Appendix J – Species Analysis Spreadsheet & Documentation

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SPECIES ANALYSIS SPREADSHEET: Project Information Sheet	
Project Name:	Loop 9, Segment A
CSJ(s):	2964-10-006
TxDOT District: (Click dropdown arrow to select a District from List)	Dallas
County(ies): (Click dropdown arrow to select each county)	Dallas, Ellis
Prepared by: (Full Name)	Ecosystem Planning and Restoration - John Williams
Date Completed: (m/d/yyyy)	8/26/2022
TxDOT ENV Spreadsheet Template date: April 7, 2022.	

Taxon	Common Name	Scientific Name	Habitat	Suitable Habitat Present?	Explanation for determination regarding suitable habitat	Federal Status	Effect/Take Determination for Federally Listed Species	State Status	Impact Determination for State-Listed Species	Explanation for Effect/Take and/or Impact Determination	Presence/ Absence survey conducted?
Fishes	Atlantic Sturgeon	*Acipenser oxyrinchus oxyrinchus*	The species is primarily found in the Atlantic from Canada to Florida, but occasionally occurs in the Gulf of Mexico. It has not been recorded off the Texas coast. It is primarily a marine species, when not breeding, but is found close to shore. It migrates to rivers and brackish water features (sometimes tidal) in the spring and fall to spawn, usually over bottoms of hard clay, rubble, gravel, and/or shell.			E		—	N/A		
Fishes	Giant Manta Ray	*Manta birostris*	The giant manta ray has a world-wide distribution, but is currently limited to several highly fragmented populations. It is the largest species of ray with a wingspan of up to 29 feet. The giant manta ray is a filter feeder that forages primarily on microscopic organisms, but is known to consume some small fish. Common occurrences are in oceanic waters, offshore, and near protective coastlines. The species has been documented in the Gulf of Mexico, including juvenile nursery grounds at Flower Garden Banks National Marine Sanctuary off the coast of Texas. This species also occasionally occurs in estuarine waters near ocean inlets at potential nursery grounds.			T		—	N/A		
Fishes	Great Hammerhead	*Sphyrna mokarran*	This generalist species of shark preferes warm coastal waters where it occurs. However, it can be found in deep open ocean as well as shallow coastal waters. It migrates seasonally in search of ideal water tempuratures.			—	N/A	T			
Fishes	Largetooth Sawfish	*Pristis pristis*	This species has the widest historic range of all the sawfish species; however, worldwide populations have decreased dramatically. Adult habitat includes inshore coastal waters, lagoons, river mouths, and estuaries, and juveniles inhabit fresh water systems that have connectivity to brackish or marine coastal systems. The species has been documented at the Flower Garden Banks National Marine Sanctuary. This species feeds on invertebrates and small fishes. Historically, the Gulf of Mexico along the Texas coast had a large population; however, the Texas coast population has dramatically decreased, and it has not been recorded off the coast of Texas since 1943.			E		—	N/A		
Fishes	Oceanic Whitetip Shark	*Carcharhinus longimanus*	This pelagic shark ranges from Argentina to Maine, including the Gulf of Mexico, the Pacific Ocean, and the Caribbean Sea. It is generally a surface-dwelling species, but it can also be found in water depths up to 183 meters. The oceanic whitetip shark generally remains offshore in the open ocean or along the outer continental shelf, but is occasionally found near oceanic islands. It prefers water temperatures greater than 20 degrees Celsius.			T		T			

Fishes	Scalloped Hammerhead Shark	*Sphyrna lewini*	This coastal pelagic species is highly migratory and primarily inhabits deeper temperate, warm, and tropical waters worldwide. Adults of the species have been recorded along the continental shelf off Texas, the Flower Garden Banks National Marine Sanctuary, Stetson Bank, and Padre Island National Seashore. Juveniles have been recorded within nurseries in Texas coastal bays and estuaries. The females return to their natal sites, which generally include shallow nearshore waters like bays and estuaries used for nurseries. They typically feed on mackerel, herring, and sardines; however, they occasionally feed on octopus and squid.			T		—	N/A		
Fishes	Shortfin Mako	*Isurus oxyrinchus*	This species of shark prefers the surface of open warm seas in the Gulf of Mexico. It feeds primarily on schooling fishes like mackerels and herrings.			—	N/A	T			
Fishes	Shortnose Sturgeon	*Acipenser brevirostrum*	The shortnose sturgeon inhabits rivers and Atlantic coastal bays and estuaries from Canada to Florida. The species has not been documented near the Texas coast or in the Gulf of Mexico.			E		—	N/A		
Invertebrates	Boulder Star Coral	*Orbicella franksi*	This rare coral is endemic to the Gulf of Mexico and Caribbean Sea, specifically in areas around Florida, Bermuda, and the Bahamas. It is known to occur in the Flower Garden Banks National Marine Sanctuary which is located approximately 70 to 115 miles off the coasts of Texas and Louisiana. It is an important reef building species that forms domes, columns, and flat shelf-like colonies. Preferred habitat includes most reef environments and depths ranging from 1 to 82 meters. The species requires very specific water parameters and is highly sensitive to changes in water and air temperatures, salinity, methane gasses and carbon dioxide concentrations, light levels, ultraviolet radiation, water quality, turbulence, and sedimentation.			T		—	N/A		
Invertebrates	Elkhorn Coral	*Acropora palmata*	The elkhorn coral is found in the Gulf of Mexico and Carribean Sea including Flower Garden Banks National Marine Sanctuary, which is located approximately 70 to 115 miles off the coasts of Texas and Louisiana. This coral species reproduces asexually and sexually and is found in reef environments in deeper, more protected, water depths from 5 to 20 meters and in more shallow, turbulent water at depths of 1 to 5 meters. On rare occasions, it can be found at depths of 60 meters. The tolerable water temperature range for this species is 21 to 29 degrees Celsius. Temperatures outside this range, even 1-2 degrees Celsius, may cause stress to the coral and induce a bleaching event that can cause death. Corals are also vulnerable to water salinity, air temperatures, methane gasses and carbon dioxide, decreased or high light levels, increased ultraviolet radiation, high or increased water turbulence, and burial by sedimentation.			T		—	N/A		

Invertebrates	Lobed Star Coral	*Orbicella annularis*	This hermaphroditic broadcast-spawning coral grows in shallow reef systems and can found at depths up to 82 meters. The species range is from Latin America through the Gulf of Mexico, including the Flower Garden Banks National Marine Sanctuary, and extending north and east to Bermuda and the Caribbean. It is often one of the most dominant and abundant species where found. This coral species can form massive colonies, is considered a reef-builder, and provides other reef dwellers refuge from predators. The tolerable water temperature range for this species is 23 to 29 degrees Celsius. Temperatures outside this range, even 1-2 degrees Celsius, may cause stress to the coral and induce a bleaching event that can cause death. Corals are also vulnerable to water salinity, air temperatures, methane gasses and carbon dioxide, decreased or high light levels, increased ultraviolet radiation, high or increased water turbulence, and burial by sedimentation. Any of these events lasting longer than a few weeks will most likely result in death.			T		—	N/A		
Invertebrates	Mountainous Star Coral	*Orbicella faveolata*	The mountainous star coral occurs in shallow waters in the Gulf of Mexico and Carribean Sea. It has been documented in the Flower Garden Banks National Marine Sanctuary, which is from 70 to 115 miles off the Texas coast. This species can grow in water depths up to 40 meters. The mountainous star coral is often one of the most dominant and abundant species where found. The tolerable water temperature range for this species is 23 to 29 degrees Celsius. Temperatures outside this range, even 1-2 degrees Celsius, may cause stress to the coral and induce a bleaching event that can cause death. Corals are also vulnerable to water salinity, air temperatures, methane gasses and carbon dioxide, decreased or high light levels, increased ultraviolet radiation, high or increased water turbulence, and burial by sedimentation.			T		—	N/A		
Invertebrates	Pillar Coral	*Dendrogyra cylindrus*	Pillar corals range from Latin America north through the Gulf of Mexico to the coast of Florida. This broadcast-spawning coral reproduces sexually and is found in sheltered reef environments. The species can live in water depths up to 25 meters. Corals are vulnerable to changes in water salinity, air and water temperatures, concentrations of methane gasses and carbon dioxide, light levels, increased ultraviolet radiation, high water turbulence, and burial by sedimentation.			T		—	N/A		
Invertebrates	Rough Cactus Coral	*Mycetophyllia ferox*	The rough cactus coral inhabits sheltered reef environments in the Gulf of Mexico and Carribean Sea. This species can grow in water depths from 5 to 30 meters. The tolerable water temperature range for this species is 0 to 25 degrees Celsius. Temperatures outside this range, even 1-2 degrees Celsius, may cause stress to the coral and induce a bleaching event that can cause death. Corals are also vulnerable to water salinity, air temperatures, methane gasses and carbon dioxide, decreased or high light levels, increased ultraviolet radiation, high or increased water turbulence, and burial by sedimentation. Any of these events lasting longer than a few weeks will most likely result in death.			T		—	N/A		

Invertebrates	Staghorn Coral	*Acropora cervicornis*	The staghorn coral occurs throughout the Carribean Sea and southern Gulf of Mexico, including Flower Gardens National Marine Sanctuary. This species can grow in water depths up to 30 meters. The tolerable water temperature range for this species is 20 to 30 degrees Celsius. Temperatures outside this range, even 1-2 degrees Celsius, may cause stress to the coral and induce a bleaching event that can cause death. Corals are also vulnerable to changes in salinity, air temperatures, concentrations of methane gasses and carbon dioxide, light levels, increased ultraviolet radiation, high or increased water turbulence, and burial by sedimentation.			T		—	N/A		
Mammals	Blue Whale	*Balaenoptera musculus*	The blue whale is the largest animal on the planet and found in all oceans with the exception of the Arctic Ocean. Its occurrence in the Gulf of Mexico is extremely rare with only two reported strandings along the Gulf coast (Louisiana and Texas). This baleen whale feeds almost exclusively on krill and seasonally migrates between winter breeding grounds (fall and winter) and summer feeding grounds (spring and summer). Its range extends from the subtropics to the Greenland Sea with sightings off of Canada's coast, the eastern United States, and infrequently in the Caribbean and Gulf of Mexico.			E		E			
Mammals	Bryde's Whale	*Balaenoptera edeni*	Unlike other baleen whales, Bryde's whale is restricted to tropical, subtropical, and warm temperate waters of the Atlantic, Indian, and Pacific Oceans. Bryde's whales are smoky gray with light mottling and three distinctive parallel ridges that extend from the blowhole to the tip of the snout. Some populations are migratory while others are year-round residents. Bryde's whales feed on krill, shrimp, crabs, copepods, and schooling fish in the open ocean.			E		E			
Mammals	False Killer Whale	*Pseudorca crassidens*	The false killer whale is a toothed whale that inhabits the tropical and subtropical waters of all oceans. It is usually observed in the open ocean but is found near land around oceanic islands and coasts with nearshore deep water. Two separate strandings have been documented on the Texas coast. The false killer whale generally feeds on squid and fish, but have been known to take marine mammals and other whales.			E		T			
Mammals	Fin Whale	*Balaenoptera physalus*	The fin whale is a cosmopolitan baleen species that is known from all oceans. It is pelagic and usually found 25 miles or more from the shore. This species migrates seasonally from high-latitude summer feeding grounds to low-latitude wintering areas. There has only been one sighting in Texas: a young whale stranded in Chambers County.			E		E			

Mammals	Gulf of Mexico Bryde's Whale	*Balaenoptera edeni (GoM subspecies)*	The Gulf of Mexico subspecies of Bryde's whale is the only non-migratory resident baleen whale in the Gulf of Mexico. It is found primarily near the continental shelf off the Florida panhandle. The species is not documented in Texas waters; however, strandings have occurred along the Louisiana coast. They are a pelagic species and one of the more frequently observed baleen whales in the Gulf of Mexico. It is estimated that there are fewer than 100 individuals of the subspecies, with fewer than 50 mature individuals.			E		E			
Mammals	Humpback Whale	*Megaptera novaeangliae*	The humpback whale is found in all oceans up to the polar ice caps. The species follows distinct migratory patterns between summer feeding grounds in temprate regions to tropical waters during the winter breeding season. Humpback whales are a baleen species known for their exceptionally long flippers. There is only one documented occurrence of the species from the Texas coast in the early 1990's.			E		E			
Mammals	Killer Whale	*Orcinus orca*	The killer whale is known to occur in every ocean, but they are most commonly found in colder temperate waters. The species is the most widely distributed of all whales and dolphins. It is often found in the southern part of the Gulf of Mexico; however, one individual was sighted in waters off Port Aransas, Texas in the northern Gulf of Mexico and another stranded individual was documented on South Padre Island in Texas. The killer whale is a top predator in the marine environment.			E		T			
Mammals	North Atlantic Right Whale	*Eubalaena glacialis*	The species has worldwide distribution with known occurrences of single individuals and pods in the Gulf of Mexico, including near the Texas coast; however, reports of this species are rare. They are typically observed in pods in deeper water depths (greater than 500 feet deep); however, individuals of this species are known to hunt for prey close to shore and on occasion, beach themselves. Some pods will often reside in the same region for many years with little movement of immigration or emigration. They feed on other whales, sharks, turtles, seals, and sea birds.			E		E			
Mammals	Sei Whale	*Balaenoptera borealis*	The sei whale is a baleen species that inhabits subtropical, temperate, and subpolar waters worldwide. It prefers deeper waters offshore where it feeds on plankton, small schooling fish, and cephalopods. This species has annual migrations from subtropical, temperate waters during the winter (breeding) to subpolar, cool waters in the summer.			E		E			
Mammals	Sperm Whale	*Physeter macrocephalus*	The sperm whale is a toothed whale that ranges from Alaska south along the Pacific coast to the Pacific Islands, along the Atlantic coast from New England to Florida, and throughout the Gulf of Mexico. This species is regularly seen in the Gulf of Mexico with more than 25 individuals observed, and two individuals were tracked swimming along the Texas coastline off South Padre Island and Port Aransas, Texas. This species feeds on cuttlefish, squids, octopus, and other marine animals.			E		E			

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Dallas, Ellis	Birds	Black Rail	*Laterallus jamaicensis*	Black rails are year-round residents of the central and upper coast and migrants in the eastern part of the state. The species nests in salt, brackish, and freshwater marshes, pond borders, wet meadows, and wetlands with hydrophytic grass species. Water depth is an important and key habitat component, as the species typically is found where water is less than two to four centimeters deep. Other significant habitat factors may include vegetation density, distance to open water, and water regime stability. Nesting typically occurs in the highest sections of the marsh, which have mesic to hydric soils and are flooded by only the highest tides. Nests are built in areas with saturated or shallowly flooded soils and dense vegetation on damp ground, on mat of previous year's dead grasses, or over shallow water. In salt or brackish marshes, typical habitat includes dense stands of cordgrasses (*Spartina* sp.), spikegrasses (*Distichlis* sp.), and needlerush (*Juncus* sp.), or, in more upland saltbush communities along marsh edges. Typical freshwater habitat includes species such as cattail (*Typha*) and bulrush (*Scirpus* sp.). Non-breeding habitat is thought to be similar to breeding habitat.	N/A	In Texas, the Black Rail breeds and winters in high quality coastal marsh and prairie. The project area is outside the breeding and wintering ranges of this species. Suitable habitat for migratory Black Rails may be present; however, any use of that habitat would be incidental and ephemeral.	T	No effect or take	T	No impact	The project area does not contain suitable breeding or wintering habitat for the Black Rail. Any use of potential migratory stopover habitat within the project area would be incidental and ephemeral.	N
Dallas	Birds	Golden-cheeked Warbler	*Setophaga (=Dendroica) chrysoparia*	This migratory species breeds in central Texas along the Balcones Escarpment on the eastern edge of the Edwards Plateau and ranges from southwest of Fort Worth to northeast of Del Rio. Breeding habitat consists of juniper-oak woodlands dominated by Ashe juniper (*Juniperus ashei*) and various oak (*Quercus* sp.) species and deciduous trees found in areas with steep slopes, canyon heads, draws, and adjacent ridgetops. The species is dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are generally placed in upright forks of mature Ashe junipers or various deciduous species. Occupied sites usually contain junipers at least 40 years old.	N	Isolated pockets of secondary growth juniper were present. Mature Ashe junipers not observed. Therefore, appropriate breeding habitat is not present. Geology within the action area is largely clay or clay loam. No limestone plateaus were observed in the area and the age-class of the Ashe junipers was too young to be considered appropriate habitat. The action area of the Golden-cheeked Warbler for Dallas county consists of the project area and a 300 ft buffer around the project area.	E	No effect or take	E	No impact	Habitat is not present for this species within the action area.	N

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Dallas	Birds	Least Tern - Interior breeding population	*Sternula (=Sterna) antillarum (Breeding)*	The interior population (subspecies *athalassos*) of the Least Tern nests on bare or sparsely vegetated sand, shell, and gravel beaches, sandbars, islands, and salt flats associated with inland rivers and reservoirs. It occasionally nests on man-made structures such as sand and gravel pits or gravel rooftops. Preferred habitat includes sand and gravel bars within a wide unobstructed river channel, or open flats along shorelines of lakes and reservoirs. Colony sites can move annually, depending on landscape disturbance and vegetation growth at established colonies. It is known to nest at three reservoirs along the Rio Grande River, on the Canadian River in the northern Panhandle, and along the Red River.	N	While perennial streams are present within the project area, they are smaller and incised and do not contain suitable bars (large) or braided channels suitable for least terns.	—	N/A	E	No impact	Habitat is not present for this species within the project area.	N
Ellis	Birds	Least Tern - Migratory	*Sternula (=Sterna) antillarum*	The interior population (subspecies *athalassos*) of the Least Tern nests on bare or sparsely vegetated sand, shell, and gravel beaches, sandbars, islands, and salt flats associated with inland rivers and reservoirs. It occasionally nests on man-made structures such as sand and gravel pits or gravel rooftops. Preferred habitat includes sand and gravel bars within a wide unobstructed river channel, or open flats along shorelines of lakes and reservoirs. Colony sites can move annually, depending on landscape disturbance and vegetation growth at established colonies. It is known to nest at three reservoirs along the Rio Grande River, on the Canadian River in the northern Panhandle, and along the Red River.	N/A	The project area is outside the breeding and wintering range of this species. Although suitable stopover habitat may be present, Least Tern is not expected to regularly occur and any use of this habitat would be incidental.	—	N/A	E	No impact	The project area does not contain suitable breeding or wintering habitat for the Least Tern.	N
Dallas, Ellis	Birds	Piping Plover - Migratory	*Charadrius melodus*	This migratory species overwinters in Texas, where it occurs on beaches, ephemeral sand flats, barrier islands, sand, mud, algal flats, washover passes, salt marshes, lagoons, and dunes along the Gulf Coast and adjacent offshore islands, including spoil islands in the Intracoastal Waterway. Algal flats appear to be the highest quality habitat because of their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low or very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast.	N/A	The list of federally threatened and endangered species indicates that based on the project location within the migratory route, effects to Piping Plover only need be considered for wind energy projects. The project area is outside the breeding and wintering range of this species. Although suitable stopover habitat may be present, Piping Plover is not expected to regularly occur and any use of this habitat would be incidental.	T	No effect or Take	T	No impact	The project is not a wind energy project within the migratory route and does not contain suitable breeding and wintering habitat for the Piping Plover.	N

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Dallas, Ellis	Birds	Red Knot - Migratory	*Calidris canutus rufa*	The species is a winter resident and migrant in Texas. It is primarily found in marine habitats such as sandy beaches, salt marshes, lagoons, mudflats of estuaries and bays, and mangrove swamps during winter months. It primarily occurs along the Gulf coast on tidal flats and beaches and less frequently in marshes and flooded fields. It has occasionally been observed along shorelines of large lakes and freshwater marshes.	N/A	The list of federally threatened and endangered species indicates that based on the project location within the migratory route, effects to Red Knot only need be considered for wind energy projects. The project area is outside the breeding and wintering range of this species. Although suitable stopover habitat may be present, Red Knot is not expected to regularly occur and any use of this habitat would be incidental.	T	No effect or Take	T	No impact	The project is not a wind energy project within the migratory route and does not contain suitable breeding and wintering habitat for the Red Knot.	N
Dallas, Ellis	Birds	White-faced Ibis	*Plegadis chihi*	The species is found in the Western Gulf Coastal Plains ecoregion of Texas. Preferred habitat includes freshwater wetlands, marshes, ponds, rivers, irrigated land, and sloughs, but it occasionally forages in brackish or saltwater marshes. It nests in marshes in low trees, on the ground in bulrushes (Scirpus sp.) or reeds, or on floating mats.	Y	Ponds and impoundments in the central portion of the project area are suitable habitat.	—	N/A	T	May impact	Suitable habitat is present for this species within the project area, therefore, the proposed project may impact this species. Bird BMP will be implemented to minimize or avoid impacts to this species.	N

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Dallas, Ellis	Birds	Whooping Crane	*Grus americana*	The species breeds in Canada and winters on the Texas coast at Aransas National Wildlife Refuge. During migration it typically stops to rest and feed in open bottomlands of large rivers and marshes but, like other waterbirds, it may also utilize flooded croplands, playas, large wetlands associated with lakes, small ponds, and various other aquatic features. Typical migration habitat includes sites with good horizontal visibility, water depth of 30 centimeters or less, and minimum wetland size of 0.04 hectare for roosting.	N	No marsh habitat was observed within the action area. Though wetlands are present within the action area, they are generally small and not associated with larger bodies of water. Although this species may utilize smaller aquatic features in the project area for migratory stopover, any use of this habitat would be incidental. The action area of the Whooping Crane for Dallas and Ellis counties is the same as the project area.	E	No effect or take	E	No impact	Habitat is not present for this species within the action area.	N
Dallas, Ellis	Birds	Wood Stork	*Mycteria americana*	The species breeds in Mexico, and nesting sites have not been recorded in Texas since 1960. However, post-breeding migrants disperse into Texas in the summer. Foraging habitat includes freshwater prairie ponds, flooded pastures or fields, ditches, and other shallow standing water with an open canopy, occasionally including brackish wetlands. The species typically roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries).	Y	Ponds and impoundments in the central portion of the project area are suitable habitat.	—	N/A	T	May impact	Suitable habitat is present for this species within the project area, therefore, the proposed project may impact this species. Bird BMP will be implemented to minimize or avoid impacts to this species.	N

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Dallas, Ellis	Insects	Monarch Butterfly	*Danaus plexippus*	Found statewide. Adults are found in a variety of habitats including native prairies, pastures, open woodlands and savannas, desert scrub, roadsides, and other habitats with abundant nectar plants, including urbanized areas. Although adults may be present year round, they are primarily encountered between March and November, and are most commonly observed in the summer and fall during breeding and migration. Caterpillars are found on various species of the family Asclepiadaceae (occasionally treated as a subfamily of Apocynaceae). Common host plants in Texas include milkweeds (Asclepias spp.) milkweed vines (Matelea spp.), climbing milkweed (Funastrum spp.), swallowworts (Cynanchum spp.) and Anglepod (Gonolobus suberosus). Caterpillars are most frequently observed between April and September."	Y	Maintained ROW could harbor numerous nectar-producing plant species suitable for Monarch Butterfly caterpillars.	C	May affect	—	N/A	This species is currently a candidate species, and no consultation with USFWS is required at this time. However, as the project is not proposed for letting until (or after as appropriate) FY 2024 when the species is anticipated to be proposed for federal listing, additional coordination may be required at that time for the Monarch Butterfly. Further analysis and any potential coordination needed for this species will be revisited and further analyzed if/when the species becomes proposed for federal listing. Insect Pollinator BMP will be implemented to minimize or avoid impacts to this	N

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Dallas, Ellis	Mollusks	Louisiana Pigtoe	*Pleurobema riddellii*	Freshwater mussel currently found in the Sabine, Neches, and Trinity River basins in Texas. The species occurs in streams to medium-sized rivers with moderate flow. In Texas, the species has only been documented occurring in relatively shallow lotic waters with preferable substrate being sand and sand with gravel and silt. It is not generally known to tolerate impoundments.	Y	Perennial streams within the project area (Red Oak Creek, Little Creek, and Sanders Branch) as well as intermittent streams with perennial pools (unnamed tributaries to Red Oak Creek and Little Creek) are within the Trinity River Watershed and could provide suitable habitat for this mussel species. Red Oak Creek within the project area is listed as Stream Group 5 as described in the Texas Freshwater Mussel Survey Protocol.	—	N/A	T	May impact	Suitable habitat is present for this species within the project area, therefore, the proposed project may impact this species. Freshwater Mussel BMP, Water Quality BMP, and Stream Crossings BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Mollusks	Sandbank Pocketbook	*Lampsilis satura*	A freshwater mussel that is currently limited to the Upper Trinity, Neches, Sabine, and San Jacinto River basins in Texas. The species occurs in flowing small to large rivers with gravel, gravel-sand, and sand substrates. It has been observed in littoral areas with snags, gravel, or sand substrate with slow to moderate currents, as well as lotic waters in substrates of sand, silty sand, and sand and clay mixture.	Y	Perennial streams within the project area (Red Oak Creek, Little Creek, and Sanders Branch) as well as intermittent streams with perennial pools (unnamed tributaries to Red Oak Creek and Little Creek) are within the Trinity River Watershed and could provide suitable habitat for this mussel species. Red Oak Creek within the project area is listed as Stream Group 5 as described in the Texas Freshwater Mussel Survey Protocol.	—	N/A	T	May impact	Suitable habitat is present for this species within the project area, therefore, the proposed project may impact this species. Freshwater Mussel BMP, Water Quality BMP, and Stream Crossings BMP will be implemented to minimize or avoid impacts to this species.	N

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Dallas, Ellis	Mollusks	Texas Fawnsfoot	*Truncilla macrodon*	A freshwater mussel that is currently limited to the Brazos, Colorado, and Trinity River basins in Texas. The species occupies large streams to medium rivers and is intolerant of impoundment. Little is known about the species due to lack of representative specimens, however it is thought that the species prefers protected areas near shore in water with a moderate current over mud, sandy mud, and gravel substrates. It is also found in perennial irrigation canals for rice.	Y	Perennial streams within the project area (Red Oak Creek, Little Creek, and Sanders Branch) as well as intermittent streams with perennial pools (unnamed tributaries to Red Oak Creek and Little Creek) are within the Trinity River Watershed and could provide suitable habitat for this mussel species. Red Oak Creek within the project area is listed as Stream Group 5 as described in the Texas Freshwater Mussel Survey Protocol.	PT	May affect	T	May impact	Suitable habitat is present for this species within the project area, therefore, the proposed project may impact this species. Freshwater Mussel BMP, Water Quality BMP, and Stream Crossings BMP will be implemented to minimize or avoid impacts to this species. This species is currently a proposed threatened species, and no consultation with USFWS is required at this time. However, as the project is not proposed for letting until (or after) FY 2024, additional coordination may be required at that time for the Texas Fawnsfoot. Further analysis and any potential coordination	N

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Project Name: Loop 9
CSJ(s): some number

County	Taxon	Common Name	Scientific Name	Habitat	Suitable Habitat Present?	Explanation for determination regarding suitable habitat	Federal Status	Effect/Take Determination for Federally Listed Species	State Status	Impact Determination for State-Listed Species	Explanation for Effect/Take and/or Impact Determination	Presence/ Absence survey conducted?
Dallas, Ellis	Mollusks	Texas Heelsplitter	*Potamilus amphichaenus*	A freshwater mussel currently known from the Trinity, Neches, and Sabine River basins. The species occurs in small streams to medium rivers with sand or mud substrate. It is found in flowing water but not in riffles or shoals. It prefers quiet waters and can be found in reservoirs.	Y	Perennial streams within the project area (Red Oak Creek, Little Creek, and Sanders Branch) as well as intermittent streams with perennial pools (unnamed tributaries to Red Oak Creek and Little Creek) are within the Trinity River Watershed and could provide suitable habitat for this mussel species. Red Oak Creek within the project area is listed as Stream Group 5 as described in the Texas Freshwater Mussel Survey Protocol.	—	N/A	T	May impact	Suitable habitat is present for this species within the project area, therefore, the proposed project may impact this species. Freshwater Mussel BMP, Water Quality BMP, and Stream Crossings BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Mollusks	Trinity Pigtoe	*Fusconaia chunii*	This species of mussel was recently split from Texas Pigtoe and occurs in similar habitats. It is found in a variety of habitats but most common in riffles. It inhabits various substrates though most often sand, gravel, and cobble.	Y	Perennial streams within the project area (Red Oak Creek, Little Creek, and Sanders Branch) as well as intermittent streams with perennial pools (unnamed tributaries to Red Oak Creek and Little Creek) are within the Trinity River Watershed and could provide suitable habitat for this mussel species. Red Oak Creek within the project area is listed as Stream Group 5 as described in the Texas Freshwater Mussel Survey Protocol.	—	N/A	T	May impact	Suitable habitat is present for this species within the project area, therefore, the proposed project may impact this species. Freshwater Mussel BMP, Water Quality BMP, and Stream Crossings BMP will be implemented to minimize or avoid impacts to this species.	N

County	Taxon	Common Name	Scientific Name	Habitat	Suitable Habitat Present?	Explanation for determination regarding suitable habitat	Federal Status	Effect/Take Determination for Federally Listed Species	State Status	Impact Determination for State-Listed Species	Explanation for Effect/Take and/or Impact Determination	Presence/ Absence survey conducted?
Dallas, Ellis	Reptiles	Alligator Snapping Turtle	*Macrochelys temminckii*	Occurs in East Texas where it inhabits perennial water bodies such as the deep water of rivers, canals, lakes, and oxbows, along with swamps, bayous, and ponds near deep running water. Preferred habitat is usually in water with a mud bottom and abundant aquatic vegetation, but the species may use sand-bottomed creeks.	Y	Smaller tributaries to the Trinity River, including Red Oak Creek and Little Creek are within the Trinity River Watershed and could be considered habitat. While bedrock areas are generally not considered habitat, impoundments and areas with appropriate sediment could harbor Macrochelys.	PT	May affect	T	May impact	Suitable habitat is present for this species within the project area, therefore, the proposed project may impact this species. The Aquatic Amphibian and Reptile BMP and Water Quality BMP will be implemented to minimize or avoid impacts to this species, as well as minimize impacts to wetland and riverine habitats. No consultation with USFWS is required at this time. However, as the project is not proposed for letting until (or after) FY 2024, additional coordination may be required at that time for the alligator snapping turtle. Further analysis and any potential	N
Dallas, Ellis	Reptiles	Texas Horned Lizard	*Phrynosoma cornutum*	The species is found in semi-arid open areas with scattered vegetation comprised of bunchgrass, cacti, yucca, mesquite, acacia, juniper, or other woody shrubs and small trees commonly found in loose sandy or loamy soils.	N	Arid areas with sparse vegetation were not observed within the project area. Likely extirpated from this area of Texas.	—	N/A	T	No impact	Habitat is not present for this species within the project area.	N

SPECIES ANALYSIS SUMMARY (ADDENDUM)
Project Name: Loop 9
CSJ(s): some number

County	Taxon	Common Name	Scientific Name	Habitat	Suitable Habitat Present?	Explanation for determination regarding suitable habitat	Federal Status	Effect/Take Determination for Federally Listed Species	State Status	Impact Determination for State-Listed Species	Explanation for Effect/Take and/or Impact Determination	Presence/ Absence survey conducted?
N/A	Birds	Golden-cheeked Warbler	*Setophaga chrysoparia*	Golden-cheeked warbler was removed from the Dallas RTEST list dated 7/12/2022.								
N/A	Birds	Interior Least Tern	*Sternula antillarum athalassos*	The Interior Least Tern was removed from the Dallas and Ellis RTEST list dated 7/12/2022.								
Dallas, Ellis	Birds	Sprague's Pipit	*Anthus spragueii*	Sprague's Pipit was added to the Dallas and Ellis RTEST list dated 7/12/2022 as an SGCN. Only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.	N	While disturbed prairie was identified within the project area, native intact prairie systems were not.	N/A	N/A	—	N/A	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N

SPECIES ANALYSIS SUMMARY (SGCN)
Project Name: Loop 9
CSJ(s): some number

County	Taxon	Common Name	Scientific Name	Habitat	Suitable Habitat Present?	Explanation for determination regarding suitable habitat	Impact Determination for SGCNs	Explanation for Impact Determination	Presence/ Absence survey conducted?
Dallas	Amphibians	eastern tiger salamander	*Ambystoma tigrinum*	Terrestrial adults generally occur under cover objects or in burrows surrounding a variety of lentic freshwater habitats, such as ponds, lakes, bottomland wetlands, or upland ephemeral pools. The specific terrestrial habitats are also varied and the occurrence of this species seems to be more closely associated with sandy, loamy or other soils which have easy burrowing properties, rather than any particular ecological system type. Requires fishless breeding pools for successful reproduction.	N	Suitable wetland habitats and appropriate sandy soils were not observed in the project area.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N
Ellis	Amphibians	southern crawfish frog	*Lithobates areolatus areolatus*	Terrestrial and aquatic: The terrestrial habitat is primarily grassland and can vary from pasture to intact prairie; it can also include small prairies in the middle of large forested areas. Aquatic habitat is any body of water but preferred habitat is ephemeral wetlands.	N	Recent intensive field surveys have shown crawfish frogs to be extant in Texas in ephemeral, prairie pothole wetlands (and in some cases depressions in open woods) within high quality or remnant prairie, usually unplowed. Appropriate habitat was not observed during desktop and field investigations.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N
Dallas	Amphibians	spotted dusky salamander	*Desmognathus conanti*	This species occurs in association with aquatic habitats in forested areas. Small, clear, spring fed streams with sandy substrate bordered with ferns and moss as well as murky, stagnant water bodies in cypress swamps, baygalls, and flood plains in bottomland forests support populations of this species.	N	Appropriate forested, stream-fed stream habitats were not observed in the project area.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N
Dallas, Ellis	Amphibians	Strecker's chorus frog	*Pseudacris streckeri*	Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates.	Y	Likely marginal habitat but disturbed and recovered prairie with ephemeral water could provide habitat for a small population. Sandy Loam substrates were identified within the project area.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Aquatic Amphibian and Reptile BMP, Terrestrial Amphibian and Reptile BMP, Water Quality BMP, and Vegetation BMP will be implemented to minimize or avoid impacts to this species.	N

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Dallas, Ellis	Amphibians	Woodhouse's toad	*Anaxyrus woodhousii*	Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied.	Y	While appropriate natural terrestrial habitat is not likely present within the project area, Woodhouse's toads are known to adapt to urban environments. Therefore, suitable habitat is present.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Aquatic Amphibian and Reptile BMP, Terrestrial Amphibian and Reptile BMP, Water Quality BMP, and Vegetation BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Birds	bald eagle	*Haliaeetus leucocephalus*	Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	Y	Lakes and mature trees are located along Red Oak Creek and its tributaries within the project area. No Eagles or nests were observed, but suitable Bald Eagle habitat is located within the project area.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Bird BMP will be implemented and compliance with the Bald and Golden Eagle Protection Act to minimize or avoid impacts to this species.	N
Dallas	Birds	black-capped vireo	*Vireo atricapilla*	Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer	N	Isolated pockets of secondary growth juniper were present. Likely not appropriate breeding habitat. Mature Ashe junipers not observed. Geology within the project area is largely clay or clay loam. No limestone plateaus were observed in the area and the age-class of the Ashe junipers was too young to be considered appropriate habitat.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N
Dallas, Ellis	Birds	Chestnut-collared Longspur	*Calcarius ornatus*	Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands	N	Areas of open shortgrass with bare ground were not observed within the project area.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N
Dallas, Ellis	Birds	Franklin's gull	*Leucophaeus pipixcan*	This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.	N	Lake shores and appropriate wetland habitats were not observed in the project area.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N

County	Taxon	Common Name	Scientific Name	Habitat	Suitable Habitat Present?	Explanation for determination regarding suitable habitat	Impact Determination for SGCNs	Explanation for Impact Determination	Presence/ Absence survey conducted?
Dallas, Ellis	Birds	western burrowing owl	*Athene cunicularia hypugaea*	Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows	Y	Open, maintained urban areas with turf grass are suitable habitat for this species.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Bird BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas	Crustaceans	a cave obligate isopod	*Caecidotea bilineata*	Spring obligate. *Caecidotea bilineata* is known only from non-cave groundwater habitats in deposits of Cretaceous age. It is presumably a phreatobite. Fine scale habitat requirements unknown.	N	No cave or spring habitats are located within the project area. The one positive identification in the Invertebrate Zoology Collections of the Smithsonian National Museum of Natural History was in 1995 from a crayfish burrow in Parkhill Prairie in Collin County.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N
Dallas	Fish	american eel	*Anguilla rostrata*	Originally found in all river systems from the Red River to the Rio Grande. Aquatic habitats include large rivers, streams, tributaries, coastal watersheds, estuaries, bays, and oceans. Spawns in Sargasso Sea, larva move to coastal waters, metamorphose, and begin upstream movements. Females tend to move further upstream than males (who are often found in brackish estuaries). American Eel are habitat generalists and may be found in a broad range of habitat conditions including slow- and fast-flowing waters over many substrate types. Extirpation in upstream drainages attributed to reservoirs that impede upstream migration.	Y	Smaller tributaries to the Trinity River, such as Red Oak Creek and Little Creek within the project area, could provide suitable habitat. Although the watershed is likely dammed prior to access to the coast (Lake Livingston dam).	No impact	While suitable habitat is present the watershed is likely dammed prior to access to the coast, therefore, impacts are not anticipated. Fish BMP, Water Quality BMP, Stream Crossing BMP, and Dewatering BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas	Fish	Mississippi silvery minnow	*Hybognathus nuchalis*	Found in eastern Texas streams, from the Brazos River eastward and northward to the Red River; found in moderate current; silty, muddy, or rocky substrate. In Texas, adults likely to inhabit smaller tributary streams.	Y	Smaller tributaries to the Trinity River, such as Red Oak Creek and Little Creek within the project area, could provide suitable habitat.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Fish BMP, Water Quality BMP, Stream Crossing BMP, and Dewatering BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Mammals	big brown bat	*Eptesicus fuscus*	Any wooded areas or woodlands except south Texas. Riparian areas in west Texas.	Y	Riparian areas along Red Oak Creek and its tributaries as well as Little Creek and its tributaries could provide appropriate bat roosting habitat.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Bat BMP will be implemented to minimize or avoid impacts to this species.	N

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Dallas, Ellis	Mammals	cave myotis bat	*Myotis velifer*	Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (*Hirundo pyrrhonota*) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore.	Y	Cave habitat was not observed during the field and desktop evaluations, however old residential and commercial building could contain suitable habitat.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Bat BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Mammals	eastern red bat	*Lasiurus borealis*	Red bats are migratory bats that are common across Texas. They are most common in the eastern and central parts of the state, due to their requirement of forests for foliage roosting. West Texas specimens are associated with forested areas (cottonwoods). Also common along the coastline. These bats are highly mobile, seasonally migratory, and practice a type of wandering migration". Associations with specific habitat is difficult unless specific migratory stopover sites or wintering grounds are found. Likely associated with any forested area in East	Y	Riparian areas along Red Oak Creek and its tributaries as well as Little Creek and its tributaries could provide appropriate bat roosting habitat.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Bat BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Mammals	eastern spotted skunk	*Spilogale putorius*	Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges &; woodlands. Prefer wooded, brushy areas &; tallgrass prairies. S.p. ssp. *interrupta* found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available.	Y	Disturbed prairies, open fields, and croplands present within project area that could provide appropriate habitat.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. General Design and Construction BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Mammals	hoary bat	*Lasiurus cinereus*	Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways.	Y	Riparian areas along Red Oak Creek and its tributaries as well as Little Creek and its tributaries could provide appropriate bat roosting habitat.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Bat BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Mammals	long-tailed weasel	*Mustela frenata*	Includes brushlands, fence rows, upland woods and bottomland hardwoods, forest edges & rocky desert scrub. Usually live close to water.	Y	Riparian areas and impoundments in the central portion of the project area could constitute appropriate habitat.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. General Design and Construction BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Mammals	mountain lion	*Puma concolor*	Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones.	N	The project area is semi-urban and fragmented habitat. The project area does not contain contiguous tracks of habitat large enough to support mountain lions.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N

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Dallas, Ellis	Mammals	muskrat	*Ondatra zibethicus*	Found in fresh or brackish marshes, lakes, ponds, swamps, and other bodies of slow-moving water. Most abundant in areas with cattail. Dens in bank burrow or conical house of vegetation in shallow vegetated water. It is primarily found in the Rio Grande near El Paso and in SE Texas in the Houston area.	N	Appropriate marsh wetland habitats were not observed in the project area.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N
Dallas, Ellis	Mammals	southeastern myotis bat	*Myotis austroriparius*	Caves are rare in Texas portion of range; buildings, hollow trees are probably important. Historically, lowland pine and hardwood forests with large hollow trees; associated with ecological communities near water. Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures.	Y	Caves not observed in the project area; however, abandoned man-made structures and riparian areas were observed in the central portion of the project area that could harbor roosting bats.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Bat BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Mammals	swamp rabbit	*Sylvilagus aquaticus*	Primarily found in lowland areas near water including: cypress bogs and marshes, floodplains, creeks and rivers.	Y	Floodplains and creeks were observed withing the project area.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. General Design and Construction BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Mammals	tricolored bat	*Perimyotis subflavus*	Forest, woodland and riparian areas are important. Caves are very important to this species.	Y	Caves not observed in the project area; however, abandoned man-made structures and riparian areas were observed in the central portion of the project area that could harbor roosting bats.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Bat BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Mammals	western hog-nosed skunk	*Conepatus leuconotus*	Habitats include woodlands, grasslands & deserts, to 7200 feet, most common in rugged, rocky canyon country; little is known about the habitat of the ssp. Telmalestes	N	The project area is comprised of mostly eastern U.S. ecotones and is not appropriate habitat.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N
Dallas, Ellis	Reptiles	eastern box turtle	*Terrapene carolina*	Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enter pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures.	Y	A variety of habitats that are considered appropriate for box turtles were observed during field investigations, including disturbed prairie, riparian corridors, and forest.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Terrestrial Amphibian and Reptile BMP and Vegetation BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Reptiles	prairie skink	*Plestiodon septentrionalis*	The prairie skink can occur in any native grassland habitat across the Rolling Plains, Blackland Prairie, Post Oak Savanna and Pineywoods ecoregions.	N	Native grassland habitat was not observed in the project area.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N

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Dallas	Reptiles	pigmy rattlesnake	*Sistrurus miliarius*	The pygmy rattlesnake occurs in a variety of wooded habitats from bottomland coastal hardwood forests to upland savannas. The species is frequently found in association with standing water.	Y	Wooded habitats were observed within the project area.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Terrestrial Amphibian and Reptile BMP and Vegetation BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Reptiles	slender glass lizard	*Ophisaurus attenuatus*	Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil.	N	Appropriate dry, higher quality, sandy prairie was not observed during field and desktop evaluation.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N
Dallas, Ellis	Reptiles	Texas garter snake	*Thamnophis sirtalis annectens*	Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical.	Y	Riparian areas could be considered appropriate habitat.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Terrestrial Amphibian and Reptile BMP and Vegetation BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Reptiles	timber rattlesnake	*Crotalus horridus*	Terrestrial: Swamps, floodplains, upland pine and deciduous woodland, riparian zones, abandoned farmland. Limestone bluffs, sandy soil or black clay. Prefers dense ground cover, i.e. grapevines, palmetto.	Y	Floodplains, riparian zones, and farmlands are present within the project area.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Terrestrial Amphibian and Reptile BMP and Vegetation BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Reptiles	western box turtle	*Terrapene ornata*	Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.	Y	A variety of habitats that are considered appropriate for box turtles were observed during field investigations, including disturbed prairie, riparian corridors, and forest.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Terrestrial Amphibian and Reptile BMP and Vegetation BMP will be implemented to minimize or avoid impacts to this species.	N

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Dallas, Ellis	Reptiles	western chicken turtle	*Deirochelys reticularia miaria*	Aquatic and terrestrial: This species uses aquatic habitats in the late winter, spring and early summer and then terrestrial habitats the remainder of the year. Preferred aquatic habitats seem to be highly vegetated shallow wetlands with gentle slopes. Specific terrestrial habitats are not well known.	N	Shallow wetlands with gentle slopes were not observed in the project area.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N
Dallas	Reptiles	western massasauga	*Sistrurus tergeminus*	Terrestrial: Shortgrass or mixed grass prairie, with gravel or sandy soils. Often found associated with draws, floodplains, and more mesic habitats within the arid landscape. Frequently occurs in shrub encroached grasslands.	Y	Disturbed prairies, open fields, and shrub encroached grasslands present within project area that could provide appropriate habitat.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Terrestrial Amphibian and Reptile BMP and Vegetation BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Plants	Engelmann's bladderpod	*Physaria engelmannii*	Grasslands and calcareous rock outcrops in a band along the eastern edge of the Edwards Plateau, ranging as far north as the Red River (Carr 2015).	Y	An area of chalky, eroded soils was located immediately east of Joe Wilson Road within Alternatives 1-3 and potentially east of Red Oak Creek in Alternative 4. While no plants were observed, this area may represent appropriate habitat for the species. Field assessments occurred in January, April, May, October, and December of 2019 and February of 2022.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Rare Plant BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas	Plants	glandular gay-feather	*Liatris glandulosa*	Occurs in herbaceous vegetation on limestone outcrops (Carr 2015)	N	No limestone outcrops were observed in the project area. Field assessments occurred in January, April, May, October, and December of 2019 and February of 2022.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N
Dallas	Plants	Glass mountain coral-root	*Hexalectris nitida*	Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under *Juniperus ashei* in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; Perennial; Flowering June-Sept; Fruiting July-Sept	N	No mixed woodlands in canyons were observed in the project area. Field assessments occurred in January, April, May, October, and December of 2019 and February of 2022.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N

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Dallas	Plants	Glen rose yucca	*Yucca necopina*	Grasslands on sandy soils and limestone outcrops; flowering April-June	Y	An area of chalky, eroded soils was located immediately east of Joe Wilson Road within Alternatives 1-3 and potentially east of Red Oak Creek in Alternative 4. While no plants were observed, this area may represent appropriate habitat for the species. Field assessments occurred in January, April, May, October, and December of 2019 and February of 2022.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Rare Plant BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Plants	Hall's prairie clover	*Dalea hallii*	In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides; Perennial; Flowering May-Sept; Fruiting June-Sept	Y	An area of chalky, eroded soils was located immediately east of Joe Wilson Road within Alternatives 1-3 and potentially east of Red Oak Creek in Alternative 4. While no plants were observed, this area may represent appropriate habitat for the species. Field assessments occurred in January, April, May, October, and December of 2019 and February of 2022.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Rare Plant BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas	Plants	Oklahoma phlox	*Phlox oklahomensis*	Known from a 1958 collection from an oak woodland four miles east of Garland, Texas (Carr 2015).	N	High quality oak woodland habitat were not observed in the project area. Field assessments occurred in January, April, May, October, and December of 2019 and February of 2022.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N

County	Taxon	Common Name	Scientific Name	Habitat	Suitable Habitat Present?	Explanation for determination regarding suitable habitat	Impact Determination for SGCNs	Explanation for Impact Determination	Presence/ Absence survey conducted?
Dallas	Plants	Osage Plains false foxglove	*Agalinis densiflora*	Most records are from grasslands on shallow, gravelly, well drained, calcareous soils; Prairies, dry limestone soils; Annual; Flowering Aug-Oct	Y	An area of chalky, eroded soils was located immediately east of Joe Wilson Road within Alternatives 1-3 and potentially east of Red Oak Creek in Alternative 4. While no plants were observed, this area may represent appropriate habitat for the species. Field assessments occurred in January, April, May, October, and December of 2019 and February of 2022.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Rare Plant BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas	Plants	plateau milkvine	*Matelea edwardsensis*	Occurs in various types of juniper-oak and oak-juniper woodlands; Perennial; Flowering March-Oct; Fruiting May-June	Y	An area of chalky, eroded soils was located immediately east of Joe Wilson Road within Alternatives 1-3 and potentially east of Red Oak Creek in Alternative 4. While no plants were observed, this area may represent appropriate habitat for the species. Field assessments occurred in January, April, May, October, and December of 2019 and February of 2022.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Rare Plant BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas, Ellis	Plants	Sutherland hawthorn	*Crataegus viridis var. glabriuscula*	In mesic soils of woods or on edge of woods, treeline/fenceline, or thicket. Above\near creeks and draws, in river bottoms. Flowering Mar-Apr; fruiting May-Oct.	Y	Riparian corridors along the major stream intersections within the project area contain suitable habitat for this species. Field assessments occurred in January, April, May, October, and December of 2019 and February of 2022.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Rare Plant BMP will be implemented to minimize or avoid impacts to this species.	N

County	Taxon	Common Name	Scientific Name	Habitat	Suitable Habitat Present?	Explanation for determination regarding suitable habitat	Impact Determination for SGCNs	Explanation for Impact Determination	Presence/ Absence survey conducted?
Dallas	Plants	Texas milk vetch	*Astragalus reflexus*	Grasslands, prairies, and roadsides on calcareous and clay substrates; Annual; Flowering Feb-June; Fruiting April-June	Y	An area of chalky, eroded soils was located immediately east of Joe Wilson Road within Alternatives 1-3 and potentially east of Red Oak Creek in Alternative 4. While no plants were observed, this area may represent appropriate habitat for the species. Field assessments occurred in January, April, May, October, and December of 2019 and February of 2022.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Rare Plant BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas	Plants	tree dodder	*Cuscuta exaltata*	Parasitic on various Quercus, Juglans, Rhus, Vitis, Ulmus, and Diospyros species as well as *Acacia berlandieri* and other woody plants; Annual; Flowering May-Oct; Fruiting July-Oct	Y	Host plants were identified within the project area during the field evaluation. Field assessments occurred in January, April, May, October, and December of 2019 and February of 2022.	May impact	Suitable habitat is present for this species within the project area; therefore, the proposed project may impact this species. Rare Plant BMP will be implemented to minimize or avoid impacts to this species.	N
Dallas	Plants	Warnock's coral-root	*Hexalectris warnockii*	In leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons; in the Trans Pecos in oak pinyon-juniper woodlands in higher mesic canyons (to 2000 m [6550 ft]), primarily on igneous substrates; in Terrell County under Quercus fusiformis mottes on terraces of spring-fed perennial streams, draining an otherwise rather xeric limestone landscape; on the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County), and the Edwards Plateau in oak-juniper woodlands on limestone slopes; in Gillespie County on igneous substrates of the Llano Uplift; flowering June-September; individual plants do not usually bloom in successive years	N	Canyon type habitat was not observed during field evaluations. Field assessments occurred in January, April, May, October, and December of 2019 and February of 2022.	No impact	Habitat is not present for this species within the project area; therefore, impacts are not anticipated.	N

Form
Species Analysis

Project Name: **Loop 9, Segment A: US 67 to IH 35E**

CSJ(s): **2964-10-006**

County(ies): **Dallas and Ellis**

Date Analysis Completed: **3/17/2022**

Prepared by: **Andrew Austin - Ecosystem Planning and Restoration**

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 9, 2019, and executed by FHWA and TxDOT.

I. Endangered Species Act

Select the appropriate statement below based on the determinations recorded in the completed project-specific species analysis spreadsheet:

☒ This project does not require consultation with or authorization from the USFWS under the Endangered Species Act.

☐ This project requires consultation with or authorization from the USFWS under the Endangered Species Act.

For a project that requires federal authorization or approval, if the completed project-specific species analysis spreadsheet indicates, "May affect," for any species, then consultation with the USFWS is required under section 7 of the Endangered Species Act and the second checkbox above must be checked.

For more information regarding the Endangered Species Act, see **ENV's Endangered Species Act Handbook**.

II. TPWD Coordination

Select the appropriate statement below:

☒ This project requires an environmental assessment (EA) or environmental impact statement (EIS), and therefore must be coordinated with TPWD under the 2021 TxDOT/TPWD MOU.

☐ This project is a categorical exclusion (CE)-level project; therefore coordination with TPWD under the 2021 TxDOT/TPWD MOU is not required; however, it will be coordinated with TPWD under the 2021 TxDOT/TPWD MOU at the TxDOT district's discretion.

☐ This project is a categorical exclusion (CE)-level project; therefore coordination with TPWD under the 2021 TxDOT/TPWD MOU is not required and it will not be coordinated with TPWD under 2021 TxDOT/TPWD MOU at the TxDOT district's discretion.

For any project that will be coordinated with TPWD, completed the **Documentation of Texas Parks and Wildlife Department Best Management Practices Form**.

For more information regarding TPWD Coordination, see **ENV's Guidance: TPWD Coordination Under the 2021 Memorandum of Understanding**.

III. Bald and Golden Eagle Protection Act (BGEPA)

Select the appropriate statement below:

☒ This project is not within 660 feet of an active or inactive Bald or Golden Eagle nest. Therefore, no coordination with USFWS is required.

☐ This project is within 660 feet of an active or inactive Bald or Golden Eagle nest; however, construction activities within 660 feet will not occur during the nesting season, and the project will adhere to the National Bald Eagle Management Guidelines of 2007. Therefore, no coordination with USFWS is required.

☐ This project is within 660 feet of an active or inactive Bald or Golden Eagle nest, and construction within 660 feet will occur during the nesting season or the project will not adhere to the National Bald Eagle Management Guidelines of 2007. Therefore, coordination with USFWS to obtain a Non-Purposeful Take Permit is required.

For more information regarding BGEPA, see Section 7.0 of **ENV's Ecological Resources Handbook**.

IV. Migratory Bird Protections

This project will comply with applicable provisions of the Migratory Bird Treaty Act (MBTA) and Texas Parks and Wildlife Code Title 5, Subtitle B, Chapter 64, Birds. It is the department's policy to avoid removal and destruction of active bird nests except through federal or state approved options. In addition, it is the department's policy to, where appropriate and practicable:

- use measures to prevent or discourage birds from building nests on man-made structures within portions of the project area planned for construction, and
- schedule construction activities outside the typical nesting season.

For more information regarding migratory bird protections, see **ENV's Guidance: Avoiding Migratory Birds and Handling Potential Violations** and Section 3.0 of **ENV's Ecological Resources Handbook**.

V. Resources Consulted

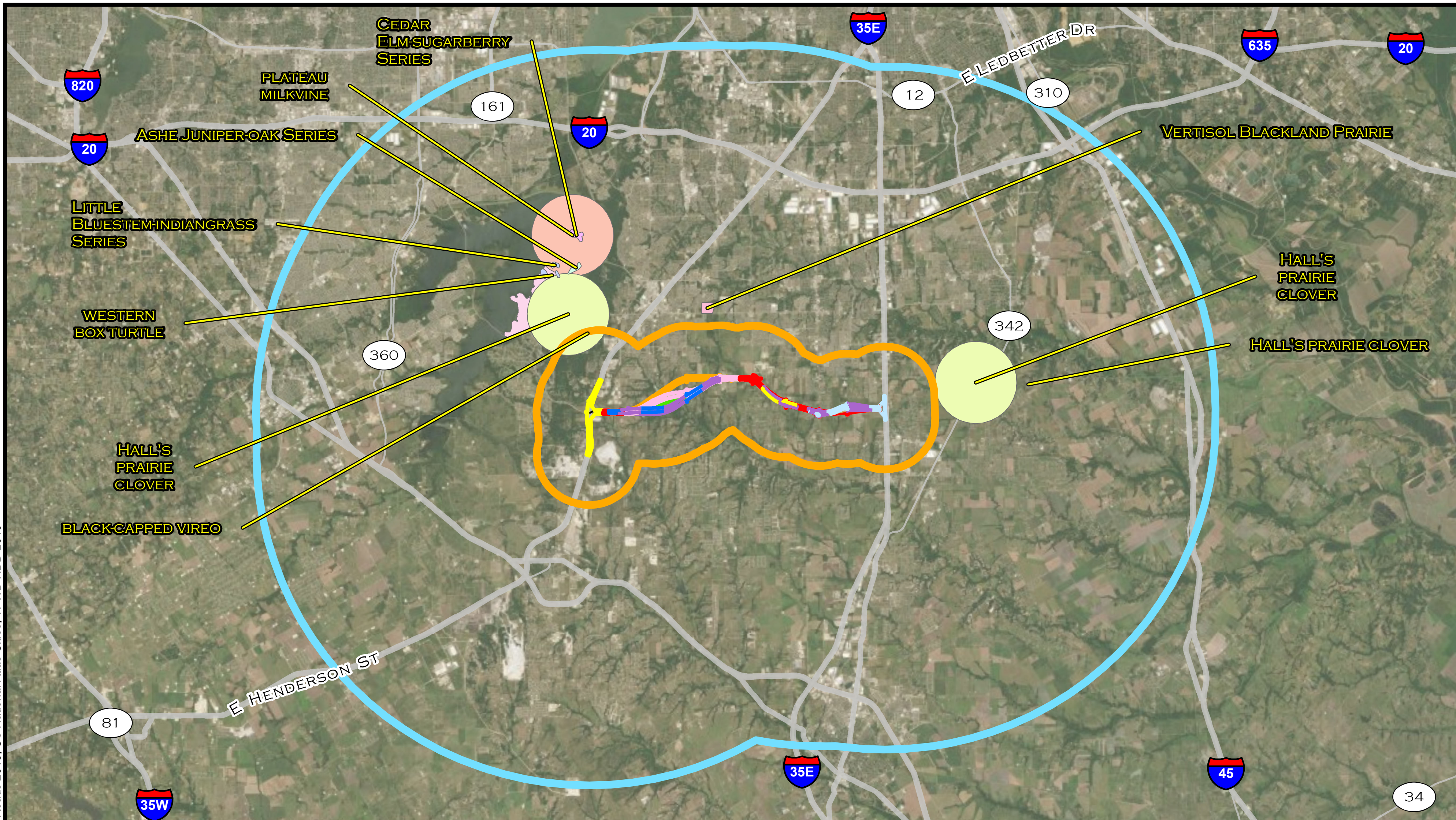
Indicate which resources were consulted/actions were taken to make the species analysis determinations recorded in this form (DO NOT ATTACH TO THIS FORM OR UPLOAD TO ECOS ANY RESOURCES CONSULTED – JUST CHECK THE APPROPRIATE BOX(ES)):

☒ Aerial Photography ☒ Topographic Map ☒ Natural Diversity Database (NDD)

☐ Karst Zone Maps ☒ Ecological Mapping System of Texas (EMST)

☒ Site Visit ☐ Species Expert Consulted ☐ Species Habitat or Presence/absence Survey

☐ Other:_____



Mod. Option A Proposed ROW
Mod. Option B Proposed ROW
Mod. Option C Proposed ROW
Mod. Option D Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW
US 67 Project Area (Evaluated Under Separate Document)
IH 35E Project Area (Evaluated Under Separate Document)
10-Mile Buffer
1.5-Mile Buffer
NDD Source Feature
Western box turtle
NDD Element Occurrence
Ashe juniper-oak Series
Cedar elm-sugarberry Series
Hall's prairie clover
Little bluestem-indiangrass Series
Vertisol blackland prairie
Black-capped vireo
Plateau milkvine

Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

NDD Database Search Map

Dallas & Ellis Counties County, Texas

Texas Department of Transportation

N

0 2 4 Miles

1:270,000

FIGURE 2

DATE:
March 2022

Sources: ESRI Imagery 2019; Open Street Map; TIGER Roads 2015; US National Atlas Cities, TPWD NDD 2019

Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\NDD\Fig2_NDD.mxd | Date: 3/2/2022 | Time: 9:47:24 AM | User Name: nhahn

Loop 9 Segment A NDD Search Results				
ID Number	**Common Name**	**Scientific Name**	**Listing Status**	**Buffer Zone**
3734	Black-capped vireo	*Vireo atricapilla*	SGCN	1.5
10990, 11074	Hall's prairie clover	*Dalea hallii*	SGCN	1.5
843	Cedar Elm-sugarberry Series	*Ulmus crassifolia-celtis laevigata* series	N/A	10
3061	Little Bluestem-indiangrass Series	*Schizachyrium scoparium-sorghastrum nutans series*	N/A	10
4433	Ashe Juniper-oak Series	*Juniperus ashei-quercus spp.* series	N/A	10
10140	Plateau milkvine	*Matelea edwardsensis*	SGCN	10
11920	Vertisol Blackland Prairie	*Schizachyrium scoparium - Sorghastrum nutans - Andropogon gerardii - Bifora americana Vertisol Grassland*	N/A	10
38283	Western box turtle	*Terrapene ornata*	SGCN	10

Element Occurrence Record

Scientific Name: Dalea hallii
Occurrence #: 5 **Eo Id:** 10990
Common Name: Hall's prairie clover
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G3 **State Rank:** S2
Federal Status:

Location Information:

Directions

2 mi W of Cedar Hill.

Survey Information:

First Observation: 1949-09-25 **Survey Date:** **Last Observation:** 1949-09-25

Eo Type: **Eo Rank:** H **Eo Rank Date:** 2006-12-07

Observed Area:

Comments:

General Description: On barren areas in Austin Chalk.

Comments: Complete label citation: 2 mi W of Cedar Hill, rare on barren areas in Austin Chalk, 25 Sep 1949, B. L. Turner 1485 (BRIT/SMU).

Protection Comments:

Management Comments:

Data:

EO Data: 1949: Described by collector as rare.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Turner, B.L. (1485). 1949. BRIT/SMU.

Specimen:

Turner, B.L. (1485). 1949. BRIT/SMU. (S49TURSMTXUS)

Element Occurrence Record

Scientific Name: Dalea hallii **Occurrence #:** 6 **Eo Id:** 11074
Common Name: Hall's prairie clover **Track Status:** Track all extant and selected historical EOs
Identification Confirmed: Y - Yes **TX Protection Status:**
Global Rank: G3 **State Rank:** S2 **Federal Status:**

Location Information:

Directions

Plants were observed approx. 2-2.5 miles south of Lancaster. The directions are generalized as this record consists of multiple observations, including a specimen.

Survey Information:

First Observation: 1948-09-26 **Survey Date:** 2015-09-15 **Last Observation:** 2015-09-15
Eo Type: **Eo Rank:** E **Eo Rank Date:** 2015-09-15
Observed Area:

Comments:

General Description: 1948: Gravelly soil, chalk slope. 15 Sep 2015: Species was found on a limestone bedrock outcropping with a significant presence of gravel adjacent to the riparian zone of an intermittent creek which feeds a large impoundment downstream. Topography was gently sloping towards the creek bed. Surrounding ecological communities included disturbed pasture land with introduced grass species, such as Bermudagrass (Cynodon dactylon) and yellow bluestem (Bothriochloa ischaemum), and various forbs and hardwood-evergreen scrubland dominated by live oak (Quercus virginiana), eastern red cedar (Juniperus virginiana), honey mesquite (Prosopis glandulosa), cedar elm (Ulmus crassifolia), black willow (Salix nigra), and possumhaw (Ilex decidua). Identifiable associated species included cusp blazing star (Liatris punctata var. mucronata).

Comments: Complete label citation: 2 mi SSW of Lancaster, gravelly soil, chalk slope, 26 Sep 1948, L. H. Shinners 10464 (BRIT/SMU). 15 Sep 2015: Other adjacent outcroppings were not surveyed for the presence of the plant.

Protection Comments:

Management Comments:

Data:

EO Data: 26 Sep 1948: A specimen was collected. 15 Sep 2015: Roughly five individuals were observed. Most were flowering, in fair health, but showed some signs of stress (browning, brittleness) likely from dry conditions and/or livestock traffic and grazing.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Barton, J. M. 2017. Texas Natural Diversity Database Reporting Form regarding an observation of Hall's prairie clover (Dalea hallii) on 15 September 2015, south of Lancaster, Dallas County.

Specimen:

Shinners, L.H. (10464). 1948. BRIT/SMU. (S48SHISMTXUS)

Element Occurrence Record

Scientific Name: Juniperus ashei-quercus spp. series
Occurrence #: 16 **Eo Id:** 4433
Common Name: Ashe Juniper-oak Series
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G4 **State Rank:** S4
Federal Status:

Location Information:

Directions

SLOPES ALONG EAST BOUNDARY OF CEDAR HILL SP

Survey Information:

First Observation: **Survey Date:** 1989-11-10 **Last Observation:** 1989-11-10

Eo Type: **Eo Rank:** C **Eo Rank Date:** 1989-11-10

Observed Area:

Comments:

General Description: BRUSHY WOODLAND, MODERATE TO LOW DIVERSITY; PATCHES OF POST OAK DOMINATE SMALL ERODING SHALE AREAS

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: DESCRIPTION AND PLANT LIST IN DLI REPORT, SITE 2

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

TEXAS PARKS & WILDLIFE DEPARTMENT. 1990. CEDAR HILL STATE PARK. SUMMARY OF REPRESENTATIVE PLANT COMMUNITIES.

Specimen:

Element Occurrence Record

Scientific Name: Matelea edwardsensis
Occurrence #: 13 **Eo Id:** 10140
Common Name: plateau milkvine
Track Status: Track all extant and selected historical EOs
Identification Confirmed:
TX Protection Status:
Global Rank: G3 **State Rank:** S3
Federal Status:

Location Information:

Directions

Cedar Hill State Park.

Survey Information:

First Observation: 19-- **Survey Date:** 19-- **Last Observation:** 19--

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments: Note that this is the only broadleaf milkvine reported from this park. Matelea reticulata was not reported from Dallas County by Diggs, Lipscomb & O'Kennon (1999). See photos and story in: Woodward, W. 1999. Fire to flower. Texas Parks & Wildlife Magazine, November 1999, pp 26-29.

Protection Comments:

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Baldon, P. 1995. Cedar Hill State Park, Dallas County, Texas: preliminary checklist of vascular plants. March 1995 draft. Texas Parks and Wildlife Department, Austin, Texas.

Specimen:

Element Occurrence Record

Scientific Name: Schizachyrium scoparium - Sorghastrum nutans - Andropogon gerardii - Bifora americana Vertisol Grassland

Occurrence #: 30 **Eo Id:** 11920

Common Name: Vertisol Blackland Prairie

Track Status: Track all extant and selected historical EOs

Identification Confirmed: Y - Yes

TX Protection Status:

Global Rank: G1G2 **State Rank:** SNR

Federal Status:

Location Information:

Directions

The site is located approximately 4.0 air miles almost directly south of Duncanville, 3.5 air miles directly west of Desoto, and 2.0 air miles east of Cedar Hill, on the north side of Belt Line Road/FM 1382. The directions were created by database staff.

Survey Information:

First Observation: 2009-03-21 **Survey Date:** 2009-03-21 **Last Observation:** 2009-03-21

Eo Type: **Eo Rank:** E **Eo Rank Date:** 2009-03-21

Observed Area:

Comments:

General Description: 21 March 2009: There is a small stream that runs through the site. See the Composition Tab for other species within the area.

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: 21 March 2009: One plant community site of unknown quality grass species; Forb species are poor quality; Exotic species are present; Woody cover is greater than 75 percent.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:
Andropogon gerardii	Herb (field)	Y	Graminoid	SFID:25751
Bifora americana	Herb (field)	Y	Flowering forb	SFID:25751
Juniperus virginiana	Tree (canopy & subcanopy)	Y	Needle-leaved tree	SFID:25751
Schizachyrium scoparium	Herb (field)	Y	Graminoid	SFID:25751
Sorghastrum nutans	Herb (field)	Y	Graminoid	SFID:25751

Reference:

Element Occurrence Record

Citation:

Native Prairies Association of Texas. 2011. Tallgrass prairie survey project that includes shapefiles, excel files, documents, images, and protocol for multiple counties in Texas (2000-2013).

Specimen:

Element Occurrence Record

Scientific Name: Schizachyrium scoparium-sorghastrum nutans series
Occurrence #: 31 **Eo Id:** 3061
Common Name: Little Bluestem-indiangrass Series
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G2 **State Rank:** S2
Federal Status:

Location Information:

Directions

AT THE END OF A DEAD END ROAD IN CEDAR HILL STATE PARK OFF BELT LINE ROAD

Survey Information:

First Observation: 1984 **Survey Date:** 1989-11-10 **Last Observation:** 1989-11-10

Eo Type: **Eo Rank:** BC **Eo Rank Date:**

Observed Area:

Comments:

General Description: UNBROKEN SOD WITH MANY NATIVE SPECIES AND SOME INVASION OF JOHNSONGRASS IN PATCHES

Comments: ONLY FAIR CONDITION; MADGE GATLIN ALSO KNOWS HOW TO GET TO THIS SITE

Protection Comments:

Management Comments: ACTIVE MANAGEMENT REQUIRED TO REDUCE MESQUITE COVER - BURN?

Data:

EO Data: DESCRIPTION AND PRELIMINARY PLANT LIST FOR ONE PORTION OF OCCURRENCE IN DLI REPORT, SITE 1

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

TEXAS PARKS & WILDLIFE DEPARTMENT. 1990. CEDAR HILL STATE PARK. SUMMARY OF REPRESENTATIVE PLANT COMMUNITIES.

RISKIND, DAVID H. 1984. FILES OF DAVID RISKIND.

Specimen:

Element Occurrence Record

Scientific Name: Ulmus crassifolia-celtis laevigata series
Occurrence #: 25 **Eo Id:** 843
Common Name: Cedar Elm-sugarberry Series
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G2G3 **State Rank:** S4
Federal Status:

Location Information:

Directions

TERRACES ALONG JOHN PENN BRANCH, BOTH SIDES OF OLD ROUTE 1382, CA. THREE-QUARTER MILE NORTHEAST OF ENTRANCE TO CEDAR HILL SP

Survey Information:

First Observation: **Survey Date:** 1989-11-10 **Last Observation:** 1989-11-10

Eo Type: **Eo Rank:** C **Eo Rank Date:** 1989-11-10

Observed Area:

Comments:

General Description: DECIDUOUS BOTTOMLAND FOREST WITH BURR OAK, CEDAR ELM, SUGARBERRY; CORALBERRY COMMON IN UNDERSTORY

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: DESCRIPTION AND PLANT LIST IN DLI REPORT, SITE 3

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

TEXAS PARKS & WILDLIFE DEPARTMENT. 1990. CEDAR HILL STATE PARK. SUMMARY OF REPRESENTATIVE PLANT COMMUNITIES.

Specimen:

Element Occurrence Record

Scientific Name: Vireo atricapilla
Occurrence #: 14 **Eo Id:** 3734
Common Name: black-capped vireo
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G3 **State Rank:** S3B
Federal Status:

Location Information:

Directions

IMMEDIATELY BELOW THE RADIO TOWER, DALLAS COUNTY, JUST NORTH OF KINGSWOOD AND JUST SOUTH OF TELEVISION ANTENNAE, STATION KRLD

Survey Information:

First Observation: **Survey Date:** **Last Observation:** 1984-SUMM

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description: JUNIPER-OAK WOODLAND

Comments: SITE BEARS FURTHER EXAMINATION & PERHAPS FIELD VERIFICATION.

Protection Comments:

Management Comments:

Data:

EO Data: NO DATA AVAILABLE AS TO NUMBERS OF INDIVIDUALS, SUCCESS OF BREEDING ACTIVITY OR CONDITION OF HABITAT.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

STANFORD, GEOFFREY. 1985-01-31. TELEPHONE CONVERSATION WITH DR. STANFORD, DIRECTOR OF THE GREENHILLS ENVIRONMENTAL CENTER, ON 31 JAN. 1985 AT 10:00 A.M., PH-214/296-1955. 7575 WHEATFIELD ROAD, DALLAS, TX 75249.

Specimen:

Occurrence List for Quads Surrounding Request Area

Scientific Name:	Common Name:	Occurrence Number:	State Status:	Federal Status:	Eo Id:
Dalea hallii	Hall's prairie clover	5			10990
Dalea hallii	Hall's prairie clover	6			11074
Fusconaia chunii	Trinity Pigtoe	56	T		12359
Hexalectris nitida	Glass Mountains coral-root	8			4082
Hexalectris warnockii	Warnock's coral-root	5			5234
Matelea edwardsensis	plateau milkvine	13			10140
Pleurobema riddellii	Louisiana Pigtoe	22	T		12360
Rookery		468			561
Rookery		469			7930
Rookery		474			1439
Rookery		477			6868
Schizachyrium scoparium - Sorghastrum nutans - Andropogon gerardii - Bifora americana Vertisol Grassland	Vertisol Blackland Prairie	29			11919
Schizachyrium scoparium - Sorghastrum nutans - Andropogon gerardii - Bifora americana Vertisol Grassland	Vertisol Blackland Prairie	83			11973
Schizachyrium scoparium-sorghastrum nutans series	Little Bluestem-indiangrass Series	27			588
Schizachyrium scoparium-sorghastrum nutans series	Little Bluestem-indiangrass Series	31			3061
Spilogale putorius	eastern spotted skunk	5			12604

Scientific Name:	Common Name:	Occurrence Number:	State Status:	Federal Status:	Eo Id:
Ulmus crassifolia-celtis laevigata series	Cedar Elm-sugarberry Series	25			843
Vireo atricapilla	black-capped vireo	8			3327
Vireo atricapilla	black-capped vireo	63			3522

Last Update: 7/12/2022

DALLAS COUNTY

AMPHIBIANS

eastern tiger salamander *Ambystoma tigrinum*

Terrestrial adults generally occur under cover objects or in burrows surrounding a variety of lentic freshwater habitats, such as ponds, lakes, bottomland wetlands, or upland ephemeral pools. The specific terrestrial habitats are also varied and the occurrence of this species seems to be more closely associated with sandy, loamy or other soils which have easy burrowing properties, rather than any particular ecological system type. Requires fishless breeding pools for successful reproduction.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S3

spotted dusky salamander *Desmognathus conanti*

This species occurs in association with aquatic habitats in forested areas. Small, clear, spring fed streams with sandy substrate bordered with ferns and moss as well as murky, stagnant water bodies in cypress swamps, baygalls, and flood plains in bottomland forests support populations of this species.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S1

Strecker's chorus frog *Pseudacris streckeri*

Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S3

Woodhouse's toad *Anaxyrus woodhousii*

Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: SU

BIRDS

bald eagle *Haliaeetus leucocephalus*

Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S3B,S3N

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DALLAS COUNTY

BIRDS

black rail *Laterallus jamaicensis*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

black-capped vireo *Vireo atricapilla*

Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3B

chestnut-collared longspur *Calcarius ornatus*

Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

Franklin's gull *Leucophaeus pipixcan*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2N

piping plover *Charadrius melodus*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2N

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DALLAS COUNTY

BIRDS

rufa red knot *Calidris canutus rufa*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore. Bolivar Flats in Galveston County, sandy beaches Mustang Island, few on outer coastal and barrier beaches, tidal mudflats and salt marshes.

Federal Status: LT State Status: T SGCN: Y

Endemic: N Global Rank: G4T2 State Rank: S2N

Sprague's pipit *Anthus spragueii*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G3G4 State Rank: S3N

western burrowing owl *Athene cunicularia hypugaea*

Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G4T4 State Rank: S2

white-faced ibis *Plegadis chihi*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.

Federal Status: State Status: T SGCN: Y

Endemic: N Global Rank: G5 State Rank: S4B

whooping crane *Grus americana*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.

Federal Status: LE State Status: E SGCN: Y

Endemic: N Global Rank: G1 State Rank: S1S2N

wood stork *Mycteria americana*

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DALLAS COUNTY

BIRDS

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.

Federal Status: State Status: T SGCN: Y

Endemic: N Global Rank: G4 State Rank: SHB,S2N

CRUSTACEANS

No accepted common name *Caecidotea bilineata*

Spring obligate. Caecidotea bilineata is known only from non-cave groundwater habitats in deposits of Cretaceous age. It is presumably a phreatobite. Fine scale habitat requirements unknown.

Federal Status: State Status: SGCN: Y

Endemic: Y Global Rank: G2G3 State Rank: S1

FISH

american eel *Anguilla rostrata*

Originally found in all river systems from the Red River to the Rio Grande. Aquatic habtiats include large rivers, streams, tributaries, coastal watersheds, estuaries, bays, and oceans. Spawns in Sargasso Sea, larva move to coastal waters, metamorphose, and begin upstream movements. Females tend to move further upstream than males (who are often found in brackish estuaries). American Eel are habitat generalists and may be found in a broad range of habitat conditions including slow- and fast-flowing waters over many substrate types. Extirpation in upstream drainages attributed to reservoirs that impede upstream migration.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G4 State Rank: S4

Mississippi silvery minnow *Hybognathus nuchalis*

Found in eastern Texas streams, from the Brazos River eastward and northward to the Red River; found in moderate current; silty, muddy, or rocky substrate. In Texas, adults likely to inhabit smaller tributary streams.

Federal Status: State Status: SGCN: Y

Endemic: Global Rank: G5 State Rank: S4

INSECTS

American bumblebee *Bombus pensylvanicus*

Habitat description is not available at this time.

Federal Status: State Status: SGCN: Y

Endemic: Global Rank: G3G4 State Rank: SNR

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DALLAS COUNTY

INSECTS

Comanche harvester ant *Pogonomyrmex comanche*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G2G3	State Rank: S2

No accepted common name *Arethaea ambulator*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: GNR	State Rank: SNR

MAMMALS

big brown bat *Eptesicus fuscus*

Any wooded areas or woodlands except south Texas. Riparian areas in west Texas.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

cave myotis bat *Myotis velifer*

Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4G5	State Rank: S2S3

eastern red bat *Lasiurus borealis*

Red bats are migratory bats that are common across Texas. They are most common in the eastern and central parts of the state, due to their requirement of forests for foliage roosting. West Texas specimens are associated with forested areas (cottonwoods). Also common along the coastline. These bats are highly mobile, seasonally migratory, and practice a type of "wandering migration". Associations with specific habitat is difficult unless specific migratory stopover sites or wintering grounds are found. Likely associated with any forested area in East, Central, and North Texas but can occur statewide.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S4

eastern spotted skunk *Spilogale putorius*

Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S1S3

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DALLAS COUNTY

MAMMALS

hoary bat *Lasiurus cinereus*

Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G3G4 State Rank: S4

long-tailed weasel *Mustela frenata*

Includes brushlands, fence rows, upland woods and bottomland hardwoods, forest edges & rocky desert scrub. Usually live close to water.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S5

mountain lion *Puma concolor*

Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S2S3

muskrat *Ondatra zibethicus*

Found in fresh or brackish marshes, lakes, ponds, swamps, and other bodies of slow-moving water. Most abundant in areas with cattail. Dens in bank burrow or conical house of vegetation in shallow vegetated water. It is primarily found in the Rio Grande near El Paso and in SE Texas in the Houston area.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S5

southeastern myotis bat *Myotis austroriparius*

Caves are rare in Texas portion of range; buildings, hollow trees are probably important. Historically, lowland pine and hardwood forests with large hollow trees; associated with ecological communities near water. Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G4 State Rank: S3?

swamp rabbit *Sylvilagus aquaticus*

Primarily found in lowland areas near water including: cypress bogs and marshes, floodplains, creeks and rivers.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S5

tricolored bat *Perimyotis subflavus*

Forest, woodland and riparian areas are important. Caves are very important to this species.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G3G4 State Rank: S2

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DALLAS COUNTY

MAMMALS

western hog-nosed skunk *Conepatus leuconotus*

Habitats include woodlands, grasslands & deserts, to 7200 feet, most common in rugged, rocky canyon country; little is known about the habitat of the ssp. telmalestes

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G4 State Rank: S4

MOLLUSKS

Louisiana pigtoe *Pleurobema riddellii*

Occurs in small streams to large rivers in slow to moderate currents in substrates of clay, mud, sand, and gravel. Not known from impoundments (Howells 2010f; Randklev et al. 2013b; Troia et al. 2015). [Mussels of Texas 2019]

Federal Status: State Status: T SGCN: Y

Endemic: N Global Rank: G1G2 State Rank: S1

sandbank pocketbook *Lampsilis satura*

Occurs in small streams to large rivers in slow to moderate current in sandy mud to sand and gravel substrate. Can occur in a variety of habitats but most common in littoral habitats such as banks or backwaters or in protected areas along point bars (Randklev et al. 2013b; Randklev et al. 2014a; Troia et al. 2015). [Mussels of Texas 2019]

Federal Status: State Status: T SGCN: Y

Endemic: Global Rank: G2? State Rank: S1

Texas fawnsfoot *Truncilla macrodon*

Occurs in large rivers but may also be found in medium-sized streams. Is found in protected near shore areas such as banks and backwaters but also riffles and point bar habitats with low to moderate water velocities. Typically occurs in substrates of mud, sandy mud, gravel and cobble. Considered intolerant of reservoirs (Randklev et al. 2010; Howells 2010o; Randklev et al. 2014b,c; Randklev et al. 2017a,b). [Mussels of Texas 2019]

Federal Status: PT State Status: T SGCN: Y

Endemic: Y Global Rank: G1 State Rank: S2

Texas heelsplitter *Potamilus amphichaenus*

Occurs in small streams to large rivers in standing to slow-flowing water; most common in banks, backwaters and quiet pools; adapts to some reservoirs. Often found in soft substrates such as mud, silt or sand (Howells et al. 1996; Randklev et al. 2017a). [Mussels of Texas 2019]

Federal Status: State Status: T SGCN: Y

Endemic: N Global Rank: G1G3 State Rank: S1

Trinity pigtoe *Fusconaia chunii*

Found in a variety of habitats but most common in riffles. Inhabits various substrates though most often sand, gravel, and cobble (species was recently split from Texas Pigtoe and occurs in similar habitats; Howells 2010a; Randklev et al. 2013b; Randklev et al. 2014a; Troia et al 2015). [Mussels of Texas 2020]

Federal Status: State Status: T SGCN: Y

Endemic: Y Global Rank: GNR State Rank: S1

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DALLAS COUNTY

REPTILES

alligator snapping turtle *Macrochelys temminckii*

Aquatic: Perennial water bodies; rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near running water; sometimes enters brackish coastal waters. Females emerge to lay eggs close to the waters edge.

Federal Status: State Status: T SGCN: Y

Endemic: N Global Rank: G3 State Rank: S2

eastern box turtle *Terrapene carolina*

Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S3

prairie skink *Plestiodon septentrionalis*

The prairie skink can occur in any native grassland habitat across the Rolling Plains, Blackland Prairie, Post Oak Savanna and Pineywoods ecoregions.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S2

pygmy rattlesnake *Sistrurus miliarius*

The pygmy rattlesnake occurs in a variety of wooded habitats from bottomland coastal hardwood forests to upland savannas. The species is frequently found in association with standing water.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S2S3

slender glass lizard *Ophisaurus attenuatus*

Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S3

Texas garter snake *Thamnophis sirtalis annectens*

Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical.

Federal Status: State Status: SGCN: Y

Endemic: Y Global Rank: G5T4 State Rank: S1

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DALLAS COUNTY

REPTILES

Texas horned lizard *Phrynosoma cornutum*

Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area.

Federal Status: State Status: T SGCN: Y

Endemic: N Global Rank: G4G5 State Rank: S3

timber (canebrake) rattlesnake *Crotalus horridus*

Terrestrial: Swamps, floodplains, upland pine and deciduous woodland, riparian zones, abandoned farmland. Limestone bluffs, sandy soil or black clay. Prefers dense ground cover, i.e. grapevines, palmetto.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G4 State Rank: S4

western box turtle *Terrapene ornata*

Terrestrial: Ornate or western box trutles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S3

western chicken turtle *Deirochelys reticularia miaria*

Aquatic and terrestrial: This species uses aquatic habitats in the late winter, spring and early summer and then terrestrial habitats the remainder of the year. Preferred aquatic habitats seem to be highly vegetated shallow wetlands with gentle slopes. Specific terrestrial habitats are not well known.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5T5 State Rank: S2S3

western massasauga *Sistrurus tergeminus*

Terrestrial: Shortgrass or mixed grass prairie, with gravel or sandy soils. Often found associated with draws, floodplains, and more mesic habitats within the arid landscape. Frequently occurs in shrub encroached grasslands.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G3G4 State Rank: S3

PLANTS

Engelmann's bladderpod *Physaria engelmannii*

Grasslands and calcareous rock outcrops in a band along the eastern edge of the Edwards Plateau, ranging as far north as the Red River (Carr 2015).

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G4 State Rank: S3

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DALLAS COUNTY

PLANTS

glandular gay-feather *Liatris glandulosa*

Occurs in herbaceous vegetation on limestone outcrops (Carr 2015)

Federal Status: State Status: SGCN: Y

Endemic: Y Global Rank: G3 State Rank: S2

Glass Mountains coral-root *Hexalectris nitida*

Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under Juniperus ashei in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; Perennial; Flowering June-Sept; Fruiting July-Sept

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G3 State Rank: S3

Glen Rose yucca *Yucca necopina*

Grasslands on sandy soils and limestone outcrops; flowering April-June

Federal Status: State Status: SGCN: Y

Endemic: Y Global Rank: G1G2 State Rank: S3

Hall's prairie clover *Dalea hallii*

In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides; Perennial; Flowering May-Sept; Fruiting June-Sept

Federal Status: State Status: SGCN: Y

Endemic: Y Global Rank: G3 State Rank: S2

Oklahoma phlox *Phlox oklahomensis*

Known from a 1958 collection from an oak woodland four miles east of Garland, Texas (Carr 2015).

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G3 State Rank: SH

Osage Plains false foxglove *Agalinis densiflora*

Most records are from grasslands on shallow, gravelly, well drained, calcareous soils; Prairies, dry limestone soils; Annual; Flowering Aug-Oct

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G3 State Rank: S2

plateau milkvine *Matelea edwardsensis*

Occurs in various types of juniper-oak and oak-juniper woodlands; Perennial; Flowering March-Oct; Fruiting May-June

Federal Status: State Status: SGCN: Y

Endemic: Y Global Rank: G3 State Rank: S3

Sutherland hawthorn *Crataegus viridis var. glabriuscula*

In mesic soils of woods or on edge of woods, treeline/fenceline, or thicket. Above\near creeks and draws, in river bottoms. Flowering Mar-Apr; fruiting May-Oct.

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DALLAS COUNTY

PLANTS

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G5T3T4 State Rank: S3

Texas milk vetch *Astragalus reflexus*

Grasslands, prairies, and roadsides on calcareous and clay substrates; Annual; Flowering Feb-June; Fruiting April-June

Federal Status: State Status: SGCN: Y
Endemic: Y Global Rank: G3 State Rank: S3

tree dodder *Cuscuta exaltata*

Parasitic on various Quercus, Juglans, Rhus, Vitis, Ulmus, and Diospyros species as well as Acacia berlandieri and other woody plants; Annual; Flowering May-Oct; Fruiting July-Oct

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G3 State Rank: S3

Warnock's coral-root *Hexalectris warnockii*

In leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons; in the Trans Pecos in oak-pinyon-juniper woodlands in higher mesic canyons (to 2000 m [6550 ft]), primarily on igneous substrates; in Terrell County under Quercus fusiformis mottes on terrraces of spring-fed perennial streams, draining an otherwise rather xeric limestone landscape; on the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County), and the Edwards Plateau in oak-juniper woodlands on limestone slopes; in Gillespie County on igneous substrates of the Llano Uplift; flowering June-September; individual plants do not usually bloom in successive years

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G2G3 State Rank: S2

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Last Update: 7/12/2022

ELLIS COUNTY

AMPHIBIANS

southern crawfish frog *Lithobates areolatus areolatus*

Terrestrial and aquatic: The terrestial habitat is primarily grassland and can vary from pasture to intact prairie; it can also include small prairies in the middle of large forested areas. Aquatic habitat is any body of water but preferred habitat is ephemeral wetlands.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G4T4 State Rank: S3

Strecker's chorus frog *Pseudacris streckeri*

Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S3

Woodhouse's toad *Anaxyrus woodhousii*

Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: SU

BIRDS

bald eagle *Haliaeetus leucocephalus*

Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S3B,S3N

black rail *Laterallus jamaicensis*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia

Federal Status: LT State Status: T SGCN: Y

Endemic: N Global Rank: G3 State Rank: S2

chestnut-collared longspur *Calcarius ornatus*

Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S3

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ELLIS COUNTY

BIRDS

Franklin's gull *Leucophaeus pipixcan*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S2N

piping plover *Charadrius melodus*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance.

Federal Status: LT State Status: T SGCN: Y

Endemic: N Global Rank: G3 State Rank: S2N

rufa red knot *Calidris canutus rufa*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore. Bolivar Flats in Galveston County, sandy beaches Mustang Island, few on outer coastal and barrier beaches, tidal mudflats and salt marshes.

Federal Status: LT State Status: T SGCN: Y

Endemic: N Global Rank: G4T2 State Rank: S2N

Sprague's pipit *Anthus spragueii*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G3G4 State Rank: S3N

western burrowing owl *Athene cunicularia hypugaea*

Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G4T4 State Rank: S2

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ELLIS COUNTY

BIRDS

white-faced ibis *Plegadis chihi*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4B

whooping crane *Grus americana*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.

Federal Status: LE	State Status: E	SGCN: Y
Endemic: N	Global Rank: G1	State Rank: S1S2N

wood stork *Mycteria americana*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: SHB,S2N

INSECTS

American bumblebee *Bombus pensylvanicus*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G3G4	State Rank: SNR

No accepted common name *Amblycorypha uhleri*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G2G3	State Rank: SNA

No accepted common name *Arethaea ambulator*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: GNR	State Rank: SNR

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ELLIS COUNTY

MAMMALS

big brown bat *Eptesicus fuscus*

Any wooded areas or woodlands except south Texas. Riparian areas in west Texas.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S5

cave myotis bat *Myotis velifer*

Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G4G5 State Rank: S2S3

eastern red bat *Lasiurus borealis*

Red bats are migratory bats that are common across Texas. They are most common in the eastern and central parts of the state, due to their requirement of forests for foliage roosting. West Texas specimens are associated with forested areas (cottonwoods). Also common along the coastline. These bats are highly mobile, seasonally migratory, and practice a type of "wandering migration". Associations with specific habitat is difficult unless specific migratory stopover sites or wintering grounds are found. Likely associated with any forested area in East, Central, and North Texas but can occur statewide.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G3G4 State Rank: S4

eastern spotted skunk *Spilogale putorius*

Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G4 State Rank: S1S3

hoary bat *Lasiurus cinereus*

Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G3G4 State Rank: S4

long-tailed weasel *Mustela frenata*

Includes brushlands, fence rows, upland woods and bottomland hardwoods, forest edges & rocky desert scrub. Usually live close to water.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S5

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ELLIS COUNTY

MAMMALS

mountain lion *Puma concolor*

Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S2S3

muskrat *Ondatra zibethicus*

Found in fresh or brackish marshes, lakes, ponds, swamps, and other bodies of slow-moving water. Most abundant in areas with cattail. Dens in bank burrow or conical house of vegetation in shallow vegetated water. It is primarily found in the Rio Grande near El Paso and in SE Texas in the Houston area.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S5

southeastern myotis bat *Myotis austroriparius*

Caves are rare in Texas portion of range; buildings, hollow trees are probably important. Historically, lowland pine and hardwood forests with large hollow trees; associated with ecological communities near water. Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G4 State Rank: S3?

swamp rabbit *Sylvilagus aquaticus*

Primarily found in lowland areas near water including: cypress bogs and marshes, floodplains, creeks and rivers.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S5

tricolored bat *Perimyotis subflavus*

Forest, woodland and riparian areas are important. Caves are very important to this species.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G3G4 State Rank: S2

western hog-nosed skunk *Conepatus leuconotus*

Habitats include woodlands, grasslands & deserts, to 7200 feet, most common in rugged, rocky canyon country; little is known about the habitat of the ssp. telmalestes

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G4 State Rank: S4

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ELLIS COUNTY

MOLLUSKS

Louisiana pigtoe *Pleurobema riddellii*

Occurs in small streams to large rivers in slow to moderate currents in substrates of clay, mud, sand, and gravel. Not known from impoundments (Howells 2010f; Randklev et al. 2013b; Troia et al. 2015). [Mussels of Texas 2019]

Federal Status: State Status: T SGCN: Y

Endemic: N Global Rank: G1G2 State Rank: S1

sandbank pocketbook *Lampsilis satura*

Occurs in small streams to large rivers in slow to moderate current in sandy mud to sand and gravel substrate. Can occur in a variety of habitats but most common in littoral habitats such as banks or backwaters or in protected areas along point bars (Randklev et al. 2013b; Randklev et al. 2014a; Troia et al. 2015). [Mussels of Texas 2019]

Federal Status: State Status: T SGCN: Y

Endemic: Global Rank: G2? State Rank: S1

Texas heelsplitter *Potamilus amphichaenus*

Occurs in small streams to large rivers in standing to slow-flowing water; most common in banks, backwaters and quiet pools; adapts to some reservoirs. Often found in soft substrates such as mud, silt or sand (Howells et al. 1996; Randklev et al. 2017a). [Mussels of Texas 2019]

Federal Status: State Status: T SGCN: Y

Endemic: N Global Rank: G1G3 State Rank: S1

Trinity pigtoe *Fusconaia chunii*

Found in a variety of habitats but most common in riffles. Inhabits various substrates though most often sand, gravel, and cobble (species was recently split from Texas Pigtoe and occurs in similar habitats; Howells 2010a; Randklev et al. 2013b; Randklev et al. 2014a; Troia et al 2015). [Mussels of Texas 2020]

Federal Status: State Status: T SGCN: Y

Endemic: Y Global Rank: GNR State Rank: S1

REPTILES

alligator snapping turtle *Macrochelys temminckii*

Aquatic: Perennial water bodies; rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near running water; sometimes enters brackish coastal waters. Females emerge to lay eggs close to the waters edge.

Federal Status: State Status: T SGCN: Y

Endemic: N Global Rank: G3 State Rank: S2

eastern box turtle *Terrapene carolina*

Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S3

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ELLIS COUNTY

REPTILES

prairie skink *Plestiodon septentrionalis*

The prairie skink can occur in any native grassland habitat across the Rolling Plains, Blackland Prairie, Post Oak Savanna and Pineywoods ecoregions.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S2

slender glass lizard *Ophisaurus attenuatus*

Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S3

Texas garter snake *Thamnophis sirtalis annectens*

Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical.

Federal Status: State Status: SGCN: Y

Endemic: Y Global Rank: G5T4 State Rank: S1

Texas horned lizard *Phrynosoma cornutum*

Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area.

Federal Status: State Status: T SGCN: Y

Endemic: N Global Rank: G4G5 State Rank: S3

timber (canebrake) rattlesnake *Crotalus horridus*

Terrestrial: Swamps, floodplains, upland pine and deciduous woodland, riparian zones, abandoned farmland. Limestone bluffs, sandy soil or black clay. Prefers dense ground cover, i.e. grapevines, palmetto.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G4 State Rank: S4

western box turtle *Terrapene ornata*

Terrestrial: Ornate or western box trutles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.

Federal Status: State Status: SGCN: Y

Endemic: N Global Rank: G5 State Rank: S3

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ELLIS COUNTY

REPTILES

western chicken turtle *Deirochelys reticularia miaria*

Aquatic and terrestrial: This species uses aquatic habitats in the late winter, spring and early summer and then terrestrial habitats the remainder of the year. Preferred aquatic habitats seem to be highly vegetated shallow wetlands with gentle slopes. Specific terrestrial habitats are not well known.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5T5	State Rank: S2S3

PLANTS

Engelmann's bladderpod *Physaria engelmannii*

Grasslands and calcareous rock outcrops in a band along the eastern edge of the Edwards Plateau, ranging as far north as the Red River (Carr 2015).

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3

Hall's prairie clover *Dalea hallii*

In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides; Perennial; Flowering May-Sept; Fruiting June-Sept

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S2

Sutherland hawthorn *Crataegus viridis var. glabriuscula*

In mesic soils of woods or on edge of woods, treeline/fenceline, or thicket. Above\near creeks and draws, in river bottoms. Flowering Mar-Apr; fruiting May-Oct.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5T3T4	State Rank: S3

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arlington Ecological Services Field Office
2005 Ne Green Oaks Blvd
Suite 140
Arlington, TX 76006-6247
Phone: (817) 277-1100 Fax: (817) 277-1129
Email Address: arles@fws.gov

In Reply Refer To: June 30, 2022
Project Code: 2022-0059763
Project Name: Loop 9, Segment A

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, which may occur within the boundary of your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under section 7(a)(1) of the Act, Federal agencies are directed to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Under and 7(a)(2) and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether their actions may affect threatened and endangered species and/or designated critical habitat. A Federal action is an activity or program authorized, funded, or carried out, in whole or in part, by a Federal agency (50 CFR 402.02).

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For Federal actions other than major construction activities, the Service suggests that a biological evaluation (similar to a Biological Assessment) be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

After evaluating the potential effects of a proposed action on federally listed species, one of the following determinations should be made by the Federal agency:

1. *No effect* - the appropriate determination when a project, as proposed, is anticipated to have no effects to listed species or critical habitat. A "no effect" determination does not require section 7 consultation and no coordination or contact with the Service is necessary. However, the action agency should maintain a complete record of their evaluation, including the steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related information.
2. *May affect, but is not likely to adversely affect* - the appropriate determination when a proposed action's anticipated effects to listed species or critical habitat are insignificant, discountable, or completely beneficial. Insignificant effects relate to the size of the impact and should never reach the scale where "take" of a listed species occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not be able to meaningfully measure, detect, or evaluate insignificant effects, or expect discountable effects to occur. This determination requires written concurrence from the Service. A biological evaluation or other supporting information justifying this determination should be submitted with a request for written concurrence.
3. *May affect, is likely to adversely affect* - the appropriate determination if any adverse effect to listed species or critical habitat may occur as a consequence of the proposed action, and the effect is not discountable or insignificant. This determination requires formal section 7 consultation.

The Service has performed up-front analysis for certain project types and species in your project area. These analyses have been compiled into *determination keys*, which allows an action agency, or its designated non-federal representative, to initiate a streamlined process for determining a proposed project's potential effects on federally listed species. The determination keys can be accessed through IPaC.

The Service recommends that candidate species, proposed species, and proposed critical habitat be addressed should consultation be necessary. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found at: https://www.fws.gov/service/section-7-consultations

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (https://www.fws.gov/library/collections/bald-and-golden-eagle-management). Additionally, wind energy projects should follow the wind energy guidelines (https://www.fws.gov/media/land-based-wind-energy-guidelines) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: https://www.fws.gov/media/recommended-best-practices-communication-tower-design-siting-construction-operation. For additional information concerning migratory birds and eagle conservation plans, please contact the Service's Migratory Bird Office at 505-248-7882.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Arlington Ecological Services Field Office
2005 Ne Green Oaks Blvd
Suite 140
Arlington, TX 76006-6247
(817) 277-1100

Project Summary

Project Code: 2022-0059763
Event Code: None
Project Name: Loop 9, Segment A
Project Type: Road/Hwy - New Construction
Project Description: Loop 9, Segment A, US 67 to IH 35E
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@32.55326975,-96.93337710263089,14z

Counties: Dallas and Ellis counties, Texas

Endangered Species Act Species

There is a total of 6 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Golden-cheeked Warbler *Setophaga chrysoparia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/33	Endangered
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. The location of the critical habitat is not available. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Whooping Crane *Grus americana* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/758	Endangered

Clams

NAME	STATUS
Texas Fawnsfoot *Truncilla macrodon* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/8965	Proposed Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

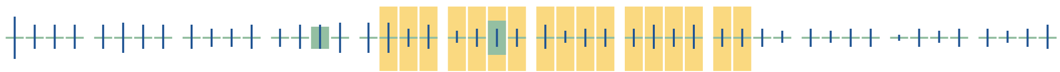
No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

■ probability of presence ■ breeding season | survey effort – no data

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Red-headed Woodpecker BCC Rangewide (CON)



Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

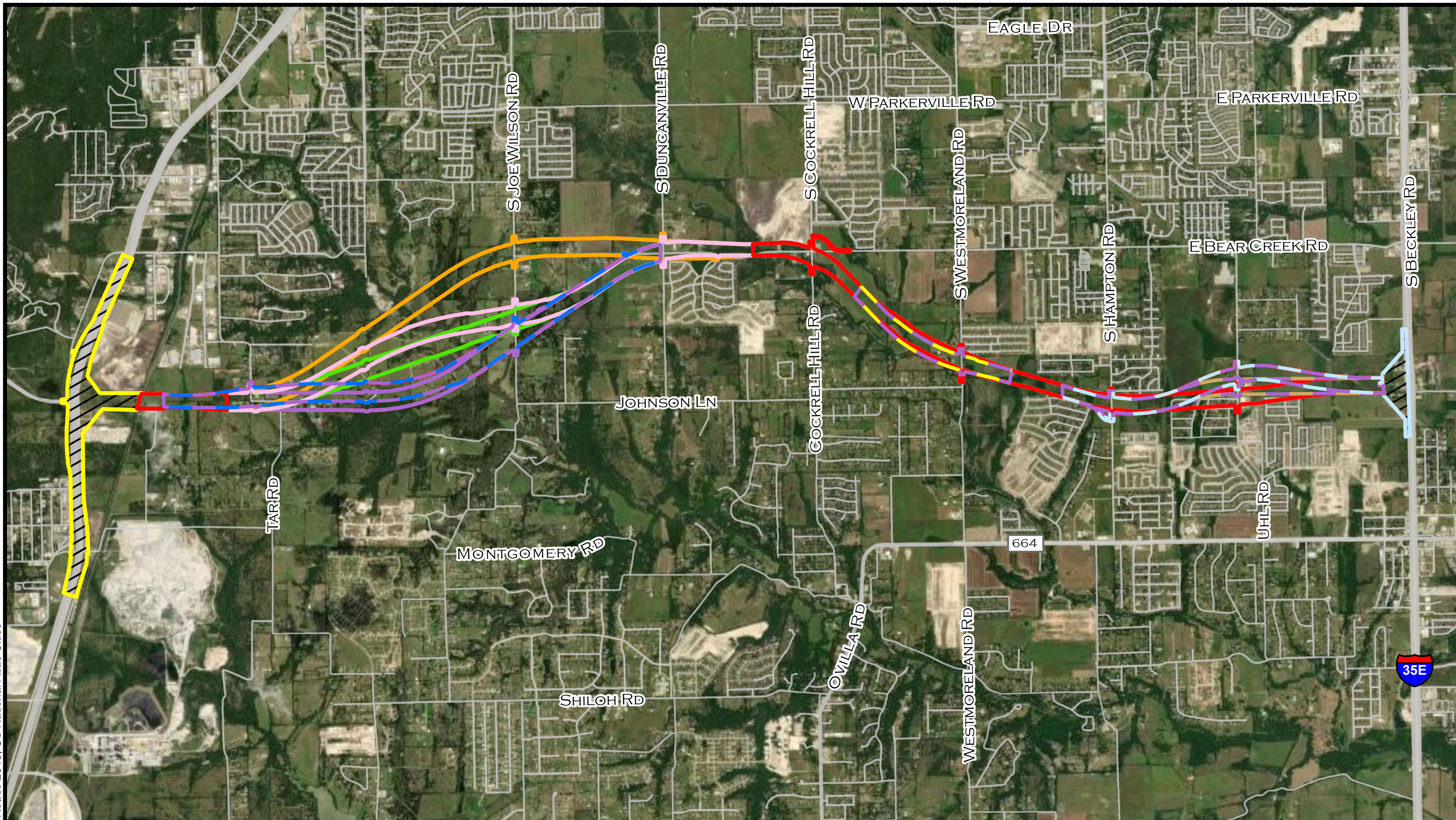
For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

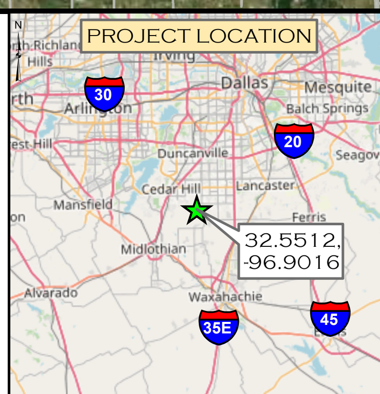
WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE VISIT HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

IPaC User Contact Information

Agency: Texas Department of Transportation
Name: Sally Clark
Address: 17575 North Eldridge Parkway Building C
City: Tomball
State: TX
Zip: 77377
Email sclark@eprusa.net
Phone: 8323993400



Mod. Option A Proposed ROW
Mod. Option B Proposed ROW
Mod. Option C Proposed ROW
Mod. Option D Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW
US 67 Project Area (Evaluated Under Separate Document)
IH 35E Project Area (Evaluated Under Separate Document)



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

Project Location Map

Dallas & Ellis Counties County, Texas

Texas Department of Transportation

N

0 2,500 5,000 Feet

1:60,000

FIGURE 1

DATE:
March 2022

Sources: ESRI Imagery 2021; Open Street Map; TIGER Roads 2015; US National Atlas Cities

Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\NDD\Fig1_project_location.mxd | Date: 3/2/2022 | Time: 9:49:51 AM | User Name: nhahn

Photo 1. Area within the Common Alignment mapped as Agriculture and Tallgrass Prairie in the EMST. Area observed as Agriculture only. Photo taken in January 2019.

Photo 2. Area within the Common Alignment mapped as Edwards Plateau Savannah, Woodland, and Shrubland in the EMST. Area observed as Edwards Plateau Savannah, Woodland, and Shrubland. Photo taken in January 2019.

Photo 3. Area within the eastern portion of the Common Alignment mapped as Disturbed Prairie in the EMST. Area observed as Disturbed Prairie. Photo taken in January 2019.

Photo 4. Area within the eastern portion of the Common Alignment mapped as Disturbed Prairie in the EMST. Area observed as Edwards Plateau Savannah, Woodland, and Shrubland. Photo taken in January 2019.

Photo 5. Unnamed tributary of Little Creek within the Common Alignment. Area mapped as Riparian on the EMST and observed as Open Water, with adjacent Riparian vegetation. Photo taken in January 2019.

Photo 6. Horse barn and pastures observed at the intersection of Bear Creek Road and South Duncanville Road. Area mapped as Urban on the EMST and observed as Urban. Photo taken in October 2019.

Photo 7. Maintained Right of Way observed within the Common Alignment along South Hampton Road. Area mapped as Urban on the EMST and observed as Urban. Photo taken in January 2019.

Photo 8. Area within Alternative 2 mapped as Edwards Plateau Savannah, Woodland, and Shrubland in the EMST. Area observed as Disturbed Prairie. Photo taken in April 2019.

Photo 9: A man-made pond, within Alternative 2. Area mapped as Floodplain in the EMST and observed as Open Water. Photo taken in April 2019.

Photo 10. Red Oak Creek within Alternative 3. Area mapped as Floodplain in the EMST and observed as Open Water, with adjacent Riparian vegetation. Photo taken in April 2019.

Photo 11. Area within Alternative 4 mapped as Edward Plateau Savanna, Woodlands, and Shrubland in the EMST. Area observed as Disturbed Prairie. Photo taken in January 2019.

Photo 12: Area within the Common Alignment mapped as Tallgrass Prairie in the EMST. Area observed as Edward Plateau Savanna, Woodlands, and Shrubland. Photo taken in February 2022.

Photo 13: Little Creek within the Common Alignment. Area mapped as Riparian on the EMST and observed as Open Water, with adjacent Riparian vegetation. Photo taken in February 2022.

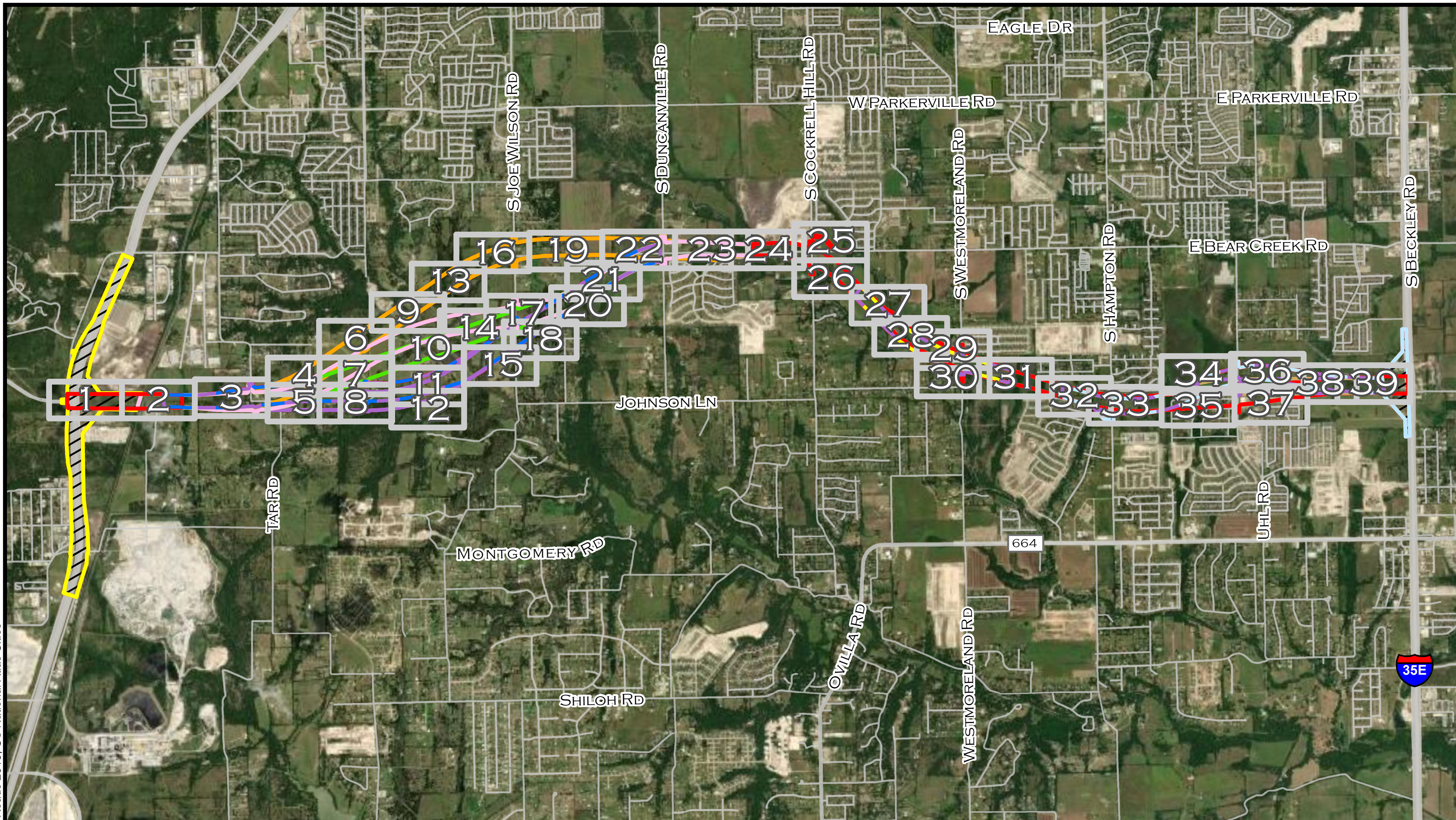
Photo 14: Red Oak Creek within the project area provides suitable habitat for freshwater mussel and reptile species, photo looking upstream. Photo taken in December 2019.

Photo 15: Little Creek within the project area provides suitable habitat for fish species, photo looking downstream. Photo taken in May 2022.

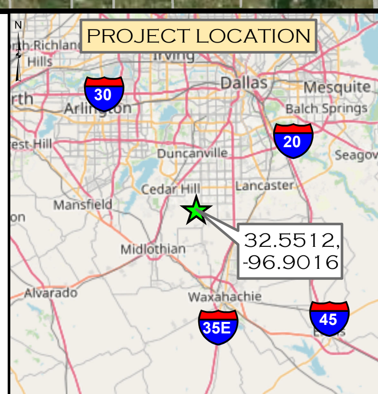
Photo 16: Ponds and impoundments in the central portion of the project area provides suitable habitat for bird species. Photo taken in January 2019.

Photo 17: Riparian areas along streams and creeks in the project area provide suitable habitat for certain mammal and reptile species. Photo taken in May 2022.

Photo 18: Floodplains within the project area provide suitable habitat for certain mammal species. Photo taken in April 2019.



Mod. Option A Proposed ROW
Mod. Option B Proposed ROW
Mod. Option C Proposed ROW
Mod. Option D Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW
US 67 Project Area (Evaluated Under Separate Document)
IH 35E Project Area (Evaluated Under Separate Document)



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Observed Habitat Type Map Overview

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 2,500 5,000 Feet

1:60,000

FIGURE 3

DATE:
July 2022

Sources: ESRI Imagery 2021; Open Street Map; TIGER Roads 2015; US National Atlas Cities

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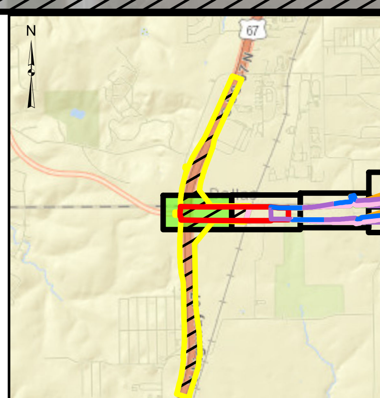
Disturbed Prairie
Riparian
Urban
Common Alignment Proposed ROW
US 67 Project Area (Evaluated Under Separate Document)



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 3
Sheet 1

DATE:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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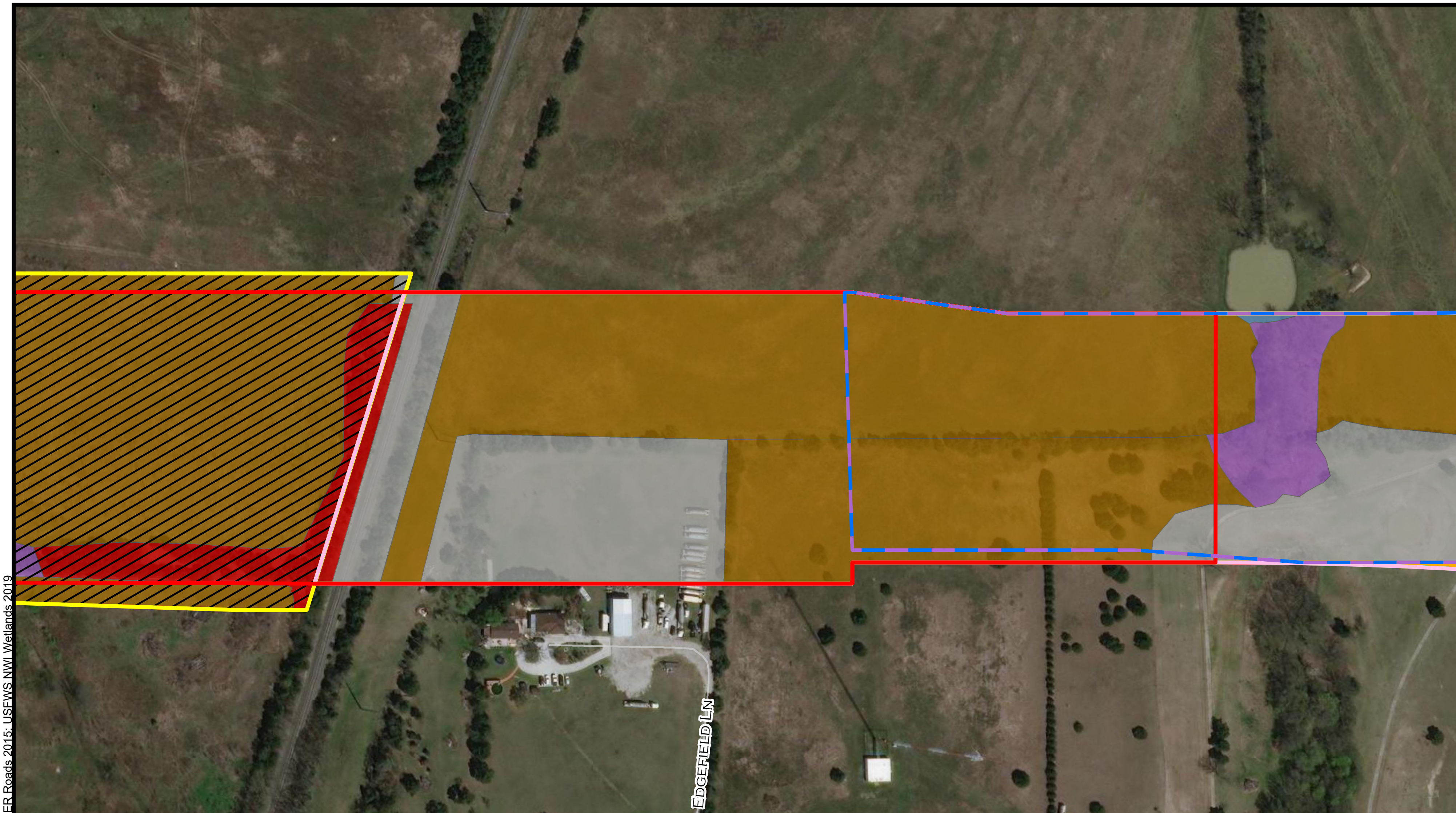

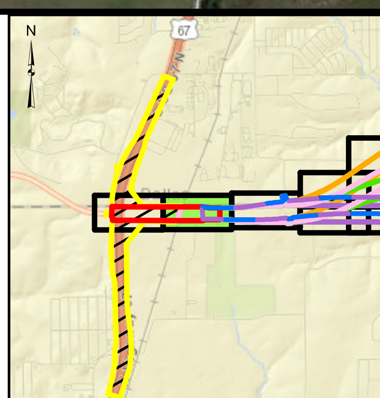

- Disturbed Prairie
- Edwards Plateau
- Open Water
- Riparian
- Urban
- Mod. Option D Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW
- US 67 Project Area (Evaluated Under Separate Document)

Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

Figure 3
Sheet 2

Date:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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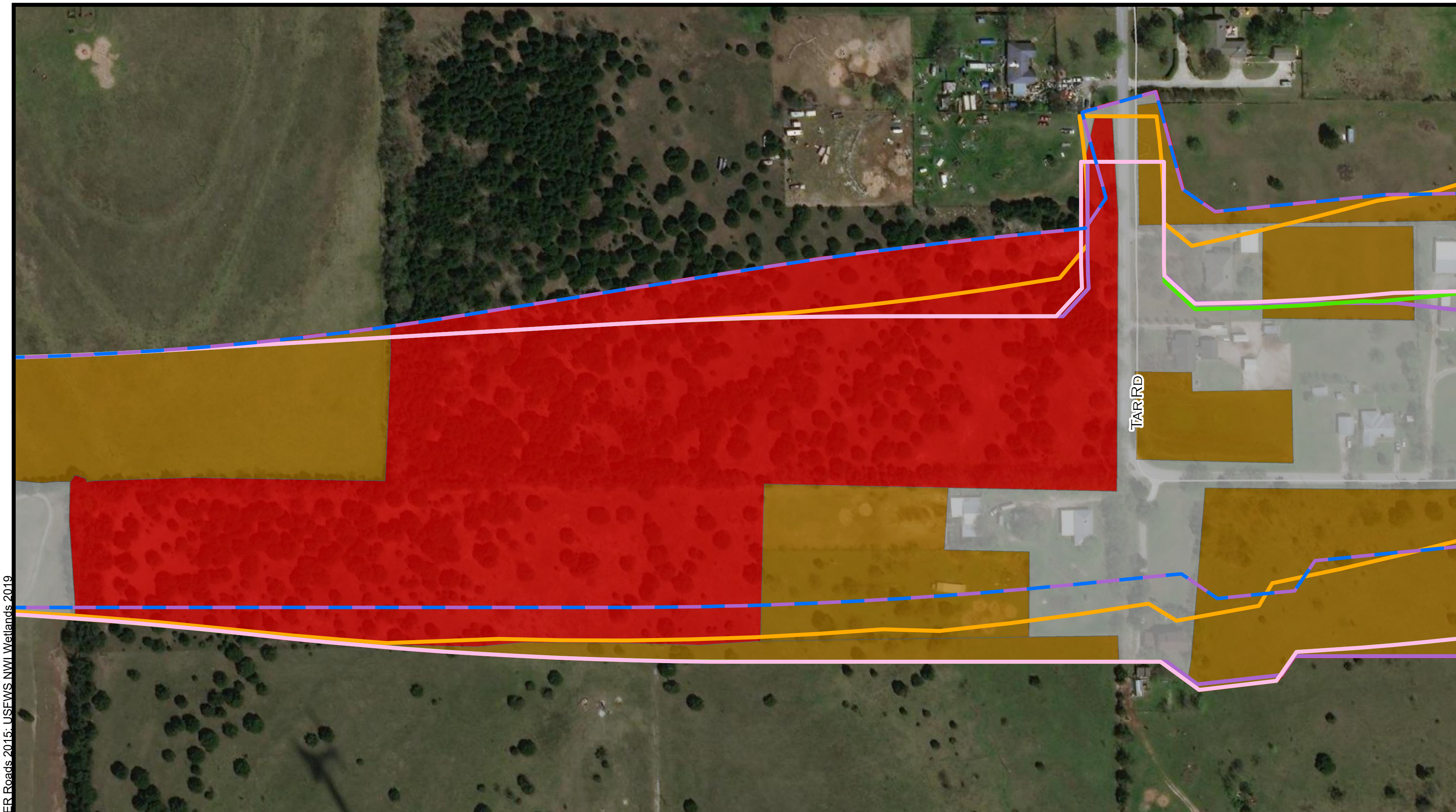
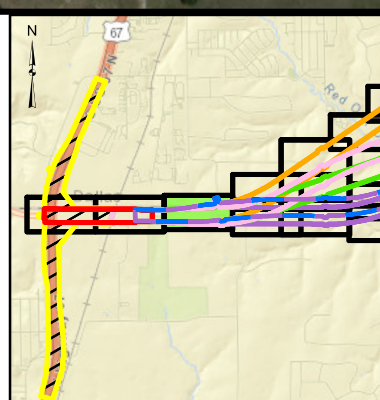


Disturbed Prairie
Edwards Plateau
Urban
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 3
SHEET 3

DATE:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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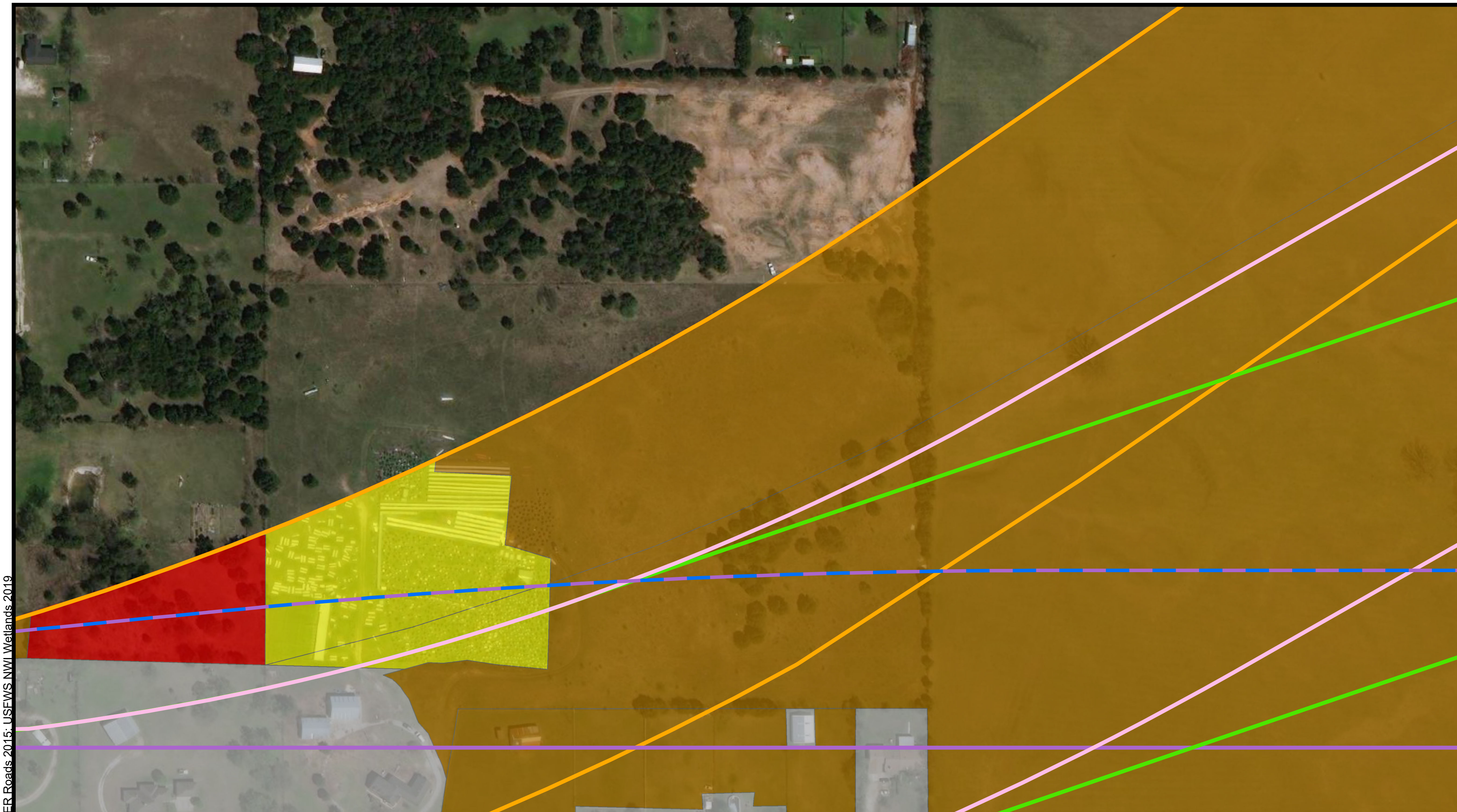
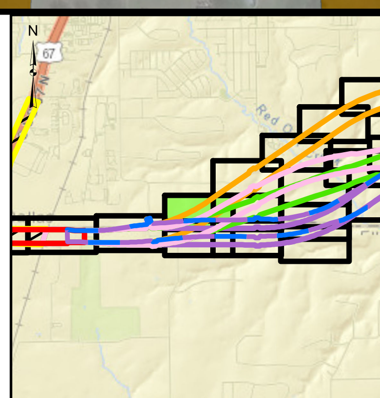


Agriculture
Disturbed Prairie
Edwards Plateau
Urban
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 3
SHEET 4

DATE:
JULY 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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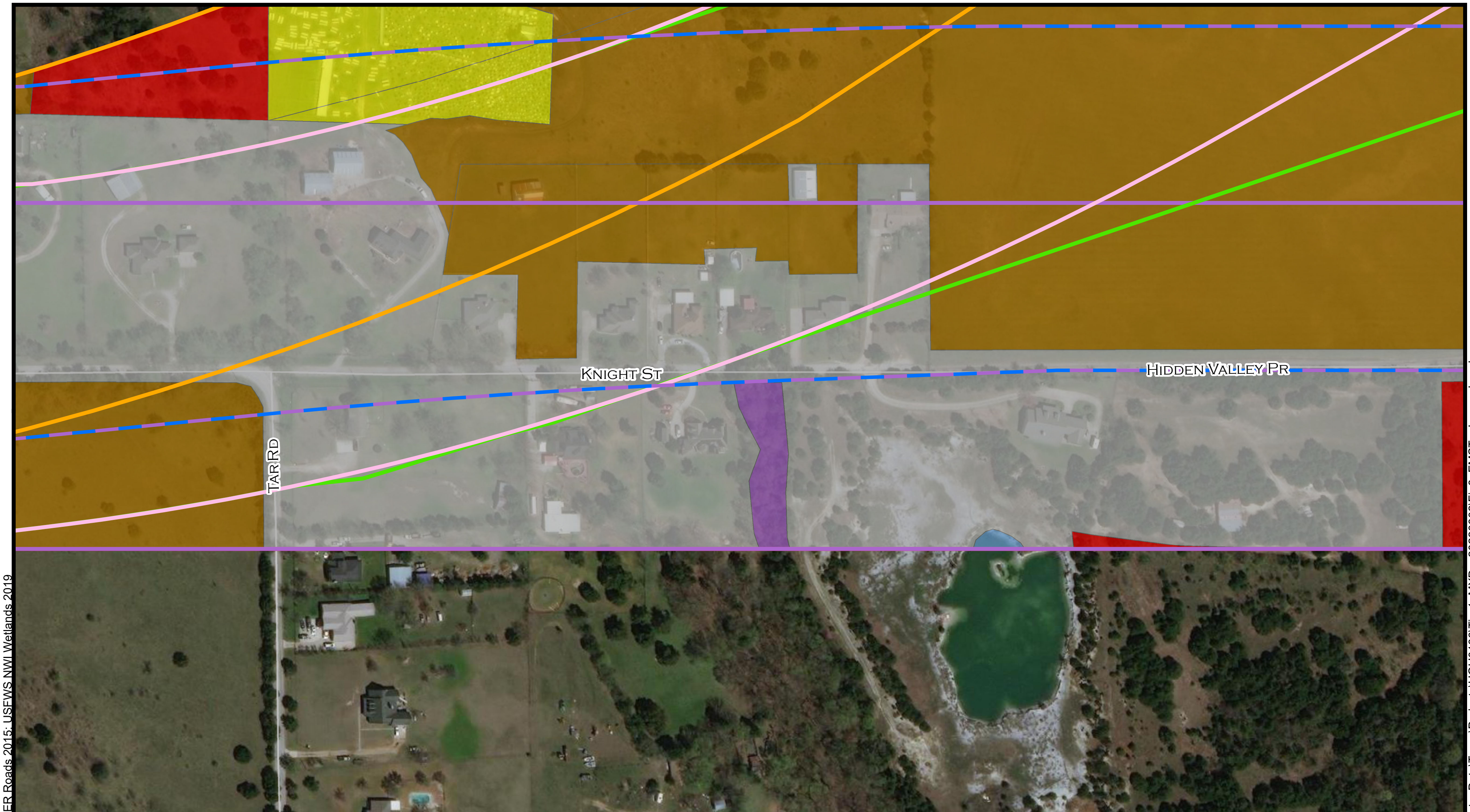
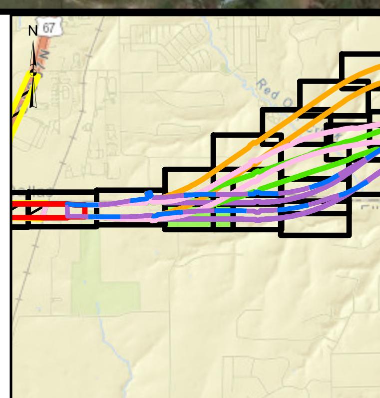


Agriculture
Disturbed Prairie
Edwards Plateau
Open Water
Riparian
Urban
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 3
SHEET 5

DATE:
JULY 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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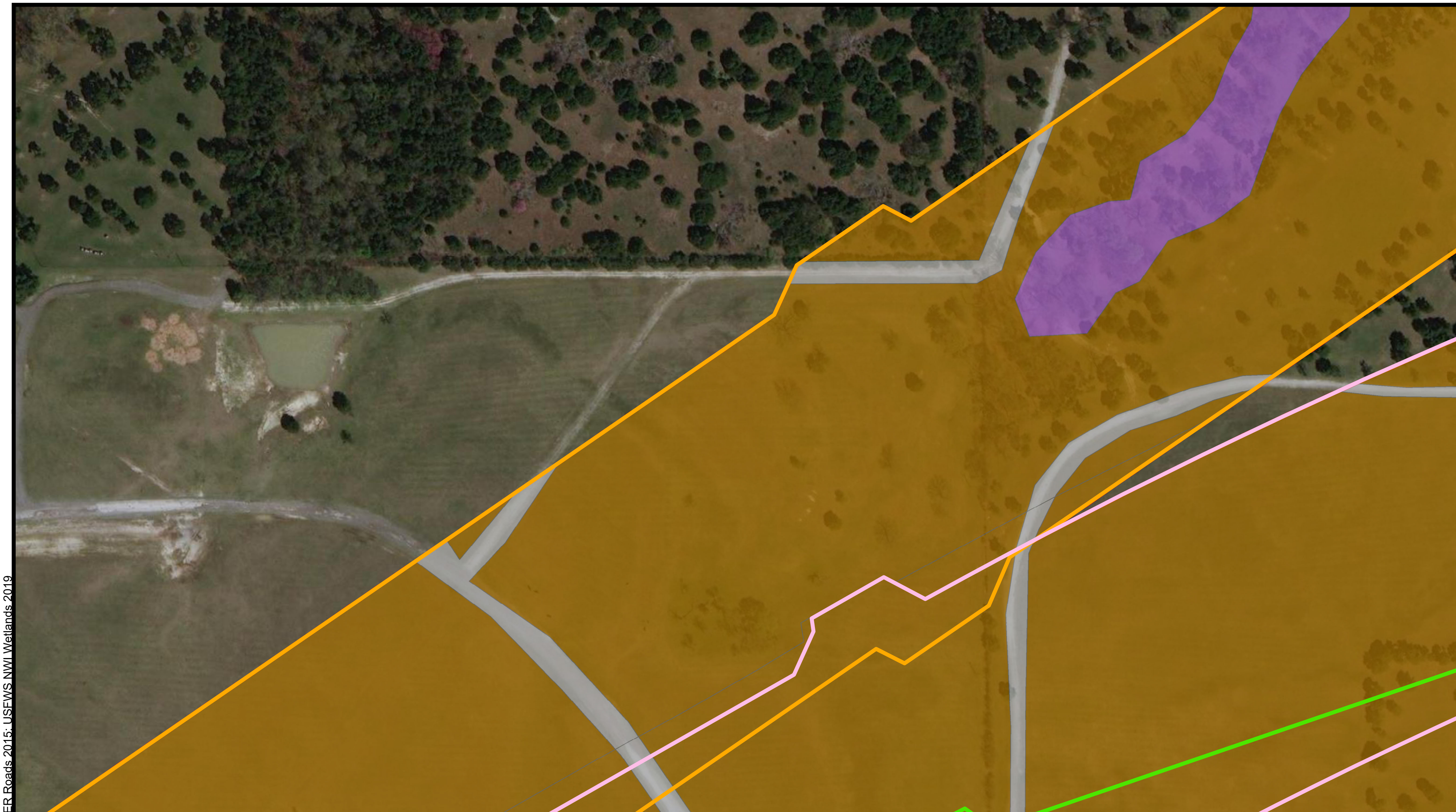
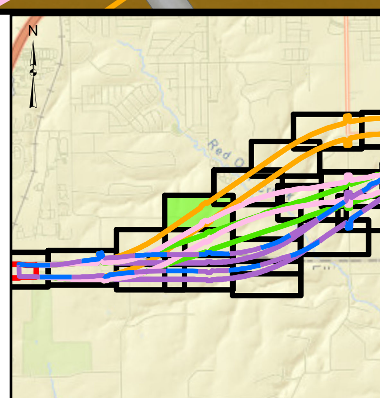


Disturbed Prairie
Riparian
Urban
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 3
SHEET 6

DATE:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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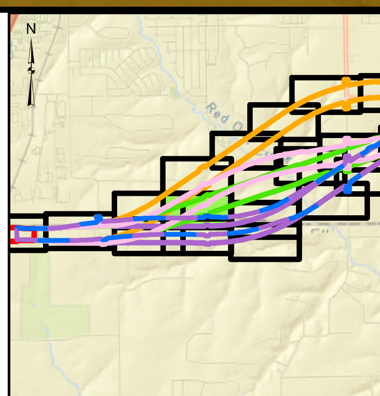
Disturbed Prairie
Open Water
Riparian
Urban
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 3
SHEET 7

DATE:
JULY 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019.

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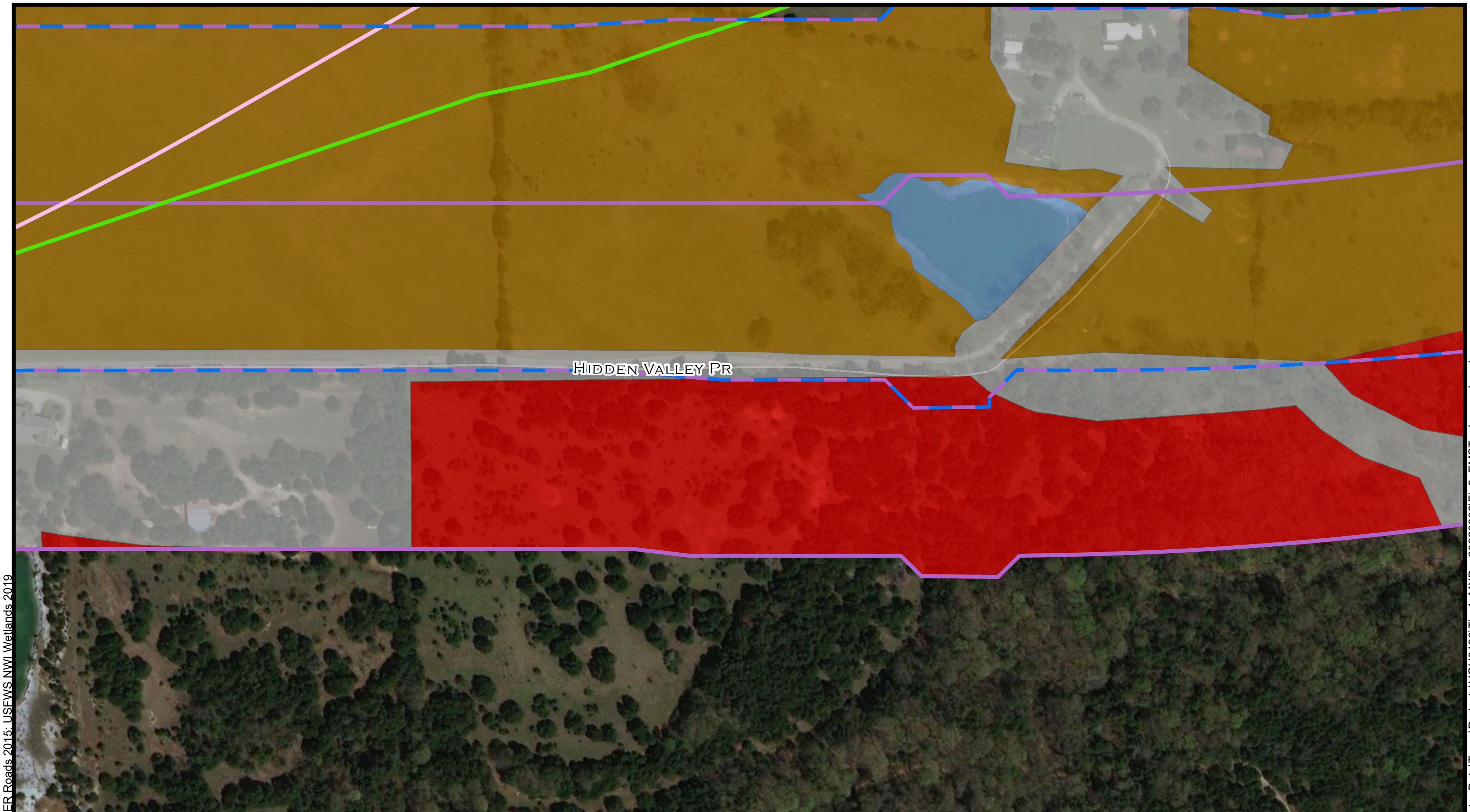
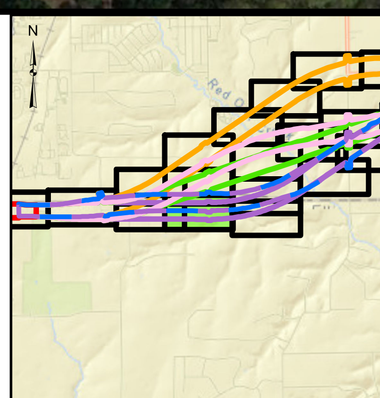


- Disturbed Prairie
- Edwards Plateau
- Open Water
- Urban
- Mod. Option D Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 3
SHEET 8

DATE:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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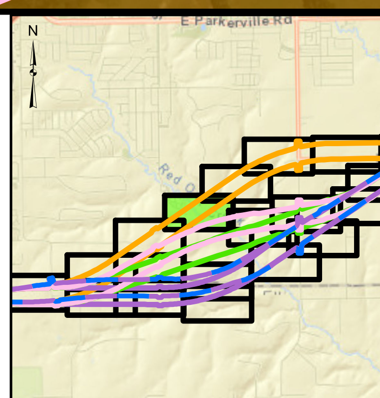
Disturbed Prairie
Edwards Plateau
Open Water
Riparian
Alternative 1 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 3
SHEET 9

DATE:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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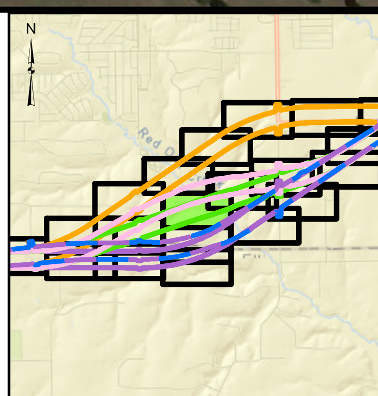
Disturbed Prairie
Open Water
Riparian
Urban
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

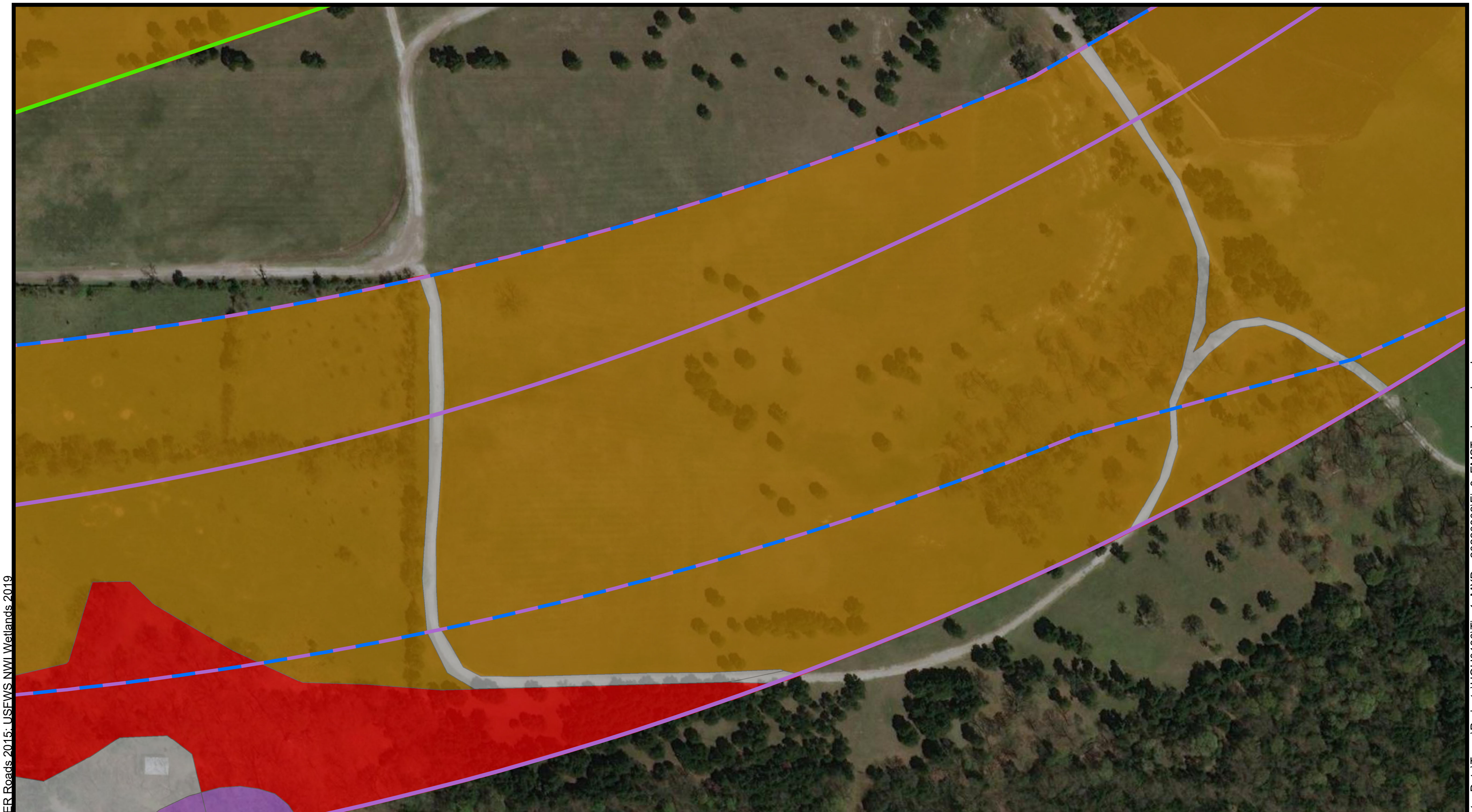
0 125 250 Feet

FIGURE 3
SHEET 10

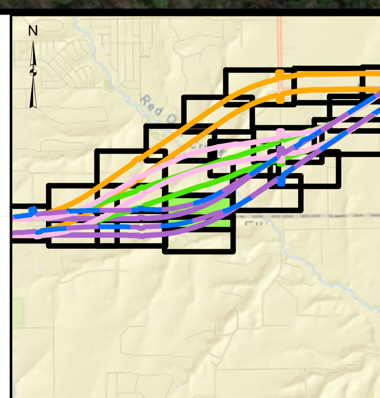
DATE:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



Disturbed Prairie
Edwards Plateau
Riparian
Urban
Mod. Option D Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 3
SHEET 11

DATE:
JULY 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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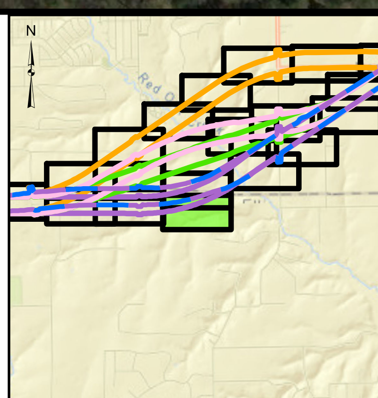
- Disturbed Prairie
- Edwards Plateau
- Riparian
- Urban
- Mod. Option D Proposed ROW
- Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

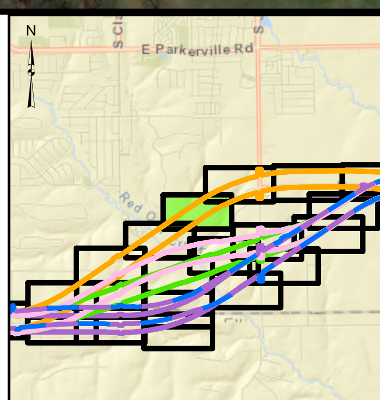
FIGURE 3
SHEET 12

DATE:
JULY 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019.

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd

Disturbed Prairie
Edwards Plateau
Riparian
Urban
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

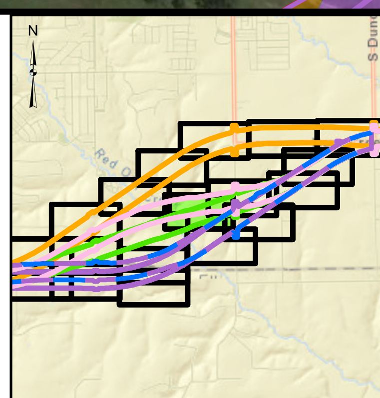
FIGURE 3
SHEET 13

DATE:
JULY 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd

- Agriculture
- Disturbed Prairie
- Open Water
- Riparian
- Urban
- Mod. Option D Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 3
SHEET 14

DATE:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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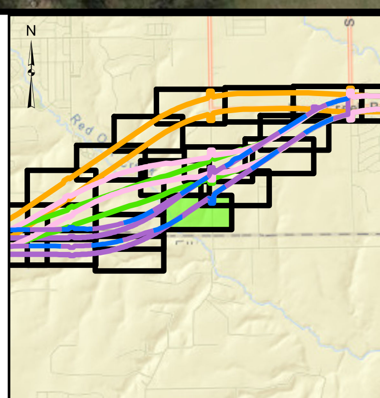
Disturbed Prairie
Open Water
Riparian
Urban
Mod. Option D Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

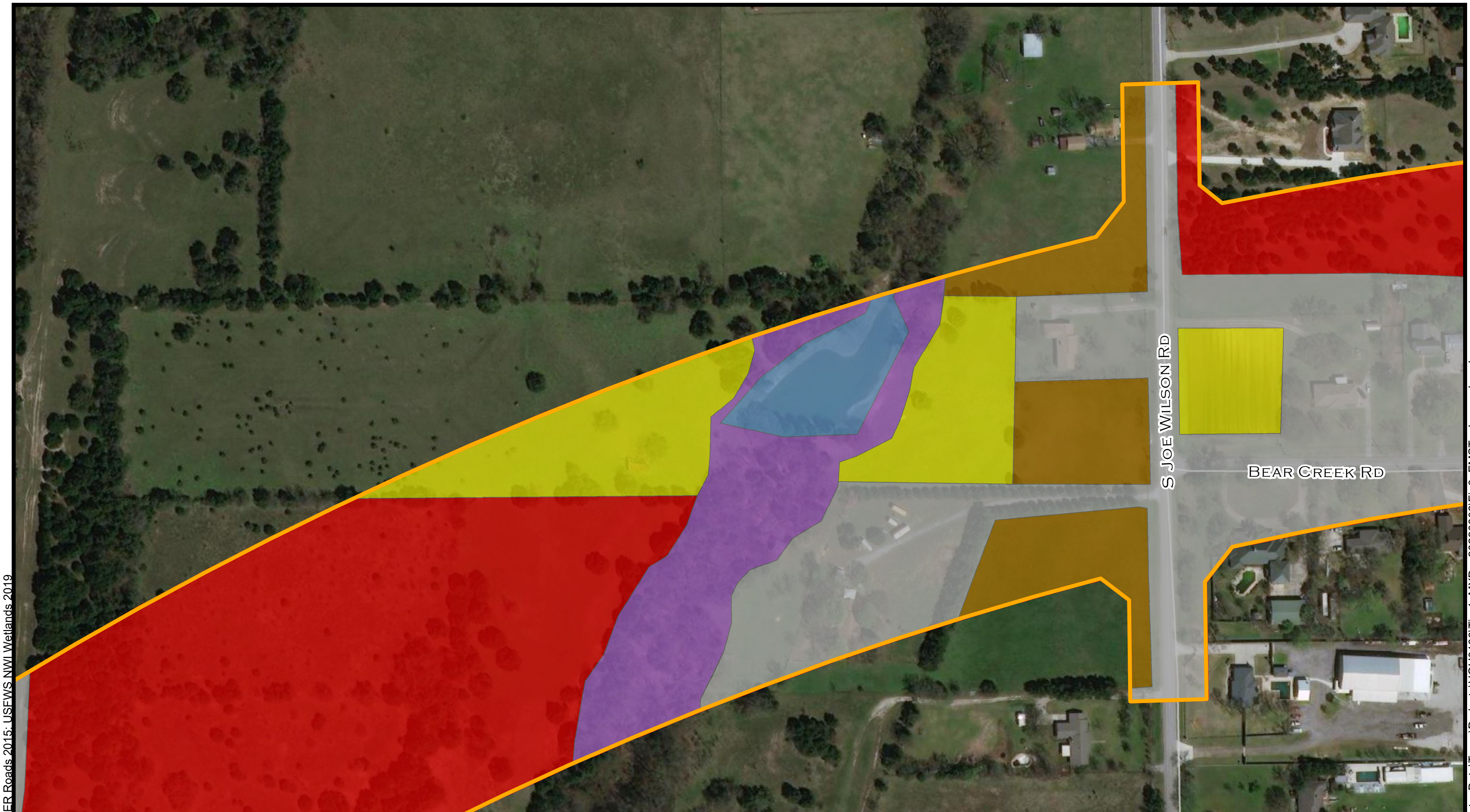
0 125 250
Feet

Figure 3
Sheet 15

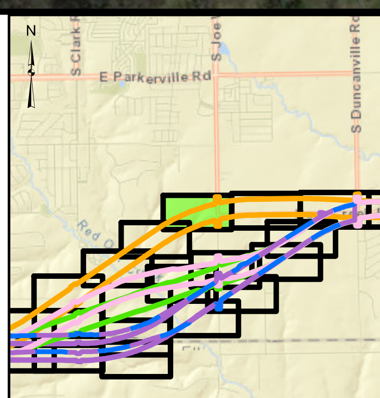
Date:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



- Agriculture
- Disturbed Prairie
- Edwards Plateau
- Open Water
- Riparian
- Urban
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

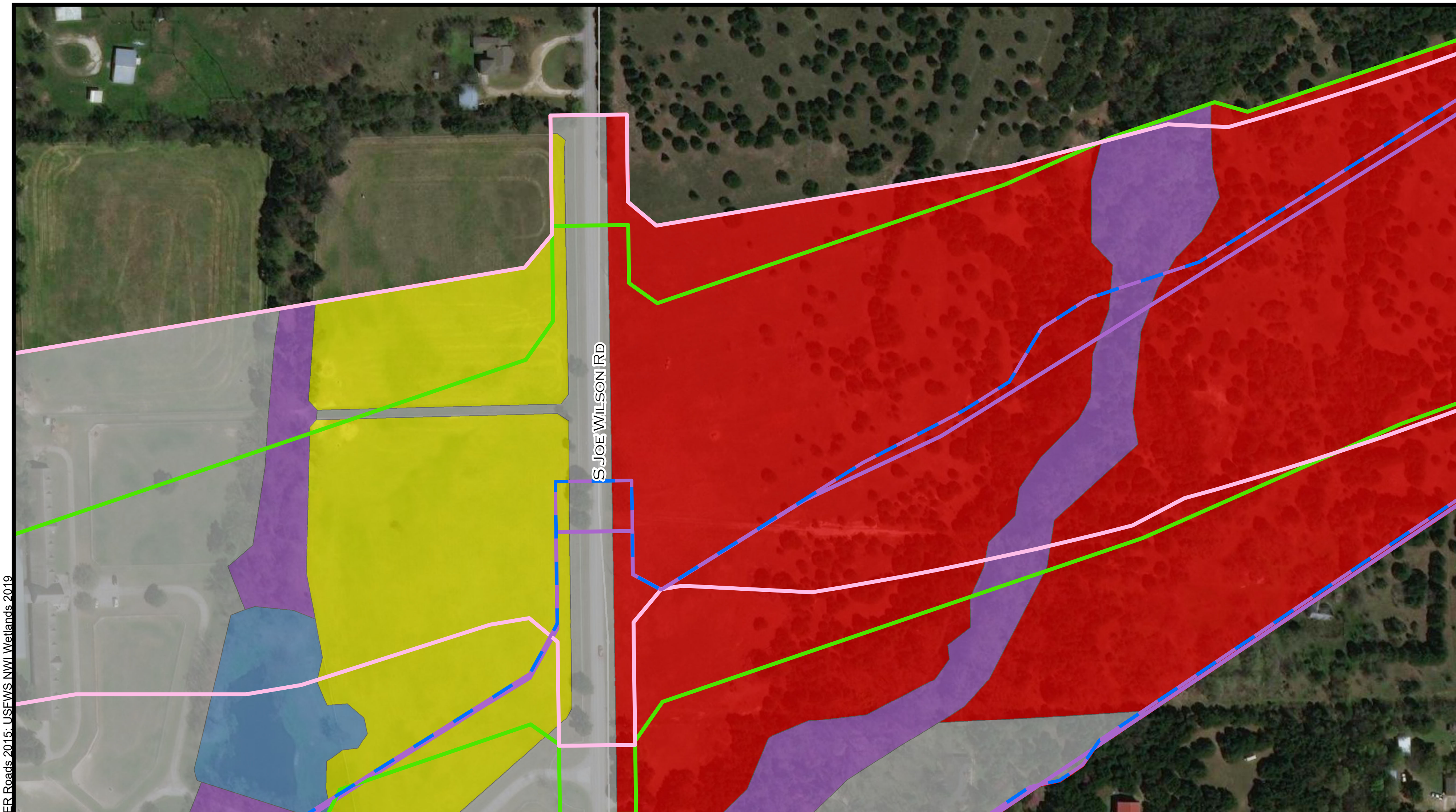
0 125 250 Feet

FIGURE 3
SHEET 16

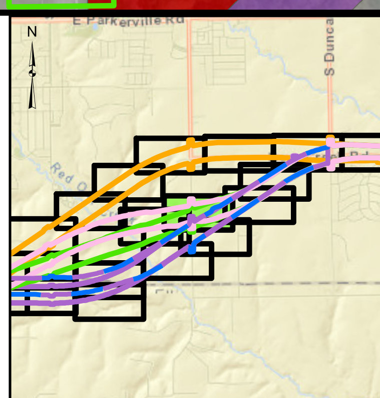
DATE:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



Agriculture
Edwards Plateau
Open Water
Riparian
Urban
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

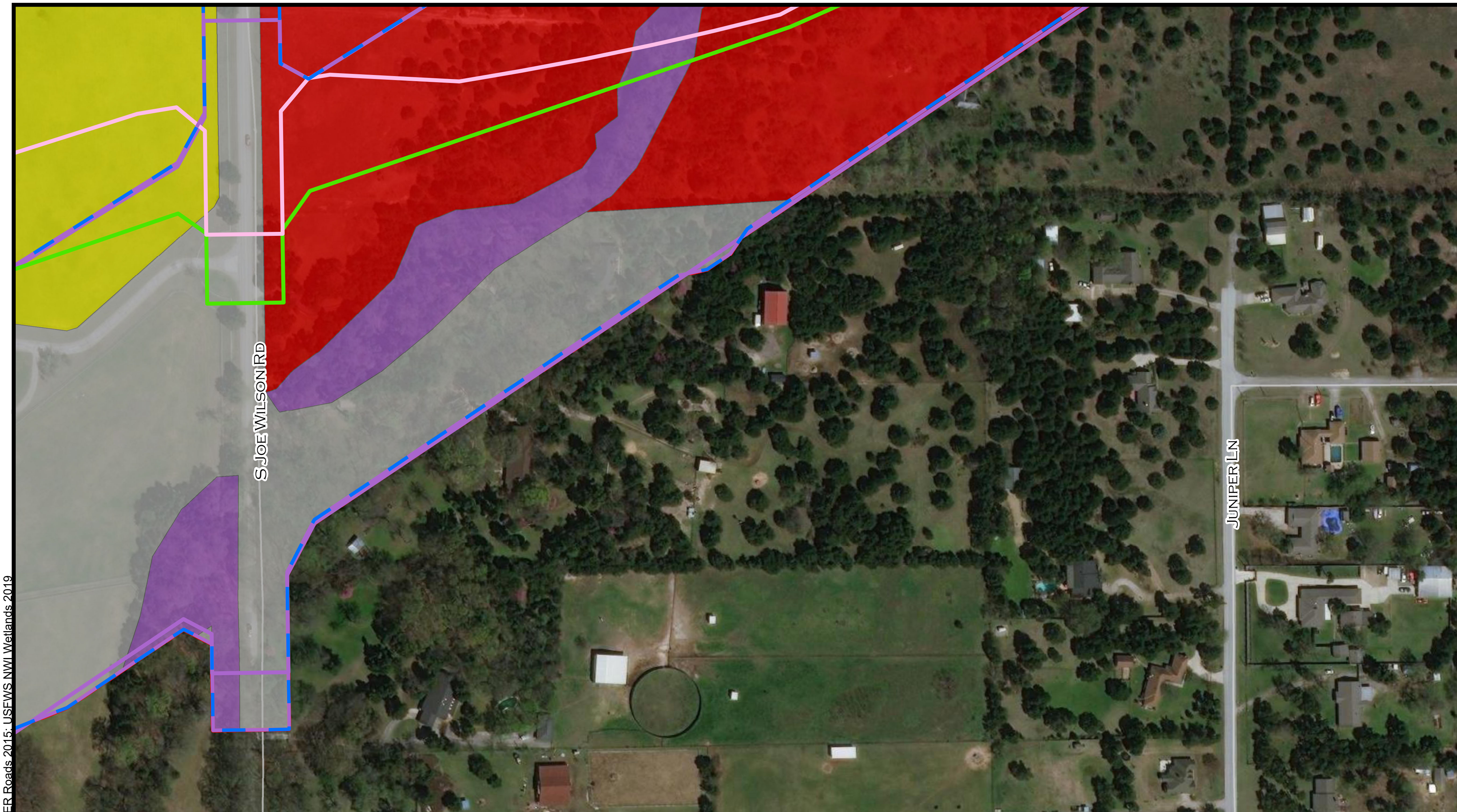
0 125 250 Feet

FIGURE 3
SHEET 17

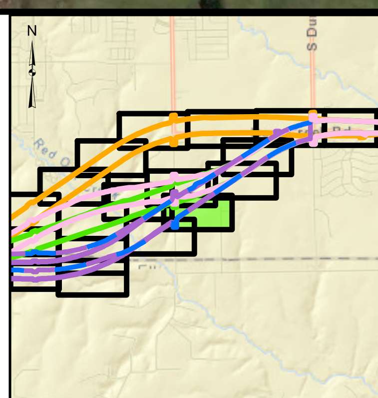
DATE:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



Agriculture
Edwards Plateau
Open Water
Riparian
Urban
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

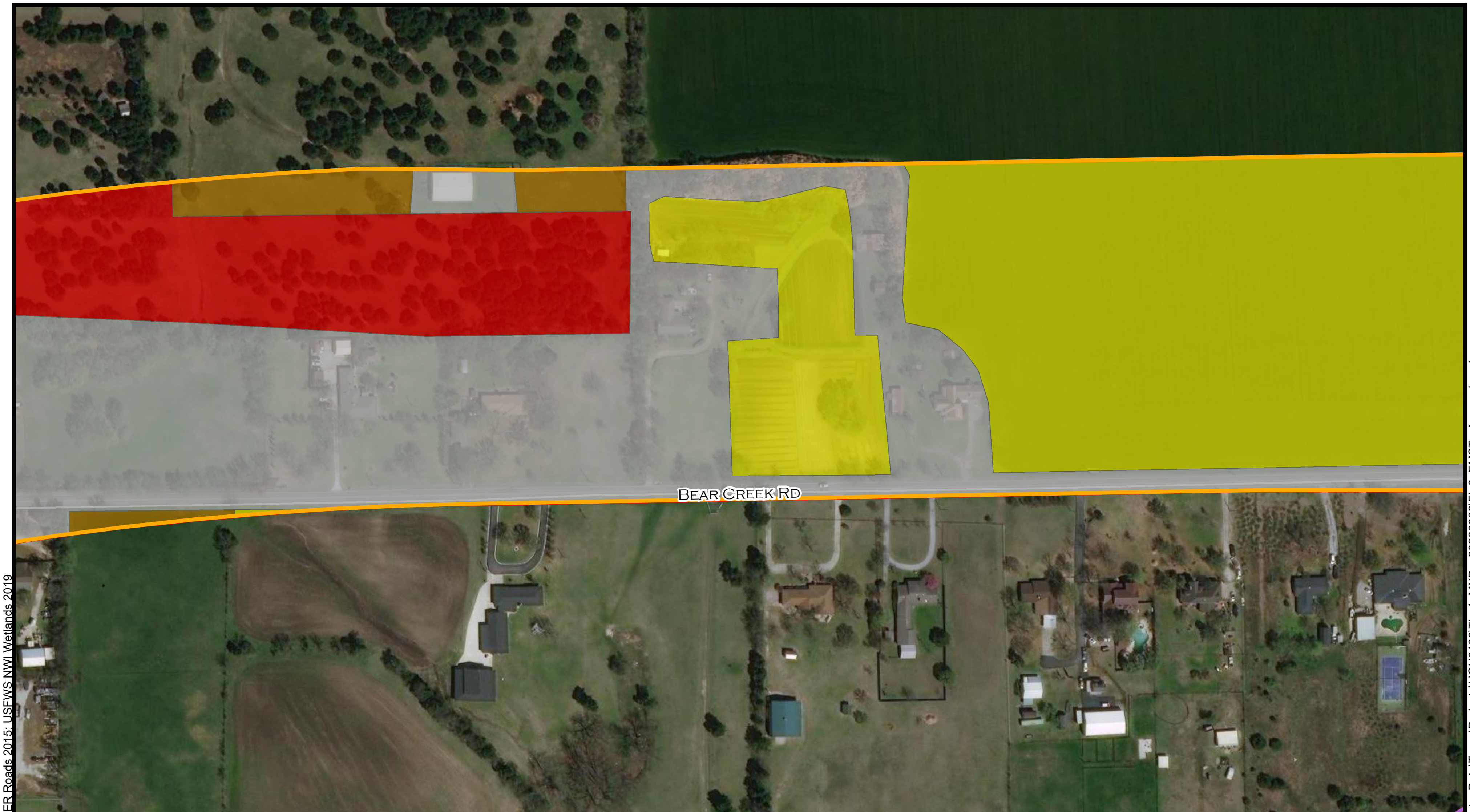
N
0 125 250 Feet

FIGURE 3
SHEET 18

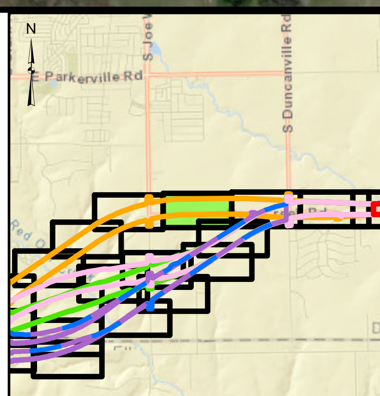
DATE:
JULY 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



Agriculture
Disturbed Prairie
Edwards Plateau
Urban
Mod. Option D Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

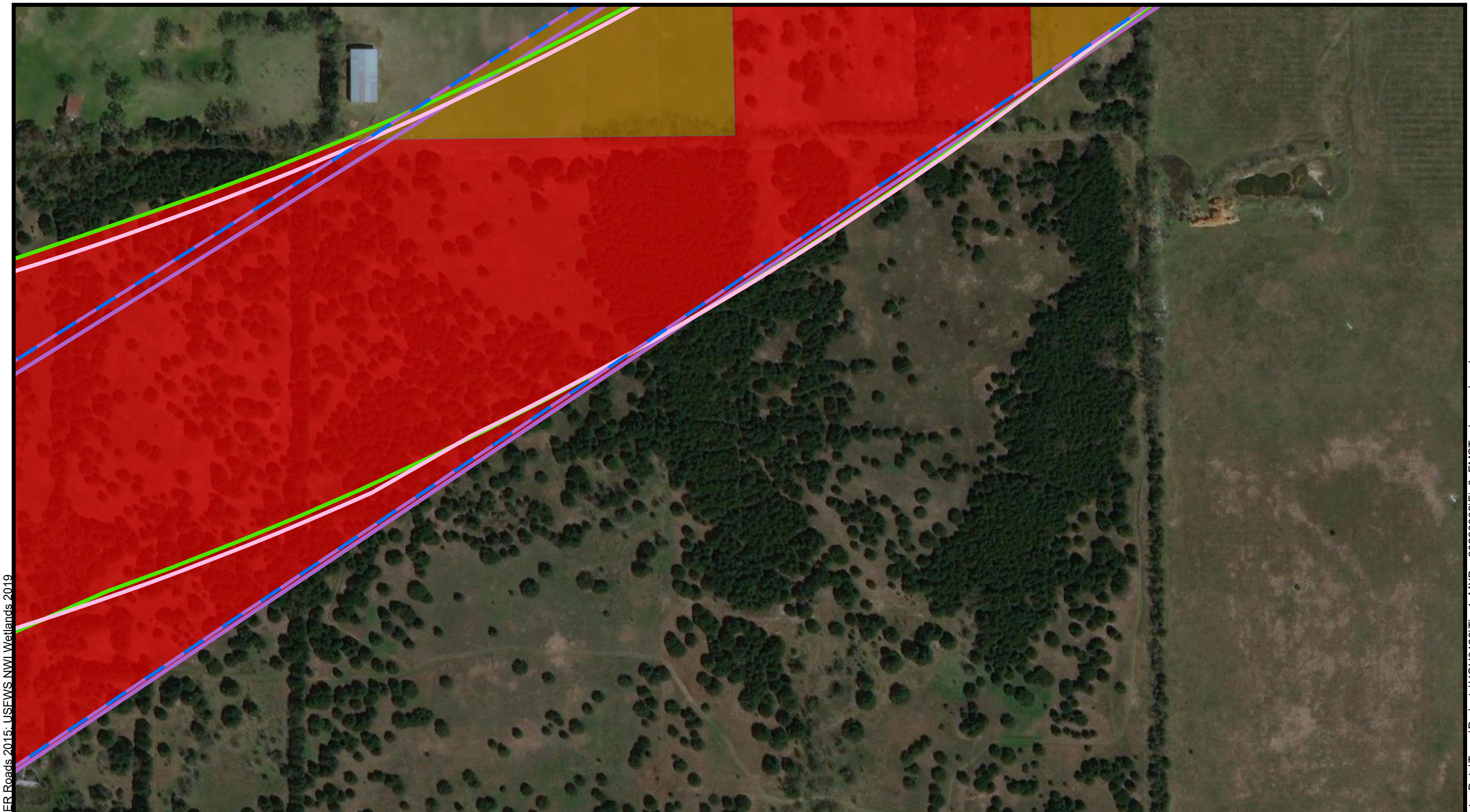
0 125 250 Feet

FIGURE 3
SHEET 19

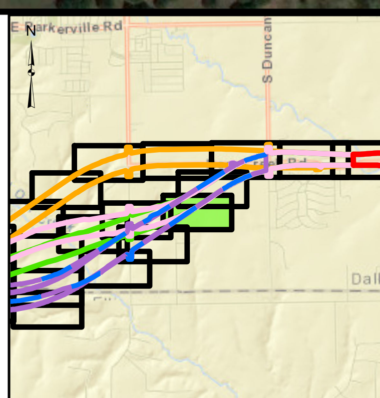
DATE:
JULY 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019.

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



- Disturbed Prairie
- Edwards Plateau
- Mod. Option D Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

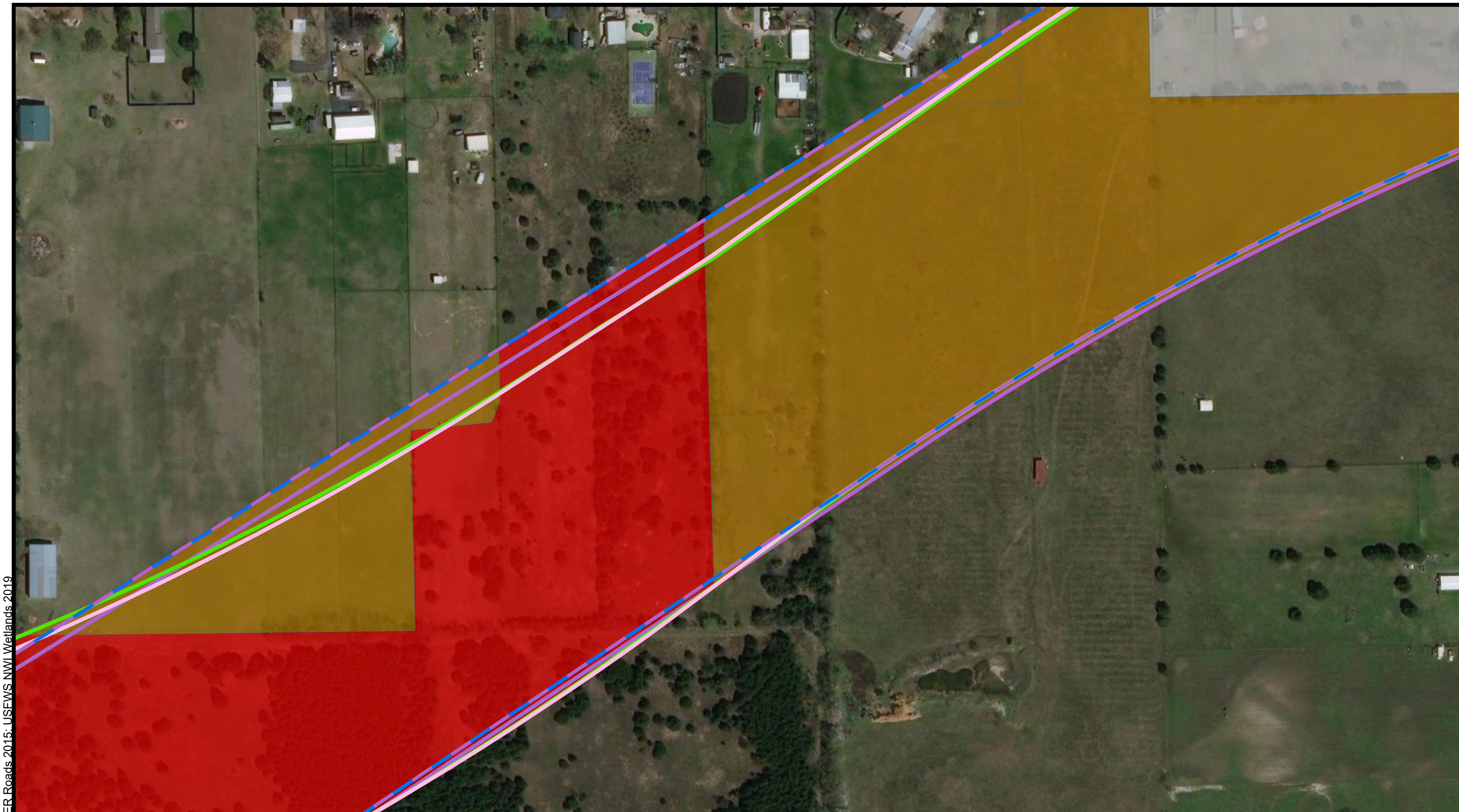
0 125 250 Feet

FIGURE 3
SHEET 20

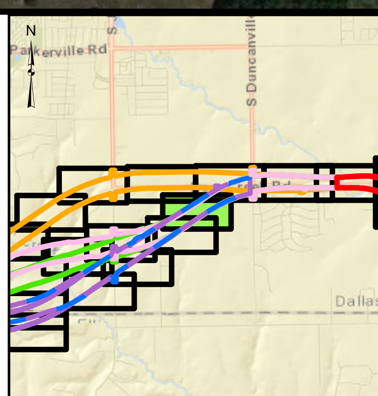
DATE:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



Disturbed Prairie
Edwards Plateau
Urban
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

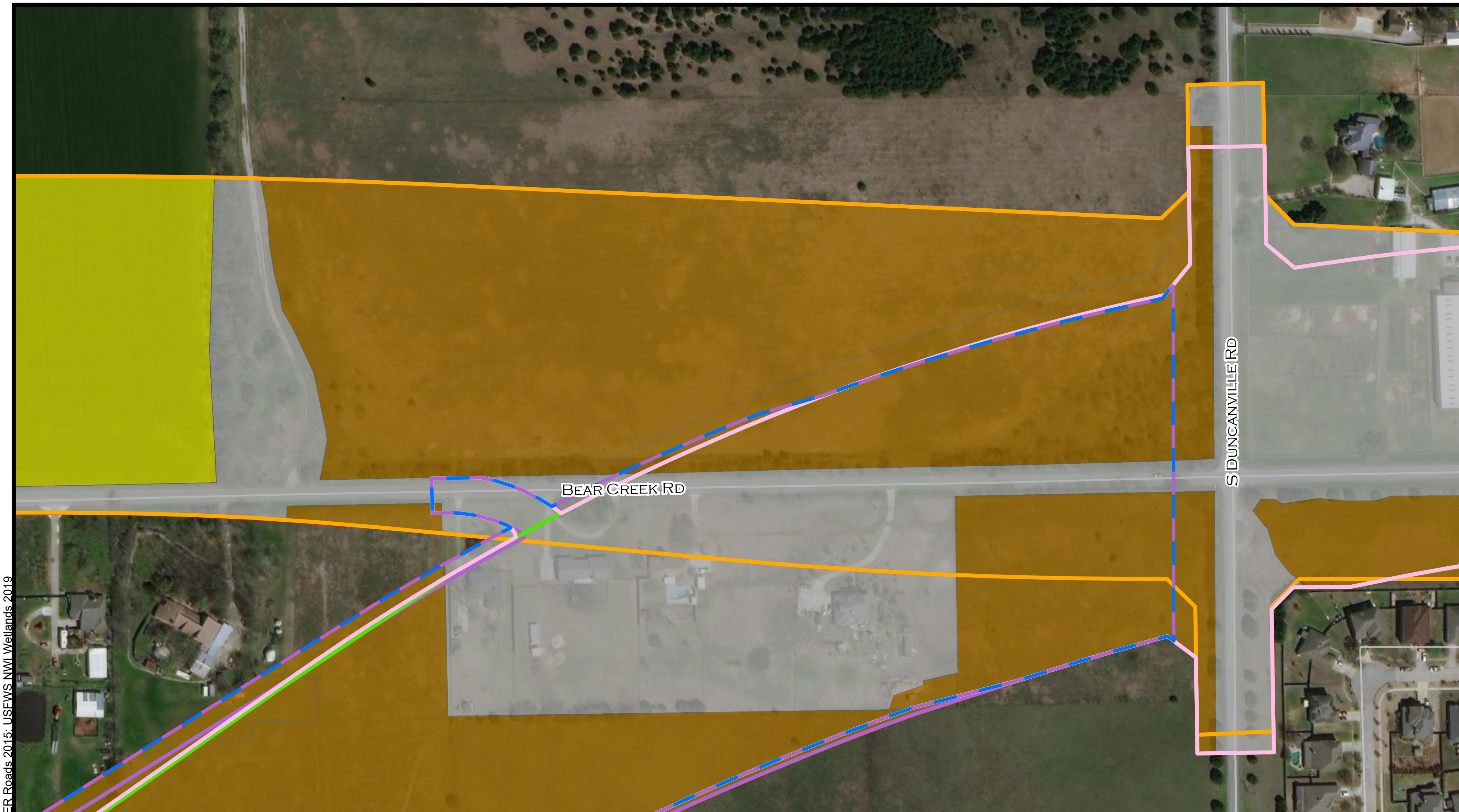
0 125 250 Feet

FIGURE 3
SHEET 21

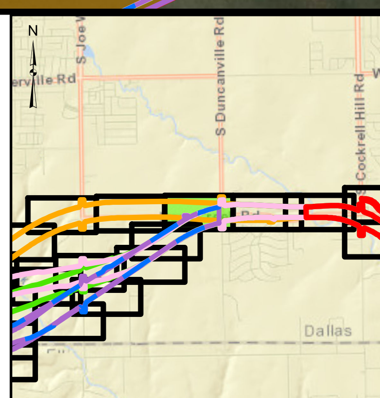
DATE:
JULY 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



Agriculture
Disturbed Prairie
Urban
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

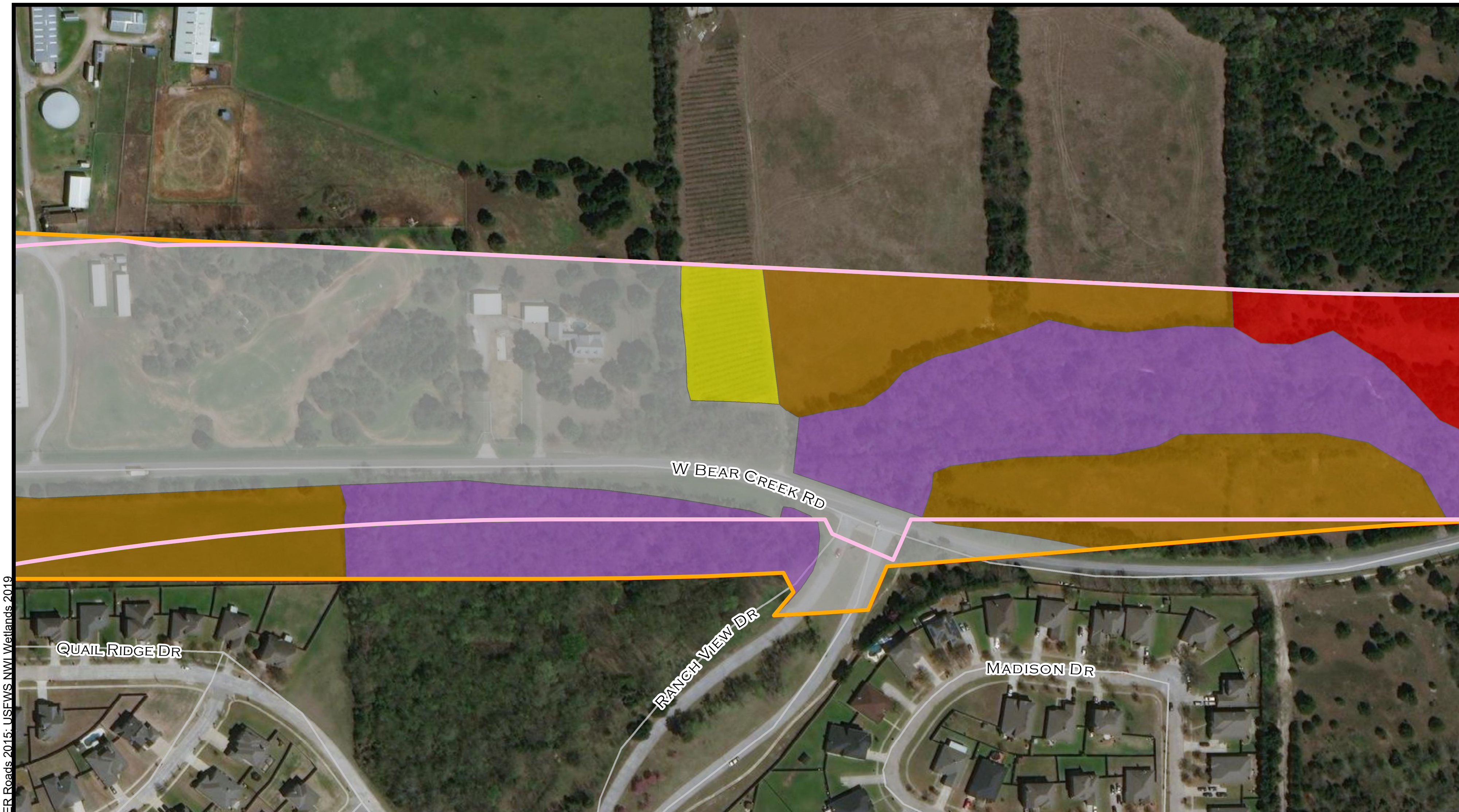
0 125 250 Feet

FIGURE 3
SHEET 22

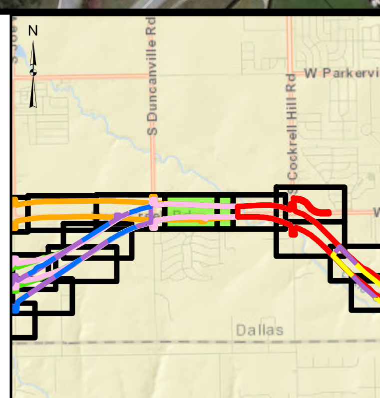
DATE:
JULY 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



Agriculture
Disturbed Prairie
Edwards Plateau
Riparian
Urban
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

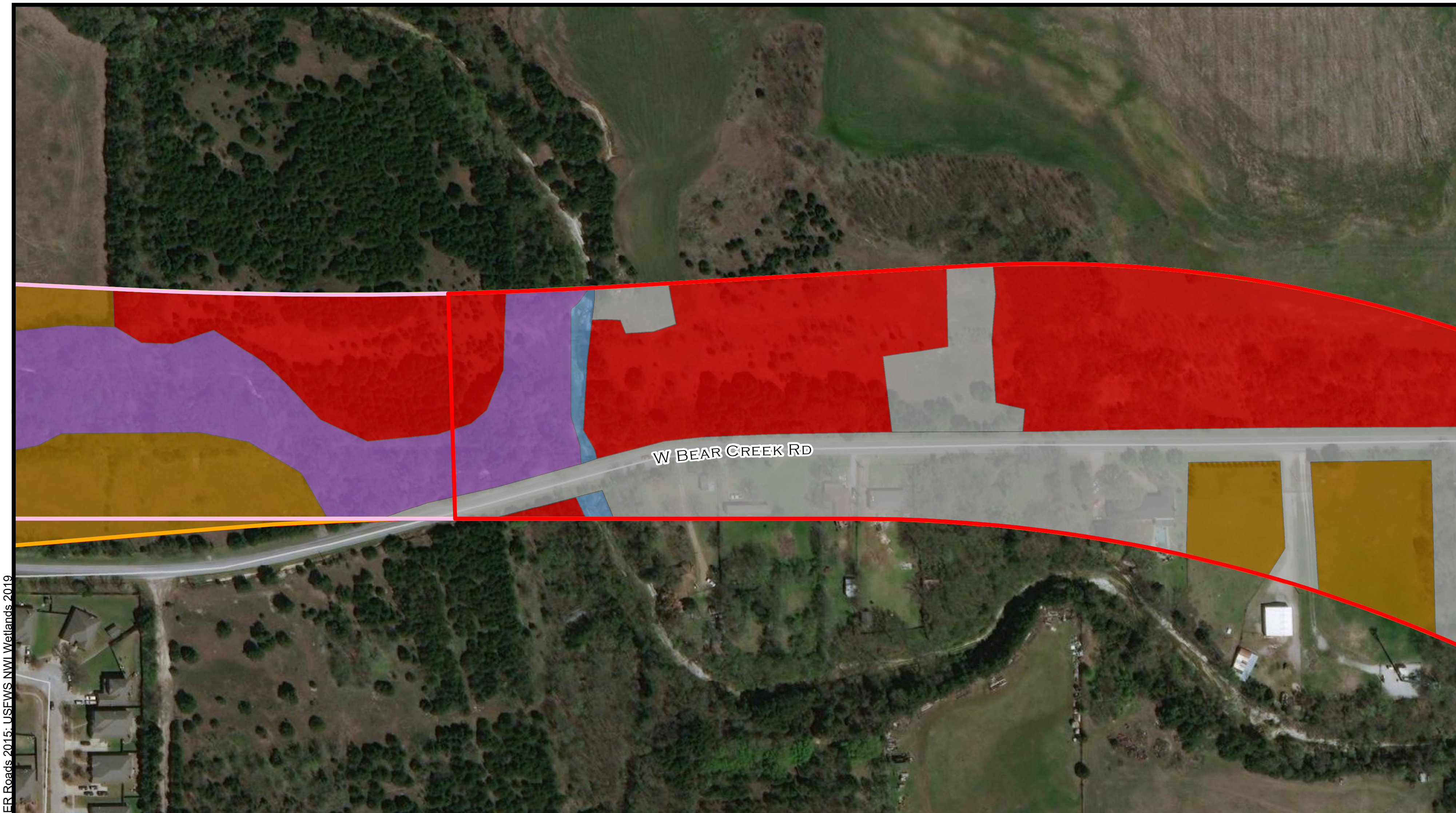
0 125 250 Feet

Figure 3
Sheet 23

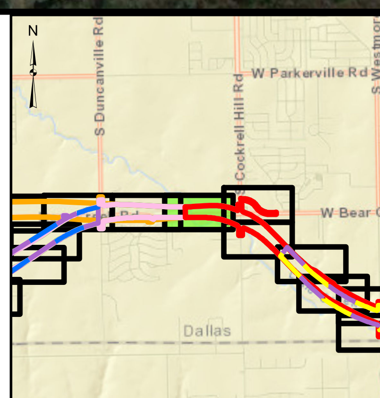
Date:
July 2022

Sources: ESRI Aerial 2021: ESRI World Street Map: TIGER Roads 2015: USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



Disturbed Prairie
Edwards Plateau
Open Water
Riparian
Urban
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 3
SHEET 24

DATE:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd

Agriculture
Disturbed Prairie
Edwards Plateau
Urban
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW

Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map
Dallas & Ellis Counties, Texas

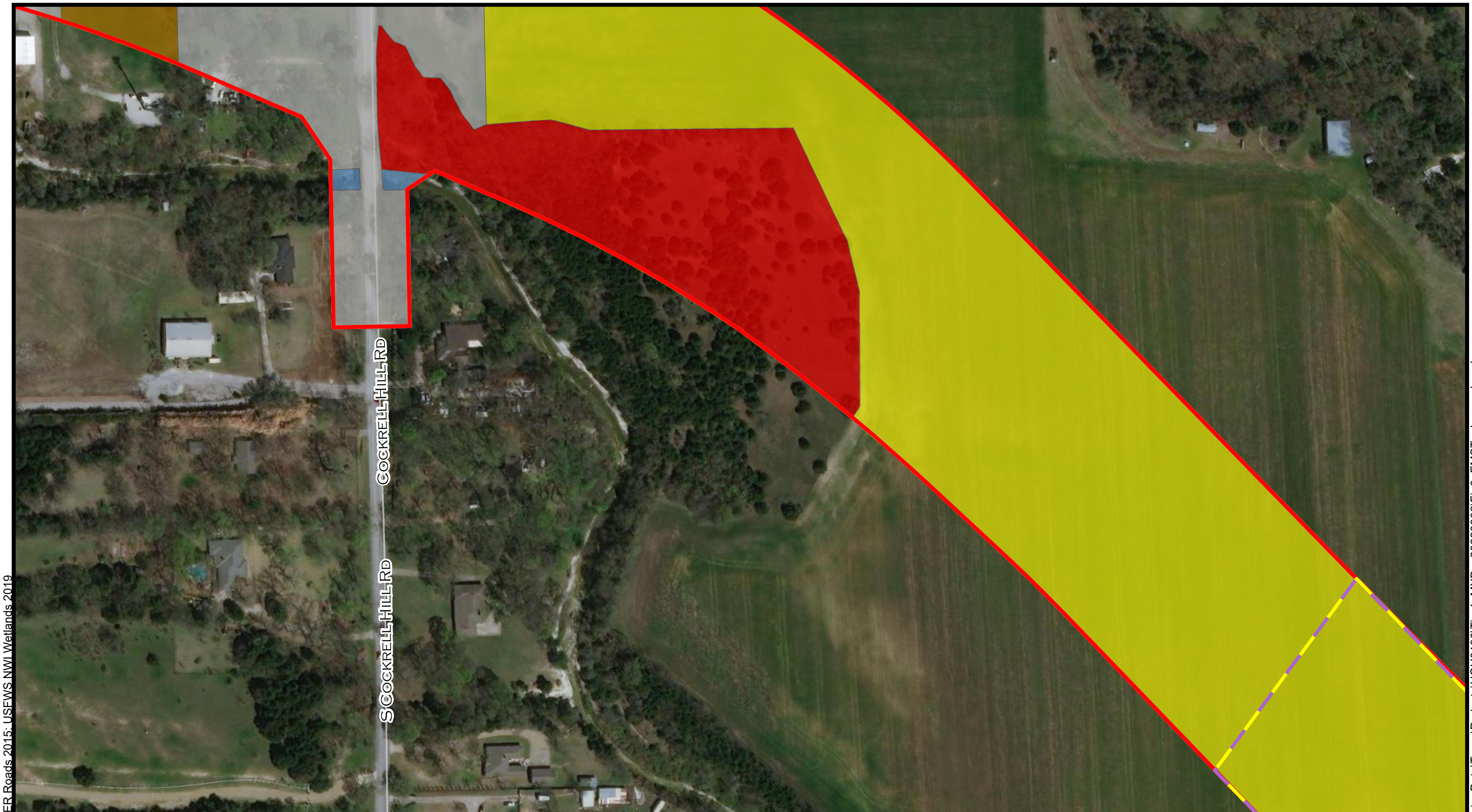
Texas Department of Transportation

FIGURE 3
SHEET 25

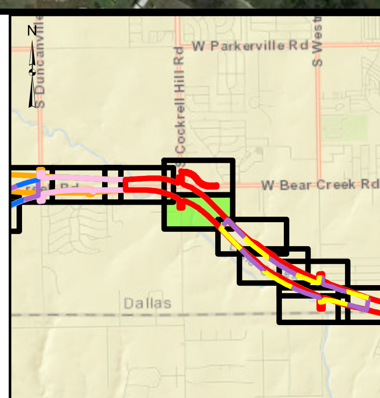
DATE:
JULY 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



Agriculture
Disturbed Prairie
Edwards Plateau
Open Water
Urban
Mod. Option C Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

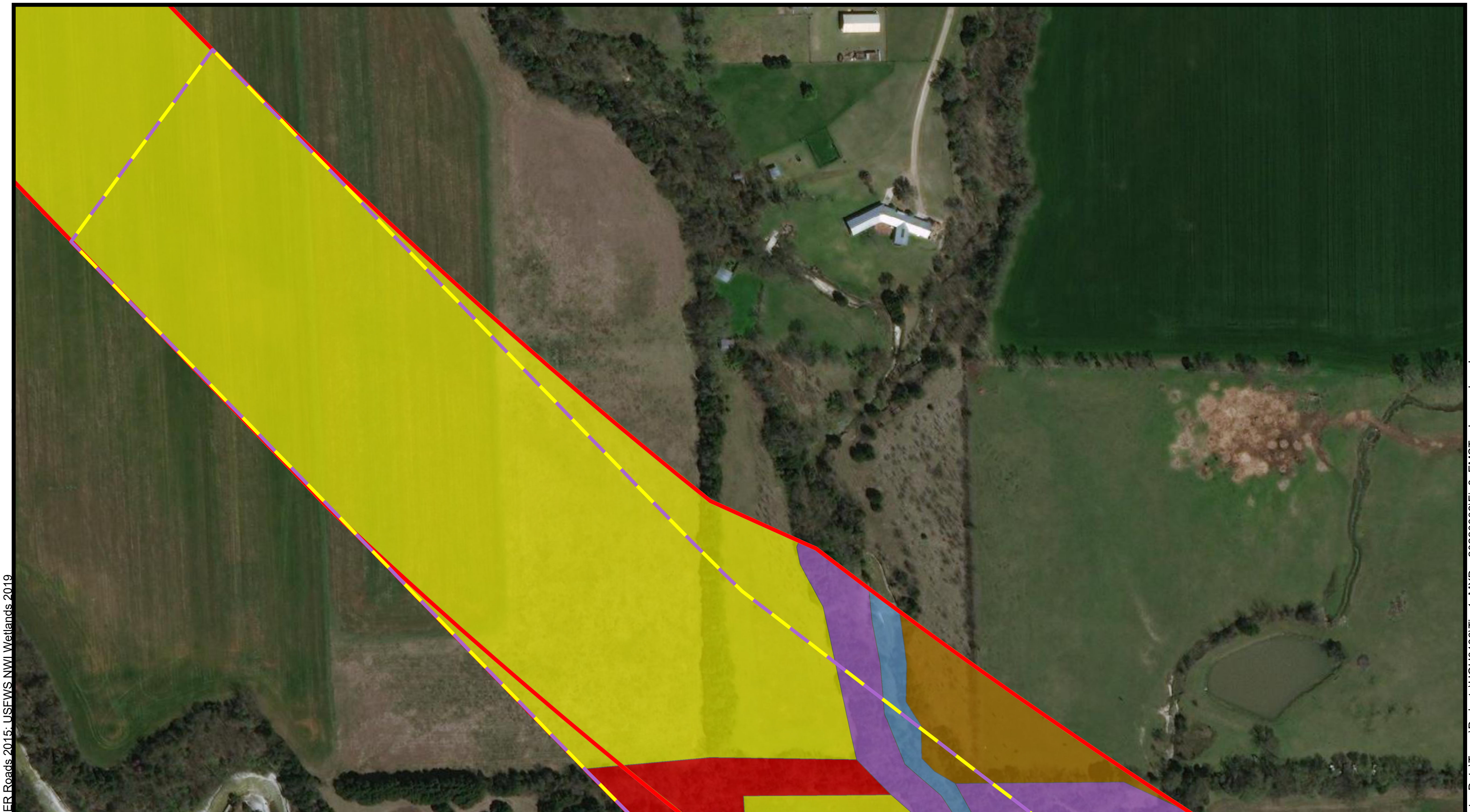
N
0 125 250 Feet

FIGURE 3
SHEET 26

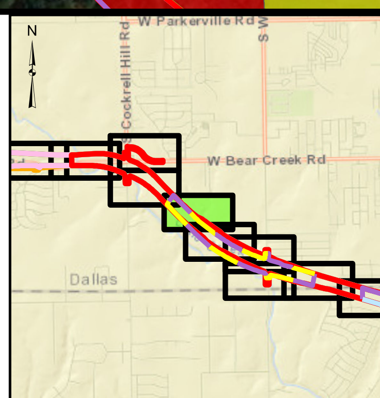
DATE:
JULY 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



Agriculture
Disturbed Prairie
Edwards Plateau
Open Water
Riparian
Mod. Option C Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

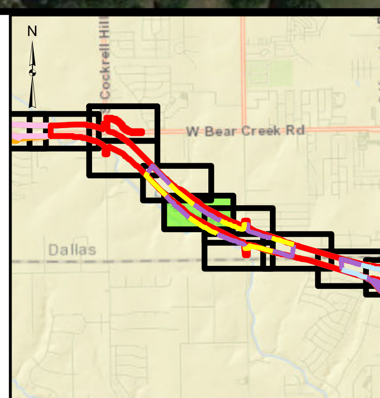
FIGURE 3
SHEET 27

DATE:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd

- Agriculture
- Disturbed Prairie
- Edwards Plateau
- Open Water
- Riparian
- Urban
- Mod. Option C Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

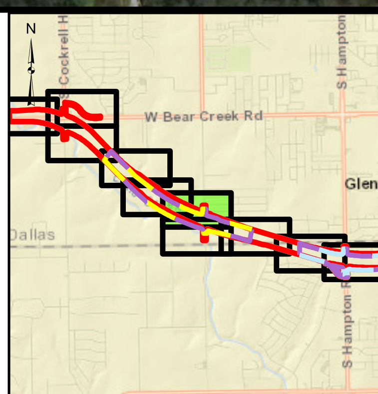
FIGURE 3
SHEET 28

DATE:
JULY 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd

- Agriculture
- Edwards Plateau
- Open Water
- Riparian
- Urban
- Mod. Option C Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

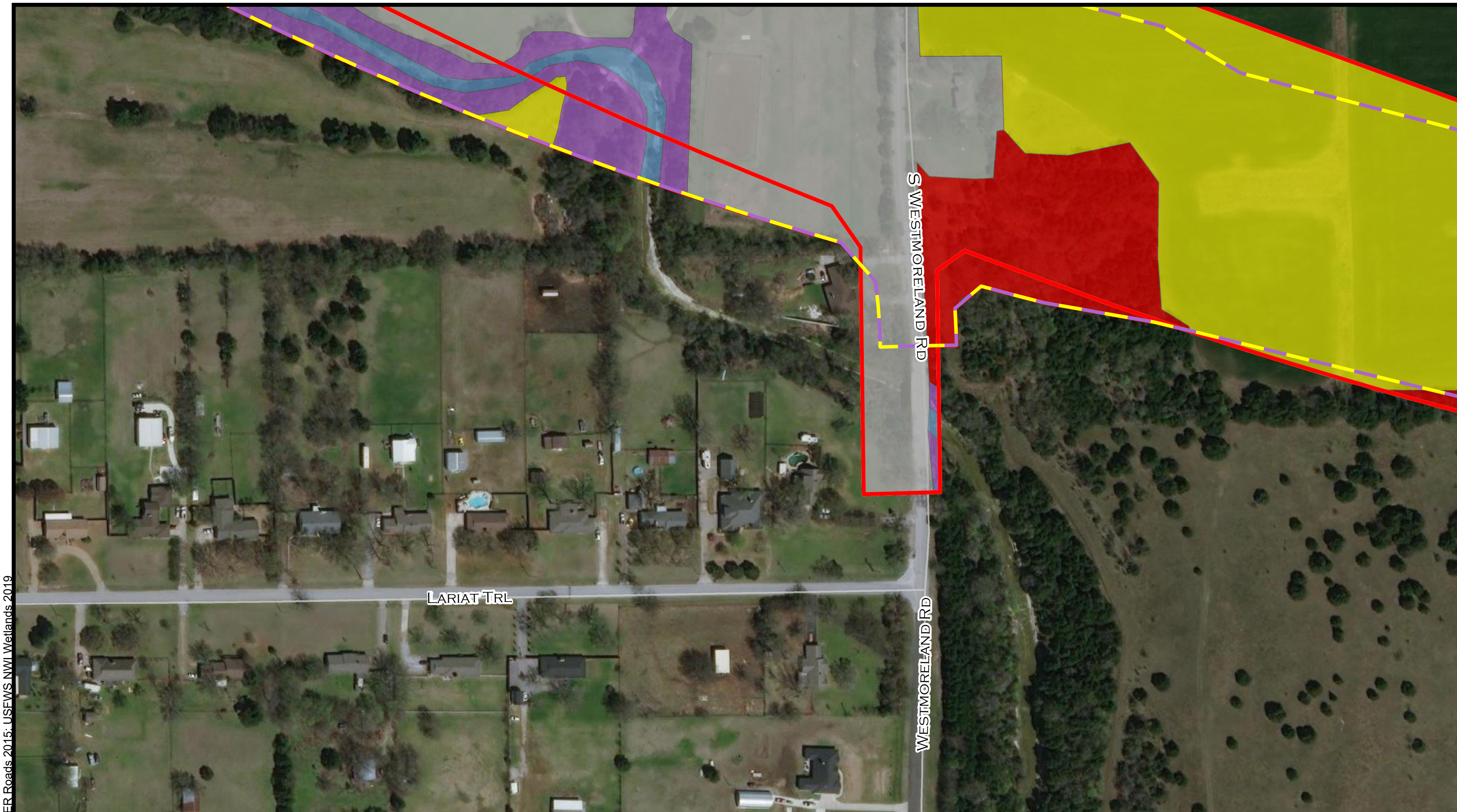
0 125 250 Feet

Figure 3
Sheet 29

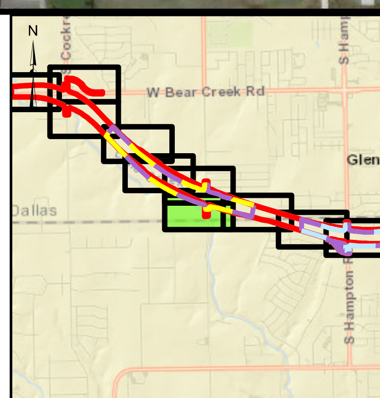
Date:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



Agriculture
Edwards Plateau
Open Water
Riparian
Urban
Mod. Option C Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 3
SHEET 30

DATE:
JULY 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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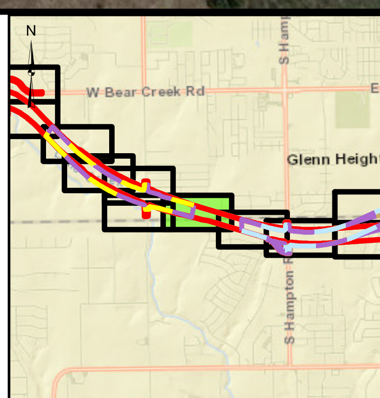
Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

- Agriculture
- Disturbed Prairie
- Edwards Plateau
- Riparian
- Mod. Option C Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

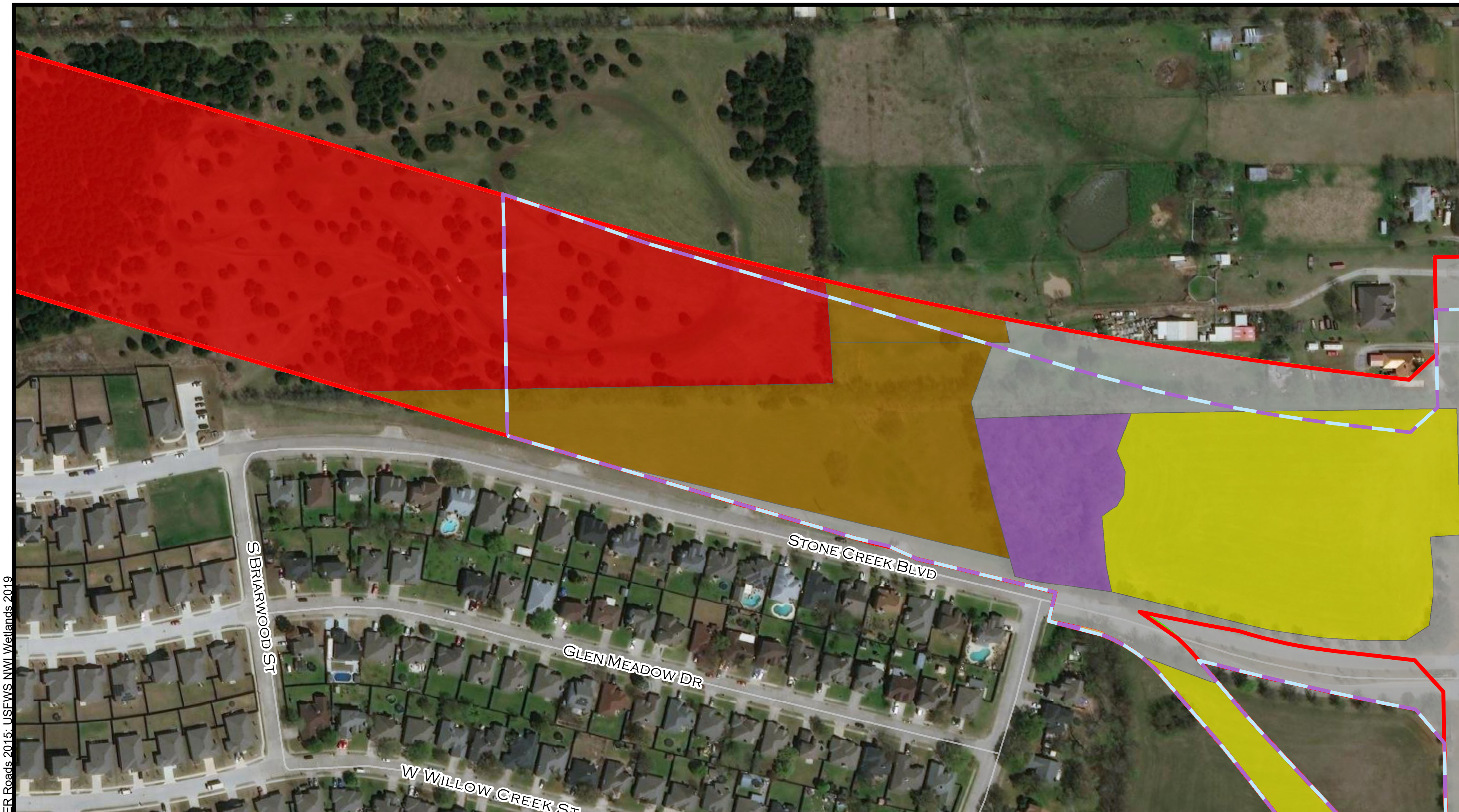
N

0 125 250 Feet

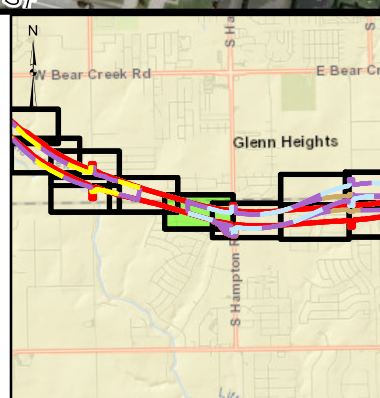
FIGURE 3
SHEET 31

DATE:
July 2022

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



Agriculture
Disturbed Prairie
Edwards Plateau
Riparian
Urban
Mod. Option A Proposed ROW
Mod. Option B Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

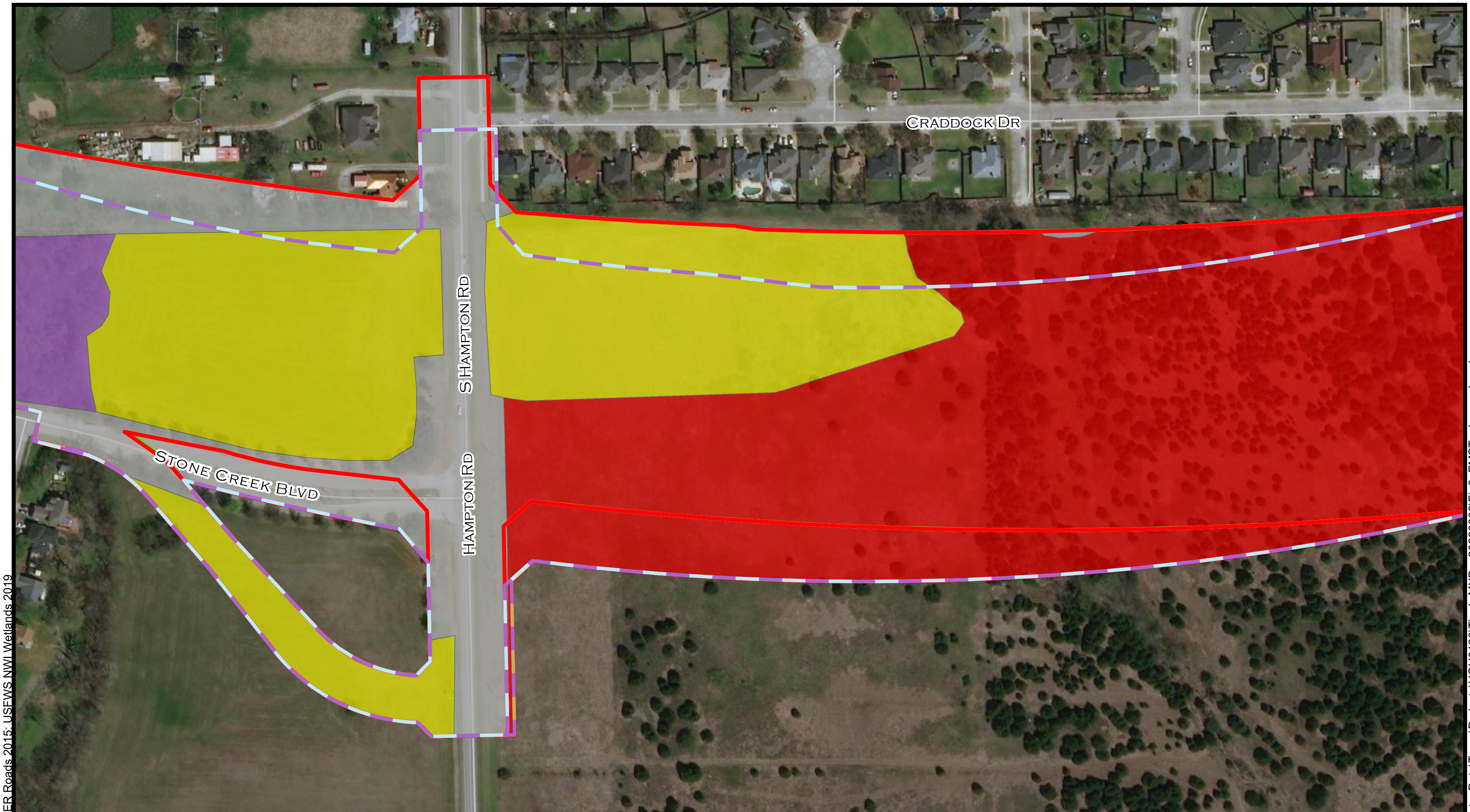
0 125 250 Feet

FIGURE 3
SHEET 32

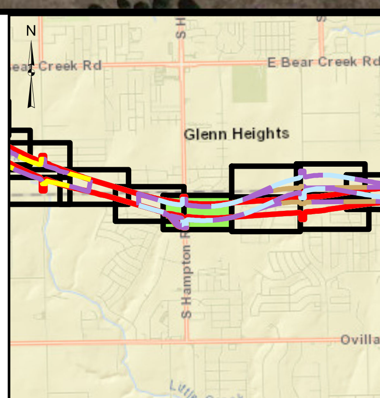
DATE:
July 2022

Sources: ESRI Aerial 2021: ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



Agriculture
Edwards Plateau
Riparian
Urban
Mod. Option A Proposed ROW
Mod. Option B Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

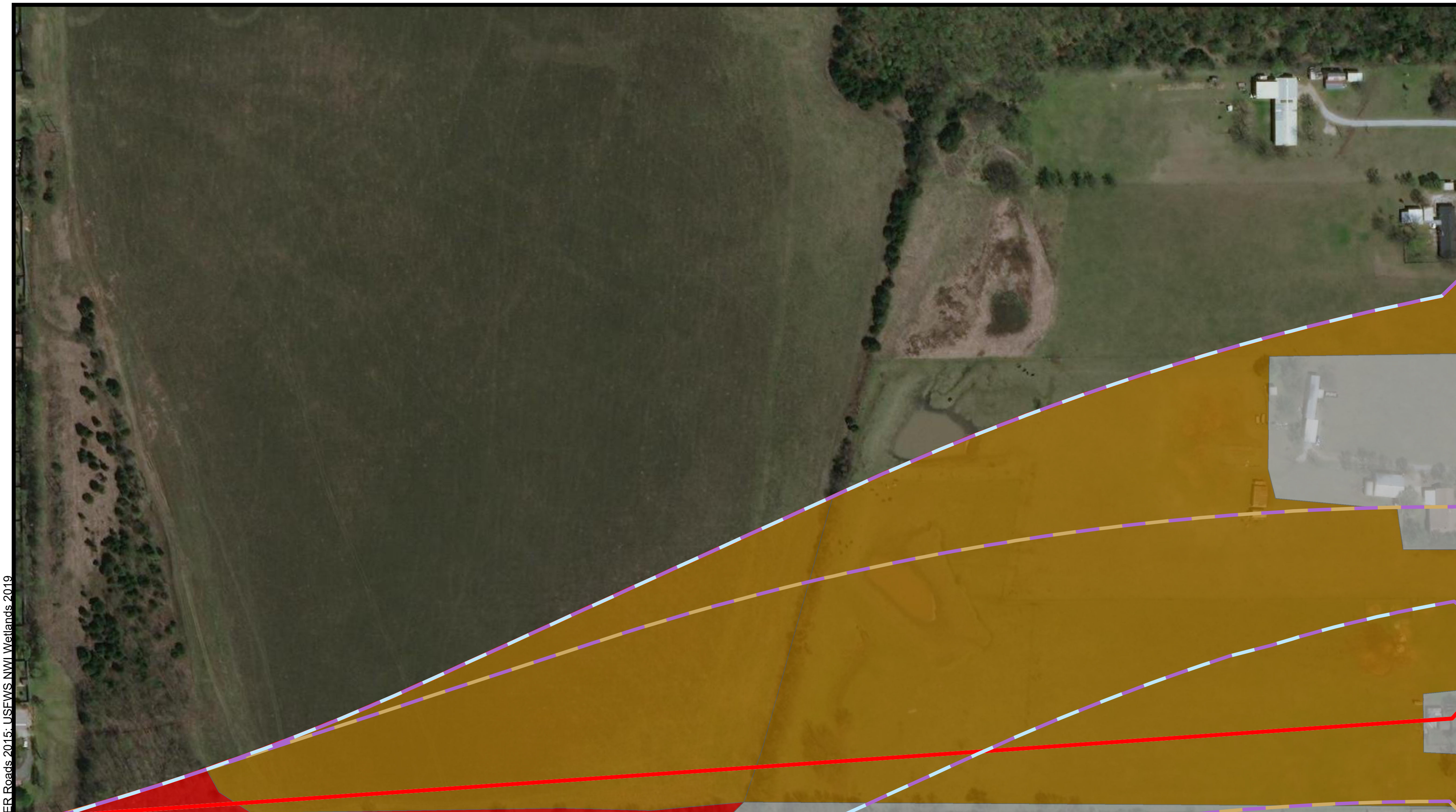
N
0 125 250 Feet

FIGURE 3
SHEET 33

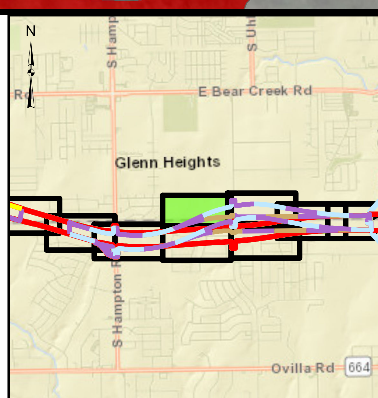
DATE:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



Disturbed Prairie
Edwards Plateau
Urban
Mod. Option A Proposed ROW
Mod. Option B Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

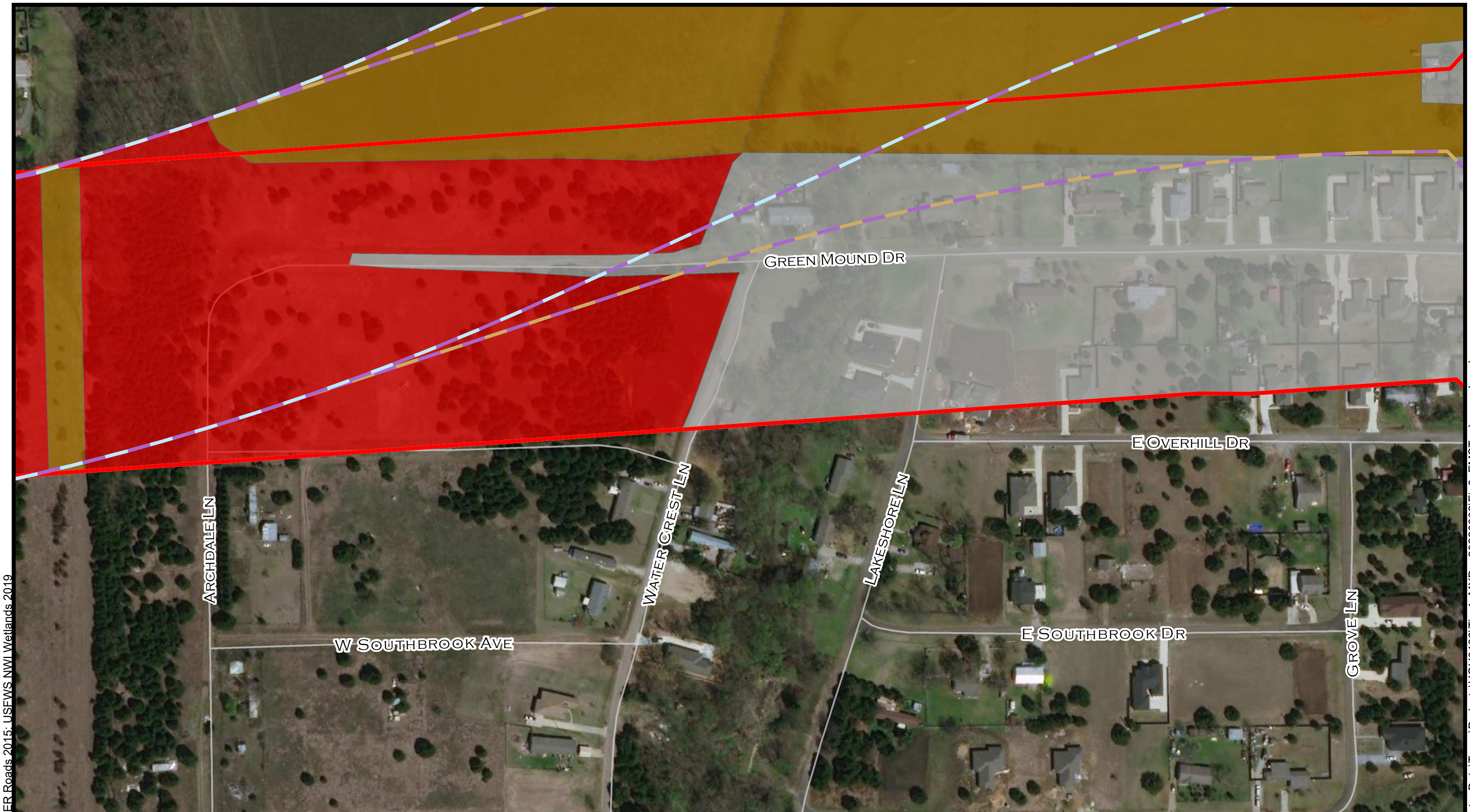
0 125 250 Feet

FIGURE 3
SHEET 34

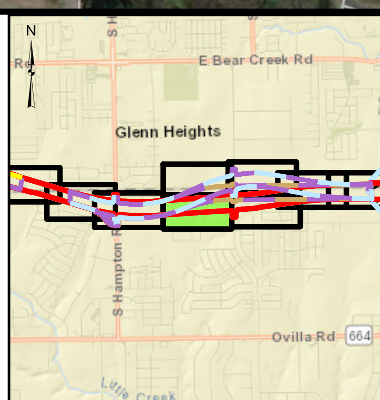
DATE:
July 2022

Sources: ESRI Aerial 2021: ESRI World Street Map: TIGER Roads 2015: USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd



Disturbed Prairie
Edwards Plateau
Urban
Mod. Option A Proposed ROW
Mod. Option B Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

Figure 3
Sheet 35

Date:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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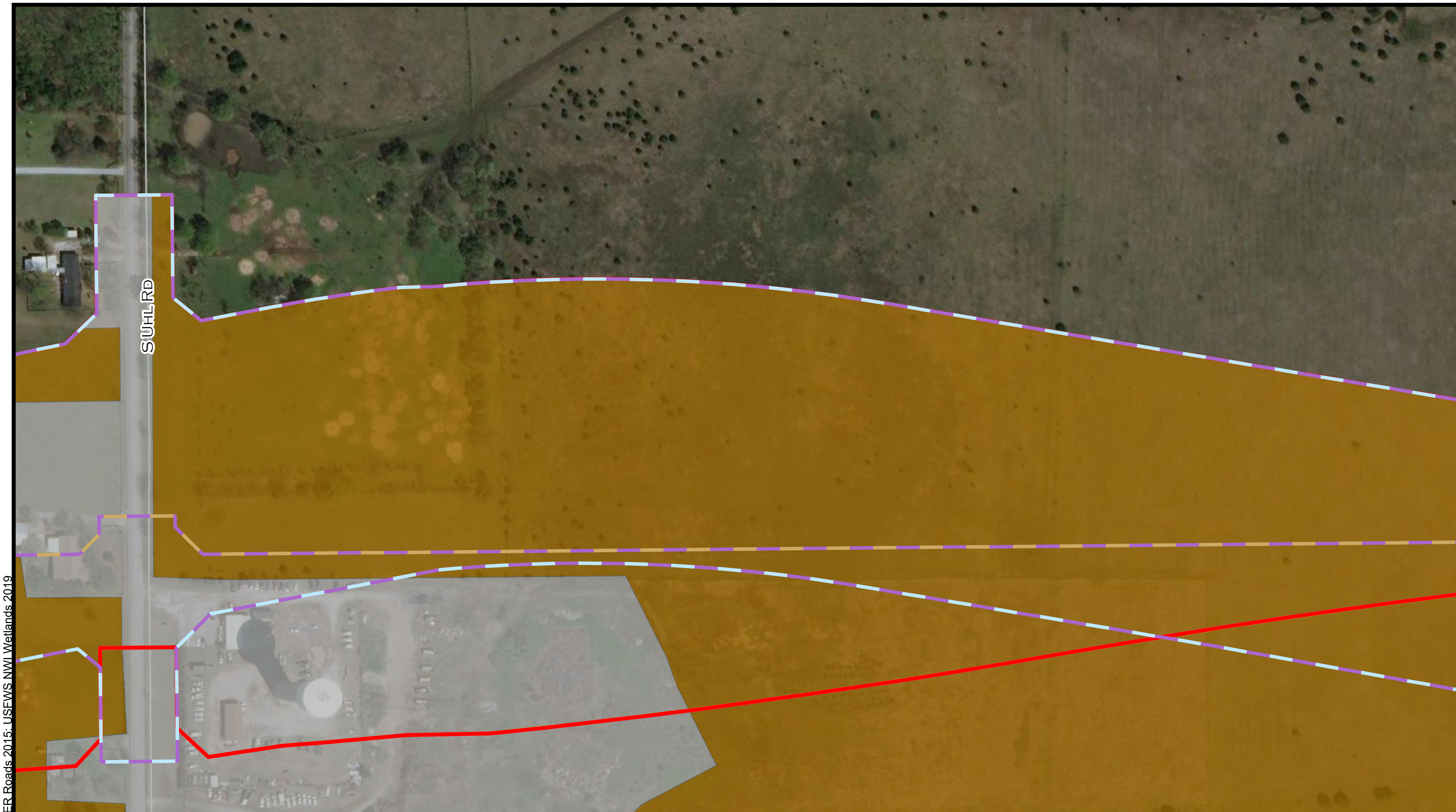
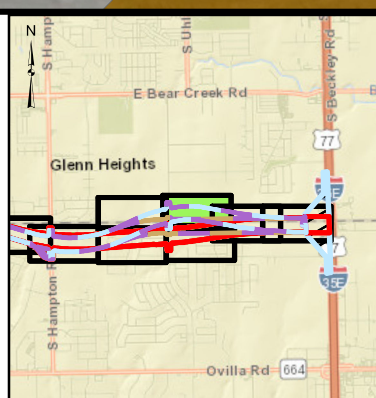


- Disturbed Prairie
- Urban
- Mod. Option A Proposed ROW
- Mod. Option B Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

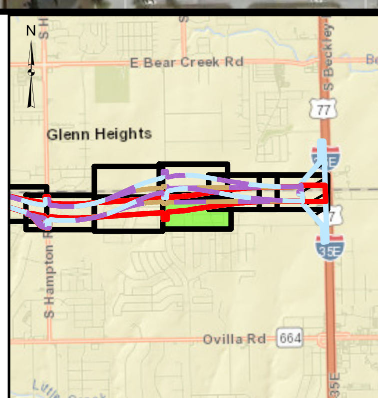
FIGURE 3
SHEET 36

DATE:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd

Disturbed Prairie
Urban
Mod. Option A Proposed ROW
Mod. Option B Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

Figure 3
Sheet 37

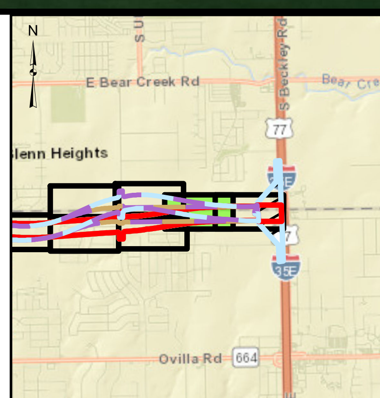
Date:
July 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig3_EMST_observed.mxd

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Agriculture
Disturbed Prairie
Edwards Plateau
Urban
Mod. Option A Proposed ROW
Mod. Option B Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

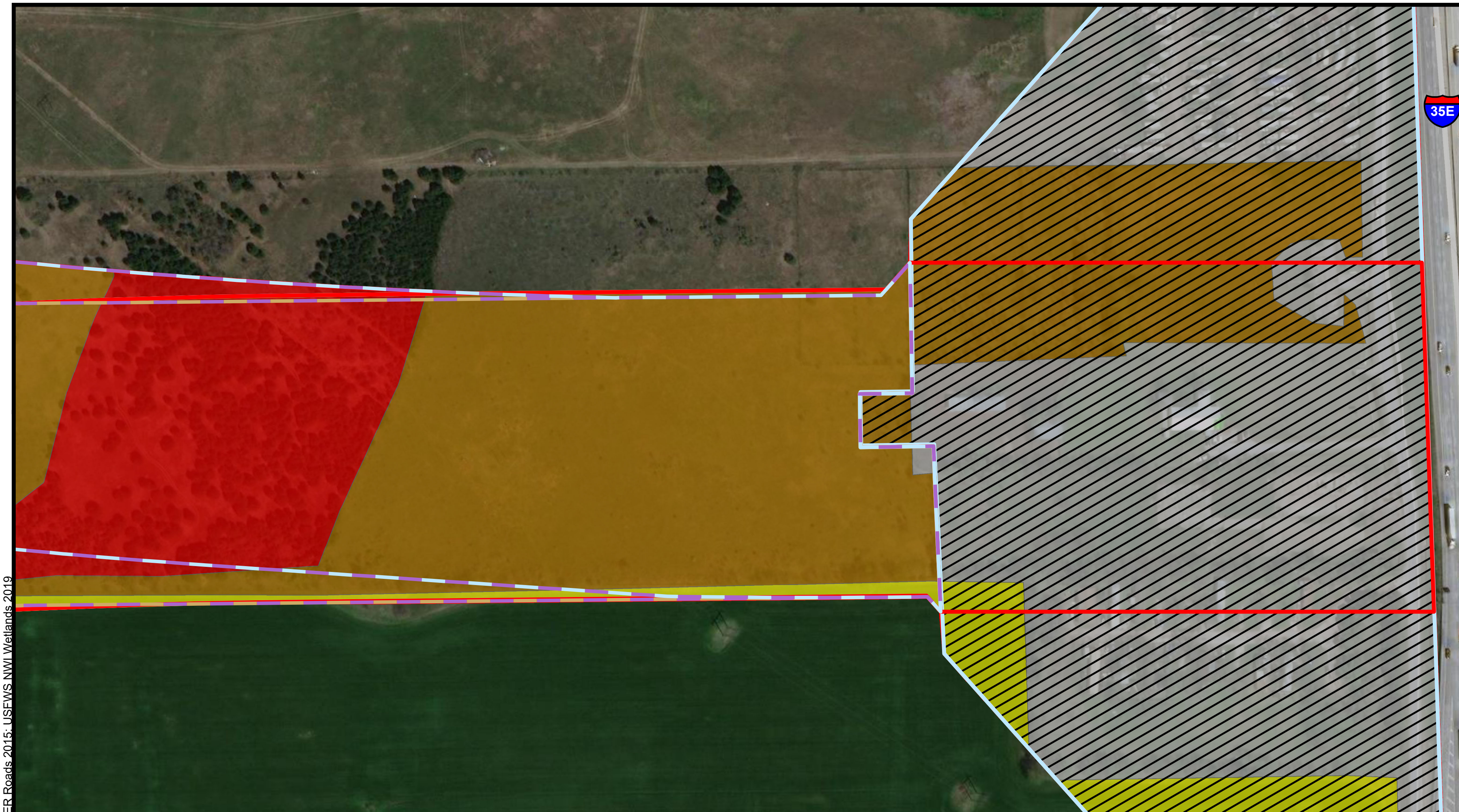
Texas Department of Transportation

N

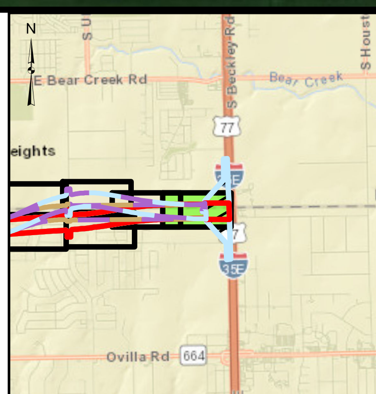
0 125 250 Feet

Figure 3
Sheet 38

Date:
July 2022



- Agriculture
- Disturbed Prairie
- Edwards Plateau
- Urban
- Mod. Option A Proposed ROW
- Mod. Option B Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW
- IH 35E Project Area (Evaluated Under Separate Document)



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Observed Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 3
SHEET 39

DATE:
JULY 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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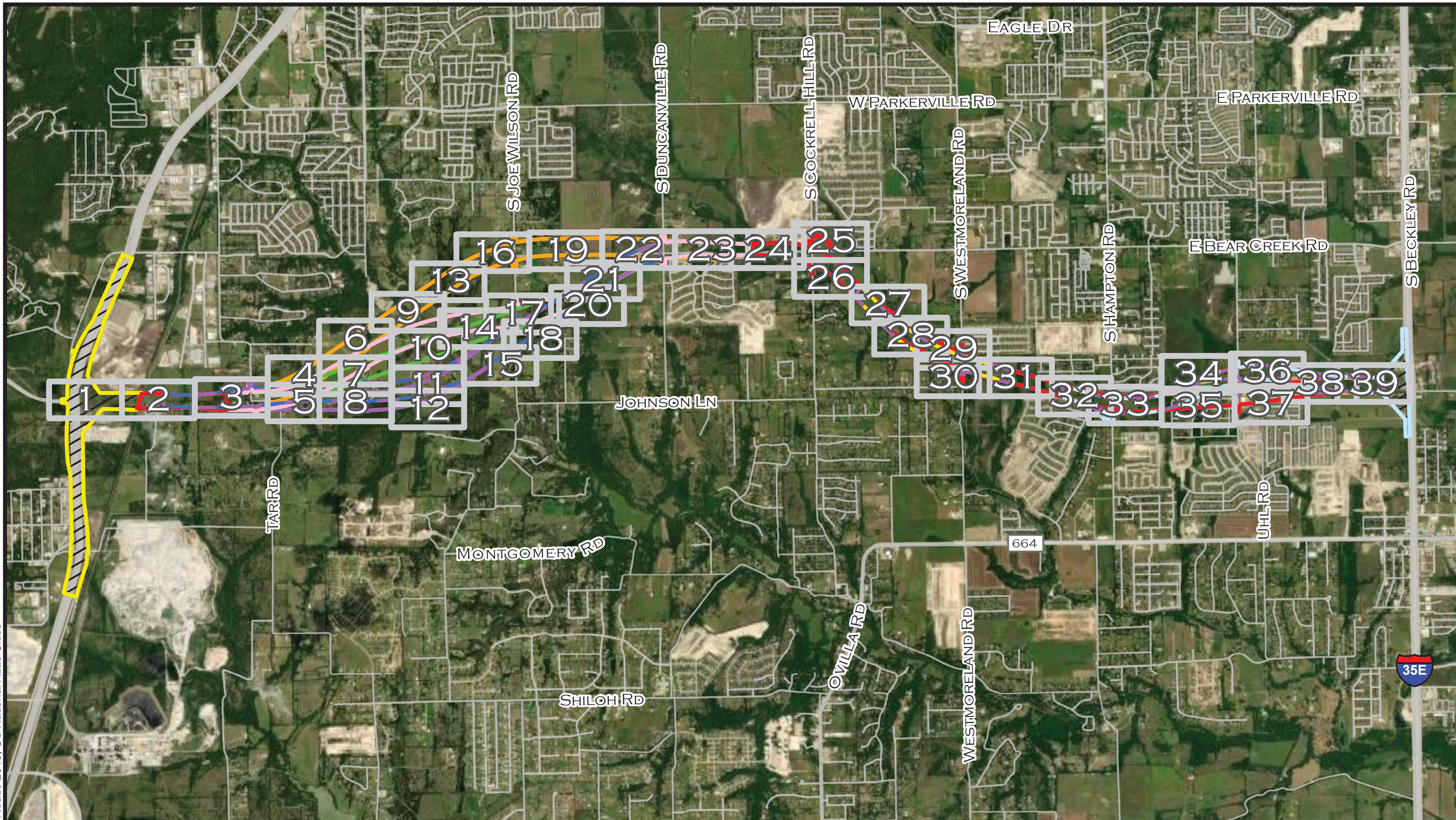
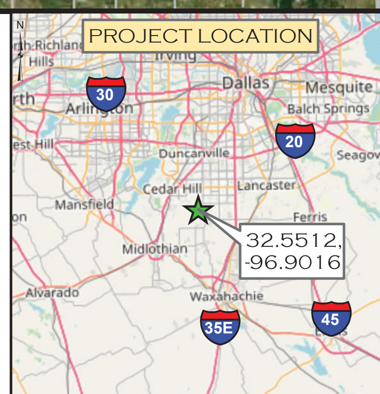


- Mod. Option A Proposed ROW
- Mod. Option B Proposed ROW
- Mod. Option C Proposed ROW
- Mod. Option D Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW
- US 67 Project Area (Evaluated Under Separate Document)
- IH 35E Project Area (Evaluated Under Separate Document)



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Mapped Habitat Type Map Overview

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 2,500 5,000 Feet

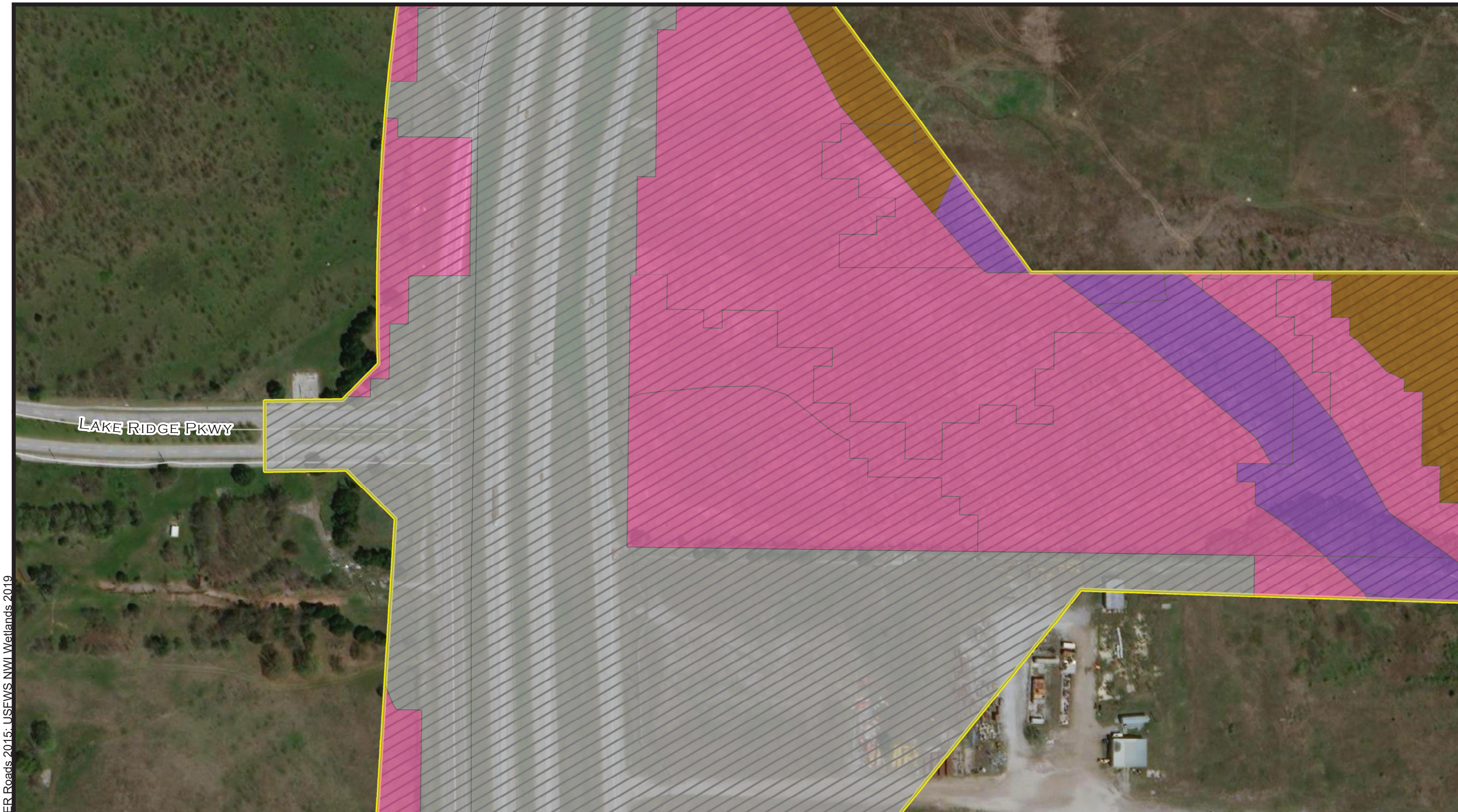
1:60,000

FIGURE 4

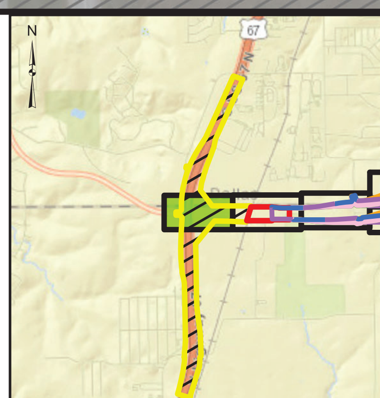
DATE:
March 2022

Sources: ESRI Imagery 2021; Open Street Map; TIGER Roads 2015; US National Atlas Cities

Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_overview_mapped.mxd | Date: 3/18/2022 | Time: 10:57:51 AM | User Name: nhahn



- Disturbed Prairie
- Edwards Plateau Savannah, Woodland, and Shrubland
- Riparian
- Urban
- US 67 Project Area (Evaluated Under Separate Document)



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

Figure 4
Sheet 1

Date:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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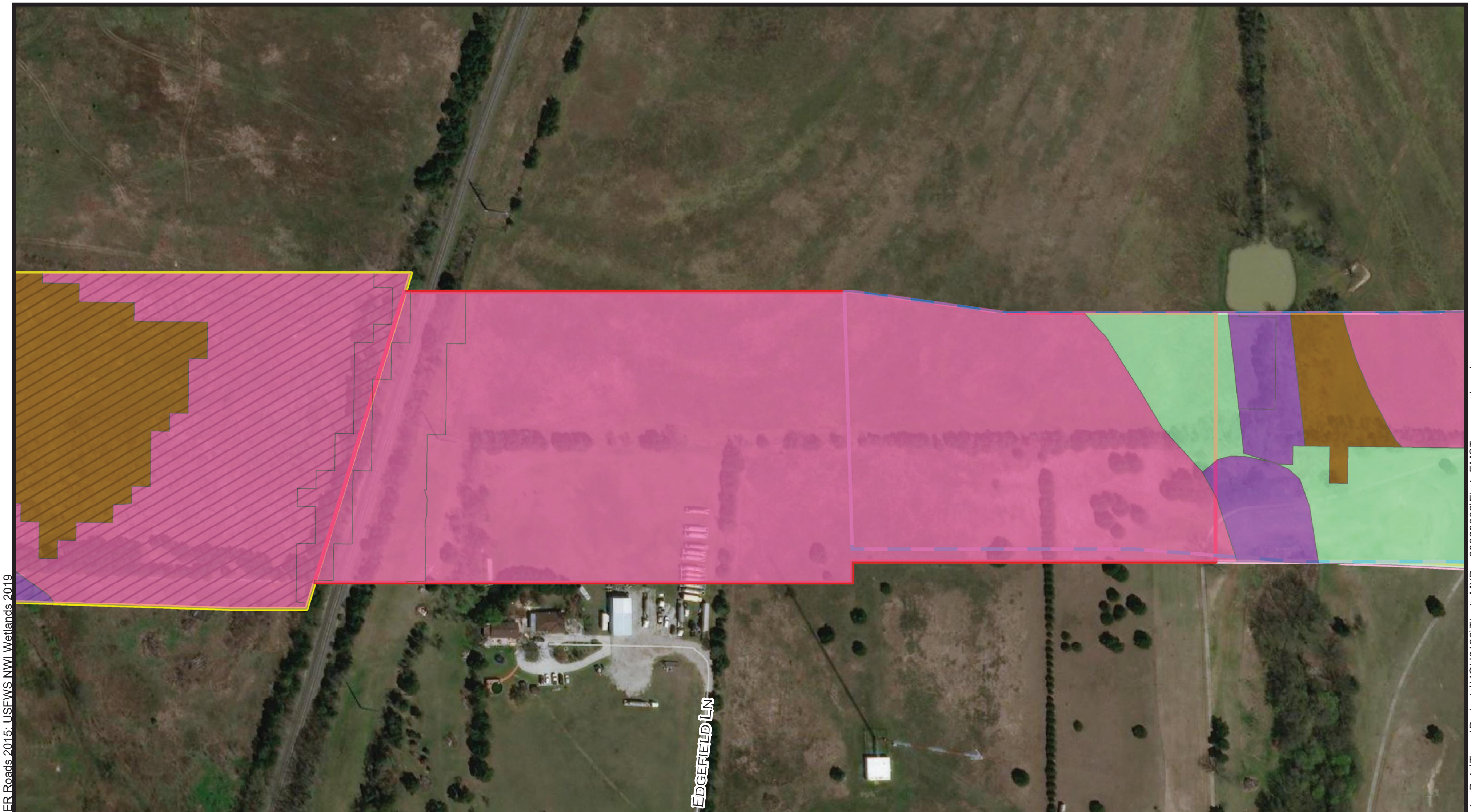
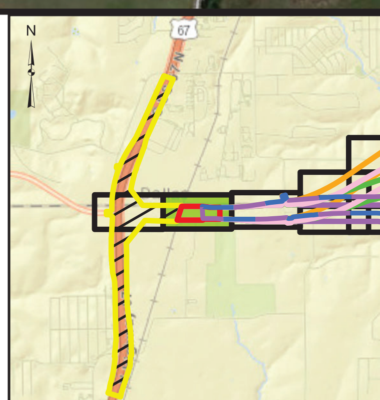


- Disturbed Prairie
- Edwards Plateau Savannah, Woodland, and Shrubland
- Riparian
- Tallgrass Prairie
- Mod. Option D Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW
- US 67 Project Area (Evaluated Under Separate Document)



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

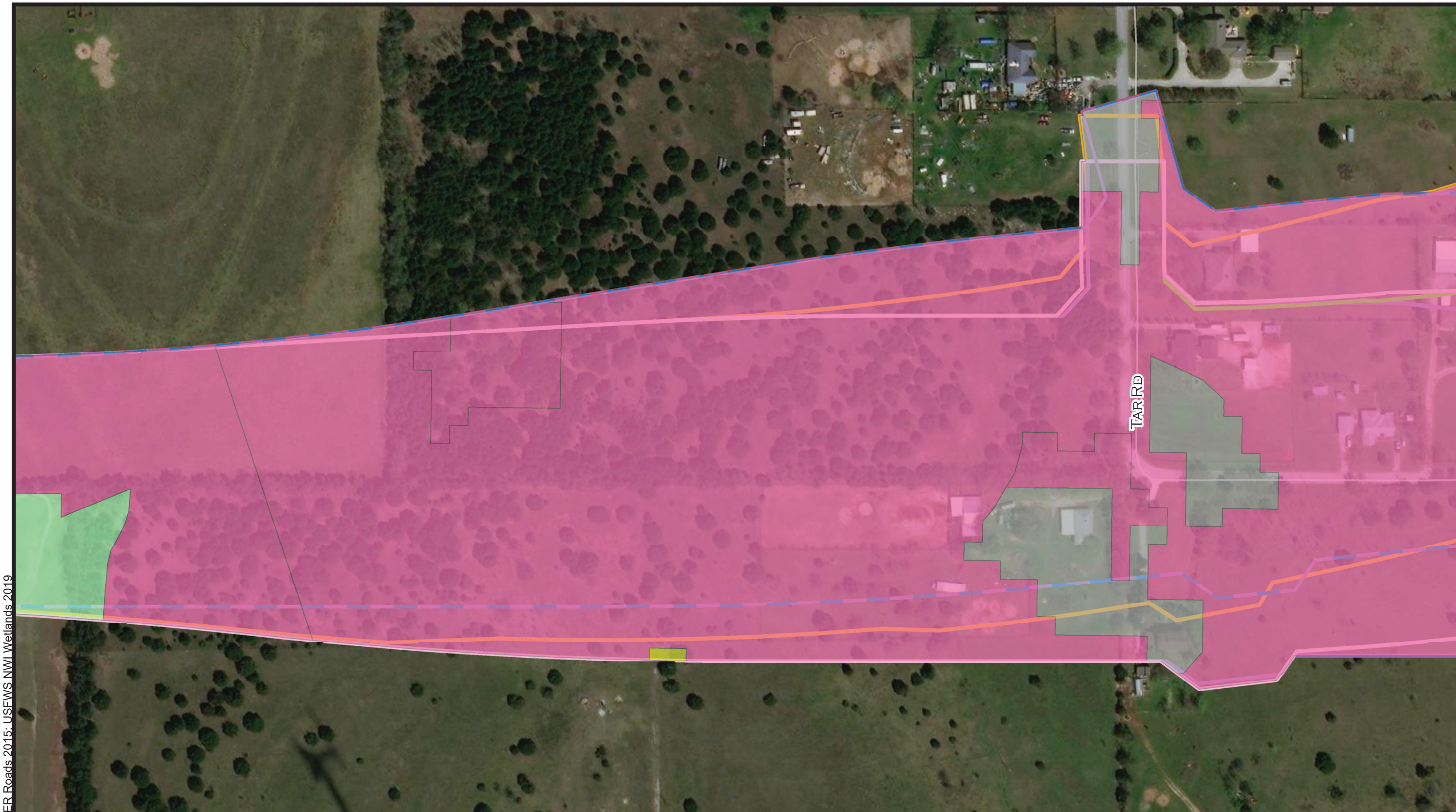
0 125 250 Feet

FIGURE 4
SHEET 2

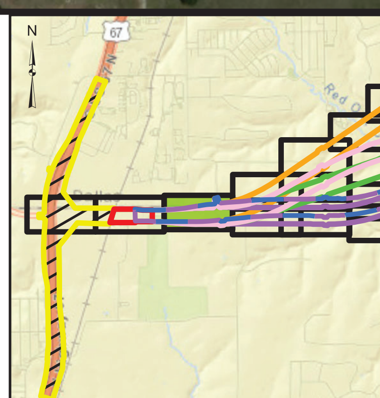
DATE:
March 2022

Sources: ESRI Aerial 2021: ESRI World Street Map: TIGER Roads 2015: USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



- Agriculture
- Edwards Plateau Savannah, Woodland, and Shrubland
- Tallgrass Prairie
- Urban
- Mod. Option D Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

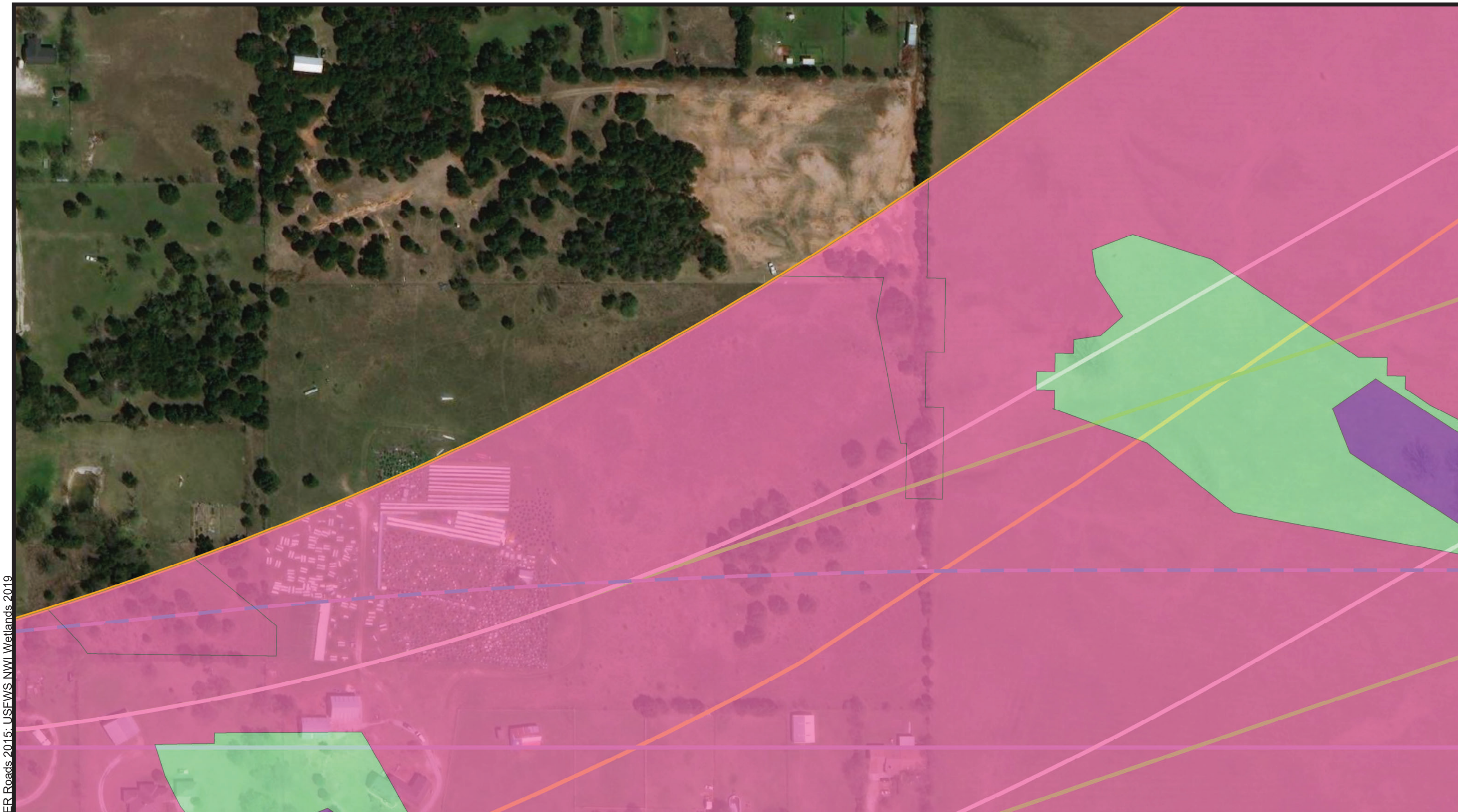
0 125 250 Feet

FIGURE 4
SHEET 3

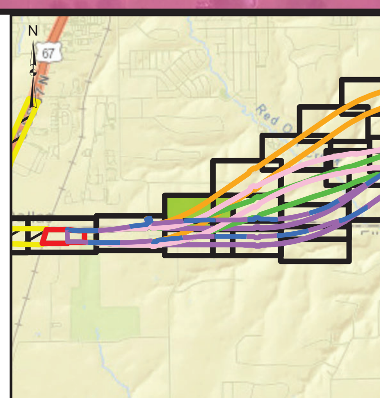
DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



- Edwards Plateau Savannah, Woodland, and Shrubland
- Riparian
- Tallgrass Prairie
- Mod. Option D Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 4
SHEET 4

DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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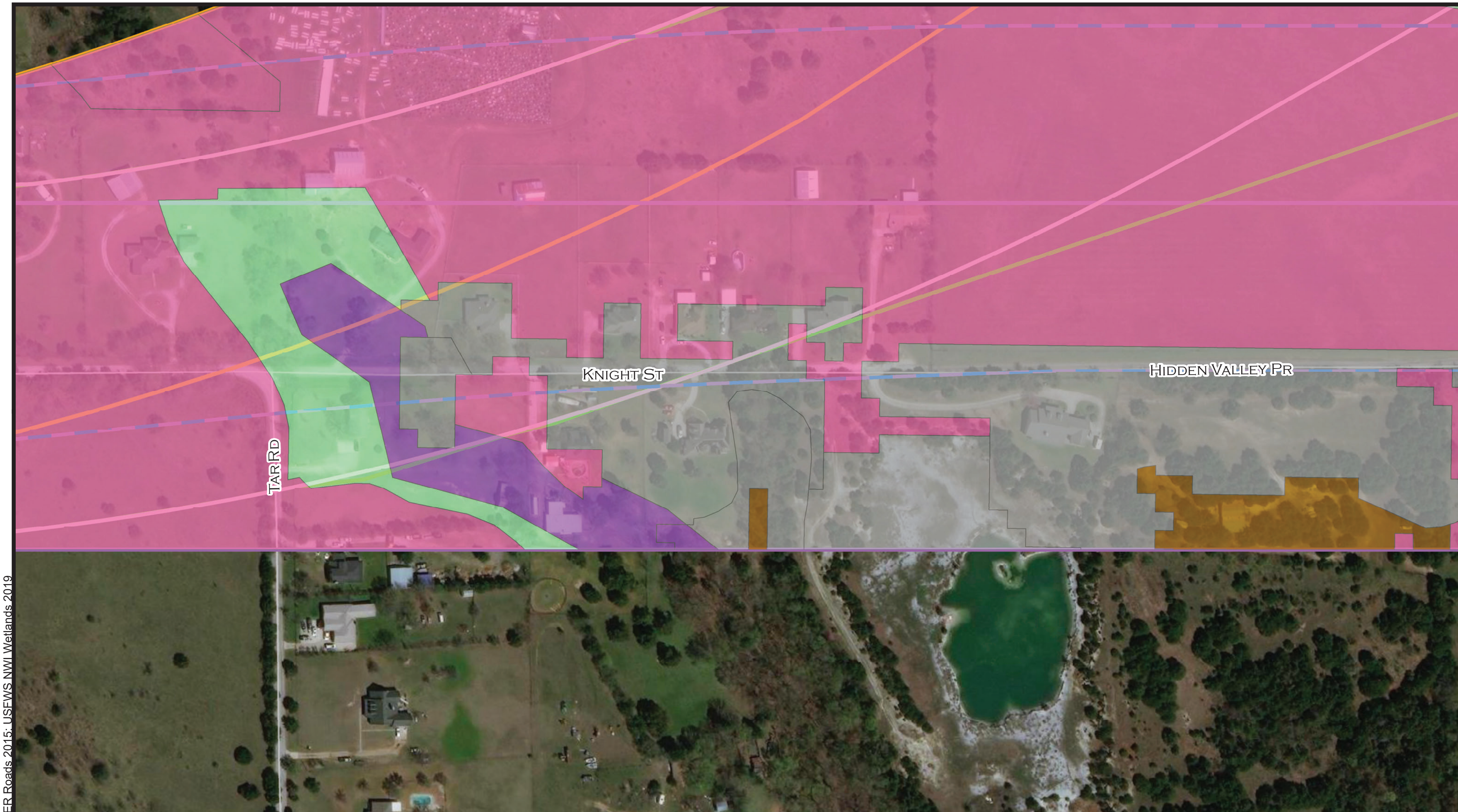
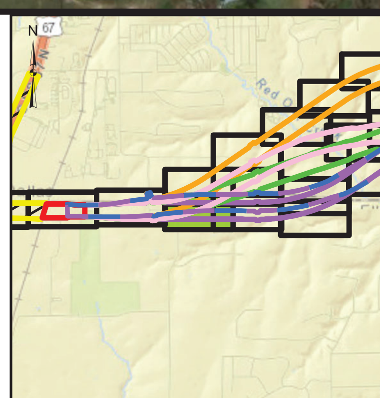


Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Riparian
Tallgrass Prairie
Urban
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

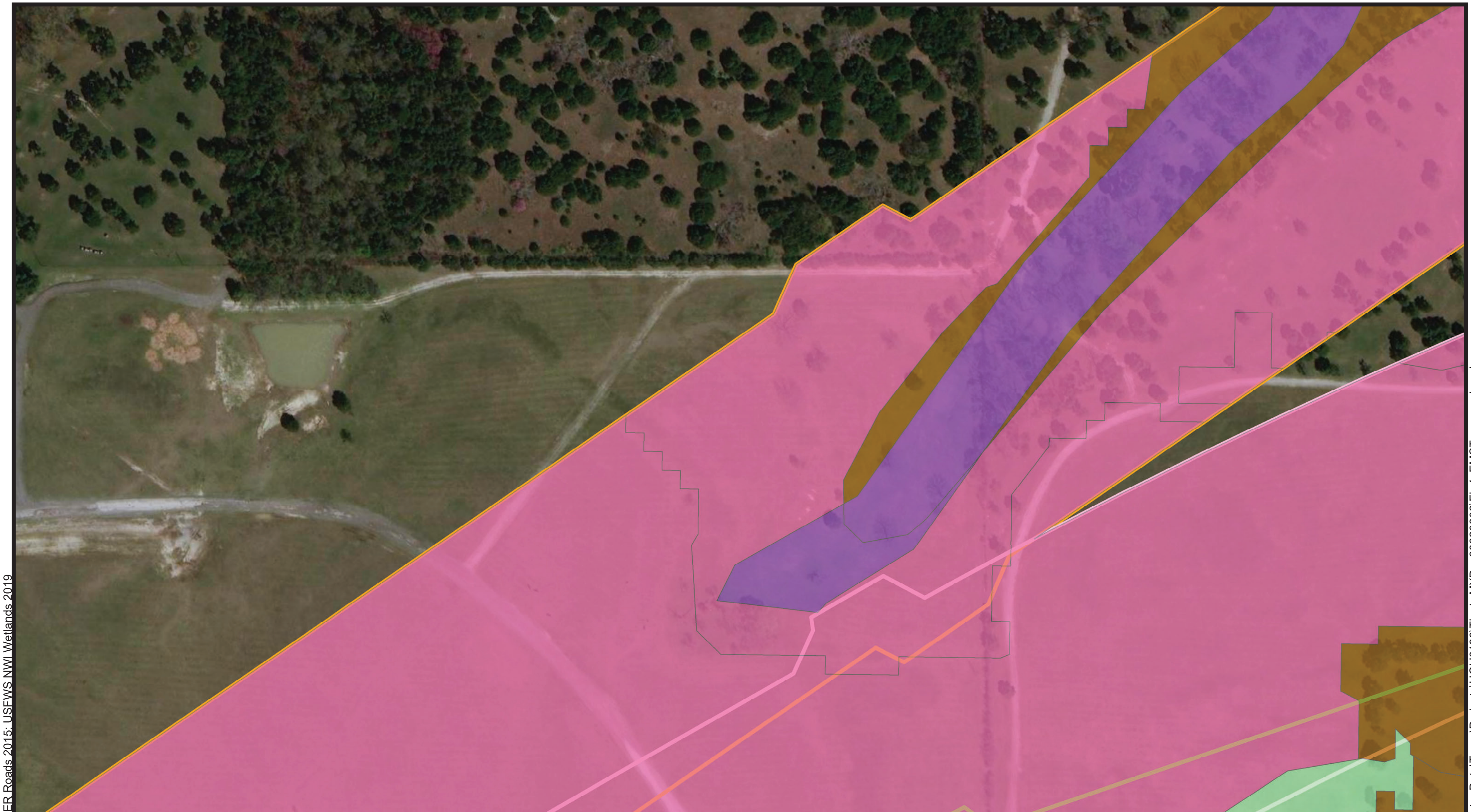
0 125 250 Feet

Figure 4
Sheet 5

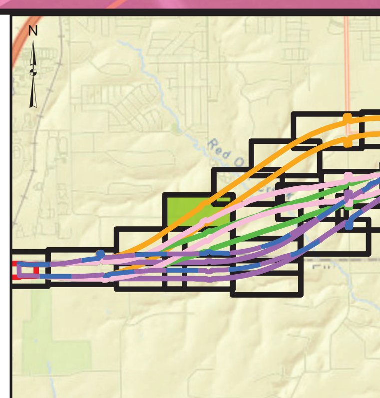
Date:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Riparian
Tallgrass Prairie
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

N
0 125 250 Feet

FIGURE 4
SHEET 6

DATE:
March 2022

Sources: ESRI Aerial 2021: ESRI World Street Map: TIGER Roads 2015: USFWS NWI Wetlands 2019

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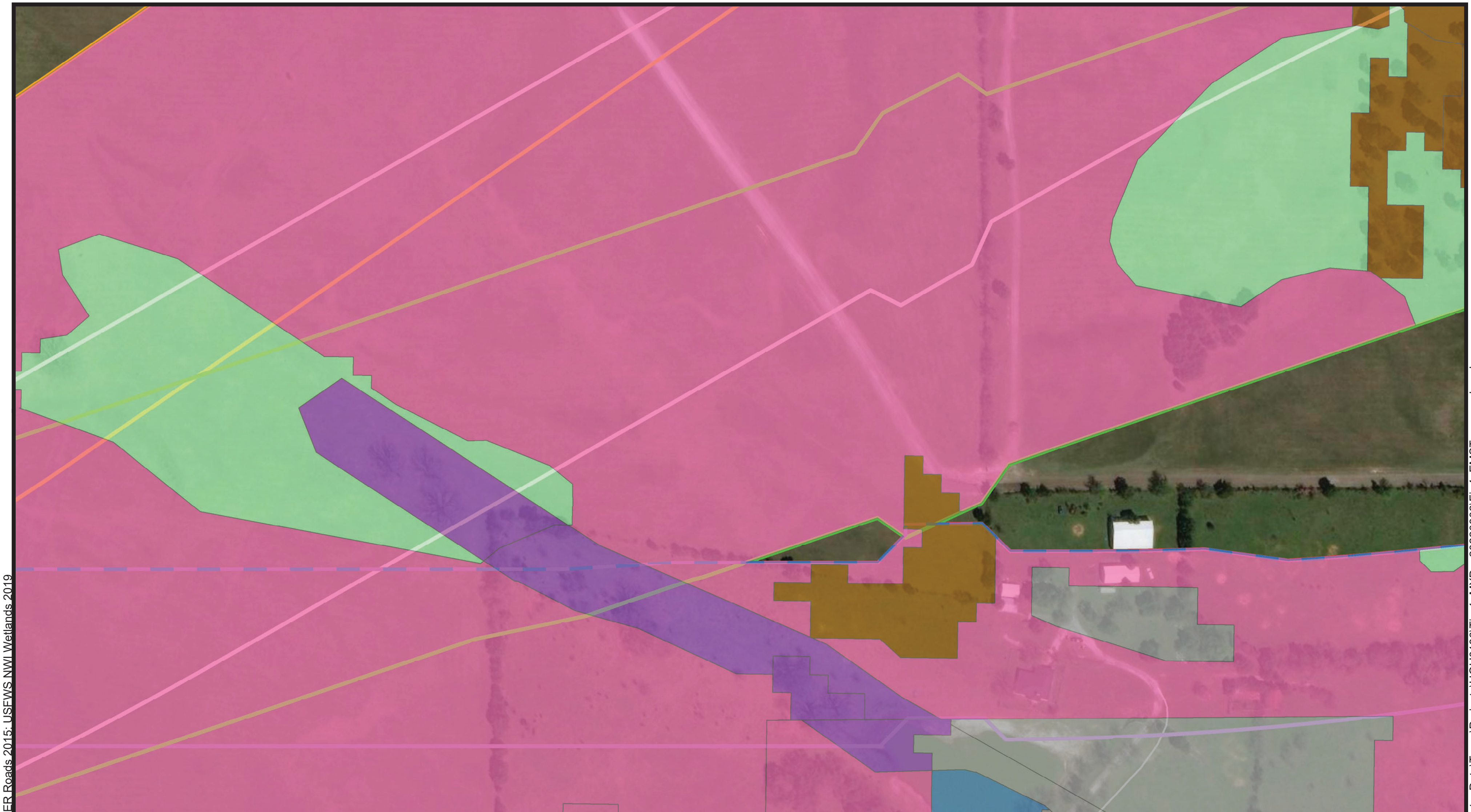
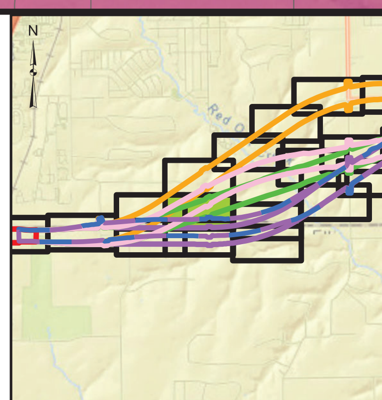


- Disturbed Prairie
- Edwards Plateau Savannah, Woodland, and Shrubland
- Open Water
- Riparian
- Tallgrass Prairie
- Urban
- Mod. Option D Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

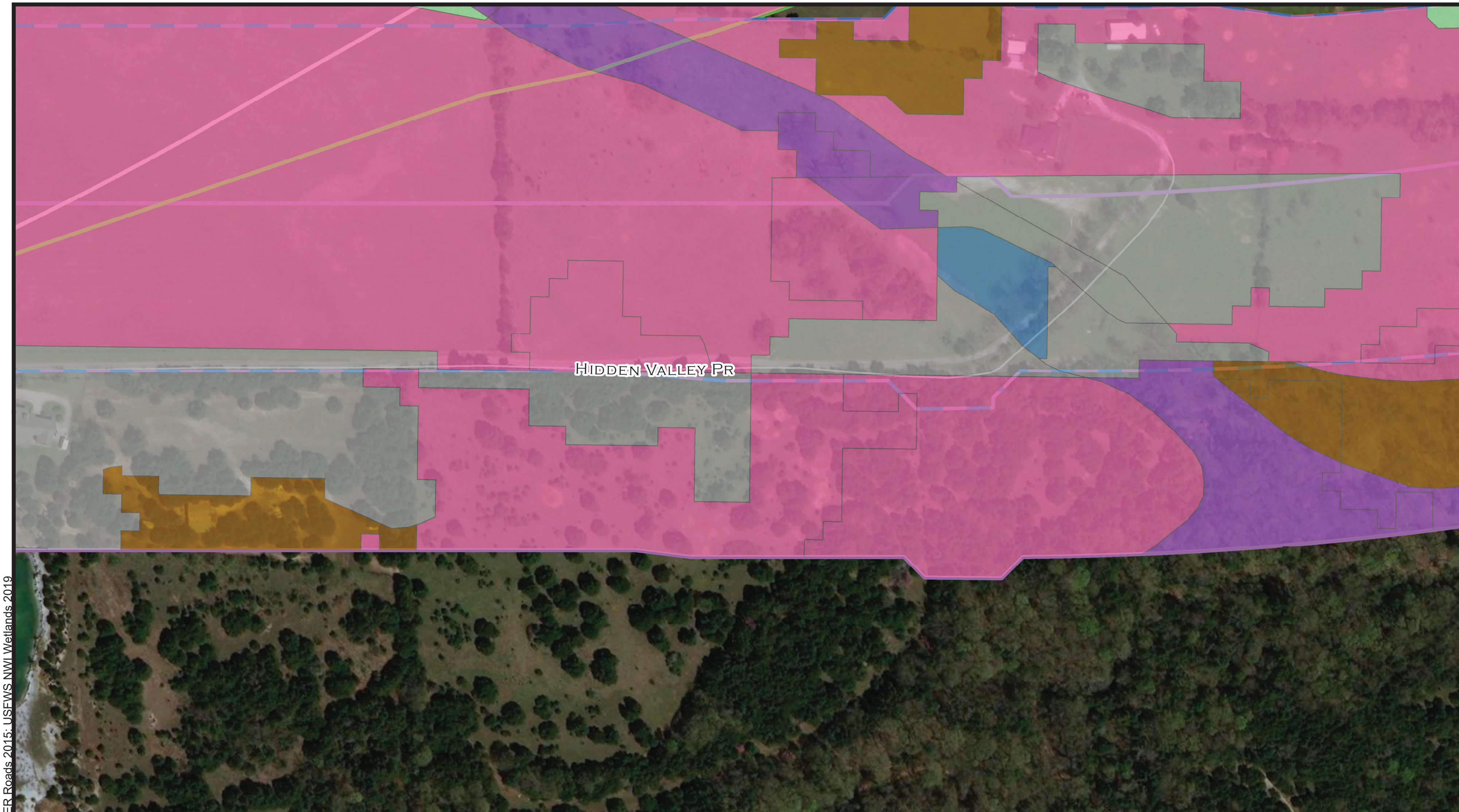
0 125 250 Feet

FIGURE 4
SHEET 7

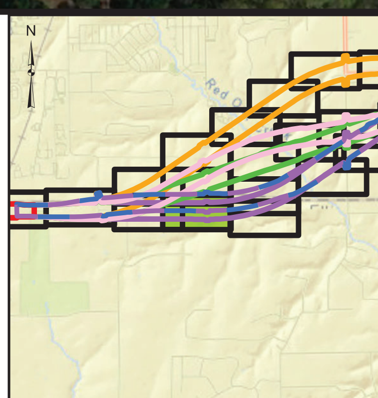
DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



- Disturbed Prairie
- Edwards Plateau Savannah, Woodland, and Shrubland
- Open Water
- Riparian
- Tallgrass Prairie
- Urban
- Mod. Option D Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

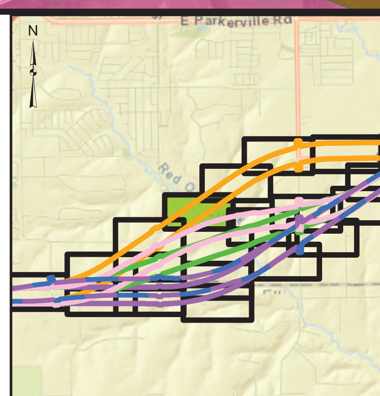
Figure 4
Sheet 8

Date:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd

- Disturbed Prairie
- Edwards Plateau Savannah, Woodland, and Shrubland
- Riparian
- Alternative 1 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

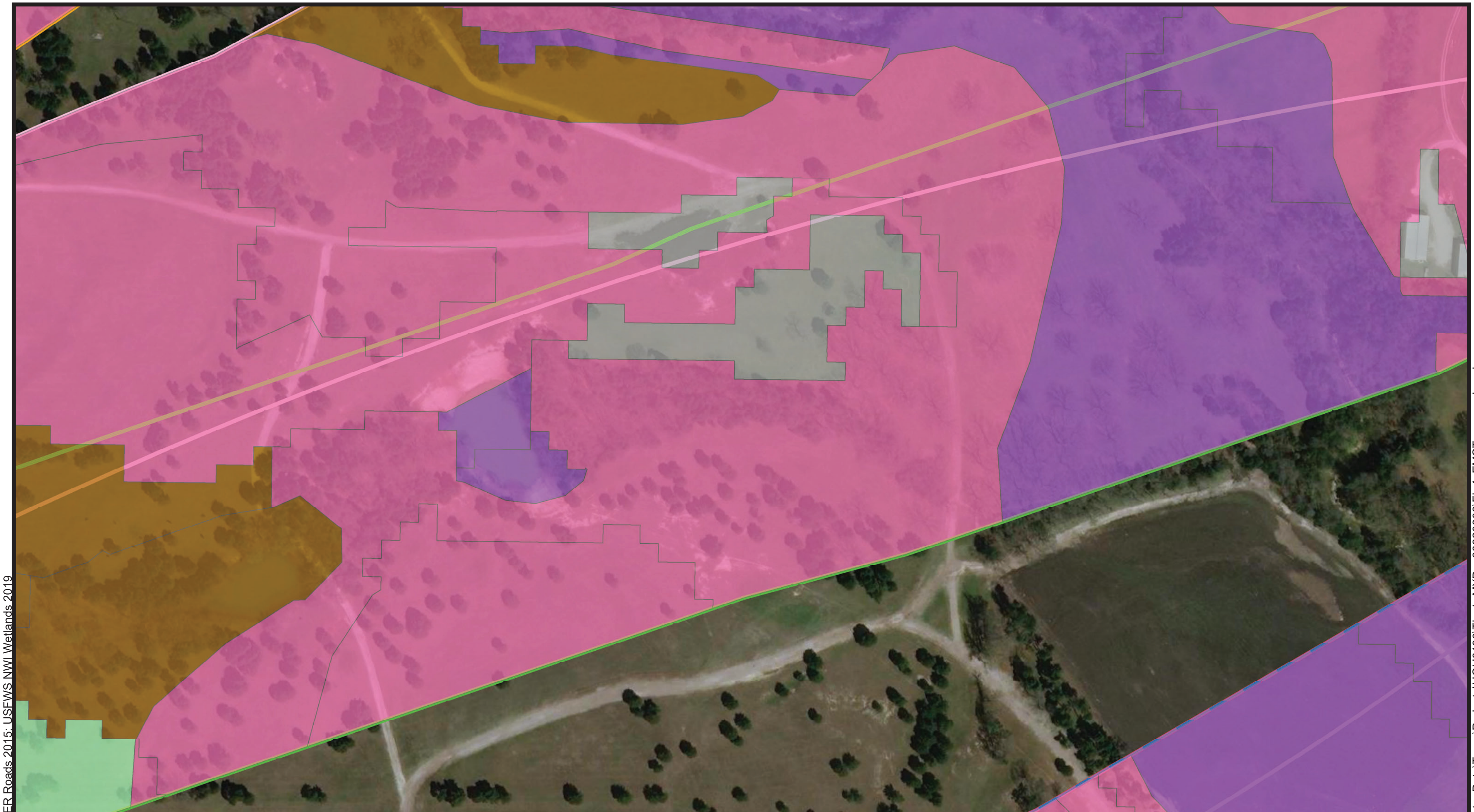
0 125 250 Feet

Figure 4
Sheet 9

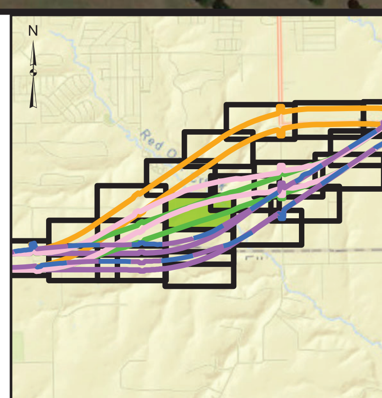
Date:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



- Disturbed Prairie
- Edwards Plateau Savannah, Woodland, and Shrubland
- Riparian
- Tallgrass Prairie
- Urban
- Mod. Option D Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 4
SHEET 10

DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019.

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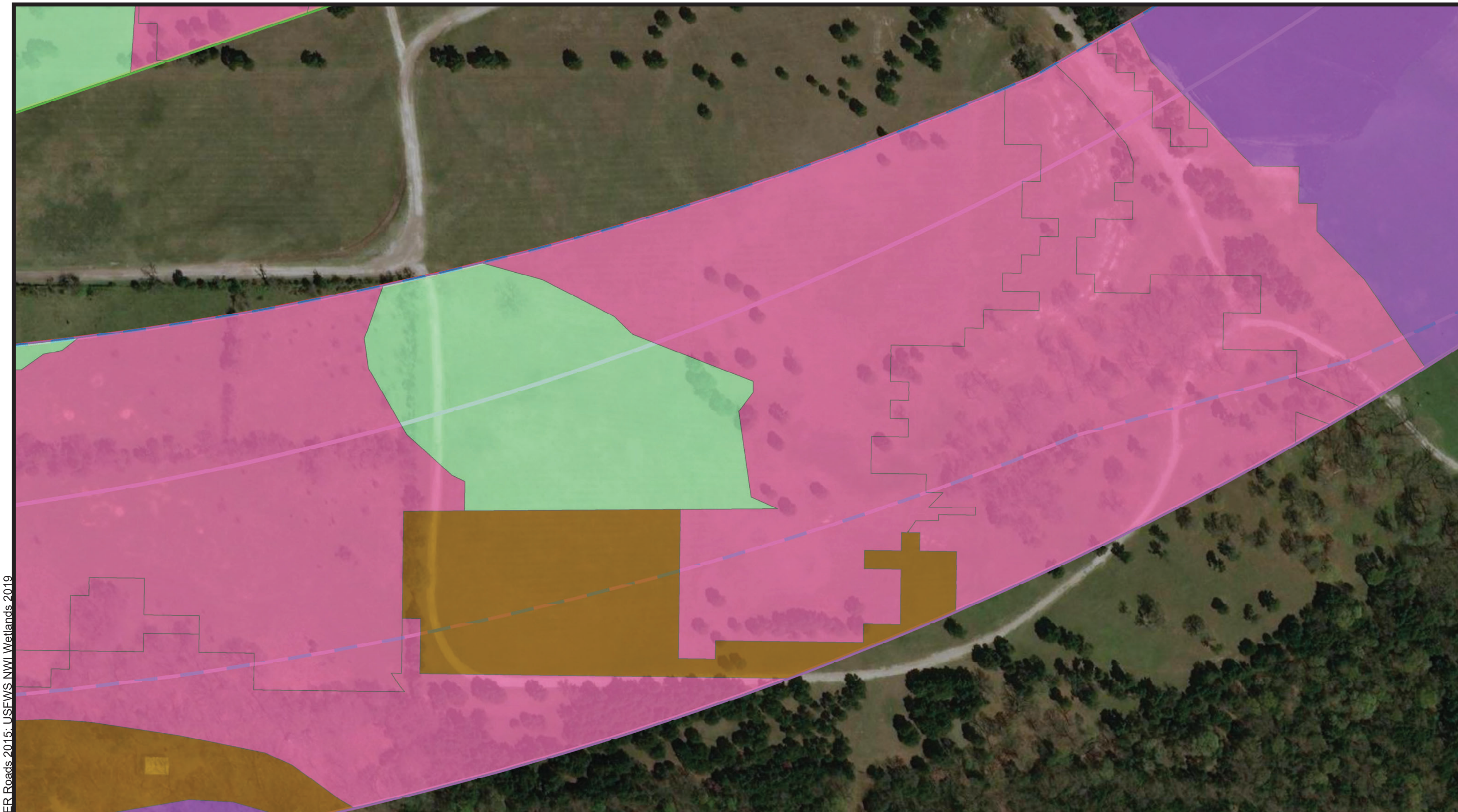
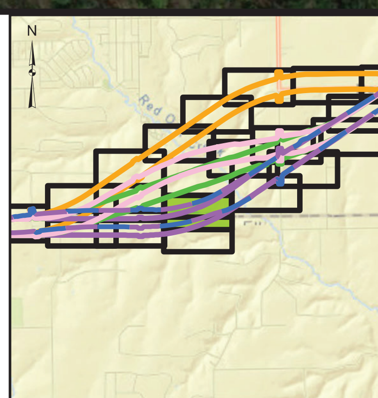


Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Riparian
Tallgrass Prairie
Mod. Option D Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

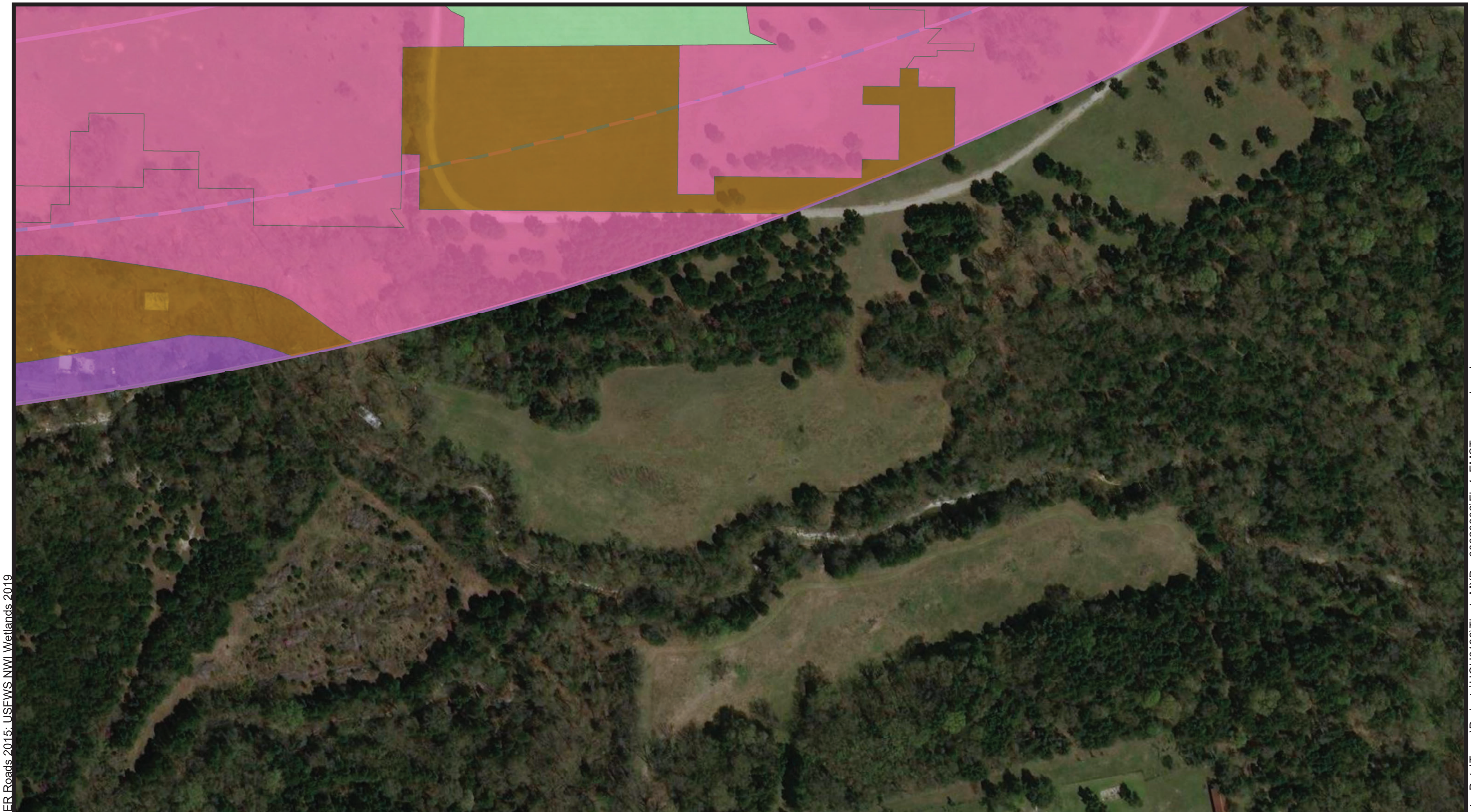
0 125 250 Feet

FIGURE 4
SHEET 11

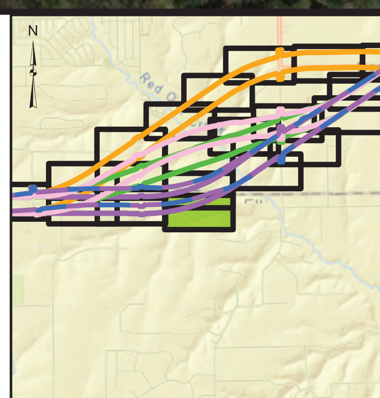
DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Riparian
Tallgrass Prairie
Mod. Option D Proposed ROW
Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 4
SHEET 12

DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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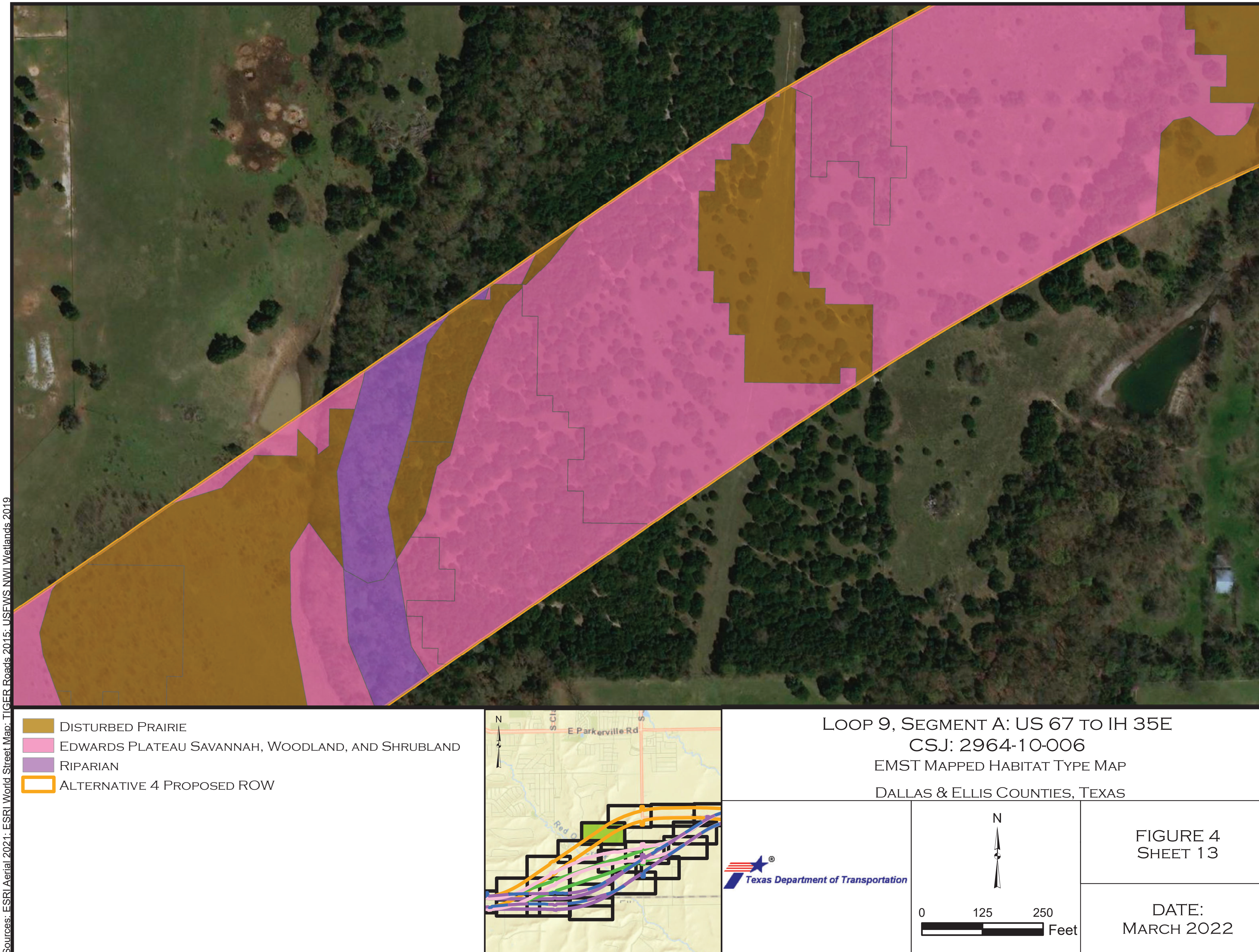


Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map
Dallas & Ellis Counties, Texas

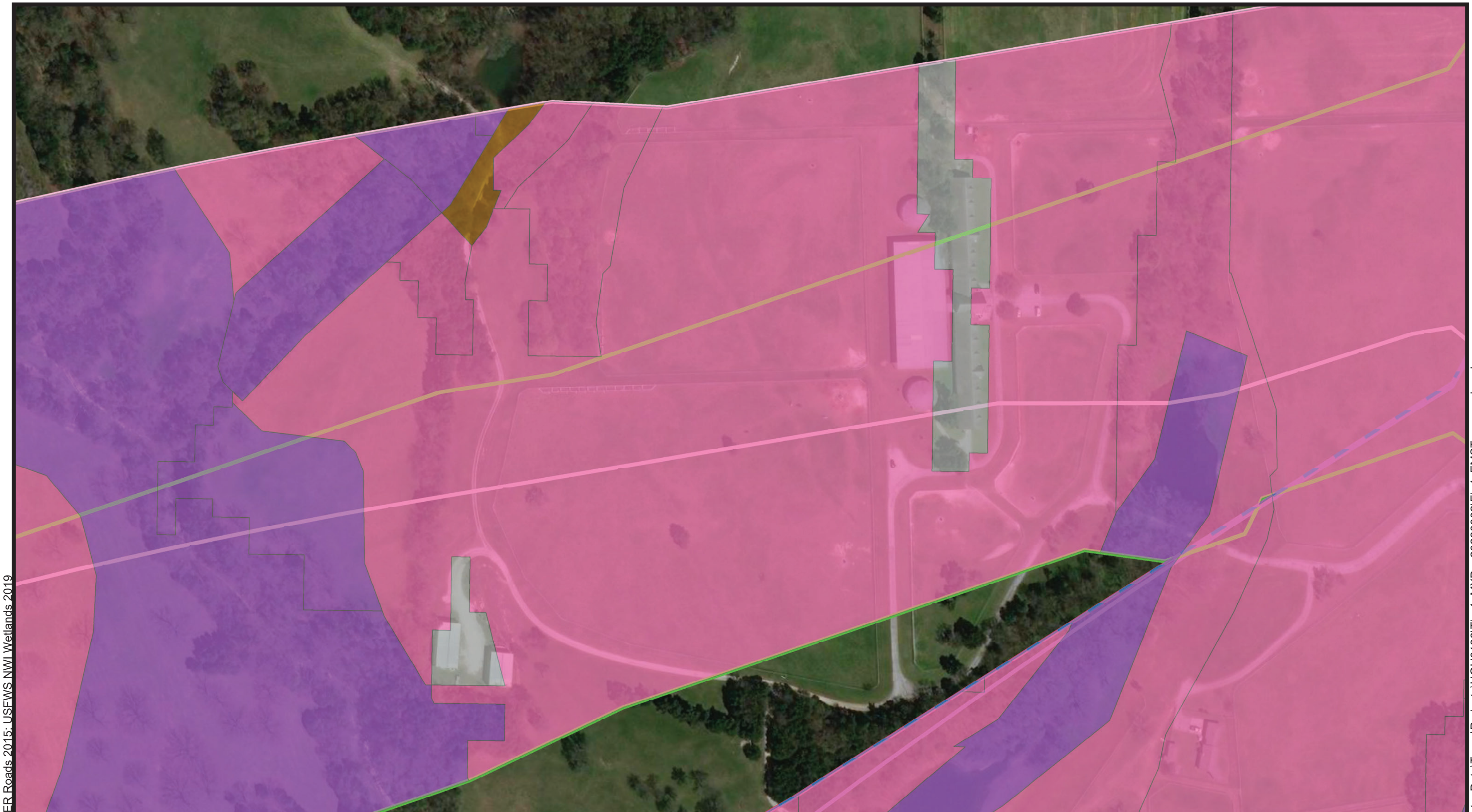
Texas Department of Transportation

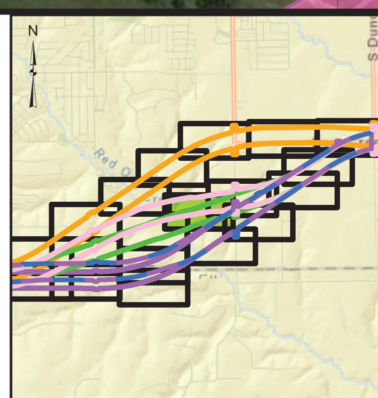
FIGURE 4
SHEET 13

DATE:
March 2022

Sources: ESRI Aerial 2021: ESRI World Street Map: TIGER Roads 2015: USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd





Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Riparian
Urban
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW

Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

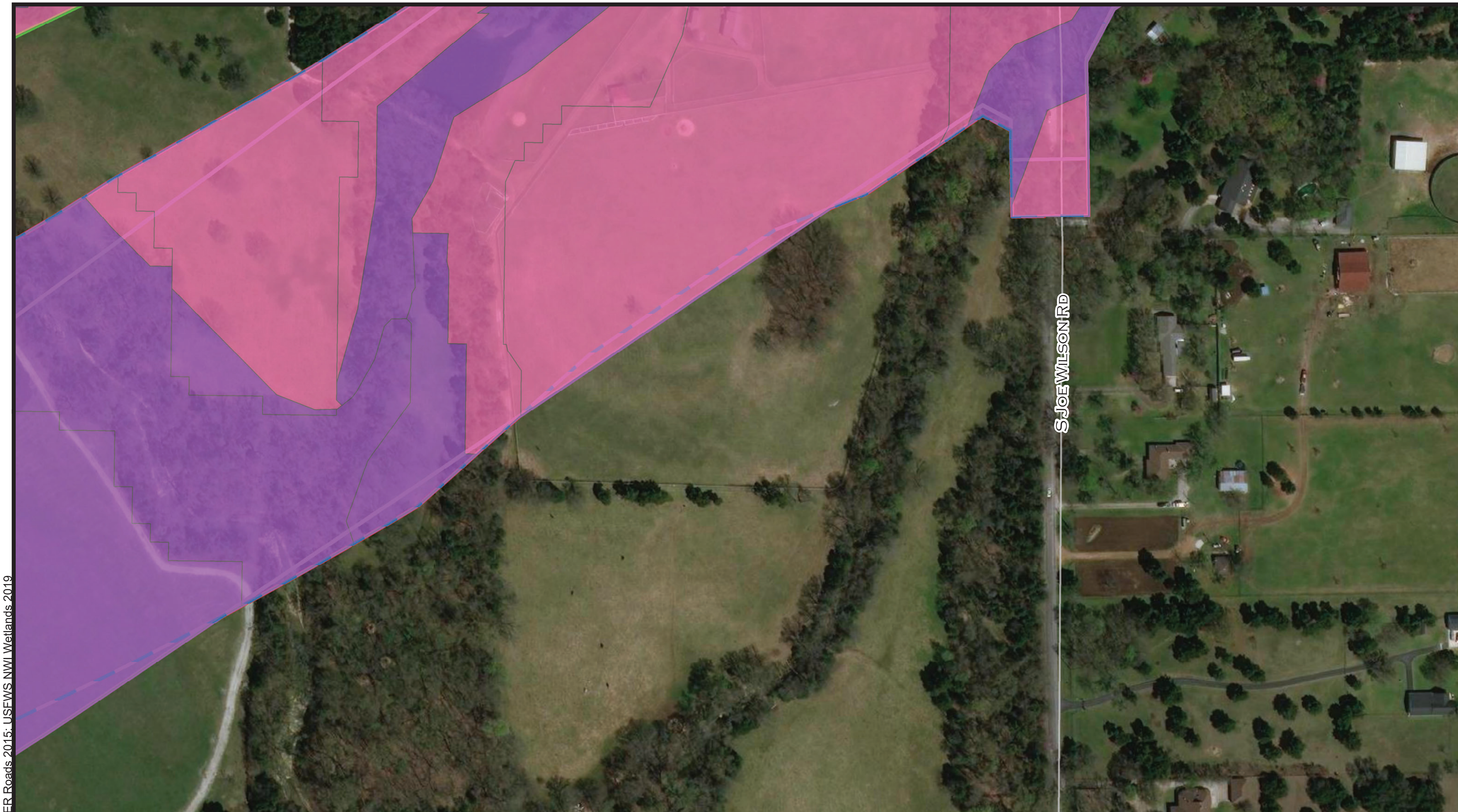
0 125 250 Feet

FIGURE 4
SHEET 14

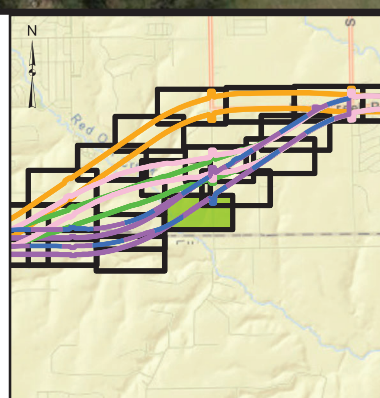
DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



Edwards Plateau Savannah, Woodland, and Shrubland
Riparian
Mod. Option D Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

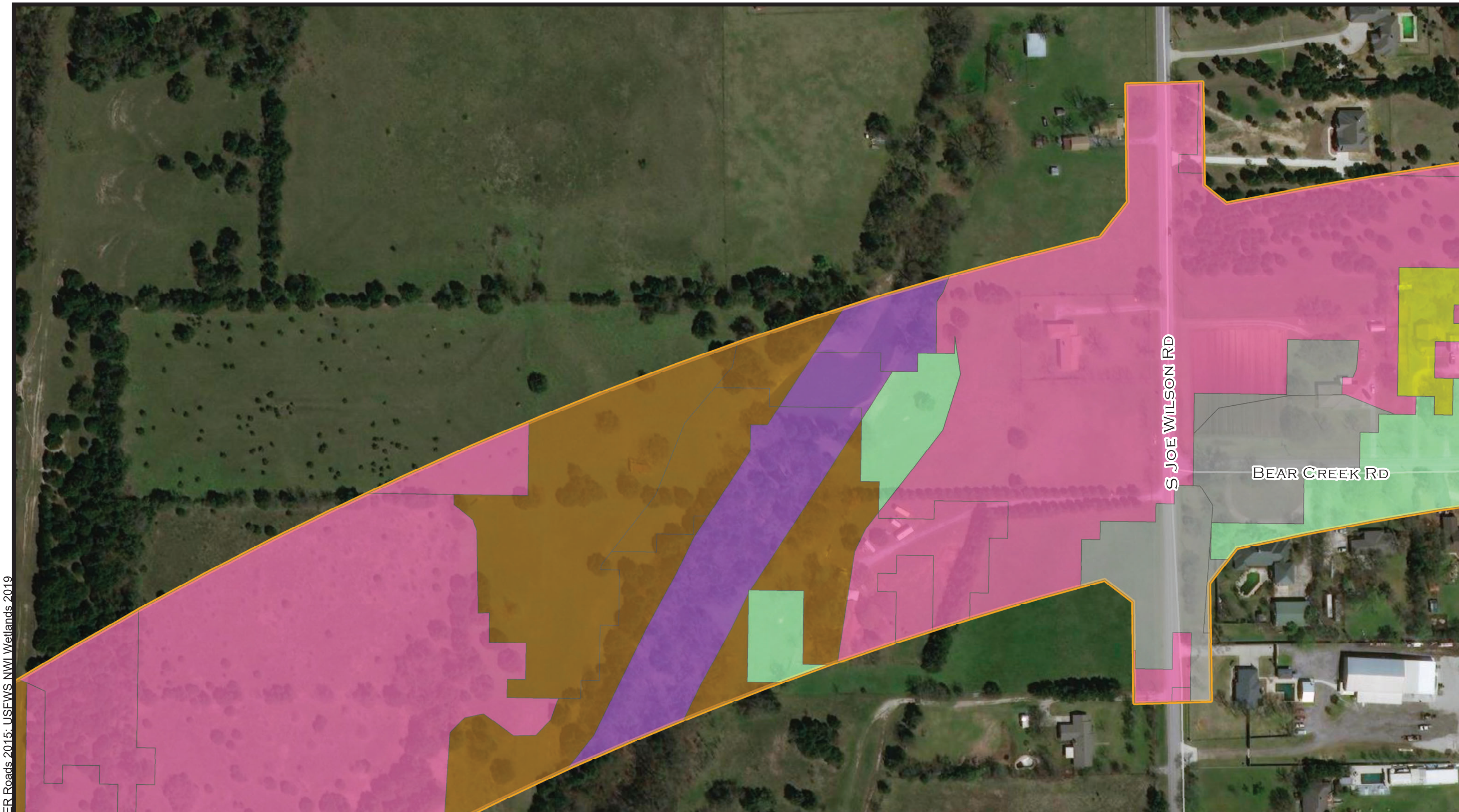
0 125 250 Feet

FIGURE 4
SHEET 15

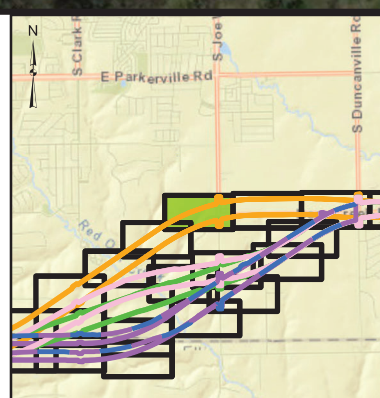
DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



Agriculture
Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Riparian
Tallgrass Prairie
Urban
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 4
SHEET 16

DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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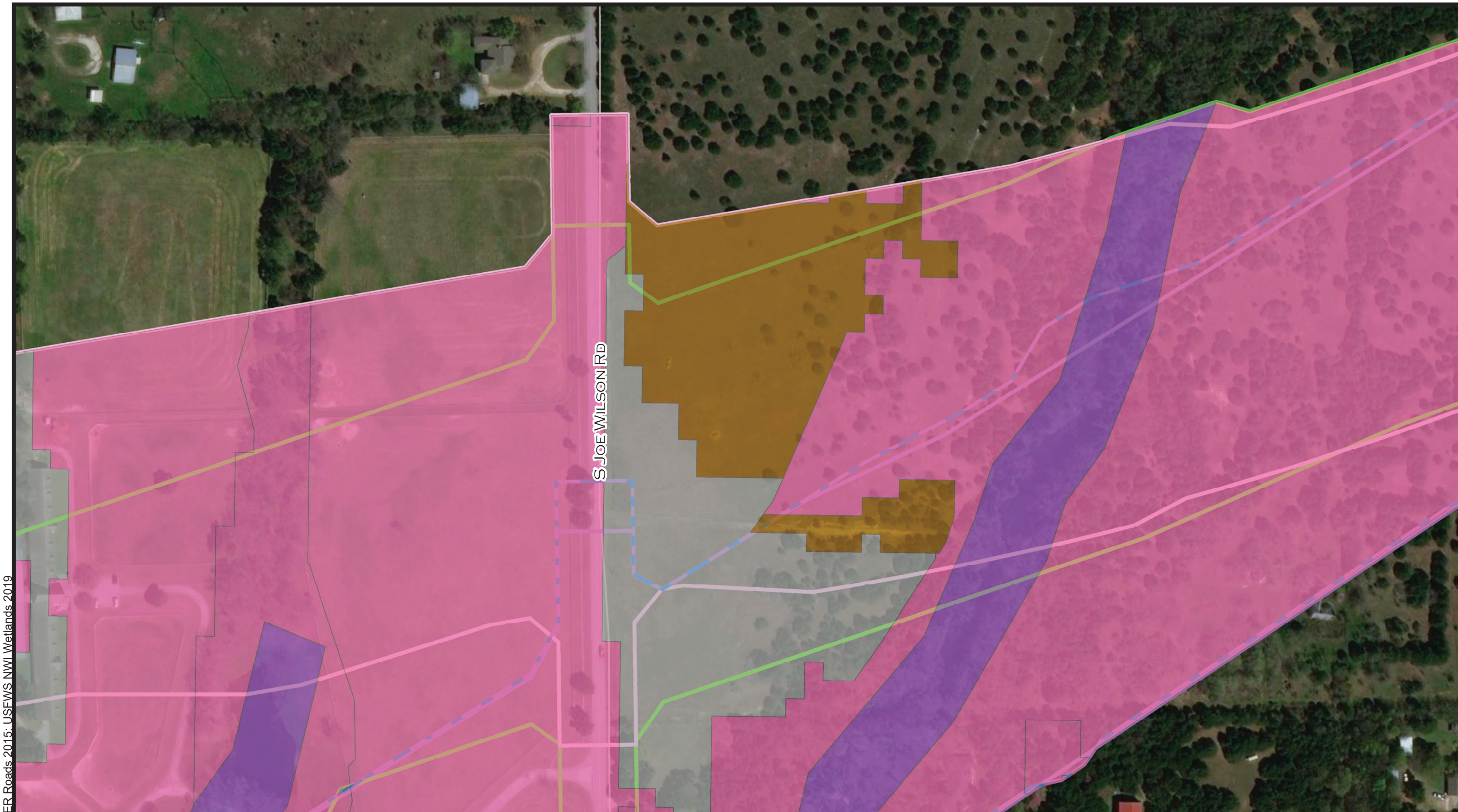
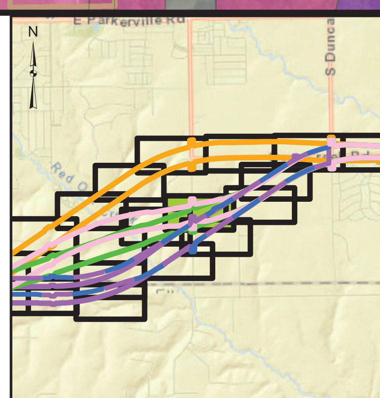


Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Riparian
Urban
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

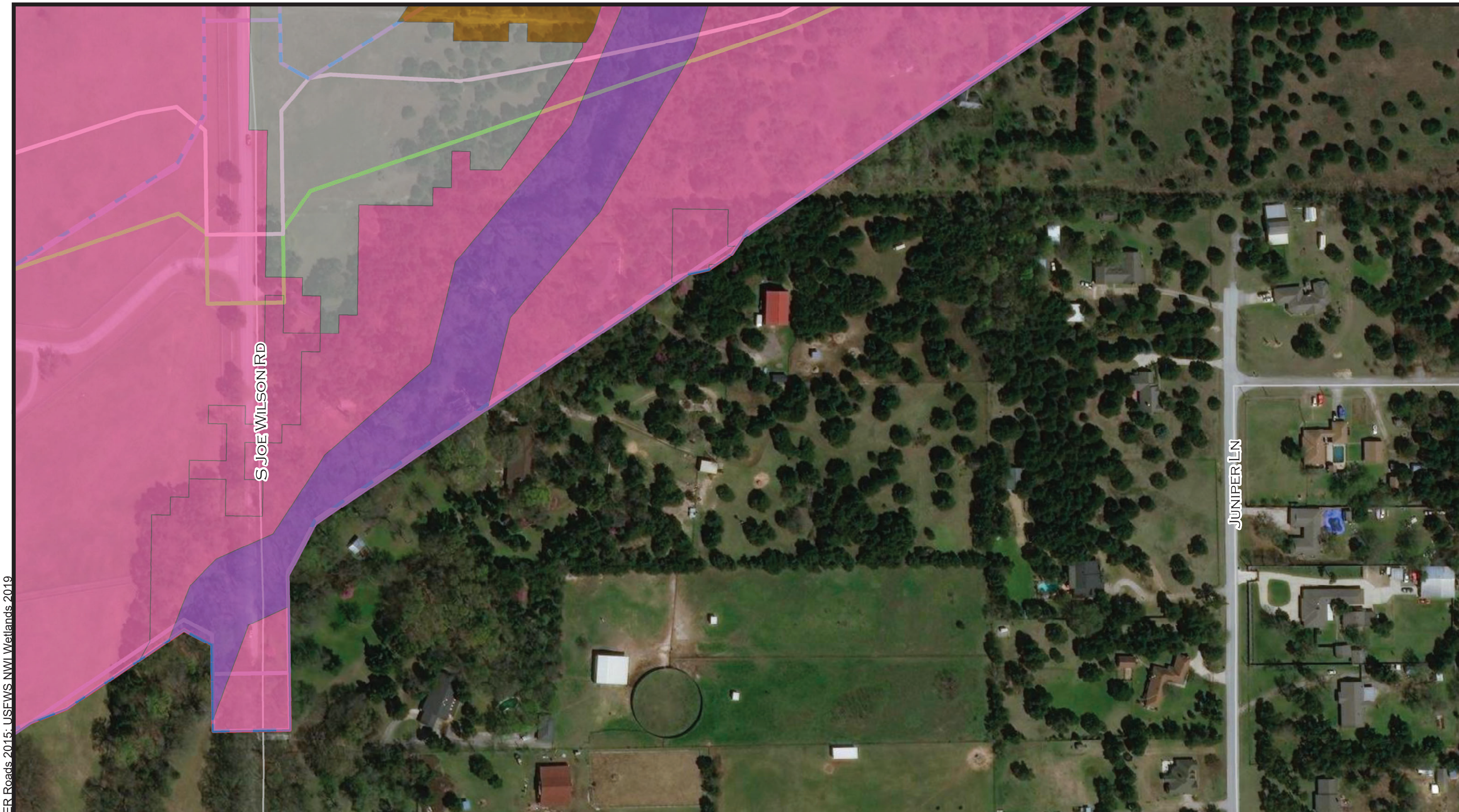
0 125 250 Feet

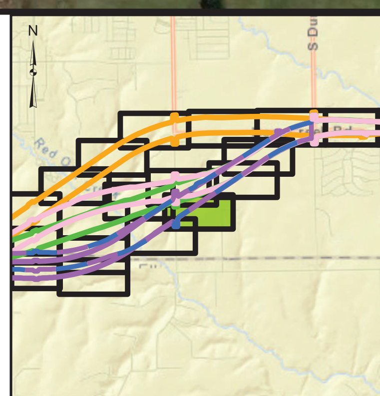
FIGURE 4
SHEET 17

DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd





Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Riparian
Urban
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW

Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

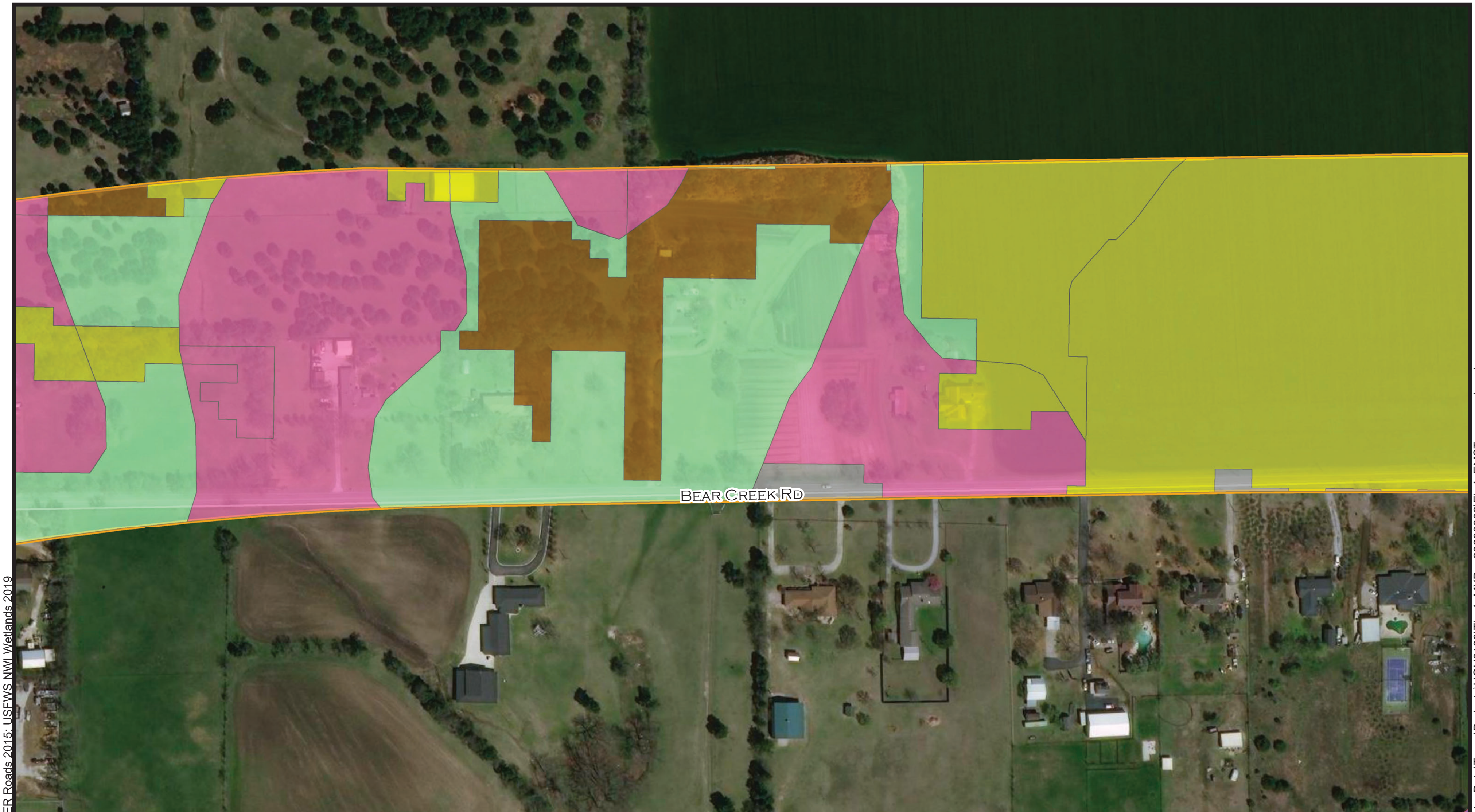
N
0 125 250 Feet

FIGURE 4
SHEET 18

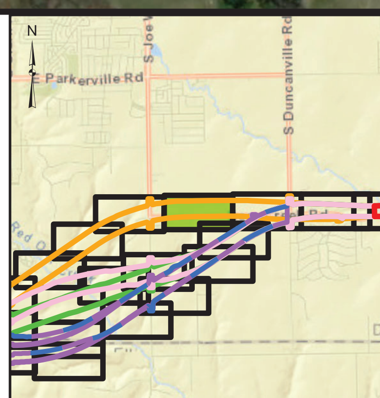
DATE:
MARCH 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



Agriculture
Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Tallgrass Prairie
Urban
Mod. Option D Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

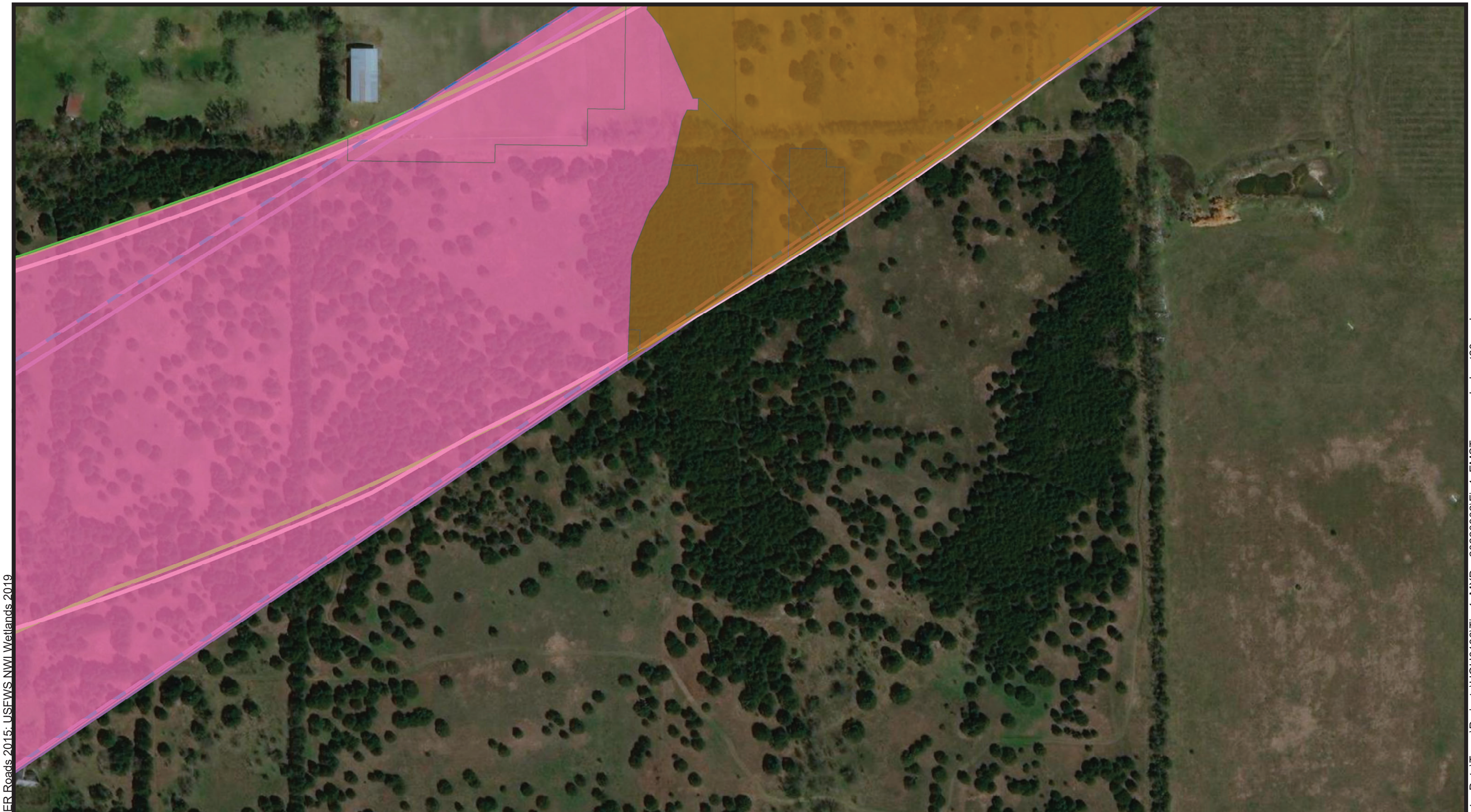
0 125 250 Feet

Figure 4
Sheet 19

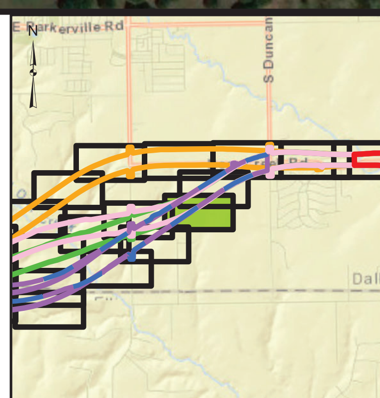
Date:
March 2022

Sources: ESRI Aerial 2021: ESRI World Street Map: TIGER Roads 2015: USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250
Feet

FIGURE 4
SHEET 20

DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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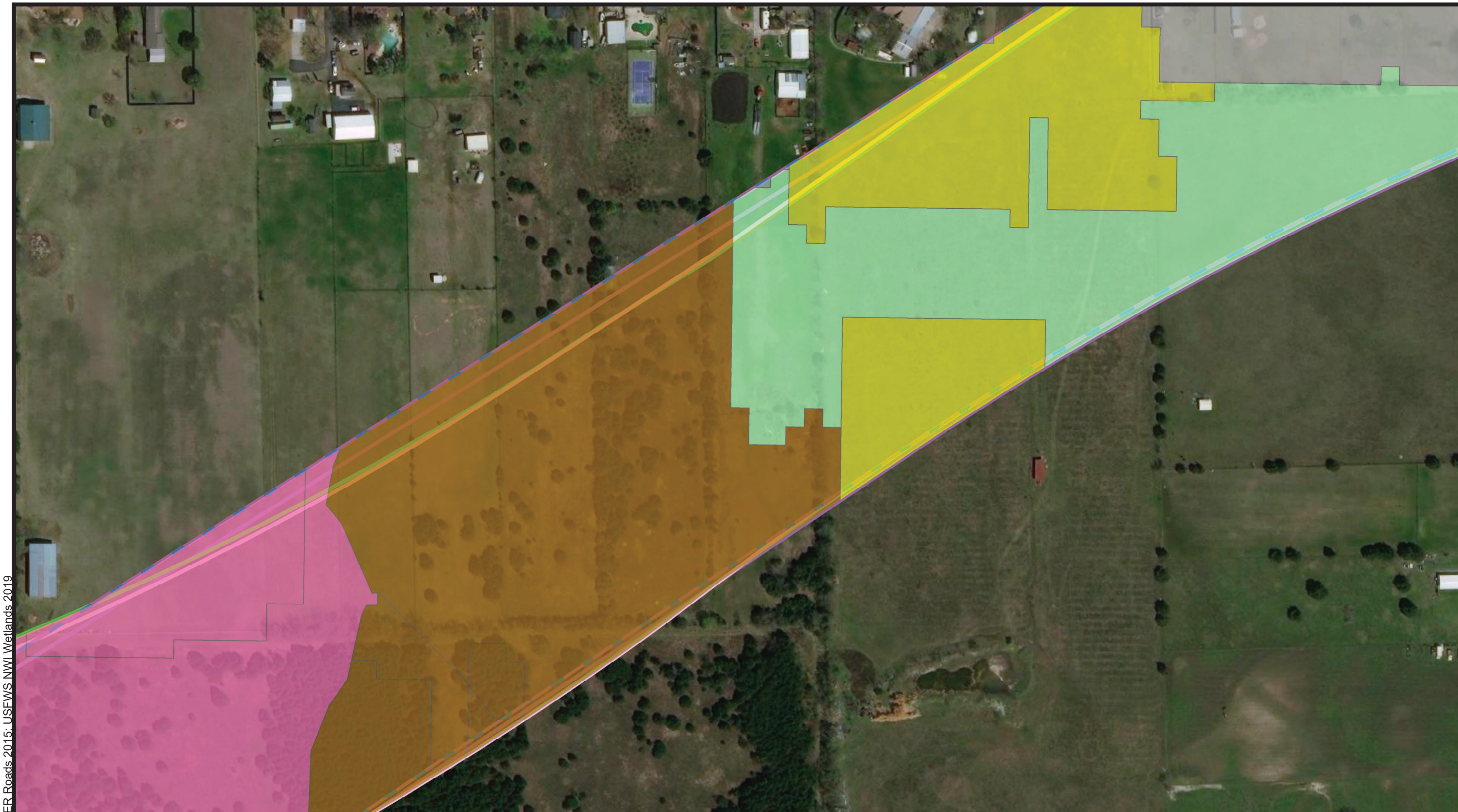
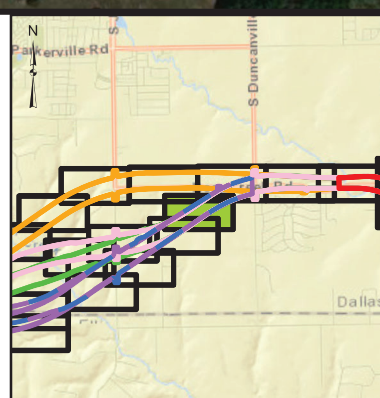


Agriculture
Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Tallgrass Prairie
Urban
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 4
SHEET 21

DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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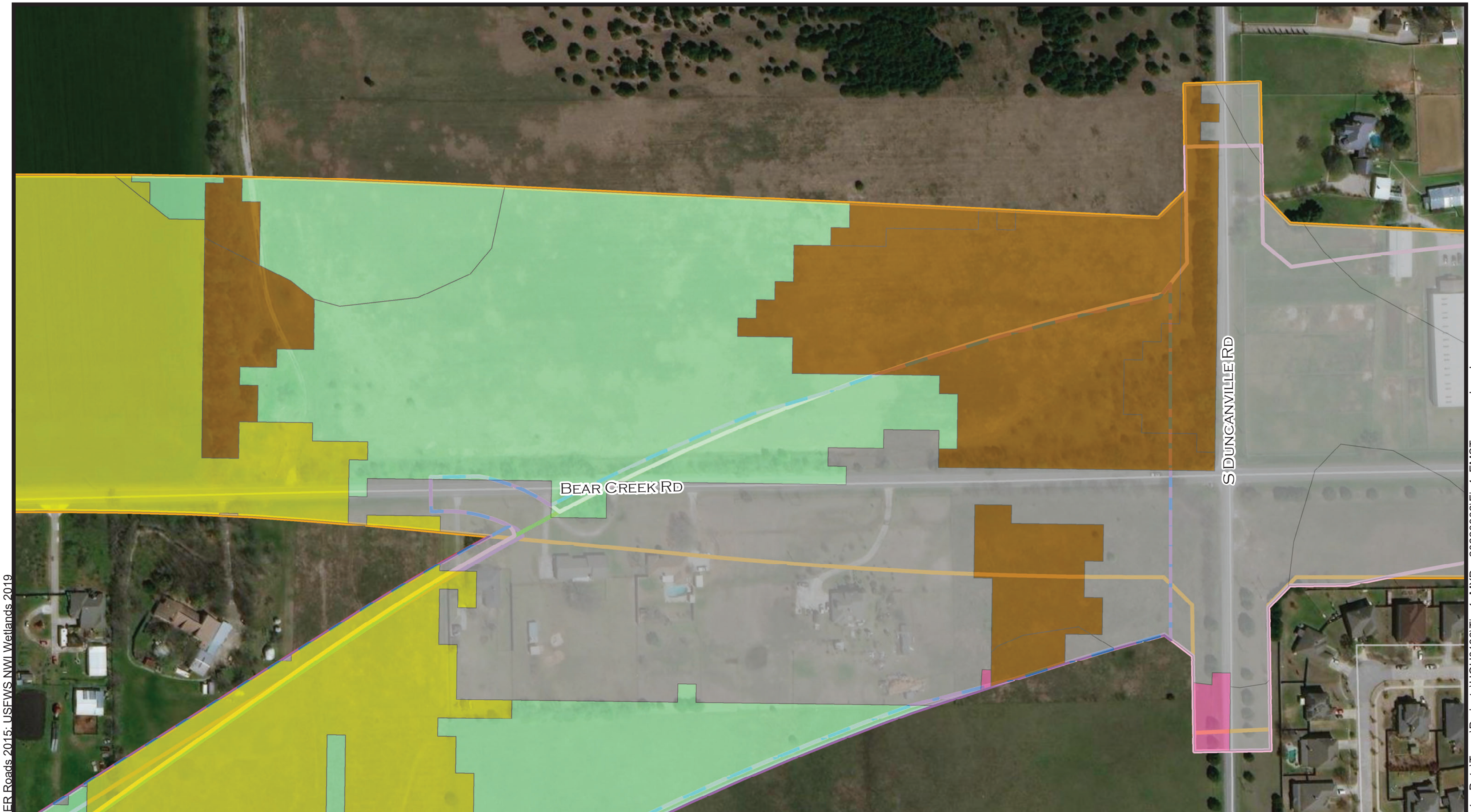
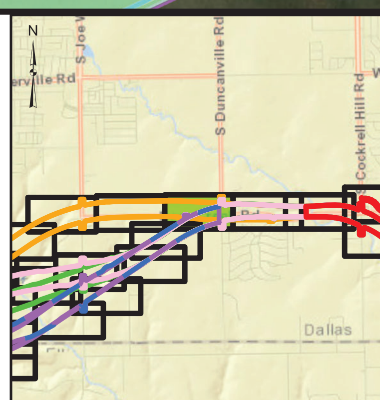


Agriculture
Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Tallgrass Prairie
Urban
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

Figure 4
Sheet 22

Date:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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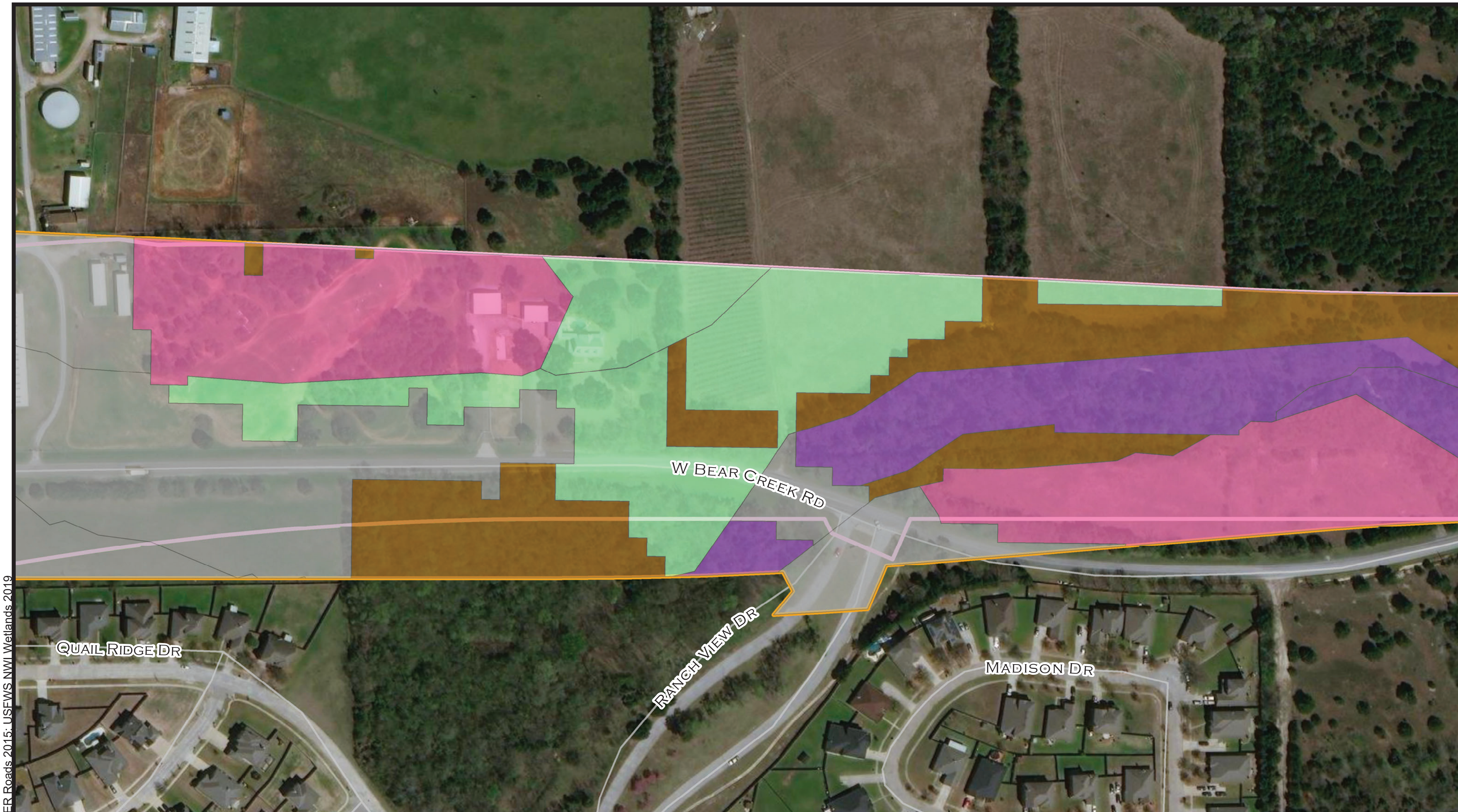
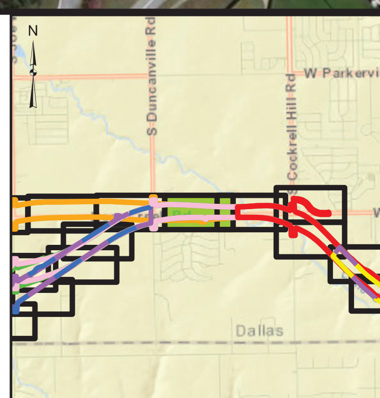


Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Riparian
Tallgrass Prairie
Urban
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

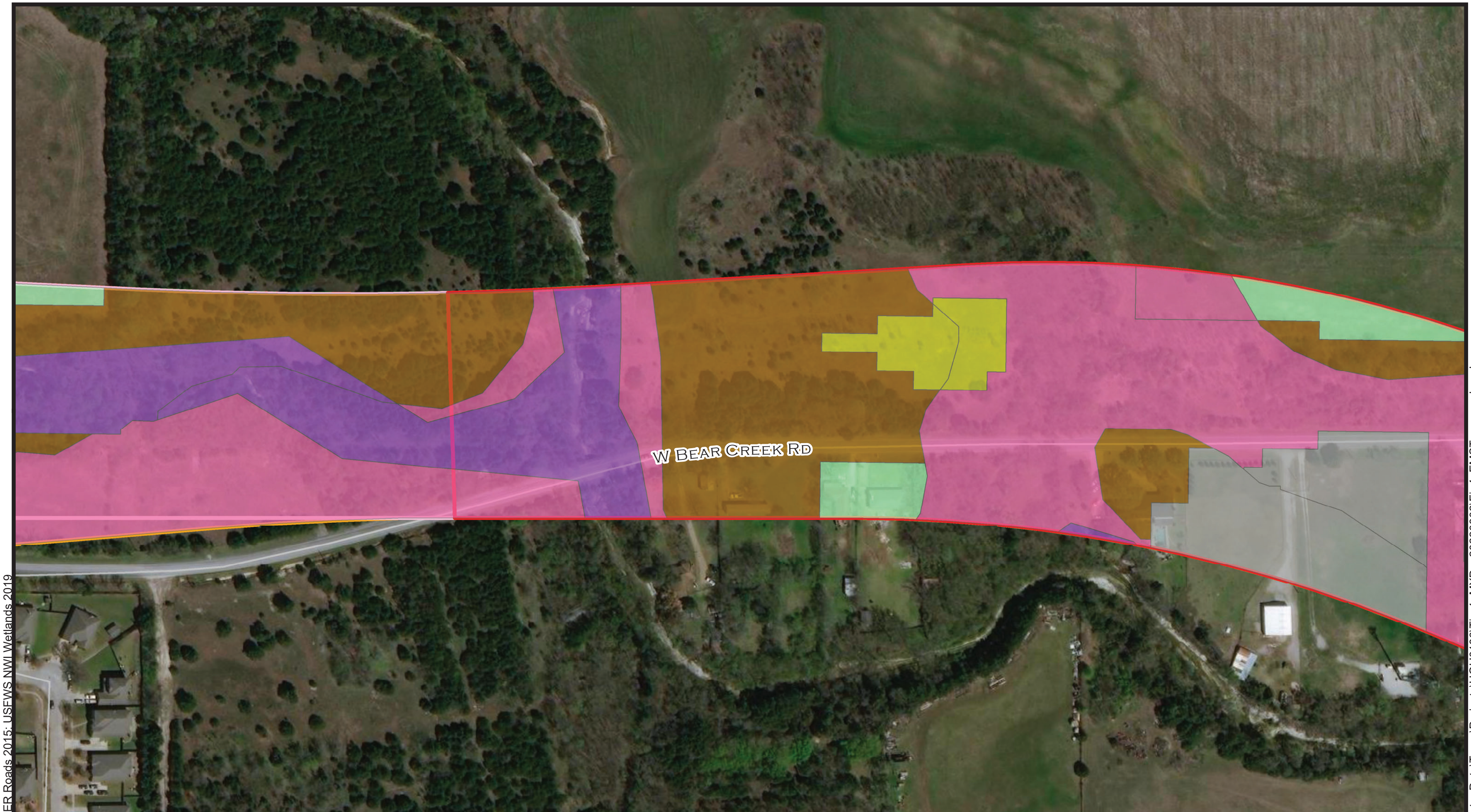
0 125 250 Feet

FIGURE 4
SHEET 23

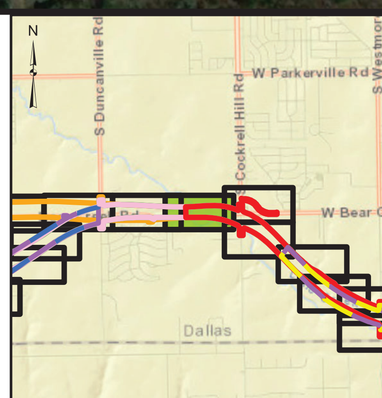
DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



Agriculture
Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Riparian
Tallgrass Prairie
Urban
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

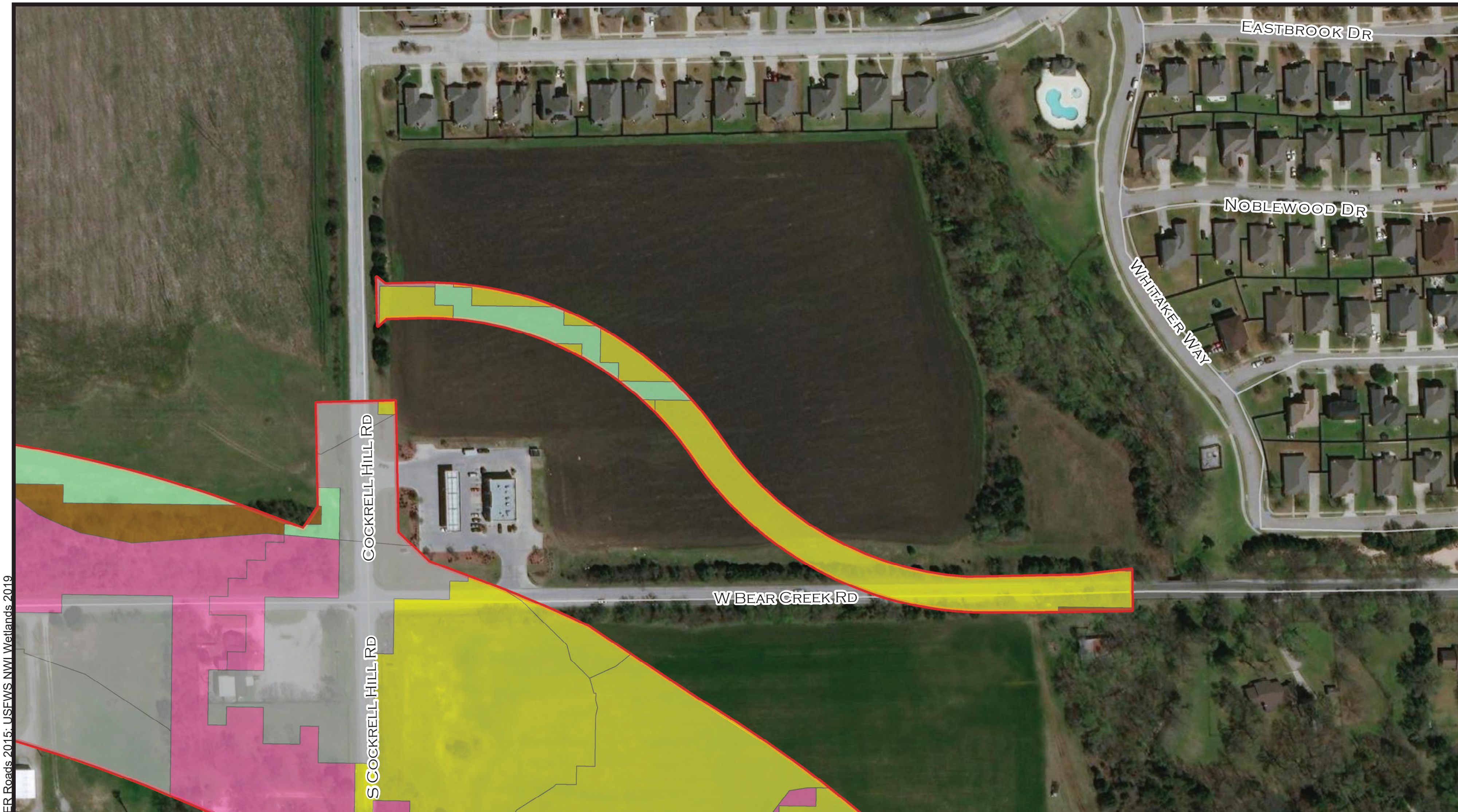
0 125 250 Feet

FIGURE 4
SHEET 24

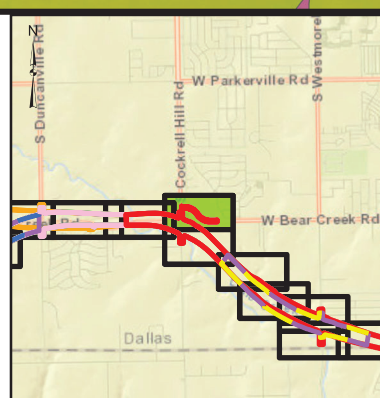
DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



Agriculture
Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Tallgrass Prairie
Urban
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

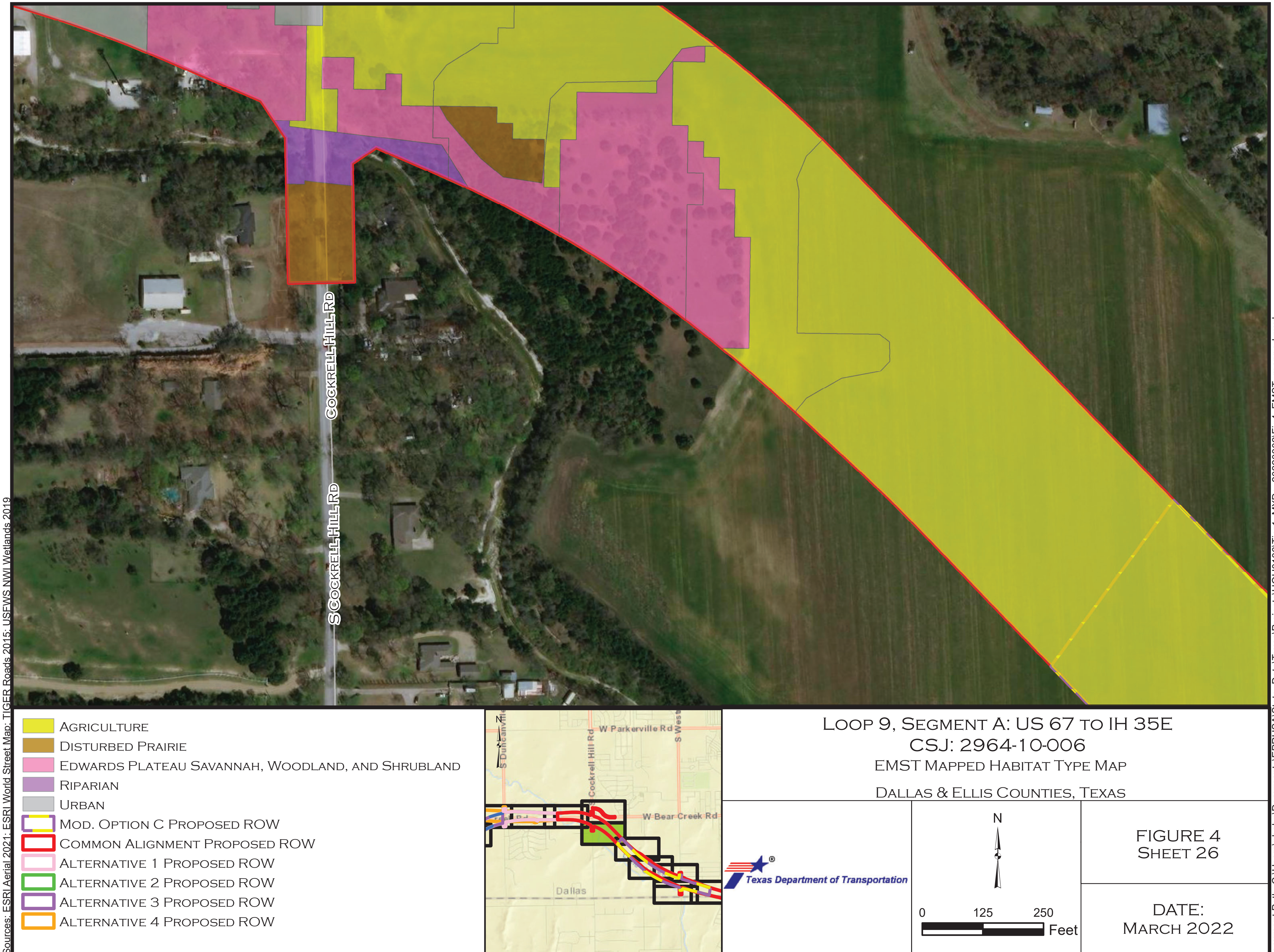
N
0 125 250 Feet

Figure 4
Sheet 25

Date:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Agriculture
Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Riparian
Urban
Mod. Option C Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW

Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

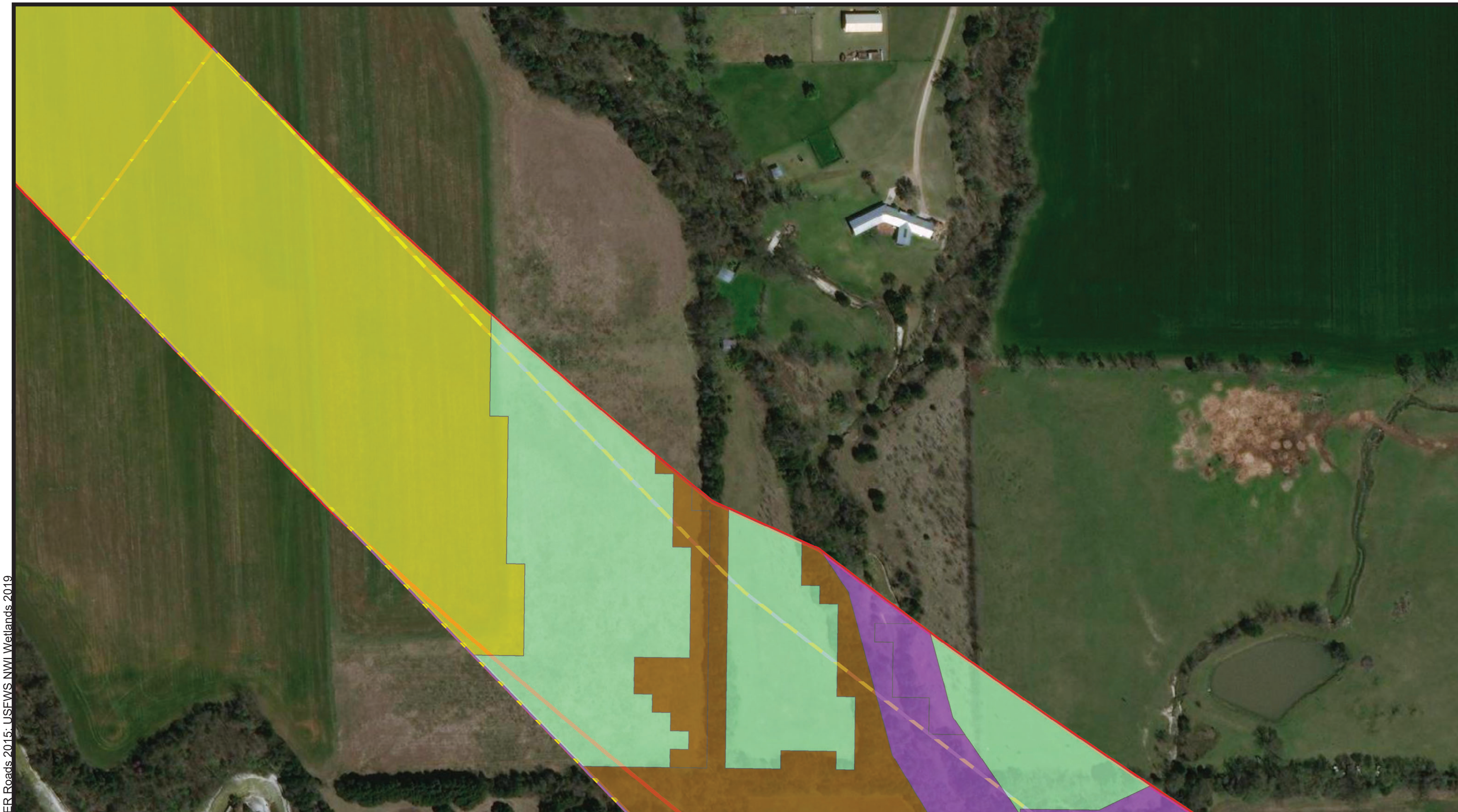
N

0 125 250 Feet

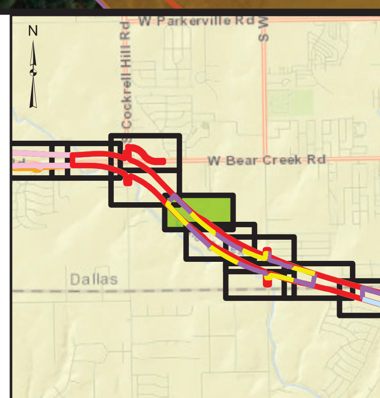
FIGURE 4
SHEET 26

DATE:
March 2022

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



- Agriculture
- Disturbed Prairie
- Riparian
- Tallgrass Prairie
- Mod. Option C Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

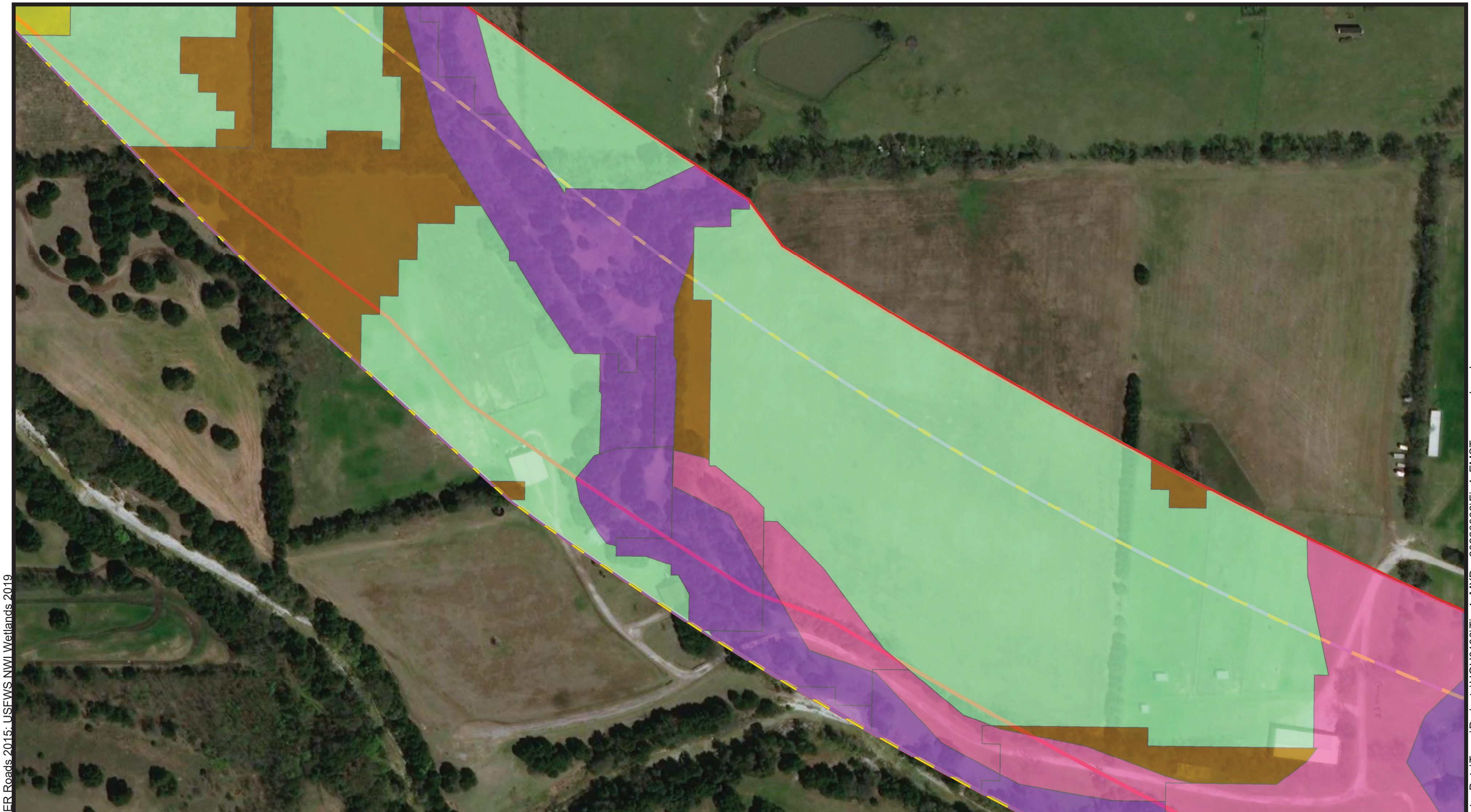
0 125 250 Feet

Figure 4
Sheet 27

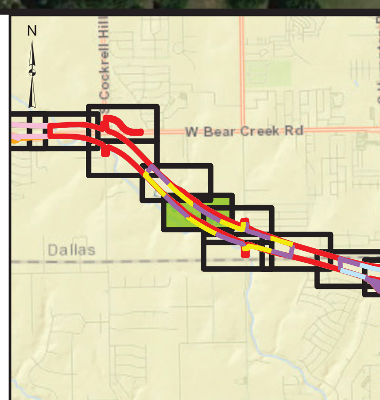
Date:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



- Agriculture
- Disturbed Prairie
- Edwards Plateau Savannah, Woodland, and Shrubland
- Riparian
- Tallgrass Prairie
- Mod. Option C Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

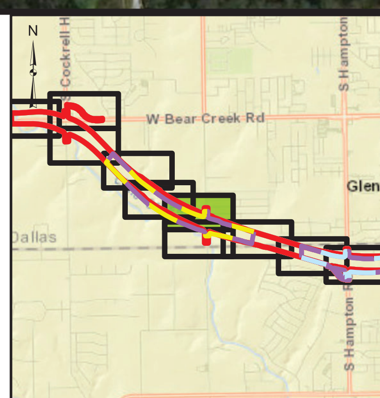
FIGURE 4
SHEET 28

DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd

- Disturbed Prairie
- Edwards Plateau Savannah, Woodland, and Shrubland
- Riparian
- Tallgrass Prairie
- Urban
- Mod. Option C Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

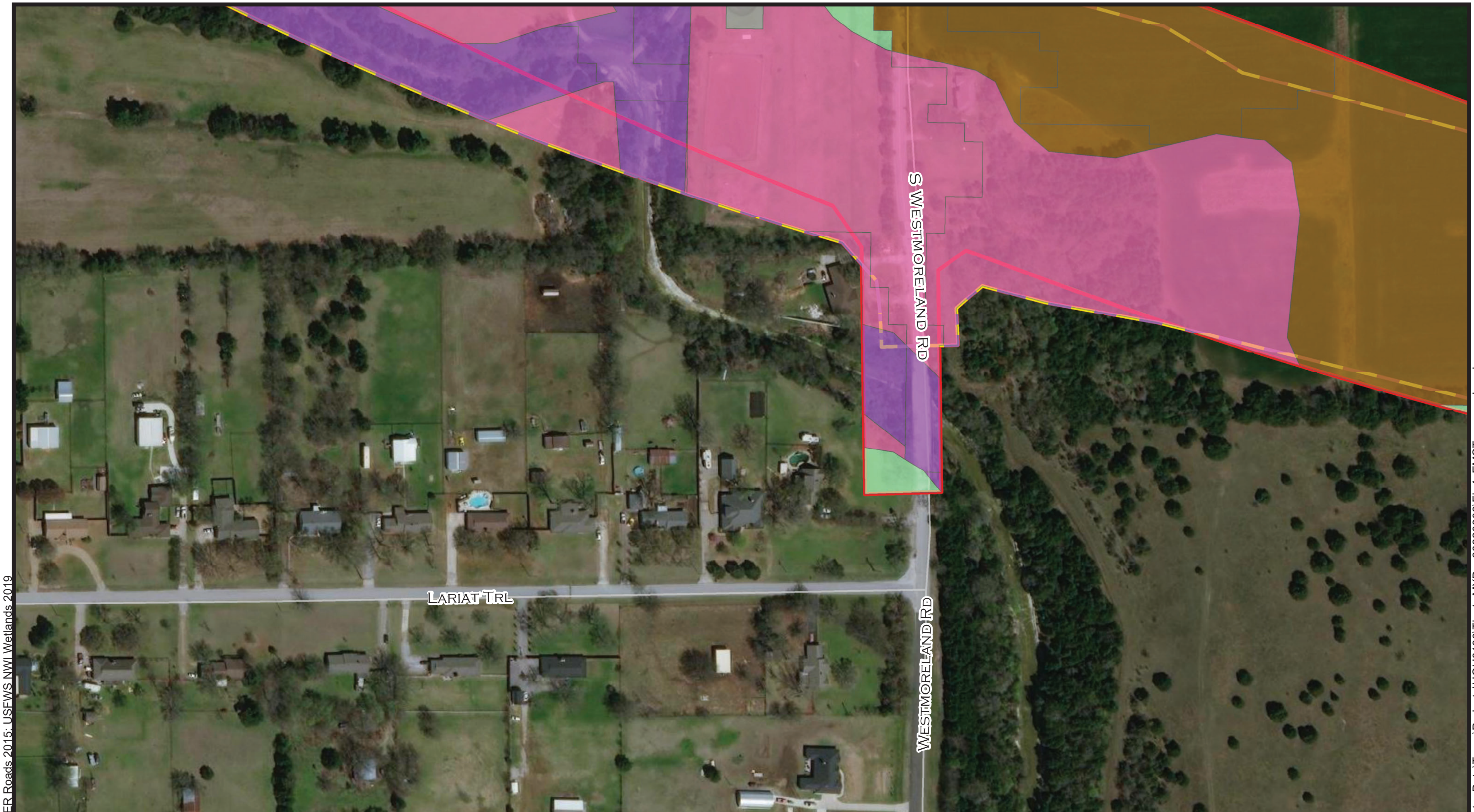
FIGURE 4
SHEET 29

DATE:
March 2022

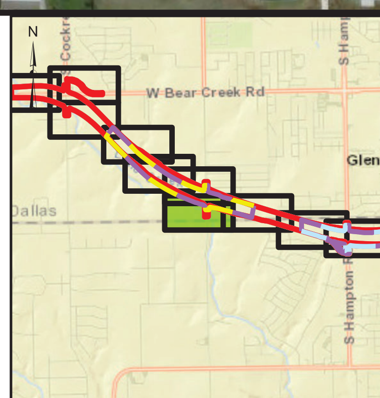
Sources: ESRI Aerial 2021: ESRI World Street Map: TIGER Roads 2015: USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019



- Disturbed Prairie
- Edwards Plateau Savannah, Woodland, and Shrubland
- Riparian
- Tallgrass Prairie
- Urban
- Mod. Option C Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

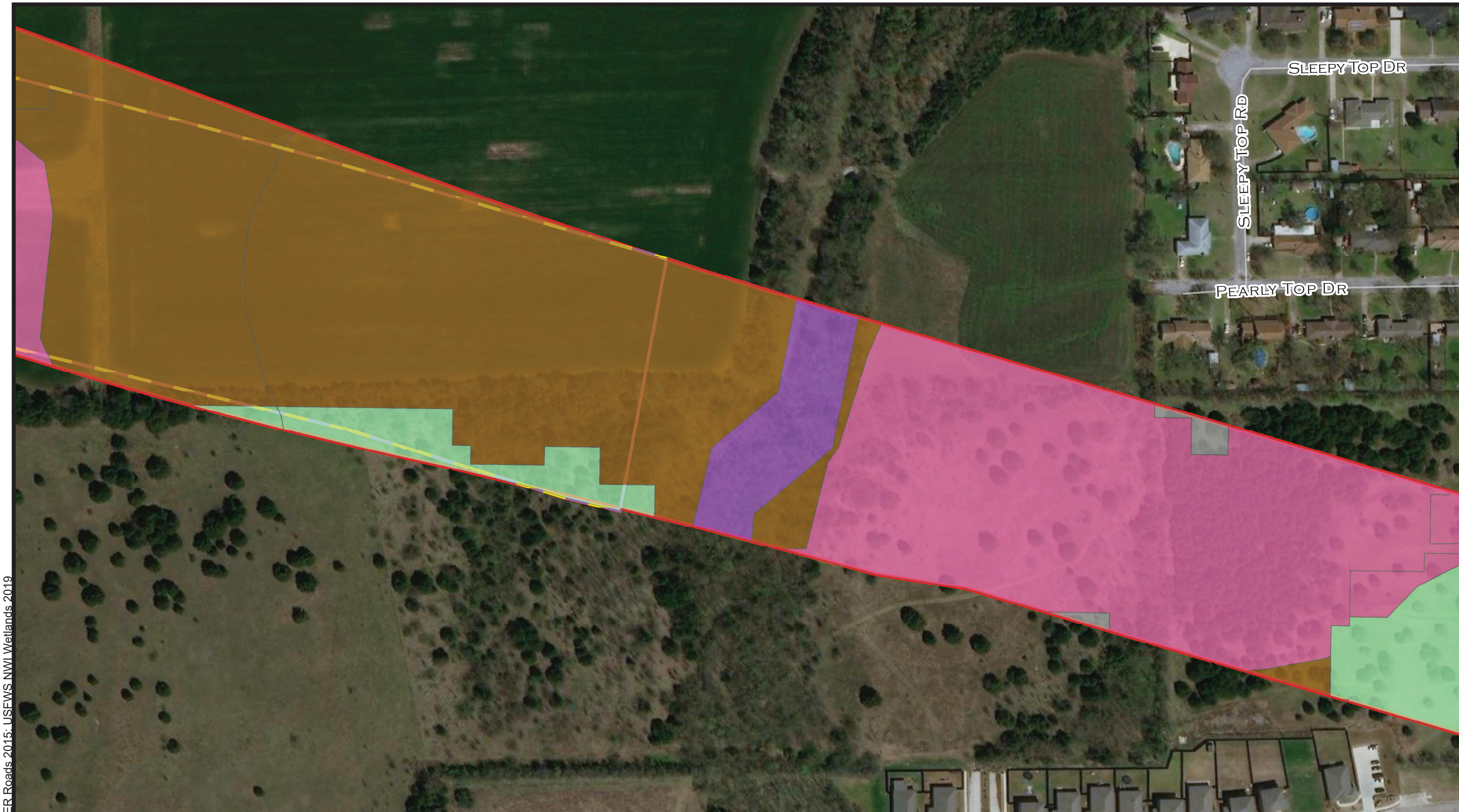
N

0 125 250 Feet

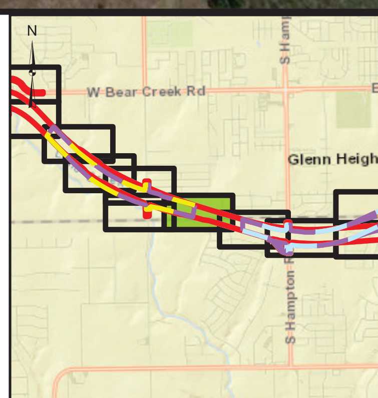
Figure 4
Sheet 30

Date:
March 2022

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



Disturbed Prairie
Edwards Plateau Savannah, Woodland, and Shrubland
Riparian
Tallgrass Prairie
Urban
Mod. Option C Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

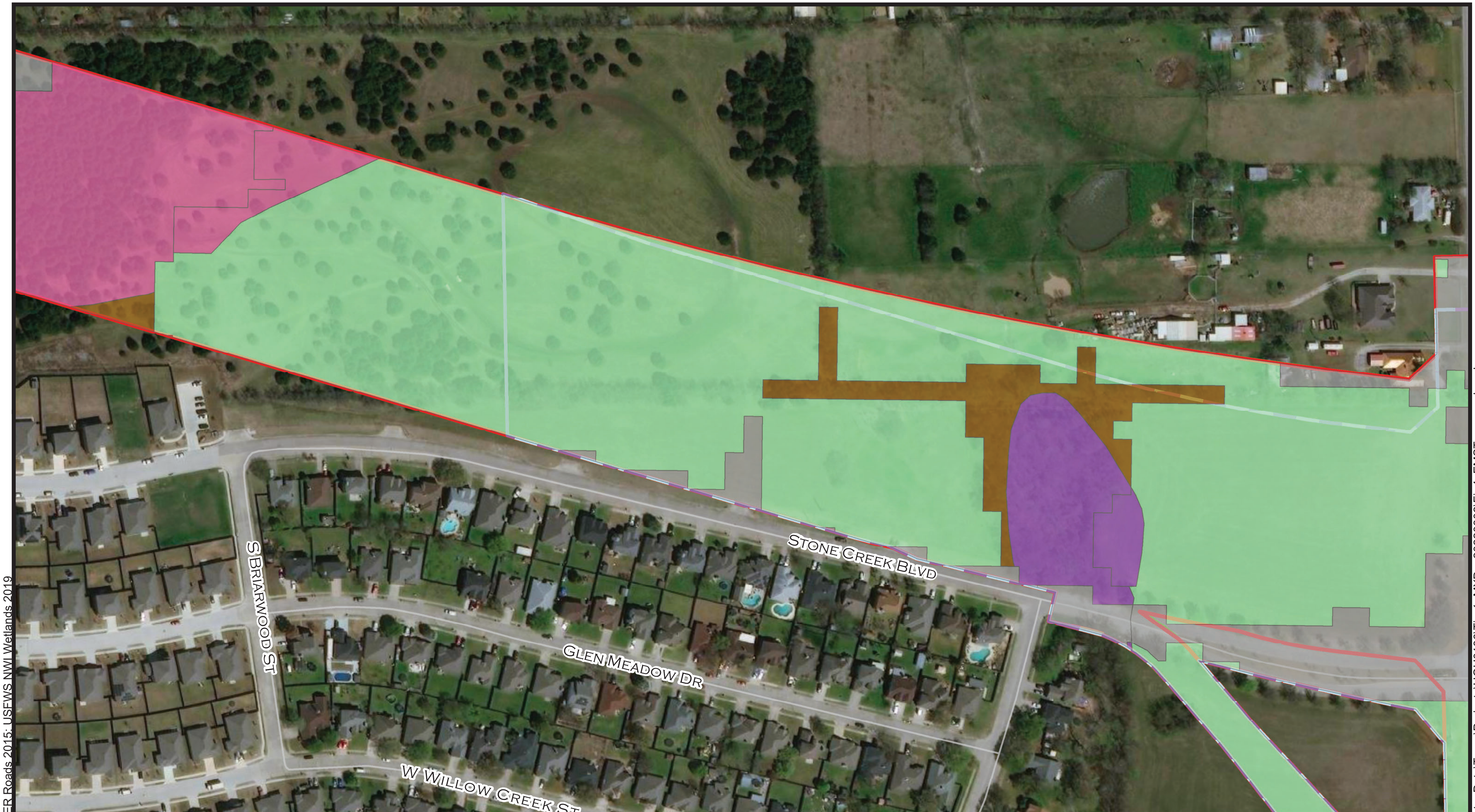
0 125 250 Feet

FIGURE 4
SHEET 31

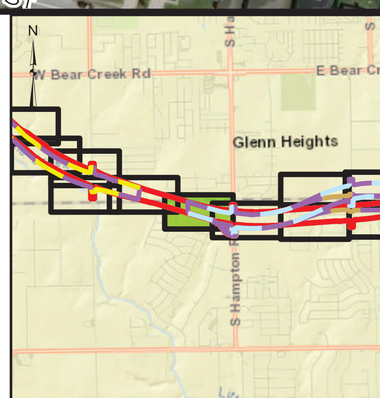
DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



- Disturbed Prairie
- Edwards Plateau Savannah, Woodland, and Shrubland
- Riparian
- Tallgrass Prairie
- Urban
- Mod. Option A Proposed ROW
- Mod. Option B Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 4
SHEET 32

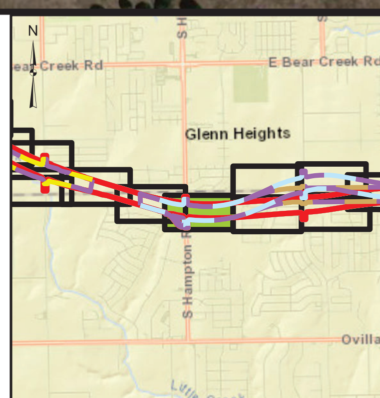
DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

- Disturbed Prairie
- Riparian
- Tallgrass Prairie
- Urban
- Mod. Option A Proposed ROW
- Mod. Option B Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006

EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

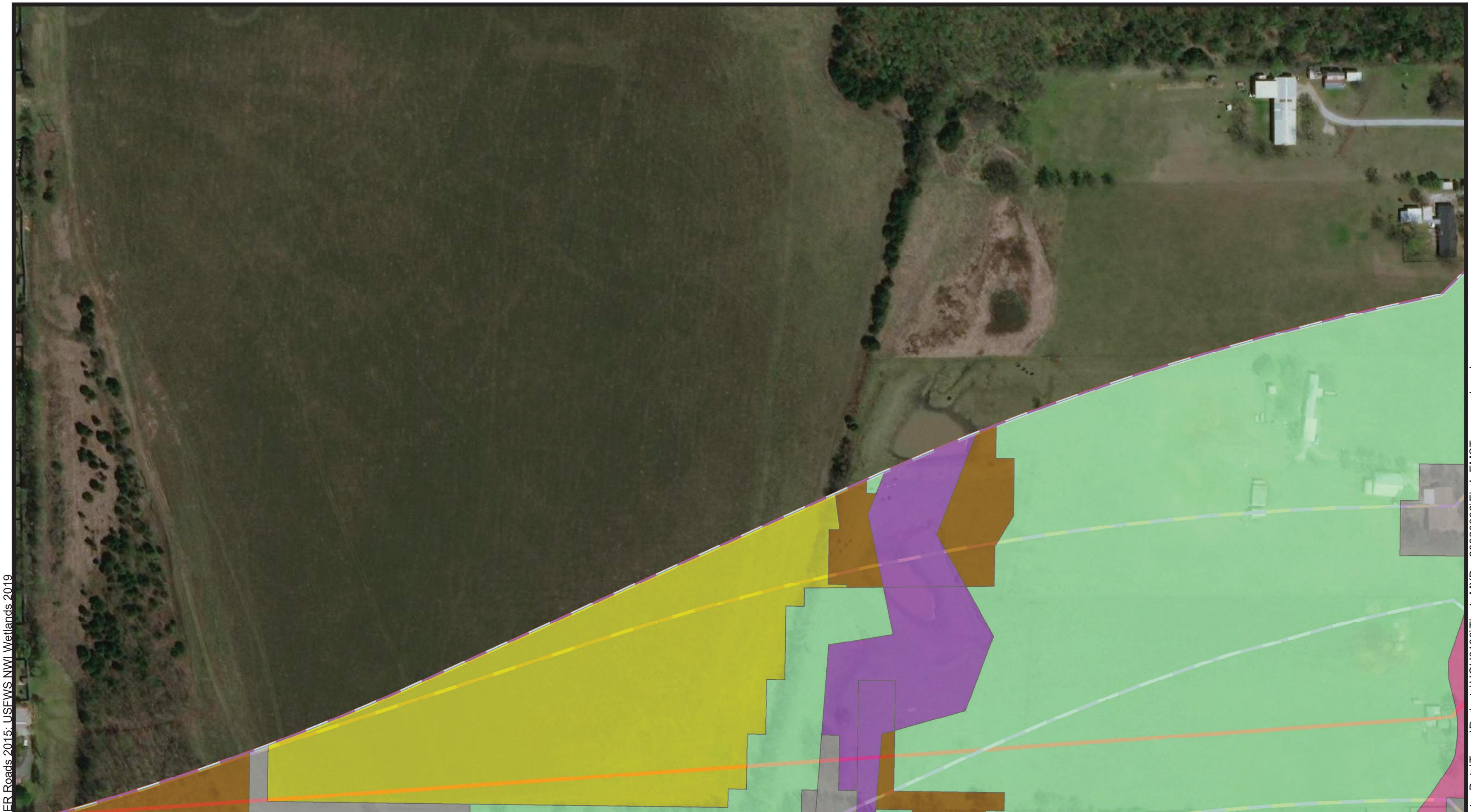
N

0 125 250 Feet

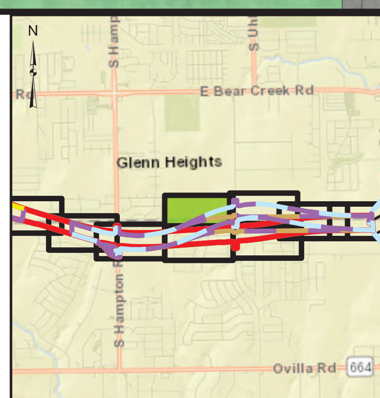
Figure 4
Sheet 33

Date:
March 2022

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



- Agriculture
- Disturbed Prairie
- Edwards Plateau Savannah, Woodland, and Shrubland
- Riparian
- Tallgrass Prairie
- Urban
- Mod. Option A Proposed ROW
- Mod. Option B Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

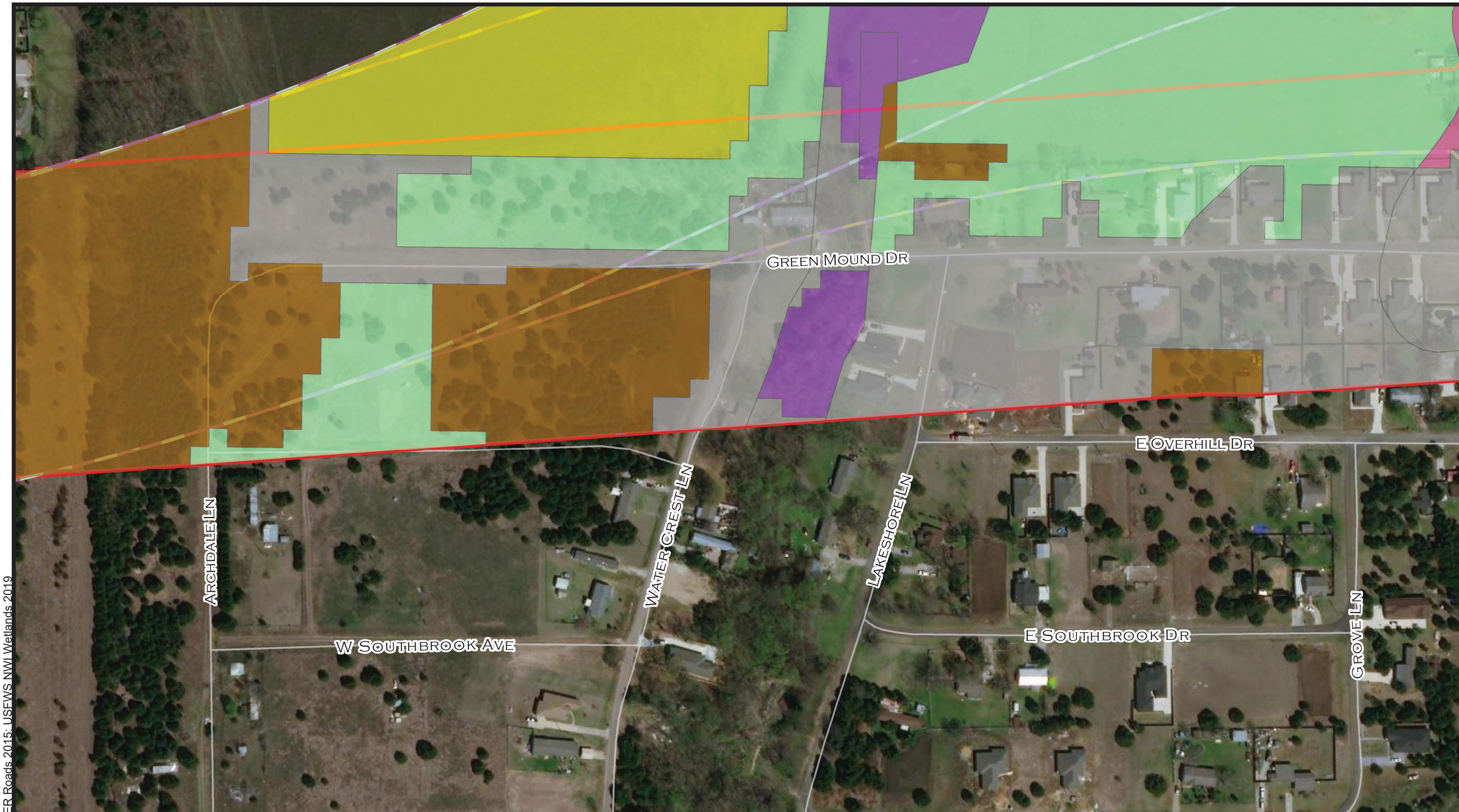
0 125 250 Feet

FIGURE 4
SHEET 34

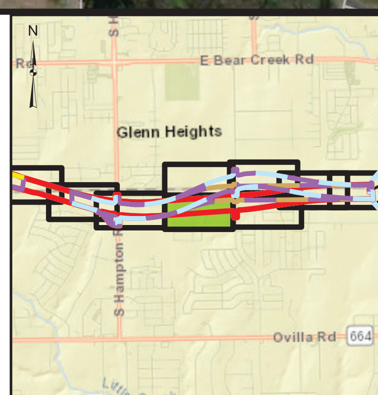
DATE:
March 2022

Sources: ESRI Aerial 2021: ESRI World Street Map: TIGER Roads 2015: USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd



- Agriculture
- Disturbed Prairie
- Edwards Plateau Savannah, Woodland, and Shrubland
- Riparian
- Tallgrass Prairie
- Urban
- Mod. Option A Proposed ROW
- Mod. Option B Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

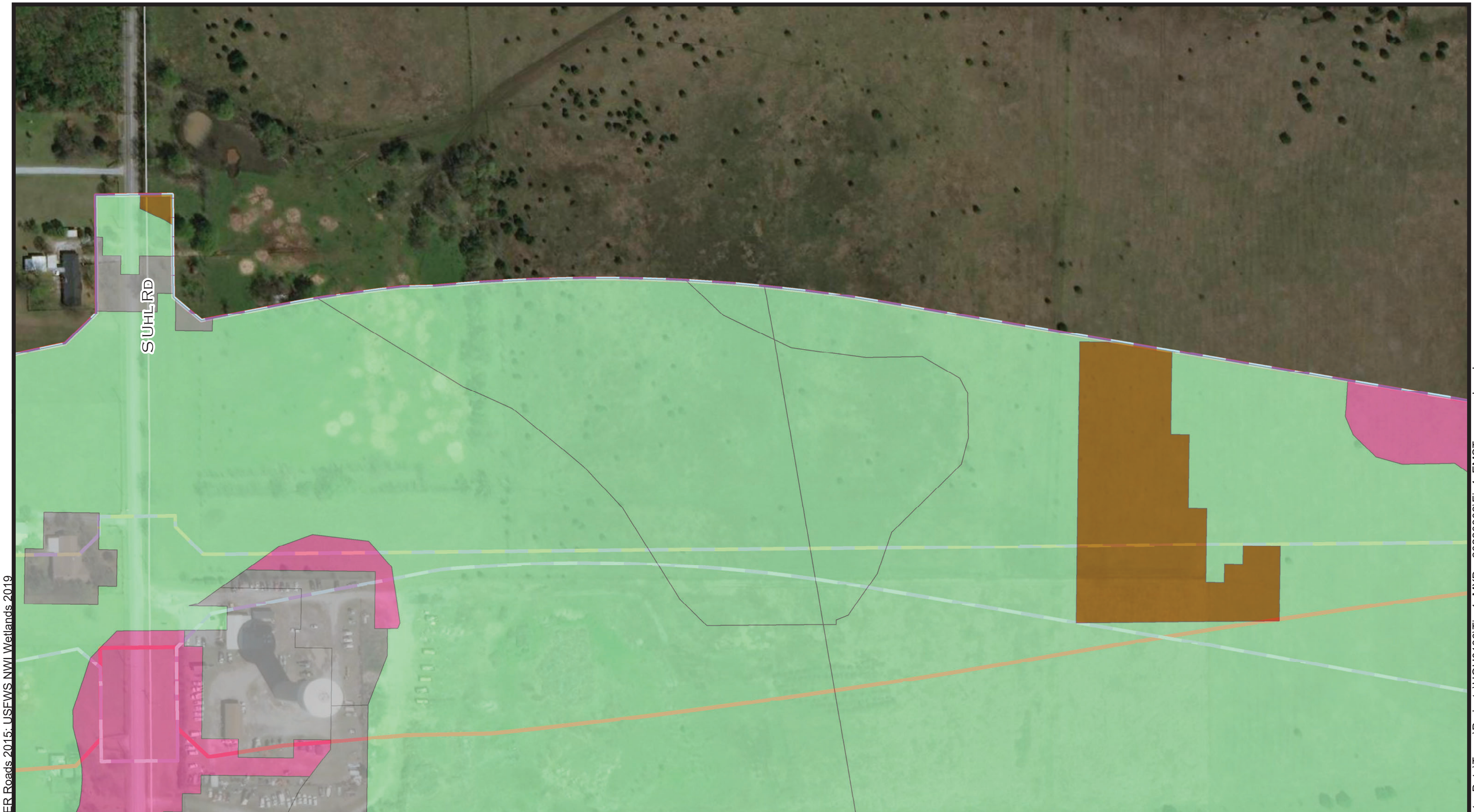
0 125 250 Feet

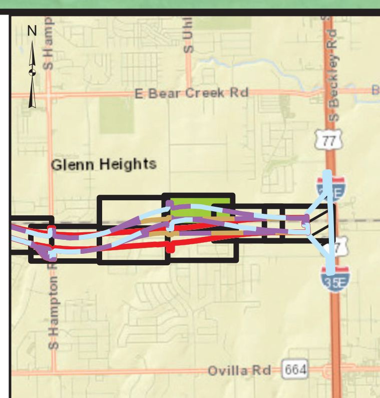
FIGURE 4
SHEET 35

DATE:
MARCH 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

Document Path: C:\Users\nhahn\Documents\EPRUSA\State_Data\Texas\Projects\HOU0136\Tier1_MXDs_20220302\Fig4_EMST_mapped.mxd





- Disturbed Prairie
- Edwards Plateau Savannah, Woodland, and Shrubland
- Tallgrass Prairie
- Urban
- Mod. Option A Proposed ROW
- Mod. Option B Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW

Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 4
SHEET 36

DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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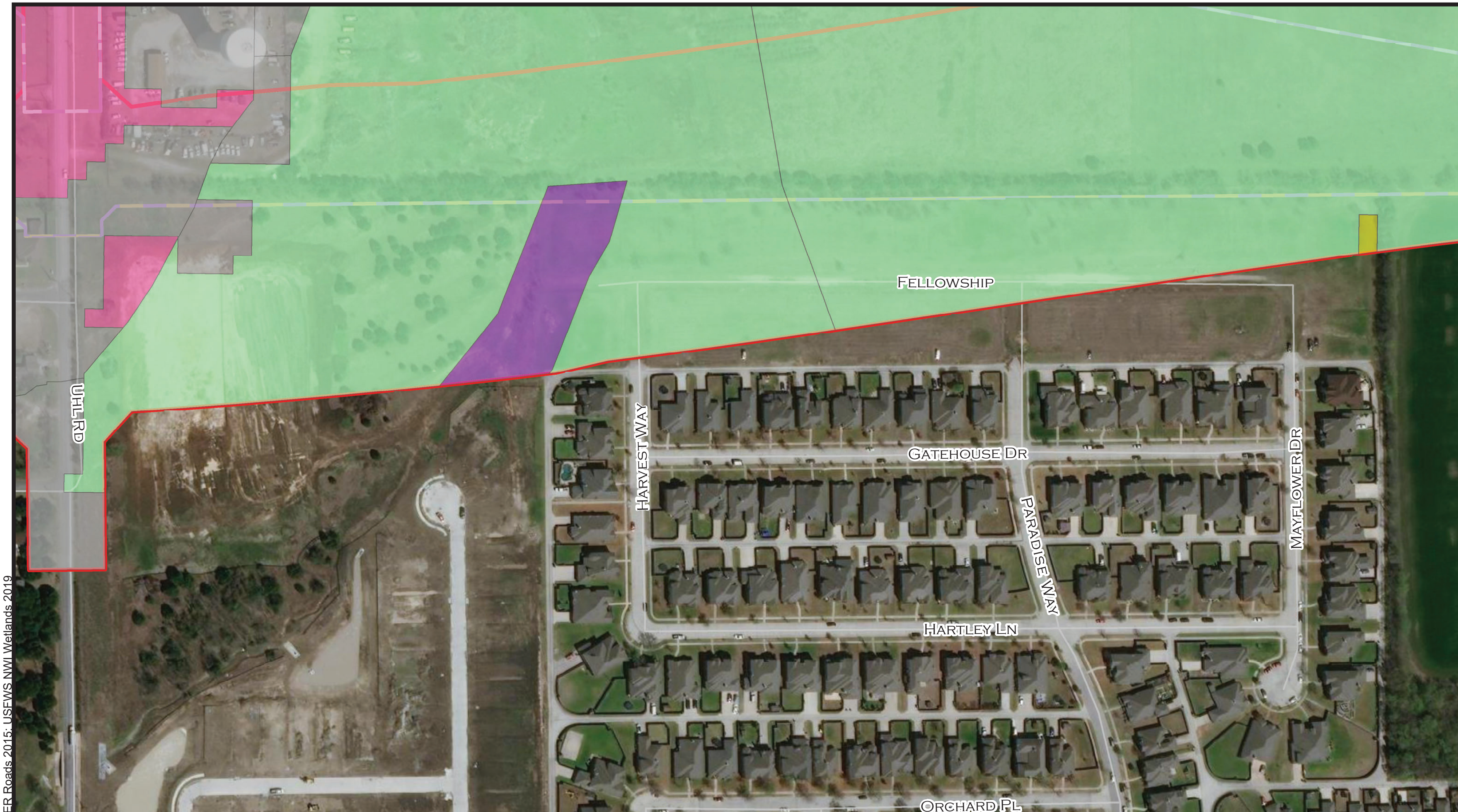
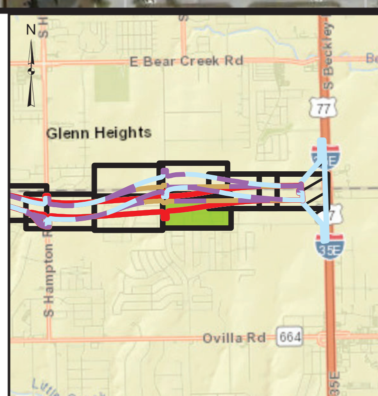


- Agriculture
- Edwards Plateau Savannah, Woodland, and Shrubland
- Riparian
- Tallgrass Prairie
- Urban
- Mod. Option A Proposed ROW
- Mod. Option B Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

Figure 4
Sheet 37

Date:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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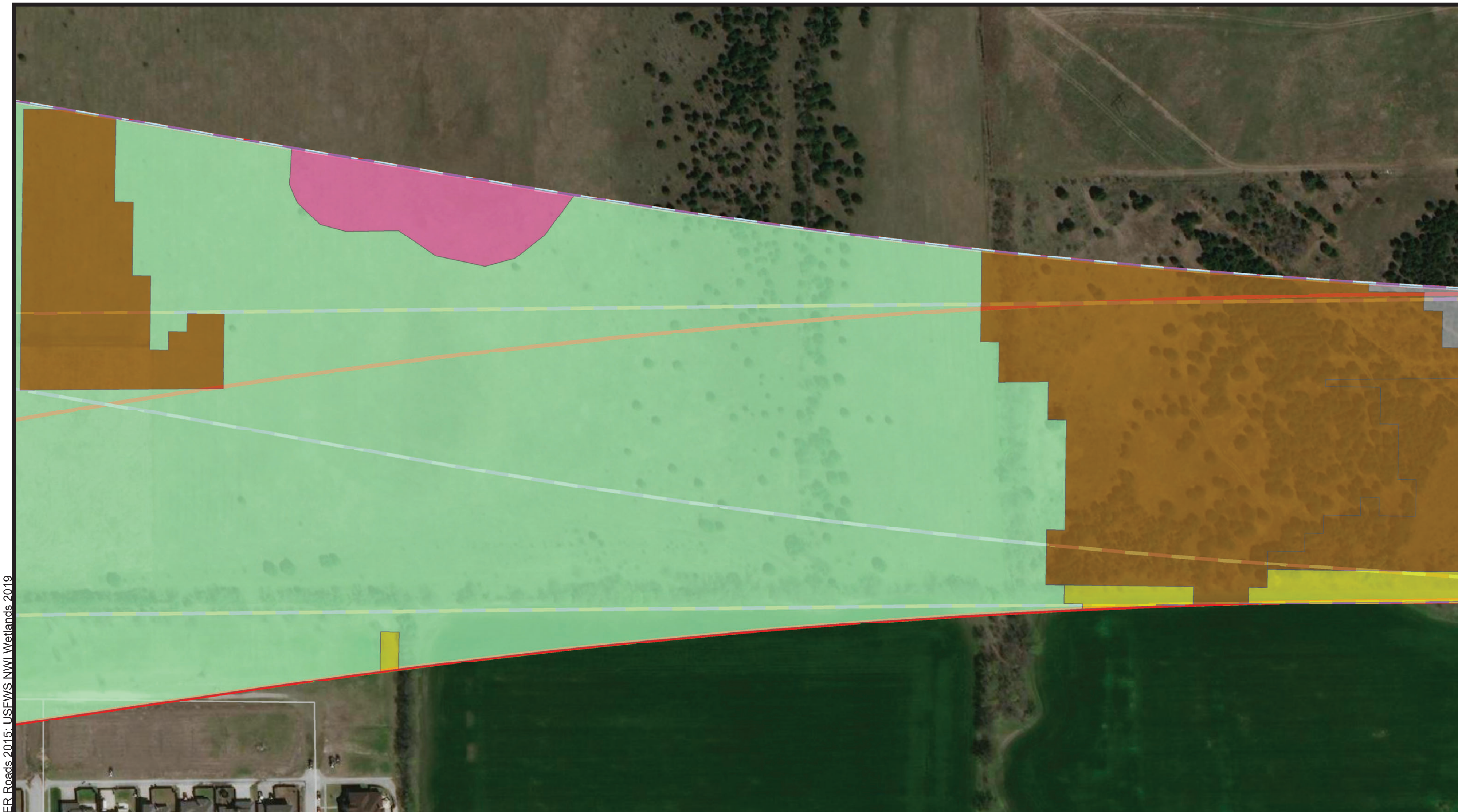
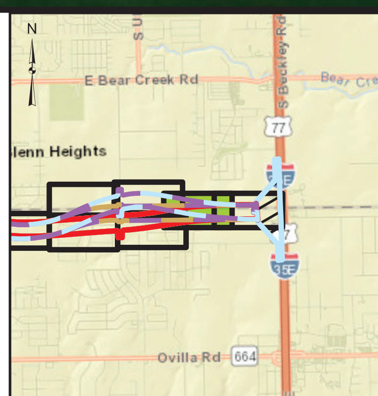


- Agriculture
- Disturbed Prairie
- Edwards Plateau Savannah, Woodland, and Shrubland
- Tallgrass Prairie
- Urban
- Mod. Option A Proposed ROW
- Mod. Option B Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 125 250 Feet

FIGURE 4
SHEET 38

DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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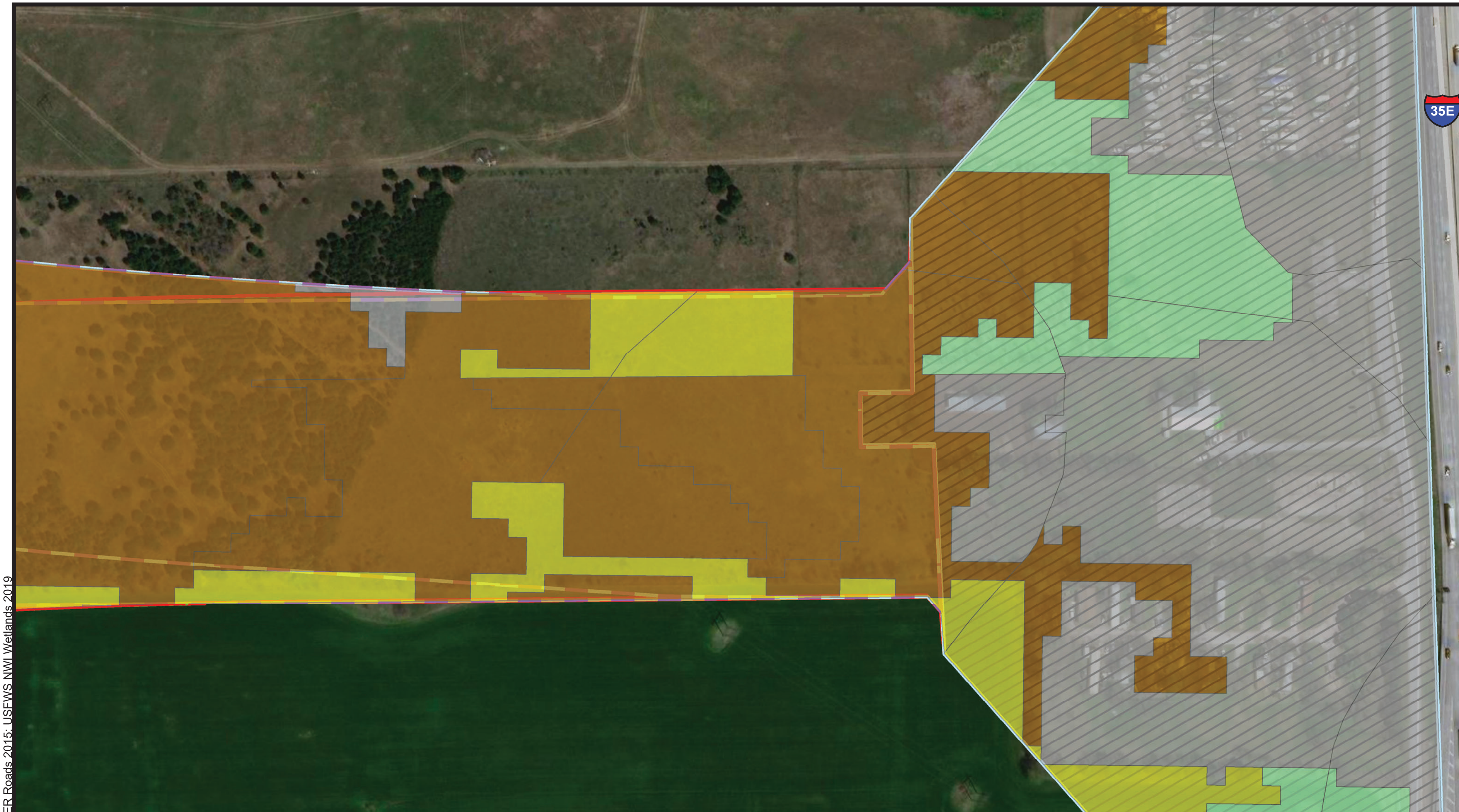
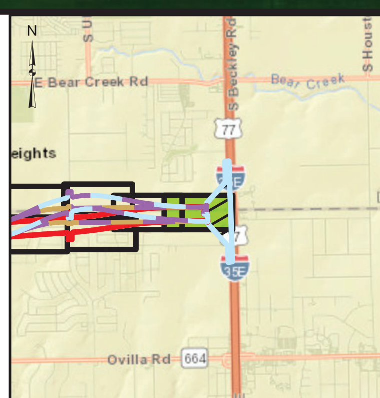


- Agriculture
- Disturbed Prairie
- Tallgrass Prairie
- Urban
- Mod. Option A Proposed ROW
- Mod. Option B Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW
- IH 35E Project Area (Evaluated Under Separate Document)



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
EMST Mapped Habitat Type Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

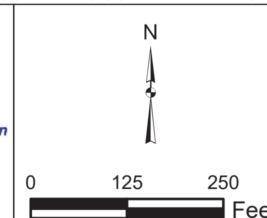


FIGURE 4
SHEET 39

DATE:
March 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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Loop 9, Segment A
EMST and Observed Vegetation

	Agriculture		Disturbed Prairie		Edwards Plateau Savannah, Woodland, and Shrubland		Open Water		Riparian		Tallgrass Prairie, Grassland		Urban		**Total**	
	Mapped	Observed	Mapped	Observed	Mapped	Observed	Mapped	Observed	Mapped	Observed	Mapped	Observed	Mapped	Observed	**Mapped**	**Observed**
Alternative 1																
Alternative 1	38.50	82.76	99.14	191.94	228.26	135.46	0.00	3.12	40.71	32.30	130.38	0.00	60.93	152.29	**597.94**	**597.87**
Alternative 1 Mod A	43.39	80.66	99.50	221.87	228.73	132.89	0.00	3.12	40.92	32.30	133.44	0.00	48.08	123.15	**594.05**	**593.98**
Alternative 1 Mod A & C	43.30	75.92	97.96	220.63	229.58	133.51	0.00	3.62	41.89	33.13	127.12	0.00	47.56	120.53	**587.41**	**587.34**
Alternative 1 Mod B	42.72	81.13	97.54	212.33	228.60	133.17	0.00	3.12	40.48	32.30	133.60	0.00	51.34	132.17	**594.29**	**594.22**
Alternative 1 Mod B & C	42.63	76.39	96.00	211.09	229.45	133.80	0.00	3.62	41.46	33.13	127.28	0.00	50.82	129.55	**587.64**	**587.57**
Alternative 1 Mod C	38.41	78.02	97.61	190.70	229.12	136.09	0.00	3.62	41.69	33.13	124.06	0.00	60.41	149.67	**591.29**	**591.23**
Alternative 2																
Alternative 2	38.41	82.60	99.67	184.01	220.96	136.24	0.00	5.16	39.43	38.80	134.23	0.00	63.62	149.44	**596.31**	**596.26**
Alternative 2 Mod A	43.30	80.50	100.02	213.95	221.42	133.66	0.00	5.16	39.63	38.80	137.28	0.00	50.77	120.29	**592.42**	**592.37**
Alternative 2 Mod A & C	43.21	75.76	98.48	212.71	222.28	134.29	0.00	5.66	40.61	39.63	130.96	0.00	50.24	117.67	**585.78**	**585.73**
Alternative 2 Mod B	42.63	80.97	98.07	204.41	221.29	133.95	0.00	5.16	39.20	38.80	137.45	0.00	54.02	129.31	**592.66**	**592.60**
Alternative 2 Mod B & C	42.54	76.23	96.53	203.17	222.15	134.58	0.00	5.66	40.17	39.63	131.12	0.00	53.50	126.69	**586.01**	**585.96**
Alternative 2 Mod C	38.32	77.86	98.13	182.78	221.81	136.86	0.00	5.66	40.40	39.63	127.91	0.00	63.10	146.82	**589.67**	**589.62**
Alternative 3																
Alternative 3	38.68	77.00	99.23	173.56	210.88	151.22	0.65	4.23	48.98	32.24	129.55	0.00	76.89	166.57	**604.87**	**604.81**
Alternative 3 Mod A	43.57	74.90	99.58	203.48	211.35	148.65	0.65	4.23	49.18	32.24	132.61	0.00	64.04	137.43	**600.98**	**600.93**
Alternative 3 Mod A & C	43.48	70.16	98.04	202.25	212.20	149.27	0.65	4.73	50.16	33.07	126.29	0.00	63.52	134.81	**594.33**	**594.28**
Alternative 3 Mod A & D	43.96	76.46	94.64	228.03	225.89	134.97	0.65	4.32	49.49	32.81	133.94	0.00	54.49	126.41	**603.06**	**603.00**
Alternative 3 Mod A C & D	43.87	71.72	93.10	226.80	226.74	135.59	0.65	4.83	50.46	33.63	127.62	0.00	53.97	123.80	**596.41**	**596.36**
Alternative 3 Mod B	42.90	75.37	97.63	193.94	211.22	148.94	0.65	4.23	48.75	32.24	132.77	0.00	67.30	146.45	**601.21**	**601.16**
Alternative 3 Mod B & C	42.81	70.63	96.09	192.71	212.07	149.56	0.65	4.73	49.72	33.07	126.45	0.00	66.78	143.83	**594.57**	**594.52**
Alternative 3 Mod B & D	43.29	76.93	92.69	218.49	225.76	135.25	0.65	4.32	49.06	32.81	134.10	0.00	57.75	135.43	**603.29**	**603.24**
Alternative 3 Mod B C & D	43.20	72.19	91.15	217.26	226.61	135.88	0.65	4.83	50.03	33.63	127.78	0.00	57.23	132.81	**596.65**	**596.59**
Alternative 3 Mod C	38.59	72.26	97.69	172.32	211.73	151.85	0.65	4.73	49.95	33.07	123.23	0.00	76.37	163.95	**598.22**	**598.17**
Alternative 3 Mod C & D	38.98	73.81	92.75	196.87	226.28	138.16	0.65	4.83	50.26	33.63	124.56	0.00	66.82	152.94	**600.30**	**600.25**
Alternative 3 Mod D	39.07	78.56	94.29	198.10	225.42	137.54	0.65	4.32	49.28	32.81	130.89	0.00	67.35	155.56	**606.94**	**606.89**
Alternative 4																
Alternative 4	52.28	102.81	111.83	182.40	205.08	130.30	0.00	3.71	39.54	34.92	141.52	0.00	54.01	151.07	**604.26**	**605.20**
Alternative 4 Mod A	57.17	100.71	112.18	212.33	205.54	127.72	0.00	3.71	39.75	34.92	144.58	0.00	41.16	121.92	**600.38**	**601.31**
Alternative 4 Mod A & C	57.08	95.96	110.65	211.10	206.40	128.35	0.00	4.21	40.72	35.75	138.26	0.00	40.64	119.30	**593.73**	**594.67**
Alternative 4 Mod B	56.50	101.17	110.23	202.79	205.41	128.01	0.00	3.71	39.31	34.92	144.74	0.00	44.42	130.94	**600.61**	**601.55**
Alternative 4 Mod B & C	56.41	96.43	108.69	201.56	206.27	128.64	0.00	4.21	40.29	35.75	138.42	0.00	43.89	128.32	**593.97**	**594.90**
Alternative 4 Mod C	52.19	98.06	110.29	181.16	205.93	130.92	0.00	4.21	40.52	35.75	135.20	0.00	53.49	148.45	**597.62**	**598.56**

United States Department of Agriculture

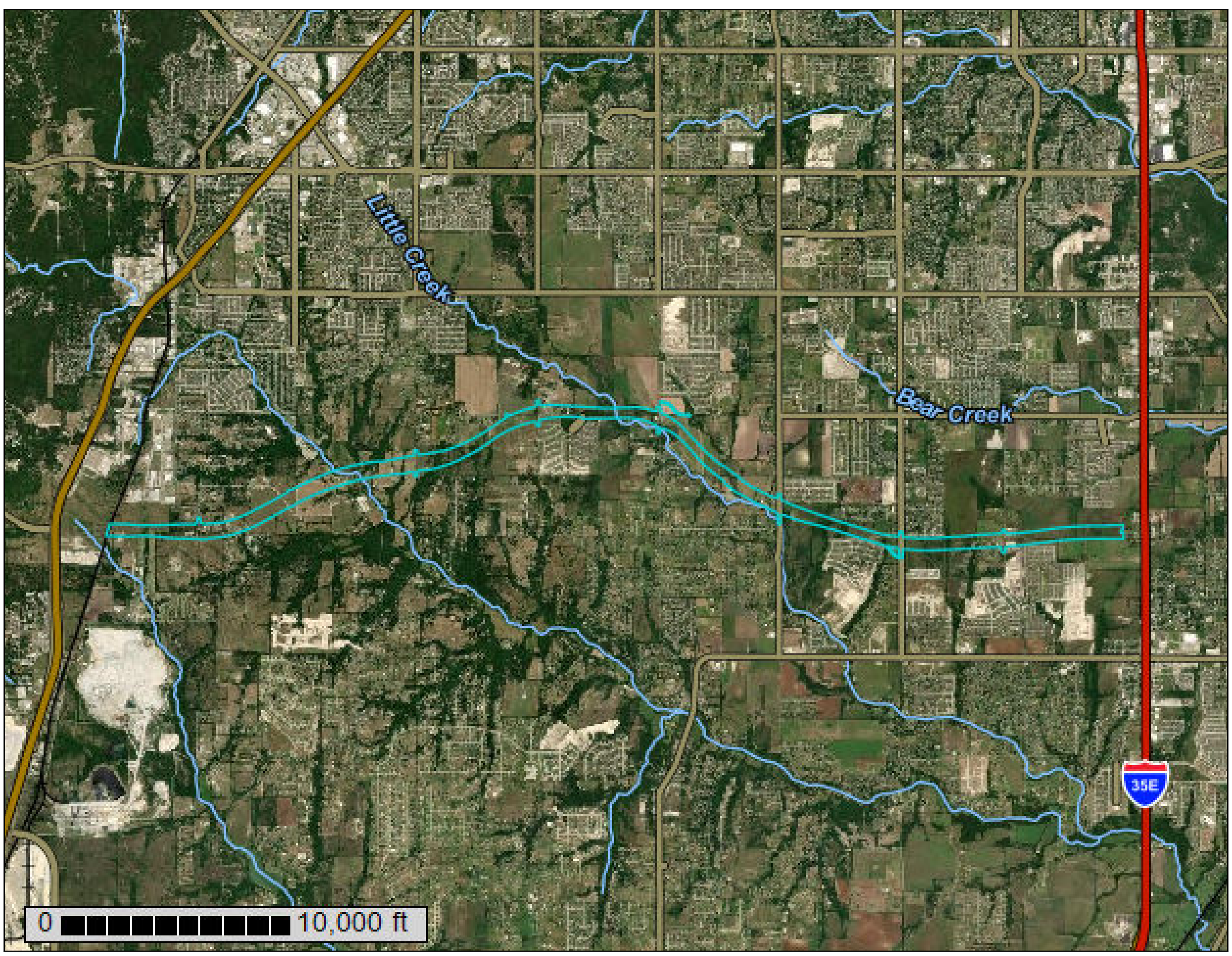
NRCS

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 Dallas County, Texas, and Ellis County, Texas

Loop 9_Alternative 1



March 18, 2022

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.

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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.

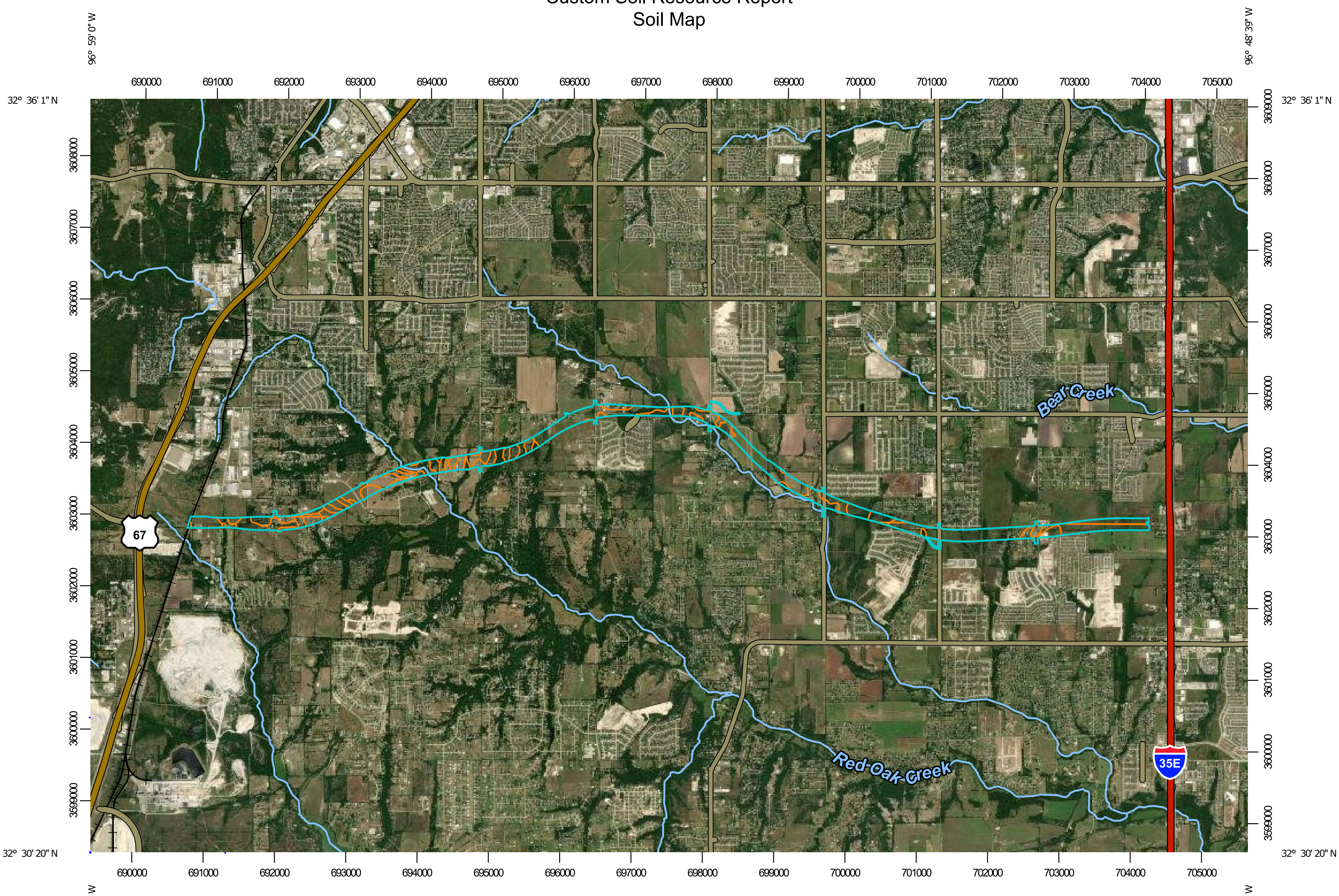
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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



Map Scale: 1:74,200 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 1000, 2000, 4000, 6000

Feet: 0, 3500, 7000, 14000, 21000

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: Dallas County, Texas
Survey Area Data: Version 19, Sep 8, 2021

Soil Survey Area: Ellis County, Texas
Survey Area Data: Version 17, Sep 8, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Jan 18, 2020—Nov 15, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5	Austin silty clay, 1 to 3 percent slopes	49.8	8.3%
7	Austin-Lewisville complex, 5 to 8 percent slopes, erode d	3.4	0.6%
23	Dalco clay, 1 to 3 percent slopes	114.5	19.1%
26	Eddy clay loam, 1 to 3 percent slopes	41.7	7.0%
27	Eddy clay loam, 3 to 8 percent slopes	34.0	5.7%
30	Eddy-Stephen complex, 1 to 5 percent slopes	102.5	17.1%
37	Frio silty clay, 0 to 1 percent slopes, frequently flooded	12.9	2.1%
41	Heiden clay, 1 to 3 percent slopes	0.2	0.0%
44	Houston Black clay, 1 to 3 percent slopes	12.0	2.0%
67	Stephen silty clay, 1 to 4 percent slopes	24.7	4.1%
Subtotals for Soil Survey Area		**395.6**	**66.2%**
Totals for Area of Interest		**597.9**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AuB	Austin silty clay, 1 to 3 percent slopes	107.5	18.0%
AuC2	Austin silty clay, 2 to 5 percent slopes, moderately eroded	23.3	3.9%
Br	Broken alluvial land, rarely flooded	2.4	0.4%
EcB	Eddy gravelly clay loam, 1 to 3 percent slopes	18.9	3.2%
EdD2	Eddy soils, 3 to 8 percent slopes, eroded	6.3	1.1%
SeC2	Stephen-Eddy complex, 2 to 5 percent slopes	0.8	0.1%
StB	Stephen silty clay, 1 to 4 percent slopes	43.1	7.2%
Subtotals for Soil Survey Area		**202.3**	**33.8%**
Totals for Area of Interest		**597.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas

shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Dallas County, Texas

5—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

7—Austin-Lewisville complex, 5 to 8 percent slopes, erode d

Map Unit Setting

National map unit symbol: d7nj
Elevation: 400 to 1,400 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 220 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Austin and similar soils: 50 percent
Lewisville and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

H1 - 0 to 6 inches: silty clay
H2 - 6 to 20 inches: silty clay
H3 - 20 to 40 inches: bedrock

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 70 percent
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R086AY006TX - Northern Clay Loam
Hydric soil rating: No

Description of Lewisville

Setting

Landform: Stream terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Alluvium of quaternary age derived from mixed sources

Typical profile

H1 - 0 to 16 inches: silty clay
H2 - 16 to 32 inches: silty clay
H3 - 32 to 64 inches: silty clay

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R086AY006TX - Northern Clay Loam
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 20 percent
Hydric soil rating: No

23—Dalco clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: d7lw
Elevation: 520 to 850 feet
Mean annual precipitation: 30 to 42 inches
Mean annual air temperature: 64 degrees F
Frost-free period: 230 to 260 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Dalco and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dalco

Setting

Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk formation

Typical profile

H1 - 0 to 7 inches: clay
H2 - 7 to 26 inches: clay
H3 - 26 to 35 inches: clay
H4 - 35 to 80 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 24 to 40 inches to paralithic bedrock
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D

Ecological site: R086AY010TX - Northern Blackland
Hydric soil rating: No

26—Eddy clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2t0s4
Elevation: 400 to 890 feet
Mean annual precipitation: 37 to 40 inches
Mean annual air temperature: 64 to 66 degrees F
Frost-free period: 245 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy residuum weathered from chalk

Typical profile

A1 - 0 to 5 inches: clay loam
A2 - 5 to 11 inches: very gravelly clay loam
Cr - 11 to 20 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 6 to 14 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge

Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Stephen

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

27—Eddy clay loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: d7m0
Elevation: 400 to 1,000 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 4 inches: clay loam
H2 - 4 to 11 inches: gravelly clay loam

H3 - 11 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

30—Eddy-Stephen complex, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: d7m4
Elevation: 400 to 1,000 feet
Mean annual precipitation: 30 to 42 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 60 percent
Stephen and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 3 inches: clay loam
H2 - 3 to 15 inches: gravelly clay loam
H3 - 15 to 40 inches: bedrock

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk formation

Typical profile

H1 - 0 to 14 inches: silty clay
H2 - 14 to 20 inches: bedrock

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: 7 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 10 percent
Hydric soil rating: No

37—Frio silty clay, 0 to 1 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2wg92
Elevation: 330 to 770 feet
Mean annual precipitation: 37 to 42 inches
Mean annual air temperature: 64 to 65 degrees F
Frost-free period: 245 to 252 days
Farmland classification: Not prime farmland

Map Unit Composition

Frio, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frio, Frequently Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous clayey alluvium derived from mudstone and/or calcareous loamy alluvium derived from mudstone

Typical profile

Ap - 0 to 6 inches: silty clay
A - 6 to 50 inches: silty clay
Bk - 50 to 80 inches: silty clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 3.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C
Ecological site: R086AY012TX - Loamy Bottomland
Hydric soil rating: No

Minor Components

Tinn, frequently flooded

Percent of map unit: 8 percent
Landform: Flood plains, flood plains
Landform position (three-dimensional): Tread
Microfeatures of landform position: Circular gilgai
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R086AY013TX - Clayey Bottomland
Hydric soil rating: No

Gladewater, frequently flooded

Percent of map unit: 2 percent
Landform: Flood plains, flood plains
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R086AY013TX - Clayey Bottomland
Hydric soil rating: Yes

41—Heiden clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2v1v9
Elevation: 290 to 1,020 feet
Mean annual precipitation: 33 to 45 inches
Mean annual air temperature: 63 to 68 degrees F
Frost-free period: 224 to 278 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Heiden and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Heiden

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex

Across-slope shape: Linear
Parent material: Clayey residuum weathered from mudstone

Typical profile

Ap - 0 to 6 inches: clay
A - 6 to 18 inches: clay
Bkss - 18 to 58 inches: clay
CBdk - 58 to 70 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 40 to 65 inches to densic material
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 12.0
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Circular gilgai
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Ferris

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Microfeatures of landform position: Linear gilgai
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY009TX - Southern Eroded Blackland
Hydric soil rating: No

44—Houston Black clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2ssh0
Elevation: 270 to 1,040 feet
Mean annual precipitation: 33 to 43 inches
Mean annual air temperature: 62 to 63 degrees F
Frost-free period: 217 to 244 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Houston black and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Houston Black

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Clayey residuum weathered from calcareous mudstone of upper cretaceous age

Typical profile

Ap - 0 to 6 inches: clay
Bkss - 6 to 70 inches: clay
BCkss - 70 to 80 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Minor Components

Heiden

Percent of map unit: 15 percent
Landform: Plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Fairlie

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

67—Stephen silty clay, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2vthm
Elevation: 430 to 890 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 62 to 69 degrees F
Frost-free period: 240 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile

A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Eddy

Percent of map unit: 5 percent
Landform: Ridges, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Ellis County, Texas

AuB—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

AuC2—Austin silty clay, 2 to 5 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2vtgk
Elevation: 420 to 1,050 feet
Mean annual precipitation: 32 to 44 inches
Mean annual air temperature: 63 to 69 degrees F
Frost-free period: 228 to 272 days
Farmland classification: Not prime farmland

Map Unit Composition

Austin, moderately eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin, Moderately Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black
Percent of map unit: 15 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Br—Broken alluvial land, rarely flooded

Map Unit Setting
National map unit symbol: d838
Elevation: 400 to 800 feet
Mean annual precipitation: 32 to 38 inches
Mean annual air temperature: 64 to 66 degrees F
Frost-free period: 240 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition
Alluvial land, broken: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alluvial Land, Broken

Setting
Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Parent material: Silty alluvium of quaternary age derived from chalk

Typical profile

H1 - 0 to 80 inches: clay loam

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Hydric soil rating: No

EcB—Eddy gravelly clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: d83l
Elevation: 400 to 1,000 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 6 inches: gravelly clay loam
H2 - 6 to 70 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 0.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

EdD2—Eddy soils, 3 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: d83m
Elevation: 400 to 1,000 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 6 inches: gravelly clay loam
H2 - 6 to 70 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 0.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed
Percent of map unit: 5 percent
Hydric soil rating: No

SeC2—Stephen-Eddy complex, 2 to 5 percent slopes

Map Unit Setting
National map unit symbol: 2vthp
Elevation: 400 to 890 feet
Mean annual precipitation: 33 to 42 inches
Mean annual air temperature: 64 to 67 degrees F
Frost-free period: 245 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition
Stephen and similar soils: 70 percent
Eddy and similar soils: 25 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile
A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities
Slope: 2 to 5 percent

Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loamy residuum weathered from chalk

Typical profile

A1 - 0 to 5 inches: gravelly clay loam
A2 - 5 to 10 inches: very gravelly clay loam
Cr - 10 to 20 inches: bedrock

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 6 to 14 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

StB—Stephen silty clay, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2vthm
Elevation: 430 to 890 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 62 to 69 degrees F
Frost-free period: 240 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile

A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Eddy

Percent of map unit: 5 percent
Landform: Ridges, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

AOI Inventory

This folder contains a collection of tabular reports that present a variety of soil information. Included are various map unit description reports, special soil interpretation reports, and data summary reports.

Component Legend

This report presents general information about the map units and map unit components in the selected area. It shows map unit symbols and names and the components in each map unit. It also shows the percent of the components in the map units, the kind of component, and the slope range of each component.

Report—Component Legend

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
5—Austin silty clay, 1 to 3 percent slopes	16,432						
		90	Austin	Series	1.0	2.0	3.0

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
7—Austin-Lewisville complex, 5 to 8 percent slopes, erode d	3,965						
		50	Austin	Series	5.0	7.0	8.0
		30	Lewisville	Series	5.0	7.0	8.0
23—Dalco clay, 1 to 3 percent slopes	5,038						
		100	Dalco	Series	1.0	2.0	3.0
26—Eddy clay loam, 1 to 3 percent slopes	6,333						
		90	Eddy	Series	1.0	2.0	3.0
27—Eddy clay loam, 3 to 8 percent slopes	5,878						
		100	Eddy	Series	3.0	6.0	8.0
30—Eddy-Stephen complex, 1 to 5 percent slopes	12,466						
		60	Eddy	Series	1.0	3.0	5.0
		30	Stephen	Series	1.0	3.0	5.0
37—Frio silty clay, 0 to 1 percent slopes, frequently flooded	10,411						
		90	Frio, frequently flooded	Series	0.0	0.5	1.0
41—Heiden clay, 1 to 3 percent slopes	6,930						
		85	Heiden	Series	1.0	2.0	3.0
44—Houston Black clay, 1 to 3 percent slopes	30,424						
		80	Houston black	Series	1.0	2.0	3.0
67—Stephen silty clay, 1 to 4 percent slopes	5,509						
		85	Stephen	Series	1.0	3.0	4.0

Component Legend–Ellis County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
AuB—Austin silty clay, 1 to 3 percent slopes	42,644						
		90	Austin	Series	1.0	2.0	3.0
AuC2—Austin silty clay, 2 to 5 percent slopes, moderately eroded	15,230						
		85	Austin, moderately eroded	Series	2.0	4.0	5.0

Component Legend–Ellis County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
Br—Broken alluvial land, rarely flooded	10,037						
		100	Alluvial land, broken	Miscellaneous area	5.0	10.0	15.0
EcB—Eddy gravelly clay loam, 1 to 3 percent slopes	17,613						
		95	Eddy	Series	1.0	2.0	3.0
EdD2—Eddy soils, 3 to 8 percent slopes, eroded	27,897						
		95	Eddy	Series	3.0	6.0	8.0
SeC2—Stephen-Eddy complex, 2 to 5 percent slopes	8,508						
		70	Stephen	Series	2.0	4.0	5.0
		25	Eddy	Series	2.0	4.0	5.0
StB—Stephen silty clay, 1 to 4 percent slopes	11,858						
		85	Stephen	Series	1.0	3.0	4.0

Land Classifications

This folder contains a collection of tabular reports that present a variety of soil groupings. The reports (tables) include all selected map units and components for each map unit. Land classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Soils

This table lists the map unit components that are rated as hydric soils in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:

A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or

B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

References:
Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
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Report—Hydric Soils

Hydric Soils–Dallas County, Texas				
Map symbol and map unit name	**Component**	**Percent of map unit**	**Landform**	**Hydric criteria**
37—Frio silty clay, 0 to 1 percent slopes, frequently flooded				
	Gladewater, frequently flooded	2	Flood plains, flood plains	2, 3, 4

Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

Report—Prime and other Important Farmlands

Prime and other Important Farmlands–Dallas County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
5	Austin silty clay, 1 to 3 percent slopes	Farmland of statewide importance
7	Austin-Lewisville complex, 5 to 8 percent slopes, erode d	Not prime farmland
23	Dalco clay, 1 to 3 percent slopes	All areas are prime farmland
26	Eddy clay loam, 1 to 3 percent slopes	Not prime farmland
27	Eddy clay loam, 3 to 8 percent slopes	Not prime farmland
30	Eddy-Stephen complex, 1 to 5 percent slopes	Not prime farmland
37	Frio silty clay, 0 to 1 percent slopes, frequently flooded	Not prime farmland
41	Heiden clay, 1 to 3 percent slopes	All areas are prime farmland
44	Houston Black clay, 1 to 3 percent slopes	All areas are prime farmland
67	Stephen silty clay, 1 to 4 percent slopes	Not prime farmland

Prime and other Important Farmlands–Ellis County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
AuB	Austin silty clay, 1 to 3 percent slopes	Farmland of statewide importance
AuC2	Austin silty clay, 2 to 5 percent slopes, moderately eroded	Not prime farmland
Br	Broken alluvial land, rarely flooded	Not prime farmland
EcB	Eddy gravelly clay loam, 1 to 3 percent slopes	Not prime farmland
EdD2	Eddy soils, 3 to 8 percent slopes, eroded	Not prime farmland
SeC2	Stephen-Eddy complex, 2 to 5 percent slopes	Not prime farmland
StB	Stephen silty clay, 1 to 4 percent slopes	Not prime farmland

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United States Department of Agriculture

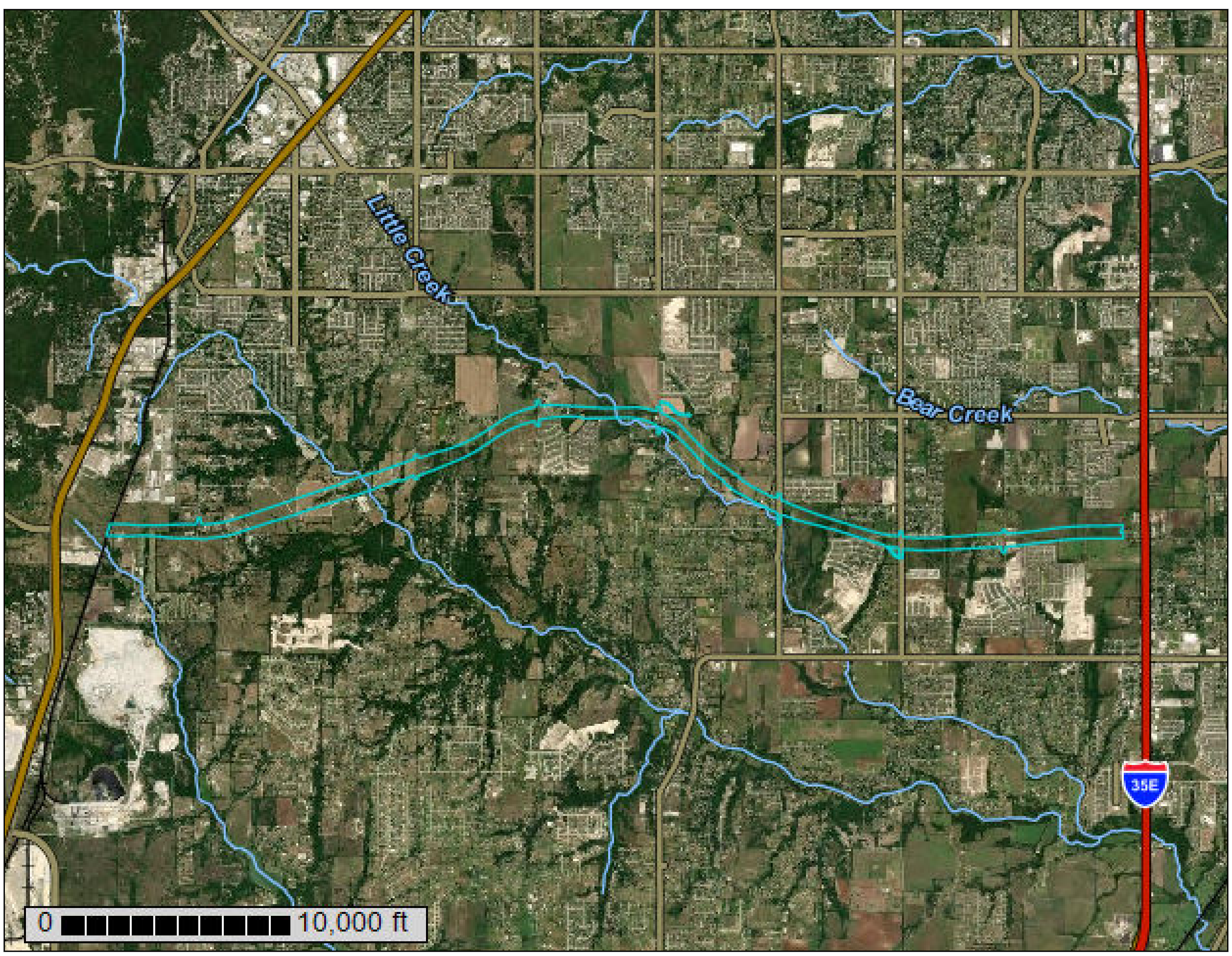
NRCS

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 Dallas County, Texas, and Ellis County, Texas

Loop 9_Alternative 2



March 18, 2022

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.

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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.

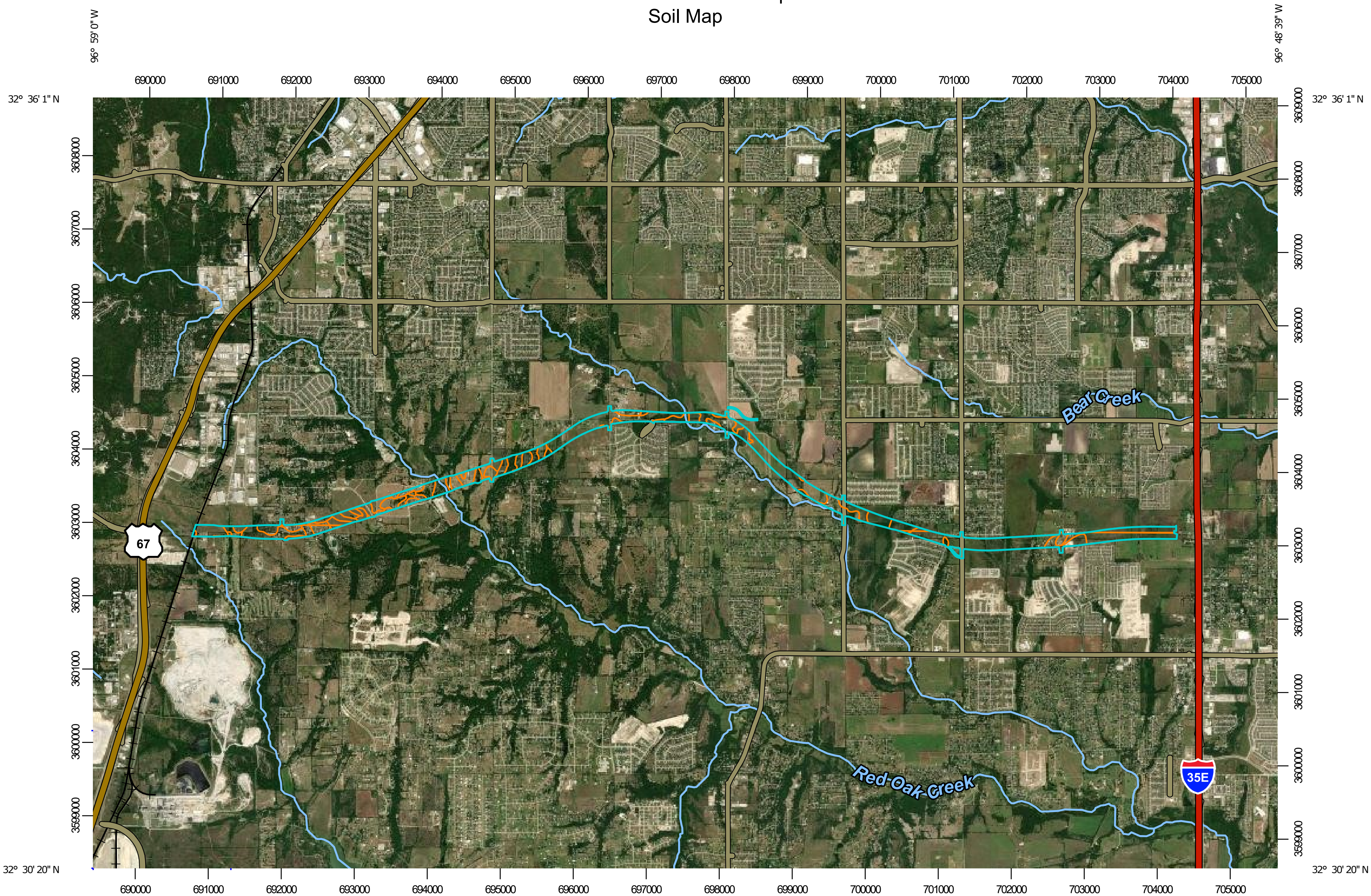
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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.

Custom Soil Resource Report
Soil Map



Map Scale: 1:74,200 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 1000, 2000, 4000, 6000

Feet: 0, 3500, 7000, 14000, 21000

N

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: Dallas County, Texas
Survey Area Data: Version 19, Sep 8, 2021

Soil Survey Area: Ellis County, Texas
Survey Area Data: Version 17, Sep 8, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Jan 18, 2020—Nov 15, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5	Austin silty clay, 1 to 3 percent slopes	48.0	8.1%
23	Dalco clay, 1 to 3 percent slopes	114.1	19.1%
26	Eddy clay loam, 1 to 3 percent slopes	28.2	4.7%
27	Eddy clay loam, 3 to 8 percent slopes	35.7	6.0%
30	Eddy-Stephen complex, 1 to 5 percent slopes	107.6	18.0%
37	Frio silty clay, 0 to 1 percent slopes, frequently flooded	9.6	1.6%
41	Heiden clay, 1 to 3 percent slopes	9.5	1.6%
44	Houston Black clay, 1 to 3 percent slopes	12.1	2.0%
67	Stephen silty clay, 1 to 4 percent slopes	27.4	4.6%
W	Water	1.1	0.2%
Subtotals for Soil Survey Area		**393.3**	**66.0%**
Totals for Area of Interest		**596.3**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AuB	Austin silty clay, 1 to 3 percent slopes	107.5	18.0%
AuC2	Austin silty clay, 2 to 5 percent slopes, moderately eroded	23.3	3.9%
Br	Broken alluvial land, rarely flooded	2.4	0.4%
EcB	Eddy gravelly clay loam, 1 to 3 percent slopes	19.4	3.3%
EdD2	Eddy soils, 3 to 8 percent slopes, eroded	6.4	1.1%
SeC2	Stephen-Eddy complex, 2 to 5 percent slopes	0.8	0.1%
StB	Stephen silty clay, 1 to 4 percent slopes	43.1	7.2%
Subtotals for Soil Survey Area		**203.0**	**34.0%**
Totals for Area of Interest		**596.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas

shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Dallas County, Texas

5—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

23—Dalco clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: d7lw
Elevation: 520 to 850 feet
Mean annual precipitation: 30 to 42 inches
Mean annual air temperature: 64 degrees F
Frost-free period: 230 to 260 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Dalco and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dalco

Setting

Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk formation

Typical profile

H1 - 0 to 7 inches: clay
H2 - 7 to 26 inches: clay
H3 - 26 to 35 inches: clay
H4 - 35 to 80 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 24 to 40 inches to paralithic bedrock
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: R086AY010TX - Northern Blackland
Hydric soil rating: No

26—Eddy clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2t0s4
Elevation: 400 to 890 feet
Mean annual precipitation: 37 to 40 inches
Mean annual air temperature: 64 to 66 degrees F
Frost-free period: 245 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy residuum weathered from chalk

Typical profile

A1 - 0 to 5 inches: clay loam
A2 - 5 to 11 inches: very gravelly clay loam
Cr - 11 to 20 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 6 to 14 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Stephen

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

27—Eddy clay loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: d7m0
Elevation: 400 to 1,000 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 4 inches: clay loam
H2 - 4 to 11 inches: gravelly clay loam
H3 - 11 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

30—Eddy-Stephen complex, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: d7m4
Elevation: 400 to 1,000 feet
Mean annual precipitation: 30 to 42 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 60 percent
Stephen and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 3 inches: clay loam
H2 - 3 to 15 inches: gravelly clay loam
H3 - 15 to 40 inches: bedrock

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk formation

Typical profile

H1 - 0 to 14 inches: silty clay
H2 - 14 to 20 inches: bedrock

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: 7 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed
Percent of map unit: 10 percent
Hydric soil rating: No

37—Frio silty clay, 0 to 1 percent slopes, frequently flooded

Map Unit Setting
National map unit symbol: 2wg92
Elevation: 330 to 770 feet
Mean annual precipitation: 37 to 42 inches
Mean annual air temperature: 64 to 65 degrees F
Frost-free period: 245 to 252 days
Farmland classification: Not prime farmland

Map Unit Composition
Frio, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frio, Frequently Flooded

Setting
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous clayey alluvium derived from mudstone and/or calcareous loamy alluvium derived from mudstone

Typical profile
Ap - 0 to 6 inches: silty clay
A - 6 to 50 inches: silty clay
Bk - 50 to 80 inches: silty clay

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 3.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C
Ecological site: R086AY012TX - Loamy Bottomland
Hydric soil rating: No

Minor Components

Tinn, frequently flooded

Percent of map unit: 8 percent
Landform: Flood plains, flood plains
Landform position (three-dimensional): Tread
Microfeatures of landform position: Circular gilgai
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R086AY013TX - Clayey Bottomland
Hydric soil rating: No

Gladewater, frequently flooded

Percent of map unit: 2 percent
Landform: Flood plains, flood plains
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R086AY013TX - Clayey Bottomland
Hydric soil rating: Yes

41—Heiden clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2v1v9
Elevation: 290 to 1,020 feet
Mean annual precipitation: 33 to 45 inches
Mean annual air temperature: 63 to 68 degrees F
Frost-free period: 224 to 278 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Heiden and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Heiden

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from mudstone

Typical profile

Ap - 0 to 6 inches: clay
A - 6 to 18 inches: clay
Bkss - 18 to 58 inches: clay
CBdk - 58 to 70 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 40 to 65 inches to densic material
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 12.0
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Circular gilgai
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R086AY011TX - Southern Blackland

Hydric soil rating: No

Ferris

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Microfeatures of landform position: Linear gilgai
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY009TX - Southern Eroded Blackland
Hydric soil rating: No

44—Houston Black clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2ssh0
Elevation: 270 to 1,040 feet
Mean annual precipitation: 33 to 43 inches
Mean annual air temperature: 62 to 63 degrees F
Frost-free period: 217 to 244 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Houston black and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Houston Black

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Clayey residuum weathered from calcareous mudstone of upper cretaceous age

Typical profile

Ap - 0 to 6 inches: clay
Bkss - 6 to 70 inches: clay
BCkss - 70 to 80 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Minor Components

Heiden

Percent of map unit: 15 percent
Landform: Plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Fairlie

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

67—Stephen silty clay, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2vthm
Elevation: 430 to 890 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 62 to 69 degrees F
Frost-free period: 240 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile

A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Eddy

Percent of map unit: 5 percent
Landform: Ridges, ridges

Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Ellis County, Texas

AuB—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

AuC2—Austin silty clay, 2 to 5 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2vtgk
Elevation: 420 to 1,050 feet
Mean annual precipitation: 32 to 44 inches
Mean annual air temperature: 63 to 69 degrees F
Frost-free period: 228 to 272 days
Farmland classification: Not prime farmland

Map Unit Composition

Austin, moderately eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin, Moderately Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 15 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Br—Broken alluvial land, rarely flooded

Map Unit Setting

National map unit symbol: d838
Elevation: 400 to 800 feet
Mean annual precipitation: 32 to 38 inches
Mean annual air temperature: 64 to 66 degrees F
Frost-free period: 240 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Alluvial land, broken: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alluvial Land, Broken

Setting

Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Parent material: Silty alluvium of quaternary age derived from chalk

Typical profile

H1 - 0 to 80 inches: clay loam

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Hydric soil rating: No

EcB—Eddy gravelly clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: d83l
Elevation: 400 to 1,000 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 6 inches: gravelly clay loam
H2 - 6 to 70 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 0.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

EdD2—Eddy soils, 3 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: d83m
Elevation: 400 to 1,000 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 6 inches: gravelly clay loam
H2 - 6 to 70 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 0.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed
Percent of map unit: 5 percent
Hydric soil rating: No

SeC2—Stephen-Eddy complex, 2 to 5 percent slopes

Map Unit Setting
National map unit symbol: 2vthp
Elevation: 400 to 890 feet
Mean annual precipitation: 33 to 42 inches
Mean annual air temperature: 64 to 67 degrees F
Frost-free period: 245 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition
Stephen and similar soils: 70 percent
Eddy and similar soils: 25 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile
A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities
Slope: 2 to 5 percent

Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loamy residuum weathered from chalk

Typical profile

A1 - 0 to 5 inches: gravelly clay loam
A2 - 5 to 10 inches: very gravelly clay loam
Cr - 10 to 20 inches: bedrock

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 6 to 14 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

StB—Stephen silty clay, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2vthm
Elevation: 430 to 890 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 62 to 69 degrees F
Frost-free period: 240 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile

A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Eddy

Percent of map unit: 5 percent
Landform: Ridges, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

AOI Inventory

This folder contains a collection of tabular reports that present a variety of soil information. Included are various map unit description reports, special soil interpretation reports, and data summary reports.

Component Legend

This report presents general information about the map units and map unit components in the selected area. It shows map unit symbols and names and the components in each map unit. It also shows the percent of the components in the map units, the kind of component, and the slope range of each component.

Report—Component Legend

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
5—Austin silty clay, 1 to 3 percent slopes	16,432						
		90	Austin	Series	1.0	2.0	3.0
23—Dalco clay, 1 to 3 percent slopes	5,038						
		100	Dalco	Series	1.0	2.0	3.0

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
26—Eddy clay loam, 1 to 3 percent slopes	6,333						
		90	Eddy	Series	1.0	2.0	3.0
27—Eddy clay loam, 3 to 8 percent slopes	5,878						
		100	Eddy	Series	3.0	6.0	8.0
30—Eddy-Stephen complex, 1 to 5 percent slopes	12,466						
		60	Eddy	Series	1.0	3.0	5.0
		30	Stephen	Series	1.0	3.0	5.0
37—Frio silty clay, 0 to 1 percent slopes, frequently flooded	10,411						
		90	Frio, frequently flooded	Series	0.0	0.5	1.0
41—Heiden clay, 1 to 3 percent slopes	6,930						
		85	Heiden	Series	1.0	2.0	3.0
44—Houston Black clay, 1 to 3 percent slopes	30,424						
		80	Houston black	Series	1.0	2.0	3.0
67—Stephen silty clay, 1 to 4 percent slopes	5,509						
		85	Stephen	Series	1.0	3.0	4.0
W—Water	19,466						
		100	Water	Miscellaneous area			

Component Legend–Ellis County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
AuB—Austin silty clay, 1 to 3 percent slopes	42,644						
		90	Austin	Series	1.0	2.0	3.0
AuC2—Austin silty clay, 2 to 5 percent slopes, moderately eroded	15,230						
		85	Austin, moderately eroded	Series	2.0	4.0	5.0
Br—Broken alluvial land, rarely flooded	10,037						
		100	Alluvial land, broken	Miscellaneous area	5.0	10.0	15.0
EcB—Eddy gravelly clay loam, 1 to 3 percent slopes	17,613						
		95	Eddy	Series	1.0	2.0	3.0

Component Legend–Ellis County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
EdD2—Eddy soils, 3 to 8 percent slopes, eroded	27,897						
		95	Eddy	Series	3.0	6.0	8.0
SeC2—Stephen-Eddy complex, 2 to 5 percent slopes	8,508						
		70	Stephen	Series	2.0	4.0	5.0
		25	Eddy	Series	2.0	4.0	5.0
StB—Stephen silty clay, 1 to 4 percent slopes	11,858						
		85	Stephen	Series	1.0	3.0	4.0

Land Classifications

This folder contains a collection of tabular reports that present a variety of soil groupings. The reports (tables) include all selected map units and components for each map unit. Land classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Soils

This table lists the map unit components that are rated as hydric soils in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

References:

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Report—Hydric Soils

Hydric Soils–Dallas County, Texas				
Map symbol and map unit name	**Component**	**Percent of map unit**	**Landform**	**Hydric criteria**
37—Frio silty clay, 0 to 1 percent slopes, frequently flooded				
	Gladewater, frequently flooded	2	Flood plains, flood plains	2, 3, 4

Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

Report—Prime and other Important Farmlands

Prime and other Important Farmlands–Dallas County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
5	Austin silty clay, 1 to 3 percent slopes	Farmland of statewide importance
23	Dalco clay, 1 to 3 percent slopes	All areas are prime farmland
26	Eddy clay loam, 1 to 3 percent slopes	Not prime farmland
27	Eddy clay loam, 3 to 8 percent slopes	Not prime farmland
30	Eddy-Stephen complex, 1 to 5 percent slopes	Not prime farmland
37	Frio silty clay, 0 to 1 percent slopes, frequently flooded	Not prime farmland
41	Heiden clay, 1 to 3 percent slopes	All areas are prime farmland
44	Houston Black clay, 1 to 3 percent slopes	All areas are prime farmland
67	Stephen silty clay, 1 to 4 percent slopes	Not prime farmland
W	Water	Not prime farmland

Prime and other Important Farmlands–Ellis County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
AuB	Austin silty clay, 1 to 3 percent slopes	Farmland of statewide importance
AuC2	Austin silty clay, 2 to 5 percent slopes, moderately eroded	Not prime farmland
Br	Broken alluvial land, rarely flooded	Not prime farmland
EcB	Eddy gravelly clay loam, 1 to 3 percent slopes	Not prime farmland
EdD2	Eddy soils, 3 to 8 percent slopes, eroded	Not prime farmland
SeC2	Stephen-Eddy complex, 2 to 5 percent slopes	Not prime farmland
StB	Stephen silty clay, 1 to 4 percent slopes	Not prime farmland

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United States Department of Agriculture

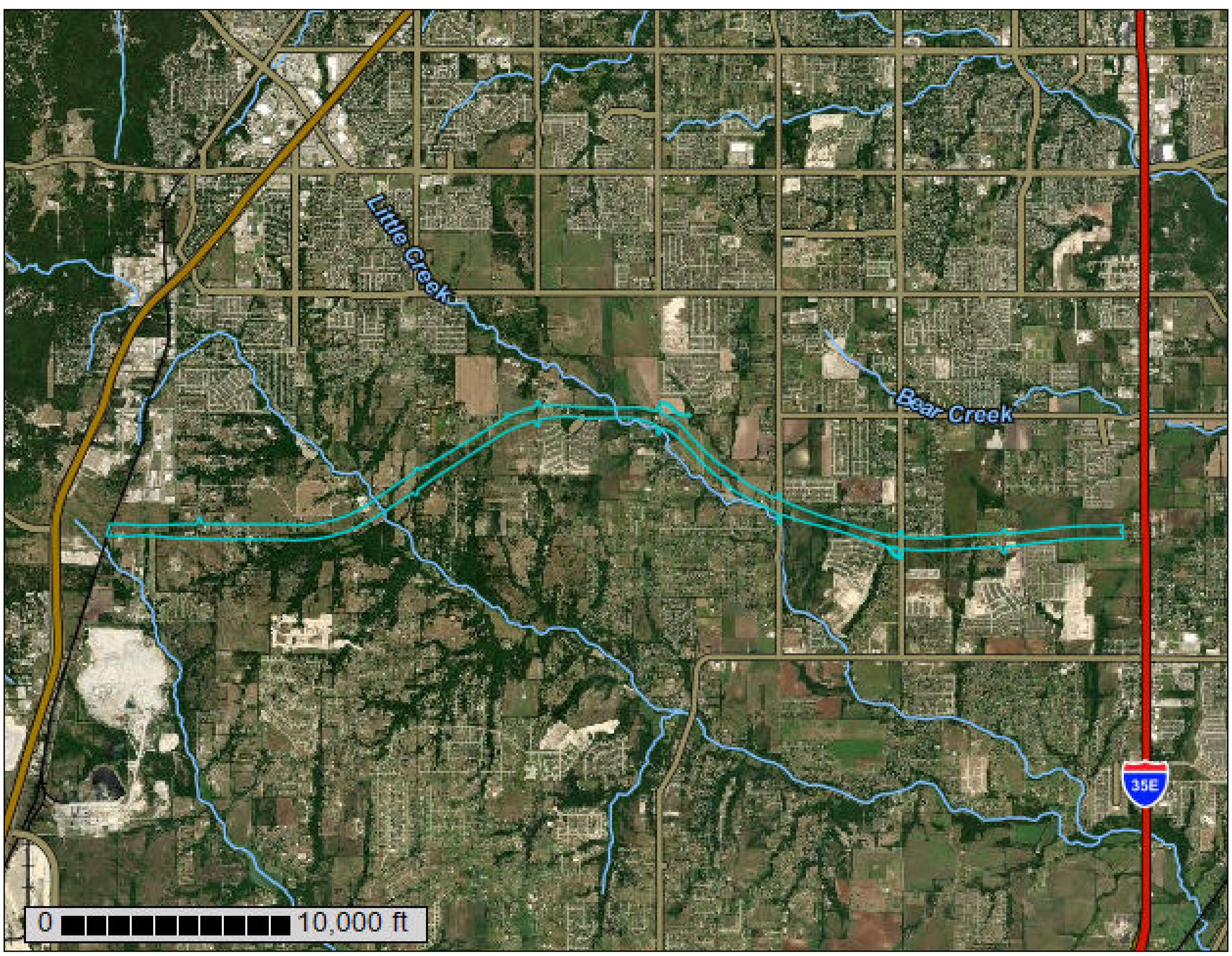
NRCS

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 Dallas County, Texas, and Ellis County, Texas

Loop 9_Alternative 3



March 18, 2022

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.

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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.

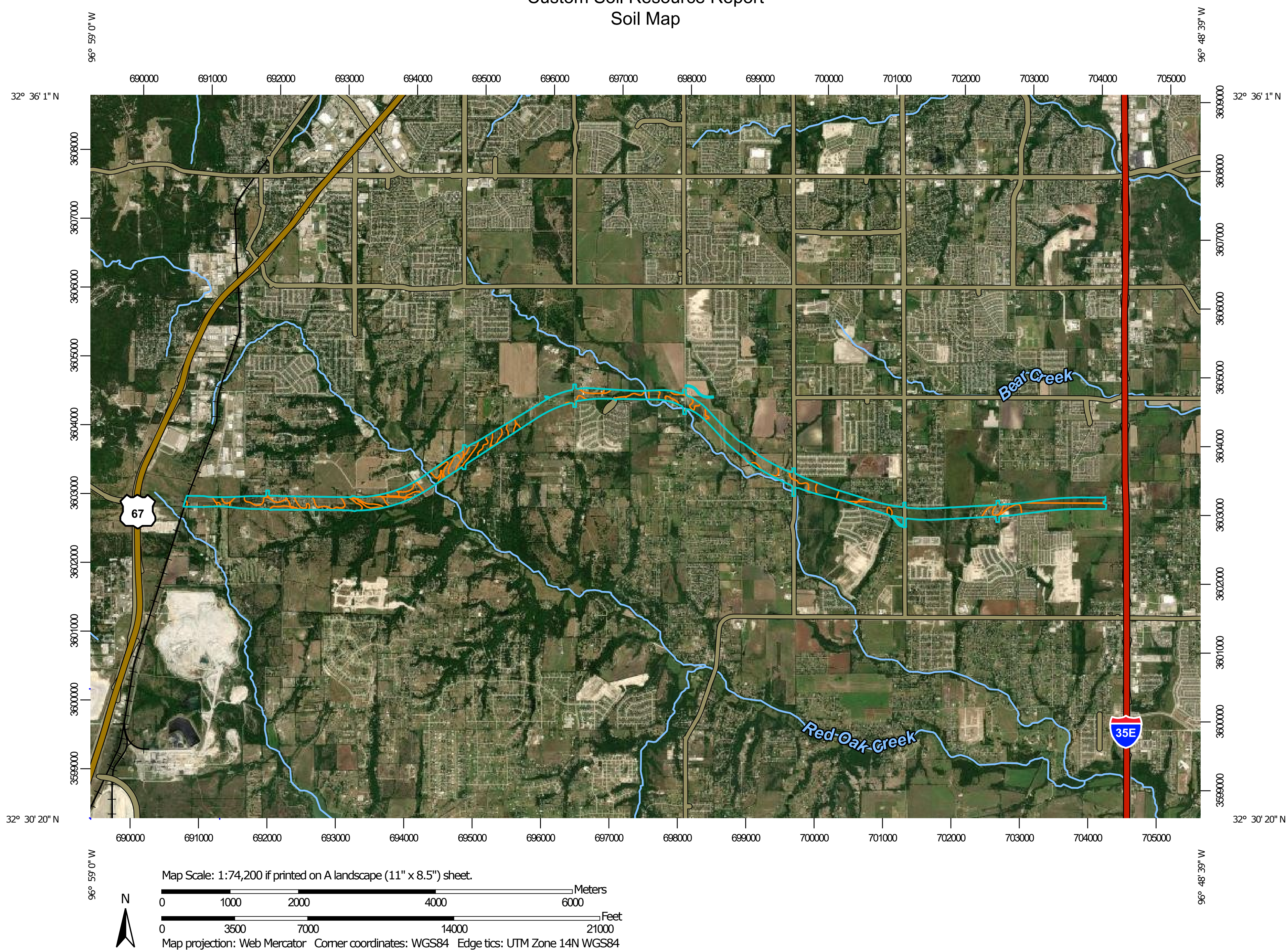
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree 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.


96° 59' 0" W
96° 48' 39" W
32° 36' 1" N
32° 30' 20" N
690000
691000
692000
693000
694000
695000
696000
697000
698000
699000
700000
701000
702000
703000
704000
705000
3609000
3608000
3607000
3606000
3605000
3604000
3603000
3602000
3601000
3600000
3599000
67
35E
Bear Creek
Red Oak Creek
N
Map Scale: 1:74,200 if printed on A landscape (11" x 8.5") sheet.
Meters
0 1000 2000 4000 6000
Feet
0 3500 7000 14000 21000
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: Dallas County, Texas
Survey Area Data: Version 19, Sep 8, 2021

Soil Survey Area: Ellis County, Texas
Survey Area Data: Version 17, Sep 8, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Jan 18, 2020—Nov 15, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5	Austin silty clay, 1 to 3 percent slopes	43.7	7.2%
23	Dalco clay, 1 to 3 percent slopes	115.7	19.1%
26	Eddy clay loam, 1 to 3 percent slopes	10.8	1.8%
27	Eddy clay loam, 3 to 8 percent slopes	21.1	3.5%
30	Eddy-Stephen complex, 1 to 5 percent slopes	100.2	16.6%
37	Frio silty clay, 0 to 1 percent slopes, frequently flooded	13.0	2.1%
41	Heiden clay, 1 to 3 percent slopes	2.8	0.5%
44	Houston Black clay, 1 to 3 percent slopes	12.0	2.0%
67	Stephen silty clay, 1 to 4 percent slopes	17.4	2.9%
W	Water	1.3	0.2%
Subtotals for Soil Survey Area		**338.0**	**55.9%**
Totals for Area of Interest		**604.9**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AuB	Austin silty clay, 1 to 3 percent slopes	111.8	18.5%
AuC2	Austin silty clay, 2 to 5 percent slopes, moderately eroded	25.5	4.2%
Br	Broken alluvial land, rarely flooded	6.7	1.1%
EcB	Eddy gravelly clay loam, 1 to 3 percent slopes	35.1	5.8%
EdD2	Eddy soils, 3 to 8 percent slopes, eroded	36.0	6.0%
SeB2	Stephen-Eddy complex, 1 to 3 percent slopes, eroded	0.1	0.0%
SeC2	Stephen-Eddy complex, 2 to 5 percent slopes	0.8	0.1%
StB	Stephen silty clay, 1 to 4 percent slopes	50.8	8.4%
Subtotals for Soil Survey Area		**266.9**	**44.1%**
Totals for Area of Interest		**604.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas

shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Dallas County, Texas

5—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

23—Dalco clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: d7lw
Elevation: 520 to 850 feet
Mean annual precipitation: 30 to 42 inches
Mean annual air temperature: 64 degrees F
Frost-free period: 230 to 260 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Dalco and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dalco

Setting

Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk formation

Typical profile

H1 - 0 to 7 inches: clay
H2 - 7 to 26 inches: clay
H3 - 26 to 35 inches: clay
H4 - 35 to 80 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 24 to 40 inches to paralithic bedrock
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: R086AY010TX - Northern Blackland
Hydric soil rating: No

26—Eddy clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2t0s4
Elevation: 400 to 890 feet
Mean annual precipitation: 37 to 40 inches
Mean annual air temperature: 64 to 66 degrees F
Frost-free period: 245 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy residuum weathered from chalk

Typical profile

A1 - 0 to 5 inches: clay loam
A2 - 5 to 11 inches: very gravelly clay loam
Cr - 11 to 20 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 6 to 14 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Stephen

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

27—Eddy clay loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: d7m0
Elevation: 400 to 1,000 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 4 inches: clay loam
H2 - 4 to 11 inches: gravelly clay loam
H3 - 11 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

30—Eddy-Stephen complex, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: d7m4
Elevation: 400 to 1,000 feet
Mean annual precipitation: 30 to 42 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 60 percent
Stephen and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 3 inches: clay loam
H2 - 3 to 15 inches: gravelly clay loam
H3 - 15 to 40 inches: bedrock

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk formation

Typical profile

H1 - 0 to 14 inches: silty clay
H2 - 14 to 20 inches: bedrock

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: 7 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed
Percent of map unit: 10 percent
Hydric soil rating: No

37—Frio silty clay, 0 to 1 percent slopes, frequently flooded

Map Unit Setting
National map unit symbol: 2wg92
Elevation: 330 to 770 feet
Mean annual precipitation: 37 to 42 inches
Mean annual air temperature: 64 to 65 degrees F
Frost-free period: 245 to 252 days
Farmland classification: Not prime farmland

Map Unit Composition
Frio, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frio, Frequently Flooded

Setting
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous clayey alluvium derived from mudstone and/or calcareous loamy alluvium derived from mudstone

Typical profile
Ap - 0 to 6 inches: silty clay
A - 6 to 50 inches: silty clay
Bk - 50 to 80 inches: silty clay

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 3.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C
Ecological site: R086AY012TX - Loamy Bottomland
Hydric soil rating: No

Minor Components

Tinn, frequently flooded

Percent of map unit: 8 percent
Landform: Flood plains, flood plains
Landform position (three-dimensional): Tread
Microfeatures of landform position: Circular gilgai
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R086AY013TX - Clayey Bottomland
Hydric soil rating: No

Gladewater, frequently flooded

Percent of map unit: 2 percent
Landform: Flood plains, flood plains
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R086AY013TX - Clayey Bottomland
Hydric soil rating: Yes

41—Heiden clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2v1v9
Elevation: 290 to 1,020 feet
Mean annual precipitation: 33 to 45 inches
Mean annual air temperature: 63 to 68 degrees F
Frost-free period: 224 to 278 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Heiden and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Heiden

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from mudstone

Typical profile

Ap - 0 to 6 inches: clay
A - 6 to 18 inches: clay
Bkss - 18 to 58 inches: clay
CBdk - 58 to 70 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 40 to 65 inches to densic material
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 12.0
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Circular gilgai
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R086AY011TX - Southern Blackland

Hydric soil rating: No

Ferris

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Microfeatures of landform position: Linear gilgai
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY009TX - Southern Eroded Blackland
Hydric soil rating: No

44—Houston Black clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2ssh0
Elevation: 270 to 1,040 feet
Mean annual precipitation: 33 to 43 inches
Mean annual air temperature: 62 to 63 degrees F
Frost-free period: 217 to 244 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Houston black and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Houston Black

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Clayey residuum weathered from calcareous mudstone of upper cretaceous age

Typical profile

Ap - 0 to 6 inches: clay
Bkss - 6 to 70 inches: clay
BCkss - 70 to 80 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Minor Components

Heiden

Percent of map unit: 15 percent
Landform: Plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Fairlie

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

67—Stephen silty clay, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2vthm
Elevation: 430 to 890 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 62 to 69 degrees F
Frost-free period: 240 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile

A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Eddy

Percent of map unit: 5 percent
Landform: Ridges, ridges

Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Ellis County, Texas

AuB—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

AuC2—Austin silty clay, 2 to 5 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2vtgk
Elevation: 420 to 1,050 feet
Mean annual precipitation: 32 to 44 inches
Mean annual air temperature: 63 to 69 degrees F
Frost-free period: 228 to 272 days
Farmland classification: Not prime farmland

Map Unit Composition

Austin, moderately eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin, Moderately Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 15 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Br—Broken alluvial land, rarely flooded

Map Unit Setting

National map unit symbol: d838
Elevation: 400 to 800 feet
Mean annual precipitation: 32 to 38 inches
Mean annual air temperature: 64 to 66 degrees F
Frost-free period: 240 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Alluvial land, broken: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alluvial Land, Broken

Setting

Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Parent material: Silty alluvium of quaternary age derived from chalk

Typical profile

H1 - 0 to 80 inches: clay loam

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Hydric soil rating: No

EcB—Eddy gravelly clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: d83l
Elevation: 400 to 1,000 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 6 inches: gravelly clay loam
H2 - 6 to 70 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 0.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

EdD2—Eddy soils, 3 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: d83m
Elevation: 400 to 1,000 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 6 inches: gravelly clay loam
H2 - 6 to 70 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 0.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed
Percent of map unit: 5 percent
Hydric soil rating: No

SeB2—Stephen-Eddy complex, 1 to 3 percent slopes, eroded

Map Unit Setting
National map unit symbol: d84q
Elevation: 400 to 1,000 feet
Mean annual precipitation: 30 to 42 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition
Stephen and similar soils: 65 percent
Eddy and similar soils: 34 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk formation

Typical profile
H1 - 0 to 14 inches: silty clay
H2 - 14 to 40 inches: bedrock

Properties and qualities
Slope: 1 to 3 percent
Depth to restrictive feature: 7 to 20 inches to paralithic bedrock

Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 6 inches: gravelly clay loam
H2 - 6 to 10 inches: gravelly clay loam
H3 - 10 to 60 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 1 percent
Hydric soil rating: No

SeC2—Stephen-Eddy complex, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2vthp
Elevation: 400 to 890 feet
Mean annual precipitation: 33 to 42 inches
Mean annual air temperature: 64 to 67 degrees F
Frost-free period: 245 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 70 percent
Eddy and similar soils: 25 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile

A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D

Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loamy residuum weathered from chalk

Typical profile

A1 - 0 to 5 inches: gravelly clay loam
A2 - 5 to 10 inches: very gravelly clay loam
Cr - 10 to 20 inches: bedrock

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 6 to 14 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

StB—Stephen silty clay, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2vthm
Elevation: 430 to 890 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 62 to 69 degrees F
Frost-free period: 240 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile

A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge

Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Eddy

Percent of map unit: 5 percent
Landform: Ridges, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

AOI Inventory

This folder contains a collection of tabular reports that present a variety of soil information. Included are various map unit description reports, special soil interpretation reports, and data summary reports.

Component Legend

This report presents general information about the map units and map unit components in the selected area. It shows map unit symbols and names and the components in each map unit. It also shows the percent of the components in the map units, the kind of component, and the slope range of each component.

Report—Component Legend

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
5—Austin silty clay, 1 to 3 percent slopes	16,432						
		90	Austin	Series	1.0	2.0	3.0
23—Dalco clay, 1 to 3 percent slopes	5,038						
		100	Dalco	Series	1.0	2.0	3.0

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
26—Eddy clay loam, 1 to 3 percent slopes	6,333						
		90	Eddy	Series	1.0	2.0	3.0
27—Eddy clay loam, 3 to 8 percent slopes	5,878						
		100	Eddy	Series	3.0	6.0	8.0
30—Eddy-Stephen complex, 1 to 5 percent slopes	12,466						
		60	Eddy	Series	1.0	3.0	5.0
		30	Stephen	Series	1.0	3.0	5.0
37—Frio silty clay, 0 to 1 percent slopes, frequently flooded	10,411						
		90	Frio, frequently flooded	Series	0.0	0.5	1.0
41—Heiden clay, 1 to 3 percent slopes	6,930						
		85	Heiden	Series	1.0	2.0	3.0
44—Houston Black clay, 1 to 3 percent slopes	30,424						
		80	Houston black	Series	1.0	2.0	3.0
67—Stephen silty clay, 1 to 4 percent slopes	5,509						
		85	Stephen	Series	1.0	3.0	4.0
W—Water	19,466						
		100	Water	Miscellaneous area			

Component Legend–Ellis County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
AuB—Austin silty clay, 1 to 3 percent slopes	42,644						
		90	Austin	Series	1.0	2.0	3.0
AuC2—Austin silty clay, 2 to 5 percent slopes, moderately eroded	15,230						
		85	Austin, moderately eroded	Series	2.0	4.0	5.0
Br—Broken alluvial land, rarely flooded	10,037						
		100	Alluvial land, broken	Miscellaneous area	5.0	10.0	15.0
EcB—Eddy gravelly clay loam, 1 to 3 percent slopes	17,613						
		95	Eddy	Series	1.0	2.0	3.0

Component Legend–Ellis County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
EdD2—Eddy soils, 3 to 8 percent slopes, eroded	27,897						
		95	Eddy	Series	3.0	6.0	8.0
SeB2—Stephen-Eddy complex, 1 to 3 percent slopes, eroded	6,319						
		65	Stephen	Series	1.0	2.0	3.0
		34	Eddy	Series	1.0	2.0	3.0
SeC2—Stephen-Eddy complex, 2 to 5 percent slopes	8,508						
		70	Stephen	Series	2.0	4.0	5.0
		25	Eddy	Series	2.0	4.0	5.0
StB—Stephen silty clay, 1 to 4 percent slopes	11,858						
		85	Stephen	Series	1.0	3.0	4.0

Land Classifications

This folder contains a collection of tabular reports that present a variety of soil groupings. The reports (tables) include all selected map units and components for each map unit. Land classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

Report—Prime and other Important Farmlands

Prime and other Important Farmlands–Dallas County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
5	Austin silty clay, 1 to 3 percent slopes	Farmland of statewide importance
23	Dalco clay, 1 to 3 percent slopes	All areas are prime farmland
26	Eddy clay loam, 1 to 3 percent slopes	Not prime farmland
27	Eddy clay loam, 3 to 8 percent slopes	Not prime farmland
30	Eddy-Stephen complex, 1 to 5 percent slopes	Not prime farmland
37	Frio silty clay, 0 to 1 percent slopes, frequently flooded	Not prime farmland
41	Heiden clay, 1 to 3 percent slopes	All areas are prime farmland
44	Houston Black clay, 1 to 3 percent slopes	All areas are prime farmland
67	Stephen silty clay, 1 to 4 percent slopes	Not prime farmland
W	Water	Not prime farmland

Prime and other Important Farmlands–Ellis County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
AuB	Austin silty clay, 1 to 3 percent slopes	Farmland of statewide importance
AuC2	Austin silty clay, 2 to 5 percent slopes, moderately eroded	Not prime farmland
Br	Broken alluvial land, rarely flooded	Not prime farmland
EcB	Eddy gravelly clay loam, 1 to 3 percent slopes	Not prime farmland
EdD2	Eddy soils, 3 to 8 percent slopes, eroded	Not prime farmland
SeB2	Stephen-Eddy complex, 1 to 3 percent slopes, eroded	Not prime farmland
SeC2	Stephen-Eddy complex, 2 to 5 percent slopes	Not prime farmland
StB	Stephen silty clay, 1 to 4 percent slopes	Not prime farmland

Hydric Soils

This table lists the map unit components that are rated as hydric soils in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

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Report—Hydric Soils

Hydric Soils–Dallas County, Texas				
Map symbol and map unit name	**Component**	**Percent of map unit**	**Landform**	**Hydric criteria**
37—Frio silty clay, 0 to 1 percent slopes, frequently flooded				
	Gladewater, frequently flooded	2	Flood plains, flood plains	2, 3, 4

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United States Department of Agriculture

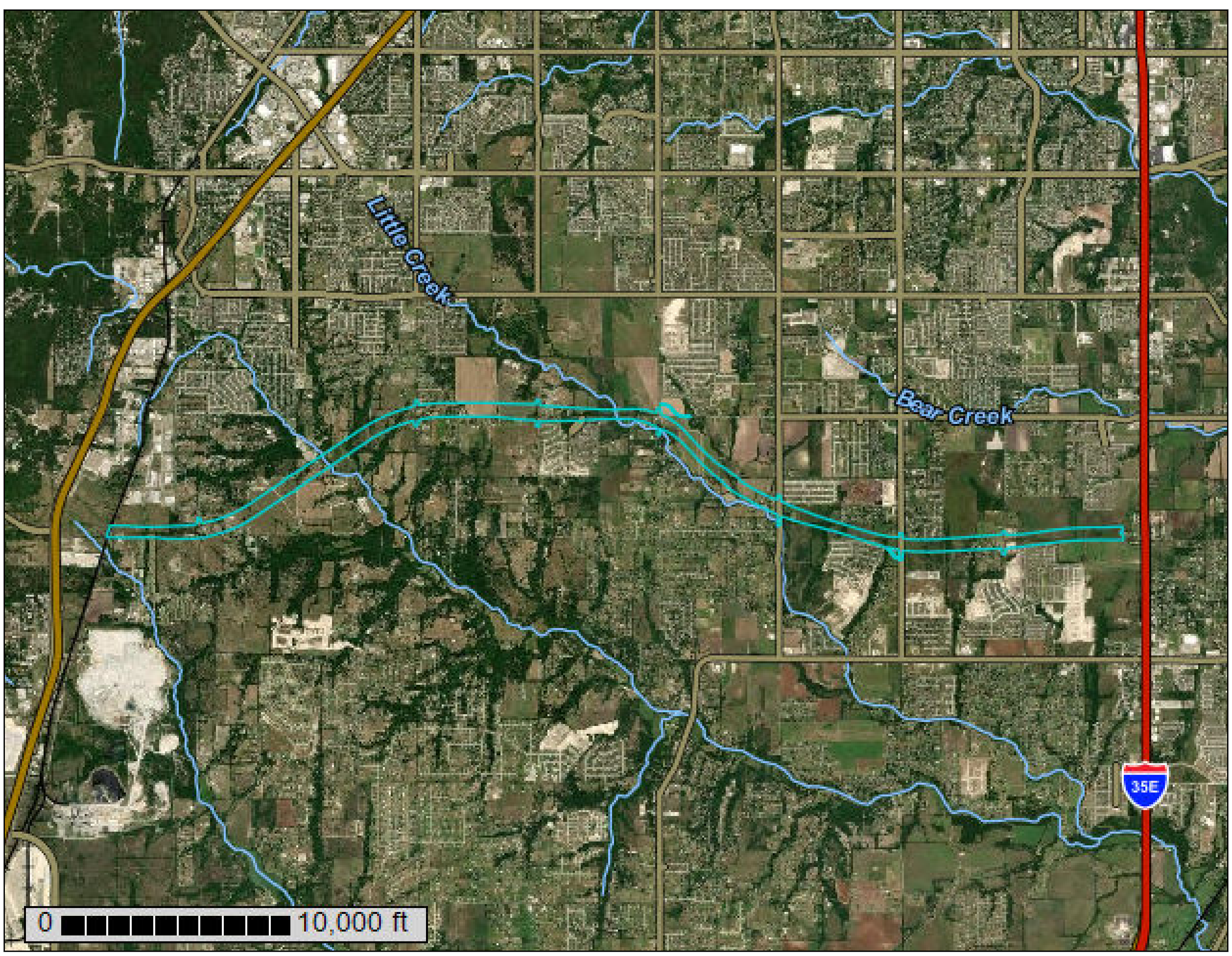
NRCS

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
Dallas County, Texas, and Ellis County, Texas

Loop 9_Alternative 4



March 18, 2022

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.

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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.

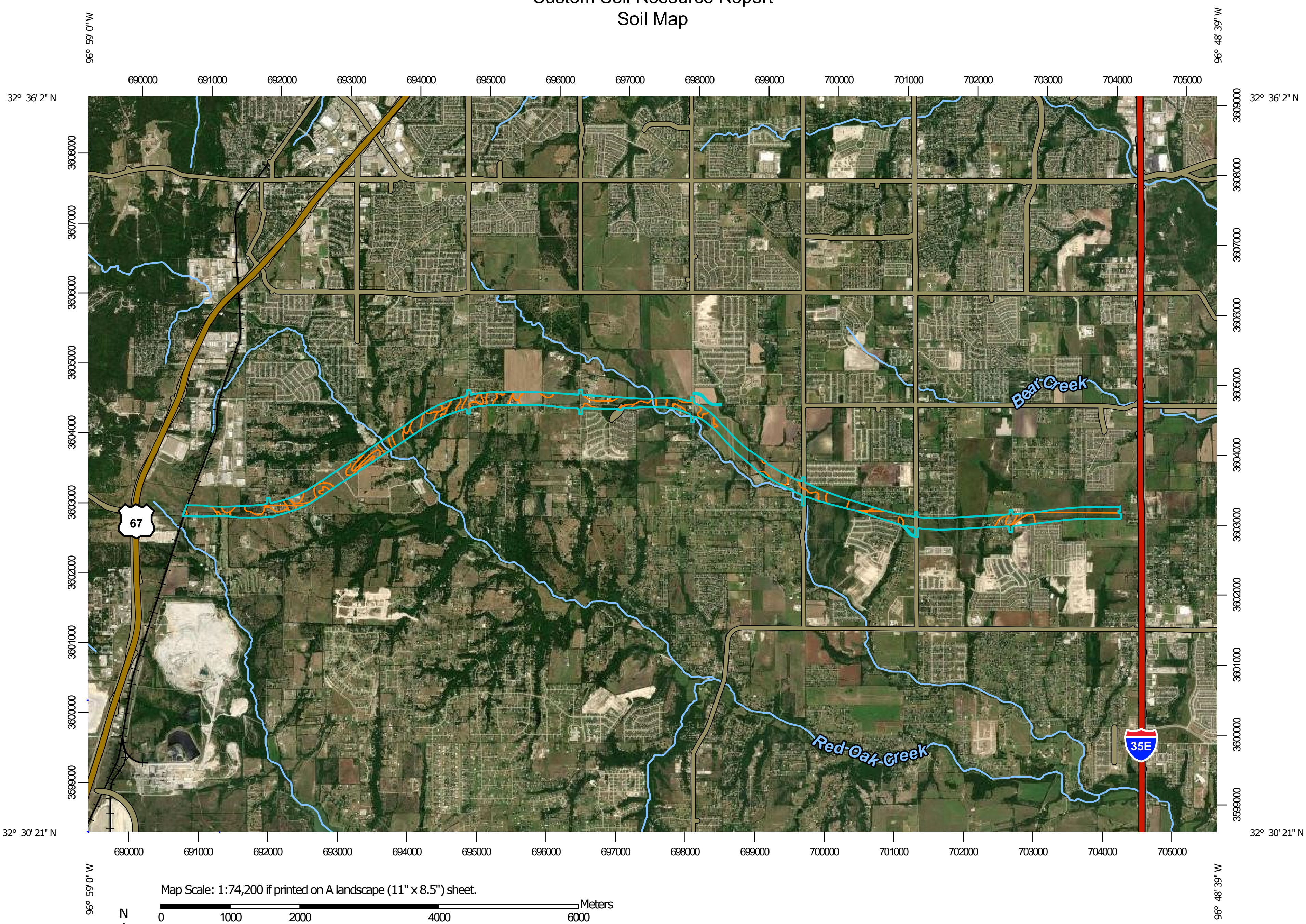
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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.

Custom Soil Resource Report
Soil Map



Map Scale: 1:74,200 if printed on A landscape (11" x 8.5") sheet.

Meters: 0 1000 2000 4000 6000

Feet: 0 3500 7000 14000 21000

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: Dallas County, Texas
Survey Area Data: Version 19, Sep 8, 2021

Soil Survey Area: Ellis County, Texas
Survey Area Data: Version 17, Sep 8, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Jan 18, 2020—Nov 15, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5	Austin silty clay, 1 to 3 percent slopes	62.4	10.3%
7	Austin-Lewisville complex, 5 to 8 percent slopes, erode d	20.5	3.4%
23	Dalco clay, 1 to 3 percent slopes	126.9	21.0%
26	Eddy clay loam, 1 to 3 percent slopes	45.4	7.5%
27	Eddy clay loam, 3 to 8 percent slopes	32.0	5.3%
30	Eddy-Stephen complex, 1 to 5 percent slopes	95.9	15.9%
37	Frio silty clay, 0 to 1 percent slopes, frequently flooded	6.6	1.1%
44	Houston Black clay, 1 to 3 percent slopes	12.1	2.0%
67	Stephen silty clay, 1 to 4 percent slopes	14.0	2.3%
Subtotals for Soil Survey Area		**415.7**	**68.8%**
Totals for Area of Interest		**604.3**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AuB	Austin silty clay, 1 to 3 percent slopes	107.5	17.8%
AuC2	Austin silty clay, 2 to 5 percent slopes, moderately eroded	21.2	3.5%
Br	Broken alluvial land, rarely flooded	2.4	0.4%
EcB	Eddy gravelly clay loam, 1 to 3 percent slopes	16.0	2.7%
EdD2	Eddy soils, 3 to 8 percent slopes, eroded	1.1	0.2%
SeC2	Stephen-Eddy complex, 2 to 5 percent slopes	0.8	0.1%
StB	Stephen silty clay, 1 to 4 percent slopes	39.4	6.5%
Subtotals for Soil Survey Area		**188.5**	**31.2%**
Totals for Area of Interest		**604.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas

shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Dallas County, Texas

5—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

7—Austin-Lewisville complex, 5 to 8 percent slopes, erode d

Map Unit Setting

National map unit symbol: d7nj
Elevation: 400 to 1,400 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 220 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Austin and similar soils: 50 percent
Lewisville and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

H1 - 0 to 6 inches: silty clay
H2 - 6 to 20 inches: silty clay
H3 - 20 to 40 inches: bedrock

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 70 percent
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R086AY006TX - Northern Clay Loam
Hydric soil rating: No

Description of Lewisville

Setting

Landform: Stream terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Alluvium of quaternary age derived from mixed sources

Typical profile

H1 - 0 to 16 inches: silty clay
H2 - 16 to 32 inches: silty clay
H3 - 32 to 64 inches: silty clay

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R086AY006TX - Northern Clay Loam
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 20 percent
Hydric soil rating: No

23—Dalco clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: d7lw
Elevation: 520 to 850 feet
Mean annual precipitation: 30 to 42 inches
Mean annual air temperature: 64 degrees F
Frost-free period: 230 to 260 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Dalco and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dalco

Setting

Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk formation

Typical profile

H1 - 0 to 7 inches: clay
H2 - 7 to 26 inches: clay
H3 - 26 to 35 inches: clay
H4 - 35 to 80 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 24 to 40 inches to paralithic bedrock
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D

Ecological site: R086AY010TX - Northern Blackland
Hydric soil rating: No

26—Eddy clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2t0s4
Elevation: 400 to 890 feet
Mean annual precipitation: 37 to 40 inches
Mean annual air temperature: 64 to 66 degrees F
Frost-free period: 245 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy residuum weathered from chalk

Typical profile

A1 - 0 to 5 inches: clay loam
A2 - 5 to 11 inches: very gravelly clay loam
Cr - 11 to 20 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 6 to 14 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge

Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Stephen

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

27—Eddy clay loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: d7m0
Elevation: 400 to 1,000 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 4 inches: clay loam
H2 - 4 to 11 inches: gravelly clay loam

H3 - 11 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

30—Eddy-Stephen complex, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: d7m4
Elevation: 400 to 1,000 feet
Mean annual precipitation: 30 to 42 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 60 percent
Stephen and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 3 inches: clay loam
H2 - 3 to 15 inches: gravelly clay loam
H3 - 15 to 40 inches: bedrock

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk formation

Typical profile

H1 - 0 to 14 inches: silty clay
H2 - 14 to 20 inches: bedrock

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: 7 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 10 percent
Hydric soil rating: No

37—Frio silty clay, 0 to 1 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2wg92
Elevation: 330 to 770 feet
Mean annual precipitation: 37 to 42 inches
Mean annual air temperature: 64 to 65 degrees F
Frost-free period: 245 to 252 days
Farmland classification: Not prime farmland

Map Unit Composition

Frio, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frio, Frequently Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous clayey alluvium derived from mudstone and/or calcareous loamy alluvium derived from mudstone

Typical profile

Ap - 0 to 6 inches: silty clay
A - 6 to 50 inches: silty clay
Bk - 50 to 80 inches: silty clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 3.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C
Ecological site: R086AY012TX - Loamy Bottomland
Hydric soil rating: No

Minor Components

Tinn, frequently flooded

Percent of map unit: 8 percent
Landform: Flood plains, flood plains
Landform position (three-dimensional): Tread
Microfeatures of landform position: Circular gilgai
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R086AY013TX - Clayey Bottomland
Hydric soil rating: No

Gladewater, frequently flooded

Percent of map unit: 2 percent
Landform: Flood plains, flood plains
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R086AY013TX - Clayey Bottomland
Hydric soil rating: Yes

44—Houston Black clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2ssh0
Elevation: 270 to 1,040 feet
Mean annual precipitation: 33 to 43 inches
Mean annual air temperature: 62 to 63 degrees F
Frost-free period: 217 to 244 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Houston black and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Houston Black

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear

Across-slope shape: Convex, linear
Parent material: Clayey residuum weathered from calcareous mudstone of upper cretaceous age

Typical profile

Ap - 0 to 6 inches: clay
Bkss - 6 to 70 inches: clay
BCkss - 70 to 80 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Minor Components

Heiden

Percent of map unit: 15 percent
Landform: Plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Fairlie

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

67—Stephen silty clay, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2vthm
Elevation: 430 to 890 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 62 to 69 degrees F
Frost-free period: 240 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile

A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Eddy

Percent of map unit: 5 percent
Landform: Ridges, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Ellis County, Texas

AuB—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

AuC2—Austin silty clay, 2 to 5 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2vtgk
Elevation: 420 to 1,050 feet
Mean annual precipitation: 32 to 44 inches
Mean annual air temperature: 63 to 69 degrees F
Frost-free period: 228 to 272 days
Farmland classification: Not prime farmland

Map Unit Composition

Austin, moderately eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin, Moderately Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 15 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Br—Broken alluvial land, rarely flooded

Map Unit Setting

National map unit symbol: d838
Elevation: 400 to 800 feet
Mean annual precipitation: 32 to 38 inches
Mean annual air temperature: 64 to 66 degrees F
Frost-free period: 240 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Alluvial land, broken: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alluvial Land, Broken

Setting

Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Parent material: Silty alluvium of quaternary age derived from chalk

Typical profile

H1 - 0 to 80 inches: clay loam

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Hydric soil rating: No

EcB—Eddy gravelly clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: d83l
Elevation: 400 to 1,000 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 6 inches: gravelly clay loam
H2 - 6 to 70 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 0.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

EdD2—Eddy soils, 3 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: d83m
Elevation: 400 to 1,000 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 6 inches: gravelly clay loam
H2 - 6 to 70 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 0.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed
Percent of map unit: 5 percent
Hydric soil rating: No

SeC2—Stephen-Eddy complex, 2 to 5 percent slopes

Map Unit Setting
National map unit symbol: 2vthp
Elevation: 400 to 890 feet
Mean annual precipitation: 33 to 42 inches
Mean annual air temperature: 64 to 67 degrees F
Frost-free period: 245 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition
Stephen and similar soils: 70 percent
Eddy and similar soils: 25 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile
A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities
Slope: 2 to 5 percent

Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loamy residuum weathered from chalk

Typical profile

A1 - 0 to 5 inches: gravelly clay loam
A2 - 5 to 10 inches: very gravelly clay loam
Cr - 10 to 20 inches: bedrock

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 6 to 14 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

StB—Stephen silty clay, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2vthm
Elevation: 430 to 890 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 62 to 69 degrees F
Frost-free period: 240 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile

A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Eddy

Percent of map unit: 5 percent
Landform: Ridges, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

AOI Inventory

This folder contains a collection of tabular reports that present a variety of soil information. Included are various map unit description reports, special soil interpretation reports, and data summary reports.

Component Legend

This report presents general information about the map units and map unit components in the selected area. It shows map unit symbols and names and the components in each map unit. It also shows the percent of the components in the map units, the kind of component, and the slope range of each component.

Report—Component Legend

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
5—Austin silty clay, 1 to 3 percent slopes	16,432						
		90	Austin	Series	1.0	2.0	3.0

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
7—Austin-Lewisville complex, 5 to 8 percent slopes, erode d	3,965						
		50	Austin	Series	5.0	7.0	8.0
		30	Lewisville	Series	5.0	7.0	8.0
23—Dalco clay, 1 to 3 percent slopes	5,038						
		100	Dalco	Series	1.0	2.0	3.0
26—Eddy clay loam, 1 to 3 percent slopes	6,333						
		90	Eddy	Series	1.0	2.0	3.0
27—Eddy clay loam, 3 to 8 percent slopes	5,878						
		100	Eddy	Series	3.0	6.0	8.0
30—Eddy-Stephen complex, 1 to 5 percent slopes	12,466						
		60	Eddy	Series	1.0	3.0	5.0
		30	Stephen	Series	1.0	3.0	5.0
37—Frio silty clay, 0 to 1 percent slopes, frequently flooded	10,411						
		90	Frio, frequently flooded	Series	0.0	0.5	1.0
44—Houston Black clay, 1 to 3 percent slopes	30,424						
		80	Houston black	Series	1.0	2.0	3.0
67—Stephen silty clay, 1 to 4 percent slopes	5,509						
		85	Stephen	Series	1.0	3.0	4.0

Component Legend–Ellis County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
AuB—Austin silty clay, 1 to 3 percent slopes	42,644						
		90	Austin	Series	1.0	2.0	3.0
AuC2—Austin silty clay, 2 to 5 percent slopes, moderately eroded	15,230						
		85	Austin, moderately eroded	Series	2.0	4.0	5.0
Br—Broken alluvial land, rarely flooded	10,037						
		100	Alluvial land, broken	Miscellaneous area	5.0	10.0	15.0

Component Legend–Ellis County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
EcB—Eddy gravelly clay loam, 1 to 3 percent slopes	17,613						
		95	Eddy	Series	1.0	2.0	3.0
EdD2—Eddy soils, 3 to 8 percent slopes, eroded	27,897						
		95	Eddy	Series	3.0	6.0	8.0
SeC2—Stephen-Eddy complex, 2 to 5 percent slopes	8,508						
		70	Stephen	Series	2.0	4.0	5.0
		25	Eddy	Series	2.0	4.0	5.0
StB—Stephen silty clay, 1 to 4 percent slopes	11,858						
		85	Stephen	Series	1.0	3.0	4.0

Land Classifications

This folder contains a collection of tabular reports that present a variety of soil groupings. The reports (tables) include all selected map units and components for each map unit. Land classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Soils

This table lists the map unit components that are rated as hydric soils in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

References:
Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
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Report—Hydric Soils

Hydric Soils–Dallas County, Texas				
Map symbol and map unit name	**Component**	**Percent of map unit**	**Landform**	**Hydric criteria**
37—Frio silty clay, 0 to 1 percent slopes, frequently flooded				
	Gladewater, frequently flooded	2	Flood plains, flood plains	2, 3, 4

Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

Report—Prime and other Important Farmlands

Prime and other Important Farmlands–Dallas County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
5	Austin silty clay, 1 to 3 percent slopes	Farmland of statewide importance
7	Austin-Lewisville complex, 5 to 8 percent slopes, erode d	Not prime farmland
23	Dalco clay, 1 to 3 percent slopes	All areas are prime farmland
26	Eddy clay loam, 1 to 3 percent slopes	Not prime farmland
27	Eddy clay loam, 3 to 8 percent slopes	Not prime farmland
30	Eddy-Stephen complex, 1 to 5 percent slopes	Not prime farmland
37	Frio silty clay, 0 to 1 percent slopes, frequently flooded	Not prime farmland
44	Houston Black clay, 1 to 3 percent slopes	All areas are prime farmland
67	Stephen silty clay, 1 to 4 percent slopes	Not prime farmland

Prime and other Important Farmlands–Ellis County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
AuB	Austin silty clay, 1 to 3 percent slopes	Farmland of statewide importance
AuC2	Austin silty clay, 2 to 5 percent slopes, moderately eroded	Not prime farmland
Br	Broken alluvial land, rarely flooded	Not prime farmland
EcB	Eddy gravelly clay loam, 1 to 3 percent slopes	Not prime farmland
EdD2	Eddy soils, 3 to 8 percent slopes, eroded	Not prime farmland
SeC2	Stephen-Eddy complex, 2 to 5 percent slopes	Not prime farmland
StB	Stephen silty clay, 1 to 4 percent slopes	Not prime farmland

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United States Department of Agriculture

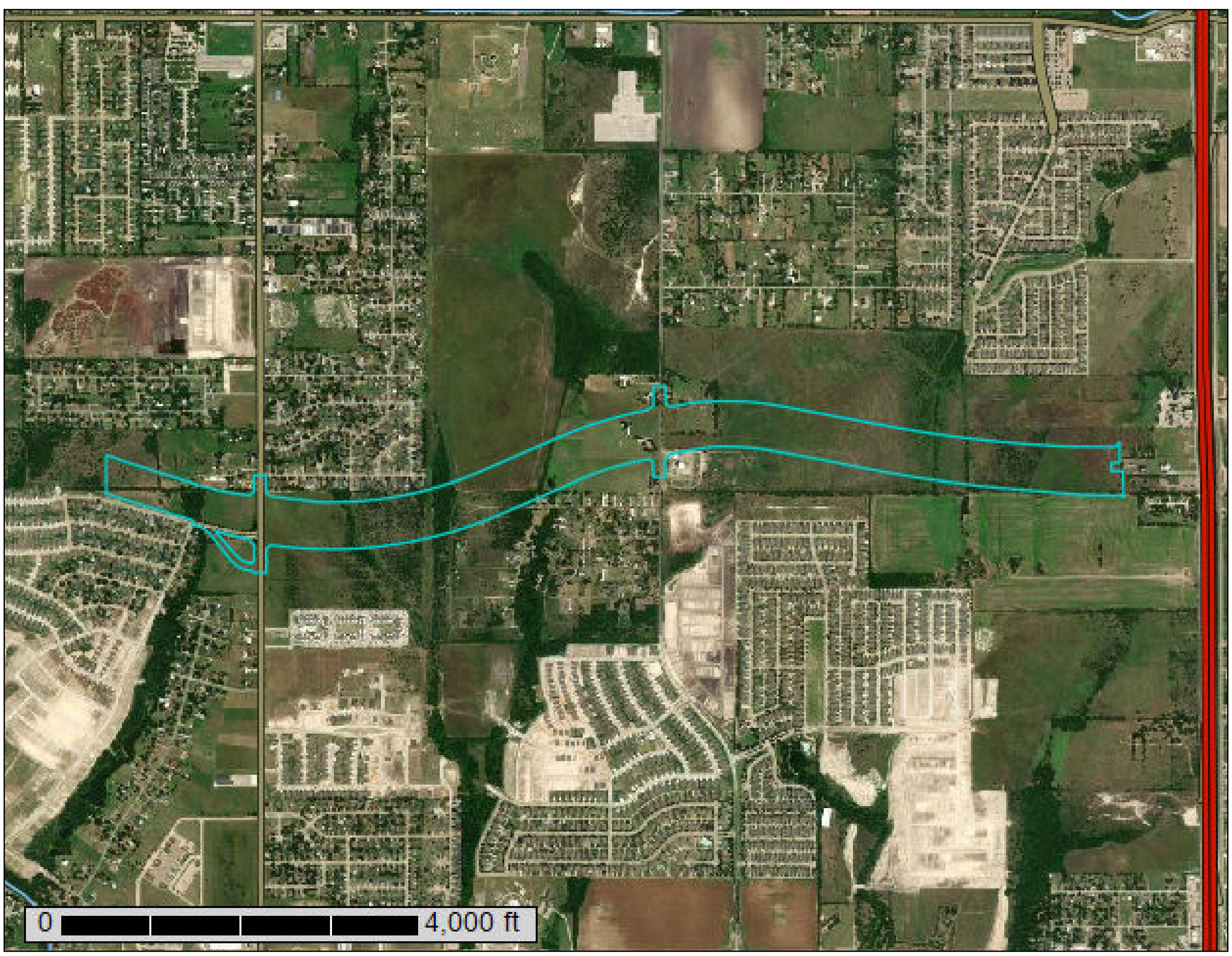
NRCS

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 Dallas County, Texas, and Ellis County, Texas

Loop 9_Modification A



March 18, 2022

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.

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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.

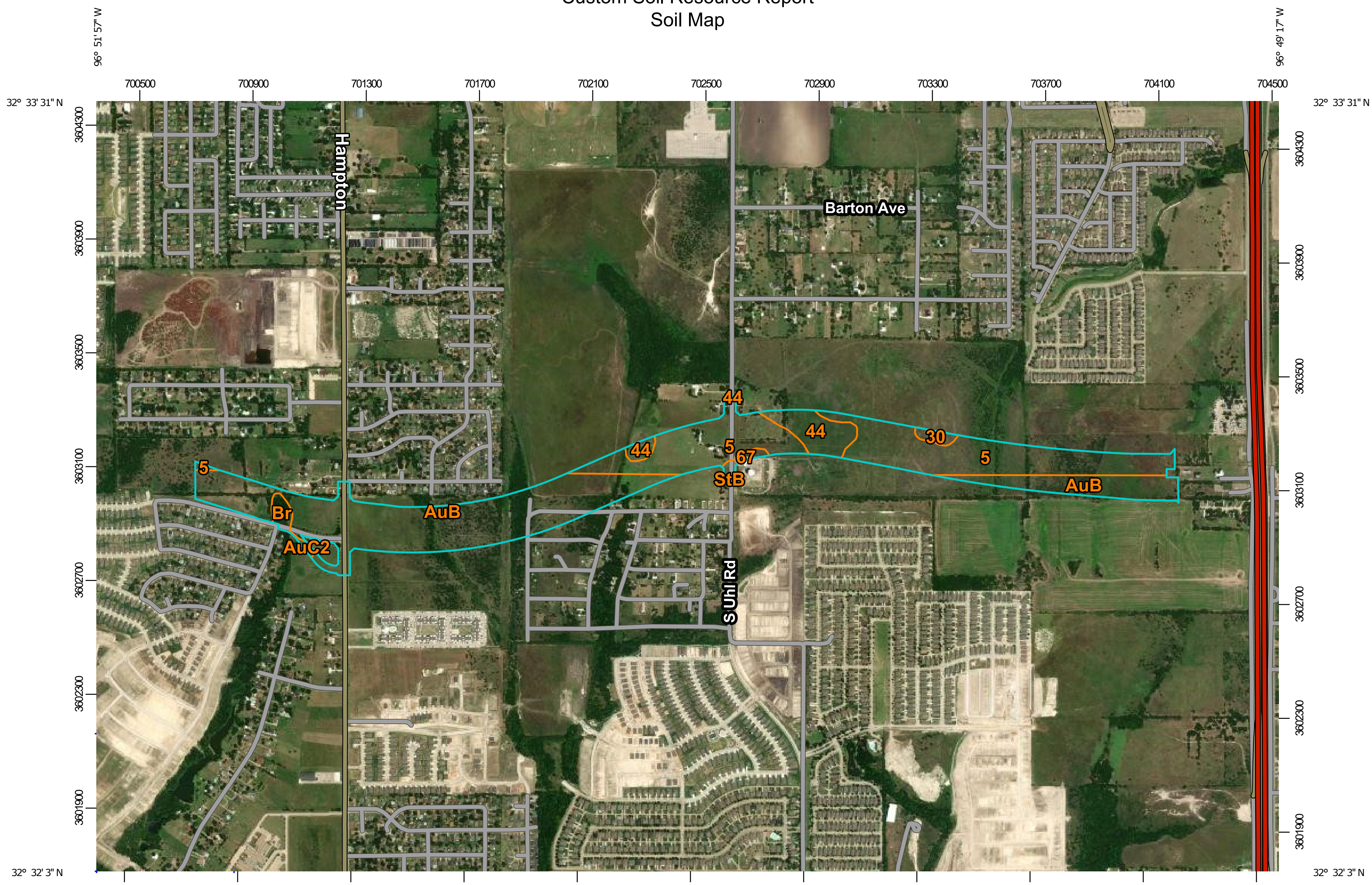
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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



Map Scale: 1:19,100 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 250, 500, 1000, 1500

Feet: 0, 500, 1000, 2000, 3000

N

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: Dallas County, Texas
Survey Area Data: Version 19, Sep 8, 2021

Soil Survey Area: Ellis County, Texas
Survey Area Data: Version 17, Sep 8, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Jan 18, 2020—Nov 15, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5	Austin silty clay, 1 to 3 percent slopes	54.8	39.1%
30	Eddy-Stephen complex, 1 to 5 percent slopes	1.4	1.0%
44	Houston Black clay, 1 to 3 percent slopes	9.4	6.7%
67	Stephen silty clay, 1 to 4 percent slopes	1.2	0.8%
Subtotals for Soil Survey Area		**66.7**	**47.6%**
Totals for Area of Interest		**140.0**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AuB	Austin silty clay, 1 to 3 percent slopes	70.8	50.6%
AuC2	Austin silty clay, 2 to 5 percent slopes, moderately eroded	0.4	0.3%
Br	Broken alluvial land, rarely flooded	1.8	1.3%
StB	Stephen silty clay, 1 to 4 percent slopes	0.3	0.2%
Subtotals for Soil Survey Area		**73.3**	**52.4%**
Totals for Area of Interest		**140.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Dallas County, Texas

5—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

30—Eddy-Stephen complex, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: d7m4
Elevation: 400 to 1,000 feet
Mean annual precipitation: 30 to 42 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 60 percent
Stephen and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 3 inches: clay loam
H2 - 3 to 15 inches: gravelly clay loam
H3 - 15 to 40 inches: bedrock

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk formation

Typical profile

H1 - 0 to 14 inches: silty clay
H2 - 14 to 20 inches: bedrock

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: 7 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 10 percent
Hydric soil rating: No

44—Houston Black clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2ssh0
Elevation: 270 to 1,040 feet
Mean annual precipitation: 33 to 43 inches
Mean annual air temperature: 62 to 63 degrees F
Frost-free period: 217 to 244 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Houston black and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Houston Black

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Clayey residuum weathered from calcareous mudstone of upper cretaceous age

Typical profile

Ap - 0 to 6 inches: clay
Bkss - 6 to 70 inches: clay
BCkss - 70 to 80 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Minor Components

Heiden

Percent of map unit: 15 percent
Landform: Plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Fairlie

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

67—Stephen silty clay, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2vthm
Elevation: 430 to 890 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 62 to 69 degrees F
Frost-free period: 240 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile

A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Eddy

Percent of map unit: 5 percent
Landform: Ridges, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Ellis County, Texas

AuB—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

AuC2—Austin silty clay, 2 to 5 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2vtgk
Elevation: 420 to 1,050 feet
Mean annual precipitation: 32 to 44 inches
Mean annual air temperature: 63 to 69 degrees F
Frost-free period: 228 to 272 days
Farmland classification: Not prime farmland

Map Unit Composition

Austin, moderately eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin, Moderately Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 15 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Br—Broken alluvial land, rarely flooded

Map Unit Setting

National map unit symbol: d838
Elevation: 400 to 800 feet
Mean annual precipitation: 32 to 38 inches
Mean annual air temperature: 64 to 66 degrees F
Frost-free period: 240 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Alluvial land, broken: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alluvial Land, Broken

Setting

Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Parent material: Silty alluvium of quaternary age derived from chalk

Typical profile

H1 - 0 to 80 inches: clay loam

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Hydric soil rating: No

StB—Stephen silty clay, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2vthm
Elevation: 430 to 890 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 62 to 69 degrees F
Frost-free period: 240 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile

A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)

Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Eddy

Percent of map unit: 5 percent
Landform: Ridges, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

AOI Inventory

This folder contains a collection of tabular reports that present a variety of soil information. Included are various map unit description reports, special soil interpretation reports, and data summary reports.

Component Legend

This report presents general information about the map units and map unit components in the selected area. It shows map unit symbols and names and the components in each map unit. It also shows the percent of the components in the map units, the kind of component, and the slope range of each component.

Report—Component Legend

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
5—Austin silty clay, 1 to 3 percent slopes	16,432						
		90	Austin	Series	1.0	2.0	3.0

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
30—Eddy-Stephen complex, 1 to 5 percent slopes	12,466						
		60	Eddy	Series	1.0	3.0	5.0
		30	Stephen	Series	1.0	3.0	5.0
44—Houston Black clay, 1 to 3 percent slopes	30,424						
		80	Houston black	Series	1.0	2.0	3.0
67—Stephen silty clay, 1 to 4 percent slopes	5,509						
		85	Stephen	Series	1.0	3.0	4.0

Component Legend–Ellis County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
AuB—Austin silty clay, 1 to 3 percent slopes	42,644						
		90	Austin	Series	1.0	2.0	3.0
AuC2—Austin silty clay, 2 to 5 percent slopes, moderately eroded	15,230						
		85	Austin, moderately eroded	Series	2.0	4.0	5.0
Br—Broken alluvial land, rarely flooded	10,037						
		100	Alluvial land, broken	Miscellaneous area	5.0	10.0	15.0
StB—Stephen silty clay, 1 to 4 percent slopes	11,858						
		85	Stephen	Series	1.0	3.0	4.0

Land Classifications

This folder contains a collection of tabular reports that present a variety of soil groupings. The reports (tables) include all selected map units and components for each map unit. Land classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

Report—Prime and other Important Farmlands

Prime and other Important Farmlands–Dallas County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
5	Austin silty clay, 1 to 3 percent slopes	Farmland of statewide importance
30	Eddy-Stephen complex, 1 to 5 percent slopes	Not prime farmland
44	Houston Black clay, 1 to 3 percent slopes	All areas are prime farmland
67	Stephen silty clay, 1 to 4 percent slopes	Not prime farmland

Prime and other Important Farmlands–Ellis County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
AuB	Austin silty clay, 1 to 3 percent slopes	Farmland of statewide importance
AuC2	Austin silty clay, 2 to 5 percent slopes, moderately eroded	Not prime farmland
Br	Broken alluvial land, rarely flooded	Not prime farmland
StB	Stephen silty clay, 1 to 4 percent slopes	Not prime farmland

Hydric Soil List - All Components

This table lists the map unit components and their hydric status in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:

A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or

B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

References:

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Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.
Vasilas, L.M., G.W. Hurt, and C.V. Noble, editors. Version 7.0, 2010. Field indicators of hydric soils in the United States.

Report—Hydric Soil List - All Components

Hydric Soil List - All Components–TX113-Dallas County, Texas					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
5: Austin silty clay, 1 to 3 percent slopes	Austin	80-95	Ridges	No	—
	Houston Black	5-20	Ridges	No	—
30: Eddy-Stephen complex, 1 to 5 percent slopes	Eddy	60	Ridges	No	—
	Stephen	30	Ridges	No	—
	Unnamed	10	—	No	—
44: Houston Black clay, 1 to 3 percent slopes	Houston Black	75-90	Ridges	No	—
	Heiden	10-20	Plains	No	—
	Fairlie	0-10	Ridges	No	—
67: Stephen silty clay, 1 to 4 percent slopes	Stephen	75-95	Ridges	No	—
	Austin	5-15	Ridges	No	—
	Eddy	0-10	Ridges,ridges	No	—

Hydric Soil List - All Components–TX139-Ellis County, Texas					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
AuB: Austin silty clay, 1 to 3 percent slopes	Austin	80-95	Ridges	No	—
	Houston Black	5-20	Ridges	No	—
AuC2: Austin silty clay, 2 to 5 percent slopes, moderately eroded	Austin-Moderately eroded	80-95	Ridges	No	—
	Houston Black	5-20	Ridges	No	—
Br: Broken alluvial land, rarely flooded	Alluvial land-Broken	100	Drainageways	No	—
StB: Stephen silty clay, 1 to 4 percent slopes	Stephen	75-95	Ridges	No	—
	Austin	5-15	Ridges	No	—
	Eddy	0-10	Ridges,ridges	No	—

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Federal Register. September 18, 2002. Hydric soils of the United States.

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United States Department of Agriculture

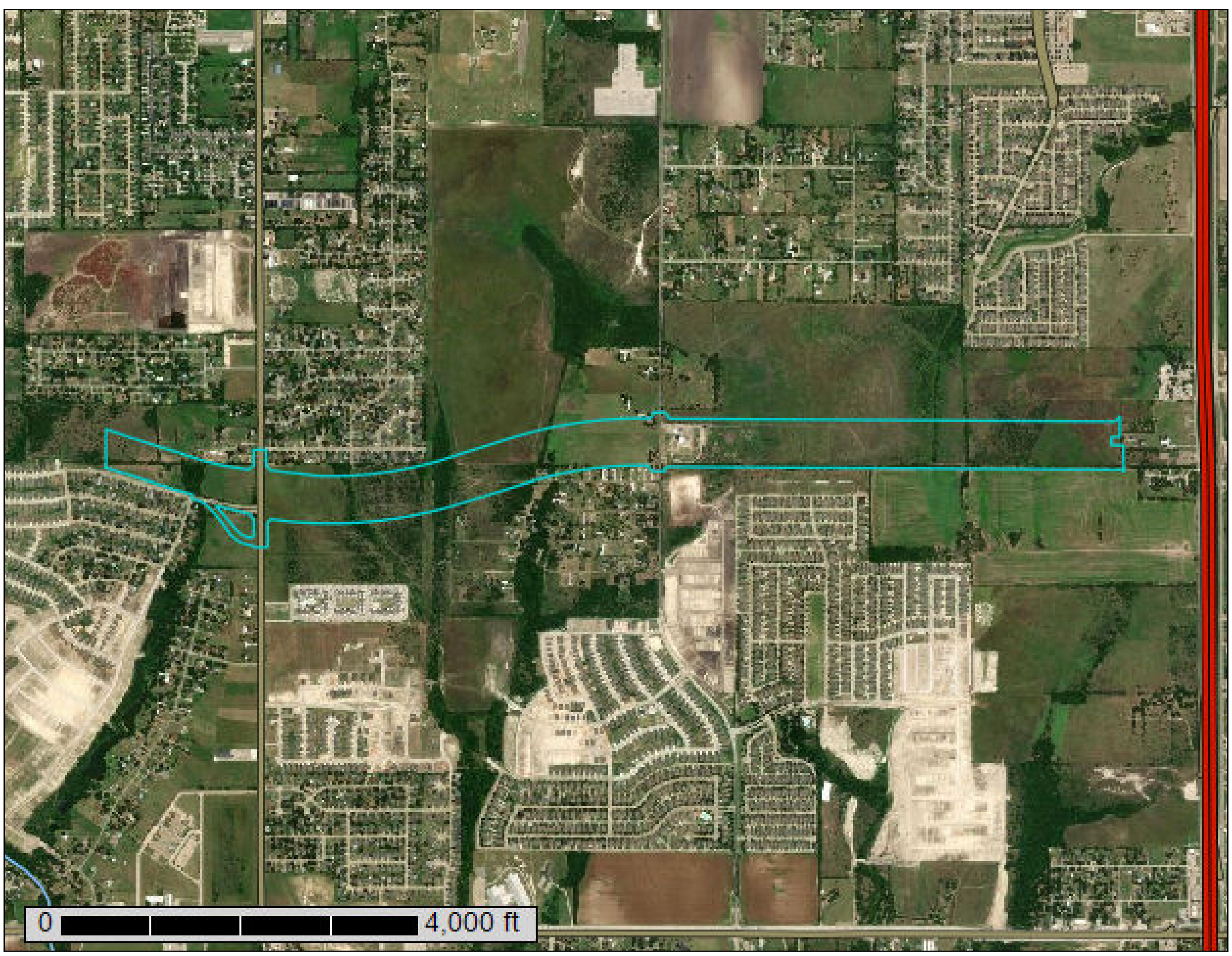
NRCS

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 Dallas County, Texas, and Ellis County, Texas

Loop 9_Modification B



March 18, 2022

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.

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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.

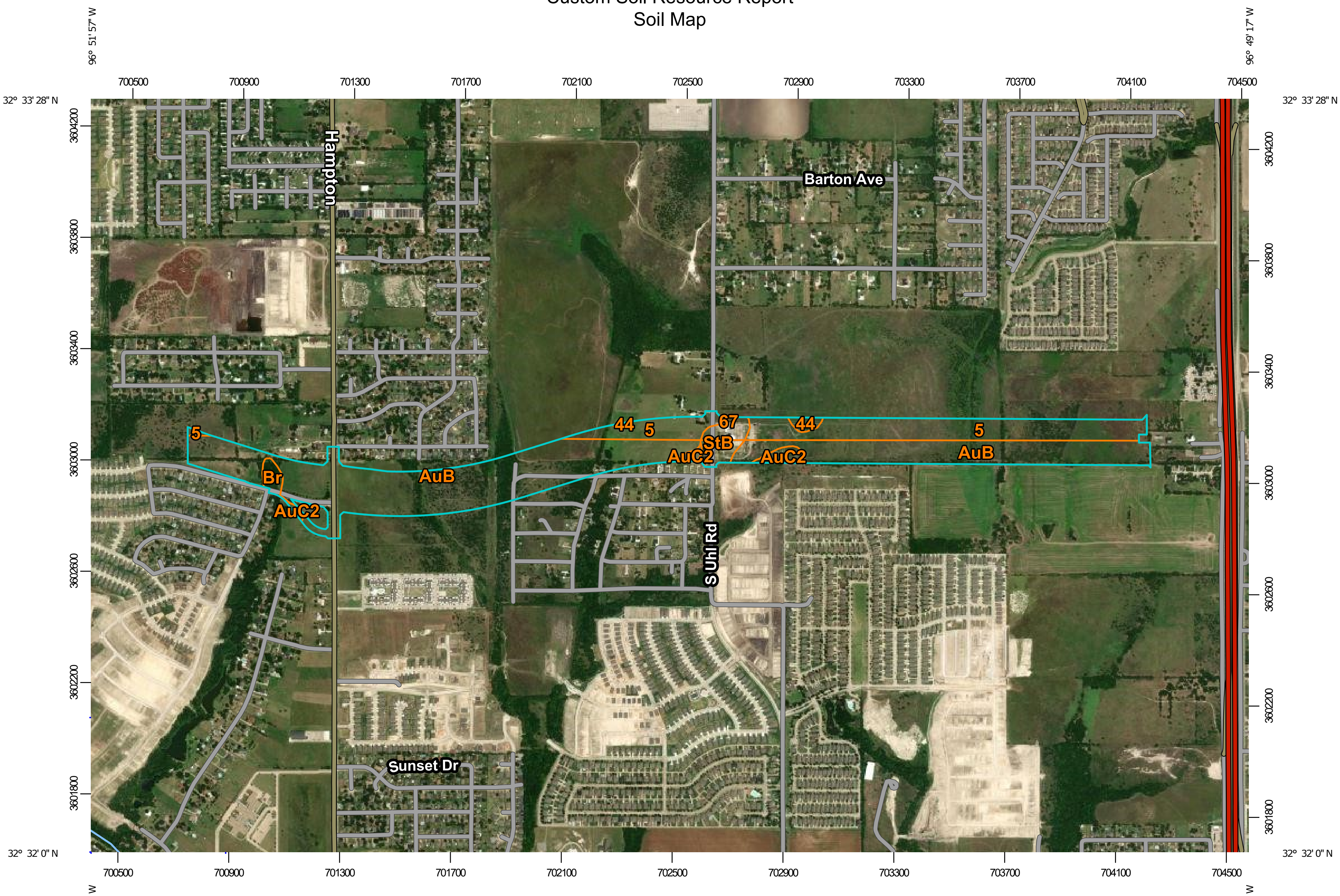
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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



Map Scale: 1:19,100 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 250, 500, 1000, 1500

Feet: 0, 500, 1000, 2000, 3000

N

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: Dallas County, Texas
Survey Area Data: Version 19, Sep 8, 2021

Soil Survey Area: Ellis County, Texas
Survey Area Data: Version 17, Sep 8, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Jan 18, 2020—Nov 15, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5	Austin silty clay, 1 to 3 percent slopes	35.1	25.0%
44	Houston Black clay, 1 to 3 percent slopes	1.3	0.9%
67	Stephen silty clay, 1 to 4 percent slopes	2.7	1.9%
Subtotals for Soil Survey Area		**39.1**	**27.9%**
Totals for Area of Interest		**140.3**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AuB	Austin silty clay, 1 to 3 percent slopes	93.6	66.7%
AuC2	Austin silty clay, 2 to 5 percent slopes, moderately eroded	3.0	2.1%
Br	Broken alluvial land, rarely flooded	1.8	1.3%
StB	Stephen silty clay, 1 to 4 percent slopes	2.8	2.0%
Subtotals for Soil Survey Area		**101.1**	**72.1%**
Totals for Area of Interest		**140.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Dallas County, Texas

5—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

44—Houston Black clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2ssh0
Elevation: 270 to 1,040 feet
Mean annual precipitation: 33 to 43 inches
Mean annual air temperature: 62 to 63 degrees F
Frost-free period: 217 to 244 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Houston black and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Houston Black

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Clayey residuum weathered from calcareous mudstone of upper cretaceous age

Typical profile

Ap - 0 to 6 inches: clay
Bkss - 6 to 70 inches: clay
BCkss - 70 to 80 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Minor Components

Heiden

Percent of map unit: 15 percent
Landform: Plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Fairlie

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

67—Stephen silty clay, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2vthm
Elevation: 430 to 890 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 62 to 69 degrees F
Frost-free period: 240 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile

A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Eddy

Percent of map unit: 5 percent
Landform: Ridges, ridges

Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Ellis County, Texas

AuB—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

AuC2—Austin silty clay, 2 to 5 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2vtgk
Elevation: 420 to 1,050 feet
Mean annual precipitation: 32 to 44 inches
Mean annual air temperature: 63 to 69 degrees F
Frost-free period: 228 to 272 days
Farmland classification: Not prime farmland

Map Unit Composition

Austin, moderately eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin, Moderately Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 15 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Br—Broken alluvial land, rarely flooded

Map Unit Setting

National map unit symbol: d838
Elevation: 400 to 800 feet
Mean annual precipitation: 32 to 38 inches
Mean annual air temperature: 64 to 66 degrees F
Frost-free period: 240 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Alluvial land, broken: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alluvial Land, Broken

Setting

Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Parent material: Silty alluvium of quaternary age derived from chalk

Typical profile

H1 - 0 to 80 inches: clay loam

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Hydric soil rating: No

StB—Stephen silty clay, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2vthm
Elevation: 430 to 890 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 62 to 69 degrees F
Frost-free period: 240 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile

A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)

Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Eddy

Percent of map unit: 5 percent
Landform: Ridges, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

AOI Inventory

This folder contains a collection of tabular reports that present a variety of soil information. Included are various map unit description reports, special soil interpretation reports, and data summary reports.

Component Legend

This report presents general information about the map units and map unit components in the selected area. It shows map unit symbols and names and the components in each map unit. It also shows the percent of the components in the map units, the kind of component, and the slope range of each component.

Report—Component Legend

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
5—Austin silty clay, 1 to 3 percent slopes	16,432						
		90	Austin	Series	1.0	2.0	3.0
44—Houston Black clay, 1 to 3 percent slopes	30,424						
		80	Houston black	Series	1.0	2.0	3.0

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
67—Stephen silty clay, 1 to 4 percent slopes	5,509						
		85	Stephen	Series	1.0	3.0	4.0

Component Legend–Ellis County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
AuB—Austin silty clay, 1 to 3 percent slopes	42,644						
		90	Austin	Series	1.0	2.0	3.0
AuC2—Austin silty clay, 2 to 5 percent slopes, moderately eroded	15,230						
		85	Austin, moderately eroded	Series	2.0	4.0	5.0
Br—Broken alluvial land, rarely flooded	10,037						
		100	Alluvial land, broken	Miscellaneous area	5.0	10.0	15.0
StB—Stephen silty clay, 1 to 4 percent slopes	11,858						
		85	Stephen	Series	1.0	3.0	4.0

Land Classifications

This folder contains a collection of tabular reports that present a variety of soil groupings. The reports (tables) include all selected map units and components for each map unit. Land classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Soil List - All Components

This table lists the map unit components and their hydric status in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
    A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.

   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

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Report—Hydric Soil List - All Components

Hydric Soil List - All Components–TX113-Dallas County, Texas					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
5: Austin silty clay, 1 to 3 percent slopes	Austin	80-95	Ridges	No	—
	Houston Black	5-20	Ridges	No	—
44: Houston Black clay, 1 to 3 percent slopes	Houston Black	75-90	Ridges	No	—
	Heiden	10-20	Plains	No	—
	Fairlie	0-10	Ridges	No	—
67: Stephen silty clay, 1 to 4 percent slopes	Stephen	75-95	Ridges	No	—
	Austin	5-15	Ridges	No	—
	Eddy	0-10	Ridges,ridges	No	—

Hydric Soil List - All Components–TX139-Ellis County, Texas					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
AuB: Austin silty clay, 1 to 3 percent slopes	Austin	80-95	Ridges	No	—
	Houston Black	5-20	Ridges	No	—
AuC2: Austin silty clay, 2 to 5 percent slopes, moderately eroded	Austin-Moderately eroded	80-95	Ridges	No	—
	Houston Black	5-20	Ridges	No	—
Br: Broken alluvial land, rarely flooded	Alluvial land-Broken	100	Drainageways	No	—
StB: Stephen silty clay, 1 to 4 percent slopes	Stephen	75-95	Ridges	No	—
	Austin	5-15	Ridges	No	—
	Eddy	0-10	Ridges,ridges	No	—

Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

Report—Prime and other Important Farmlands

Prime and other Important Farmlands–Dallas County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
5	Austin silty clay, 1 to 3 percent slopes	Farmland of statewide importance
44	Houston Black clay, 1 to 3 percent slopes	All areas are prime farmland
67	Stephen silty clay, 1 to 4 percent slopes	Not prime farmland

Prime and other Important Farmlands–Ellis County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
AuB	Austin silty clay, 1 to 3 percent slopes	Farmland of statewide importance
AuC2	Austin silty clay, 2 to 5 percent slopes, moderately eroded	Not prime farmland
Br	Broken alluvial land, rarely flooded	Not prime farmland

Prime and other Important Farmlands–Ellis County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
StB	Stephen silty clay, 1 to 4 percent slopes	Not prime farmland

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United States Department of Agriculture

NRCS

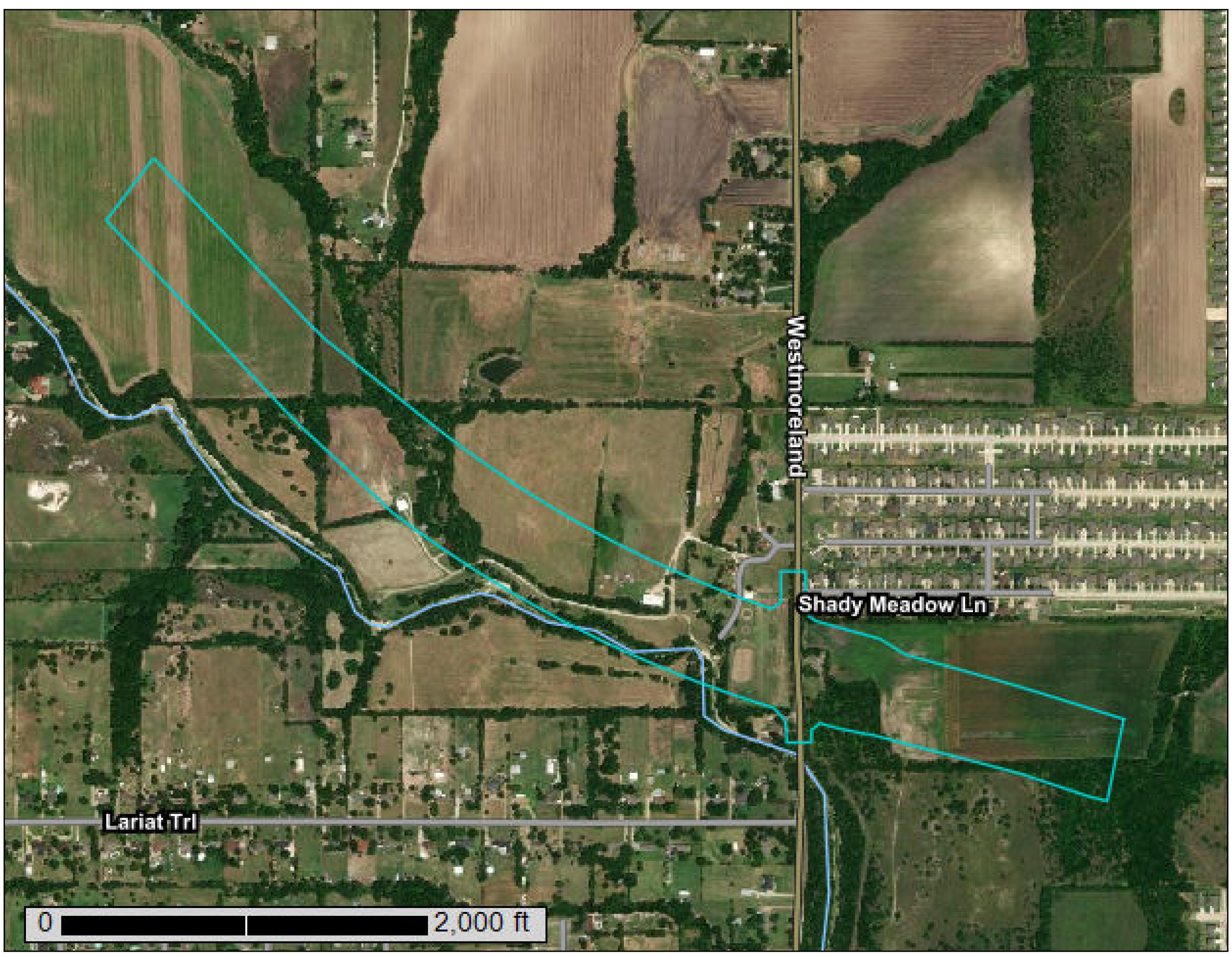
Natural Resources Conservation Service

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

Dallas County, Texas

Loop 9_Modification C



March 18, 2022

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.

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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.

Custom Soil Resource Report
Soil Map

Map Scale: 1:9,290 if printed on A landscape (11" x 8.5") sheet.

0 100 200 400 600 Meters

0 450 900 1800 2700 Feet

N

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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Dallas County, Texas
Survey Area Data: Version 19, Sep 8, 2021

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

Date(s) aerial images were photographed: Jan 18, 2020—Nov 15, 2020

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5	Austin silty clay, 1 to 3 percent slopes	8.6	12.2%
23	Dalco clay, 1 to 3 percent slopes	33.6	47.5%
30	Eddy-Stephen complex, 1 to 5 percent slopes	21.0	29.7%
44	Houston Black clay, 1 to 3 percent slopes	7.5	10.6%
Totals for Area of Interest		**70.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Dallas County, Texas

5—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

23—Dalco clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: d7lw
Elevation: 520 to 850 feet
Mean annual precipitation: 30 to 42 inches
Mean annual air temperature: 64 degrees F
Frost-free period: 230 to 260 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Dalco and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dalco

Setting

Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk formation

Typical profile

H1 - 0 to 7 inches: clay
H2 - 7 to 26 inches: clay
H3 - 26 to 35 inches: clay
H4 - 35 to 80 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 24 to 40 inches to paralithic bedrock
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: R086AY010TX - Northern Blackland
Hydric soil rating: No

30—Eddy-Stephen complex, 1 to 5 percent slopes

Map Unit Setting
National map unit symbol: d7m4
Elevation: 400 to 1,000 feet
Mean annual precipitation: 30 to 42 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition
Eddy and similar soils: 60 percent
Stephen and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile
H1 - 0 to 3 inches: clay loam
H2 - 3 to 15 inches: gravelly clay loam
H3 - 15 to 40 inches: bedrock

Properties and qualities
Slope: 1 to 5 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk formation

Typical profile

H1 - 0 to 14 inches: silty clay
H2 - 14 to 20 inches: bedrock

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: 7 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 10 percent
Hydric soil rating: No

44—Houston Black clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2ssh0
Elevation: 270 to 1,040 feet
Mean annual precipitation: 33 to 43 inches
Mean annual air temperature: 62 to 63 degrees F
Frost-free period: 217 to 244 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Houston black and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Houston Black

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Clayey residuum weathered from calcareous mudstone of upper cretaceous age

Typical profile

Ap - 0 to 6 inches: clay
Bkss - 6 to 70 inches: clay
BCkss - 70 to 80 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Minor Components

Heiden

Percent of map unit: 15 percent
Landform: Plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Fairlie

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

AOI Inventory

This folder contains a collection of tabular reports that present a variety of soil information. Included are various map unit description reports, special soil interpretation reports, and data summary reports.

Component Legend

This report presents general information about the map units and map unit components in the selected area. It shows map unit symbols and names and the components in each map unit. It also shows the percent of the components in the map units, the kind of component, and the slope range of each component.

Report—Component Legend

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
5—Austin silty clay, 1 to 3 percent slopes	16,432						
		90	Austin	Series	1.0	2.0	3.0
23—Dalco clay, 1 to 3 percent slopes	5,038						
		100	Dalco	Series	1.0	2.0	3.0

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
30—Eddy-Stephen complex, 1 to 5 percent slopes	12,466						
		60	Eddy	Series	1.0	3.0	5.0
		30	Stephen	Series	1.0	3.0	5.0
44—Houston Black clay, 1 to 3 percent slopes	30,424						
		80	Houston black	Series	1.0	2.0	3.0

Land Classifications

This folder contains a collection of tabular reports that present a variety of soil groupings. The reports (tables) include all selected map units and components for each map unit. Land classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

Report—Prime and other Important Farmlands

Prime and other Important Farmlands–Dallas County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
5	Austin silty clay, 1 to 3 percent slopes	Farmland of statewide importance
23	Dalco clay, 1 to 3 percent slopes	All areas are prime farmland
30	Eddy-Stephen complex, 1 to 5 percent slopes	Not prime farmland
44	Houston Black clay, 1 to 3 percent slopes	All areas are prime farmland

Hydric Soil List - All Components

This table lists the map unit components and their hydric status in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

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Report—Hydric Soil List - All Components

Hydric Soil List - All Components–TX113-Dallas County, Texas					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
5: Austin silty clay, 1 to 3 percent slopes	Austin	80-95	Ridges	No	—
	Houston Black	5-20	Ridges	No	—
23: Dalco clay, 1 to 3 percent slopes	Dalco	100	Ridges	No	—
30: Eddy-Stephen complex, 1 to 5 percent slopes	Eddy	60	Ridges	No	—
	Stephen	30	Ridges	No	—
	Unnamed	10	—	No	—
44: Houston Black clay, 1 to 3 percent slopes	Houston Black	75-90	Ridges	No	—
	Heiden	10-20	Plains	No	—
	Fairlie	0-10	Ridges	No	—

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United States Department of Agriculture

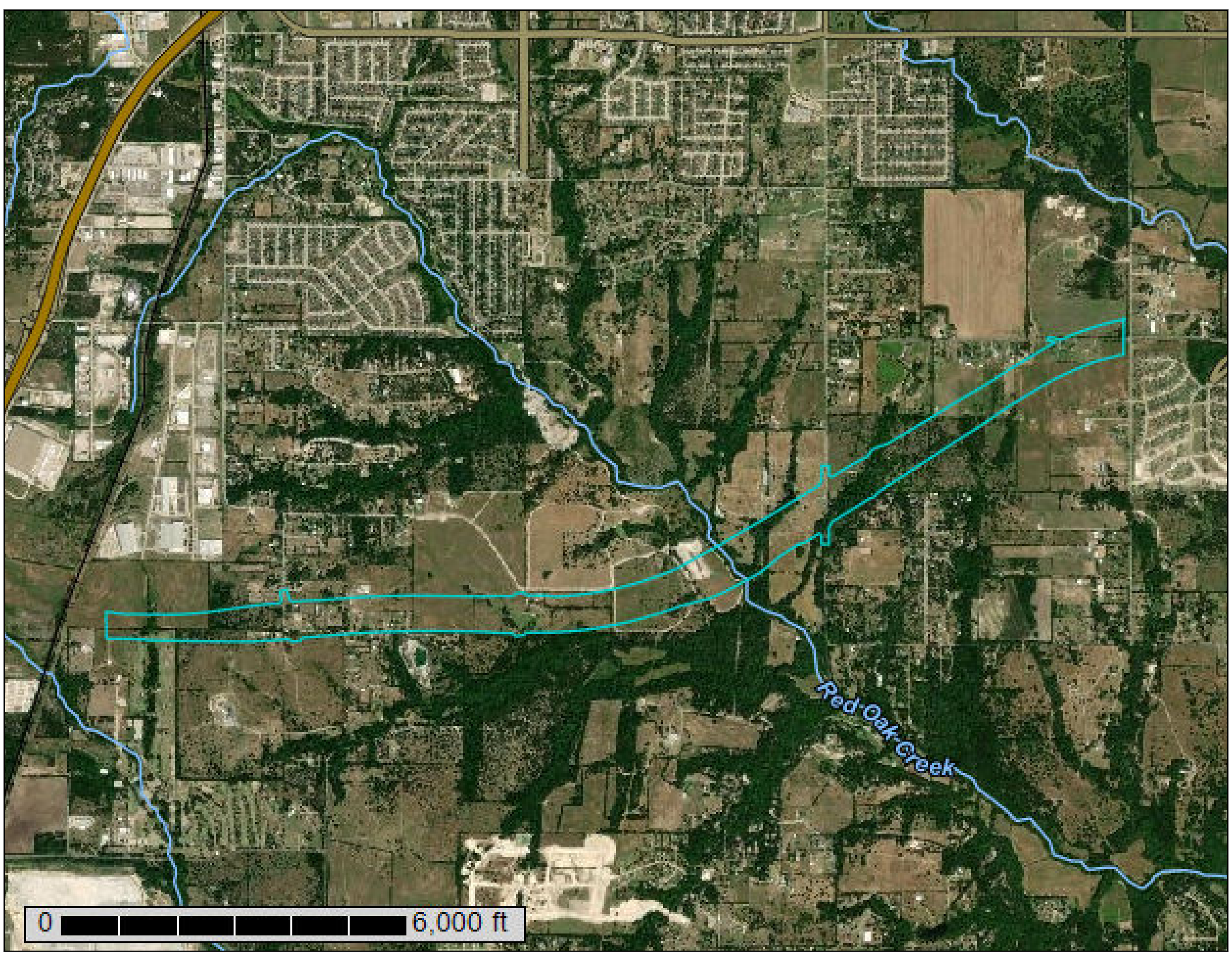
NRCS

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
Dallas County, Texas, and Ellis County, Texas

Loop 9_Modification D



March 18, 2022

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.

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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.

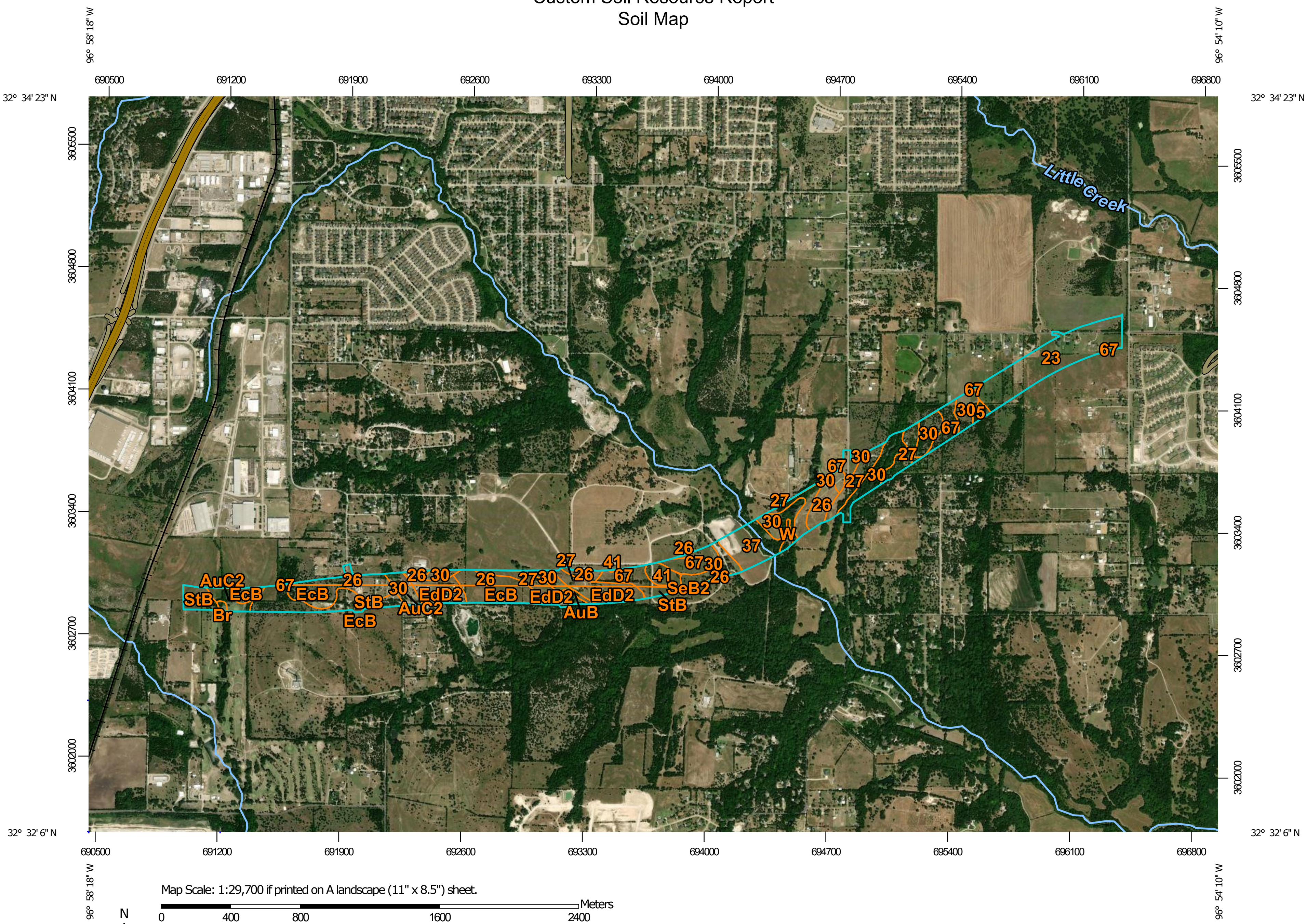
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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



Map Scale: 1:29,700 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 400, 800, 1600, 2400

Feet: 0, 1000, 2000, 4000, 6000

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: Dallas County, Texas
Survey Area Data: Version 19, Sep 8, 2021

Soil Survey Area: Ellis County, Texas
Survey Area Data: Version 17, Sep 8, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Jan 18, 2020—Nov 15, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5	Austin silty clay, 1 to 3 percent slopes	1.8	0.7%
23	Dalco clay, 1 to 3 percent slopes	38.3	14.2%
26	Eddy clay loam, 1 to 3 percent slopes	24.2	9.0%
27	Eddy clay loam, 3 to 8 percent slopes	31.9	11.9%
30	Eddy-Stephen complex, 1 to 5 percent slopes	46.1	17.1%
37	Frio silty clay, 0 to 1 percent slopes, frequently flooded	15.2	5.7%
41	Heiden clay, 1 to 3 percent slopes	5.0	1.9%
67	Stephen silty clay, 1 to 4 percent slopes	23.6	8.8%
W	Water	1.5	0.6%
Subtotals for Soil Survey Area		**187.6**	**69.7%**
Totals for Area of Interest		**269.0**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AuB	Austin silty clay, 1 to 3 percent slopes	1.5	0.5%
AuC2	Austin silty clay, 2 to 5 percent slopes, moderately eroded	7.6	2.8%
Br	Broken alluvial land, rarely flooded	2.0	0.7%
EcB	Eddy gravelly clay loam, 1 to 3 percent slopes	25.6	9.5%
EdD2	Eddy soils, 3 to 8 percent slopes, eroded	19.0	7.1%
SeB2	Stephen-Eddy complex, 1 to 3 percent slopes, eroded	0.0	0.0%
StB	Stephen silty clay, 1 to 4 percent slopes	25.8	9.6%
Subtotals for Soil Survey Area		**81.4**	**30.3%**
Totals for Area of Interest		**269.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas

shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Dallas County, Texas

5—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

23—Dalco clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: d7lw
Elevation: 520 to 850 feet
Mean annual precipitation: 30 to 42 inches
Mean annual air temperature: 64 degrees F
Frost-free period: 230 to 260 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Dalco and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dalco

Setting

Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk formation

Typical profile

H1 - 0 to 7 inches: clay
H2 - 7 to 26 inches: clay
H3 - 26 to 35 inches: clay
H4 - 35 to 80 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 24 to 40 inches to paralithic bedrock
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: R086AY010TX - Northern Blackland
Hydric soil rating: No

26—Eddy clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2t0s4
Elevation: 400 to 890 feet
Mean annual precipitation: 37 to 40 inches
Mean annual air temperature: 64 to 66 degrees F
Frost-free period: 245 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy residuum weathered from chalk

Typical profile

A1 - 0 to 5 inches: clay loam
A2 - 5 to 11 inches: very gravelly clay loam
Cr - 11 to 20 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 6 to 14 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Stephen

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

27—Eddy clay loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: d7m0
Elevation: 400 to 1,000 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 4 inches: clay loam
H2 - 4 to 11 inches: gravelly clay loam
H3 - 11 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

30—Eddy-Stephen complex, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: d7m4
Elevation: 400 to 1,000 feet
Mean annual precipitation: 30 to 42 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 60 percent
Stephen and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 3 inches: clay loam
H2 - 3 to 15 inches: gravelly clay loam
H3 - 15 to 40 inches: bedrock

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk formation

Typical profile

H1 - 0 to 14 inches: silty clay
H2 - 14 to 20 inches: bedrock

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: 7 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 10 percent
Hydric soil rating: No

37—Frio silty clay, 0 to 1 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2wg92
Elevation: 330 to 770 feet
Mean annual precipitation: 37 to 42 inches
Mean annual air temperature: 64 to 65 degrees F
Frost-free period: 245 to 252 days
Farmland classification: Not prime farmland

Map Unit Composition

Frio, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frio, Frequently Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous clayey alluvium derived from mudstone and/or calcareous loamy alluvium derived from mudstone

Typical profile

Ap - 0 to 6 inches: silty clay
A - 6 to 50 inches: silty clay
Bk - 50 to 80 inches: silty clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 3.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C
Ecological site: R086AY012TX - Loamy Bottomland
Hydric soil rating: No

Minor Components

Tinn, frequently flooded

Percent of map unit: 8 percent
Landform: Flood plains, flood plains
Landform position (three-dimensional): Tread
Microfeatures of landform position: Circular gilgai
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R086AY013TX - Clayey Bottomland
Hydric soil rating: No

Gladewater, frequently flooded

Percent of map unit: 2 percent
Landform: Flood plains, flood plains
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R086AY013TX - Clayey Bottomland
Hydric soil rating: Yes

41—Heiden clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2v1v9
Elevation: 290 to 1,020 feet
Mean annual precipitation: 33 to 45 inches
Mean annual air temperature: 63 to 68 degrees F
Frost-free period: 224 to 278 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Heiden and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Heiden

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from mudstone

Typical profile

Ap - 0 to 6 inches: clay
A - 6 to 18 inches: clay
Bkss - 18 to 58 inches: clay
CBdk - 58 to 70 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 40 to 65 inches to densic material
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 12.0
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Circular gilgai
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R086AY011TX - Southern Blackland

Hydric soil rating: No

Ferris

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Microfeatures of landform position: Linear gilgai
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY009TX - Southern Eroded Blackland
Hydric soil rating: No

67—Stephen silty clay, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2vthm
Elevation: 430 to 890 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 62 to 69 degrees F
Frost-free period: 240 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile

A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Eddy

Percent of map unit: 5 percent
Landform: Ridges, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Ellis County, Texas

AuB—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

AuC2—Austin silty clay, 2 to 5 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2vtgk
Elevation: 420 to 1,050 feet
Mean annual precipitation: 32 to 44 inches
Mean annual air temperature: 63 to 69 degrees F
Frost-free period: 228 to 272 days
Farmland classification: Not prime farmland

Map Unit Composition

Austin, moderately eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin, Moderately Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 15 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Br—Broken alluvial land, rarely flooded

Map Unit Setting

National map unit symbol: d838
Elevation: 400 to 800 feet
Mean annual precipitation: 32 to 38 inches
Mean annual air temperature: 64 to 66 degrees F
Frost-free period: 240 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Alluvial land, broken: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alluvial Land, Broken

Setting

Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Parent material: Silty alluvium of quaternary age derived from chalk

Typical profile

H1 - 0 to 80 inches: clay loam

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Hydric soil rating: No

EcB—Eddy gravelly clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: d83l
Elevation: 400 to 1,000 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 6 inches: gravelly clay loam
H2 - 6 to 70 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 0.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

EdD2—Eddy soils, 3 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: d83m
Elevation: 400 to 1,000 feet
Mean annual precipitation: 31 to 39 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Eddy and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 6 inches: gravelly clay loam
H2 - 6 to 70 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 0.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

SeB2—Stephen-Eddy complex, 1 to 3 percent slopes, eroded

Map Unit Setting

National map unit symbol: d84q
Elevation: 400 to 1,000 feet
Mean annual precipitation: 30 to 42 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 65 percent
Eddy and similar soils: 34 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk formation

Typical profile

H1 - 0 to 14 inches: silty clay
H2 - 14 to 40 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 7 to 20 inches to paralithic bedrock

Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Description of Eddy

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from austin chalk

Typical profile

H1 - 0 to 6 inches: gravelly clay loam
H2 - 6 to 10 inches: gravelly clay loam
H3 - 10 to 60 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 3 to 15 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water supply, 0 to 60 inches: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY001TX - Northern Chalky Ridge
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 1 percent
Hydric soil rating: No

StB—Stephen silty clay, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2vthm
Elevation: 430 to 890 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 62 to 69 degrees F
Frost-free period: 240 to 277 days
Farmland classification: Not prime farmland

Map Unit Composition

Stephen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stephen

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous clayey residuum weathered from chalk

Typical profile

A1 - 0 to 9 inches: silty clay
A2 - 9 to 15 inches: extremely paracobbly silty clay
Cr - 15 to 27 inches: bedrock

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 12 to 19 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R086AY002TX - Southern Chalky Ridge

Hydric soil rating: No

Minor Components

Austin

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Eddy

Percent of map unit: 5 percent
Landform: Ridges, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R086AY002TX - Southern Chalky Ridge
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

AOI Inventory

This folder contains a collection of tabular reports that present a variety of soil information. Included are various map unit description reports, special soil interpretation reports, and data summary reports.

Component Legend

This report presents general information about the map units and map unit components in the selected area. It shows map unit symbols and names and the components in each map unit. It also shows the percent of the components in the map units, the kind of component, and the slope range of each component.

Report—Component Legend

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
5—Austin silty clay, 1 to 3 percent slopes	16,432						
		90	Austin	Series	1.0	2.0	3.0
23—Dalco clay, 1 to 3 percent slopes	5,038						
		100	Dalco	Series	1.0	2.0	3.0

Component Legend–Dallas County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
26—Eddy clay loam, 1 to 3 percent slopes	6,333						
		90	Eddy	Series	1.0	2.0	3.0
27—Eddy clay loam, 3 to 8 percent slopes	5,878						
		100	Eddy	Series	3.0	6.0	8.0
30—Eddy-Stephen complex, 1 to 5 percent slopes	12,466						
		60	Eddy	Series	1.0	3.0	5.0
		30	Stephen	Series	1.0	3.0	5.0
37—Frio silty clay, 0 to 1 percent slopes, frequently flooded	10,411						
		90	Frio, frequently flooded	Series	0.0	0.5	1.0
41—Heiden clay, 1 to 3 percent slopes	6,930						
		85	Heiden	Series	1.0	2.0	3.0
67—Stephen silty clay, 1 to 4 percent slopes	5,509						
		85	Stephen	Series	1.0	3.0	4.0
W—Water	19,466						
		100	Water	Miscellaneous area			

Component Legend–Ellis County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
AuB—Austin silty clay, 1 to 3 percent slopes	42,644						
		90	Austin	Series	1.0	2.0	3.0
AuC2—Austin silty clay, 2 to 5 percent slopes, moderately eroded	15,230						
		85	Austin, moderately eroded	Series	2.0	4.0	5.0
Br—Broken alluvial land, rarely flooded	10,037						
		100	Alluvial land, broken	Miscellaneous area	5.0	10.0	15.0
EcB—Eddy gravelly clay loam, 1 to 3 percent slopes	17,613						
		95	Eddy	Series	1.0	2.0	3.0
EdD2—Eddy soils, 3 to 8 percent slopes, eroded	27,897						
		95	Eddy	Series	3.0	6.0	8.0

Component Legend–Ellis County, Texas							
Map unit symbol and name	Map unit acres	Pct. of map unit	Component name	Component kind	Pct. slope		
					Low	RV	High
SeB2—Stephen-Eddy complex, 1 to 3 percent slopes, eroded	6,319						
		65	Stephen	Series	1.0	2.0	3.0
		34	Eddy	Series	1.0	2.0	3.0
StB—Stephen silty clay, 1 to 4 percent slopes	11,858						
		85	Stephen	Series	1.0	3.0	4.0

Land Classifications

This folder contains a collection of tabular reports that present a variety of soil groupings. The reports (tables) include all selected map units and components for each map unit. Land classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Soils

This table lists the map unit components that are rated as hydric soils in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

References:
Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
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Federal Register. July 13, 1994. Changes in hydric soils of the United States.
Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
National Research Council. 1995. Wetlands: Characteristics and boundaries.
Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.
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Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

Report—Hydric Soils

Hydric Soils–Dallas County, Texas				
Map symbol and map unit name	**Component**	**Percent of map unit**	**Landform**	**Hydric criteria**
37—Frio silty clay, 0 to 1 percent slopes, frequently flooded				
	Gladewater, frequently flooded	2	Flood plains, flood plains	2, 3, 4

Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

Report—Prime and other Important Farmlands

Prime and other Important Farmlands–Dallas County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
5	Austin silty clay, 1 to 3 percent slopes	Farmland of statewide importance
23	Dalco clay, 1 to 3 percent slopes	All areas are prime farmland
26	Eddy clay loam, 1 to 3 percent slopes	Not prime farmland
27	Eddy clay loam, 3 to 8 percent slopes	Not prime farmland
30	Eddy-Stephen complex, 1 to 5 percent slopes	Not prime farmland
37	Frio silty clay, 0 to 1 percent slopes, frequently flooded	Not prime farmland
41	Heiden clay, 1 to 3 percent slopes	All areas are prime farmland
67	Stephen silty clay, 1 to 4 percent slopes	Not prime farmland
W	Water	Not prime farmland

Prime and other Important Farmlands–Ellis County, Texas		
Map Symbol	**Map Unit Name**	**Farmland Classification**
AuB	Austin silty clay, 1 to 3 percent slopes	Farmland of statewide importance
AuC2	Austin silty clay, 2 to 5 percent slopes, moderately eroded	Not prime farmland
Br	Broken alluvial land, rarely flooded	Not prime farmland
EcB	Eddy gravelly clay loam, 1 to 3 percent slopes	Not prime farmland
EdD2	Eddy soils, 3 to 8 percent slopes, eroded	Not prime farmland
SeB2	Stephen-Eddy complex, 1 to 3 percent slopes, eroded	Not prime farmland
StB	Stephen silty clay, 1 to 4 percent slopes	Not prime farmland

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U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

NRCS-CPA-106
(Rev. 1-91)

FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

PART I *(To be completed by Federal Agency)*	3. Date of Land Evaluation Request / 4. Sheet 1 of ____
1. Name of Project Loop 9, Segment A	5. Federal Agency Involved TXDOT
2. Type of Project Transportation	6. County and State Dallas and Ellis, Texas
PART II *(To be completed by NRCS)*	1. Date Request Received by NRCS / 2. Person Completing Form
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form). YES ☐ NO ☐	4. Acres Irrigated / Average Farm Size
5. Major Crop(s) / 6. Farmable Land in Government Jurisdiction Acres: %	7. Amount of Farmland As Defined in FPPA Acres: %
8. Name Of Land Evaluation System Used / 9. Name of Local Site Assessment System	10. Date Land Evaluation Returned by NRCS

PART III *(To be completed by Federal Agency)*		Alternative Corridor For Segment Alternatives 1, 2, 3, and 4			
		Corridor A	Corridor B	Corridor C	Corridor D
A. Total Acres To Be Converted Directly		598	596	605	604
B. Total Acres To Be Converted Indirectly, Or To Receive Services					
C. Total Acres In Corridor		598	596	605	604
PART IV *(To be completed by NRCS) Land Evaluation Information*					
A. Total Acres Prime And Unique Farmland					
B. Total Acres Statewide And Local Important Farmland					
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted					
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value					
PART V *(To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)*					
PART VI *(To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))*	Maximum Points				
1. Area in Nonurban Use	15	2	2	3	2
2. Perimeter in Nonurban Use	10	2	2	2	2
3. Percent Of Corridor Being Farmed	20	0	0	0	0
4. Protection Provided By State And Local Government	20	0	0	0	0
5. Size of Present Farm Unit Compared To Average	10	0	0	0	0
6. Creation Of Nonfarmable Farmland	25	12	12	10	13
7. Availablility Of Farm Support Services	5	0	0	0	0
8. On-Farm Investments	20	3	3	2	5
9. Effects Of Conversion On Farm Support Services	25	0	0	0	0
10. Compatibility With Existing Agricultural Use	10	3	3	3	3
TOTAL CORRIDOR ASSESSMENT POINTS	160	22	22	20	25
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland (From Part V)	100	0	0	0	0
Total Corridor Assessment (From Part VI above or a local site assessment)	160	22	22	20	25
TOTAL POINTS *(Total of above 2 lines)*	260	22	22	20	25

1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES ☐ NO ☐

5. Reason For Selection:

Signature of Person Completing this Part: Sally Clark

DATE 7/14/22

NOTE: Complete a form for each segment with more than one Alternate Corridor

See attached table for results for all alternatives.

CORRIDOR - TYPE SITE ASSESSMENT CRITERIA

The following criteria are to be used for projects that have a linear or corridor - type site configuration connecting two distant points, and crossing several different tracts of land. These include utility lines, highways, railroads, stream improvements, and flood control systems. Federal agencies are to assess the suitability of each corridor - type site or design alternative for protection as farmland along with the land evaluation information.

(1) How much land is in nonurban use within a radius of 1.0 mile from where the project is intended?
More than 90 percent - 15 points
90 to 20 percent - 14 to 1 point(s)
Less than 20 percent - 0 points

(2) How much of the perimeter of the site borders on land in nonurban use?
More than 90 percent - 10 points
90 to 20 percent - 9 to 1 point(s)
Less than 20 percent - 0 points

(3) How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than five of the last 10 years?
More than 90 percent - 20 points
90 to 20 percent - 19 to 1 point(s)
Less than 20 percent - 0 points

(4) Is the site subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland?
Site is protected - 20 points
Site is not protected - 0 points

(5) Is the farm unit(s) containing the site (before the project) as large as the average - size farming unit in the County ?
(Average farm sizes in each county are available from the NRCS field offices in each state. Data are from the latest available Census of Agriculture, Acreage or Farm Units in Operation with $1,000 or more in sales.)
As large or larger - 10 points
Below average - deduct 1 point for each 5 percent below the average, down to 0 points if 50 percent or more below average - 9 to 0 points

(6) If the site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?
Acreage equal to more than 25 percent of acres directly converted by the project - 25 points
Acreage equal to between 25 and 5 percent of the acres directly converted by the project - 1 to 24 point(s)
Acreage equal to less than 5 percent of the acres directly converted by the project - 0 points

(7) Does the site have available adequate supply of farm support services and markets, i.e., farm suppliers, equipment dealers, processing and storage facilities and farmer's markets?
All required services are available - 5 points
Some required services are available - 4 to 1 point(s)
No required services are available - 0 points

(8) Does the site have substantial and well-maintained on-farm investments such as barns, other storage building, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?
High amount of on-farm investment - 20 points
Moderate amount of on-farm investment - 19 to 1 point(s)
No on-farm investment - 0 points

(9) Would the project at this site, by converting farmland to nonagricultural use, reduce the demand for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?
Substantial reduction in demand for support services if the site is converted - 25 points
Some reduction in demand for support services if the site is converted - 1 to 24 point(s)
No significant reduction in demand for support services if the site is converted - 0 points

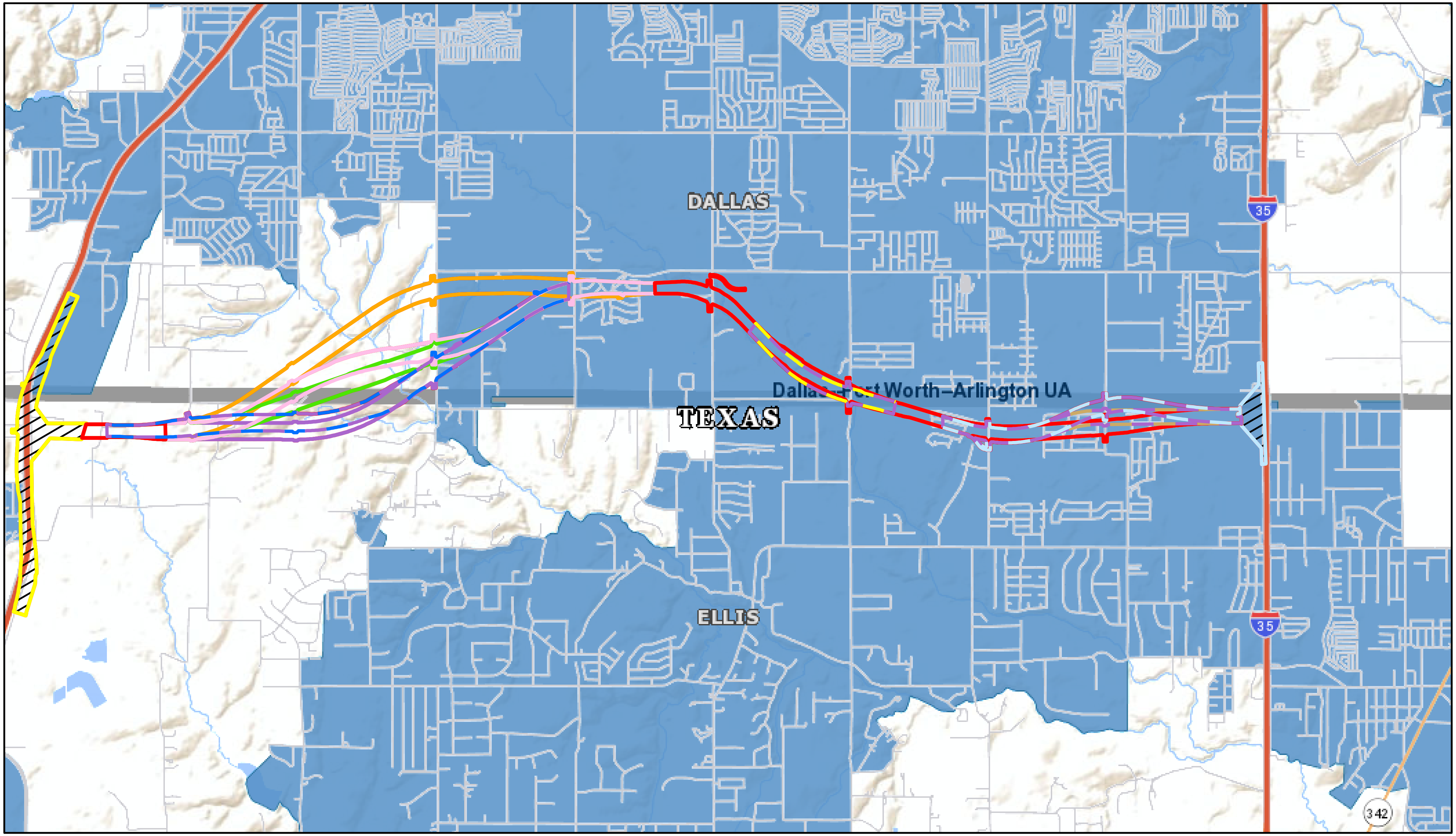
(10) Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of surrounding farmland to nonagricultural use?
Proposed project is incompatible to existing agricultural use of surrounding farmland - 10 points
Proposed project is tolerable to existing agricultural use of surrounding farmland - 9 to 1 point(s)
Proposed project is fully compatible with existing agricultural use of surrounding farmland - 0 points

Loop 9, Segment A
Summary of Farmland Conversion Impacts by
Alternative Alignment

	Acres	Acres in Agriculture	1	2	3	4	5	6	7	8	9	10	Total
Alternative 1													
Alternative 1	598	83	2	2	0	0	0	12	0	3	0	3	22
Alternative 1 Mod A	594	81	2	2	0	0	0	12	0	3	0	3	22
Alternative 1 Mod A & C	587	76	2	2	0	0	0	12	0	3	0	3	22
Alternative 1 Mod B	594	81	2	2	0	0	0	12	0	3	0	3	22
Alternative 1 Mod B & C	588	76	2	2	0	0	0	12	0	3	0	3	22
Alternative 1 Mod C	591	78	2	2	0	0	0	12	0	3	0	3	22
Alternative 2													
Alternative 2	596	83	2	2	0	0	0	12	0	3	0	3	22
Alternative 2 Mod A	592	81	2	2	0	0	0	12	0	3	0	3	22
Alternative 2 Mod A & C	586	76	2	2	0	0	0	12	0	3	0	3	22
Alternative 2 Mod B	593	81	2	2	0	0	0	12	0	3	0	3	22
Alternative 2 Mod B & C	586	76	2	2	0	0	0	12	0	3	0	3	22
Alternative 2 Mod C	590	78	2	2	0	0	0	12	0	3	0	3	22
Alternative 3													
Alternative 3	605	77	3	2	0	0	0	10	0	2	0	3	20
Alternative 3 Mod A	601	75	3	2	0	0	0	10	0	2	0	3	20
Alternative 3 Mod A & C	594	70	3	2	0	0	0	10	0	2	0	3	20
Alternative 3 Mod A & D	603	76	3	2	0	0	0	10	0	2	0	3	20
Alternative 3 Mod A C & D	596	72	3	2	0	0	0	10	0	2	0	3	20
Alternative 3 Mod B	601	75	3	2	0	0	0	10	0	2	0	3	20
Alternative 3 Mod B & C	595	71	3	2	0	0	0	10	0	2	0	3	20
Alternative 3 Mod B & D	603	77	3	2	0	0	0	12	0	2	0	3	22
Alternative 3 Mod B C & D	597	72	3	2	0	0	0	12	0	2	0	3	22
Alternative 3 Mod C	598	72	3	2	0	0	0	10	0	2	0	3	20
Alternative 3 Mod C & D	600	74	3	2	0	0	0	12	0	2	0	3	22
Alternative 3 Mod D	607	79	3	2	0	0	0	10	0	2	0	3	20
Alternative 4													
Alternative 4	604	103	2	2	0	0	0	13	0	5	0	3	25
Alternative 4 Mod A	600	101	2	2	0	0	0	13	0	5	0	3	25
Alternative 4 Mod A & C	594	96	2	2	0	0	0	13	0	5	0	3	25
Alternative 4 Mod B	601	101	2	2	0	0	0	13	0	5	0	3	25
Alternative 4 Mod B & C	594	96	2	2	0	0	0	13	0	5	0	3	25
Alternative 4 Mod C	598	98	2	2	0	0	0	13	0	5	0	3	25

Appendix A
CENSUS BUREAU URBANIZED AREA MAP

Loop 9, Segment A



March 18, 2022

- Mod. Option A Proposed ROW
- Mod. Option B Proposed ROW
- Mod. Option C Proposed ROW
- Mod. Option D Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW

2010 Census Urbanized Areas
2010 Census Urban Clusters
2010 Census Urbanized Areas
Counties
States

US 67 Project Area (Evaluated Under Separate Document)
IH 35E Project Area (Evaluated Under Separate Document)

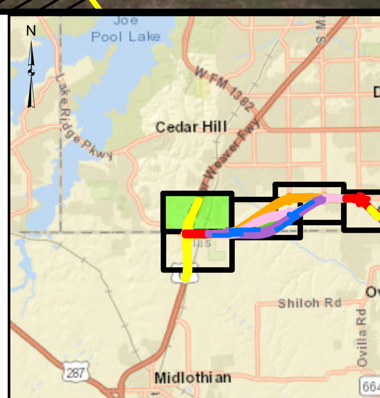
1:72,224

0 0.5 1 2 mi
0 0.75 1.5 3 km

Source: U.S. Census Bureau, Sources: Esri, USGS, NOAA

Created with: TIGERweb
(c)Copyright 2022 - US Census Bureau

US 67 Project Area (Evaluated Under Separate Document)



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
Suitable Habitat for Freshwater Mussels

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 500 1,000 Feet

FIGURE 5
Sheet 1

DATE:
August 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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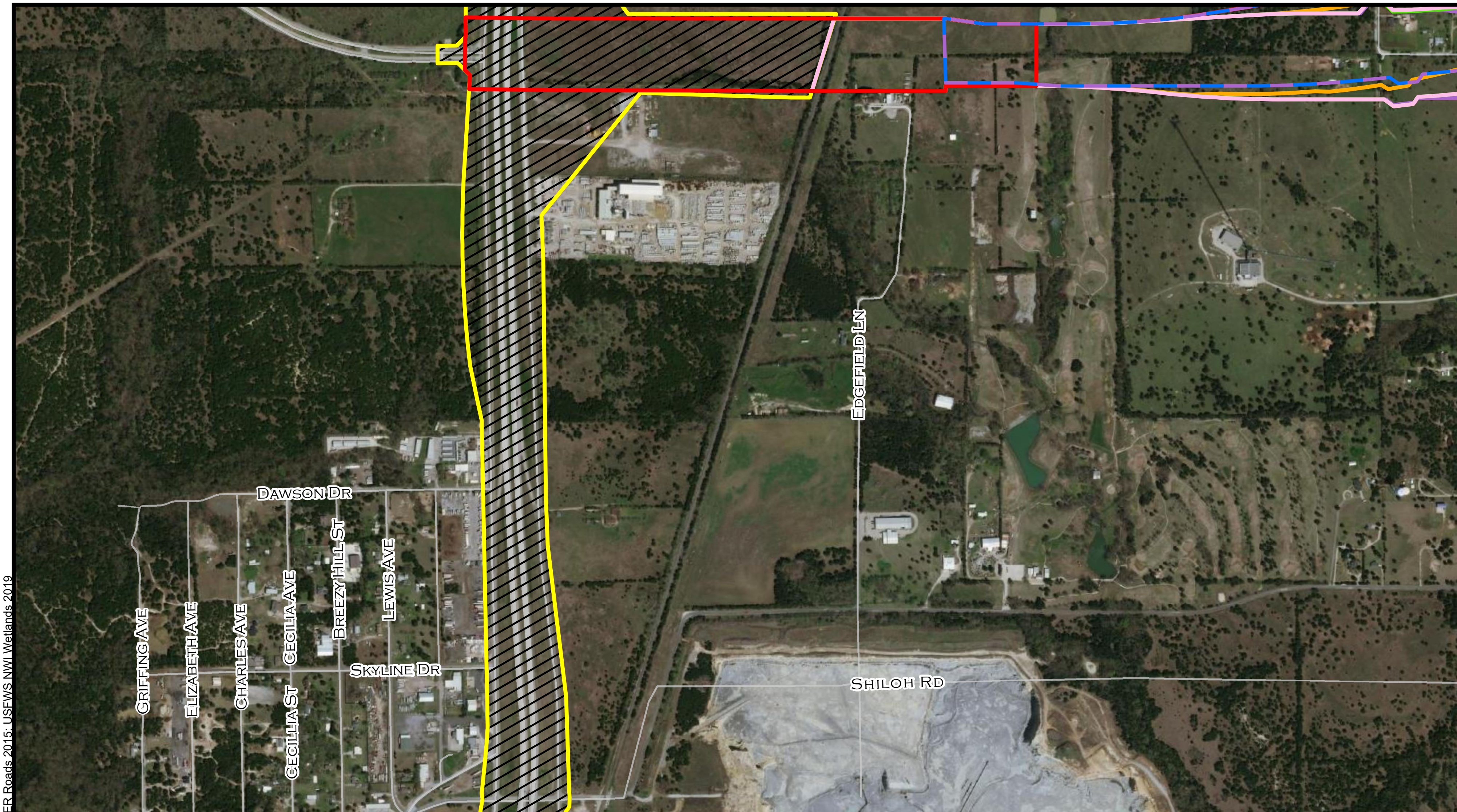
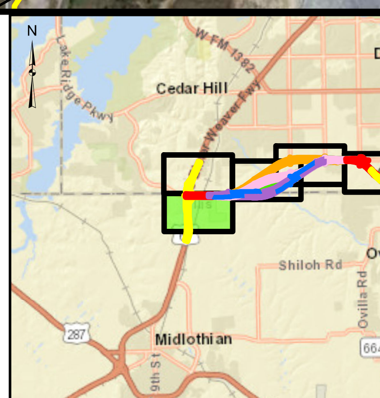


- Mod. Option D Proposed ROW
- Common Alignment Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW
- US 67 Project Area (Evaluated Under Separate Document)



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

Suitable Habitat for Freshwater Mussels

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 500 1,000 Feet

FIGURE 5
SHEET 2

DATE:
August 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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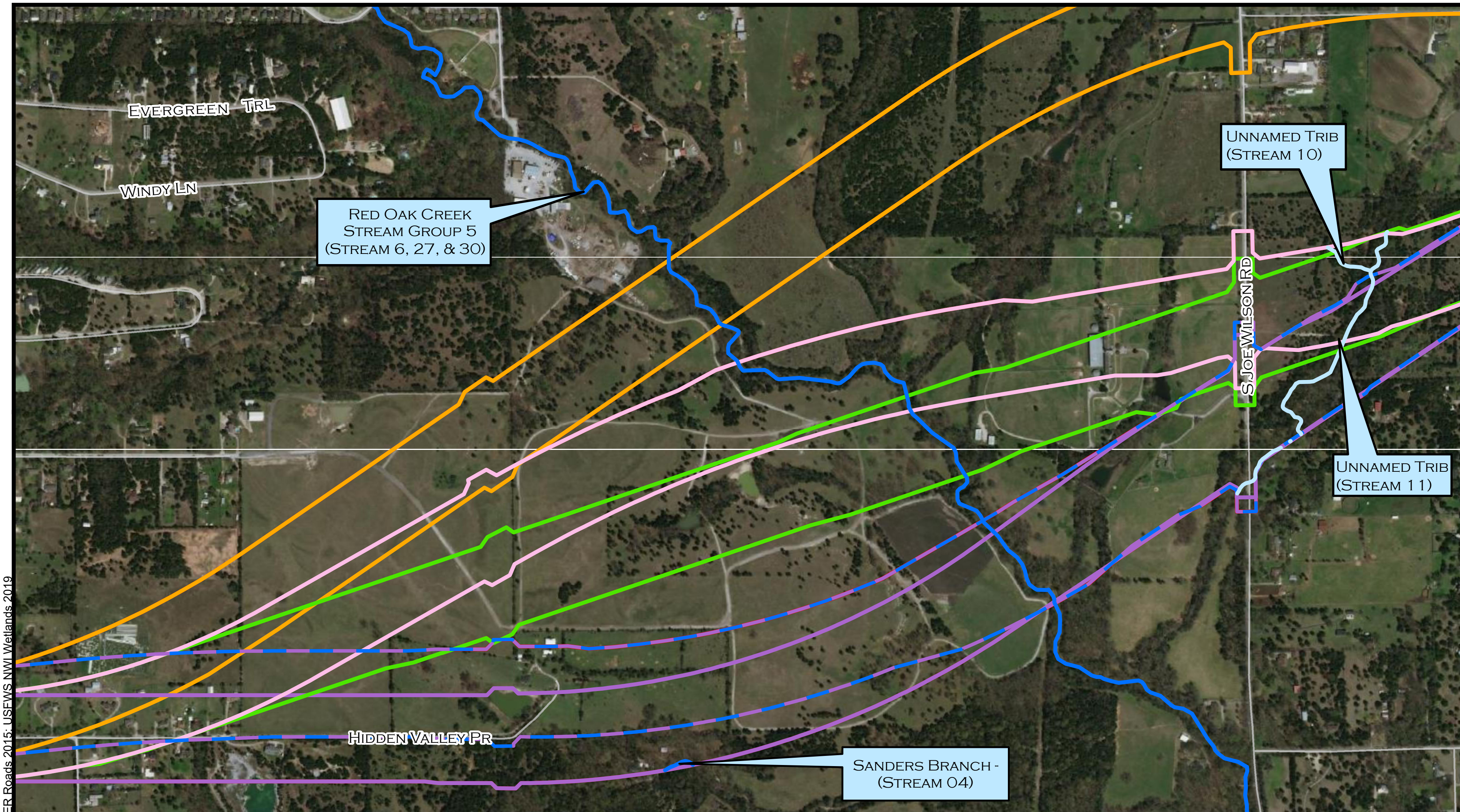
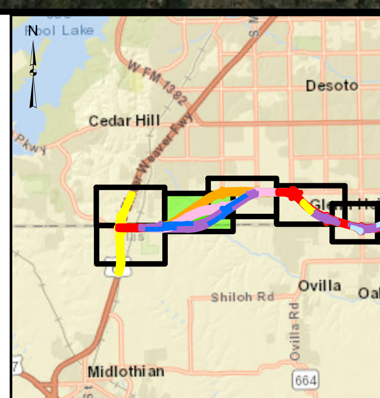


Streams - Perennial
Streams - Intermittent with Perennial Pools
Mod. Option D Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW

Note: The (Stream Number) comes from the 2022 Water Features Delineation Report-Final



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006

Suitable Habitat for Freshwater Mussels

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 500 1,000 Feet

Figure 5
Sheet 3

Date:
August 2022

Sources: ESRI Aerial 2021: ESRI World Street Map: TIGER Roads 2015: USFWS NWI Wetlands 2019

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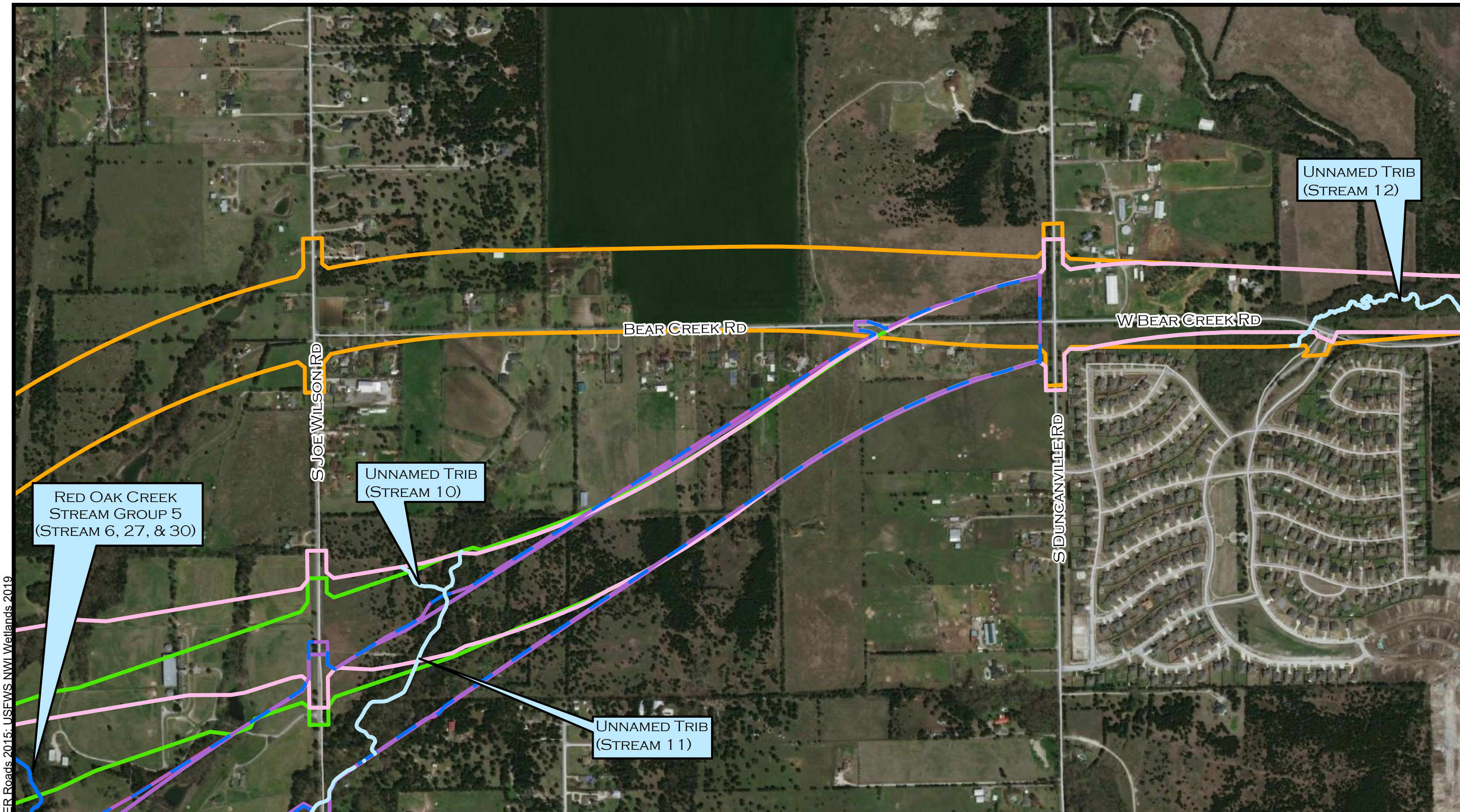
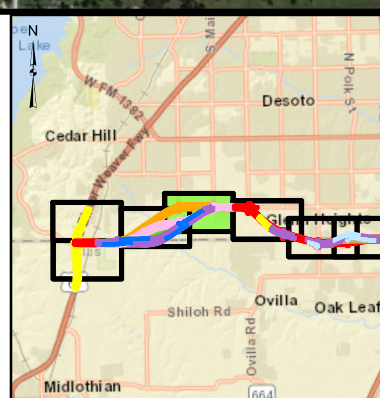


- Streams - Perennial
- Streams - Intermittent with Perennial Pools
- Mod. Option D Proposed ROW
- Alternative 1 Proposed ROW
- Alternative 2 Proposed ROW
- Alternative 3 Proposed ROW
- Alternative 4 Proposed ROW

Note: The (Stream Number) comes from the 2022 Water Features Delineation Report-Final



Loop 9, Segment A: US 67 to IH 35E

CSJ: 2964-10-006

Suitable Habitat for Freshwater Mussels

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 500 1,000 Feet

FIGURE 5
SHEET 4

DATE:
August 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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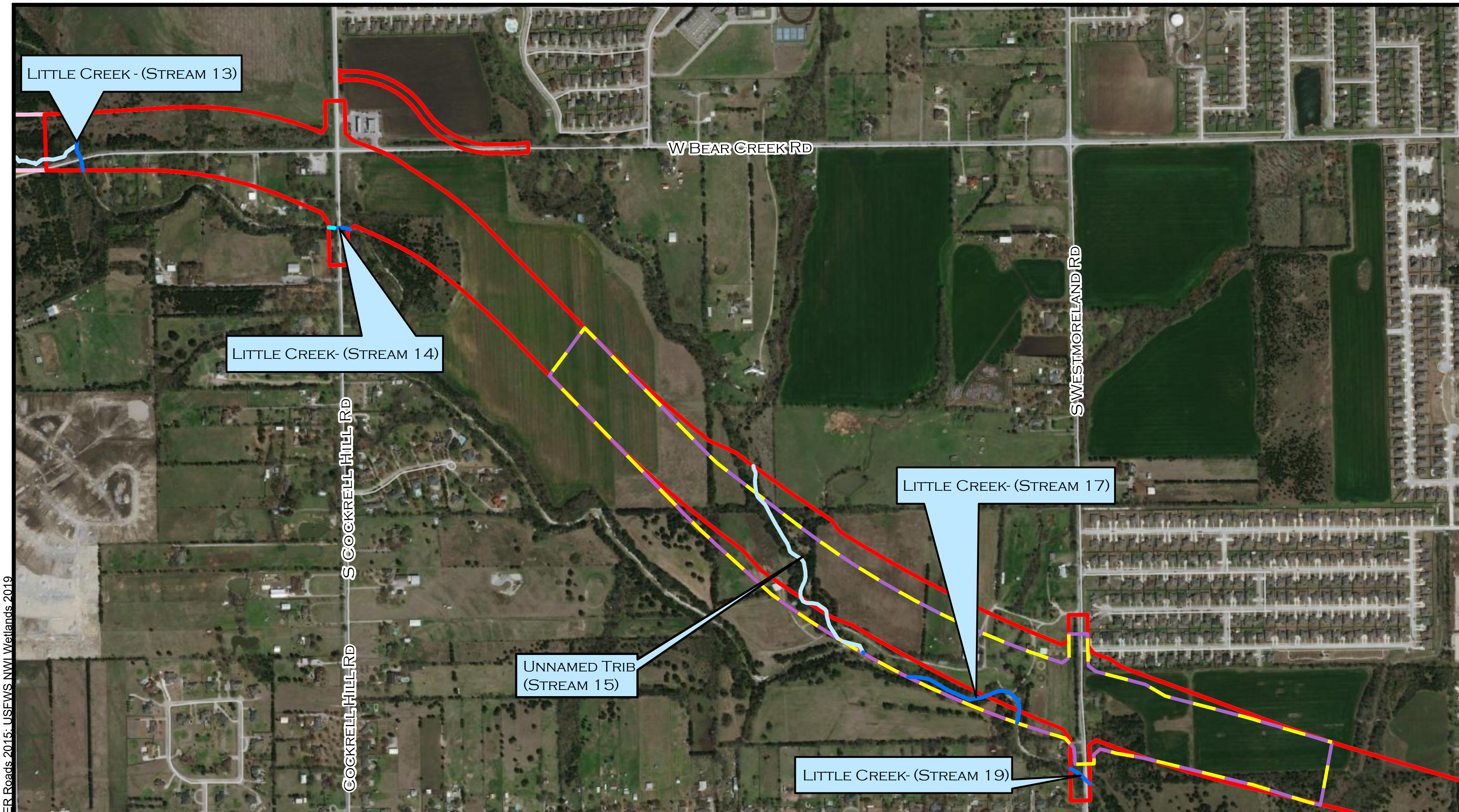
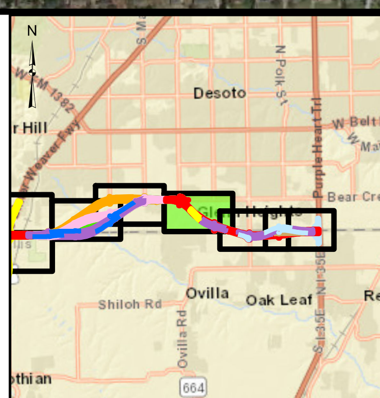
Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019



Streams - Perennial
Streams - Intermittent with Perennial Pools
Mod. Option C Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW

Note: The (Stream Number) comes from the 2022 Water Features Delineation Report-Final



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
Suitable Habitat for Freshwater Mussels

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 500 1,000 Feet

Figure 5
Sheet 5

Date:
August 2022

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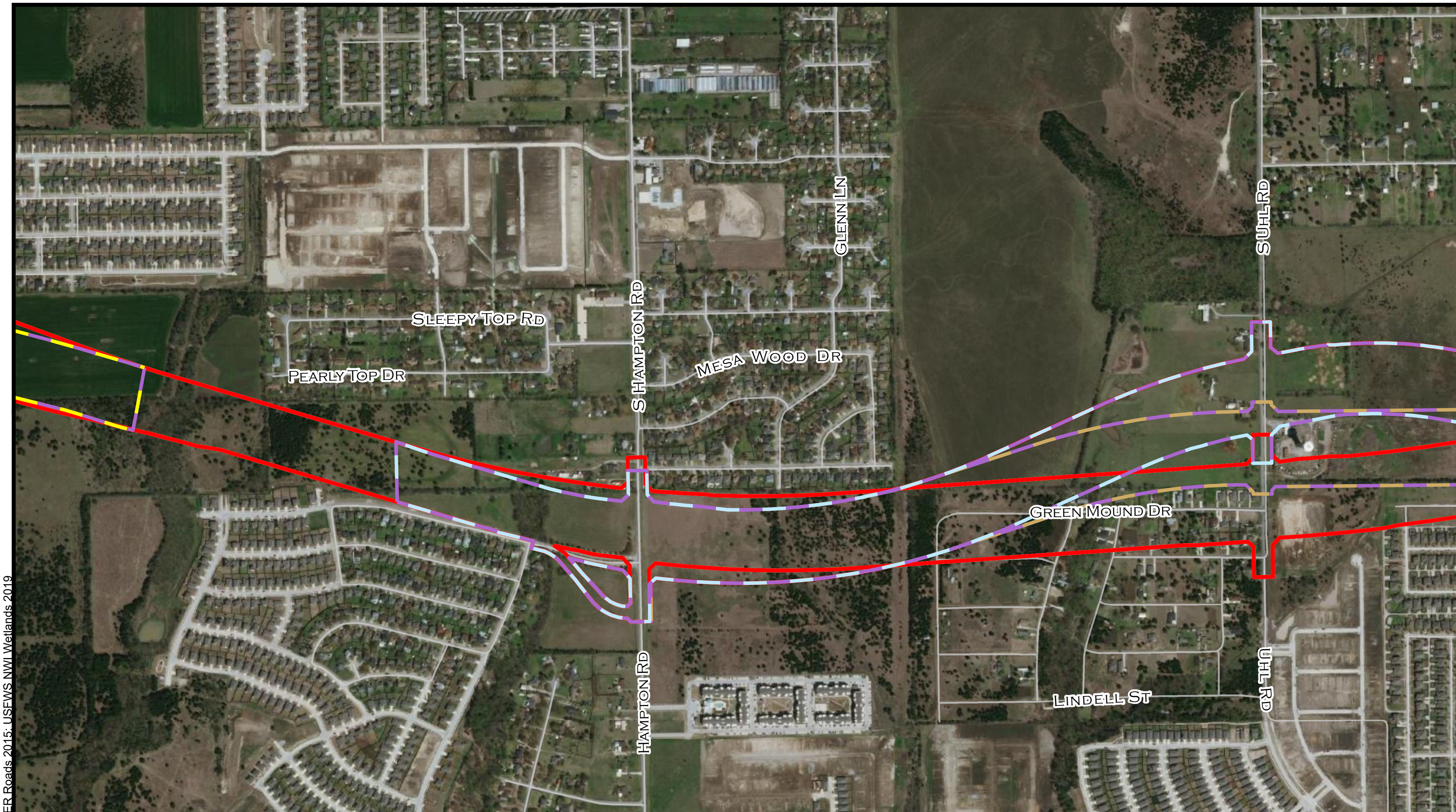
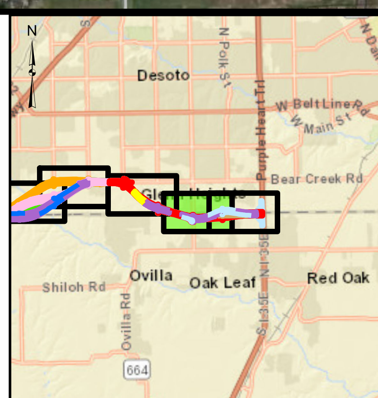


Mod. Option A Proposed ROW
Mod. Option B Proposed ROW
Mod. Option C Proposed ROW
Common Alignment Proposed ROW



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
Suitable Habitat for Freshwater Mussels
Dallas & Ellis Counties, Texas

Texas Department of Transportation

N
0 500 1,000 Feet

FIGURE 5
Sheet 6

DATE:
August 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019

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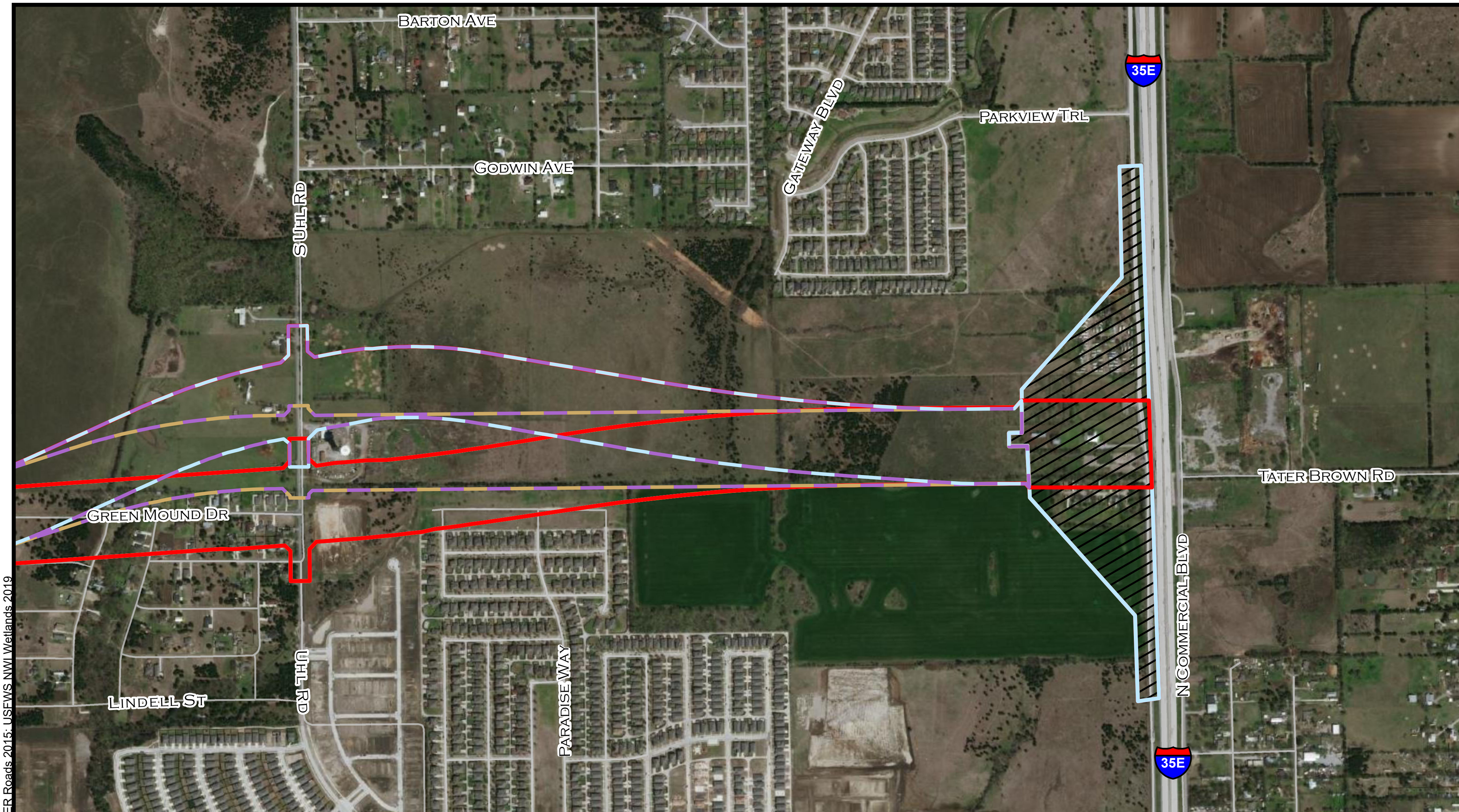
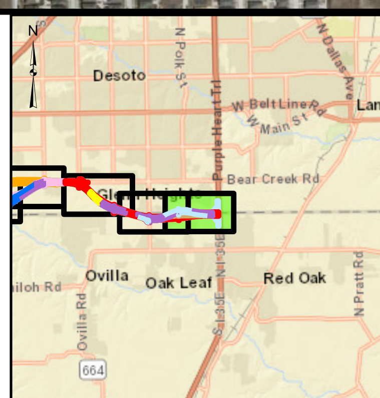


Mod. Option A Proposed ROW
Mod. Option B Proposed ROW
Common Alignment Proposed ROW
Alternative 1 Proposed ROW
Alternative 2 Proposed ROW
Alternative 3 Proposed ROW
Alternative 4 Proposed ROW
IH 35E Project Area (Evaluated Under Separate Document)



Loop 9, Segment A: US 67 to IH 35E
CSJ: 2964-10-006
Suitable Habitat for Freshwater Mussels
Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 500 1,000 Feet

FIGURE 5
SHEET 7

DATE:
August 2022

Sources: ESRI Aerial 2021; ESRI World Street Map; TIGER Roads 2015; USFWS NWI Wetlands 2019.

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Loop 9, Segment A
Summary of Waters of the U.S. by Alternative Alignment

Feature Name	Wetlands		Open Waters		Streams		Totals	
	AC	LF	AC	LF	AC	LF	AC	LF
Alternative 1	2.16	N/A	0.78	N/A	3.07	15,250	**6.01**	**15,250**
Alternative 1 Mod A	2.04	N/A	1.59	N/A	3.01	14,760	**6.64**	**14,760**
Alternative 1 Mod B	2.78	N/A	1.40	N/A	3.02	14,881	**7.20**	**14,881**
Alternative 1 Mod C	2.16	N/A	0.78	N/A	3.58	15,521	**6.52**	**15,521**
Alternative 1 Mod A & C	2.04	N/A	1.59	N/A	3.52	15,031	**7.15**	**15,031**
Alternative 1 Mod B & C	2.78	N/A	1.40	N/A	3.53	15,152	**7.71**	**15,152**
Alternative 2	2.23	N/A	3.39	N/A	3.01	14,554	**8.63**	**14,554**
Alternative 2 Mod A	2.12	N/A	4.20	N/A	2.94	14,063	**9.26**	**14,063**
Alternative 2 Mod B	2.85	N/A	4.01	N/A	2.96	14,185	**9.82**	**14,185**
Alternative 2 Mod C	2.23	N/A	3.39	N/A	3.52	14,825	**9.14**	**14,825**
Alternative 2 Mod A & C	2.12	N/A	4.20	N/A	3.45	14,334	**9.77**	**14,334**
Alternative 2 Mod B & C	2.85	N/A	4.01	N/A	3.47	14,456	**10.33**	**14,456**
Alternative 3	3.14	N/A	2.48	N/A	3.10	14,435	**8.73**	**14,435**
Alternative 3 Mod A	3.03	N/A	3.29	N/A	3.04	13,944	**9.36**	**13,944**
Alternative 3 Mod B	3.76	N/A	3.10	N/A	3.05	14,066	**9.91**	**14,066**
Alternative 3 Mod C	3.14	N/A	2.48	N/A	3.61	14,706	**9.24**	**14,706**
Alternative 3 Mod D	3.75	N/A	2.49	N/A	3.11	14,385	**9.35**	**14,385**
Alternative 3 Mod A & C	3.03	N/A	3.29	N/A	3.55	14,215	**9.87**	**14,215**
Alternative 3 Mod A & D	3.63	N/A	3.31	N/A	3.04	13,895	**9.98**	**13,895**
Alternative 3 Mod A C & D	3.63	N/A	3.31	N/A	3.55	14,166	**10.49**	**14,166**
Alternative 3 Mod B & C	3.76	N/A	3.10	N/A	3.56	14,336	**10.42**	**14,336**
Alternative 3 Mod B & D	4.36	N/A	3.11	N/A	3.06	14,016	**10.53**	**14,016**
Alternative 3 Mod B C & D	4.36	N/A	3.11	N/A	3.57	14,287	**11.04**	**14,287**
Alternative 3 Mod C & D	3.75	N/A	2.49	N/A	3.62	14,656	**9.86**	**14,656**
Alternative 4	2.09	N/A	1.16	N/A	2.41	13,768	**5.66**	**13,768**
Alternative 4 Mod A	1.97	N/A	1.98	N/A	2.34	13,278	**6.29**	**13,278**
Alternative 4 Mod B	2.71	N/A	1.78	N/A	2.36	13,399	**6.84**	**13,399**
Alternative 4 Mod C	2.09	N/A	1.16	N/A	2.92	14,039	**6.17**	**14,039**
Alternative 4 Mod A & C	1.97	N/A	1.98	N/A	2.85	13,549	**6.80**	**13,549**
Alternative 4 Mod B & C	2.71	N/A	1.78	N/A	2.87	13,670	**7.35**	**13,670**

Loop 9, Segment A
Summary of Waters of the U.S. - Alternative 1

Feature Name	Alternative 1		Alternative 1 Mod A		Alternative 1 Mod B		Alternative 1 Mod C		Alternative 1 Mod A & C		Alternative 1 Mod B & C	
	AC	LF	AC	LF	AC	LF	AC	LF	AC	LF	AC	LF
Wetland Features												
Wetland 1	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A
Wetland 2	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A
Wetland 3	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A
Wetland 4*	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A
Wetland 5*	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A
Wetland 6*	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A	0.5167	N/A	0.517	N/A
Wetland 7	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A
Wetland 8	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A
Wetland 9	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Wetland 10	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Wetland 11	0.032	N/A	0.032	N/A	0.032	N/A	0.032	N/A	0.032	N/A	0.032	N/A
Wetland 12*	0.004	N/A	0.004	N/A	0.004	N/A	0.004	N/A	0.004	N/A	0.004	N/A
Wetland 13	-	N/A	-	N/A	0.617	N/A	-	N/A	-	N/A	0.617	N/A
Wetland 14	0.117	N/A	-	N/A	0.117	N/A	0.117	N/A	-	N/A	0.117	N/A
Wetland 15*	0.036	N/A	0.036	N/A	0.036	N/A	0.036	N/A	0.036	N/A	0.036	N/A
Open Water												
Pond 1*	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A
Pond 2*	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 3*	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 4	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 5	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 6*	0.562	N/A	0.562	N/A	0.562	N/A	0.562	N/A	0.562	N/A	0.562	N/A
Pond 7*	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 8	0.150	N/A	0.150	N/A	0.150	N/A	0.150	N/A	0.150	N/A	0.150	N/A
Pond 9	0.056	N/A	-	N/A	0.056	N/A	0.056	N/A	-	N/A	0.056	N/A
Pond 11	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 12*	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 13*	-	N/A	0.753	N/A	0.618	N/A	-	N/A	0.753	N/A	0.618	N/A
Pond 14*	-	N/A	0.117	N/A	-	N/A	-	N/A	0.117	N/A	-	N/A
Streams												
Stream 1	0.050	722	0.050	722	0.050	722	0.050	722	0.050	722	0.050	722
Stream 2*#	0.059	428	0.059	428	0.059	428	0.059	428	0.059	428	0.059	428
Stream 3	0.008	61	0.008	61	0.008	61	0.008	61	0.008	61	0.008	61
Stream 4*	-	-	-	-	-	-	-	-	-	-	-	-

Loop 9, Segment A
Summary of Waters of the U.S. - Alternative 1

Feature Name	Alternative 1		Alternative 1 Mod A		Alternative 1 Mod B		Alternative 1 Mod C		Alternative 1 Mod A & C		Alternative 1 Mod B & C	
Stream 5#	-	-	-	-	-	-	-	-	-	-	-	-
Stream 6	0.211	1535	0.211	1535	0.211	1535	0.211	1535	0.211	1535	0.211	1535
Stream 7	0.080	576	0.080	576	0.080	576	0.080	576	0.080	576	0.080	576
Stream 8*	0.124	900	0.124	900	0.124	900	0.124	900	0.124	900	0.124	900
Stream 9*	0.075	541	0.075	541	0.075	541	0.075	541	0.075	541	0.075	541
Stream 10	0.051	372	0.051	372	0.051	372	0.051	372	0.051	372	0.051	372
Stream 11*	0.585	897	0.585	897	0.585	897	0.585	897	0.585	897	0.585	897
Stream 12*#	0.328	2448	0.328	2448	0.328	2448	0.328	2448	0.328	2448	0.328	2448
Stream 13*	0.059	425	0.059	425	0.059	425	0.059	425	0.059	425	0.059	425
Stream 14*	0.021	154	0.021	154	0.021	154	0.021	154	0.021	154	0.021	154
Stream 15	0.551	1235	0.551	1235	0.551	1235	0.644	1492	0.644	1492	0.644	1492
Stream 16	0.068	520	0.068	520	0.068	520	0.033	252	0.033	252	0.033	252
Stream 17	0.245	337	0.245	337	0.245	337	0.753	1028	0.753	1028	0.753	1028
Stream 18	0.093	700	0.093	700	0.093	700	0.061	468	0.061	468	0.061	468
Stream 19*	0.024	176	0.024	176	0.024	176	-	-	-	-	-	-
Stream 20*	0.061	446	0.061	446	0.061	446	0.061	446	0.061	446	0.061	446
Stream 21#	0.086	628	0.078	566	0.078	566	0.086	628	0.078	566	0.078	566
Stream 22	0.020	150	0.012	89	0.012	89	0.020	150	0.012	89	0.012	89
Stream 23	0.087	635	0.085	618	0.085	618	0.087	635	0.085	618	0.085	618
Stream 24*	0.093	684	0.093	685	0.094	686	0.093	684	0.093	685	0.094	686
Stream 25*#	0.093	680	0.045	327	0.062	448	0.093	680	0.045	327	0.062	448
Stream 26	-	-	-	-	-	-	-	-	-	-	-	-
Stream 27	-	-	-	-	-	-	-	-	-	-	-	-
Stream 28	-	-	-	-	-	-	-	-	-	-	-	-
Stream 29*	-	-	-	-	-	-	-	-	-	-	-	-
Stream 30	-	-	-	-	-	-	-	-	-	-	-	-
Total Wetland	2.16	N/A	2.04	N/A	2.78	N/A	2.16	N/A	2.04	N/A	2.78	N/A
Total Open Water	0.78	N/A	1.59	N/A	1.40	N/A	0.78	N/A	1.59	N/A	1.40	N/A
Total Stream	3.07	15250	3.01	14760	3.02	14881	3.58	15521	3.52	15031	3.53	15152

* Portions of the feature were desktop delineated based on lack of field access at the time of the site visit
# Portions of the stream feature are partially culverted through the project area

Loop 9, Segment A
Summary of Waters of the U.S. - Alternative 2

Feature Name	Alternative 2		Alternative 2 Mod A		Alternative 2 Mod B		Alternative 2 Mod C		Alternative 2 Mod A & C		Alternative 2 Mod B & C	
	AC	LF	AC	LF	AC	LF	AC	LF	AC	LF	AC	LF
Wetland Features												
Wetland 1	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A
Wetland 2	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A
Wetland 3	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A
Wetland 4*	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A
Wetland 5*	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A
Wetland 6*	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A
Wetland 7	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A
Wetland 8	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A
Wetland 9	0.074	N/A	0.074	N/A	0.074	N/A	0.074	N/A	0.074	N/A	0.074	N/A
Wetland 10	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Wetland 11	0.029	N/A	0.029	N/A	0.029	N/A	0.029	N/A	0.029	N/A	0.029	N/A
Wetland 12*	0.004	N/A	0.004	N/A	0.004	N/A	0.004	N/A	0.004	N/A	0.004	N/A
Wetland 13	-	N/A	-	N/A	0.617	N/A	-	N/A	-	N/A	0.617	N/A
Wetland 14	0.117	N/A	-	N/A	0.117	N/A	0.117	N/A	-	N/A	0.117	N/A
Wetland 15*	0.036	N/A	0.036	N/A	0.036	N/A	0.036	N/A	0.036	N/A	0.036	N/A
Open Water												
Pond 1*	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A
Pond 2*	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 3*	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 4	0.584	N/A	0.584	N/A	0.584	N/A	0.584	N/A	0.584	N/A	0.584	N/A
Pond 5	0.903	N/A	0.903	N/A	0.903	N/A	0.903	N/A	0.903	N/A	0.903	N/A
Pond 6*	1.687	N/A	1.687	N/A	1.687	N/A	1.687	N/A	1.687	N/A	1.687	N/A
Pond 7*	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 8	0.150	N/A	0.150	N/A	0.150	N/A	0.150	N/A	0.150	N/A	0.150	N/A
Pond 9	0.056	N/A	-	N/A	0.056	N/A	0.056	N/A	-	N/A	0.056	N/A
Pond 11	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 12*	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 13*	-	N/A	0.753	N/A	0.618	N/A	-	N/A	0.753	N/A	0.618	N/A
Pond 14*	-	N/A	0.117	N/A	-	N/A	-	N/A	0.117	N/A	-	N/A
Streams												
Stream 1	0.050	722	0.050	722	0.050	722	0.050	722	0.050	722	0.050	722
Stream 2*#	0.059	428	0.059	428	0.059	428	0.059	428	0.059	428	0.059	428
Stream 3	0.008	61	0.008	61	0.008	61	0.008	61	0.008	61	0.008	61
Stream 4*	-	-	-	-	-	-			-	-	-	-
Stream 5#	0.230	1690	0.230	1690	0.230	1690	0.230	1690	0.230	1690	0.230	1690
Stream 6	0.103	749	0.103	749	0.103	749	0.103	749	0.103	749	0.103	749

Loop 9, Segment A
Summary of Waters of the U.S. - Alternative 2

Feature Name	Alternative 2		Alternative 2 Mod A		Alternative 2 Mod B		Alternative 2 Mod C		Alternative 2 Mod A & C		Alternative 2 Mod B & C	
Stream 7	-	-	-	-	-	-			-	-	-	-
Stream 8*	-	-	-	-	-	-			-	-	-	-
Stream 9*	0.055	401	0.055	401	0.055	401	0.055	401	0.055	401	0.055	401
Stream 10	0.041	302	0.041	302	0.041	302	0.041	302	0.041	302	0.041	302
Stream 11*	0.633	982	0.633	982	0.633	982	0.633	982	0.633	982	0.633	982
Stream 12*#	0.328	2448	0.328	2448	0.328	2448	0.328	2448	0.328	2448	0.328	2448
Stream 13*	0.059	425	0.059	425	0.059	425	0.059	425	0.059	425	0.059	425
Stream 14*	0.021	154	0.021	154	0.021	154	0.021	154	0.021	154	0.021	154
Stream 15	0.551	1235	0.551	1235	0.551	1235	0.644	1492	0.644	1492	0.644	1492
Stream 16	0.068	521	0.068	521	0.068	521	0.033	252	0.033	252	0.033	252
Stream 17	0.245	337	0.245	337	0.245	337	0.753	1028	0.753	1028	0.753	1028
Stream 18	0.093	701	0.093	701	0.093	701	0.061	468	0.061	468	0.061	468
Stream 19*	0.024	176	0.024	176	0.024	176	-	-	-	-	-	-
Stream 20*	0.061	446	0.061	446	0.061	446	0.061	446	0.061	446	0.061	446
Stream 21#	0.086	628	0.078	566	0.078	566	0.086	628	0.078	566	0.078	566
Stream 22	0.020	150	0.012	89	0.012	89	0.020	150	0.012	89	0.012	89
Stream 23	0.087	635	0.085	618	0.085	618	0.087	635	0.085	618	0.085	618
Stream 24*	0.093	684	0.093	685	0.094	686	0.093	684	0.093	685	0.094	686
Stream 25*#	0.093	680	0.045	327	0.062	448	0.093	680	0.045	327	0.062	448
Stream 26	-	-	-	-	-	-	-	-	-	-	-	-
Stream 27	-	-	-	-	-	-	-	-	-	-	-	-
Stream 28	-	-	-	-	-	-	-	-	-	-	-	-
Stream 29*	-	-	-	-	-	-	-	-	-	-	-	-
Stream 30	-	-	-	-	-	-	-	-	-	-	-	-
Total Wetland	**2.23**	**N/A**	**2.12**	**N/A**	**2.85**	**N/A**	**2.23**	**N/A**	**2.12**	**N/A**	**2.85**	**N/A**
Total Open Water	**3.39**	**N/A**	**4.20**	**N/A**	**4.01**	**N/A**	**3.39**	**N/A**	**4.20**	**N/A**	**4.01**	**N/A**
Total Stream	**3.01**	**14554**	**2.94**	**14063**	**2.96**	**14185**	**3.52**	**14825**	**3.45**	**14334**	**3.47**	**14456**

* Portions of the feature were desktop delineated based on lack of field access at the time of the site visit
# Portions of the stream feature are partially culverted through the project area

Loop 9, Segment A
Summary of Waters of the U.S. - Alternative 3

Feature Name	Alternative 3		Alternative 3 Mod A		Alternative 3 Mod B		Alternative 3 Mod C		Alternative 3 Mod D		Alternative 3 Mod A & C		Alternative 3 Mod A & D		Alternative 3 Mod A, C & D		Alternative 3 Mod B & C		Alternative 3 Mod B & D		Alternative 3 Mod B, C, & D		Alternative 3 Mod C & D	
	AC	LF	AC	LF	AC	LF	AC	LF	AC	LF	AC	LF	AC	LF	AC	LF	AC	LF	AC	LF	AC	LF	AC	LF
Wetland Features																								
Wetland 1	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A
Wetland 2	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A
Wetland 3	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A
Wetland 4*	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A
Wetland 5*	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A
Wetland 6*	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A
Wetland 7	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A
Wetland 8	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A
Wetland 9	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Wetland 10	0.987	N/A	0.987	N/A	0.987	N/A	0.987	N/A	1.609	N/A	0.987	N/A	1.609	N/A	1.609	N/A	0.987	N/A	1.609	N/A	1.609	N/A	1.609	N/A
Wetland 11	0.026	N/A	0.026	N/A	0.026	N/A	0.026	N/A	0.009	N/A	0.026	N/A	0.009	N/A	0.009	N/A	0.026	N/A	0.009	N/A	0.009	N/A	0.009	N/A
Wetland 12*	0.006	N/A	0.006	N/A	0.006	N/A	0.006	N/A	0.003	N/A	0.006	N/A	0.003	N/A	0.003	N/A	0.006	N/A	0.003	N/A	0.003	N/A	0.003	N/A
Wetland 13	-	N/A	-	N/A	0.617	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	0.617	N/A	0.617	N/A	0.617	N/A	-	N/A
Wetland 14	0.117	N/A	-	N/A	0.117	N/A	0.117	N/A	0.117	N/A	-	N/A	-	N/A	-	N/A	0.117	N/A	0.117	N/A	0.117	N/A	0.117	N/A
Wetland 15*	0.036	N/A	0.036	N/A	0.036	N/A	0.036	N/A	0.036	N/A	0.036	N/A	0.036	N/A	0.036	N/A	0.036	N/A	0.036	N/A	0.036	N/A	0.036	N/A
Open Water																								
Pond 1*	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A
Pond 2*	0.058	N/A	0.058	N/A	0.058	N/A	0.058	N/A	-	N/A	0.058	N/A	-	N/A	-	N/A	0.058	N/A	-	N/A	-	N/A	-	N/A
Pond 3*	1.249	N/A	1.249	N/A	1.249	N/A	1.249	N/A	1.314	N/A	1.249	N/A	1.314	N/A	1.314	N/A	1.249	N/A	1.314	N/A	1.314	N/A	1.314	N/A
Pond 4	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 5	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 6*	0.022	N/A	0.022	N/A	0.022	N/A	0.022	N/A	0.029	N/A	0.022	N/A	0.029	N/A	0.029	N/A	0.022	N/A	0.029	N/A	0.029	N/A	0.029	N/A
Pond 7*	0.934	N/A	0.934	N/A	0.934	N/A	0.934	N/A	0.934	N/A	0.934	N/A	0.934	N/A	0.934	N/A	0.934	N/A	0.934	N/A	0.934	N/A	0.934	N/A
Pond 8	0.150	N/A	0.150	N/A	0.150	N/A	0.150	N/A	0.150	N/A	0.150	N/A	0.150	N/A	0.150	N/A	0.150	N/A	0.150	N/A	0.150	N/A	0.150	N/A
Pond 9	0.056	N/A	-	N/A	0.056	N/A	0.056	N/A	0.056	N/A	-	N/A	-	N/A	-	N/A	0.056	N/A	0.056	N/A	0.056	N/A	0.056	N/A
Pond 11	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 12*	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A

Loop 9, Segment A
Summary of Waters of the U.S. - Alternative 3

Feature Name	Alternative 3		Alternative 3 Mod A		Alternative 3 Mod B		Alternative 3 Mod C		Alternative 3 Mod D		Alternative 3 Mod A & C		Alternative 3 Mod A & D		Alternative 3 Mod A, C & D		Alternative 3 Mod B & C		Alternative 3 Mod B & D		Alternative 3 Mod B, C, & D		Alternative 3 Mod C & D	
Pond 13*	-	N/A	0.753	N/A	0.618	N/A	-	N/A	-	N/A	0.753	N/A	0.753	N/A	0.753	N/A	0.618	N/A	0.618	N/A	0.618	N/A	-	N/A
Pond 14*	-	N/A	0.117	N/A	-	N/A	-	N/A	-	N/A	0.117	N/A	0.117	N/A	0.117	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Streams																								
Stream 1	0.050	722	0.050	722	0.050	722	0.050	722	0.050	722	0.050	722	0.050	722	0.050	722	0.050	722	0.050	722	0.050	722	0.050	722
Stream 2*#	0.059	428	0.059	428	0.059	428	0.059	428	0.058	426	0.059	428	0.058	426	0.058	426	0.059	428	0.058	426	0.058	426	0.058	426
Stream 3	0.008	61	0.008	61	0.008	61	0.008	61	0.008	61	0.008	61	0.008	61	0.008	61	0.008	61	0.008	61	0.008	61	0.008	61
Stream 4*	0.031	224	0.031	224	0.031	224	0.031	224	-	-	0.031	224	-	-	-	-	0.031	224	-	-	-	-	-	-
Stream 5#	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stream 6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stream 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stream 8*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stream 9*	0.154	1116	0.154	1116	0.154	1116	0.154	1116	0.157	1139	0.154	1116	0.157	1139	0.157	1139	0.154	1116	0.157	1139	0.157	1139	0.157	1139
Stream 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stream 11*	0.870	1934	0.870	1934	0.870	1934	0.870	1934	0.884	1944	0.870	1934	0.884	1944	0.884	1944	0.870	1934	0.884	1944	0.884	1944	0.884	1944
Stream 12*#	0.328	2448	0.328	2448	0.328	2448	0.328	2448	0.328	2448	0.328	2448	0.328	2448	0.328	2448	0.328	2448	0.328	2448	0.328	2448	0.328	2448
Stream 13*	0.059	425	0.059	425	0.059	425	0.059	425	0.059	425	0.059	425	0.059	425	0.059	425	0.059	425	0.059	425	0.059	425	0.059	425
Stream 14*	0.021	154	0.021	154	0.021	154	0.021	154	0.021	154	0.021	154	0.021	154	0.021	154	0.021	154	0.021	154	0.021	154	0.021	154
Stream 15	0.551	1235	0.551	1235	0.551	1235	0.644	1492	0.551	1235	0.644	1492	0.551	1235	0.644	1492	0.644	1492	0.551	1235	0.644	1492	0.644	1492
Stream 16	0.068	520	0.068	520	0.068	520	0.033	252	0.068	520	0.033	252	0.068	520	0.033	252	0.033	252	0.068	520	0.033	252	0.033	252
Stream 17	0.245	337	0.245	337	0.245	337	0.753	1028	0.245	337	0.753	1028	0.245	337	0.753	1028	0.753	1028	0.245	337	0.753	1028	0.753	1028
Stream 18	0.093	700	0.093	700	0.093	700	0.061	468	0.093	700	0.061	468	0.093	700	0.061	468	0.061	468	0.093	700	0.061	468	0.061	468
Stream 19*	0.024	176	0.024	176	0.024	176	-	-	0.024	176	-	-	0.024	176	-	-	-	-	0.024	176	-	-	-	-
Stream 20*	0.061	446	0.061	446	0.061	446	0.061	446	0.061	446	0.061	446	0.061	446	0.061	446	0.061	446	0.061	446	0.061	446	0.061	446
Stream 21#	0.086	628	0.078	566	0.078	566	0.086	628	0.086	628	0.078	566	0.078	566	0.078	566	0.078	566	0.078	566	0.078	566	0.086	628
Stream 22	0.020	150	0.012	89	0.012	89	0.020	150	0.020	150	0.012	89	0.012	89	0.012	89	0.012	89	0.012	89	0.012	89	0.020	150
Stream 23	0.087	635	0.085	618	0.085	618	0.087	635	0.087	635	0.085	618	0.085	618	0.085	618	0.085	618	0.085	618	0.085	618	0.087	635
Stream 24*	0.093	684	0.093	685	0.094	686	0.093	684	0.093	684	0.093	685	0.093	685	0.093	685	0.094	686	0.094	686	0.094	686	0.093	684
Stream 25*#	0.093	680	0.045	327	0.062	448	0.093	680	0.093	680	0.045	327	0.045	327	0.045	327	0.062	448	0.062	448	0.062	448	0.093	680
Stream 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stream 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Loop 9, Segment A
Summary of Waters of the U.S. - Alternative 3

Feature Name	Alternative 3		Alternative 3 Mod A		Alternative 3 Mod B		Alternative 3 Mod C		Alternative 3 Mod D		Alternative 3 Mod A & C		Alternative 3 Mod A & D		Alternative 3 Mod A, C & D		Alternative 3 Mod B & C		Alternative 3 Mod B & D		Alternative 3 Mod B, C, & D		Alternative 3 Mod C & D	
Stream 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stream 29*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stream 30	0.101	731	0.101	731	0.101	731	0.101	731	0.121	875	0.101	731	0.121	875	0.121	875	0.101	731	0.121	875	0.121	875	0.121	875
Total Wetland	3.14	N/A	3.03	N/A	3.76	N/A	3.14	N/A	3.75	N/A	3.03	N/A	3.63	N/A	3.63	N/A	3.76	N/A	4.36	N/A	4.36	N/A	3.75	N/A
Total Open Water	2.48	N/A	3.29	N/A	3.10	N/A	2.48	N/A	2.49	N/A	3.29	N/A	3.31	N/A	3.31	N/A	3.10	N/A	3.11	N/A	3.11	N/A	2.49	N/A
Total Stream	3.10	14435	3.04	13944	3.05	14066	3.61	14706	3.11	14385	3.55	14215	3.04	13895	3.55	14166	3.56	14336	3.06	14016	3.57	14287	3.62	14656

* Portions of the feature were desktop delineated based on lack of field access at the time of the site visit
# Portions of the stream feature are partially culverted through the project area

Loop 9, Segment A
Summary of Waters of the U.S. - Alternative 4

Feature Name	Alternative 4		Alternative 4 Mod A		Alternative 4 Mod B		Alternative 4 Mod C		Alternative 4 Mod A & C		Alternative 4 Mod B & C	
	AC	LF	AC	LF	AC	LF	AC	LF	AC	LF	AC	LF
Wetland Features												
Wetland 1	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A	0.197	N/A
Wetland 2	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A	0.245	N/A
Wetland 3	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A	0.067	N/A
Wetland 4*	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A	0.031	N/A
Wetland 5*	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A	0.849	N/A
Wetland 6*	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A	0.517	N/A
Wetland 7	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A	0.039	N/A
Wetland 8	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A	0.028	N/A
Wetland 9	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Wetland 10	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Wetland 11	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Wetland 12*	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Wetland 13	-	N/A	-	N/A	0.617	N/A	-	N/A	-	N/A	0.617	N/A
Wetland 14	0.117	N/A	-	N/A	0.117	N/A	0.117	N/A	-	N/A	0.117	N/A
Wetland 15*	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Open Water												
Pond 1*	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A	0.009	N/A
Pond 2*	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 3*	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 4	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 5	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 6*	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 7*	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 8	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A
Pond 9	0.056	N/A	-	N/A	0.056	N/A	0.056	N/A	-	N/A	0.056	N/A
Pond 11	0.084	N/A	0.084	N/A	0.084	N/A	0.084	N/A	0.084	N/A	0.084	N/A
Pond 12*	1.013	N/A	1.013	N/A	1.013	N/A	1.013	N/A	1.013	N/A	1.013	N/A
Pond 13*	-	N/A	0.753	N/A	0.618	N/A	-	N/A	0.753	N/A	0.618	N/A
Pond 14*	-	N/A	0.117	N/A	-	N/A	-	N/A	0.117	N/A	-	N/A
Streams												
Stream 1	0.050	722	0.050	722	0.050	722	0.050	722	0.050	722	0.050	722
Stream 2*#	0.058	426	0.058	426	0.058	426	0.058	426	0.058	426	0.058	426
Stream 3	0.008	61	0.008	61	0.008	61	0.008	61	0.008	61	0.008	61
Stream 4*	-	-	-	-	-	-	-	-	-	-	-	-
Stream 5#	-	-	-	-	-	-	-	-	-	-	-	-
Stream 6	-	-	-	-	-	-	-	-	-	-	-	-

Loop 9, Segment A
Summary of Waters of the U.S. - Alternative 4

Feature Name	Alternative 4		Alternative 4 Mod A		Alternative 4 Mod B		Alternative 4 Mod C		Alternative 4 Mod A & C		Alternative 4 Mod B & C	
Stream 7	-	-	-	-	-	-	-	-	-	-	-	-
Stream 8*	-	-	-	-	-	-	-	-	-	-	-	-
Stream 9*	-	-	-	-	-	-	-	-	-	-	-	-
Stream 10	-	-	-	-	-	-	-	-	-	-	-	-
Stream 11*	-	-	-	-	-	-	-	-	-	-	-	-
Stream 12*#	0.352	2626	0.352	2626	0.352	2626	0.352	2626	0.352	2626	0.352	2626
Stream 13*	0.059	425	0.059	425	0.059	425	0.059	425	0.059	425	0.059	425
Stream 14*	0.021	154	0.021	154	0.021	154	0.021	154	0.021	154	0.021	154
Stream 15	0.551	1235	0.551	1235	0.551	1235	0.644	1492	0.644	1492	0.644	1492
Stream 16	0.068	521	0.068	521	0.068	521	0.033	252	0.033	252	0.033	252
Stream 17	0.245	337	0.245	337	0.245	337	0.753	1028	0.753	1028	0.753	1028
Stream 18	0.093	701	0.093	701	0.093	701	0.061	468	0.061	468	0.061	468
Stream 19*	0.024	176	0.024	176	0.024	176	-	-	-	-	-	-
Stream 20*	0.061	446	0.061	446	0.061	446	0.061	446	0.061	446	0.061	446
Stream 21#	0.086	628	0.078	566	0.078	566	0.086	628	0.078	566	0.078	566
Stream 22	0.020	150	0.012	89	0.012	89	0.020	150	0.012	89	0.012	89
Stream 23	0.087	635	0.085	618	0.085	618	0.087	635	0.085	618	0.085	618
Stream 24*	0.093	684	0.093	685	0.094	686	0.093	684	0.093	685	0.094	686
Stream 25*#	0.093	680	0.045	327	0.062	448	0.093	680	0.045	327	0.062	448
Stream 26	0.129	947	0.129	947	0.129	947	0.129	947	0.129	947	0.129	947
Stream 27	0.093	675	0.093	675	0.093	675	0.093	675	0.093	675	0.093	675
Stream 28	0.130	947	0.130	947	0.130	947	0.130	947	0.130	947	0.130	947
Stream 29*	0.082	593	0.082	593	0.082	593	0.082	593	0.082	593	0.082	593
Stream 30	-	-	-	-	-	-	-	-	-	-	-	-
Total Wetland	**2.09**	**N/A**	**1.97**	**N/A**	**2.71**	**N/A**	**2.09**	**N/A**	**1.97**	**N/A**	**2.71**	**N/A**
Total Open Water	**1.16**	**N/A**	**1.98**	**N/A**	**1.78**	**N/A**	**1.16**	**N/A**	**1.98**	**N/A**	**1.78**	**N/A**
Total Stream	**2.41**	**13768**	**2.34**	**13278**	**2.36**	**13399**	**2.92**	**14039**	**2.85**	**13549**	**2.87**	**13670**

* Portions of the feature were desktop delineated based on lack of field access at the time of the site visit
# Portions of the stream feature are partially culverted through the project area

Form
Documentation of Texas Parks and Wildlife Department Best Management Practices

Project Name: **Loop 9, Segment A**

CSJ(s): **2964-10-006**

County(ies): **Dallas and Ellis**

Date Form Completed: **07/01/2022**

Prepared by: **Ecosystem Planning and Restoration – John Williams**

Information on state-listed species, SGCN, water resources, and other natural resources can be found in the ECOS documents tab under the filenames specified in the e-mail sent to WHAB_TXDOT@tpwd.texas.gov.

1. Does the project impact any state parks, wildlife management areas, wildlife refuges, or other designated protected areas?

   ☒ No

   ☐ Yes

   <if yes, describe>

2. Does TxDOT need TPWD assistance in identifying and locating Section 404 mitigation opportunities for this project?

   ☒ No / N/A / Not yet determined

   ☐ Yes

   <if yes, describe>

3. Is there a species or resource challenge that TPWD can assist with additional guidance? If so, describe below:

   <describe assistance requested>

4. List all BMP that will be applied to this project per the document *Beneficial Management Practices: Avoiding, Minimizing, and Mitigating Impacts of Transportation Projects on State Natural Resources*.

   ***Note, these are BMP that TxDOT commits to implement at the time this form is completed. This list may change prior to or during construction based on changes to project impacts, design, etc.**

BMP to be Implemented:

All alternatives and modifications of the proposed project are within the range of and contain suitable habitat for eight state threatened/endangered species, one federally listed candidate species, as well as 29 Species of Greatest Conservation Need (SGCN) as verified by a qualified biologist in January, April, May, October, and December of 2019 and February of 2022. Field evaluation occurred in discontinuous months as further access became available.

The following BMPs will be used to minimize or avoid impacts to these species as listed in the Beneficial Management Practices as part of the 2021 TPWD Memorandum of Understanding.

- Aquatic Amphibian and Reptile BMP
- Bat BMP
- Bird BMP
- Dewatering BMP
- Fish BMP
- Freshwater Mussel BMP
- General Design and Construction BMP
- Insect Pollinator BMP
- Rare Plant BMP
- Stream Crossings BMP
- Terrestrial Amphibian and Reptile BMP
- Water Quality BMP
- Vegetation BMP
- Compliance with the Bald and Golden Eagle Protection Act
- Minimize impacts to wetland and riverine habitats

5. List all TxDOT species protection specifications that will be applied to this project (e.g., Amphibian and Reptile Exclusion Fence, Bat Houses, etc.)

Species protection specifications to be Implemented:

Mussels of Texas Database

The project area is located within three sub-watersheds (HUC-12):

- Headwater Waxahachie Creek (120301090301)
- Headwater Red Oak Creek (120301050301)
- Middle Red Oak Creek (120301050305)

The database did not identify any occurrences within the watersheds of the project area.

Data accessed on 08/26/2022.