Table 3-4: Federally Listed Fish and Wildlife Species for the Study Area County

Kemp's Ridley sea turtle	*Lepidochelys kempii*	Endangered	None
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	None
Loggerhead sea turtle	*Caretta caretta*	Threatened	None

Sources: USFWS (2024b) and TPWD (2024c)
(a) Could occur as a rare non-breeding migrant or as a rare vagrant within the Study Area.

3.6.5.2.1 Eastern Black Rail

The eastern black rail is the smallest rail species in North America and breeds within the Atlantic Gulf Coastal Prairies of Texas. The species can be found inhabiting salt and brackish marshes with dense vegetation coverage, impounded and un-impounded salt and brackish marshes, higher elevations of these wetland zones, and inland coastal prairies and associated wetlands. Regardless of the water regime, eastern black rails require dense vegetation coverage that is generally less than or equal to 1 meter in height. Vegetation structure is noted to be more important than species composition in determining habitat suitability (USFWS 2024b). This species is unlikely to occur within the Study Area due to the lack of potential suitable habitat.

3.6.5.2.2 Piping Plover

The piping plover is an uncommon to locally common winter resident along the Texas coastline and is rarely seen inland during migration. They occupy sandy beaches and lakeshores, bayside mudflats, and salt flats. Piping plovers feed on small marine insects and other small invertebrates (Elliot-Smith and Haig 2020). This species may occur as a rare non-breeding migrant (Lockwood and Freeman 2014) within the Study Area if suitable stopover habitat is available.

3.6.5.2.3 Rufa Red Knot

The rufa red knot is a long-distance migrant that may travel up to 5,000 miles during migration without stopping. Red knots nest in the arctic tundra and overwinter along the Texas coastline. Winter foraging habitats include coastal beaches, tidal sand flats, mudflats, marsh, shallow ponds, and sand bars (Baker et al. 2020). This species is a non-breeding winter migrant along the Texas coastline (Lockwood and Freeman 2014) and may occur within the Study Area as a rare migrant if suitable stopover habitat is available.

3.6.5.2.4 Whooping Crane

The whooping crane breeds at Wood Buffalo National Park in Canada and overwinters primarily in marshes at Aransas National Wildlife Refuge on the Texas coast (USFWS 2024c). Family groups of whooping cranes have also been documented overwintering further inland in Central Texas, south-central Kansas, and central Nebraska, possibly in response to record warm temperatures and extreme drought conditions in the southern and central United States (Wright et al. 2014). Winter migration primarily occurs within a 200-mile-wide migratory corridor in which 95% of all whooping crane sightings occur. Migration stopover sites typically include small surface waters with emergent vegetation cover, harvested grainfields, pastures, or burned upland fields (Urbanek and Lewis 2020). The Study Area occurs within the primary migratory corridor for the whooping crane (USFWS 2024c). This species may occur within the Study Area as a rare migrant if suitable stopover habitat is available.

3.6.5.2.5 Oceanic Whitetip Shark

The oceanic whitetip shark is a pelagic species found throughout the world typically in open ocean, around outer continental shelfs, and in deep waters around oceanic islands. This species is a top predator feeding on bony fish, squid, large sportfish, sea birds, marine mammals, and other sharks (NOAA 2024b). This species does not occur in within the Study Area due to an absence of marine habitat.

3.6.5.2.6 Monarch Butterfly

The monarch butterfly ranges from North and South America to the Caribbean, Australia, New Zealand, the Pacific islands, and Western Europe. The species has been proposed as a candidate species for protection under the ESA due to decreasing populations and habitat loss. Eastern and western monarch populations migrate both north and south on an annual basis. Populations usually overwinter in Mexico, Texas, Florida, and California and then spend the spring and summer months migrating back north. The entire migration cycle lasts for four generations of monarchs and no individual makes the round trip. Monarchs are heavily dependent on milkweed plants for nectar and larval consumption. Preferred overwintering habitat includes appropriate roosting vegetation, dense tree cover, access to streams, and warm enough temperatures to allow for flight (USFWS 2024d). The Study Area is located along the spring and fall eastern monarch butterfly migratory route (USFWS 2024e). This species may occur within the Study Area as a migrant at specific times of year.

3.6.5.2.7 Blue Whale

The blue whale occurs in all oceans of the world; however, there are only two records from the Gulf of Mexico: one stranded in 1924 near Sabine Pass and another stranded in 1940 near San Luis Pass. Blue whales inhabit Arctic feeding grounds in the spring and summer, moving to more temperate waters in the fall and winter for mating and parturition (Schmidly and Bradley 2016). This species does not occur within the Study Area due to an absence of marine habitat.

3.6.5.2.8 Gulf of Mexico Bryde's Whale

In 2021, NOAA Fisheries issued a direct final rule to revise the common and scientific name of the Gulf of Mexico Bryde's whale to Rice's whale (*Balaneoptera ricei*). Rice's whales are typically observed in the northeastern portion of the Gulf of Mexico along the continental shelf between 100 and 400 meters deep. This species feeds on krill, copepods, red crabs, shrimp, and small fish (NOAA 2024c). This species does not occur within the Study Area due to an absence of marine habitat.

3.6.5.2.9 Humpback Whale

The humpback whale inhabits tropical, subtropical, temperate, and subpolar waters worldwide. They are known to utilize open ocean and coastal waters. According to the TPWD (2024c), the Gulf of Mexico's distinct population segment is not considered at risk of extinction and is not currently listed as endangered in the ESA. This species does not occur within the Study Area due to an absence of marine habitat.

3.6.5.2.10 North Atlantic Right Whale

The North Atlantic right whale is primarily found in Atlantic coastal waters along the continental shelf. This species migrates northward in spring and summer to feeding grounds off the coast of New England and Canada. In the fall, this species travels to shallow waters off the southeast coast of the United States. Diet mainly consists of copepods and zooplankton (NOAA 2024d). This species of whale only occurs accidentally in the Gulf of Mexico, and the only record of one stranding along the Texas coast was reported in Brazoria County in 1972 (Schmidly and Bradley 2016). This species does not occur within the Study Area due to an absence of marine habitat.

3.6.5.2.11 Ocelot

The ocelot once occupied Texas, Louisiana, Arkansas, and Arizona in the United States. However, due to habitat loss, there are only two known small, isolated breeding populations that total less than 100 individuals on a private ranch and Laguna Atascosa National Wildlife Refuge (USFWS 2023). Ocelots occupy mixed brush species with interspersed trees such as mesquite, live oak, ebony, and hackberry. Soil type, along with canopy cover and density, is important for this species. Optimal habitat consists of large tracks of isolated dense brush with a 95% canopy cover of shrubs. Shrub density below 6 feet with deep, fertile clay or loamy soils is preferred (Campbell 2003). Due to the rarity of this species and lack of isolated dense shrub habitat, this species is not likely to occur within the Study Area.

3.6.5.2.12 Sei Whale

The sei whale migrates between wintering grounds at low latitudes and feeding grounds at high latitudes, generally occupying open ocean and deep waters along the edges of continental shelves. This species feeds on copepods, euphausiids, squid, krill, and small fish. Sei whales are found in the offshore waters of the Gulf of Mexico and Caribbean Sea and up the western North Atlantic Ocean. However, sei whales have a tendency not to enter semi-enclosed waters such as the Gulf of Mexico (National Marine Fisheries Service [NMFS] 2011). Only one record of a stranded mummified skeleton was reported in Brazoria County in 2002 (Schmidly and Bradley 2016). This species does not occur within the Study Area due to an absence of marine habitat.

3.6.5.2.13 Sperm Whale

The sperm whale is highly migratory and occurs worldwide in all oceans. This species spends most of its time in deep waters, as represented by its main diet of squid, sharks, skates, and other deepwater fish species (NOAA 2024e). In the Gulf of Mexico, they are the most numerous large whales. Most sightings are from the continental edge and upper continental slope, in depths between 328 and 6,562 feet (Schmidly and Bradley 2016). This species does not occur within the Study Area due to an absence of marine habitat.

3.6.5.2.14 Tricolored Bat

On September 13, 2022, the USFWS announced the proposal to list the tricolored bat as endangered by the ESA due to the impacts of white-nosed syndrome. The tricolored bat has an expansive range throughout eastern and central North America, occupying many types of roost sites and locations. Individuals typically forage alongside trees and on forest perimeters, in forested riparian corridors, and along waterways adjacent to forested areas (USFWS 2024f). While historically associated with forested areas, this species is an opportunistic generalist and will utilize a multitude of habitats and structures where potential roosting may be close to foraging habitat. Non-reproductive individuals have a propensity to select roost sites within mature stands of trees or near buffer zones near perennial streams. Maternity and summer roost sites utilize dead trees and live tree foliage and within manmade structures or tree cavities. Caves, mines, and rock crevices may also be utilized between foraging arrays. Winter hibernation sites occur within caves, mines, cave-like tunnels, and sometimes within box culverts underneath highways adjacent to forested areas (USFWS 2024f). Due to its opportunistic behavior, this species may occur within the Study Area.

3.6.5.2.15 West Indian Manatee

The West Indian manatee inhabits temperate and equatorial waters of the southeastern United States, the Caribbean basin, northern and northeastern South America, and equatorial West Africa. The extent of their range is limited by their intolerance to colder temperatures during the winter months (Lefebvre 1989). This species is rare in Texas rivers, estuaries, canals, and bays with sightings occurring as far south as the mouth of the Rio Grande (Schmidly and Bradley 2016). This species does not occur within the Study Area due to an absence of marine habitat.

3.6.5.2.16 Green Sea Turtle

The green sea turtle is found worldwide, including in the Gulf of Mexico. Green sea turtles prefer lagoons and shoals with an abundance of marine grasses and algae (NOAA 2024f). The adults are primarily herbivorous, mainly consuming algae and seagrasses, though they also forage on invertebrates, mollusks, sponges, crustaceans, and jellyfish. Terrestrial habitat is typically limited to nesting activities on deep, coarse to fine sands with little organic content along high-energy beaches (Meylan et al. 1990; Allard et al. 1994). This species does not occur within the Study Area due to an absence of marine habitat.

3.6.5.2.17 Hawksbill Sea Turtle

The hawksbill sea turtle is a highly migratory species that utilizes a variety of habitats during different life stages but is typically found in shallow coastal waters with rocky bottoms, coral reefs, estuaries, and mangrove-bordered bays in water generally less than 60 feet deep. In Texas, juvenile hawksbills have been documented to be associated with stone jetties. This species prefers foraging near coral reefs, rocky outcrops, and high-energy shoals, which are optimum sites for sponge growth, sponge being one of their principal food sources. Other forage foods include crabs, sea urchins, shellfish, jellyfish, plant material, and fish (NOAA 2024g). Hawkbills nest on low- and high-energy beaches typically under vegetation (NMFS and USFWS 1993). This species does not occur within the Study Area due to an absence of marine habitat.

3.6.5.2.18 Kemp's Ridley Sea Turtle

The Kemp's Ridley sea turtle is found in shallow waters along the coast, primarily in the Gulf of Mexico, often in bays and lagoons with juveniles foraging in less than 3 feet of water. The primary nesting location for Kemp's Ridley sea turtles is at Rancho Nuevo, Tamaulipas, Mexico. Sporadic nesting has been reported from Mustang Island, Texas southward to Isla Aquada, Campeche, Mexico (NOAA 2024h). Large populations have been documented within Sabine Pass, both within and outside the channel entrance. The abundance of young Kemp's Ridley sea turtles was found to increase considerably during the warm season months (Renaud and Williams 1995). This species does not occur within the Study Area due to an absence of marine habitat.

3.6.5.2.19 Leatherback Sea Turtle

The leatherback sea turtle spends most of its life in the ocean, seldom approaching land except for nesting. The leatherback prefers open ocean, near the edge of the continental shelf, but also can be found in gulfs, bays, and estuaries. The leatherback's nesting beaches are primarily within tropical latitudes, with the largest concentration in Trinidad and Tobago, the West Indies, and Gabon, Africa (NOAA 2024i). This species prefers sandy sloping beaches, often near deep water and rough seas. This species does not occur within the Study Area due to an absence of marine habitat.

3.6.5.2.20 Loggerhead Sea Turtle

The loggerhead sea turtle typically nests on high-energy beaches with narrow, steeply sloped sand dunes. Post-hatchling loggerheads utilize pelagic habitats and return to nearshore coastal areas as juveniles to continue maturing into adulthood. Adult habitats overlap with the juvenile stage, except for most bays and estuaries along the Atlantic and Gulf coasts, which are infrequently used by adults (NOAA 2022). This species does not occur within the Study Area due to an absence of marine habitat.

3.6.5.3 State-Listed Wildlife Species

State-listed species receive protection under state laws such as Chapters 67, 68, and 88 of the TPWD Code and sections 65.171–65.184 and 69.01–69.14 of Title 31 of the TAC. Fifteen species are protected at the state level and designated as threatened within San Patricio County (Table 3-5). Species that were identified in the RTEST report at a county level that are also federally listed are listed in Table 3-4 (TPWD 2024c).

Table 3-5: State-Listed Fish and Wildlife Species for the Study Area County

Common Name	Scientific Name	Status	Potential for Occurrence in the Study Area[a]
		TPWD	
Amphibians			
Black-spotted newt	*Notophthalmus meridionalis*	Threatened	Likely
Sheep frog	*Hypopachus variolosus*	Threatened	Likely
South Texas siren (Large Form)	*Siren* sp.	Threatened	Not Likely[a]
Birds			
Black rail	*Laterallus jamaicensis*	Threatened	Not Likely
Reddish egret	*Egretta rufescens*	Threatened	Not Likely[a]
Swallow-tailed kite	*Elanoides forficatus*	Threatened	Not Likely[a]
Texas Botteri's sparrow	*Peucaea botterii texana*	Threatened	Likely
White-faced ibis	*Plegadis chihi*	Threatened	Not Likely[a]

Table 3-5: State-Listed Fish and Wildlife Species for the Study Area County

Common Name	Scientific Name	Status	Potential for Occurrence in the Study Area[a]
		TPWD	
White-tailed hawk	*Buteo albicaudatus*	Threatened	Likely
Wood stork	*Mycteria americana*	Threatened	Not Likely[a]
Fishes			
Shortfin mako shark	*Isurus oxyrinchus*	Threatened	None
Mammals			
White-nosed coati	*Nasua narica*	Threatened	Not Likely
Reptiles			
Texas horned lizard	*Phrynosoma cornutum*	Threatened	Not Likely[a]
Texas scarlet snake	*Cemophora lineri*	Threatened	Likely
Texas tortoise	*Gopherus berlandieri*	Threatened	Not Likely

Source: TPWD (2024c).
(a) Could occur within the Study Area as a migrant or on rare occasions.

3.6.5.3.1 Black-spotted Newt

The black-spotted newt is known to occupy nine counties in Texas along the Gulf of Mexico, mostly concentrated within 100 miles of the coast in the Gulf Coastal Plains. Adults, juveniles, and larvae usually inhabit permanent and temporary ponds, roadside ditches, and quiet stream pools amongst submerged vegetation in poorly drained clay soils. Eggs can be attached to submerged vegetation in shallow water, and adults and juveniles can be found under rocks and other forms of shelter when ponds dry up (Garrett and Barker 1987). They are known to use a wide variety of vegetation associations, such as thorn scrub and pasture. Aquatic habitats used for reproduction include a variety of ephemeral and permanent waterbodies (TPWD 2024c). Based on the NDD (TPWD 2024d), a documented occurrence of this species is mapped approximately 5 miles northeast of the Study Area. This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.2 Sheep Frog

The sheep frog's range extends from south Texas through the Pacific and Atlantic slopes of Mexico to Costa Rica. In Texas, this species is known to occupy various habitats such as grasslands, savannas, and in moist sites in arid areas (Bartlett and Bartlett 1999; TPWD 2024c). Eggs are usually laid after heavy rainfall or when their habitat is flooded by irrigation water. Species are known to migrate unknown distances through unsuitable habitats from their home range to breeding ponds (NatureServe 2024). This species may occur within the Study Area as a migrant or if suitable habitat is present.

3.6.5.3.3 South Texas Siren (Large Form)

The South Texas siren (large form SP1), as defined by the TPWD, has been considered threatened by the TPWD since 2003. However, their present distribution and population status are not well understood. This species may have occurred as far north as San Patricio and Jim Wells counties, but there is no consensus on the current overall population status (Kline and Carreon 2013). The South Texas siren is believed to be found in bodies of quiet water, permanent or temporary, with or without submerged vegetation. They can also be found in wet areas such as arroyos, canals, ditches, or shallow depressions. This species may also aestivate in the ground during dry periods but does require some moisture (TPWD 2024c). Based on the NDD (TPWD 2024d), a documented occurrence of this species is mapped approximately 7 miles northeast of the Study Area. Although unlikely, this species may be found within the Study Area as a rare occurrence if suitable habitat is present.

3.6.5.3.4 Black Rail

The black rail has a large range throughout North, Central, and South America. Breeding habitat includes marshes with salt, brackish, and freshwater salinity; grass swamps; wet prairies; and pond borders. Preferred habitat is salty prairie and high salt marsh with grass stem counts of 10 to 20 centimeters or higher (TPWD 2015). Wintering habitat along the Gulf Coast has been identified as either tidally or non-tidally influenced persistent, herbaceous emergent wetlands occurring over the wetland-upland interface. This species is unlikely to occur within the Study Area.

3.6.5.3.5 Reddish Egret

The reddish egret is a permanent resident of the Texas Gulf Coast and inhabits brackish marshes, shallow salt ponds, and tidal flats. In the spring, nests are built on the ground or in low vegetation on dry coastal islands in brushy thickets of Spanish dagger (*Yucca gloriosa*) and prickly-pear cactus (*Opuntia* sp.). Post breeding, reddish egrets disperse and occasionally travel inland during the summer, foraging along ponds and small lakes (Koczur et al. 2020). This species may occur within the Study Area as a temporary post-breeding visitor if suitable habitat is present.

3.6.5.3.6 Swallow-tailed Kite

The swallow-tailed kite historically occurred along the coastal plains, interior lowlands, and riparian areas throughout the southeastern United States and into central Texas. Currently in Texas, the species is a rare to uncommon migrant throughout the eastern third of the state and a rare to locally uncommon summer resident in the southeast. The most recent breeding records exist from Chambers, Liberty, Orange, and Tyler counties (Lockwood and Freeman 2014). Habitats include lowland forested, swampy areas ranging into open woodland, marshes, rivers, lakes, and ponds. Nesting occurs in tall trees within clearings or on forest woodland edge, usually in pine, bald cypress, or other deciduous trees (Meyer 1995). This species may occur within the Study Area as a rare temporary migrant if suitable habitat is present.

3.6.5.3.7 Texas Botteri's Sparrow

The Texas Botteri's sparrow is largely restricted to bunchgrass prairies and grasslands on the Coastal Prairies from southern Kleberg County southward (Lockwood and Freeman 2014). This species usually nests on the ground within low clumps of grass (TPWD 2024e). However, little information is known about this species based on its cryptic behavior and various nesting strategies amongst different vegetation types (Miller et al. 2013). This species may occur within the Study Area if suitable habitat is present.

3.6.5.3.8 White-faced Ibis

The white-faced ibis breeds and winters along the Texas Gulf Coast. Other breeding populations in the northwestern United States migrate south to overwinter along the Gulf Coast and in Central America. Preferred habitat includes swamps, ponds, rivers, sloughs, irrigated rice fields, freshwater marsh, and sometimes brackish and saltwater marsh. This species is a colonial nester and forages on insects, newts, leeches, earthworms, snails, crayfish, frogs, and fish (Ryder and Manry 2020). This species may occur within the Study Area as a rare temporary migrant if suitable habitat is available.

3.6.5.3.9 White-tailed Hawk

The white-tailed Hawk is an uncommon to locally common resident in the Coastal Prairies and southeastern South Texas Brush County (Lockwood and Freeman 2014). Along the coast, this species is known to occupy prairies, cordgrass flats, and scrub-live oak. Further inland, the species may occupy prairie, mesquite and oak savanna, and mixed savanna-chaparral. This species may occur within the Study Area if suitable habitat is present.

3.6.5.3.10 Wood Stork

The wood stork is a colonial bird that breeds in Florida, Georgia, South Carolina, and Mexico. Nesting occurs in mangrove or cypress trees within brackish or freshwater swamp habitats. Post breeding, storks from Mexico migrate northward along the Mississippi River Valley. Migrating wood storks use prairie ponds, flooded pastures or fields, ditches, and other shallow standing water habitats to forage for fish and other small animals. This species usually roosts communally in tall snags and sometimes in association with other wading birds (Coulter et al. 1999). This species may occur as a rare temporary migrant within the Study Area if suitable habitat is present.

3.6.5.3.11 Shortfin Mako Shark

The shortfin mako shark is a pelagic species with a widespread distribution spanning temperate and tropical waters across the globe. It occasionally occurs inshore where the continental shelf is narrow and will use the water column from the surface to 600 meters deep. The Gulf of Mexico is used as wintering grounds for some shortfin mako sharks (NOAA 2024j). This species does not occur within the Study Area due to an absence of marine habitat.

3.6.5.3.12 White-nosed Coati

The white-nosed coati is believed to occupy Arizona, New Mexico, Texas, Mexico, and Central America (Wilson and Reeder 1993). In Texas, individuals are likely transients from Mexico (TPWD 2024c). This species is a diurnal omnivore, often traveling in groups of a dozen or more individuals consisting of mothers and offspring while adult males are usually solitary most of the year (Hoffmeister 1986). This species typically occupies woodlands, riparian corridors, and canyons. This species is unlikely to occur within the Study Area.

3.6.5.3.13 Texas Horned Lizard

The Texas horned lizard inhabits a variety of habitats, including open desert, grasslands, and shrubland in arid and semiarid habitats on soils varying from pure sands and sandy loams to coarse gravels, conglomerates, and desert pavements. Their primary prey item is the harvester ant (*Pogonomyrmex* spp.), but they may also consume grasshoppers, beetles, and grubs (Henke and Fair 1998). Historically, the Texas horned lizard has occurred throughout most of Texas, but habitat loss and the spread of nonnative fire ants (*Solenopsis invicta*) have caused population declines (Dixon 2013). According to Henke and Fair (1998), Texas horned lizards rarely occur in Texas east of Fort Worth to Corpus Christi, except for small, isolated populations. This species may be found within the Study Area as a rare occurrence if suitable habitat is present.

3.6.5.3.14 Texas Scarlet Snake

The Texas scarlet snake is a semi-fossorial species that is restricted to areas of loose, sandy soil. In south Texas, it has been recorded from live oak-dotted sand dunes, coastal shrub scrub, and agricultural lands with sandy soils. Scarlet snakes forage at night, feeding on small lizards and reptile eggs (Werler and Dixon 2010). This species may occur within the Study Area if suitable habitat is present.

3.6.5.3.15 Texas Tortoise

The Texas tortoise is a long-lived species with a shell that has characteristically yellowish orange, bluntly horned scutes (shell plates). Habitat preferences include arid brush, scrub woods, and grass-cactus associations with grassy understories. The Texas tortoise is active from March to November, and when inactive, it occupies shallow depressions at the base of bushes or cacti, underground burrows, or under other suitable objects such as trash. The tortoise feeds on fruits of prickly pear and other mostly succulent plants (TPWD 2024c). This species is unlikely to occur within the Study Area.

3.7 Socioeconomics

This section presents a summary of the economic and demographic characteristics of the Study Area within San Patricio County and provides a brief comparison with the socioeconomic environment of the state of Texas. Reviewed literature sources include publications of the Texas Demographic Center (TDC) and the United States Census Bureau (USCB).

3.7.1 Population Trends

San Patricio County experienced a population increase of 6.1% between 2010 and 2020. By comparison, population at the state level increased by 15.9% during the same decade (USCB 2010 and 2024). According to the TDC (2024), the population of San Patricio County is projected to increase by 4.7% between 2020 and 2030, by 3.6% between 2030 and 2040, and by 1.7% between 2040 and 2050. By comparison, the population of Texas is expected to experience population increases of 12.9%, 11.8%, and 10.4% over the same time periods, respectively (TDC 2024). Table 3-6 presents the past population trends and projections for San Patricio County and for the state of Texas.

Table 3-6: Population Trends and Projections for San Patricio County and the State of Texas

Place	Population				
	2010	2020	2030	2040	2050
San Patricio County	64,804	68,755	71,973	74,569	75,816
Texas	25,145,561	29,145,505	32,912,882	36,807,213	40,645,784

Sources: USCB (2010 and 2024); TDC (2024).

3.7.2 Employment

The civilian labor force (CLF) in San Patricio County decreased by 0.1% (33 people) between 2010 and 2020. By comparison, the CLF at the state level grew by 18.8% (2,251,395 people) over the same time period (USCB 2010 and 2024).

Between 2010 and 2020, San Patricio County experienced a decrease in its unemployment rate from 4.5% to 2.9%. By comparison, the state of Texas experienced a decrease in its unemployment rate from 4.6% to 3.4% over the same period. Table 3-7 presents the CLF and unemployment data for San Patricio County and the state of Texas for the years 2010 and 2020.

Table 3-7: Labor Force and Unemployment for the San Patricio County and the State of Texas

Place		**2010**	**2020**
San Patricio County			
	Civilian Labor Force	29,762	29,729
	Unemployment Rate (%)	4.5%	2.9%
State of Texas			
	Civilian Labor Force	11,962,847	14,214,242
	Unemployment Rate (%)	4.6%	3.4%

Sources: USCB (2010 and 2024).

3.7.3 Leading Economic Sectors

The major occupations in San Patricio County in 2017 and in 2022 were Education and Health Services, followed by the category of Trade, Transportation & Utilities. Similarly, the major occupations in the state of Texas in 2017 and 2022 were Education and Health Services, followed by the category of Trade, Transportation & Utilities (USCB 2024). Table 3-8 presents the number of persons employed in each occupation category during 2017 and 2022 in San Patricio County and the state of Texas.

Table 3-8: Covered Employment and Major Economic Sectors in San Patricio County and the State of Texas (5-year Period)

Employment Sector	Employment			
	San Patricio County		**State of Texas**	
	2017	**2022**	**2017**	**2022**
Natural Resources & Mining	2,356	1,682	412,873	362,389
Construction	3,932	3,688	1,038,063	1,211,829
Manufacturing	2,474	2,561	1,116,657	1,180,979
Trade, Transportation & Utilities	5,033	5,567	2,538,645	2,818,158
Information	133	197	227,592	223,134
Financial Activities	1,284	1,108	839,234	958,261
Professional & Business Services	1,885	2,123	1,437,711	1,696,528
Education & Health Services	6,240	6,480	2,739,219	2,989,483

Table 3-8: Covered Employment and Major Economic Sectors in San Patricio County and the State of Texas (5-year Period)

Leisure & Hospitality	2,590	2,551	1,154,649	1,205,584
Other Services	1,195	1,230	663,422	689,813
Public Administration	1,747	1,598	521,004	571,970
Total Employment	28,869	28,785	12,689,069	13,908,128

Source: USCB (2024).

3.7.4 Community Values

The term "community values" is included as a factor for consideration of transmission line certification under PURA § 37.056(c)(4), although the term has not been specifically defined for regulatory purposes by the PUC. To evaluate the effects of the proposed transmission line, the Consultant has defined community values as a "shared appreciation of an area or other natural or human resource by a national, regional, or local community."

The Consultant evaluated the proposed Project for community resources that may be important to a particular community, such as parks or recreational areas, historical and archeological sites, or scenic vistas within the Study Area. Additionally, the Consultant mailed consultation letters to federal, state, and local officials (see Section 2.4 and Appendix A) to collect information regarding community values and community resources, among other things. Input received was used in the evaluation of the proposed Project. Community values and community resources are discussed in the following sections.

3.8 Human Resources

3.8.1 Land Use

The primary land uses in the Study Area are pastureland/rangeland, oil and gas infrastructure, and an aggregate operation for sand material. The land use data were obtained from interpretation of aerial imagery, USGS topographical maps, a drone survey, and a vehicular reconnaissance survey from publicly accessible viewpoints. Planned land use features were limited to known features obtained from governmental entities and mobility authorities. The Study Area is located within the Sinton ISD and no schools were identified within the Study Area (Texas Education Agency 2024).

County websites were reviewed to identify any potential land use conflicts outlined in comprehensive land use plans. San Patricio County does not have a comprehensive land use plan on its website (San Patricio County 2024a). County economic development websites were reviewed for current and planned projects within the Study Area, but none were identified that may conflict with the Project (San Patricio County 2024b).

3.8.2 Conservation Easements

A conservation easement is a restriction that property owners voluntarily place on specified uses of their property to protect natural, productive, or cultural features. The property owner retains legal title to the property and determines the types of uses to allow or restrict. The property can still be bought, sold, and inherited, but the conservation easement is tied to the land and binds all present and future owners to its terms and restrictions. Conservation easement language will vary as to the individual property owner's allowances for additional developments on the land. Land trusts facilitate the easement and ensure compliance with the specified terms and conditions.

A review of websites and databases and correspondence with several non-governmental organizations (e.g., TNC, TLC, and the National Conservation Easement Database [NCED]) identified one conservation area (Rob and Bessie Welder Park), which located within the western corner of the Study Area. Although not identified in the reviewed sources, some properties in the Study Area may have some form of conservation easement or agreement that is not listed (TNC 2024; TLC 2024; NCED 2024).

3.8.3 Recreation

The PUC recognizes parks and recreational areas as those owned by a governmental body or an organized group, club, or place of worship. Federal and state database searches and county/local maps were reviewed to identify any parks and/or recreational areas within the Study Area. Reconnaissance surveys were also conducted to identify any additional park or recreational areas. No national, state, or county parks were identified within the Study Area (NPS 2024a; TPWD 2024b). There is one local park identified within the western portion of the Study Area: Rob and Bessie Welder Park.

3.8.4 Agriculture

Agriculture is a significant segment of the economy throughout Texas, and San Patricio County has active agricultural sectors. According to the USDA National Agricultural Statistics Service's 2022 Census of Agriculture, the total market value for agricultural products sold within San Patricio County was $101,209,000, a 23% decrease from the 2017 market value of $131,342,000. The number of farms in San Patricio County decreased from 656 in 2017 to 620 in 2022 (a decrease of 5%) (USDA 2017 and 2022). In comparison, the total market value for agricultural products sold within the state of Texas was $32,166,561,000 in 2022, a 29% increase from the 2017 market value of $24,924,041,000. The number of farms in Texas decreased from 248,416 in 2017 to 230,622 in 2022 (a decrease of 7%) (USDA 2017 and 2022). Detailed agricultural information for San Patricio County and state of Texas are provided in Table 3-9.

Table 3-9: Percent Change of Market Value and Number of Farms for San Patricio County and the State of Texas

County/ State		Year		Percent Change
		2017	2022	
San Patricio County	Market Value ($)	$131,342,000	$101,209,000	23%
	Number of Farms	656	620	5%
State of Texas	Market Value ($)	$24,924,041,000	$32,166,561,000	29%
	Number of Farms	248,416	230,622	7%

Sources: USDA (2017 and 2022).

3.8.5 Transportation/Aviation

3.8.5.1 Transportation Features

According to TxDOT (2024a and 2024b), the only major highway transportation corridor within the Study Area is US Hwy 77, located along the south-southeast border of the Study Area. A safety improvement project is proposed along US Hwy 77 within the Study Area (TxDOT 2024b). No railroads were identified within the Study Area; however, a Union Pacific railroad runs parallel to and just outside the southeast border of the Study Area (United States Department of Transportation 2024).

3.8.5.2 Aviation Facilities

The Consultant reviewed the Brownsville Sectional Aeronautical Chart (FAA 2024a) and the Chart Supplement for the South-Central United States (formerly the Airport/Facility Directory) (FAA 2024b) to identify FAA-registered facilities within the Study Area subject to notification requirements listed in 14 CFR Part 77.9. Facilities subject to notification requirements listed in 14 CFR Part 77.9 include public-use airports listed in the Airport/Facility Directory (currently the Chart Supplement), public-use or military airports under construction, airports operated by a federal agency or DoD, or an airport or heliport with at least one FAA-approved instrument approach procedure.

No military FAA-registered airports were identified within the Study Area. No public-use heliports or heliports with an instrument approach procedure are listed for the Study Area in the Chart Supplement for the South-Central United States. There is one public-use, FAA-registered airport with at least one runway longer than 3,200 feet, Alfred C. "Bubba" Thomas Airport, located approximately 2.0 miles southwest of the Study Area (FAA 2024b).

In addition, the Consultant reviewed the FAA database (FAA 2024c), USGS topographic maps, recent aerial photography, and conducted field reconnaissance to identify private-use airstrips and private-use heliports not subject to notification requirements listed in 14 CFR Part 77.9. There were no private-use heliports or airstrips identified within the Study Area.

3.8.6 Utility Features and Oil and Gas Facilities

Utility features reviewed included existing electrical transmission lines, distribution lines, pipelines, solar farms, wind farms, water wells, and oil/gas storage wells. Data sources used to identify existing electrical transmission and distribution lines include utility company and regional system maps, aerial imagery, USGS topographic maps, and field reconnaissance surveys.

No wind or solar farms are located within the Study Area. Existing utility facilities located within the Study Area include:

- Forty-two pipelines (RRC 2024e)
- One electrical transmission line (AEP Texas' existing Medio Creek-Lon Hill 138-kV transmission line) (Platts 2024)
- Three water wells (TWDB 2024b)

3.8.7 Communication Towers

Review of the Federal Communication Commission (FCC) database indicated that there are no AM radio transmitters within the Study Area or within 10,000 feet of the Study Area. One FM radio transmitter/microwave tower/other electronic installation was identified approximately 793 feet northwest of the Study Area boundary (FCC 2024).

3.8.8 Aesthetic Values

Aesthetics is included as a factor for consideration in the evaluation of transmission facilities in PURA § 37.056(c)(4). The term aesthetics refers to the subjective perception of natural beauty in the landscape, and this section of the document attempts to define and measure the Study Area's scenic qualities. Consideration of the visual environment includes a determination of aesthetic values where the major potential effect of the Project on the resource is considered aesthetic, or where the location of a transmission line could affect the scenic enjoyment of a recreation area.

The aesthetic analysis considers potential visual impacts to the public. Areas visible from major roads and highways or publicly owned or accessible lands (for example, parks or privately owned recreation areas open to the public) were analyzed. Several factors are taken into consideration when attempting to define the potential impact on a scenic resource that would result from the construction of the proposed transmission line. Among these are:

- Topographical variation (hills, valleys, etc.).
- Prominence of water in the landscape.
- Vegetation variety (forests, pasture, etc.).
- Diversity of scenic elements.
- Degree of human development or alteration.
- Overall uniqueness of the scenic environment compared to the larger region.

The Study Area is located in a rural setting. The predominant land uses within the Study Area are pastureland/rangeland, oil/gas pipelines and infrastructure, and an aggregate operation for sand material. The Study Area is bound by US Hwy 77 on the southeast side and an existing transmission line on the northwest side. Overall, the Study Area viewscape consists of pasture/rangeland and infrastructure.

No known high-quality aesthetic resources, designated views, or designated scenic roads or highways were identified within the Study Area (America's Scenic Byways 2024; Federal Highway Administration 2024). The Study Area is located within the Tropical Trail Region; however, there were no sites of interest identified within the Study Area (THC 2024a).

A review of the NPS website did not indicate any Wild and Scenic Rivers; National Parks; National Monuments; National Memorials; National Historic Sites; National Historic, Scenic, or Recreational Trails; or National Battlefields within the Study Area (National Wild and Scenic River System 2024; NPS 2024a, 2024b, 2024c, 2024d, 2024e, and 2024f).

Based on these criteria, the Study Area exhibits a low degree of aesthetic quality for the region. Although some portions of the Study Area might be visually appealing, the aesthetic quality of the Study Area overall is not distinguishable from that of other adjacent areas within the region.

3.8.9 Texas Coastal Management Program

As specified in 31 TAC § 25.102, the PUC may grant a certificate for the construction of generating or transmission facilities within the coastal boundary as defined in 31 TAC § 503.1 only when it finds that the proposed facilities are consistent with the applicable goals and policies of the CMP specified in 31 TAC § 501.14(a), or that the proposed facilities will not have any direct and significant impacts on any of the applicable CNRAs.

The Consultant reviewed the CMP, aerial imagery, Texas GLO (2023a and 2023b), FEMA, USFWS, and USGS data to identify CNRAs as outlined in 31 TAC §26.3. CNRAs are defined as waters of the open Gulf of Mexico, waters under tidal influence, submerged lands, coastal wetlands, submerged aquatic vegetation, tidal sound and mud flats, oyster reefs, hard substrate reefs, coastal barriers, coastal shore areas, gulf beaches, critical dune areas, special hazard areas (floodplains, etc.), critical erosion areas, coastal historic areas, and coastal preserves.

Review of NWI data and aerial imagery indicated that CNRAs are not present within the portion of the Study Area that is within the CMP (southeast of US Hwy 77).

3.9 Cultural Resources

The Study Area is in the Central and Southern Planning Region as delineated by the THC (Mercado-Allinger et al. 1996) (see **Figure 3-4**) and in the Coastal Texas Archeological Region as described by Perttula (2004). The Coastal Texas Archeological Region is a narrow band that parallels the Gulf Coast from just south of the Brazos River to the Rio Grande. The basic chronological framework of the region is broken into three prehistoric periods that generally coincide with broad climatic conditions and the Historic Period, during which Europeans arrived and settled. These periods are discussed below.

3.9.1 Paleoindian Period (11,500 to 8,600 years before present [BP])

The Paleoindian Period is the earliest generally accepted period of human occupation in North America. During this period, it has been postulated that prehistoric populations exploited now-extinct giant mammals such as ancient bison (*Bison antiquus*) and the Columbian mammoth (*Mammuthus columbi)*. The Paleoindian Period coincided with the end of the last major North American glaciation, known geologically as the Late Pleistocene, and with the beginning of the Holocene epoch.

Cultural Resource Planning Region Boundary

County Boundary

State of Texas
San Patricio County
City of Sinton

NAD 1983 Lambert Conformal Conic

September 09, 2024

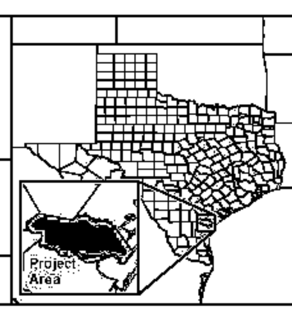

FIGURE 3-4
LOCATION OF THE STUDY AREA IN RELATION TO THE CULTURAL RESOURCE PLANNING REGIONS OF TEXAS

Medio Creek-Lon Hill 138-kV Cut-in to Portilla Substation Double-circuit Transmission Line in San Patricio County

0 50 100
Miles

In his overview of the archeology of the central and southern Texas Coast, Ricklis (1995 and 2004) omits the Paleoindian Period due to a paucity of Paleoindian remains in the region and environmental changes that have submerged Paleoindian sites in the Gulf of Mexico. During the final cold phase of the Pleistocene epoch, approximately 20,000 BP, rising global temperatures caused continental ice sheets and glaciers to melt, resulting in rapidly rising sea levels for approximately 10,000 years. Prior to roughly 10,000 BP, when the global sea level was more than 300 feet lower than it is today, the Gulf Coast was far east of its present position (Ricklis 1995). Few Paleoindian artifacts have been recorded in San Patricio County and no intact components of this period are known in the county. Paleoindian points, including Clovis, Golondrina, Angostura, and Scottsbluff types, have been recorded along Chiltipin Creek, a deeply incised creek that flows approximately 1 mile south of the study area (Hester 2015). These materials are from what were inland locales during the Pleistocene (Ricklis 2004; Hester 2015).

3.9.2 Archaic Period (ca. 7,500 to 950 BP)

The long-lasting Archaic Period in Coastal Texas is distinguished by changes in material culture representing cultural adaptation to the changing environment. The foraging lifeway is epitomized by the Archaic tradition, characterized by the hunting of small game, plant gathering, and an emphasis on the exploitation of marine resources in coastal zones. The Archaic Period is generally subdivided into three sub-periods: Early, Middle, and Late.

3.9.2.1 Early Archaic (7,500 to 4,200 BP)

Early Archaic archeological sites in Coastal Texas predate the modern estuarine environment. Ricklis (2004) points out that occupation in this region during the Early Archaic occurred in two phases, both confined to the shoreline. The first phase dates to roughly 7,500 to 6,800 BP and is represented almost exclusively by thin but dense lenses of oyster and rangia shells with little debitage or stone tools. There is a noticeable lack of faunal remains, and almost no fish bones or otoliths have been observed in sites that date to this earliest phase of the Early Archaic (Ricklis 2004). The later phase dates to roughly 5,800 to 4,200 BP, during which estuarine resource use intensifies. Oyster shell middens continue to be a dominant feature of this latter phase, but evidence of hunting and fishing, including faunal remains and fish otoliths, is found in the archeological record (Ricklis 2004). Bell and Andice points, indicative of the Early Archaic, have been reported from sites on Chiltipin Creek (Hester 2015).

3.9.2.2 Middle Archaic (4,200 to 3,100 BP)

The Middle Archaic Period is virtually invisible in the archeological record of the Coastal Texas region (Ricklis 1995 and 2004). During this period, there appears to be a rapid rise in sea level that destroyed productive estuarine environments (Ricklis 2004). Hester (2015) identified Gower and Pedernales projectile points that suggest brief, limited occupation at coastal sites in Nueces County during the Middle Archaic. By 3,000 BP, sea level reached and stabilized at its current level, and the Late Archaic began.

3.9.2.3 Late Archaic (3,100 to 950 BP)

The Late Archaic Period is the best understood and best represented of the Archaic sub-periods. During the Late Archaic, shellfish gathering, fishing, and hunting intensified, suggesting populations grew during this period (Ricklis 2004). Barrier islands protected bays and lagoons, and extensive shallows that provided organic nutrients in the form of decaying plant matter were re-established. Shellfish and fish species that were economically useful to human populations became more abundant, leading to intensive exploitation of these resources. Shell middens were more numerous and larger than those seen in earlier periods, although shellfish gathering played a smaller role in the diet during this period. Projectile points diagnostic of the Late Archaic on the Texas coast include Morhiss, Kent, Ensor, Frio, Catan, and Matamoros points (Hester 2015). Asphaltum, a natural tar substance found on Gulf Coast beaches, imprinted with basketry weaves has been recovered from a number of sites dating to this period (Ricklis 2004). Bell and Andice points, indicative of the Early Archaic, have been reported from sites on Chiltipin Creek near the Study Area (Hester 2015).

3.9.3 Late Prehistoric Period (950 to 300 BP)

The primary hallmarks of the Late Prehistoric on the Texas Gulf Coast are the introduction of the bow and arrow and the widespread use of pottery, which may have been introduced at the end of the Late Archaic (Ricklis 2004). Undecorated ceramics and Scallorn arrow points are typical of the earlier phase of the Late Prehistoric Period. The end of the Late Prehistoric Period, known as the Rockport Phase, begins around 700 BP and is characterized by distinctive pottery decorated with asphaltum, Perdiz arrow points, and bone and shell tools (Ricklis 1995 and 2004). The transition from Scallorn to Perdiz arrow points is also seen further inland in Central Texas, where the end of the Late Prehistoric Period is known as the Toyah Phase. An increase in bison remains at archeological sites dating to the end of the Late Prehistoric Period is observed in both regions (Ricklis 2004).

3.9.4 Post-Contact Period (ca. 300 to 50 BP)

European exploration into the area that is now San Patricio Country began in 1519 with an expedition led by Spanish explorer Pineda. The exploration was followed by De Leon's expeditions of 1689 and 1691 (Guthrie 2024). De Leon sailed up and down the coast investigating bays and likely entered Aransas Pass.

French explorers came ashore on St. Joseph Island in 1712 and 1718, and Ortiz Parrilla later advanced knowledge of the area in the Nueces River Valley (Guthrie 2024).

At the time of the early expeditions, the area was occupied by the Karankawa, who inhabited the Colorado and Brazos River valleys along the Gulf of Mexico (Lipscomb 2024). In 1722, the Nuestra Señora del Espíritu Santo de Zúñiga Mission was established in present-day Goliad to serve Karankawa groups but was unable to induce Karankawas to accept Christian teachings or to strengthen Spanish claim on the coast (Leffler 2024). The Karankawa stayed at the mission seasonally, and relations between the Karankawa and Europeans were turbulent (Ricklis 1996). Diseases introduced by Europeans devastated local populations, and the Karankawa were extinct by the 1850s.

In 1828, empresarios John McMullen and James McGloin contracted with the government of Mexico to settle 200 Irish Catholic families on 80 leagues of land, including what would become San Patricio County (Guthrie 2024). The first groups of families, recruited from the Irish population of New York, landed at El Cópano and Matagorda in late 1829 and established the town of San Patricio de Hibernia. Settlement of the region would continue into the 1830s with Mexican, Anglo-American, and Irish settlers (Bauer 2024). In 1834, the colony was legally established as the Municipality of San Patricio in the Mexican state of Coahuila and Texas (Guthrie 2024).

Fort Lipantitlán, built to restrict Anglo immigration into Texas, surrendered to a company of the colony's settlers in 1835 during the Texas Revolution, although Mexican forces continued to use the fort. In February 1836, a detachment of Texans encountered a Mexican force in the town of San Patricio, and all but four of the Texans were killed or captured. Afterward, most of the colonists moved to safer areas (Guthrie 2024).

Refugio County was organized as part of the original 13 counties of the Republic of Texas and at the time included areas that would eventually be part of Goliad, Calhoun, San Patricio, Victoria, Bee, and Nueces counties (Leffler 2024). San Patricio County was established in 1836 by the Congress of the new Republic of Texas. Fear of Mexican incursions inhibited population growth in the area, as Mexican forces raided the area up until 1842. San Patricio County was officially designated a "depopulated area" by the Republic of Texas during the early years of the county's formation (Guthrie 2024).

General Zachary Taylor moved his army into the region after Texas was annexed by the United States in 1845 and the population began to grow. In 1845, Corpus Christi was designated the county seat of San Patricio County and remained so until 1846 when Nueces County was formed and San Patricio became San

Patricio County's seat. In 1848, more counties were formed and San Patricio County was further reduced in size (Guthrie 2024). Bee County was formally established in 1858 from portions of San Patricio, Goliad, Refugio, Live Oak, and Karnes counties, with Beeville serving as the county seat (Bauer 2024).

From 1850 to 1860, the population of San Patricio County increased from 200 to 620, including 95 slaves in 1860 (Guthrie 2024). Although far from the Civil War battle lines, San Patricio County was on the "Cotton Road" to Matamoros, Mexico, a major center of cotton smuggling after the Union government imposed a blockade on the South (Guthrie 2024). During the war, San Patricio County was plagued by bands of rustlers preying on local herds and by federal raiding parties, leading many, once again, to flee the area (Guthrie 2024). The Eighth Texas Infantry withstood Union attacks at Corpus Christi and aided Confederate troops who were retreating from the lower Rio Grande Valley (Leffler 2024). Toward the end of the Civil War, settlers in search of cheap land from other parts of the southern United States moved into San Patricio County (Guthrie 2024).

After the war, ranching remained an important part of the economy for the area. Many cattle drives followed the Chisholm Trail bound for the railheads from Texas to broader American markets. During the 1870s and 1880s, these were diverted to the Rockport-Fulton area after cattle processing plants had been established. Sheep ranching was also a prominent industry between 1870 and 1880. During the 1880s, ranching gave way to large-scale agriculture, with corn and oats as the primary crops (Bauer 2024).

In 1870, there were 602 people living in San Patricio County. In 1871, Thomas M. Coleman and George W. Fulton joined with J.M. and Thomas H. Mathis in a partnership that formed the largest cattle firm in Texas (Guthrie 2024). The Coleman, Mathis, and Fulton partnership, which held acreage in San Patricio, Goliad, and Aransas counties, flourished until an 18-month drought in 1878-1879 wiped out much of its stock. In 1880, Mesquital, later named Taft Ranch, was formed as a ranch for the Coleman-Fulton Pasture Company (Guthrie 2024).

In 1885, the San Antonio and Aransas Pass Railway was built to the newly laid-out Aransas Harbor (Guthrie 2024) and the local agriculture industry intensified with the expansion of the San Antonio and Aransas Pass Railway to Beeville in 1886 (Bauer 2024). By the 1890s, towns such as Mathis, Sinton, and Gregory had been established along the railroad. Development of the area was encouraged by out-of-state investors, especially David B. Sinton, a wealthy Ohio banker who was an old friend of Fulton. In 1893, after the Coleman-Fulton company donated 640 acres for a townsite near the center of the county, the Sinton Town

Company was formed to develop the site. The next year, Sinton became the county seat of San Patricio County (Guthrie 2024).

The development of San Patricio County intensified during the first years of the twentieth century, as land agents began to widely advertise San Patricio County property to prospective farmers. New towns sprang up along the railroads as hundreds of new farmers moved into the area. Laborers were brought in from Mexico to clear the land of mesquite and prepare it for farming (Guthrie 2024).

From 1900 to 1920, the Taft ranch, which controlled much of the land in San Patricio County, converted 2,300 acres to cultivation. In 1903, Coleman Company established a railroad spur that serviced several loading areas and a company store at Mesquital (Guthrie 2024). The store and the railroad lines led to the creation of the company town, renamed Taft by Coleman-Fulton executive Joseph F. Green. San Patricio County's population more than doubled during the 1920s after oil and gas discoveries in the region diversified the local economy. However, crop farming emerged as the most important element of the agricultural economy. Many farmers produced vegetables for urban markets, but cotton became the area's most important crop. About 15,000 acres were planted in cotton in 1910, and by 1930, the acreage had increased to 155,000. In 1930 more than two-thirds of the county's farmers were tenants but only 342 fully owned their lands (Guthrie 2024).

During the Great Depression, which began in 1929, farmers were hit by the combination of falling prices and a boll weevil infestation (Bauer 2024). In San Patricio County, low prices, federal crop restrictions, and other factors combined to drive tens of thousands of acres out of agricultural production. Hundreds of farmers were forced off the land. However, the discovery of oil in Pettus in 1929 and in neighboring Karnes County in 1930, as well as the continual development of oil and gas by companies such as Plymouth Oil Company in San Patricio County, aided in the post-Depression recovery in the area (Bauer 2024; Leffler 2024; Guthrie 2024).

San Patricio County as whole continued to see marked growth from the oil industry into the 1950s (Guthrie 2024). The shrimping industry, which operates along the coast and in Aransas Pass near the Study Area, also become an important industry for the region. Since 1950, Texas has been among the top three shrimp producers in the United States (Guthrie 2024; Maril 2020).

3.9.5 Previous Investigations

The Consultant conducted an examination of the Atlas, maintained by the THC and TARL, to identify previous cultural resources investigations within the Study Area. Four cultural resources surveys have been conducted within the Study Area (THC 2024b) (Table 3-10).

Table 3-10: Previous Cultural Resources Surveys within the Study Area

Atlas ID	Date	Author(s)	Sponsor	Agency
8400010982	2004	Shelly Perkins	FERC	PBS& J Corporation
8500025354	2012	Christopher L. Borstel	FERC	Tetra Tech, Inc.
8500073385	Not Available	Not Available	Not Available	Not Available
8500073387	2015	Sydne Marshall	FERC	Tetra Tech, Inc.

Source: THC (2024b).

3.9.6 Records Review

The Consultant conducted an examination of the Atlas, THC's Historic Sites Atlas (2024c), NPS' NRHP databases (2024a and 2024b), and TxDOT's Historic Resources Aggregator (2024) to identify previously recorded archeological sites, NRHP-listed properties and districts, National Historic Landmarks, historic-age cemeteries, and OTHMs within the Study Area. This review identified no previously recorded archeological sites, NRHP-listed or determined-eligible properties or districts, National Historic Landmarks or OTHMs recorded within the Study Area (NPS 2024c and 2024g; THC 2024b and 2024c; TxDOT 2024c).

One cemetery was identified within the Study Area (THC 2024b). The Welder Ranch Grave (SP-C021) is recorded as a Vicinity Cemetery, indicating its exact location is unknown. The cemetery is mapped within a circle measuring approximately 1,500 feet in diameter, the northern approximate half of which extends into the Study Area. A grave is depicted south of the Study Area on the 1954 USGS Sinton, TX topographic map. Descendants of Felipe Roque de la Portilla, who received and attempted to settle a land grant from Spain, including the Study Area, still work a ranch on Portilla's original land grant (Welder 2024).

4.0 ENVIRONMENTAL IMPACTS OF THE ALTERNATIVE ROUTES

The evaluation and comparison of potential impacts for each of the five Alternative Routes was based upon the consideration of the requirements of Section 37.056(c)(4)(A)-(D) of the Texas Utilities Code, the PUC's Substantive Rule 25.101, including the PUC's policy of prudent avoidance, field reconnaissance, and the information received from federal and state agencies and local officials. Measurements of the environmental criteria were taken from recent aerial photography (Google Earth 2024) and from available digital resource layers using GIS software.

The five Alternative Routes were labeled from A through E for evaluation. The Consultant professionals with a proficiency in different environmental disciplines (terrestrial and aquatic ecology, land use and planning, cultural resources, and GIS) evaluated the Alternative Routes based upon environmental conditions present along each Alternative Route and the general routing criteria developed by the Company and the Consultant. Each Consultant evaluator independently analyzed the Alternative Routes and the environmental and land use data presented in Table 4-1 for their technical discipline. The potential impacts to natural, human, and cultural resources resulting from the proposed Project are discussed below by discipline.

4.1 Impact on Natural Resources

4.1.1 Impact on Physiography and Geology

Construction of the proposed transmission line is not anticipated to have adverse effects on the physiographic or geologic features or resources of the area. Erection of the structures will require the excavation and/or minor disturbance of small quantities of materials but should have no measurable impacts on the geologic resources or features along any of the Alternative Routes. No geologic hazards are anticipated to be created by the proposed Project.

4.1.2 Impact on Soils

The construction and operation of transmission lines normally create very few long-term adverse impacts on soils. Transmission lines do not normally cause a conversion of farmland/pastureland because the site can still be used in this capacity after construction. The major potential impact upon soils from any transmission line construction would be erosion and soil compaction. The potential for soil erosion is generally greatest during the initial clearing of the ROW; however, the Company employs erosion control measures during the clearing and construction process. Where existing land cover includes woody vegetation within the ROW, much of this vegetation will be removed to provide adequate space for construction activities and to minimize corridor maintenance and operational problems. In these areas, only

Table 4-1 ENVIRONMENTAL DATA FOR ROUTE EVALUATION

Evaluation Criteria	Route A	Route B	Route C	Route D	Route E
Land Use					
Length of Alternative Route	1.98	1.59	1.81	2.22	2.61
Number of habitable structures[a] within 300 feet of ROW centerline	0	0	0	0	0
Length of ROW using existing transmission line ROW	0	0	0	0	0
Length of ROW parallel to existing transmission line ROW	0	0	0	0	0
Length of ROW parallel to other existing compatible ROW (roads, highways, railways, etc. – excluding oil and gas pipelines)	0	0	0.45	1.09	0.16
Length of ROW parallel to apparent property lines (not following existing ROW)	0	0	0	0	0
Sum of evaluation criteria 4, 5, and 6	0	0	0.45	1.09	0.16
Percent of evaluation criteria 4, 5, and 6	0%	0%	25%	49%	6%
Length of ROW across parks/recreational areas[c]	0	0	0	0	0
Number of additional parks/recreational areas[c] within 1,000 feet of ROW centerline	0	0	0	0	0
Length of ROW across cropland	0	0	0	0	0
Length of ROW across pasture/rangeland	1.75	1.59	1.81	2.22	2.61
Length of ROW across cropland or pastureland with mobile irrigation systems	0	0	0	0	0
Length of ROW parallel to existing pipeline ROW < 500 feet from route centerline	0.43	0.07	0	0	0
Number of pipeline crossings[e]	7	5	5	5	5
Number of transmission line crossings	0	0	0	0	0
Number of Interstate, U.S., and State highway crossings	0	0	0	0	0
Number of Farm-to-Market (FM)/Ranch-to-Market (RM) road crossings	0	0	0	0	0
Number of FAA-registered public/military airfields[f] within 20,000 feet of ROW centerline (with runway > 3,200 feet)	1	1	1	1	1
Number of FAA-registered public/military airfields[f] within 10,000 feet of ROW centerline (with runway < 3,200 feet)	0	0	0	0	0
Number of private airstrips within 10,000 feet of ROW centerline	0	0	0	0	0
Number of heliports within 5,000 feet of ROW centerline	0	0	0	0	0
Number of commercial AM radio transmitters within 10,000 feet of ROW centerline	0	0	0	0	0
Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	0	0	0	0	0
Number of recorded water wells within 200 feet of ROW centerline	0	0	0	0	0
Number of recorded oil and gas wells within 200 feet of ROW centerline	5	2	0	0	0
Aesthetics					
Estimated length of ROW within foreground visual zone[g] of Interstate, U.S., and State highways	0.83	0.43	0.62	1.20	1.60
Estimated length of ROW within foreground visual zone[g] of FM/RM roads	0	0	0	0	0
Estimated length of ROW within foreground visual zone[g] of parks/recreational areas[d]	0.15	0	0	0	0
Ecology					
Length of ROW across upland woodland/brushland	0.83	0	0	0.12	0.12
Length of ROW across bottomland/riparian woodland/brushland	0	0	0	0	0
Length of ROW across potential wetlands[i]	0	0	0	0	0
Length of ROW across known critical habitat of federally endangered or threatened species	0	0	0	0	0
Number of stream crossings	0	0	0	0	0
Length of ROW parallel (within 100 feet) to streams	0	0	0	0	0
Length of ROW across open water (ponds, lakes, etc.)	0	0	0	0	0
Length of ROW across 100-year floodplains	0	0	0	0	0
Cultural Resources					
Number of recorded cultural resource sites within 1,000 feet of ROW centerline	0	0	0	0	0
Number of cemeteries within 1,000 feet of ROW centerline	1	0	0	0	0
Number of NRHP listed or determined eligible sites within 1,000 feet of ROW centerline	0	0	0	0	0
Length of ROW crossing areas of high archaeological/historical site potential	0.60	0.17	0.52	0.15	0.14

(a) Single-family and multi-family dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, places of worship, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis.

(b) Due to the potential inaccuracies of the aerial photography and data utilized, all habitable structures within 300 feet have been identified.

(c) Property lines created by existing road, highway, or railroad ROW are not double counted in the "parallel ROW" criteria.

(d) Defined as parks and recreational areas owned by a governmental body or an organized group, club, or place of worship.

(e) Pipelines 8 inches in diameter or greater.

(f) As listed in the Chart Supplement South Central U.S. (formerly known as the Airport/Facility Directory South Central U.S.).

(g) 0.5 mile, unobstructed.

(h) As mapped by the USFWS NWI.

the leaf litter and a small amount of herbaceous vegetation would remain, and both would be temporarily disturbed by the necessary movement of heavy equipment.

Construction of the transmission line would require minimal amounts of clearing in areas that have already been cleared for crops, pastures, an existing road, and transmission line. The most important factor in controlling soil erosion associated with construction activity is to revegetate areas that have potential erosion problems immediately following construction. Natural succession would revegetate most of the ROW. Impacts from soil erosion caused by construction activity would be minimized due to the implementation of BMPs designed in the SWPPP and matting.

Prime farmland soils, as defined by the NRCS, are soils that are best suited for producing food, feed, forage, or fiber crops. The USDA recognizes the importance and vulnerability of prime farmlands throughout the nation and encourages the wise use and conservation of these soils where possible. The Project would cross prime farmland soils but would cross no cropland. In addition to construction-related impacts described above, the major impact of the Project on soils would be the physical occupation of small areas by the actual support structures. However, most of the ROW would be available for agricultural use once construction of the transmission line is completed.

4.1.3 Impact on Mineral and Energy Resources

Activities associated with the construction, operation, and maintenance of electrical transmission lines typically do not adversely impact mineral and energy resources when appropriate measures are implemented during the routing and construction phases. There are numerous oil or gas wells and pipelines identified within the Study Area that were taken into consideration during the routing process. An aggregate operation for sand material was identified in the Study Area. Although unidentified gravel/caliche pits and quarries may occur within the Study Area, no significant adverse impacts are anticipated to gravel/caliche pits and quarries.

4.1.4 Impact on Water Resources

4.1.4.1 Surface Water

A SWPPP will be implemented during construction and no adverse impacts to surface waters are anticipated for any of the Alternative Routes. Potential impacts may include short-term disturbances resulting from construction activities, which would result primarily from increased siltation from erosion and decreased water quality from accidental spillage of petroleum and other chemical products. Additionally, activities such as clearing of vegetation may temporarily increase local stormwater runoff volumes and sediment loading. However, potential impacts would be avoided whenever possible by spanning surface waters if present, diverting construction traffic around water resources via existing roads, and eliminating unnecessary clearing of vegetation. This may eliminate the necessity of constructing temporary low-water crossings that may result in erosion, siltation, and disturbance of the stream and its biota. If a spanned stream is dry at the time of construction, some bank and streambed alterations may be necessary to facilitate crossing. Such activities will be conducted according to USACE regulations and the SWPPP.

None of the five Alternative Routes cross or parallel (within 100 feet) NHD-indicated natural streams or rivers.

4.1.4.2 Floodplains

FEMA has conducted detailed floodplain analyses for San Patricio County. The five Alternative Routes avoid locating transmission line structures within floodplains. The Project should have no significant impact on the function of floodplains. Prior to construction, the Company will coordinate with the appropriate floodplain administrator, as necessary, to acquire any floodplain construction permits.

4.1.4.3 Groundwater

No adverse impacts to groundwater are expected to occur from the construction and operation of the proposed transmission line. The amount of recharge area that would be disturbed by construction is minimal when compared with the total amount of recharge area available for the aquifer systems in the region. A SWPPP will be developed to identify avoidance measures for potential contamination of water resources. Standard operating procedures and spill response specifications relating to petroleum product storage, refueling, and maintenance activities of equipment are provided as a component of the SWPPP. Any accidental spills would be promptly responded to in accordance with state and federal regulations. The Company will take all necessary and available precautions to avoid and minimize the occurrence of such spills.

4.1.5 Impact on the Ecosystem

4.1.5.1 Vegetation

Impacts to vegetation resulting from the construction and operation of transmission lines are primarily associated with the removal of existing woody vegetation within the ROW. The amount of vegetation cleared from the transmission line ROW would be dependent upon the type of vegetation present and whether the ROW will be completely new or involve widening existing ROW. For example, the greatest amount of vegetation clearing would occur in wooded areas, whereas cropland and grassland would require little to no removal of vegetation.

Three of the five Alternative Routes cross upland woodland/brushland that would require removal. This vegetation type was interpolated from aerial photography and route lengths across these areas were digitally measured for tabulation. The estimated length of route across upland woodland/brushland forest ranges from 0.83 mile for Alternative Route A to 0.12 mile for Alternative Routes D and E (Table 4-1). None of the Alternative Routes would cross bottomland/riparian vegetation.

Construction of the transmission line within the ROW would be performed in such a way as to minimize adverse impacts to vegetation and to retain existing ground cover when practicable. Where necessary, soil conservation practices will be undertaken to protect local vegetation and ensure successful revegetation for areas disturbed during construction.

4.1.5.2 Aquatic Resources

Removal of vegetation in wetlands increases the potential for erosion and sedimentation, which can be detrimental to downstream aquatic life and plant communities. Any placement of fill material within WOTUS would represent a permit action that may require notification to the USACE. Detailed field studies would be required to verify the location and amount of jurisdictional wetlands that may be within the ROW of an Alternative Route. Precautions would be taken throughout the construction process to avoid and minimize impacts to wetlands. Depending on the size and vegetation type (shrub/scrub or herbaceous), these areas can be spanned in many instances, although they cannot always be avoided by construction equipment. Impact minimization measures (e.g., timber matting, hand-clearing woody vegetation, spanning wetlands) will be implemented during construction to reduce wetland impacts. Placement of approved BMPs for construction and minimization of erosion in disturbed areas would help dissipate the flow of runoff. Placement of silt fences or hay-bale dikes between streams and disturbed areas would also help prevent siltation into the waterway.

None of the Alternative Routes cross NWI-mapped wetlands (Table 4-1).

Physical habitat loss or modification could result whenever access road crossings intercept a drainage system, through sedimentation due to erosion, increased suspended solids loading, or accidental petroleum spills directly into a creek, lake, or other aquatic feature. Erosion results in siltation and increased suspended solids entering streams, creeks, or lakes, which in turn may negatively affect many aquatic organisms at many trophic levels. Since aquatic features of the general area typically exhibit relatively high turbidities during and following runoff events, small increases in suspended solids during the construction phase are unlikely to have any discernible adverse impact.

None of the Alternative Routes cross NHD-mapped lakes, streams, or ponds.

4.1.5.3 Wildlife

The impacts of transmission lines on wildlife include short-term effects resulting from physical disturbance during construction, as well as long-term effects resulting from habitat modification, fragmentation, or loss. The net effect from transmission line construction on local wildlife is typically minor. The following section provides a general discussion of the effects of transmission line construction and operation on terrestrial wildlife, followed by a discussion of the possible impact of the Alternative Routes.

Any required clearing or other construction-related activities would directly or indirectly affect most animals that reside within or traverse the transmission line ROW. Heavy machinery may adversely affect smaller, low-mobility species, particularly amphibians, reptiles, and small mammals.

If construction occurs during the breeding season (generally spring to fall), construction activities may adversely affect the young of some species. Heavy machinery may cause soil compaction, which may adversely affect fossorial animals (i.e., those that live underground). Mobile species, such as birds and larger mammals, may avoid initial clearing and construction activities and move into adjacent areas outside the ROW. Construction activities may temporarily deprive some animals of cover and, therefore, potentially subject them to increased natural predation. Wildlife in the immediate area may experience a slight loss of browse or forage material during construction. However, the prevalence of similar habitats in adjacent areas and vegetation succession in the ROW following construction would minimize the effects of these losses.

The increased noise and activity levels during construction could disturb the daily activities (e.g., breeding, foraging) of species inhabiting the areas adjacent to the ROW. Dust and gaseous emissions should have only minimal effects on wildlife. Although construction activities may disrupt the normal behavior of many wildlife species, little, if any, permanent damage to these populations should result. Periodic clearing along the ROW, while producing temporary negative impacts to wildlife, can improve the habitat for ecotonal or edge species through the increased production of small shrubs, perennial forbs, and grasses.

Transmission line structures will be designed in compliance with the Avian Power Line Interaction Committee (APLIC) standards, as defined in *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2012). As such, the danger of electrocution to birds from this Project is anticipated to be insignificant. Some avian species may use transmission line structures or wires for perching and roosting; however, this is not the designed intent of those facilities. Additionally, edge-adapted species (e.g., some flycatchers, northern cardinal [*Cardinalis cardinalis*], northern bobwhite [*Colinus virginianus*], Cooper's hawk [*Accipiter cooperii*], brown-headed cowbird [*Molothrus ater*], and northern mockingbird [*Mimus polyglottos*]) may select the edge habitat created along the changed vegetation areas adjacent to the transmission line ROW (Rochelle et al. 1999).

The transmission line (both structures and wires) could present a hazard to flying birds, particularly when flying through a migratory pathway or stopover site (National Audubon Society 2023). Mortality is directly related to an increase in structure height; number of guy wires, conductors, and ground wires; and use of solid or pulsating red lights (an FAA requirement on some structures or structures over 200 feet in height) (Erickson et al. 2005). Collision hazards are greatest near habitat "magnets" (e.g., wetlands, open water, edges, and riparian zones) and during the fall when flight altitudes of dense migrating flocks are lower in association with cold air masses, fog, and inclement weather. The greatest danger of mortality exists during periods of low ceiling, poor visibility, and drizzle when birds are flying low, perhaps commencing or terminating a flight, and when they may have difficulty seeing obstructions (Electric Power Research Institute 1993). Most migrant species known to occur in the Study Area, including passerines, should be minimally affected during migration since their normal flying altitudes are much greater than the heights of the proposed transmission structures (Willard 1978; Gauthreaux 1978).

The species most prone to collision are often the largest and most common for resident birds or for birds during periods of non-migration (Rusz et al. 1986; APLIC 1994); however, over time, these birds learn the location of transmission lines and become less susceptible to wire strikes (Avery 1978). Raptors, typically, are uncommon victims of transmission line collisions because of their great visual acuity (Thompson 1978). In addition, many raptors only become active after sufficient thermal currents develop, which is usually late in the morning when poor light is not a factor (Avery 1978).

Waterfowl species are particularly vulnerable to collisions with power lines because of their low-altitude flight and high speed. Additionally, species that travel in large flocks, such as blackbirds and many shorebirds, are also vulnerable because dense flocking makes movement around obstacles more difficult for individuals in the flock (APLIC 1994).

Utility companies can employ several means to minimize transmission line impacts on birds in flight. The initial placement of a transmission line is the most important consideration (Avery 1978; APLIC 1994, 2006). The proximity of a transmission line to areas of frequent bird use (e.g., communal foraging or roosting areas, rookeries, wetlands) is crucial. This is especially true for daily use areas, such as feeding areas or other areas where birds may be taking off or landing regularly (APLIC 1994 and 2006). The position of the individual structures can also help reduce collisions. Faanes (1987), in an in-depth study in North Dakota, found that birds in flight tend to avoid the transmission line structures, presumably because such structures are visible from a distance. Instead, most appear to fly over the lines in the mid-span region. In areas where the transmission line passes between roosting and foraging areas, the structures can be placed in the center of the flyway (i.e., where the birds are more likely to fly) to increase their visibility, in addition to marking the wires.

Faanes (1987) reported that 97% of birds observed colliding with a power line did so with the ground (static) wire, largely because of attempts to avoid the conductors. Beaulaurier (1981) found that removal of the ground wire at two study sites in Oregon resulted in a reduction in collisions of 35% and 69%. However, since overhead static wires are installed on transmission lines for safety and reliability reasons, increasing the visibility of the static wire would be a better alternative, when necessary. Increasing the visibility of the wires by using markers such as orange aviation balls, black-and-white ribbons, or spiral vibration dampers, particularly at mid-span, can reduce the number of collisions. Beaulaurier (1981) reviewed 17 studies involving marking ground wires or conductors and found an average reduction in collisions of 45% when compared to unmarked lines.

Negative edge effects can be reduced through native revegetation of disturbed construction areas where necessary and appropriate for safe and reliable operation. Additionally, nest management through platform design (if required), equipment protection, and other physical disincentives to bird use and nesting can avoid negative impacts to birds and power reliability (APLIC 2006).

In general, the greatest potential impact to wildlife typically results from the loss and fragmentation of woodland and wetland habitats. Woodlands, particularly, are relatively static environments that require greater regenerative time compared with rangeland or emergent wetlands. In most cases, wetlands and small waterbodies can be spanned with little or no resulting impact to wildlife. However, as previously noted, no aquatic habitat will be crossed due to the absence of streams crossed by the Alternative Routes. Therefore, the greatest potential to impact wildlife would be the length requiring woodland clearing, followed by the length of the Alternative Routes, which would present the potential for wire strikes to both migrant and resident birds.

Alternative Routes B and C have the least potential for impacts to wildlife because they do not cross upland woodland/brushland that would require clearing, and they are the shorter Alternative Routes. Alternative Route A is the least desirable from a wildlife standpoint because it crosses the largest amount of upland woodland/brushland that would likely require 0.83 mile of clearing. Other considerations, such as stream crossings, working within floodplains, or wetland crossings, were not considered for the proposed Project because they are not crossed by the Alternative Routes.

4.1.5.4 Recreationally and Commercially Important Species

Increased noise and equipment movement during construction may temporarily displace mobile wildlife species from the immediate workspace area. These impacts are considered short-term and normal wildlife movements would be expected to resume after construction is completed. Three of the five Alternative Routes cross areas of upland woodland/brushland, which can represent the highest degree of habitat fragmentation by converting the area within the ROW to an herbaceous habitat. It is not anticipated that significant impacts will occur to large game, small game, or trapping species from construction activities and with the removal of vegetation (habitat modification/fragmentation). The proposed Project is not anticipated to have a significant impact on game fish, waterfowl hunting, recreational fishing, and commercial fishing due to the lack of surface water features crossed by the five Alternative Routes.

4.1.5.5 Endangered and Threatened Species

An assessment of potential impacts for listed threatened or endangered species within the Study Area was conducted by reviewing readily available desktop data from the USFWS IPaC, TPWD RTEST, and TPWD NDD. Current USFWS IPaC listings (USFWS 2024a) reviewed data based on the Study Area, while the TPWD RTEST (TPWD 2024c) data is only available at the county level. The NDD data (TPWD 2024d) also provides historical records of species and other rare resources that could occur in the Study Area. Potential USFWS-designated critical habitat locations (TPWD 2024e) were also included in the review.

4.1.5.5.1 Plant Species

Listed endangered at a federal and state level, the black lace cactus has the potential to occur in San Patricio County (USFWS 2024a). However, a review of the NDD (TPWD 2024d) data shows that no known population occurs within 10 miles of the Study Area and it is unlikely the black lace cactus would occur in the Study Area due to the lack of suitable habitat. Therefore, the Project should not significantly impact this species.

4.1.5.5.2 Federally Listed Wildlife Species

The ocelot could occur as a rare vagrant within this region but, due to the lack of isolated dense shrub habitat, is not expected to occur within the Study Area. Therefore, impacts on this species are not anticipated.

The eastern black rail is unlikely to occur within the inland habitat within the Study Area. Other federally listed avian species, such as piping plover, red knot, and whooping crane, may occur as possible non-breeding migrants or post-breeding dispersals that pass through the Study Area and potentially occupy habitats temporarily. Therefore, impacts would be considered temporary.

Federally listed aquatic species, including the oceanic whitetip shark, blue whale, Gulf of Mexico Bryde's whale, humpback whale, North Atlantic right whale, sei whale, sperm whale, West Indian manatee, green sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, and loggerhead sea turtle, do not occur within the Study Area due to an absence of marine habitat. Therefore, there will be no impact on these species.

4.1.5.5.3 Federally Proposed, Candidate, and Other Protected Species

The tricolored bat, which has been proposed by the USFWS to be listed as endangered, may occur within the Study Area where upland woodland/brushland vegetation occurs—three of the five Alternative Routes cross this habitat type. However, impacts to this species are considered temporary due to their opportunistic behavior and ability to relocate to suitable habitat.

The monarch butterfly is a federal candidate species for listing. The Study Area could provide potential suitable migratory habitat for the monarch butterfly at specific times of the year. Although the monarch butterfly may occur as a temporary migrant within the Study Area, no significant impacts to this species are anticipated to occur.

Although not federally listed as threatened or endangered, bald eagles are protected under the MBTA and BGEPA. Bald eagles are not likely to occur within the Study Area. If, in the course of biological surveys and/or construction activities, any bald eagle roost or nest trees are identified within the vicinity of the

Project, the Company will refer to the National Bald Eagle Management Guidelines to avoid and minimize harm and disturbance of bald eagles as recommended by the USFWS.

4.1.5.5.4 State-Protected Species

State-listed amphibians, including the black-spotted newt, sheep frog, and South Texas siren (large form), may occur within the Study Area if suitable habitat is present. However, impacts to their preferred habitat, such as surface waters and wetlands, are not anticipated. Therefore, no significant impacts to this species are anticipated.

The black rail is unlikely to occur within the inland habitat within the Study Area. Other state-listed avian species such as the reddish egret, swallow-tailed kite, white-faced ibis, white-tailed hawk, and wood stork may occur as possible non-breeding migrants or post-breeding dispersals that may pass through the Study Area and potentially occupy habitats temporarily or seasonally. The Texas Botteri's sparrow may occur within the Study Area. However, impacts to this species are considered temporary due to their ability to relocate to similar unaffected habitat. With the implementation of mitigation measures for avian species discussed previously, no adverse impacts to birds are anticipated to occur from the construction of any of the alternative routes.

The state-listed shortfin mako shark does not occur within the Study Area due to the absence of marine habitat. No impacts to this species will occur.

The white-nosed coati is not likely to occur within the Study Area; therefore, no impacts to this species are anticipated.

The Texas horned lizard, Texas scarlet snake, and Texas tortoise may occur within the Study Area and these species could experience minor temporary disturbance during construction efforts. However, these species are not expected to experience significant impacts due to their ability to relocate to similar unaffected habitat.

4.1.5.5.5 Critical Habitat

No USFWS-designated critical habitat occurs within the Study Area, and none of the five Alternative Routes cross NDD-mapped element of occurrence record data for federally or state-listed species or sensitive vegetation communities (TPWD 2024c).

4.2 Socioeconomic Impact

4.2.1 Impact on Social and Economic Factors

Construction and operation of the proposed transmission line is not anticipated to result in a significant change in the population or employment rate within the Study Area. The Company typically uses contract labor supervised by Company employees during the clearing and construction phases of transmission line projects. Construction workers for the Project would likely commute to the work site on a daily or weekly basis instead of permanently relocating to the area. The temporary workforce increase would likely result in an increase in local retail sales due to purchases of lodging, food, fuel, and other merchandise for the duration of construction activities. No additional staff would be required for line operations and maintenance. The Company is also required to pay sales tax on purchases and is subject to paying local property tax on land or improvements as applicable. As described in Section 1.2, this Project is needed to provide increased electric service to meet the forecasted load growth in north-central San Patricio County, which will benefit the local area by providing the necessary capacity for the area.

4.2.2 Impact on Community Values

Adverse effects upon community values are defined as aspects of the proposed Project that would significantly and negatively alter the use, enjoyment, or intrinsic value attached to an important area or resource by a community. This definition assumes that community concerns are identified regarding the location and specific characteristics of the proposed transmission line and do not include possible objections to electric transmission lines in general.

Impacts on community values can be classified into two areas: (1) direct effects, or those effects that would occur if the location and construction of a transmission line results in the removal or loss of public access to a valued resource; and (2) indirect effects, or those effects that would result from a loss in the enjoyment or use of a resource due to the characteristics (primarily aesthetic) of the proposed lines, structures, or ROW. Impacts on community values, whether direct or indirect, can be more accurately gauged as they affect recreational areas or resources and the visual environment of an area (aesthetics). Impacts in these areas are discussed in detail in Sections 4.3.2 and 4.3.7 of this report, respectively.

4.3 Impact on Human Resources

4.3.1 Impact on Land Use

Land use impacts from transmission line construction are determined by the amount of land (of varying use) displaced by the actual ROW and by the compatibility of electric transmission line ROW with adjacent land uses. During construction, temporary impacts to land uses within the ROW could occur due to the movement of workers and materials through the area. Construction noise and dust, as well as temporary disruption of traffic flow, may also temporarily affect residents and businesses in the area immediately adjacent to the ROW. Coordination among the Company, their contractors, and landowners regarding access to the ROW and construction scheduling would minimize these disruptions.

4.3.1.1 Habitable Structures

One of the most important measures of potential land use impact is the number of habitable structures located within a specified distance of an Alternative Route centerline. Habitable structures are defined by 16 TAC § 25.101(a)(3) as:

> *Structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis. Habitable structures include, but are not limited to, single-family and multifamily dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, and schools.*

The Consultant determined the number and distance of habitable structures located within 300 feet of the centerline of each Alternative Route using GIS software, interpretation of aerial imagery, and verification during field reconnaissance where possible. To account for the margin of error in horizontal accuracy of aerial imagery, the Consultant identified habitable structures located within 320 feet of the centerline of each Alternative Route.

No known habitable structures are impacted by the Alternative Routes.

4.3.1.2 Using and Paralleling Existing Transmission Line ROW

The least impact to land use generally results from building within existing transmission line ROW, followed by building parallel to existing transmission line ROW. Using existing transmission line ROW of sufficient width usually eliminates the need for additional clearing. Additionally, building parallel to existing transmission line ROW, when compared to establishing a new ROW corridor, can also minimize the amount of ROW to be cleared, which generally results in the least amount of impact to landowners, the environment, and the overall aesthetic quality of that area. In fact, the factors listed by 16 TAC § 25.101(b)(3)(B) to be considered in the selection of Alternative Routes include:

- Whether the Alternative Routes utilize existing compatible ROW, including the use of vacant positions on existing multiple-circuit transmission lines.
- Whether the Alternative Routes parallel existing compatible ROW.
- Whether the Alternative Routes parallel property lines or other natural or cultural features.

The existing Medio Creek-Lon Hill 138-kV transmission line is the only transmission line in the Study Area and the Project is proposed to cut into this line. Therefore, there are no transmission line parallel opportunities for the Project.

4.3.1.3 Paralleling Other Existing Compatible ROW

Paralleling other existing compatible ROW (roads, highways, distribution lines, etc. – excluding oil and gas pipelines) is also considered to be a positive routing criterion, one that usually results in fewer impacts than establishing a new ROW corridor within an area and is included in the PUC's transmission line certification criteria. In accordance with PUC Substantive Rule § 25.101(b)(3)(B), the Consultant identified existing compatible ROW for potential paralleling opportunities.

Three of the Alternative Routes parallel other existing compatible ROW (Routes C through E). The Alternative Routes with lengths paralleling other compatible ROW range from 0.16 mile for Alternative Route E to 1.09 miles for Alternative Route D (Table 4-1).

4.3.1.4 Paralleling Property Lines

Another important land use and favorable routing criterion under PUC Substantive Rule § 25.101(b)(3)(B) is the length of property lines paralleled. In the absence of existing ROW to follow, paralleling property or fence lines minimizes disruption to agricultural activities and creates less of a constraint to the future development of a tract of land. Property lines created by existing compatible ROW (e.g., roadways, highways, railroads) are not double counted in the "Length of ROW parallel to property lines" criterion.

None of the Alternative Routes parallel apparent property lines. Landowner properties in the Study Area are large and following property lines was not applicable.

4.3.1.5 Combined Total Length Paralleling ROW and Property Lines

The combined total length that each Alternative Route parallels existing transmission lines, other compatible ROW, and apparent property lines was calculated for comparison. The sum of each criterion was then considered in relation to the total length of the Alternative Route.

Alternative Routes A and B do not parallel ROW or apparent property lines. The combined total lengths paralleling ROW and property lines range from 0.16 mile for Alternative Route E to 1.09 miles for Alternative Route D (Table 4-1).

4.3.1.6 Overall Length of Routes

The length of an alternative route can be an indicator of the relative magnitude of land use impacts. Generally, all other things being equal, the shorter the route, the less land is crossed, which usually results in the least amount of potential impacts. The total lengths of the Alternative Routes range from 1.59 miles for Alternative Route B to 2.61 miles for Alternative Route E (Table 4-1). The differences in route lengths reflect the direct or indirect pathway of each Alternative Route between the Project endpoints. The lengths of the Alternative Routes may also reflect the effort to parallel existing transmission lines and other existing linear features and apparent property boundaries, and the geographic diversity of the alternative routes.

4.3.1.7 Impact on Lands with Conservation Easements

None of the alternative routes cross known conservation easements.

4.3.2 Impact on Recreation

Potential impacts on parks or recreation areas include the disruption or prevention of recreation activities. One local park was identified within the Study Area (Rob and Bessie Welder Park). No significant impacts to the use of the parks and recreation facilities located within the Study Area are anticipated from any of the Alternative Routes. Also, no adverse impacts are anticipated for any fishing or hunting areas from any of the Alternative Routes.

None of the Alternative Routes cross any known parks and recreation facilities and none are located within 1,000 feet of a known park or recreation facility.

4.3.3 Impact on Agriculture

Impacts to agricultural land uses can generally be ranked by degree of potential impact, with the least potential impact occurring in areas where grazing is the primary use (pasture or rangeland), followed by cultivated cropland, with forested/wooded land (orchards, commercial timber, etc.) having the highest degree of impact.

All of the Alternative Routes cross some length of pastureland/rangeland; however, because the ROW for the Project will not be fenced or otherwise separated from adjacent lands, there will be no significant long-term displacement of farming or grazing activities. The Alternative Routes with impacts to pasture or rangeland range from 1.59 miles for Alternative Route B to 2.61 miles for Alternative Route E (Table 4-1).

None of the Alternative Routes impact any known cropland and none crosses lands with known mobile irrigation systems (rolling or pivot).

4.3.4 Impact on Utility Features and Oil and Gas Facilities

Oil and gas wells and pipelines are located throughout the Study Area. During the route development process, the Company and the Consultant applied a setback distance of 250 feet from the Alternative Route centerlines to identified well heads using RRC data layers (RRC 2024e), aerial imagery interpretation, and GIS software-generated measurements. In some instances, the setback distance was reduced due to the need to traverse a particular area to connect the Project endpoints while also considering other existing constraints in the area.

The Company and the Consultant applied a setback distance of 500 feet when an Alternative Route would need to parallel existing transmission pipelines and, when feasible, existing gathering pipelines as identified using RRC data layers (RRC 2024e), aerial photo interpretation, and GIS software-generated measurements. The Company and the Consultant also applied routing criteria to cross existing transmission pipelines and, when feasible, existing gathering pipelines at 90 degrees, if possible, but no less than 60 degrees. These routing criteria are to address potential delays in construction schedules and additional cost in addressing the PUC final order language directing the electric utility to work with pipeline owners or operators to assess if mitigation may be necessary. Pipelines that are crossed by the PUC-approved Alternative Route will be indicated on engineering drawings and flagged prior to construction. The Company will notify and coordinate with pipeline companies as necessary during transmission line construction and operation.

Two Alternative Routes have some length parallel to existing pipeline ROW less than 500 feet from the centerline. The Alternative Route lengths parallel to existing pipelines range from 0.07 mile for Alternative Route B to 0.43 mile for Alternative Route A (Table 4-1).

The number of pipelines crossed by the Alternative Routes ranges from five each for Alternative Routes B, C, D, and E to seven for Alternative Route A. Alternative Route B has two recorded oil and gas wells less than 250 feet from the centerline and Alternative Route A has five.

No Alternative Routes cross existing electric transmission lines and there are no recorded water wells within 250 feet of the centerline of the Alternative Routes.

4.3.5 Impact on Transportation/Aviation

4.3.5.1 Transportation Features

Potential impacts to transportation could include the temporary disruption of traffic and potential conflicts with proposed roadway or utility improvements. Increased traffic and congestion may also occur during the construction of the proposed Project. However, the Project would generate only minor construction traffic at any given time or location. This traffic would consist of construction employees' personal vehicles and trucks and equipment for material deliveries and construction. Such impacts, however, are usually temporary and short-term. The Company will coordinate with the agencies in control of the affected roadways to address these traffic flow impacts. The Company would also be required to obtain road-crossing permits from TxDOT for any crossing of state-maintained roadways.

None of the Alternative Routes cross an interstate, United States, or State highway or an FM road.

4.3.5.2 Aviation Facilities

According to FAA Part 77 regulations, Title 14 CFR Part 77.9, notification of the construction of the proposed transmission line will be required if structure heights exceed the height of an imaginary surface extending outward and upward at a slope of 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of a public or military airport having at least one runway longer than 3,200 feet. The FAA also requires notification if structure heights exceed a slope of 50 to 1 for a horizontal distance of 10,000 feet from the nearest runway of a public or military airport with no runway longer than 3,200 feet, and if structure heights exceed a 25 to 1 slope for a horizontal distance of 5,000 feet from landing and takeoff areas for heliports (FAA 2024a and 2024b).

There is one public FAA-registered airport, Alfred C. "Bubba" Thomas Airport, with at least one runway longer than 3,200 feet located within 20,000 feet of all the Alternative Routes (Table 4-2).

There are no FAA-registered airports where the runway is no longer than 3,200 feet located within 10,000 feet of any of the Alternative Routes, private airstrips located within 10,000 feet of the Alternative Routes, or heliports within 5,000 feet of the Alternative Routes.

Table 4-2: Airport/Airstrip and Heliport Locations Near Alternative Routes

Figures B-1 and B-2 Map ID[a]	Airstrip/Heliport	FAA Identifier	Alternative Routes	Nearest Link	Distance from Nearest Link (feet)	Exceeds Slope
1	Alfred C. "Bubba" Thomas Airport	T69	A	1	13,723	No
			B	2	16,302	No
			C	9	16,626	No
			D	9	16,626	No
			E	9	16,626	No

(a) Airports, airstrips, and heliports are located on Figures B-1 and B-2 (map pockets).

4.3.6 Impact on Communication Towers

The Alternative Routes would not have a significant impact on electronic communication facilities or operations in the Study Area. No commercial AM radio towers were identified within 10,000 feet of the Alternative Route centerlines. No FM radio transmitter or other electronic communication facility was identified within 2,000 feet of the centerlines.

4.3.7 Impact on Aesthetics

Aesthetic impacts, or impacts upon visual resources, exist when the ROW, lines, or structures of a transmission line system create an intrusion into, or substantially alter the character of, an existing scenic view. The significance of the impact is directly related to the quality of the view, in the case of natural scenic areas, or to the importance of the existing setting in the use or enjoyment of an area, in the case of valued community resources and recreational areas.

It is virtually impossible for a new transmission line to have no visual impacts, and construction of the proposed 138-kV transmission line could have both temporary and permanent aesthetic effects. Temporary impacts would include views of the actual construction, including assembly and erection of the structures, and any clearing of the ROW. Where limited clearing is required, the brush and wood debris could have a temporary negative impact on the local visual environment. Permanent impacts from the Project would include the views of the structures and lines themselves, as well as views of cleared ROW from public viewpoints, including roadways, recreational areas, and scenic overlooks.

To evaluate aesthetic impacts, field surveys were conducted to determine the general aesthetic character of the area and the degree to which the proposed transmission line would be visible from selected areas. These areas generally include those of potential community value, parks and recreational areas, and the major highways and FM roads that traverse the Study Area. Measurements were made to estimate the length of each Alternative Route that would fall within the foreground visual zone (FVZ) of recreational areas or major highways. A transmission line (structures and wires) is within the FVZ if it is visible (e.g., not obstructed by terrain, trees, buildings) within 0.5 mile of an observer. The determination of the visibility of the transmission line from various points was calculated using USGS maps, GIS software, and aerial imagery interpretation.

All of the Alternative Routes have some portion of their lengths located within the FVZ of US Hwys. Alternative Route B has the least length with 0.43 mile and Alternative Route E has the longest length with 1.60 miles. None of the alternative routes are located within the FVZ of FM/RM roads.

Only Alternative Route A has a portion of its length, 0.15 mile, located within the FVZ of parks or recreational areas.

4.3.8 Impact on Texas Coastal Management Program

An approximate 46.25-acre portion of the Study Area east of US Hwy 77 is located within the CMP boundary. No CNRAs were identified within the portion of the Study Area within the CMP boundary and none of the Alternate Routes are located east of US Hwy 77; therefore, none of the Alternative Routes will have any direct and significant impact on CNRAs.

4.4 Impact on Cultural Resources

Construction activity has the potential to adversely impact cultural resource sites. Although this transmission line Project is currently being conducted without the need for federal funding, permitting, or assistance, federal guidelines established under Section 106 of the National Historic Preservation Act of 1966, as amended, provide useful standards for considering the severity of possible direct and indirect impacts. According to the Secretary of the Interior's Guidelines for protection of historical and archeological resources (36 CFR Part 800), adverse impacts may occur directly or indirectly when a project causes changes in archeological, architectural, or cultural qualities that contribute to a resource's historical or archeological significance.

4.4.1 Direct Impacts

Direct impacts include actions that physically damage or alter an archeological site, historically significant building, structure, object, district, or other cultural resource. Typically, these impacts occur during the construction phase of a transmission line project and can result from actual placement of tower locations and lines as well as from activities associated with construction, including clearing vegetation and vehicular and heavy machinery traffic. Archeological sites, which can be surficial or shallowly buried, are particularly sensitive to these impacts.

Historically significant buildings, structures, objects, districts, and other landscape-related resources within or adjacent to the Study Area can be directly affected by construction activities. These effects can include direct impacts to the resources themselves via physical destruction or damage, or impacts to their character-defining features, including changes to the overall character of the property's use or alteration of physical features within the property's setting that contribute to its historical significance.

Direct impacts to cemeteries require compliance with the Texas Health and Safety Code, as amended. These rules and regulations are available in Title 13, Part 2, Chapter 22, Rule § 22.5 of the TAC. The marked boundaries of historic-age cemeteries are notorious for shifting over time as a result of several factors, including abandonment, the removal or disintegration of headstones or other markers, and the encroachment of new developments. This boundary ambiguity can result in unmarked burials being unintentionally or intentionally excluded from current cemetery boundaries. To limit the potential for a project to impact unmarked burials, the THC recommends all construction projects, including ground disturbance within 25 feet of a known cemetery boundary, be surveyed in advance by an archeologist for evidence of possible burials within proposed construction areas.

4.4.2 Indirect Impacts

Indirect impacts can include the introduction of visual, atmospheric, or audible elements that diminish the integrity of a property's significant historic features. Often, indirect impacts affect cultural resources located outside of the immediate Study Area and frequently relate to a resource's overall integrity of setting, feeling, or association. Such impacts may include landscape alteration or changes in land use patterns, the introduction of air pollution, increased traffic, or changes in population density. Historic landscapes, buildings, structures, objects, and districts are common resources affected by indirect impacts.

4.4.3 Mitigation

The preferred form of mitigation for impacts to cultural resources is avoidance. Alternative forms of mitigation for direct impacts can be developed for archeological and historical sites and properties through the implementation of an appropriate data recovery program. Indirect impacts to historically significant properties and landscapes can be lessened through careful design choices and landscaping considerations. In some situations, the relocation of historic structures may be another possible form of mitigation.

4.4.4 Summary of Impact on Cultural Resources

The distance of each recorded site located within 1,000 feet of the nearest Alternative Route was measured using GIS software and aerial photography interpretation. A records review described in Section 3.12.6 indicated no archeological sites, OTHMs, State Antiquities Landmarks, NRHP-listed or determined-eligible resources, or National Historic Trails are recorded within 1,000 feet of the Alternative Routes. One cemetery, the Welder Ranch Grave Cemetery (THC Cemetery Number SP-C-021), is recorded within 1,000 feet of Alternative Route A. The THC lists the Welder Ranch Grave as a Vicinity Cemetery, meaning its exact location is unknown. The THC (2024b) maps the cemetery within a circle approximately 1,475 feet in diameter. Alternative Route A is 896 feet from the general location circle (Table 4-3). The grave is depicted outside of the Study Area on the 1954 USGS Sinton East TX topographic quadrangle.

Table 4-3: Cemeteries Within 1,000 feet of Alternative Route Centerlines

Figures B-1 and B-2 Map ID	Cemetery ID	Cemetery Name	Distance in Feet from Centerline	Alternative Route(s)
-	SP-C021	Welder Ranch Grave	896	A

None of the Alternative Routes have been surveyed for cultural resources. Thus, the potential for undiscovered cultural resources does exist along all of the Alternative Routes. To assess this potential, a review of geological, soil, and topographical maps was conducted by a professional archeologist to identify areas along the alternative routes with a high probability for archeological resources. High probability areas (HPAs) for pre-contact archeological sites are typically identified adjacent to streams or near sources of fresh water along the Alternative Routes and near previously recorded sites. Post-contact resources are likely to be found near water sources; however, they will also be near primary and secondary roads that provided access to the sites. Buildings and cemeteries are more likely to be located within or near communities. HPAs were identified along the Alternative Routes near buildings depicted on historic topographic quadrangles and along an unnamed intermittent stream. To facilitate the data evaluation and Alternative Route comparison, each HPA was mapped using GIS and the length of each Alternative Route crossing these areas was tabulated.

All of the Alternative Routes cross HPAs. Alternative Route E crosses the least amount of HPA at 0.14 mile. Alternative Route A crosses the most HPA at 0.60 mile (Table 4-1).

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5.0 ALTERNATIVE ROUTE EVALUATION

The purpose of this EA was to delineate and evaluate the most viable Alternative Routes for the proposed 138-kV transmission line between the proposed Portilla Substation and the existing Medio Creek-Lon Hill 138-kV transmission line in San Patricio County. The Consultant, with review and assistance from the Company, evaluated numerous Preliminary Alternative Links for the proposed transmission line Project. These Preliminary Alternative Links were developed using publicly available environmental and land use data, as well as data collected during on-site field visits. As a result of these evaluations, the Company and the Consultant modified the Preliminary Alternative Links and selected five Alternative Routes for further analysis. These five Alternative Routes were subjected to a detailed environmental analysis by the Consultant and to an engineering and cost analysis by the Company.

5.1 The Consultant's Environmental Evaluation

The Consultant completed the environmental analysis of the five Alternative Routes (Section 4.0); environmental data used in the analysis were shown in Table 4-1. The environmental evaluation consisted of a comparison of Alternative Routes strictly from an environmental viewpoint, based upon the measurement of 41 separate environmental criteria, as well as comments from local, state, and federal agencies; field reconnaissance of the Study Area and Alternative Routes; and the general routing methodology used by the Consultant.

The Consultant used a consensus approach to evaluate the potential impact of the five Alternative Routes. Professionals with expertise in different environmental disciplines (terrestrial and aquatic ecology, land use and planning, and cultural resources) evaluated the five Alternative Routes using the environmental and land use data presented in Table 4-1 for their technical discipline. The evaluators then discussed their independent results. The relationship and relative sensitivity among the major environmental factors were determined by the group. The group then selected an Alternative Route that best satisfies a balance between the major environmental factors, as well as ranking Alternative Routes second through fifth, all based strictly upon the environmental data. These rankings are shown in Table 5-1 and reflect the order of their potential environmental impact. Although all Alternative Routes were considered by the group to be environmentally acceptable, it is the consensus of the Consultant evaluators that Alternative Route B is the most favorable after evaluating the objective environmental criteria.

The Company considers this information along with engineering, construction, maintenance, operational, and cost considerations to select the route that they believe best addresses the requirements of PURA and

PUC Substantive Rules as required by the PUC's CCN application. The Company will describe the selection process in the CCN application.

Table 5-1: The Consultant's Ranking of the Alternative Routes, Medio Creek-Lon Hill 138-kV Cut-in to Portilla Substation Double-circuit Transmission Line

Alternative Route	Land Use Specialist	Ecology Specialist	Cultural Resources Specialist	Project Manager	Consensus
A	3	5	5	4	4
B	1	1	1	1	1
C	2	2	4	2	2
D	4	3	2	3	3
E	5	4	3	5	5

The land use evaluation placed the greatest importance on the overall length of route. Comparing the five Alternative Routes from a land use perspective, Alternative Route B was selected as having the least potential impact on land use, followed in ranking by Alternative Routes C, A, D, and E.

The ecological ranking of the alternative routes was based primarily on the length of Alternative Route that crosses upland woodland/brushland. The ecologist ranked Alternative Route B as having the least potential ecological impact followed in ranking by Alternative Routes C, D, E, and A.

The cultural resources ranking of the Alternative Routes was based primarily on the amount of HPA crossed by the routes and the length of the routes. Alternative Route B was identified as having the least potential impact on cultural resources, followed in ranking by Alternative Routes D, E, C, and A. All of the Alternative Routes are acceptable from a cultural resources perspective since potential impacts were minimized during the route development phase.

The POWER Project Manager ranked the Alternative Routes, considering all of the evaluation criteria and the flow of the Alternative Routes across the Study Area. The overall length of route and length of route crossing upland woodland/brushland were considered key factors. An additional consideration was the amount of HPA crossed by the Alternative Routes. Potential impact avoidance and minimization measures typically employed during the construction of transmission lines were also taken into account. Alternative Route B was selected by the POWER Project Manager as the best-balanced route considering all the evaluation criteria reviewed, followed in ranking by Alternative Routes C, D, A, and E.

Following the evaluation by discipline, the Consultant's group of evaluators, which included the Project Manager and Siting Specialist, discussed the relative importance and sensitivity of each set of criteria (land use, cultural, and natural resources) as applied to the Alternative Routes. Based on group discussion of the relative value and importance of each set of criteria (land use, ecology, and cultural resources) for this specific Project, it was the consensus of the group that the overall length and the length of route crossing upland woodland/brushland were primary factors in their decision for selecting the best-balanced Alternative Route based upon the environmental, land use, and cultural data and ranking the Alternative Routes in order of preference. A secondary factor was the amount of HPA crossed by the Alternative Routes.

The Consultant's recommendation of Alternative Route B as the route that best balances the PUC routing criteria related to land use, aesthetics, ecology, and cultural resources is based primarily on the following advantages among the objective criteria:

Alternative Route B:

- Is the shortest route, at 1.59 miles.
- Has the shortest length across pastureland/rangeland, at 1.59 miles.
- Has the third least length of ROW across HPA, at 0.17 mile.

Alternative Route B also:

- Crosses no parks/recreational areas and is not located within 1,000 feet of any additional parks/recreational areas.
- Crosses no cropland.
- Has no FAA-registered airports with no runway more than 3,200 feet in length within 10,000 feet of the route centerline.
- Has no private airstrips within 10,000 feet of the route centerline.
- Has no heliports within 5,000 feet of the route centerline.
- Has no commercial AM radio transmitter within 10,000 feet of the route centerline.
- Has no FM radio transmitters, microwave towers, or other electronic installations within 2,000 feet of the route centerline.
- Has no recorded water wells within 200 feet of route centerline.
- Crosses no upland woodland/brushland.

- Crosses no bottomland riparian woodland.
- Crosses no NWI-mapped wetlands.
- Crosses no rivers.
- Has no cemeteries within 1,000 feet of the route centerline.
- Crosses no recorded cultural resource sites and is not located within 1,000 feet of any additional recorded cultural resource sites.
- Crosses no NRHP listed or determined-eligible properties and is not located within 1,000 feet of any additional NRHP listed or determined-eligible properties.

Therefore, based upon its evaluation of this Project and its experience and expertise in transmission line routing, the Consultant recommends Alternative Route B from an overall land use and environmental perspective. Considering all pertinent factors related to land use, ecology, and cultural resources, it is the Consultant's opinion that Alternative Route B best addresses the applicable criteria in PURA § 37.056(c)(4) and the PUC Substantive Rules.

Figures B-1 and B-2 (map pockets) show the approximate locations of habitable structures and other land use features in the vicinity of the Alternative Routes. Land use features in the vicinity of the Alternative Routes are listed and described with respect to their distance and direction from each Alternative Route in Table 5-2 through Table 5-6.

Table 5-2: Habitable Structures and Other Land Use Features in the Vicinity of Alternative Route A

Link Combination: 1-3-10				
Feature ID Number[a]	**Structure/Feature**	**Distance from Centerline[b] (feet)**	**Direction**	**Nearest Alternative Link[c]**
-	Welder Ranch Grave	896	SW	-
1	Alfred C "Bubba" Thomas Airport	13,723	SW	1

(a) All land use features are located on Figures B-1 and B-2 (map pockets).
(b) Due to the potential horizontal inaccuracies of the aerial photography and data utilized, all habitable structures within 320 feet have been identified.
(c) For protection, sensitive cultural resource sites are not shown on Figures B-1 and B-2 and the nearest Alternative Link is not provided.

Table 5-3: Habitable Structures and Other Land Use Features in the Vicinity of Alternative Route B

Link Combination: 2-3-10				
Feature ID Number[a]	Structure/Feature	Distance from Centerline[b] (feet)	Direction	Nearest Alternative Link[c]
1	Alfred C "Bubba" Thomas Airport	16,302	SW	2

(a) All land use features are located on Figures B-1 and B-2 (map pockets).
(b) Due to the potential horizontal inaccuracies of the aerial photography and data utilized, all habitable structures within 320 feet have been identified.
(c) For protection, sensitive cultural resource sites are not shown on Figures B-1 and B-2 and the nearest Alternative Link is not provided.

Table 5-4: Habitable Structures and Other Land Use Features in the Vicinity of Alternative Route C

Link Combination: 4-7-9-10				
Feature ID Number[a]	Structure/Feature	Distance from Centerline[b] (feet)	Direction	Nearest Alternative Link[c]
1	Alfred C "Bubba" Thomas Airport	16,626	SW	9

(a) All land use features are located on Figures B-1 and B-2 (map pockets).
(b) Due to the potential horizontal inaccuracies of the aerial photography and data utilized, all habitable structures within 320 feet have been identified.
(c) For protection, sensitive cultural resource sites are not shown on Figures B-1 and B-2 and the nearest Alternative Link is not provided.

Table 5-5: Habitable Structures and Other Land Use Features in the Vicinity of Alternative Route D

Link Combination: 5-6-7-9-10				
Feature ID Number[a]	Structure/Feature	Distance from Centerline[b] (feet)	Direction	Nearest Alternative Link[c]
1	Alfred C "Bubba" Thomas Airport	16,626	SW	9

(a) All land use features are located on Figures B-1 and B-2 (map pockets).
(b) Due to the potential horizontal inaccuracies of the aerial photography and data utilized, all habitable structures within 320 feet have been identified.
(c) For protection, sensitive cultural resource sites are not shown on Figures B-1 and B-2 and the nearest Alternative Link is not provided.

Table 5-6: Habitable Structures and Other Land Use Features in the Vicinity of Alternative Route E

Link Combination: 5-8-9-10				
Feature ID Number[a]	**Structure/Feature**	**Distance from Centerline[b] (feet)**	**Direction**	**Nearest Alternative Link[c]**
1	Alfred C "Bubba" Thomas Airport	16,626	SW	9

(a) All land use features are located on Figures B-1 and B-2 (map pockets).
(b) Due to the potential horizontal inaccuracies of the aerial photography and data utilized, all habitable structures within 320 feet have been identified.
(c) For protection, sensitive cultural resource sites are not shown on Figures B-1 and B-2 and the nearest Alternative Link is not provided.

6.0 LIST OF PREPARERS

This Environmental Assessment was prepared for the Company by POWER. The Company provided information in Section 1.0. Below is a list of the Consultant's employees with primary responsibilities for the preparation of this document.

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APPENDIX A - AGENCY CORRESPONDENCE

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AGENCY CORRESPONDENCE LETTERS AND STUDY AREA MAP

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Medio Creek-Lon Hill 138-kV Cut-in to Portilla Substation Double-circuit Transmission Line Project
Federal, State, and Local Agencies/Officials Contact List

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Region 14 Interim Director – Corpus Christi
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Director, Aviation Division
Texas Department of Transportation
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Director, Environmental Affairs Division
Texas Department of Transportation
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Mr. Humberto "Tito" Gonzalez Jr., P.E.
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6230 E. Stassney Lane
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Mr. Valente Olivarez Jr., P.E.
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SAN PATRICIO COUNTY

The Honorable David R. Krebs
San Patricio County Judge
1301 East Sinton Street, Ste. C
Sinton, Texas 78387

The Honorable Sonia Lopez
San Patricio County Commissioner
Precinct 1
520 Harvill St.
Sinton, TX 78387

Ms. Susan Boutwell
Floodplain Administrator
San Patricio County
313 N. Rachal Ave. Rm #223
Sinton, Tx 78387

Commissioner Lilly Wilkinson
Parks Director
San Patricio County Parks
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Mr. Steve Elliot
District Manager
San Patricio County Drainage District
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The Honorable Howard Gillespie
San Patricio County Commissioner
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3141 FM 3512
Aransas Pass, TX 78336

LOCAL

The Honorable Mary Speidel
Mayor
City of Sinton
301 E. Market St.
Sinton, TX 78387

Mr. John D. Hobson
City Manager
City of Sinton
301 E. Market
Sinton, TX 78387

Dr. Andy Reddock
Superintendent
Sinton Independent School District
322 S. Archer Street
Sinton, Texas 78387

NON-GOVERNMENTAL ORGANIZATION

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Interim Executive Director
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Chief Executive Officer
Texas Agricultural Land Trust
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San Antonio, TX 78209

Medio Creek-Lon Hill 138-kV Cut-in to Portilla Substation Double-circuit Transmission Line Project
Federal, State, and Local Agencies/Officials Contact List

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Austin, TX 78716

Ms. Lori Olson
Executive Director
Texas Land Trust Council
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Wimberley, TX 78676

Ms. Suzanne Scott
State Director
The Nature Conservancy of Texas
200 E. Grayson St., Suite 202
San Antonio, TX 78215

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POWER ENGINEERS

POWER ENGINEERS, INC.
14090 SOUTHWEST FREEWAY
SUITE 300
SUGAR LAND, TX 77478 USA

PHONE 512-735-1823
FAX 713-977-8797

June 6, 2024
(Via Mail)

«Name»
«Company_or_Title»
«Department»
«Address»
«City_State_Zip»

Re: Proposed Medio Creek to Lon Hill 138-kV Cut-in to Portilla Substation Double-circuit Transmission Line Project
San Patricio County, Texas
POWER Engineers, Inc. Project No. 0251937

Dear «Name»:

AEP Texas Inc. (AEP Texas) will be filing an application with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to build approximately 1.5 miles of double-circuit 138-kilovolt (kV) transmission line in San Patricio County, Texas.

The proposed 138-kV transmission line will connect the proposed Portilla Substation to the existing Medio Creek to Lon Hill 138-kV transmission line. The proposed Portilla Substation is located north of State Highway 77 approximately 0.95 mile northeast of the intersection of SH 77 and SH 181 and approximately 1.40 miles north of the City of Sinton. From the proposed Portilla Substation, the new line will extend approximately 1.5 miles northwest to a tap point on the existing Medio Creek to Lon Hill 138-kV transmission line, which is located approximately 2.4 miles northwest of the City of Sinton. A study area has been developed to consider possible routes connecting the proposed Portilla Substation to the tap point to be included in the CCN application for filing with the PUC. The tap point may be located anywhere along the existing transmission line within the study area. There are no proposed routes for the project at this time. The location of the study area, existing 138-kV transmission line, proposed Portilla Substation, and approximate locations of other existing transmission facilities are shown on the enclosed map.

POWER Engineers, Inc. (POWER) is preparing an Environmental Assessment and Alternative Route Analysis to support AEP Texas' CCN application with the PUC. POWER is gathering data on the existing environment and identifying environmental, cultural, and land use constraints within the study area. POWER will identify potential routes between the end points that consider these environmental, cultural, and land use constraints.

POWER is requesting that your agency/office provide information concerning environmental and land use constraints or other issues of interest to your agency/office within the study area. Your input will be an important consideration in the evaluation of the potential routes and in the assessment of potential impacts of each route. In addition, POWER would appreciate receiving information about any permits, easements, or other approvals by your agency/office that you believe could affect this project, or if you are aware of any major proposed development or construction in the study area. Upon certification of a final route for the proposed project by the PUC, AEP Texas will identify and obtain necessary permits, if required, from your agency/office.

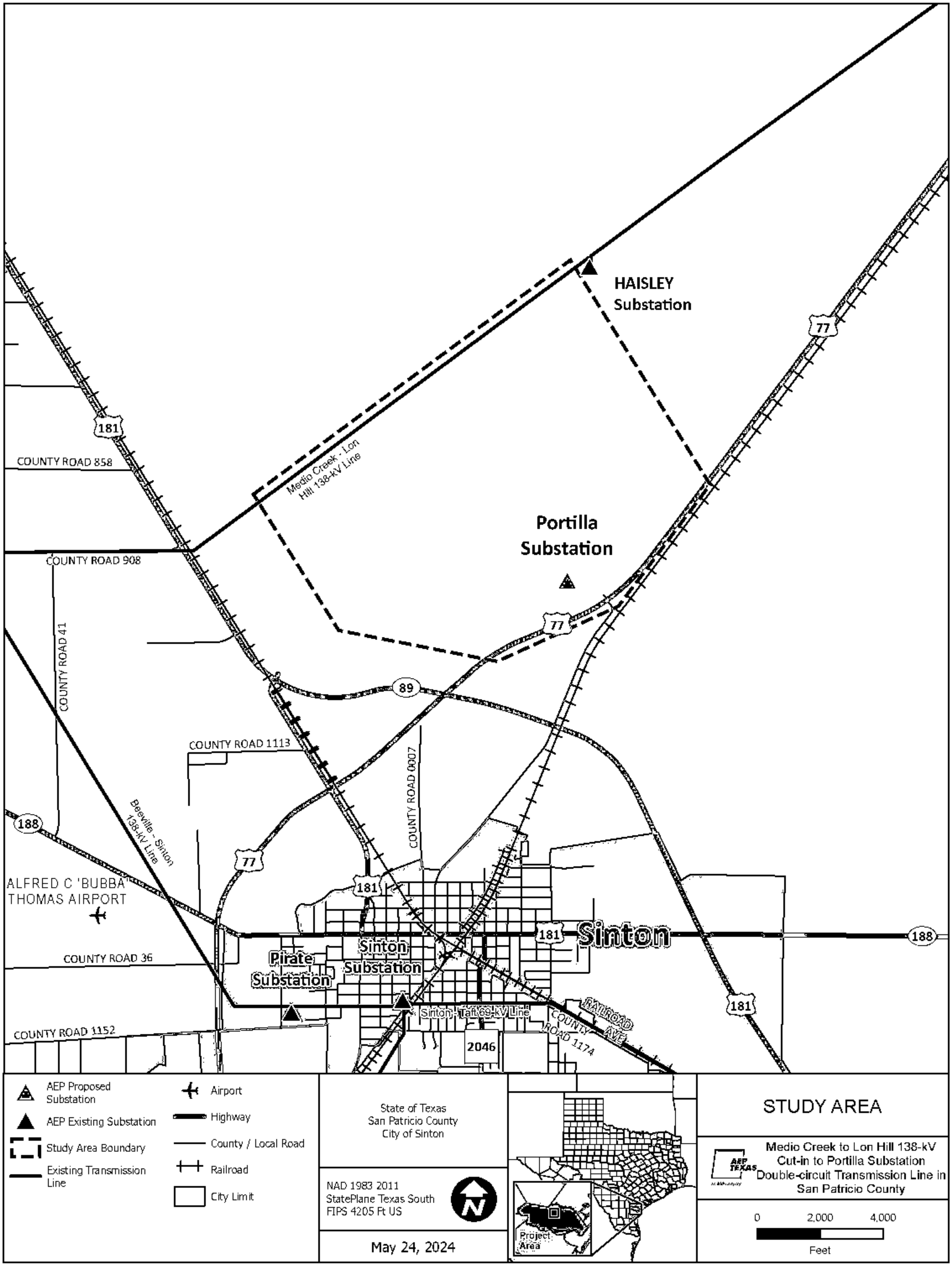
Thank you for your assistance with this proposed electric transmission line project route development process. Please contact me by phone at 512-735-1823, or by email at kathleen.cooney@powereng.com if you have any questions or require additional information. POWER would appreciate receiving your reply by June 30, 2024.

Sincerely,

Kathleen Cooney
Environmental Project Manager

Enclosure(s):
Study Area Map

Sent via mail
ProjectWise 0251937



HAISLEY Substation
Portilla Substation
Medio Creek - Lon Hill 138-kV Line
Beeville - Sinton 138-kV Line
Sinton - Taft 69-kV Line
COUNTY ROAD 858
COUNTY ROAD 908
COUNTY ROAD 41
COUNTY ROAD 1113
COUNTY ROAD 0007
COUNTY ROAD 36
COUNTY ROAD 1152
COUNTY ROAD 1174
RAILROAD AVE
181
77
89
188
2046
ALFRED C 'BUBBA' THOMAS AIRPORT
Sinton
Pirate Substation
Sinton Substation
AEP Proposed Substation
AEP Existing Substation
Study Area Boundary
Existing Transmission Line
Airport
Highway
County / Local Road
Railroad
City Limit
State of Texas
San Patricio County
City of Sinton
NAD 1983 2011
StatePlane Texas South
FIPS 4205 Ft US
May 24, 2024
Project Area
STUDY AREA
Medio Creek to Lon Hill 138-kV
Cut-in to Portilla Substation
Double-circuit Transmission Line in
San Patricio County
0
2,000
4,000
Feet

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AGENCY RESPONSES

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From:	9-ASW-RA-Office (FAA)
To:	Cooney, Kathleen
Cc:	9-AJO-AWA-OEGroup (FAA)
Subject:	[EXTERNAL] Power Engineers AEP Texas Inc.
Date:	Thursday, June 20, 2024 3:00:28 PM
Attachments:	2024-6-6 Power Engineers AEP Texas.pdf

Hello,

Please find the response to your correspondence regarding Power Engineers AEP Texas Inc.'s proposed transmission line in San Patricio County, Texas.

Have a great day!

~ Office of the ASW Regional Administrator

U.S. Department
of Transportation
**Federal Aviation
Administration**

Southwest Region
10101 Hillwood Parkway
Fort Worth, TX 76177

June 14, 2024

Kathleen Cooney
14090 Southwest Freeway
Suite 300
Sugar Land, TX 77478

Dear Ms. Cooney,

This is in response to your June 6, 2024, correspondence concerning AEP Texas Inc. (AEP Texas), which is planning to apply with the Public Utility Commission of Texas (PUC) to amend its Certificate of Convenience and Necessity (CCN) to build approximately 1.5 miles of double-circuit 138-kilovolt (kV) transmission line in San Patricio County, Texas. You requested information regarding environmental and land use constraints within the study area.

As set forth in Title 14 of the Code of Federal Regulations Part 77, Objects that Affect the Navigable Airspace, the prime concern of the Federal Aviation Administration is the effect of certain proposed construction on the safe and efficient use of the navigable airspace.

To accomplish this mission, aeronautical studies are conducted based on information provided by sponsors on FAA Form 7460-1, Notice of Proposed Construction or Alteration. If your organization is planning to sponsor any construction or alterations that may affect navigable airspace, you must file FAA Form 7460-1 electronically via:
https://oeaaa.faa.gov/oeaaa/external/portal.jsp.

For additional information and assistance, please feel free to contact the Obstruction Evaluation Group via email, OEGroup@faa.gov, at 10101 Hillwood Parkway, Fort Worth, Texas, 76177, or (817) 222-5954.

Sincerely,

Rob Lowe
Regional Administrator,
Southwest Region

CC: Obstruction Evaluation Group, AJV-A520

From:	Velazquez, Dana
To:	Cooney, Kathleen
Cc:	Dracoulis, Danielle; Smothers-Shamshum, Ronald
Subject:	[EXTERNAL] IMS:115629 RE: Proposed Medio Creek to Lon Hill 138-kV Cut-in to Portillo Substation Double-Circuit Transmission Line Project San Patricio County, Texas, POWER Engineers Inc.
Date:	Tuesday, June 11, 2024 9:38:11 AM
Attachments:	image001.png

U.S. Department of Homeland Security
FEMA Region 6
800 N. Loop 288
Denton, TX 76209

FEMA

Ms. Kathleen Cooney
Environmental Project Manager
Power Engineers, Inc.
14000 Southwest Freeway
Suite 300
Sugarland, TX 77478

RE: Proposed Medio Creek to Lon Hill 138-kV Cut-in to Portillo Substation Double-Circuit Transmission Line Project San Patricio County, Texas, POWER Engineers Inc.
Project No. 0251937

Dear Ms. Cooney,

We acknowledge receipt of your request for review/environmental consultation in reference to the Medio Creek to Lon Hill 138-kV Cut-in to Portillo Substation Double-Circuit Transmission Line Project

☐ We have no comments to offer.

☒ We offer the following comments:

We would request that the community Floodplain Administrator be contacted for the review and possible permit requirements for this project. If federally funded, we would request project be in compliance with EO11988 & EO 11990.

The Community Floodplain Administrator for your project contact information is listed below:

San Patricio County, Texas
Susan Boutwell
Floodplain Administrator
sboutwell@sanpatriciocountytx.gov
361-587-3567

REVIEWER:

Dana Velazquez
Floodplain Management and Insurance Branch
Mitigation Division
(202) 341-8673 DATE: 6/11/2024

www.fema.gov

Best Regards,

Dana M. Velazquez
HM Support Specialist
4586P-TX
Hazard Mitigation Division Branch
W: 202-341-8673 P: 850-321-1803
dana.velazquez@fema.dhs.gov

FEMA

TEXAS GENERAL LAND OFFICE
COMMISSIONER DAWN BUCKINGHAM, M.D.

June 13, 2024

Kathleen Cooney
Power Engineers, Inc.
14090 Southwest Fwy, Ste 300
Sugar Land, TX 77478-3679

Re: Proposed Medio Creek to Lon Hill 138-kV Cut-in to Portilla Substation Double-circuit Transmission Line Project
San Patricio County, Texas
POWER Engineers, Inc. Project No. 0251937

Dear Ms. Cooney:

On behalf of Commissioner Buckingham, I would like to thank you for your letter concerning the above- referenced project.

Using your map depicting the project's study area, it does not appear that the General Land Office will have any environmental issues or land use constraints at this time.

When a final route for this proposed project has been determined, please contact me and we can assess the route to determine if the project will cross any streambeds or Permanent School Fund (PSF) land that would require an easement from our agency.

In the interim, if you would like to speak to me further on this project, I can be reached by email at jeff.burroughs@glo.texas.gov or by phone at (512) 463-7845.

Again, thank you for your inquiry.

Sincerely,

Jeff Burroughs
Manager, Right-of-Way Department
Leasing Operations

From:	Holle, Chris - FPAC-NRCS, TX
To:	Cooney, Kathleen
Cc:	Stahnke, Alan - FPAC-NRCS, TX; Anderson, Ashley - FPAC-NRCS, TX
Subject:	[EXTERNAL] EA - Proposed Power Engineers Medio Creek to Lon Hill Transmission Line Project in San Patricio County, Texas
Date:	Thursday, July 11, 2024 1:18:42 PM
Attachments:	Power Engineers Medio Creek to Lon hill Transmission Line Project Letter.pdf Power Engineers Medio Creek to Lon Hill Transmission Line Soil Report.pdf

Kathleen,

Attached you will find the soil report and letter for the requested environmental assessment. This, updated, assessment is for the Proposed Power Engineers Medio Creek to Lon Hill Transmission Line Project in San Patricio County, Texas. Should you have any questions or need additional information, please let me know.

Thanks,

Chris Holle
USDA-NRCS
101 S. Main
Temple, Texas
(254) 742-9951

USDA United States Department of Agriculture

Farm Production and Conservation

Natural Resources Conservation Service

USDA NRCS
W.R. Poage Federal Building
101 South Main Street
Temple, TX 76501

July 10, 2024

Power Engineers, Inc.
14090 Southwest Freeway
Suite 300
Sugar Land, TX. 77478

Attention: Kathleen Cooney, Environmental Project Manager

Subject: Proposed Medio Creek to Lon Hill 138-kV Cut-in to Portilla Substation Double-circuit Transmission Line Project, San Patricio County, Texas

Thank you for the opportunity to provide input on the potential environmental effects of the Proposed Medio Creek to Lon Hill 138-kV Cut-in to Portilla Substation Double-circuit Transmission Line Project, San Patricio County. The proposed site has been evaluated and does not involve any USDA-NRCS easements.

The soils in the proposed project area have been reviewed. There are a few soil limitations in the project area that should be taken into consideration while planning for the project. As with any project, soil erosion is a main concern and erosion prevention practices are recommended. There is a moderate potential for steel corrosion and low potential for concrete corrosion the area. Although the area contains prime farmland, above ground transmission lines are not considered a permanent conversion, therefore further evaluation is unnecessary. There are hydric soils present, which can be indicators of wetlands. There is some ponding potential and soils with seasonal water tables.

Enclosed is a Web Soil Survey map and reports illustrating the location of the soils as well as the ratings for related interpretations that are described above. We encourage you to consider this information during the construction of the proposed transmission line and take measures to protect the soils and water quality.

If you have further questions, please contact me at (254) 742-9951 or by email at chris.holle@usda.gov.

Sincerely,

Chris Holle

CHRIS HOLLE
USDA/NRCS

Attachment: Power Engineers Medio Creek to Lon Hill Transmission Line_Soil_Report

United States Department of Agriculture

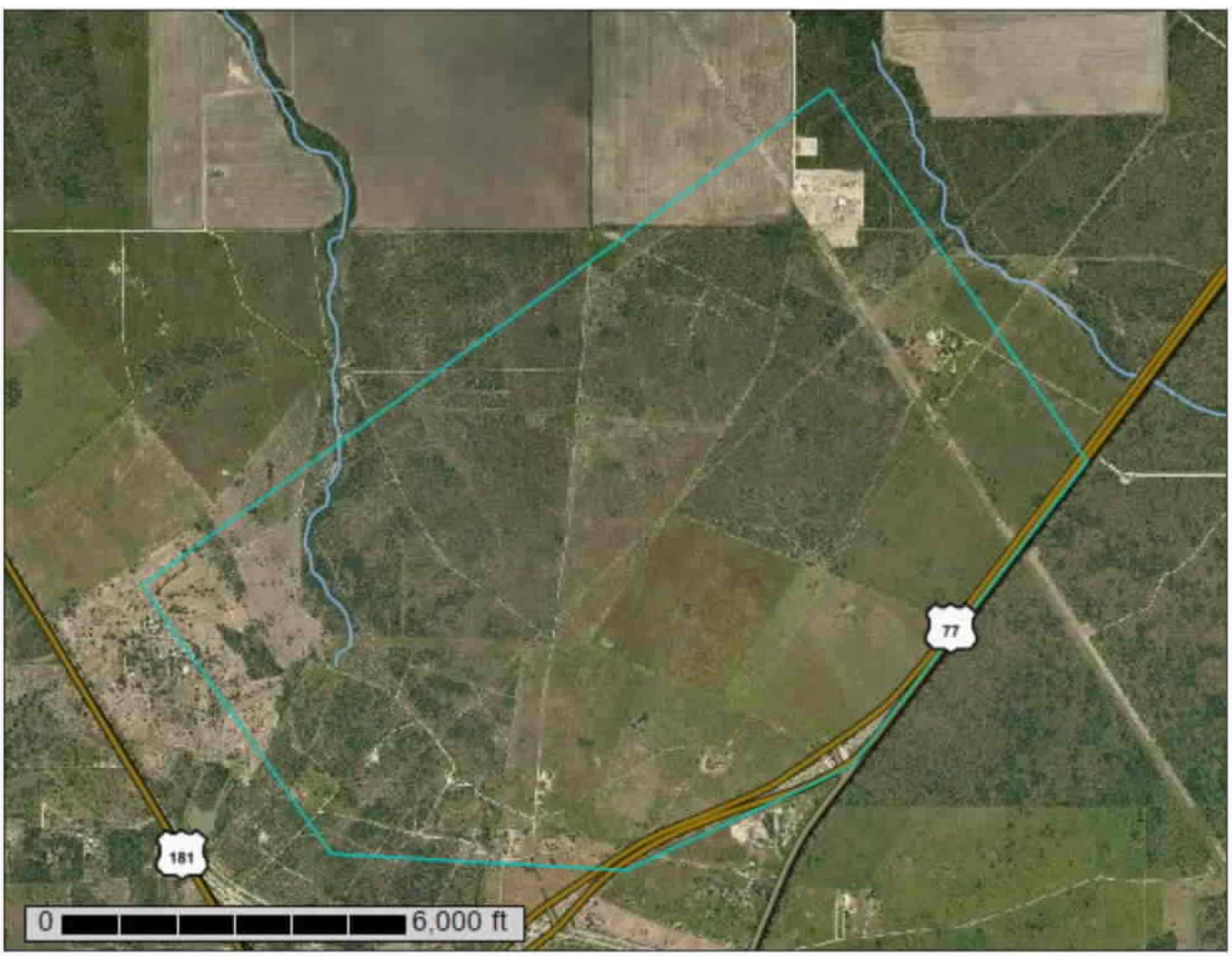
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for
San Patricio and Aransas Counties, Texas

Medio Creek to Lon Hill Transmission Line



July 10, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

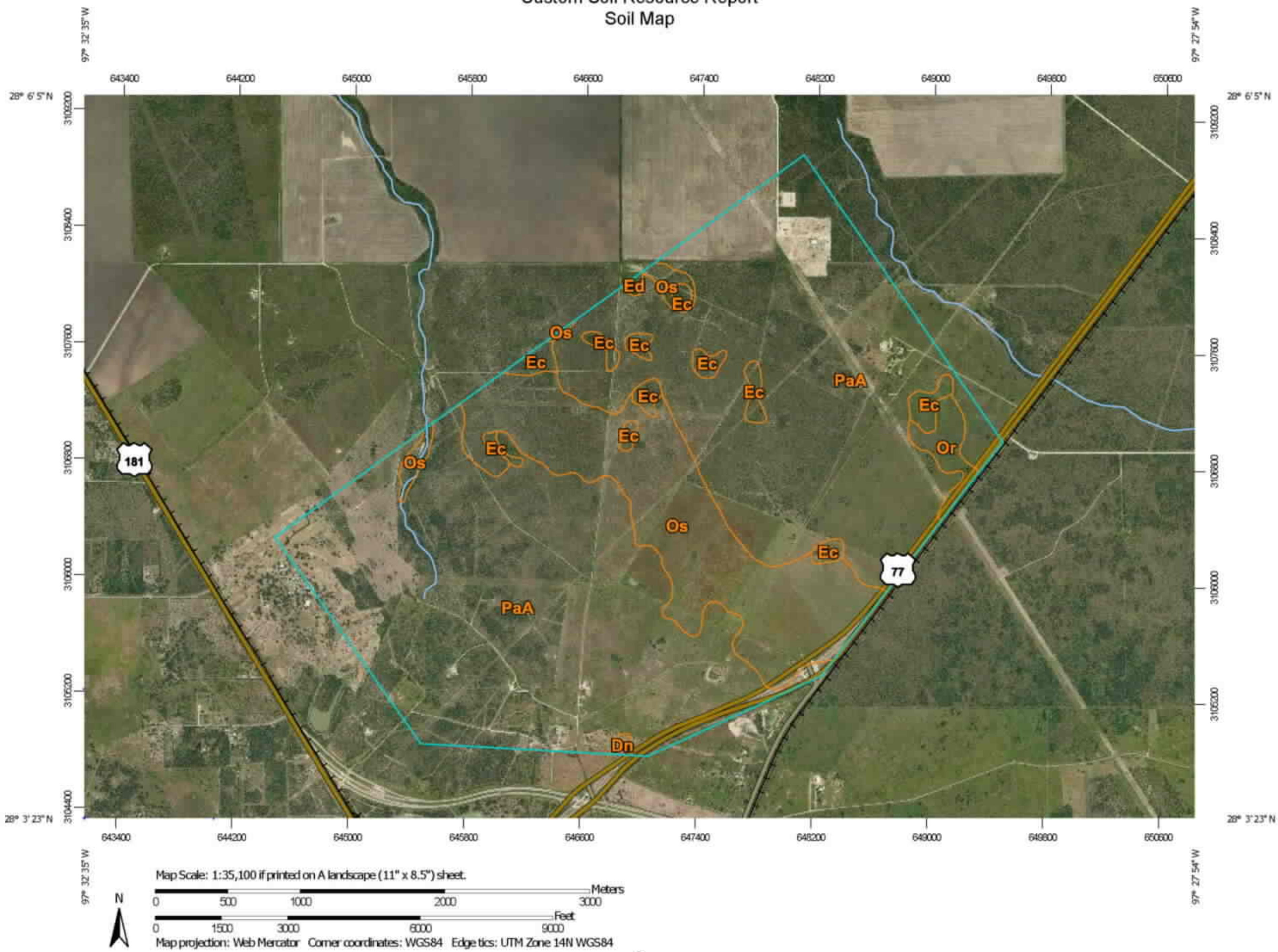
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


97° 32' 35" W
97° 27' 54" W
28° 6' 5" N
28° 3' 23" N
643400
644200
645000
645800
646600
647400
648200
649000
649800
650600
3109200
3108400
3107600
3106800
3106000
3105200
3104400
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77
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Map Scale: 1:35,100 if printed on A landscape (11" x 8.5") sheet.
Meters
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1000
2000
3000
Feet
0
1500
3000
6000
9000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Patricio and Aransas Counties, Texas
Survey Area Data: Version 20, Sep 5, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Nov 5, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.