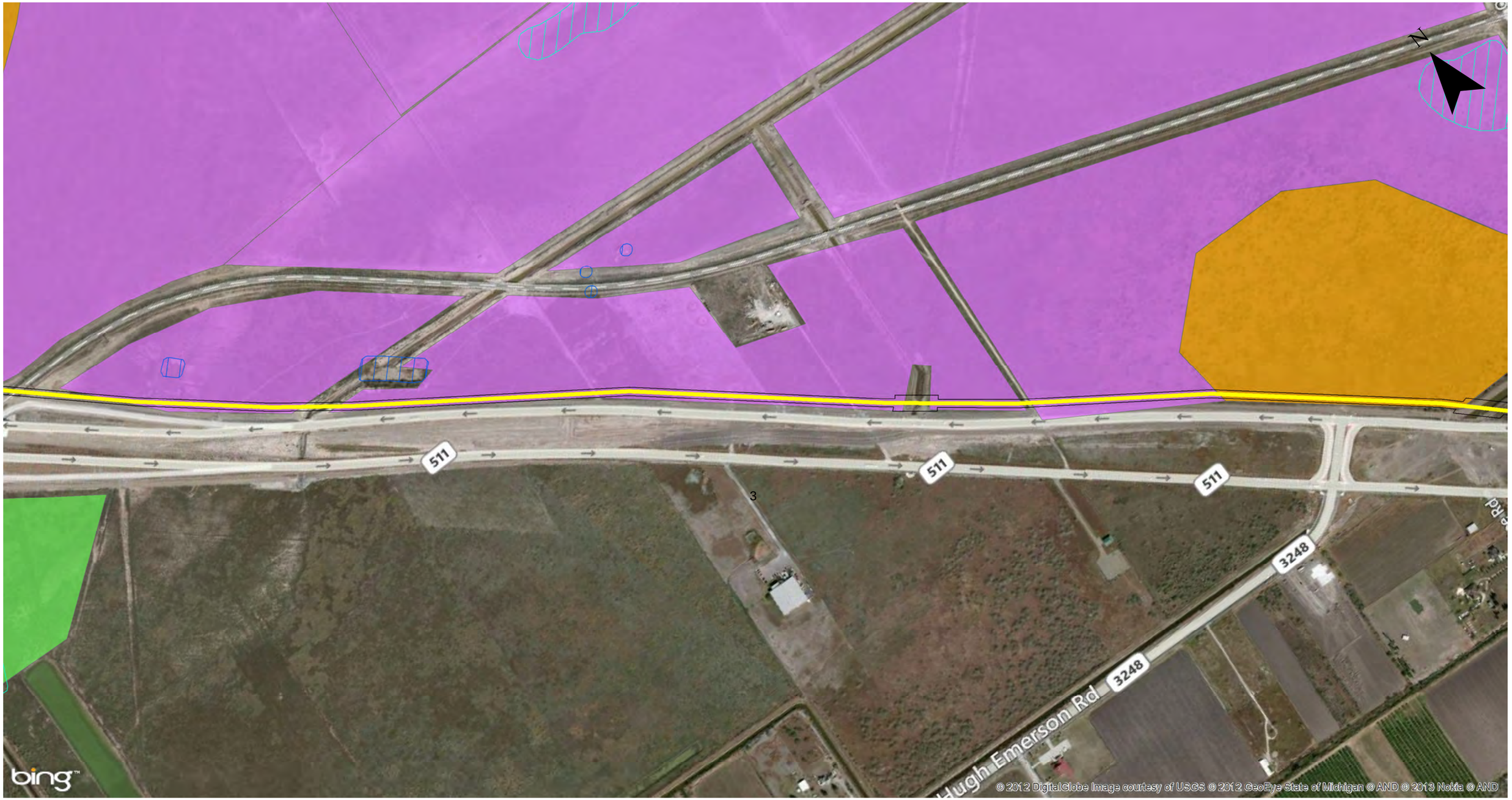
NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM



Environmental Resources Management

DESIGN:	A Ragatz	DRAWN:	S King	CHKD.:	K Schlicht
DATE:	12/11/2013	SCALE:	AS SHOWN	REVISION:	0

FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-8_habitat_survey.mxd

FIGURE 4-7c
HABITAT SURVEY MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Habitat Survey Points
- Water Discharge Pipeline
- Survey ROW

NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM

Environmental Resources Management

DESIGN:	A Ragatz	DRAWN:	S King	CHKD.:	K Schlicht
DATE:	12/11/2013	SCALE:	AS SHOWN	REVISION:	0

FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-8_habitat_survey.mxd

FIGURE 4-7d
HABITAT SURVEY MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Habitat Survey Points
- Water Discharge Pipeline
- Survey ROW

NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
DATE: 12/11/2013	SCALE: AS SHOWN	REVISION: 0
FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-8_habitat_survey.mxd		

FIGURE 4-7e
HABITAT SURVEY MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Habitat Survey Points
- Water Discharge Pipeline
- Survey ROW

NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM

Environmental Resources Management

DESIGN: A Ragatz	DRAWN: S King	CHKD.: K Schlicht
DATE: 12/11/2013	SCALE: AS SHOWN	REVISION: 0

FILE: N:\Projects\Tenaska\Brownsville\Models_GIS\MXD\Supp_BA\fig4-8_habitat_survey.mxd

FIGURE 4-7f
HABITAT SURVEY MAP
Water Discharge Pipeline
Biological Assessment
Tenaska Brownsville Partners, LLC
Brownsville, Texas

Legend

- Habitat Survey Points
- Water Discharge Pipeline
- Survey ROW

NWI Wetlands

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Delineated Habitat Type

- Agriculture
- Dense Mesquite
- Grassland
- Herbaceous
- Mesquite
- Mesquite Savannah

ERM