TPWD provides additional information in the NDD about the locations and descriptions of rare habitats and areas managed to achieve high species diversity, and that provide quality habitat for common and rare wildlife species. Information obtained from the NDD in August 2022 includes EOIDs corresponding with mapped locations of rare habitats for Denton and Wise counties. EOIDs were provided for the rare habitat series of mollisol blackland prairie and Ozark limestone glade within the study area. The mollisol blackland prairie series has seven total mapped EOIDs in Denton and Wise counties. The mollisol blackland prairie EOID 11570 is mapped in the eastern portion of the study area and measures approximately 500 acres. The Ozark and limestone glade series EOID 11381 is mapped in the western portion of the study area and measures approximately 950 acres. Both are unranked and have not been assessed at the state level (i.e., SNR; TPWD, 2022a). Inclusion of EOIDs for this and other rare vegetation series indicates where such habitats have been found, but absence of an EOID for an area does not equate to absence of any particular rare vegetation series. Other sensitive vegetation series listed for Denton and Wise counties include Ashe juniper-oak, little bluestem-Indiangrass, post oak-blackjack oak, little bluestem sideoats grama - Texas wintergrass, little bluestem - narrowleaf pinweed Cardinal's-feather, and Texas oak series.

Several little bluestem-Indiangrass communities were identified in both Denton and Wise counties, the closest of which is located approximately 6 miles east of the study area. TPWD regards the little bluestem-Indiangrass series as imperiled at the state level (i.e., S2 ranking), meaning that these communities are at a high risk of extirpation due to a restrictive range, few populations or occurrences, steep population declines, severe threats, or other factors.

The Texas oak series has three EOIDs' in Wise County, the closest of which is approximately 10 miles north of the study area. TPWD recognizes this community as rare or uncommon at the state level (i.e., S3 ranking).

The Ashe juniper-oak series has one EOID in Wise County approximately 20 miles northwest of the study area. The post oak-blackjack oak series has three EOIDs in Wise County, the closest of which is approximately 18 miles northwest of the study area. Both vegetation communities are ranked as generally secure at the state level (i.e., S4 ranking).

The little bluestem-sideoats grama-Texas wintergrass series has two EOIDs in Wise County, the closest of which is approximately less than one mile south of the study area. The little bluestem-narrowleaf pinweed-Cardinal's feather series has three EOIDs in Wise County, the closest of which is approximately 17 miles west of the study area. Both vegetation communities are unranked and have not been assessed at the state level (i.e., SNR).

3.5.2 Fish and Wildlife

3.5.2.1 Terrestrial Wildlife

A wide variety of vertebrate species including amphibians, reptiles, mammals, and birds occur throughout the study area. These animals are addressed below in two groups: commonly occurring (i.e., "common") species; and species that are considered threatened, endangered, or rare by TPWD or USFWS. The information about common wildlife species presented in **Tables 3-4** through **3-12** is generally based on reference sources that provide species distribution information on a county-by-county basis. Species with specific geographic locations, assumed endemic to montane habitats, or limited ranges isolated from the study area were not included in **Tables 3-4** through **3-12**.

Habitat types for the wildlife discussed below are grouped into seven general categories: woodland; desert; shrubland; open; water; cultivated; and urban. Woodland habitat is home to species that live on or in the ground within forested areas or are arboreal in nature; woodland areas include riparian forest areas found in stream floodplains and can overlap water habitats to some extent. Desert habitats are in arid regions, and may contain a mix of grassland, shrubland, or open habitat. Shrubland habitat is dominated by woody vegetation but is generally low-growing and lacks taller trees. Open habitat includes grasslands or arid/semi-arid rocky areas. Cultivated areas consist of row crops, orchards, or grain fields; hay meadows would be considered grassland habitat. Water habitat is for all aquatic species, as well as those which live exclusively near water (e.g., frogs or wading birds). Urban habitats are favored by those animals which thrive in man-made environments and succeed in disturbed areas.

Amphibians

Amphibian species native to Texas include caudate species (i.e., salamanders and newts) and anuran species (i.e., frogs and toads). Salamanders and newts are restricted to aquatic or moist habitats, but some frogs/toads inhabit more arid environments. All species require water during reproduction, either during the act of mating or for rearing young. Amphibians are ectothermic (i.e., "cold blooded," lacking the ability to internally regulate body temperature) and are particularly vulnerable to pollution because they respire through their skin (Conant and Collins, 1998). Refer to **Table 3-4** for the amphibian species known to occur within Denton and Wise counties.

TABLE 3-4. AMPHIBIAN SPECIES WITHIN THE STUDY AREA

Common Name	Scientific Name	Habitat Preference(s)
Order: Anura (frogs and toads)		
American bullfrog	*Lithobates catesbeianus*	Water
American green treefrog	*Dryophytes cinereus*	Water
American toad	*Anaxyrus americanus*	Water – Woodland
Bronze frog	*Lithobates clamitans*	Water – Woodland
Cajun chorus frog	*Pseudacris fouquettei*	Open – Shrubland – Woodland – Water
Couch's spadefoot toad	*Scaphiopus couchii*	Open
Crawfish frog	*Lithobates areolatus*	Open – Water – Woodland
Cricket frog	*Acris crepitans*	Shrubland – Woodland – Water
Eastern narrowmouth toad	*Gastrophryne carolinensis*	Shrubland – Woodland – Water
Gray treefrog	*Dryophytes versicolor*	Woodland – Water
Great Plains narrow-mouthed toad	*Gastrophryne olivacea*	Open
Green toad	*Anaxyrus debilis*	Open
Hurter's spadefoot	*Scaphiopus hurterii*	Open – Shrubland – Woodland – Water
Plains leopard frog	*Rana blairi*	Open – Water
Red-spotted toad	*Anaxyrus punctatus*	Open
Southern leopard frog	*Lithobates sphenocephalus*	Water – Woodland – Shrubland
Spotted chorus frog	*Pseudacris clarkii*	Open – Shrubland – Water
Strecker's chorus frog	*Pseudacris streckeri*	Open – Shrubland – Woodland – Water
Texas toad	*Anaxyrus speciosus*	Open – Cultivated
Woodhouse's toad	*Anaxyrus woodhousii*	Open – Water
Order: Caudata (salamanders and newts)		
Eastern newt	*Notophthalmus viridescens*	Water – Woodland
Lesser siren	*Siren intermedia*	Water
Small-mouthed salamander	*Ambystoma texanum*	Water – Woodland
SOURCES: AmphibiaWeb, 2023; Conant and Collins, 1998; International Union for Conservation of Nature and Natural Resources (IUCN), 2023.		

Reptiles

Reptile species native to north central Texas include crocodilians, turtles, snakes, and lizards. Reptiles have thick, scaly skin to protect their bodies. Most lay soft, leathery eggs, although some bear live young. Reptiles, like amphibians, are ectothermic. **Table 3-5** presents the reptile species known to occur within Denton and Wise counties.

TABLE 3-5. REPTILE SPECIES WITHIN THE STUDY AREA

Common Name	Scientific Name	Habitat Preference(s)
	Order: Crocodylia (crocodilians)	
American alligator	Alligator mississippiensis	Water
	Order: Squamata (snakes and lizards)	
Broadhead skink	*Plestiodon laticeps*	Woodland – Water
Bullsnake	*Pituophis catenifer sayi*	Open – Desert
Central plains milksnake	*Lampropeltis gentilis*	Open – Shrubland – Woodland
Coachwhip	*Masticophis flagellum*	Open – Desert
Collared lizard	*Crotaphytus collaris*	Open
Common kingsnake	*Lampropeltis getula*	Open – Shrubland – Woodland Water
Common lesser earless lizard	*Holbrookia maculata*	Open – Cultivated
Copperhead	*Agkistrodon contortrix*	Woodland – Water
Cottonmouth	*Agkistrodon piscivorus*	Shrubland – Woodland – Water
Diamond-backed watersnake	*Nerodia rhombifer*	Water
Dusty hognose snake	*Heterodon gloydi*	Open
Eastern hognose snake	*Heterodon platirhinos*	Open – Shrubland – Woodland
Eastern yellowbelly racer	*Coluber constrictor flaviventris*	Open – Shrubland – Woodland
Five-lined skink	*Plestiodon fasciatus*	Woodland – Water
Flathead snake	*Tantilla gracilis*	Open – Shrubland – Woodland
Graham's crayfish snake	*Regina grahamii*	Water
Great Plains ratsnake	*Pantherophis emoryi*	Open
Green anole	*Anolis carolinensis*	Shrubland – Woodland – Water Urban
Ground skink	*Scincella lateralis*	Woodland
Ground snake	*Sonora semiannulata*	Open – Shrubland – Woodland
Lined snake	*Tropidoclonion lineatum*	Open – Urban
Mediterranean house gecko	*Hemidactylus turcicus*	Urban
North American racer	*Coluber constrictor*	Open – Shrubland – Woodland
Plain-bellied watersnake	*Nerodia erythrogaster*	Water
Plain hog-nosed snake	*Heterodon nasicus*	Open
Prairie lizard	*Sceloporus undulatus*	Open
Prairie racerunner	*Aspidoscelis sexlineata viridis*	Open
Prairie ring-necked snake	*Diadophis punctatus arnyi*	Open
Pygmy rattlesnake	*Sistrurus miliarius*	Woodland – Water
Red-bellied mudsnake	*Farancia abacura*	Water
Ring-necked snake	*Diadophis punctatus*	Open
Rough earthsnake	*Virginia striatula*	Open – Shrubland – Woodland
Rough green snake	*Opheodrys aestivus*	Open – Shrubland – Woodland Water
Slender glass lizard	*Ophisaurus attenuates*	Open – Woodland
Smooth earthsnake	*Virginia valeriae*	Open – Woodland
Southern prairie skink	*Plestiodon septentrionalis*	Open – Woodland – Urban
Southern watersnake	*Nerodia fasciata*	Water
Speckled kingsnake	*Lampropeltis holbrooki*	Open – Shrubland – Woodland Water
Texas blind snake	*Rena dulcis*	Desert – Open
Texas brown snake	*Storeria dekayi texana*	Water – Woodland – Urban

TABLE 3-5. REPTILE SPECIES WITHIN THE STUDY AREA

Common Name	Scientific Name	Habitat Preference(s)
Order: Squamata (snakes and lizards) continued		
Texas coral snake	*Micrurus tener*	Open – Shrubland – Woodland Water
Texas garter snake	*Thamnophis sirtalis annectens*	Open – Woodland – Urban Water
Texas horned lizard	*Phrynosoma cornutum*	Open
Timber rattlesnake	*Crotalus horridus*	Woodland – Water
Texas ratsnake	*Pantherophis obsoletus*	Open – Shrubland – Woodland Water
Texas spiny lizard	*Sceloporus olivaceus*	Open – Woodland – Urban
Texas spotted whiptail	*Aspidoscelis gularis*	Open – Shrubland
Variable groundsnake	*Sonora semiannulata semiannulata*	Desert – Open
Western diamondback rattlesnake	*Crotalus atrox*	Open
Western ribbonsnake	*Thamnophis proximus*	Water
Yellow-bellied kingsnake	*Lampropeltis calligaster*	Open – Shrubland – Woodland
Order: Testudines (turtles)		
Alligator snapping turtle	*Macrochelys temminckii*	Water
Chicken turtle	*Deirochelys reticularia*	Water
Common snapping turtle	*Chelydra serpentina*	Water
Eastern box turtle	*Terrapene carolina*	Shrubland – Woodland – Water
Eastern mud turtle	*Kinosternon subrubrum*	Shrubland – Woodland – Water
Eastern musk turtle	*Sternotherus odoratus*	Water
Mississippi map turtle	*Graptemys pseudogeographica*	Water
Ornate box turtle	*Terrapene ornata ornata*	Open
Razor-backed musk turtle	*Sternotherus carinatus*	Water
Red-eared slider	*Trachemys scripta*	Water
Smooth softshell turtle	*Apalone mutica*	Water
Spiny softshell turtle	*Apalone spinifera*	Water
Yellow mud turtle	*Kinosternon flavescens*	Water
SOURCES: Conant and Collins, 1998; IUCN, 2023; NatureServe Explorer, 2023.		

Birds

Birds differ from other animal groups in that feathers cover part or all of their bodies, and they lay hard, calcium-rich eggs. The four tables below present bird species, which could occur in the study area at various times throughout the year. They are divided into groups on residency: permanent residents (**Table 3-6**); breeding (i.e., summer) residents (**Table 3-7**); winter residents (**Table 3-8**); and those which migrate through the area between their breeding and winter grounds (**Table 3-9**).

TABLE 3-6. BIRD SPECIES THAT MAY PERMANENTLY RESIDE WITHIN THE STUDY AREA

Common Name	Scientific Name	Order	Habitat Preference(s)
American coot	*Fulica americana*	Gruiformes	Water
American crow	*Corvus brachyrhynchos*	Passeriformes	Woodland – Urban
American kestrel	*Falco sparverius*	Falconiformes	Open
American robin	*Turdus migratorius*	Passeriformes	Open – Woodland
Barn owl	*Tyto alba*	Strigiformes	Woodland – Urban
Barred owl	*Strix varia*	Strigiformes	Woodland
Belted kingfisher	*Megaceryle alcyon*	Coraciiformes	Water

TABLE 3-6. BIRD SPECIES THAT MAY PERMANENTLY RESIDE WITHIN THE STUDY AREA

Common Name	Scientific Name	Order	Habitat Preference(s)
Bewick's wren	*Thryomanes bewickii*	Passeriformes	Woodland
Black-bellied whistling-duck	*Dendrocygna autumnalis*	Anseriformes	Water – Woodland
Black rail	*Laterallus jamaicensis*	Rallidae	Water
Black vulture	*Coragyps atratus*	Cathartiformes	Open
Blue jay	*Cyanocitta cristata*	Passeriformes	Woodland
Blue-winged teal	*Anas discors*	Anseriformes	Water
Brown-headed cowbird	*Molothrus ater*	Passeriformes	Woodland – Open
Brown thrasher	*Toxostoma rufum*	Passeriformes	Shrubland
Burrowing owl	*Athene cunicularia*	Strigiformes	Open
Carolina chickadee	*Poecile carolinensis*	Passeriformes	Open – Woodland – Urban
Common grackle	*Quiscalus quiscula*	Passeriformes	Open – Urban
Cooper's hawk	*Accipiter cooperii*	Falconiformes	Woodland
Crested caracara	*Caracara plancus*	Falconiformes	Desert – Open – Shrubland
Downy woodpecker	*Dryobates pubescens*	Piciformes	Woodland
Eastern bluebird	*Sialia sialis*	Passeriformes	Woodland
Eastern meadowlark	*Sturnella magna*	Passeriformes	Open
Eastern phoebe	*Sayornis phoebe*	Passeriformes	Shrubland – Woodland – Urban
Eastern screech-owl	*Megascops asio*	Strigiformes	Woodland
Eurasian-collared dove	*Streptopelia decaocto*	Columbiformes	Urban
European starling	*Sturnus vulgaris*	Passeriformes	Woodland – Urban
Field sparrow	*Spizella pusilla*	Passeriformes	Open
Grasshopper sparrow	*Ammodramus savannarum*	Passeriformes	Open
Great blue heron	*Ardea herodias*	Pelecaniformes	Water
Greater roadrunner	*Geococcyx californianus*	Cuculiformes	Woodland – Open
Great horned owl	*Bubo virginianus*	Strigiformes	Woodland – Open – Urban
Great-tailed grackle	*Quiscalus mexicanus*	Passeriformes	Open – Urban
Hairy woodpecker	*Dryobates villosus*	Piciformes	Woodland
Horned lark	*Eremophila alpestris*	Passeriformes	Open
House finch	*Haemorhous mexicanus*	Passeriformes	Woodland – Open – Urban
House sparrow	*Passer domesticus*	Passeriformes	Urban
Inca dove	*Columbina inca*	Columbiformes	Urban
Killdeer	*Charadrius vociferus*	Charadriiformes	Open
Ladder-backed woodpecker	*Picoides scalaris*	Piciformes	Shrubland
Lark sparrow	*Chondestes grammacus*	Passeriformes	Open
Loggerhead shrike	*Lanius ludovicianus*	Passeriformes	Open
Mourning dove	*Zenaida macroura*	Columbiformes	Woodland – Open – Urban
Northern bobwhite	*Colinus virginianus*	Galliformes	Open
Northern cardinal	*Cardinalis cardinalis*	Passeriformes	Woodland
Northern flicker	*Colaptes auratus*	Piciformes	Woodland
Northern mockingbird	*Mimus polyglottos*	Passeriformes	Woodland – Open – Urban
Pied-billed grebe	*Podilymbus podiceps*	Podicipediformes	Water
Pileated woodpecker	*Dryocopus pileatus*	Piciformes	Woodland
Red-bellied woodpecker	*Melanerpes carolinus*	Piciformes	Woodland
Red-headed woodpecker	*Melanerpes erythrocephalus*	Piciformes	Woodland
Red-shouldered hawk	*Buteo lineatus*	Accipitriformes	Woodland
Red-tailed hawk	*Buteo jamaicensis*	Falconiformes	Woodland – Open

TABLE 3-6. BIRD SPECIES THAT MAY PERMANENTLY RESIDE WITHIN THE STUDY AREA

Common Name	Scientific Name	Order	Habitat Preference(s)
Red-winged blackbird	*Agelaius phoeniceus*	Passeriformes	Open
Rock dove	*Columba livia*	Columbiformes	Open – Urban
Tufted titmouse	*Baeolophus bicolor*	Passeriformes	Woodland – Urban
Turkey vulture	*Cathartes aura*	Falconiformes	Woodland – Open – Urban
Wild turkey	*Meleagris gallopavo*	Galliformes	Open – Woodland
Wood duck	*Aix sponsa*	Anseriformes	Water – Woodland
SOURCES: Cornell Lab of Ornithology (Cornell), 2023; eBird, 2023; NatureServe Explorer, 2023; Sibley, 2003. NOTE: Any species determined to potentially reside within the study area permanently may also breed within the study area.			

TABLE 3-7. BIRD SPECIES THAT MAY BREED WITHIN THE STUDY AREA

Common Name	Scientific Name	Order	Habitat Preference(s)
Acadian flycatcher	*Empidonax virescens*	Passeriformes	Woodland
Anhinga	*Anhinga anhinga*	Suliformes	Water
Barn swallow	*Hirundo rustica*	Passeriformes	Open – Urban
Bell's vireo	*Vireo bellii*	Passeriformes	Shrubland
Black-and-white warbler	*Mniotilta varia*	Passeriformes	Woodland
Black-capped vireo	*Vireo atricapilla*	Passeriformes	Shrubland
Black-crowned night-heron	*Nycticorax nycticorax*	Pelecaniformes	Water
Black-chinned hummingbird	*Archilochus alexandri*	Caprimulgiformes	Woodland
Blue-gray gnatcatcher	*Polioptila caerulea*	Passeriformes	Woodland
Blue grosbeak	*Passerina caerulea*	Passeriformes	Woodland
Cattle egret	*Bubulcus ibis*	Pelecaniformes	Open – Water
Cave swallow	*Petrochelidon fulva*	Passeriformes	Open
Chimney swift	*Chaetura pelagica*	Caprimulgiformes	Open – Urban
Chipping sparrow	*Spizella passerine*	Passeriformes	Woodlands – Open
Chuck-will's-widow	*Antrostomus carolinensis*	Caprimulgiformes	Woodland
Cliff swallow	*Petrochelidon pyrrhonota*	Passeriformes	Open – Water
Common gallinule	*Gallinula galeata*	Gruiformes	Water
Common nighthawk	*Chordeiles minor*	Caprimulgiformes	Open
Common poorwill	*Phalaenoptilus nuttallii*	Caprimulgiformes	Shrubland
Common yellowthroat	*Geothlypis trichas*	Passeriformes	Shrubland
Dickcissel	*Spiza americana*	Passeriformes	Open
Eastern kingbird	*Tyrannus tyrannus*	Passeriformes	Open – Woodland
Eastern wood-pewee	*Contopus virens*	Passeriformes	Woodland
Gray catbird	*Dumetella carolinensis*	Passeriformes	Woodland
Great crested flycatcher	*Myiarchus crinitus*	Passeriformes	Woodland
Great egret	*Ardea alba*	Pelecaniformes	Water
Green heron	*Butorides virescens*	Pelecaniformes	Water
Hooded warbler	*Setophaga citrina*	Passeriformes	Woodland
Indigo bunting	*Passerina cyanea*	Passeriformes	Woodland
Kentucky warbler	*Geothlypis Formosa*	Passeriformes	Woodland
Least bittern	*Ixobrychus exilis*	Pelecaniformes	Water
Little blue heron	*Egretta caerulea*	Pelecaniformes	Water
Louisiana waterthrush	*Parkesia motacilla*	Passeriformes	Water
Neotropic cormorant	*Nannopterum brasilianus*	Suliformes	Water
Northern parula	*Setophaga americana*	Passeriformes	Woodland
Northern rough-winged swallow	*Stelgidopteryx serripennis*	Passeriformes	Open – Water
Orchard oriole	*Icterus spurius*	Passeriformes	Woodland
Painted bunting	*Passerina ciris*	Passeriformes	Shrubland

TABLE 3-7. BIRD SPECIES THAT MAY BREED WITHIN THE STUDY AREA

Common Name	Scientific Name	Order	Habitat Preference(s)
Prairie warbler	*Setophaga discolor*	Passeriformes	Open – Shrubland – Woodland
Prothonotary warbler	*Protonotaria citrea*	Passeriformes	Woodland
Purple gallinule	*Porphyrio martinica*	Gruiformes	Water
Purple martin	*Progne subis*	Passeriformes	Water
Red-eyed vireo	*Vireo olivaceus*	Passeriformes	Woodland
Ruby-throated hummingbird	*Archilochus colubris*	Caprimulgiformes	Woodland – Urban
Scissor-tailed flycatcher	*Tyrannus forficatus*	Passeriformes	Open
Snowy egret	*Egretta thula*	Pelecaniformes	Water
Summer tanager	*Piranga rubra*	Passeriformes	Woodland
Swainson's hawk	*Buteo swainsoni*	Accipitriformes	Open
Swainson's warbler	*Limnothlypis swainsoni*	Passeriformes	Woodland
Warbling vireo	*Vireo gilvus*	Passeriformes	Woodland – Open
Western kingbird	*Tyrannus verticalis*	Passeriformes	Open
White-eyed vireo	*Vireo griseus*	Passeriformes	Shrubland
White-tailed kite	*Elanus leucurus*	Accipitriformes	Open – Woodland
White-winged dove	*Zenaida asiatica*	Columbiformes	Woodland – Open
Wood thrush	*Hylocichla mustelina*	Passeriformes	Woodland
Yellow-billed cuckoo	*Coccyzus americanus*	Cuculiformes	Woodland
Yellow-breasted chat	*Icteria virens*	Passeriformes	Shrubland
Yellow-crowned night-heron	*Nyctanassa violacea*	Pelecaniformes	Water
Yellow-throated vireo	*Vireo flavifrons*	Passeriformes	Woodland
Yellow-throated warbler	*Setophaga dominica*	Passeriformes	Woodland

SOURCES: Cornell, 2023; eBird, 2023; NatureServe Explorer, 2023; Sibley, 2003.
NOTES:

- Listed species include those that do not permanently reside within the study area but may breed in the study area.
- Look for the list of species that may permanently reside within the study area in **Table 3-10**, as those species may also breed within the study area.

TABLE 3-8. BIRD SPECIES THAT MAY WINTER WITHIN THE STUDY AREA

Common Name	Scientific Name	Order	Habitat Preference(s)
American goldfinch	*Spinus tristis*	Passeriformes	Woodland – Open
American pipit	*Anthus rubescens*	Passeriformes	Open
American wigeon	*Mareca americana*	Anseriformes	Water
American woodcock	*Scolopax minor*	Charadriiformes	Woodland
Bald eagle	*Haliaetus leucocephalus*	Accipitriformes	Woodland
Bonaparte's gull	*Chroicocephalus philadelphia*	Charadriiformes	Open – Water
Brewer's blackbird	*Euphagus cyanocephalus*	Passeriformes	Urban – Cultivated – Open
Brown creeper	*Certhia americana*	Passeriformes	Woodland
Bufflehead	*Bucephala albeola*	Anseriformes	Water
Canada goose	*Branta canadensis*	Anseriformes	Open – Water
Canvasback	*Aythya valisineria*	Anseriformes	Water
Cedar waxwing	*Bombycilla cedrorum*	Passeriformes	Woodland – Open
Chestnut-collared longspur	*Calcarius ornatus*	Passeriformes	Open
Common goldeneye	*Bucephala clangula*	Anseriformes	Water
Dark-eyed junco	*Junco hyemalis*	Passeriformes	Woodland
Double-crested cormorant	*Nannopterum auritum*	Suliformes	Water
Eared grebe	*Podiceps nigricollis*	Podicipediformes	Water
Eastern towhee	*Pipilo erythrophthalmus*	Passeriformes	Open – Shrubland – Woodland
Forster's tern	*Sterna forsteri*	Charadriiformes	Water
Fox sparrow	*Passerella iliaca*	Passeriformes	Woodland – Open

TABLE 3-8. BIRD SPECIES THAT MAY WINTER WITHIN THE STUDY AREA

Common Name	Scientific Name	Order	Habitat Preference(s)
Gadwall	*Mareca strepera*	Anseriformes	Water
Golden-crowned kinglet	*Regulus satrapa*	Passeriformes	Woodland
Greater scaup	*Aythya marila*	Anseriformes	Water
Greater yellowlegs	*Tringa melanoleuca*	Charadriiformes	Water
Green-winged teal	*Anas crecca*	Anseriformes	Water
Harris's sparrow	*Zonotrichia querula*	Passeriformes	Woodland
Hermit thrush	*Catharus guttatus*	Passeriformes	Woodland – Open
Herring gull	*Larus argentatus*	Charadriiformes	Open – Water
Hooded merganser	*Lophodytes cucullatus*	Anseriformes	Water – Woodland
Horned grebe	*Podiceps auritus*	Podicipediformes	Water
House wren	*Troglodytes aedon*	Passeriformes	Woodland
Lapland longspur	*Calcarius lapponicus*	Passeriformes	Open
Least sandpiper	*Calidris minutilla*	Charadriiformes	Water
Le Conte's sparrow	*Ammospiza lecontei*	Passeriformes	Open
Lesser scaup	*Aythya affinis*	Anseriformes	Water
Lincoln's sparrow	*Melospiza lincolnii*	Passeriformes	Woodland – Open
Long-eared owl	*Asio otus*	Strigiformes	Woodland
Mallard	*Anas platyrhynchos*	Anseriformes	Water – Open
Northern harrier	*Circus cyaneus*	Falconiformes	Open
Northern pintail	*Anas acuta*	Anseriformes	Water
Northern shoveler	*Spatula clypeata*	Anseriformes	Water
Orange-crowned warbler	*Leiothlypis celata*	Passeriformes	Woodland – Water
Pine siskin	*Spinus pinus*	Passeriformes	Woodland – Open
Prairie falcon	*Falco mexicanus*	Falconiformes	Open
Purple finch	*Haemorhous purpureus*	Passeriformes	Woodland
Red-breasted nuthatch	*Sitta canadensis*	Passeriformes	Woodland
Redhead	*Aythya americana*	Anseriformes	Water
Ring-billed gull	*Larus delawarensis*	Charadriiformes	Open – Water
Ring-necked duck	*Aythya collaris*	Anseriformes	Water
Ross's goose	*Anser rossii*	Anseriformes	Open – Water
Rough-legged hawk	*Buteo lagopus*	Falconiformes	Open
Ruby-crowned kinglet	*Corthylio calendula*	Passeriformes	Woodland
Ruddy duck	*Oxyura jamaicensis*	Anseriformes	Water
Rusty blackbird	*Euphagus carolinus*	Passeriformes	Woodland
Savannah sparrow	*Passerculus sandwichensis*	Passeriformes	Open
Sedge wren	*Cistothorus platensis*	Passeriformes	Open
Sharp-shinned hawk	*Accipiter striatus*	Falconiformes	Woodland
Short-eared owl	*Asio flammeus*	Strigiformes	Open
Smith's longspur	*Calcarius pictus*	Passeriformes	Open
Song sparrow	*Melospiza melodia*	Passeriformes	Woodland
Spotted towhee	*Pipilo maculatus*	Passeriformes	Shrubland
Sprague's pipit	*Anthus spragueii*	Passeriformes	Open
Swamp sparrow	*Melospiza georgiana*	Passeriformes	Open – Water
Vesper sparrow	*Pooecetes gramineus*	Passeriformes	Open
Western meadowlark	*Sturnella neglecta*	Passeriformes	Open
White-crowned sparrow	*Zonotrichia leucophrys*	Passeriformes	Woodland – Open
White-throated sparrow	*Zonotrichia albicollis*	Passeriformes	Woodland
Wilson's snipe	*Gallinago delicata*	Charadriiformes	Water
Yellow-bellied sapsucker	*Sphyrapicus varius*	Piciformes	Woodland
Yellow-rumped warbler	*Setophaga coronata*	Passeriformes	Woodland
SOURCES: Cornell, 2023; eBird, 2023; NatureServe Explorer, 2023; Sibley, 2003.			

TABLE 3-9. BIRD SPECIES THAT MAY MIGRATE THROUGH THE STUDY AREA

Common Name	Scientific Name	Order	Habitat Preference(s)
American bittern	*Botaurus lentiginosus*	Pelecaniformes	Water
Alder flycatcher	*Empidonax alnorum*	Passeriformes	Shrubland
American avocet	*Recurvirostra americana*	Charadriiformes	Water
American golden-plover	*Pluvialis dominica*	Charadriiformes	Open – Water
American redstart	*Setophaga ruticilla*	Passeriformes	Woodland
American white pelican	*Pelecanus erythrorhynchos*	Pelecaniformes	Water
Baird's sandpiper	*Calidris bairdii*	Charadriiformes	Water
Baltimore oriole	*Icterus galbula*	Passeriformes	Woodland
Bank swallow	*Riparia riparia*	Passeriformes	Open – Water
Black-bellied plover	*Pluvialis squatarola*	Charadriiformes	Water
Black-billed cuckoo	*Coccyzus erythropthalmus*	Cuculiformes	Woodland
Blackburnian warbler	*Setophaga fusca*	Passeriformes	Woodland
Black-headed grosbeak	*Pheucticus melanocephalus*	Passeriformes	Woodland – Shrubland
Black-necked stilt	*Himantopus mexicanus*	Charadriiformes	Water
Black tern	*Chlidonias niger*	Charadriiformes	Water
Black-throated green warbler	*Setophaga virens*	Passeriformes	Woodland
Blue-headed vireo	*Vireo solitarius*	Passeriformes	Woodland
Blue-winged warbler	*Vermivora cyanoptera*	Passeriformes	Shrubland – Woodland
Bobolink	*Dolichonyx oryzivorus*	Passeriformes	Open
Broad-winged hawk	*Buteo platypterus*	Accipitriformes	Woodland
Buff-breasted sandpiper	*Calidris subruficollis*	Charadriiformes	Open
Canada warbler	*Cardellina canadensis*	Passeriformes	Woodland
Caspian tern	*Hydroprogne caspia*	Charadriiformes	Water
Chestnut-sided warbler	*Setophaga pensylvanica*	Passeriformes	Woodland
Cinnamon teal	*Spatula cyanoptera*	Anseriformes	Water
Clay-colored sparrow	*Spizella pallida*	Passeriformes	Shrubland
Common loon	*Gavia immer*	Gaviiformes	Water
Common tern	*Sterna hirundo*	Charadriiformes	Water
Dunlin	*Calidris alpine*	Charadriiformes	Water
Franklin's gull	*Leucophaeus pipixcan*	Charadriiformes	Water
Fulvous whistling-duck	*Dendrocygna bicolor*	Anseriformes	Water
Gray-cheeked thrush	*Catharus minimus*	Passeriformes	Woodland
Greater white-fronted goose	*Anser albifrons*	Anseriformes	Open – Water
Hudsonian godwit	*Limosa haemastica*	Charadriiformes	Water
Least flycatcher	*Empidonax minimus*	Passeriformes	Woodland
Lesser yellowlegs	*Tringa flavipes*	Charadriiformes	Water
Long-billed dowitcher	*Limnodromus scolopaceus*	Charadriiformes	Water
Magnolia warbler	*Setophaga magnolia*	Passeriformes	Woodland
Marbled godwit	*Limosa fedoa*	Charadriiformes	Water
Marsh wren	*Cistothorus palustris*	Passeriformes	Water
Merlin	*Falco columbarius*	Falconiformes	Open
Mississippi kite	*Ictinia mississippiensis*	Accipitriformes	Open – Woodland
Mourning warbler	*Geothlypis philadelphia*	Passeriformes	Woodland
Nashville warbler	*Leiothlypis ruficapilla*	Passeriformes	Woodland
Nelson's sparrow	*Ammospiza nelsoni*	Passeriformes	Open – Water
Northern waterthrush	*Parkesia noveboracensis*	Passeriformes	Woodland – Water
Olive-sided flycatcher	*Contopus cooperi*	Passeriformes	Woodland
Osprey	*Pandion haliaetus*	Falconiformes	Water
Ovenbird	*Seiurus aurocapilla*	Passeriformes	Woodland
Pectoral sandpiper	*Calidris melanotos*	Charadriiformes	Water
Peregrine falcon	*Falco peregrinus*	Falconiformes	Water
Piping plover	*Charadrius melodus*	Charadriiformes	Water
Red-breasted merganser	*Mergus serrator*	Anseriformes	Water
Red knot	*Calidris canutus*	Charadriiformes	Water
Roseate spoonbill	*Platalea ajaja*	Pelecaniformes	Water – Woodland

TABLE 3-9. BIRD SPECIES THAT MAY MIGRATE THROUGH THE STUDY AREA

Common Name	Scientific Name	Order	Habitat Preference(s)
Rose-breasted grosbeak	*Pheucticus ludovicianus*	Passeriformes	Woodland
Ruddy turnstone	*Arenaria interpres*	Charadriiformes	Water
Sanderling	*Calidris alba*	Charadriiformes	Water
Sandhill crane	*Antigone canadensis*	Gruiformes	Open – Water
Scarlet tanager	*Piranga olivacea*	Passeriformes	Woodland
Semipalmated plover	*Charadrius semipalmatus*	Charadriiformes	Open
Semipalmated sandpiper	*Calidris pusilla*	Charadriiformes	Water
Short-billed dowitcher	*Limnodromus griseus*	Charadriiformes	Water
Snow goose	*Anser caerulescens*	Anseriformes	Water
Snowy plover	*Charadrius nivosus*	Charadriiformes	Water
Solitary sandpiper	*Tringa solitaria*	Charadriiformes	Water
Sora	*Porzana carolina*	Gruiformes	Water
Spotted sandpiper	*Actitis macularius*	Charadriiformes	Water
Stilt sandpiper	*Calidris himantopus*	Charadriiformes	Water
Swainson's thrush	*Catharus ustulatus*	Passeriformes	Woodland
Tennessee warbler	*Leiothlypis peregrina*	Passeriformes	Woodland
Tricolored heron	*Egretta tricolor*	Pelecaniformes	Water
Tree swallow	*Tachycineta bicolor*	Passeriformes	Woodland
Upland sandpiper	*Bartramia longicauda*	Charadriiformes	Open
Veery	*Catharus fuscescens*	Passeriformes	Water – Woodland
Virginia rail	*Rallus limicola*	Gruiformes	Water
Western sandpiper	*Calidris mauri*	Charadriiformes	Water
Whip-poor-will	*Antrostomus vociferus*	Caprimulgiformes	Woodland
White-faced ibis	*Plegadis chihi*	Pelecaniformes	Water
White-rumped sandpiper	*Calidris fuscicollis*	Charadriiformes	Water
Whooping crane	*Grus americana*	Gruiformes	Open – Water
Willet	*Tringa semipalmata*	Charadriiformes	Water
Willow flycatcher	*Empidonax traillii*	Passeriformes	Open
Wilson's phalarope	*Phalaropus tricolor*	Charadriiformes	Water
Wilson's warbler	*Cardellina pusilla*	Passeriformes	Woodland
Wood stork	*Mycteria americana*	Ciconiiformes	Water – Woodland
Yellow-bellied flycatcher	*Empidonax flaviventris*	Passeriformes	Woodland
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	Passeriformes	Open
Yellow rail	*Coturnicops noveboracensis*	Gruiformes	Water
Yellow warbler	*Setophaga petechia*	Passeriformes	Woodland
SOURCES: Cornell, 2023; eBird, 2023; NatureServe Explorer, 2023; Sibley, 2003.			

Mammals

According to Schmidly and Bradley (2016), 202 species of mammals reside in Texas. Mammals are distinct from other groups in that their bodies are covered with hair, and they feed milk to their young. Nearly all mammals in Texas bear live young using a placenta (i.e., Eutherian or "placental" mammals). A notable exception is the Virginia opossum (*Didelphis virginiana*), which is a pouch-rearing mammal (i.e., marsupial). **Table 3-10** presents the mammals that are expected to occur within suitable habitat in the study area.

TABLE 3-10. MAMMAL SPECIES WITHIN THE STUDY AREA

Common Name	Scientific Name	Habitat Preference(s)
Order: Artiodactyla (even-toed ungulates)		
Feral pig	*Sus scrofa*	Woodland – Open
White-tailed deer	*Odocoileus virginianus*	Woodland
Order: Carnivora (carnivores)		
American badger	*Taxidea taxus*	Open
American mink	*Vison vison*	Water
Bobcat	*Lynx rufus*	Woodland
Common gray fox	*Urocyon cinereoargenteus*	Woodland
Common raccoon	*Procyon lotor*	Woodland – Water
Coyote	*Canis latrans*	Open
Eastern spotted skunk	*Spilogale putorius*	Open – Woodland
Hog-nosed skunk	*Conepatus leuconotus*	Open – Shrubland – Woodland
Long-tailed weasel	*Mustela frenata*	Open
Mountain lion	*Felis concolor*	Shrubland – Desert
Northern river otter	*Lontra canadensis*	Water
Red fox	*Vulpes Vulpes*	Woodland – Cultivated – Open
Ringtail	*Bassariscus astutus*	Woodland – Open
Striped skunk	*Mephitis mephitis*	Woodland – Open
Order: Chiroptera (bats)		
American perimyotis	*Perimyotis subflavus*	Woodland – Urban
Big brown bat	*Eptesicus fuscus*	Woodland – Urban
Big free-tailed bat	*Nyctinomops macrotis*	Woodland – Urban
Brazilian free-tailed bat	*Tadarida brasiliensis*	Woodland – Urban
Eastern red bat	*Lasiurus borealis*	Woodland
Evening bat	*Nycticeius humeralis*	Woodland – Urban
Hoary bat	*Lasiurus cinereus*	Woodland
Seminole bat	*Lasiurus seminolus*	Woodland
Silver-haired bat	*Lasionycteris noctivagans*	Woodland – Urban
Order: Cingulata (armadillos and allies)		
Nine-banded armadillo	*Dasypus novemcinctus*	Open – Woodland – Urban – Shrubland – Water
Order: Lagomorpha (hares, rabbits, and picas)		
Black-tailed jackrabbit	*Lepus californicus*	Open
Eastern cottontail	*Sylvilagus floridanus*	Open
Swamp rabbit	*Sylvilagus aquaticus*	Shrubland – Water
Order: Didelphimorphia (opossums and allies)		
Virginia opossum	*Didelphis virginiana*	Woodland – Open – Urban
Order: Rodentia (rodents)		
American beaver	*Castor canadensis*	Woodland – Water
Baird's pocket gopher	*Geomys breviceps*	Woodland
Black rat	*Rattus rattus*	Urban
Black-tailed prairie dog	*Cynomys ludovicianus*	Open – Urban

TABLE 3-10. MAMMAL SPECIES WITHIN THE STUDY AREA

Common Name	Scientific Name	Habitat Preference(s)
Common muskrat	*Ondatra zibethicus*	Water
Cotton deermouse	*Peromyscus gossypinus*	Woodland
Eastern fox squirrel	*Sciurus niger*	Woodland
Eastern gray squirrel	*Sciurus carolinensis*	Woodland
Eastern woodrat	*Neotoma floridana*	Desert – Open – Woodland
Fulvous harvest mouse	*Reithrodontomys fulvescens*	Desert – Open – Shrubland
Hispid cotton rat	*Sigmodon hispidus*	Open – Urban
Hispid pocket mouse	*Chaetodipus hispidus*	Open
House mouse	*Mus musculus*	Open – Urban
Lacey's white-ankled deermouse	*Peromyscus laceianus*	Woodland – Urban
Merriam's pocket mouse	*Perognathus merriami*	Open
North American deermouse	*Peromyscus maniculatus*	Woodland – Open
North American porcupine	*Erethizon dorsatum*	Open – Shrubland – Woodland
Northern pygmy mouse	*Baiomys taylori*	Open – Woodland
Norway rat	*Rattus norvegicus*	Open – Urban
Nutria	*Myocastor coypus*	Water
Ord's kangaroo rat	*Dipodomys ordii*	Desert – Open
Plains harvest mouse	*Reithrodontomys montanus*	Open
Plains pocket gopher	*Geomys bursarius*	Woodland – Open
Southern flying squirrel	*Glaucomys volans*	Woodland
Southern plains woodrat	*Neotoma micropus*	Shrubland – Desert
Texas deermouse	*Peromyscus attwateri*	Woodland – Shrubland
Texas marsh rice rat	*Oryzomys texensis*	Water
Thirteen-lined ground squirrel	*Ictidomys tridecemlineatus*	Open
White-footed mouse	*Peromyscus leucopus*	Woodland
Woodland vole	*Microtus pinetorum*	Woodland
Order: Soricomorpha (moles and shrews)		
Eastern mole	*Scalopus aquaticus*	Open
Least shrew	*Cryptotis parva*	Open
Southern short-tailed shrew	*Blarina carolinensis*	Woodland
SOURCES: Schmidly and Bradley, 2016; NatureServe Explorer, 2023.		

3.5.2.2 Fish and Aquatic Wildlife

All streams in the study area are likely to experience wide variations in flow during any given year. The smallest streams in the study area are shallow ephemeral streams with very limited floodplains that do not support substantial aquatic life, such as fish, crayfish, or mollusks. These streams flow only during and shortly after rainfall events and receive no groundwater inflow. Flow in larger streams may be intermittent, receiving seasonal contribution from groundwater but leaving segments of the streambed dry for much of the year. Ponds do not experience the extreme variations in flow relative to streams, and ponds are nearly always exposed to full sunlight. As a result, the organisms which inhabit ponds are adapted to the different environments found in both streams and ponds. Ponds and smaller reservoirs are more likely to experience higher water temperatures and lower dissolved oxygen compared to streams and larger reservoirs. Algae and phytoplankton, which thrive on sunlight, fare better in slower moving systems such as ponds. Larger species, including many types of fish, fare better in streams, rivers, and large lakes.

Freshwater Fish

Table 3-11 presents some of the common fish species expected within the study area, the majority of which would be found in Grapevine Lake or the numerous streams.

TABLE 3-11. FISH SPECIES WITHIN THE STUDY AREA

Common Name	Scientific Name	Common Name	Scientific Name
Amazon molly	*Poecilia formosa*	Longnose gar	*Lepisosteus osseus*
Atlantic threadfin	*Polydactylus octonemus*	Mexican tetra	*Astyanax argentatus*
Bigscale logperch	*Percina macrolepida*	Mimic shiner	*Notropis volucellus*
Black bullhead	*Ameiurus melas*	Mississippi silvery minnow	*Hybognathus nuchalis*
Blackstripe topminnow	*Fundulus notatus*	Naked goby	*Gobiosoma bosc*
Blackspot shiner	*Notropis atrocaudalis*	None	*Etheostoma pulchellum*
Blackspotted topminnow	*Fundulus olivaceus*	Orangespotted sunfish	*Lepomis humilis*
Blacktail shiner	*Cyprinella venusta*	Pallid shiner	*Hybopsis amnis*
Bluegill sunfish	*Lepomis macrochirus*	Plains killifish	*Fundulus zebrinus*
Blue tilapia	*Oreochromis aureus*	Pugnose minnow	*Opsopoeodus emiliae*
Bluntnose darter	*Etheostoma chlorosoma*	Red-bellied piranha	*Pygocentrus nattereri*
Brook silverside	*Labidesthes sicculus*	Redfin shiner	*Lythrurus umbratilis*
Bullhead minnow	*Pimephales vigilax*	Red shiner	*Cyprinella lutrensis*
Central stoneroller	*Campostoma anomalum*	Ribbon shiner	*Lythrurus fumeus*
Channel catfish	*Ictalurus punctatus*	Rio Grande cichlid	*Herichthys cyanoguttatus*
Common carp	*Cyprinus carpio*	River carpsucker	*Carpiodes carpio*
Dusky darter	*Percina sciera*	Roundnose minnow	*Dionda episcopa*
Emerald shiner	*Notropis atherinoides*	Sailfin molly	*Poecilia latipinna*
Flathead catfish	*Pylodictis olivaris*	Sand shiner	*Notropis stramineus*
Flathead minnow	*Pimephales promelas*	Slough darter	*Etheostoma gracile*
Freckled madtom	*Noturus nocturnus*	Smallmouth buffalo	*Ictiobus bubalus*
Freshwater drum	*Aplodinotus grunniens*	Spotted bass	*Micropterus punctulatus*
Ghost shiner	*Notropis buchanani*	Spotted gar	*Lepisosteus oculatus*
Gizzard shad	*Dorosoma cepedianum*	Spotted sucker	*Minytrema melanops*
Golden shiner	*Notemigonus crysoleucas*	Tadpole madtom	*Noturus gyrinus*
Goldfish	*Carassius auratus*	Threadfin shad	*Dorosoma petenense*
Green sunfish	*Lepomis cyanellus*	Warmouth	*Chaenobryttus gulosus*
Gulf killfish	*Fundulus grandis*	Weed shiner	*Notropis texanus*
Inland silverside	*Menidia beryllina*	Western mosquitofish	*Gambusia affinis*
Largemouth bass	*Micropterus salmoides*	White bass	*Morone chrysops*
Logperch	*Percina caprodes*	White crappie	*Pomoxis annularis*
Longear sunfish	*Lepomis megalotis*	Yellow bullhead	*Ameiurus natalis*
SOURCES: Hendrickson and Cohen, 2022; IUCN, 2023; NatureServe Explorer, 2023; USFWS, 2023b; USGS, 2023b.			

Freshwater Mollusks

There are over 300 freshwater mussel species known to reside within North America, over 50 of which have been observed within Texas waters. Freshwater mussels are highly susceptible to habitat degradation and loss. Currently, fifteen native Texas mussel species are state listed as threatened. The USFWS has listed six of the TPWD listed species as candidate species, which await determination for potential federal listing as threatened or endangered. Within Texas, the Asian clam (*Corbicula fluminea*), purple-nacre corbicula (*Corbicula* sp.), and zebra mussel (*Dreissena polymorpha*) are prevalent and wide-spread exotic invasive species (Howells, 2014). **Table 3-12** provides a list of potential mussel species found within the study area.

TABLE 3-12. MOLLUSK SPECIES WITHIN THE STUDY AREA

Common Name	Scientific Name	Common Name	Scientific Name
Asian clam	*Corbicula fluminea*	Pistolgrip	*Tritogonia verrucosa*
Bankclimber	*Plectomerus dombeyanus*	Pondhorn	*Uniomerus tetralasmus*
Bleufer	*Potamilus purpuratus*	Pondmussel	*Sagittunio subrostrata*
Carolina marshclam	*Polymesoda caroliniana*	Rock pocketbook	*Arcidens confragosus*
Creeper	*Strophitus undulatus*	Round pearlshell	*Glebula rotundata*
Dark falsemussel	*Mytilopsis leucophaeata*	Sandbank pocketbook	*Lampsilis satura*
Deertoe	*Truncilla truncata*	Southern mapleleaf	*Quadrula apiculata*
Fawnsfoot	*Truncilla donaciformis*	Tapered pondhorn	*Uniomerus declivis*
Fingernailclams	*Eupera* spp., *Musculium* spp., *Pisidium* spp., *Sphaerium* spp.	Texas fawnsfoot	*Truncilla macrodon*
Flat floater	*Utterbackiana suborbiculata*	Texas heelsplitter	*Potamilus amphichaenus*
Fragile papershell	*Leptodea fragilis*	Texas Lilliput	*Toxolasma texasiense*
Giant floater	*Pyganodon grandis*	Texas pigtoe	*Fusconaia askewi*
Gulf mapleleaf	*Tritogonia nobilis*	Threehorn wartyback	*Obliquaria reflexa*
Lilliput	*Toxolasma parvum*	Threeridge	*Amblema plicata*
Louisiana fatmucket	*Lampsilis hydiana*	Trinity pigtoe	*Fusconaia chunii*
Louisiana pigtoe	*Pleurobema riddellii*	Wabash pigtoe	*Fusconaia flava*
Paper pondshell	*Utterbackia imbecillis*	Washboard	*Megalonaias nervosa*
Pimpleback	*Cyclonaias pustulosa*	Yellow sandshell	*Lampsilis teres*
Pink papershell	*Potamilus ohiensis*	Zebra mussel	*Dreissena polymorpha*
SOURCES: Charles et al., 2020; Howells, 2014; IUCN, 2023; NatureServe Explorer, 2023.			

3.5.2.3 Commercially or Recreationally Important Fish and Wildlife Species

Wildlife Resources

Wildlife within the study area provides human benefits resulting from both consumptive (i.e., involving removal of wildlife) and non-consumptive uses. Bird watching is a popular non-consumptive use. Local Audubon Society chapter members play a valuable role in assisting local fish and wildlife agencies with field updates of rare or endangered species

sightings (Audubon Texas, 2023). Diverse wildlife populations in the study area provide observing and photographing opportunities, although public access is limited.

According to the USFWS, more than one million people engage in recreational hunting within the state of Texas each year (USFWS, 2018). Hunting adds over two billion dollars to the state's economy each year through fees to hunt on public land, private leases, or for travel-related expenses. These numbers include hunters that are residents of Texas as well as those that travel to the state to hunt. Within the study area, established hunting seasons exist for the species listed in **Table 3-13**.

TABLE 3-13. GAME SPECIES WITHIN THE STUDY AREA

Common Name	**Scientific Name**
American alligator	Alligator mississippiensis
Dove	*Zenaida asiatica; Zenaida macroura*
Duck and coot	Numerous species
Light and dark geese	Numerous species
Quail	*Colinus virginianus*
Rails, gallinules, and moorhens	Numerous species
Sandhill crane	*Grus canadensis*
Squirrel	*Sciurus carolinensis; Sciurus niger*
Teal duck	*Anas discors; Anas crecca; Spatula cyanoptera*
Wild Turkey	*Meleagris gallopavo*
White-tailed deer	*Odocoileus virginianus*
Snipe and woodcock	*Gallinago delicata; Scolopax* spp.
SOURCE: TPWD, 2023d.	

Fisheries and Aquatic Resources

Recreational fishing opportunities in the study area are available around Grapevine Lake and the associated tributaries. These aquatic features provide the main perennial water bodies within the study area. Numerous small ponds are also found in the study area, but many are only temporarily or intermittently ponded. Some of these pond features may be permanent, particularly upland freshwater or stock ponds. No commercial harvesting of aquatic species is known to occur in the study area (TPWD, 2022b). Game fishing species expected to be found in the study area are shown in **Table 3-14**.

TABLE 3-14. GAME FISHING SPECIES WITHIN THE STUDY AREA

Common Name	Scientific Name	Habitat
Channel catfish	*Ictalurus punctatus*	Streams, rivers, lakes, eddies, ponds, and shallow waters.
Blue catfish	*Ictalurus furcatus*	large-stream and river fish, occurring in main channels, tributaries, and impoundments of major river systems.
Flathead catfish	*Pylodictis olivaris*	Deep pools of medium to large rivers or pools adjacent to main tributaries; low to moderate gradient rivers and reservoirs.
Largemouth bass	*Micropterus salmoides*	Moderately clear to turbid, quiet warm waters; streams, rivers, lakes, ponds; utilize vegetation/underwater structures.
Spotted bass	*Micropterus punctulatus*	Small to large fast-flowing streams and rivers with rock or rip rap substrate, and large deep reservoirs.
White bass	*Morone chrysops*	Large streams, rivers, and lakes; adults found in open water.
White crappie	*Pomoxis annularis*	Commonly found in sand and mud substrate pools and backwaters of warm, turbid creeks, small to large rivers, lakes, and reservoirs. cat
SOURCES: Hendrickson and Cohen, 2022; NatureServe Explorer, 2023; TPWD, 2022b.		

3.5.2.4 Endangered and Threatened Fish and Wildlife Species

The USFWS has authority under the ESA to list and monitor the status of species whose populations are considered imperiled. USFWS regulations that implement the ESA are codified and regularly updated in 50 Code of Federal Regulations (CFR) Part 17. The federal process identifies potential candidates based upon the species' biological vulnerability. The vulnerability decision is based upon many factors affecting the species within its range and is linked to the best scientific data available to the USFWS at the time. Species listed as threatened or endangered by the USFWS are provided full protection under the ESA including a prohibition of indirect take, such as destruction of known critical habitat (i.e., areas formally designated by USFWS in the Federal Register).

Texas endangered species legislation in 1973 and subsequent amendments have established a state regulatory program for the management and protection of endangered species (i.e., species in danger of extinction) and threatened species (i.e., likely to become endangered within the foreseeable future). Chapters 67 and 68 of the Texas Parks and Wildlife Code authorize the TPWD to formulate lists of threatened and endangered fish and wildlife species and to regulate the taking or possession of the species. Under this statutory authority, the TPWD regulates the taking, possession, transport, export, processing, selling or offering for sale, or shipping of threatened or endangered species of fish and wildlife (Texas Legislature Online, 2023).

Table 3-15 lists plant and wildlife species that are considered endangered or threatened by the USFWS and/or TPWD, or are designated a SGCN by TPWD, and whose geographic range includes any portion of Denton or Wise counties. It should be noted that inclusion in the table does not imply that a species is known to occur in the study area but only acknowledges the potential for occurrence. The estimate of likelihood of a species to occur within the study area is based on an analysis of habitat available and the known habitat preferences for each species. There is no USFWS-designated critical habitat within the study area for any of the federally protected species in **Table 3-15**. A discussion of each species' habitat follows **Table 3-15**, grouped first by state or federal listed species, and followed by the SGCN.

TABLE 3-15. ENDANGERED, THREATENED, OR RARE WILDLIFE POTENTIALLY IN THE STUDY AREA

Common Name	Scientific Name	Listing Status [1,4]		Species Potential to Occur within Study Area?
		Federal	State	
AMPHIBIANS				
Strecker's chorus frog	*Pseudacris streckeri*	–	SGCN	Yes
Woodhouse's toad	*Anaxyrus woodhousii*	–	SGCN	Yes
BIRDS				
Bald eagle	*Haliaeetus leucocephalus*	DM	SGCN	Yes
Black rail	*Laterallus jamaicensis*	LT	T	Yes
Chestnut-collared longspur	*Calcarius ornatus*	–	SGCN	Yes
Franklin's gull	*Leucophaeus pipixcan*	–	SGCN	Yes [2]
Lark bunting	*Calamospiza melanocorys*	–	SGCN	Yes
Mountain plover	*Charadrius montanus*	–	SGCN	Yes [2]
Piping plover[3]	*Charadrius melodus*	LT	T	Yes [2]
Red knot[3]	*Calidris canutus rufa*	LT	T	Yes [2]
Sprague's pipit	*Anthus spragueii*	–	SGCN	Yes [2]
Western burrowing owl	*Athene cunicularia hypugaea*	–	SGCN	Yes
White-faced ibis	*Plegadis chihi*	–	T	Yes [2]
Whooping crane	*Grus americana*	LE	E	Yes [2]
INSECTS				
American bumblebee	*Bombus pensylvanicus*	–	SGCN	Yes
Monarch butterfly	*Danaus plexippus*	C	–	Yes[2]
None	*Arethaea ambulator*	–	SGCN	
MAMMALS				
Big brown bat	*Eptesicus fuscus*	–	SGCN	Yes
Big free-tailed bat	*Nyctinomops macrotis*	–	SGCN	Yes[2]
Black-tailed prairie dog	*Cynomys ludovicianus*	–	SGCN	No
Eastern red bat	*Lasiurus borealis*	–	SGCN	Yes
Eastern spotted skunk	*Spilogale putorius*	–	SGCN	Yes
Hoary bat	*Lasiurus cinereus*	–	SGCN	Yes
Long-tailed weasel	*Mustela frenata*	–	SGCN	Yes
Mountain lion	*Puma concolor*	–	SGCN	Yes
Muskrat	*Ondatra zibethicus*	–	SGCN	Yes
Swamp rabbit	*Sylvilagus aquaticus*	–	SGCN	Yes
Tricolored bat	*Perimyotis subflavus*	PE	SGCN	Yes

TABLE 3-15. ENDANGERED, THREATENED, OR RARE WILDLIFE POTENTIALLY IN THE STUDY AREA

Common Name	Scientific Name	Listing Status [1,4]		Species Potential to Occur within Study Area?
		Federal	State	
Western hog-nosed skunk	*Conepatus leuconotus*	–	SGCN	Yes
MOLLUSKS				
Louisiana pigtoe	*Pleurobema riddellii*	–	T	Yes
Sandbank pocketbook	*Lampsilis satura*	–	T	No
Texas heelsplitter	*Potamilus amphichaenus*	–	T	Yes
REPTILES				
Alligator snapping turtle	*Macrochelys temminckii*	PT	T	Yes
Eastern box turtle	*Terrapene carolina*	–	SGCN	Yes
Prairie skink	*Plestiodon septentrionalis*	–	SGCN	Yes
Pygmy rattlesnake	*Sistrurus miliarius*	–	SGCN	Yes
Slender glass lizard	*Ophisaurus attenuates*	–	SGCN	Yes
Smooth softshell turtle	*Apalone mutica*	–	SGCN	Yes
Texas garter snake	*Thamnophis sirtalis annectens*	–	SGCN	Yes
Texas horned lizard	*Phrynosoma cornutum*	--	T	Yes
Timber rattlesnake	*Crotalus horridus*	–	SGCN	Yes
Western box turtle	*Terrapene ornata*	–	SGCN	Yes
Western chicken turtle	*Deirochelys reticularia miaria*	–	SGCN	No
Western hognose snake	*Heterodon nasicus*	–	SGCN	Yes
Western massasauga	*Sistrurus tergeminus*	–	SGCN	Yes
Western rattlesnake	*Crotalus viridis*	–	SGCN	Yes

SOURCES: TPWD, 2022a; TPWD, 2023c; USFWS, 2023b; USFWS, 2023c.
NOTES:

1. **USFWS listing codes**: C = Candidate; DM = Recovered, delisted, and being monitored; LE = Federally Listed Endangered Species (i.e., in danger of extinction); LT = Federally Listed Threatened Species (i.e., severely depleted population that may become endangered); PT = Proposed Threatened; PE = Proposed Endangered; blank = no federal status.
   TPWD listing codes: E = State Listed Endangered Species; T = State Listed Threatened Species; SGCN = Species of Greatest Conservation Need (i.e., rare species with no regulatory listing status).
2. Assumed to be a transient species, potentially migrating through the study area and using suitable habitat for stopovers.
3. According to USFWS Information for Planning and Conservation database, the assessment of these species in the study area is only necessary for wind energy projects.
4. The USFWS list supersedes information provided for federal status in TPWD Annotated County List of Rare Species, in the case of a discrepancy. The species is listed by USFWS for the county but is not expected to occur within the study area.

Listed Threatened or Endangered Species

The discussion that follows describes habitat preferences and other characteristics for the state and federal threatened or endangered species shown in **Table 3-15** (i.e., federally listed as LE, LT, or DM and/or state listed as E or T). Unless otherwise noted, the information below is drawn primarily from TPWD (2022a; 2023c), USFWS (2023b; 2023c), and NatureServe Explorer (2023) online data and publications. Many of the listed threatened or endangered species that may be found in the study area are migratory birds. These species utilize the area primarily as a travel corridor, where suitable habitats are

used for resting and feeding stops. Some of the more important migratory habitats within the study area include riparian zones, grasslands, wetlands, and upland woods/brush.

Breeding habitat for the bald eagle is commonly located within two to three miles of a major water source, which can be used for foraging. Primary food sources include fish and waterfowl, most often associated with rivers, lakes, bays, and coastal areas. Bald eagles roost and nest in large trees and often return to the same nest year after year. In Texas, bald eagle nesting typically occurs from October to July. Past threats to the species included reproductive failure due to pesticides, unrestricted taking by humans, and loss of habitat. Recovery efforts have been successful, and the bald eagle populations are currently being monitored. The NDD database includes a record of a bald eagle approximately twenty-four miles northwest of the study area, and there are numerous observations noted on eBird throughout the study area and around Grapevine Lake. Given the number of sightings and the proximity of a major water body with intact riparian areas, it is probable that bald eagles would be found within the study area (Cornell, 2023; eBird, 2023; Sibley, 2003).

The black rail prefers mesic environments, including salt, brackish, and freshwater marshes, pond margins, wet meadows, and grassy swamps. This elusive species nests in or along the edges of marshes and damp ground. Typically, nests are hidden in dense marsh grass cover over a mat of prior years' dead grass material. Black rails forage on aquatic invertebrates in shallow wetlands. This species is generally difficult to observe and more often identified at night when males call during the breeding season (Cornell, 2023; Sibley, 2003). It is reasonable that the black rail may utilize the study area where suitable habitat exists.

The piping plover is a compact ground bird that breeds in the Northern Plains. In Texas, it is a migrant that winters along the Gulf Coast at beaches and bayside mud or salt flats. This species is considered migratory through the study area. Piping plover migratory flocks have been observed at lakes around the Dallas-Fort Worth Metroplex and several have been documented at Grapevine Lake approximately five miles east of the study area. It is reasonable that the piping plover may utilize the study area where suitable habitat exists (Cornell, 2023; eBird, 2023; Sibley, 2003).

The red knot is a small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Red knots migrate long distances in flocks northward through the contiguous U.S. mainly April through June, and flocks southward in July through October. In Texas, this bird winters along the Gulf Coast. The red knot prefers the shoreline of coast and bays and uses mudflats during rare inland encounters. Habitat consists primarily of seacoasts on tidal flats and beaches, herbaceous wetland, and tidal flat/shore. This species is considered migratory through the study area. Only a few observations have been noted along lake shorelines within the Dallas-Fort Worth Metroplex, with none yet recorded at Grapevine Lake. The use of the study area by the red knot should be considered incidental relative to the large area considered as part of the migration corridor (Cornell, 2023; eBird, 2023; Sibley, 2003).

White-faced ibis prefer freshwater marshes, sloughs, and irrigated rice fields. This colonial nesting species prefers to nest in low trees, in marshes, on the ground among bulrushes or reeds, or on floating mats. Large colonies, also referred to as rookeries, almost exclusively occur near the coast. Numerous sightings of the white-faced ibis have been recorded all over Grapevine Lake, including portions of the lake within the study area. This species would be expected to stopover within the study area during migration (Cornell, 2023; eBird, 2023; Sibley, 2003).

The whooping crane prefers small ponds, marshes, and flooded grain fields for both roosting and foraging. Critical habitat in Texas for the whooping crane includes the Aransas National Wildlife Refuge and vicinity in Aransas, Refugio, and Calhoun counties along the Gulf Coast, which is located over 300 miles south of the study area. Migrating populations exhibit strong migratory site fidelity, and one of the primary migration corridors passes through central Texas and through the Great Plains to the north (Cornell, 2023; Sibley, 2003). Recent observations of whooping crane sightings in the Dallas-Fort Worth Metroplex were at River Legacy Parks in Tarrant County, Texas. These sitings are located over 18 miles east of the study area (eBird, 2023). TPWD stated that the study area is within the whooping crane core migration corridor and that the study area contains peripheral whooping crane stopover polygons based on a study from 2010 to 2016 (TPWD, 2022c). There is potential that a whooping crane may utilize the study area during migratory stopover.

In the southwestern states, migrating monarch butterflies tend to occur more frequently near water sources such as rivers, creeks, roadside ditches, and irrigated gardens. Monarch butterflies would be found during the later spring and summer migrations through Texas. During the breeding season, monarchs lay their eggs on their milkweed host plant (primarily *Asclepias* spp.). TPWD conservation plans stress the importance of maintaining multi-species pollinator floral communities to support and promote migrating monarchs (TPWD, 2016). Natural areas proximal to Grapevine Lake and larger floodplains may contain less disturbed pasture conditions that could provide pollinator habitat suitable for the species.

The tricolored bat is associated with forested habitats, where it can forage near trees and along waterways. As such, it is frequently observed foraging among riparian corridors. The tricolored bat appears to prefer woodlands over open habitats, even though they have been occasionally spotted flying among agricultural fields. Their current known extent includes most of Texas, excluding the western portions of the state. It is likely that the tricolored bat is present within the study area due to the presence of woods and riparian corridors (Schmidly and Bradley, 2016; IUCN, 2023).

The Louisiana pigtoe prefers small streams to large rivers in slow to moderate currents with clay, mud, sand, or gravel substrates. This species is not particularly known for a preference for impoundments. As individuals have been found within the Upper Trinity River network, there is potential for the Louisiana pigtoe to be present in streams within the study area (Howells, 2014).

The sandbank pocketbook can be found in east Texas and Louisiana west of the Mississippi River. In Texas, this species is found from San Jacinto to the Sabine River; however, it is not found in the Trinity River drainage. Preferred habitat includes small streams to large rivers with sandy mud to gravel substrates that experience slow to moderate currents. Reservoirs are not known to house this species due to flow alteration and poor water quality. While preferred habitat exists, the species' range of the sandbank pocketbook does not include the Trinity River basin; therefore, it is unlikely to occur within the study area (Charles et al., 2020).

The Texas heelsplitter primarily occurs within small streams to large rivers in standing to slow-flowing water with mud, silt, or sand substrates. This species is primarily found among banks, backwaters, and quiet pools of the river systems. The Texas heelsplitter is endemic to the Trinity, Neches-Angelina, and Sabine rivers. The NDD includes one record within the study area in Grapevine Lake and one record east of the study area (TPWD, 2022c). There is potential for this mollusk species to be present within the study area (Howells, 2014).

Alligator snapping turtles reside in aquatic environments of perennial waters such as rivers, canals, lakes, oxbows, swamps, bayous, or ponds. Occasionally, this species may enter brackish coastal waters near the mouth of a freshwater system. The species prefers slow-moving, deep water habitats, although they may also occupy shallow creeks or streams. Typical system substrates include mud with some aquatic vegetation. Female turtles emerge from waters to lay eggs near the water's edge from late April through mid-May (Conant and Collins, 1998; IUCN, 2023). It is likely that the alligator snapping turtle may be found within the study area.

The historical range of the Texas horned lizard included the entire state of Texas in arid and semiarid areas of flat, open terrain with scattered vegetation and sandy or loamy soils. Population declines have been linked to loss of habitat, insecticides, over-collection, and the accidental introduction of the imported fire ant (*Solenopsis invicta*). Despite declines in east and central Texas, the Texas horned lizard is still common in portions of the Rio Grande Plains of south Texas, the Rolling and High Plains of northwest Texas, and the Trans Pecos of far west Texas. It remains possible that the Texas horned lizard could occur in the study area (Conant and Collins, 1998; IUCN, 2023).

Species of Greatest Conservation Need

The Strecker's chorus frog is a nocturnal amphibian that burrows into the soil, preferably sandy in texture, to shield from predators and heat. This species emerges from burrows after early spring rains to breed in flooded fields, ditches, small ponds, and depressional wetlands. Breeding individuals prefer to attach fertilized eggs onto submerged vegetation (AmphibiaWeb, 2023; IUCN, 2023). It is likely for the Strecker's chorus frog to be present within the study area.

The Woodhouse's toad utilizes a wide variety of both terrestrial and aquatic habitats. The species may be found among forests, grasslands, and barrier island sand dunes. In some portions of the species range, the Woodhouse's toad is expanding into urbanized areas or degraded riparian corridors and agricultural fields. Between February and July in the Great Plains, the Woodhouse's toad migrates to aquatic environments to breed in ponds, lakes, and rain-fed depressions (AmphibiaWeb, 2023; IUCN, 2023). It is likely for the Woodhouse's toad to be present within the study area.

The chestnut-collard longspur is a compact ground bird that breeds in open short and mixed-grass prairies and winters in shortgrass prairies or desert grasslands where vegetation is under a foot tall. Typical habitat is dry areas that are grazed or undisturbed areas where grasses are short without interference. Often found in flocks, though rarely with other species of longspurs. The range in Texas is associated with wintering and non-breeding purposes. Migration and breeding occur in central and northern U.S. states in fallow fields and crop fields. The species is more likely to be found in grazed areas and in mowed or burned areas to a lesser extent. According to eBird sightings, this species has been observed within the study area and within the DFW Metroplex. There is potential for the chestnut-collard longspur to migrate through, and winter in the study area where suitable habitat exists (Cornell, 2023; eBird, 2023; Sibley, 2003).

Franklin's gull is a long-distance migrant bird that utilizes a wide variety of riparian to ephemeral wetlands as stopover sites. In Texas, the species is casually found wintering along the coastline, near shores, among tidal flats or shores, and within herbaceous wetlands. This bird frequently utilizes Grapevine Lake as a stopover site and should be expected within the study area during the migration season (Cornell, 2023; eBird, 2023; Sibley, 2003).

The lark bunting is a ground bird endemic to the grasslands and shrub-steppe of North America. Typical habitat is open shortgrass prairies with patches of taller vegetation. Breeding and nesting occur in open grasslands near the base of shrubs or cacti, avoiding bare ground. This species is known to forage or nest in agricultural fields. Migration and wintering flocks use open habitats such as grasslands, playas, or human-modified areas such as roadside edges. According to eBird sightings, this species has been observed approximately two miles north of the study area. The lark bunting is likely to winter in the

study area due to the nearby agricultural fields and weedy roadside edges (Cornell, 2023; eBird, 2023; Sibley, 2003).

The mountain plover is a compact ground bird that nests on high plains or shortgrass prairie. Nests are constructed on the ground in shallow depressions. Non-breeding habitat includes shortgrass plains and bare, dirt (plowed) fields. This species is considered migratory through the study area. The use of the study area by the mountain plover should be considered incidental relative to the large area considered as part of the migration corridor (Cornell, 2023; eBird, 2023; Sibley, 2003).

The Sprague's pipit is an endemic nesting species in the northern Great Plains within North America. Breeding and nesting occur in tall native mixed-grass prairies with scattered shrub cover. This species generally does not utilize cropland, overgrazed areas, or non-native grasslands; however, migrant birds and those near the border areas between Mexico and the U.S. have been known to utilize these kinds of habitats. According to eBird sightings, this species has occurred within the study area and around Grapevine Lake (Cornell, 2023; eBird, 2023; Sibley, 2003). The use of the study area by the Sprague's pipit should be considered incidental relative to the large area considered as part of the migration corridor.

The western burrowing owl occurs in the western half of North America. Nesting occurs in warmer temperate and sub-tropical regions from southern California to west Texas and south into Mexico. Typical habitat consists of open grasslands, especially prairie, plains, and savanna. Sometimes the burrowing owl is found in open areas, such as vacant lots near human habitation or airports. Preferred habitat is typified by shorter vegetation accompanied by abandoned small mammal burrows, which the owl modifies for its own use. This species rarely creates its own burrows and is thus associated with known habitat for prairie dog, ground squirrel, fox, and similar ground-dwelling mammals. Species decline is primarily due to habitat loss and fragmentation. There remains a limited possibility the western burrowing owl could occur within the study area (Cornell, 2023; eBird, 2023; Sibley, 2003).

The American bumblebee occupies open farmland and fields throughout much of the plains, as well as temperate forests in the eastern United States and deserts of the western

United States. A colonial breeding species, it typically nests at the surface of the ground among long grass mixes with occasionally nesting underground. With the presence of farmland, forests, and grasslands in the area, the American bumblebee could potentially occur within the study area.

Arethaea ambulator is a terrestrial insect for which there is little available information (GBIF, 2023).

The big brown bat prefers wooded areas or woodlands of central, eastern, and north Texas. The species is not known to occur in the southern part of the state. In west Texas, the bat utilizes riparian corridors. The big brown bat will often utilize attics, building crevices, caves, spaces between rocks, areas under loose bark of dead trees, or in tree cavities. The big brown bat emerges early in the evening to forage among the top of the tree canopy. The species migrates in winter to hibernate in caves or buildings. Breeding occurs in the fall and young are born from May to August the following year (Schmidly and Bradley, 2016). With the presence of ample woodland habitat, there is potential for the big brown bat to be present within the study area.

The big free-tailed bat is a seasonal migrant in the region. Little data is available on the habitat preference of the species. Studies have suggested that preferred maternity roosts may be in crevices and cracks found in high canyon walls, trees, caves, or buildings. Female bats congregate in nursery colonies and give birth to a single offspring from late June to early July. Wintering habitat preferences are currently undetermined. Most individuals observed within the U.S. have been documented within Big Bend National Park. The distribution of the big free-tailed bat includes Wise County (Schmidly and Bradley, 2016; TPWD, 2023e). There is limited potential for this species to utilize the study area where suitable habitat exists.

The black-tailed prairie dog's distribution range included Denton and Wise counties; however, this species has been extirpated throughout most of the former range. Preferred habitat includes short-grass prairies, alluvial fans, hardpan flats, edges of shallow valleys, and overgrazed or denuded pastureland (Schmidly and Bradley, 2016). There is potential for the black-tailed prairie dog to utilize preferred habitat within the study area; however,

the presence of this species is not expected in the study area. Review of aerial imagery did not indicate the presence of any prairie dog towns (NearMap, 2023).

The eastern red bat is found among a wide variety of habitats throughout the state of Texas but typically associated with woodland environments, as well as foraging along edges of pastures, croplands, and fence lines. This solitary species often roosts open in trees and do not associate with caves, mine tunnels, or underground features common among other bat species. The eastern red bat will often utilize trees as roost sites during the summer and while migrating, where they mimic dead leaves. The eastern red bat is a permanent resident throughout most of Texas but only potentially migrates to western Texas during the summer months, particularly females with offspring. The distribution range includes Denton and Wise counties. Within the study area, the eastern red bat is likely to utilize the open cropland and forested areas for foraging and migration (IUCN, 2023; Schmidly and Bradley, 2016; TPWD, 2023e).

The eastern spotted skunk prefers wooded or bushy areas and tallgrass prairies but may also utilize open fields and prairies, croplands, fence rows, farmyards, forest margins, and woodlands. If rocky canyons or outcrops are available, this skunk species will readily den among rock cracks and crevices or burrow under a large rock. Individuals also may den in hollow trees, under buildings, in underground tile drains, in underground burrows, or in attic crawlspaces. Breeding occurs in March through April, although some individuals will breed again in July to August to produce a second litter (Schmidly and Bradley, 2016). The NDD includes three records of this species, the closest of which is approximately three miles south of the study area in Tarrant County. Given the general habitat characteristics, there is potential for the eastern spotted skunk to be present within the study area.

The hoary bat is a solitary migrant that frequently inhabits wooded environments, as the species roosts in the open while hanging from a branch or twig, as well as croplands and arid deserts. Some individuals are known to migrate to montane and riparian woodlands in the Trans Pecos region, whereas others may migrate to the forests and woodlands of central and eastern Texas. The species prefers to forage in open croplands, over forest canopy cover, or small forest openings. The hoary bat's distribution range includes Denton County. This species could migrate through or stopover in the winter wherever trees exist

within the study area, and potentially forage in the cropland. It is possible the hoary bat could utilize the study area (IUCN, 2023; Schmidly and Bradley, 2016; TPWD, 2023e).

The long-tailed weasel may be found residing in a wide range of habitats throughout most of Texas, including shrubland, fencerows, upland and bottomland woods, forest edges, and rocky desert scrubland. Typically, the species resides alongside pocket gophers and ground squirrels. The long-tailed weasel is a strong swimmer and often lives close to water. This species could potentially be found within the study area wherever suitable habitat is present (Schmidly and Bradley, 2016; IUCN, 2023).

Mountain lion habitat preferences are wide and variable, including swamps, open riparian woodlands, shrubby country, canyons, escarpments, and rimrocks. Riparian corridors with an open understory are important for the mountain lion to travel between habitats. Dense woodlands or thick shrubby areas are usually avoided by this species. Although the mountain lion is often associated with montane and remote areas, TPWD has confirmed two sightings in Dallas and Collin Counties in the last few years, the latter of which was near Princeton, Texas (CBS, 2020). It remains possible that transient individuals could be found in the study area (Schmidly and Bradley, 2016).

The muskrat is an aquatic rodent species. The distribution range includes Denton and Wise counties. Preferred habitat includes marshes, lakes, drainage ditches, canals, or streams. Shallow freshwater marshes with a non-woody vegetative fringe including cattails, bulrushes, and sedges are likely habitats in which the muskrat will occur in the interior portions of Texas. There is potential for the muskrat to occur in the study area where suitable habitat exists (Schmidly and Bradley, 2016).

The swamp rabbit prefers poorly draining river bottoms such as cypress bogs, marshes, floodplains, and coastal marshes. Individuals have been observed swimming across rivers and streams within its home range. Inland individuals tend to inhabit shrubs, trees, and vines associated with the typical bottomland forest for the region (Schmidly and Bradley, 2016). With the availability of bottomland hardwood forests within the study area, the swamp rabbit may be present.

The western hog-nosed skunk inhabits a wide range of environments, including woodlands, grasslands, deserts, shrublands, and rocky canyons in mountainous regions. This species prefers to den in rock crevices, hollow logs, underground burrows, caves, and mine shafts, or under buildings. As the species utilizes a wide range of habitat, there is potential for the western hog-nosed skunk to be present within the study area (Schmidly and Bradley, 2016; IUCN, 2023).

The eastern box turtle is a terrestrial reptile that prefers forests, fields, and the edge habitats where these conditions meet. Some individuals have been documented to seasonally migrate between open fields in the spring and forests in the summer. In the summertime, the eastern box turtle frequents shallow pools. This turtle species will burrow into loose soil, debris, mud, and old stump holes in trees, or under leaf litter for protection (Conant and Collins, 1998). Given the presence of woodlands and open fields, there is potential for the eastern box turtle to be present within the study area.

The prairie skink is a semi-fossorial, terrestrial species that occupies riparian, woodland, suburban, sand, savanna, and grassland habitats. The woodland habitats are broad and encompass mixed, conifer and hardwood species. This species can be found in pine barrens, grassy dunes, sandy substrates of streams, road ROW, and rocky hillsides. Nests are dug in loose moist soil under objects such as rocks or logs. This species is active from May to September and hibernates during the other months of the year (IUCN, 2023). Given the broad habitat requirements, it is possible for the prairie skink to utilize the study area.

The pygmy rattlesnake can be found in forested and woodland habitats, riparian, savanna, grassland, and cropland areas. Forested and woodland habitats are broad and encompass mixed, conifer, and hardwood species. Preferred habitat includes lakes, marshes, roadside ditches, hardwood floodplains, swamps, mixed pine-hardwood forests, sandhills, and wet grasslands. This species burrows under surface cover or utilizes other animal burrows during the day as it is a nocturnal species (IUCN, 2023). Given the broad habitat requirements, it is possible for the pygmy rattlesnake to utilize the study area.

The slender glass lizard predominantly inhabits open grasslands, prairies, woodland margins, open woodlands, oak savannas, longleaf pine (*Pinus palustris*) flatwoods, scrub-

shrub areas, fallow fields, and areas adjacent to streams and ponds. Typically, this species will utilize areas with sandy soil textures (Conant and Collins, 1998; USGS, 2023c). It is possible the slender glass lizard may be found in the study area where suitable habitat exists.

The smooth softshell turtle is an aquatic species that can tolerate deep and shallow water habitats. This species lives in low to moderate gradient streams that are large to medium in size, lakes, impoundments, and shallow bogs. Bottom substrate generally is sandy to mud in texture and houses aquatic vegetation. Nests are usually no more than ninety meters from water and in high open sandbars or banks. Given the number of sizeable streams in the study area, it is possible for the smooth softshell turtle to occur within the study area.

The Texas garter snake inhabits both terrestrial and aquatic ecosystems, including grasslands and modified open areas that are in the vicinity of ponds, streams, or marshes. This subspecies of the common garter snake (*Thamnophis sirtalis*) is found primarily in east-central Texas, southwestern Kansas, Oklahoma, and the Texas panhandle. This snake species may utilize aquatic environments more in the spring when frogs are congregating for breeding among ephemeral pools. The Texas garter snake also prefers areas with permanent sources of water or damp soil that supports abundant earthworm activity. The NDD includes two records of this species, the closest of which is approximately three miles east of the study area. The Texas garter snake may also be abundant in some suburban areas in the City of Dallas, Texas. Due to its wide range of habitat including wetlands and open fields, it is likely for the Texas garter snake to be present within the study area (USGS, 2023c).

The timber rattlesnake utilizes swamps, floodplains, upland pine and deciduous woodlands, riparian corridors, and abandoned farmland. Habitats commonly used are often above limestone bluffs, sandy soils, or black clays. The timber rattlesnake typically prefers dense ground cover. The timber rattlesnake tends to gravitate to rocky retreats with crevices or fissures for overwintering habitat. The NDD includes one record of this species approximately ten miles northwest of the study area. It is possible that the timber rattlesnake is present within the study area where suitable habitat exists (Conant and Collins, 1998).

The western box turtle inhabits prairie grasslands, pasturelands, fields, sandhills, and open woodlands. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil or utilize burrows previously used by other animals. The species prefers soils that are sandy in texture. With the wide prairie and open woodland habitat association utilized by the western box turtle, there is potential for the species to be found within the study area (Conant and Collins, 1998; IUCN, 2023).

The western chicken turtle was historically distributed throughout east Texas, occupying the Coastal Plains region. Currently, only six counties in Texas have confirmed observations, all of which are south of the study area. Preferred habitats are semi-aquatic areas with shallow slow-moving water such as ponds, lakes, streams, and swamps. Soft mud and aquatic vegetation are utilized for hibernation. Suitable habitat exists for the species within the study area, but the study area may be beyond the species range. There is only a limited possibility this species would be found in the study area (Conant and Collins, 1998; USFWS, 2023b).

The western hognose snake inhabits mixed or shortgrass prairies, sandhills, wide valleys, floodplains, bajadas, shrub encroached grasslands, moderate areas of agricultural intensity, and the margins of irrigation ditches. This species aestivates between November and March and are most active from May to August. During aestivation, this species is burrowed in the soil. There is potential for the western hognose snake to utilize suitable habitat where present within the study area.

The western massasauga is often found in mixed woodland areas, rocky hillsides, and grasslands. If found in woodlands, this terrestrial species is more likely to be found on the edge of open woodlands. Burrows from other animals are often utilized. There is potential for the western massasauga to occur within the study area.

The western rattlesnake is found in a variety of woodland habitats, savanna, croplands, arid basins, grasslands, cliffs, deserts, and shrublands. Woodland habitat includes hardwood, mixed, and conifer. This species aestivates and occupies other animal burrows, crevices, or caves. Active months can range between late March and November.

Given the wide habitat requirements, it is possible for the western rattlesnake to occur within the study area.

3.6 Community Values and Community Resources

The term "community values" is included as a factor for the consideration of transmission line certification under Section 37.056(c)(4) of the Texas Utilities Code. The PUCT CCN application requires an assessment of values and resources important to the local community. At times, community values and resources could include the following:

- habitable structure locations;
- AM, FM, microwave, and other electronic installations in the study area;
- FAA-registered airstrips, private airstrips, and heliports located in the study area;
- irrigated pasture or croplands utilizing center-pivot or other traveling irrigation systems;
- input from the public participation meetings;
- approvals or permits required from other governmental agencies; and
- comments received from community leaders and members of the public.

In addition to the above-listed items, Halff evaluated the proposed project for community resources that may not be listed by the PUCT, but that may also be important to communities. Halff defines the term "community resources" to be areas or other natural resources recognized by a national, regional, or local community. Examples of community resources would be parks, recreation areas, historical or archeological sites, or a scenic vista. As discussed in **Section 2.2.1** and **Section 2.5**, Halff mailed consultation letters to elected and appointed officials within the study area and hosted two public participation meetings to identify and collect information regarding community values and community resources. Oncor staff, Halff, and other Oncor representatives also met or otherwise communicated with city and other government officials in the study area to discuss the proposed project. The above-listed values and resources important to the local community are discussed in the appropriate sections of this document.

3.7 Land Use

3.7.1 Urban/Residential Areas

The study area is situated within Denton and Wise counties and, as shown on the agency correspondence figure in **Appendix A**, numerous incorporated cities are contained within or extend into the study area. A great proportion of the study area remains undeveloped, yet the area is rapidly changing. Urbanized areas tend to cluster along major transportation corridors such as IH 35W, US 377, US 287, FM 156, and SH 114, and aerial photography shows many areas shown as grassland or agriculture in **Figure 3-5** are being converted, primarily as master planned residential communities. While commercial and industrial development is also spread throughout the study area, it is more concentrated near the IH 35W, US 377, and SH 114 corridors in the southeast portion of the study area.

Halff solicited information from municipalities, county officials, and other regional entities as mentioned in **Section 2.2.1**. Halff also solicited information from school districts and various state and federal agencies regarding environmental and/or land use constraints within the study area. Copies of all written responses received are contained in **Appendix A**, and information received is noted in appropriate discussions in **Section 3.0** and/or **Section 7.0** of this report, relevant to resource-specific comments made by the agency (e.g., NRCS regarding soils, and TPWD and USFWS regarding wildlife). Responses that addressed potential land use constraints in general include the following:

- The Town of Flower Mound responded via e-mail documenting the Town's prior meetings with Oncor representatives regarding the Dunham Switch location. The Town recommended submitting a concept plan of the station on aerial photography to assist Town staff in determining which types of applications would be required.
- The City of Justin replied via e-mail providing information pertaining to: a planned realignment of FM 407 east of the downtown area; planned Boss Range Road improvements; a potential historical structure and property; and a map showing future development projects within the City and extra-territorial jurisdiction.
- The Trinity River Authority provided a high-level overview map of their facilities near the project study area and, upon additional inquiry from Halff, provided GIS shapefile data of certain facility alignments within the study area.
- The City of Fort Worth provided a link to download publicly available GIS shapefile data from their website.

Additional information was provided by municipal representatives after the public participation meetings (see **Section 2.5** and **Section 5.0**). Information relating to planned or future developments was also provided by development sponsors and is included below to emphasize the dynamic nature of the study area.

- The Town of Argyle provided by e-mail GIS shapefile data of the Town of Argyle sewer lines within the study area. They also provided reference to the Argyle urban forest canopy study regarding the Town's natural resources. In coordination with the Town of Northlake, maps providing recommended link alternatives due west of the Dunham Switch were also provided.
- The Town of Northlake provided GIS shapefile data providing the location of the existing road network, proposed road alignments, and planned development blocks.
- Green Brick Partners provided by e-mail electronic data of land plans for a multi-phase residential development in the south-central portion of the study area, west of Alliance Airport.
- Hillwood provided by e-mail graphics of their land interests and planned developments in the study area, most of which are in the central portion of the study area in proximity to the FM 156 corridor.
- PMB Capital Investments provided by e-mail graphics of a large, master planned development north of and adjacent to the proposed Ramhorn Hill Switch endpoint.

In addition to the above listed entities, other smaller-scale developments managed by individual owners in the western portion of the study area were also received and evaluated. These latter examples further demonstrate the dynamic nature of the study area, even in seemingly undeveloped portions.

3.7.2 Recreation Areas

A review of federal, state, and local websites and maps, as well as field reconnaissance surveys, resulted in the identification of numerous park/recreational facilities (e.g., managed lands, parks, golf courses) within the study area. Many of these facilities are open space or designated town/city park areas, yet also include less formal open and public use areas (e.g., pools; playground areas) managed by homeowners associations, in master planned residential neighborhoods. Others include private enterprises that provide recreational opportunities to the general public such as golf courses, adventure

parks, and shooting ranges. The largest park/recreational area within the study area is that associated with Grapevine Lake. Although the main body of Grapevine Lake barely encroaches into the eastern extent of the study area, several federally owned management areas associated with the Denton Creek floodplain and its tributaries extend well into the eastern third of the study area.

No conservation easements or wildlife management associations have been identified in the study area (National Conservation Easement Database [NCED], 2023; Nature Conservancy, 2023; Texas Land Conservancy [TLC], 2023; TPWD, 2022c; USGS, 2023d). A review of the U.S. National Park Service (USNPS) website indicated that no USNPS parks, wild and scenic rivers, national battlefields, historic trails, or national historic sites open to the public are located within the study area (USNPS, 2023a; 2023b). There are no TPWD parks or TPWD-designated public hunting units located within the study area (TPWD, 2023f; 2023g). No parks, recreation areas, scientific areas, wildlife refuges, or historic sites funded by the U.S. Land and Water Conservation Fund Act (LWCF) were found within the study area (LWCF Coalition, 2023).

3.7.2.1 USACE Lands

Grapevine Lake is federally-owned land operated by the USACE to provide multi-purpose water resource uses, including recreation. The USACE's role in outdoor recreation at Grapevine Lake consists of managing parks and trails, fishing along waterways, managing the water surface as it relates to boating activity, and managing general access to lands. As identified in the Grapevine Lake Master Plan, three different categories of land classification are used as it pertains to recreation: low density recreation; wildlife management areas; and environmentally sensitive areas. Low density recreation incudes lands that may support passive public recreational use (e.g., fishing, hunting, wildlife viewing, natural surface trails, hiking, etc.). Within the study area, these include the following:

- North Shore Park adjacent to and east of US 377 provides trailheads for hiking and biking within the Knob Hills Trail hike and bike system;
- Knob Hills Park adjacent to and east of US 377 provides trailheads for hiking and biking along Knob Hills Trail, along with an equestrian access to the Cross Timbers Horse trail at Knob Hills Park northeast of the Dunham Switch; and

- Roanoke Park, an undeveloped park managed by the USACE located south of Denton Creek and adjacent to US 377 in Roanoke.

Wildlife management areas include lands managed primarily for the conservation of fish and wildlife habitat. These lands generally include comparatively large contiguous parcels, most of which are located within the flood pool of the lake. Passive recreation uses such as natural surface trails, fishing, hunting, and wildlife observation are compatible with this classification. Wildlife management areas in the study area include those portions of USACE recreational areas south of Catherine Branch and west of IH 35W.

Environmentally sensitive areas are identified in the Grapevine Lake Master Plan as areas "to be protected from intense development or disturbance from future land use actions such as utility or road easements. Passive public use such as natural surface trails, bank fishing, and nature study are appropriate for these areas (USACE, 2022a; USACE 2022c)." The Denton Creek Environmentally Sensitive Area represents most of the USACE recreational area shown in **Figure 3-1C**. It is comprised of mostly mature riparian forest and bottomland hardwoods intermixed with some upland Cross Timbers habitat. It is a large contiguous band of high-quality habitat for numerous species of wildlife (USACE, 2022a; USACE 2022c).

3.7.2.2 Institutional Areas

Several school campuses, including elementary, middle, and high schools were identified within the study area. Some of the high school campuses are large and include many fields and other potential practice or gathering areas within the campus layout. Because of this, and because other areas within any campus (e.g., parking lots; gymnasiums; individual buildings) can also support recreational activities, the entire campus in any instance was identified as a recreational area.

In addition to these campuses, an adjunct Northwest ISD facility was identified in the study area. Adjacent to Denton Creek (see **Figure 3-1C**), the Northwest ISD Outdoor Learning Center was developed by the ISD, rehabilitating an abandoned ranch to provide a district-wide outdoor learning campus that can serve up to 650 students per day. Facilities include a gathering hall along with several trails and learning pavilions to experience the different ecological communities.

3.7.3 Agriculture

Agriculture is an important component of the economy for Denton and Wise counties, as indicated by representative agricultural statistics from the USDA 2017 Census of Agriculture (USDA, 2019) shown in **Table 3-16**. The 2017 Census of Agriculture identified cattle as the primary livestock and forage production was the primary crop in Denton and Wise counties. In terms of statewide significance, Denton County ranks significant for horses, ponies, mules, burros, and donkey sales relative to other Texas counties for those categories. No center-pivot irrigation systems were observed in the study area from aerial photography or during field reconnaissance surveys.

TABLE 3-16. AGRICULTURAL STATISTICS FOR DENTON AND WISE COUNTIES

STATISTICAL CATEGORY	DENTON COUNTY	WISE COUNTY
Market Value of Products Sold (in $ millions)		
Crop Sales	$24.2M	$11.6M
Livestock Sales	$99.0M	$34.7M
TOTAL SALES	$123.2M	$46.3M
Top Crop Types and Livestock Inventory		
1st Crop Type and Acreage	Forage-land [1] 52,828 acres	Forage-land [1] 60,607 acres
2nd Crop Type and Acreage	Wheat for gain, all 31,277 acres	Wheat for gain, all 4,317 acres
3rd Crop Type and Acreage	Sorghum for grain 9,346 acres	Sorghum for grain 904 acres
4th Crop Type and Acreage	Cotton, all 3,310 acres	Vegetables harvested, all 459 acres
1st Livestock Type and Number of Animals	Cattle and calves 38,843	Cattle and calves 80,744
2nd Livestock Type and Number of Animals	Horses and ponies 9,341	Layers for egg production 13,606
3rd Livestock Type and Number of Animals	Goats, all 4,266	Goats, all 7,437
4th Livestock Type and Number of Animals	Sheep and lambs 2,978	Horses and ponies 4,883

SOURCE: USDA, 2019.
NOTES:
1. Land used for all hay, grass silage, and greenchop.

3.7.4 Utilities

Utility Corridors

Through adoption of the Grapevine Lake Master Plan, the USACE has established 20 utility corridors to serve as the preferred location for future easements for roads or utility lines. These corridors generally incorporate or parallel existing easements. Future use of

these corridors, where the corridor is limited to, or incorporates an existing easement, may require prior approval of those entities that have legal rights to the easement. However, the master plan places tight restrictions on the use of these corridors. For example, the USACE prioritizes the use of the established utility corridors before other USACE land may be considered for development use. Six utility corridors as identified and defined in the Grapevine Lake Master Plan (USACE, 2022c) were identified in the study area. These are numbered in **Figure 3-1C**, and a general description consistent with the Grapevine Lake Master Plan follows below. For a description of existing utilities that may occupy any of the USACE-designated corridors, please refer to **Appendix G**.

- **Utility Corridor 11** – This corridor follows US 377 with the northernmost extent beginning near the intersection of US 377 and Dunham Road. The southern end includes a two-pronged fork. The west branch begins just northwest of Fairstaff Road, where it proceeds northeast until it intersects the main portion of the corridor. The eastern branch remains along the US 377 corridor until it reaches the general area of Bobcat Boulevard. The corridor is approximately 3 miles long and 100 feet wide. Future utilities in this corridor must be placed within or as close as possible to the limits of the existing road easement. The total width of the corridor does not exceed 100 feet, including the space occupied by the road. Future use of this corridor is restricted to sub-surface boring, and no bore pits will be permitted on USACE property to protect the riparian habitat.
- **Utility Corridor 12** – This corridor includes a north and south segment. The southern segment parallels the western limits of the USACE boundary between US 377 and Northwest Regional Airport, crossing Denton Creek at its southern end. The northern segment is a short reach located near FM 1171, crossing a narrow riparian area along Graham Branch. The corridor is approximately 1.3 miles long and 70 feet wide. Future utilities in this corridor must be placed within or as close as possible to the limits of the existing road easement. The total width of the corridor does not exceed 70 feet, including the space occupied by the road. Future use of this corridor is restricted to sub-surface boring, and no bore pits will be permitted on USACE property to protect the riparian habitat.
- **Utility Corridor 13** – This corridor follows a north to south path that crosses Denton Creek, southwest of Northwest Regional Airport. This corridor is approximately 4 miles long and 50 feet wide. Future utilities in this corridor must be placed within or as close as possible to the limits of the existing railroad

easement. Future use of this corridor is restricted to sub-surface boring; no bore pits will be permitted within riparian or other sensitive habitat, and bore pits will be placed off USACE property unless no feasible alternative exists.

- **Utility Corridor 14** – This corridor follows a northeast to southwest path that crosses Denton Creek southwest of Northwest Regional Airport. This corridor is approximately half a mile long and 140 feet wide. Future utilities in this corridor must be placed within or as close as possible to the limits of the existing road easement. The corridor is restricted to the existing road ROW not to exceed 70 feet from the center of the road. Future use of this corridor is restricted to sub-surface boring, and no bore pits will be permitted on USACE property to protect the riparian habitat along the road.
- **Utility Corridor 15** – This corridor parallels the east side of IH 35W, crossing both through Denton Creek and Catherine Branch, and another unnamed tributary. The corridor is approximately half a mile long and 140 feet wide. The corridor is restricted to the existing road right-of-way not to exceed 70 feet from the center of the road. For both portions, future use of this corridor is restricted to sub-surface boring, and no bore pits will be permitted on USACE property to protect the riparian habitat along the roads.
- **Utility Corridor 16** – The corridor occurs in two east to west segments within Knobs Hills Park northeast of the proposed Dunham Switch. The northern segment follows FM 1171 within Knob Hills Park and crosses White Branch. The southern segment crosses along Dunham Road. These two corridors are 50 feet wide and combined total two-thirds of a mile in length.

Oil and Natural Gas

Oil and natural gas production are prominent in Denton and Wise counties. There are over 10,000 registered records within RRC databases for Denton County and over 20,000 records within Wise County. Of the Denton County well records, over 2,000 are within the study area and over 1,500 well records for Wise County are within the study area (RRC, 2022). Similarly, there are numerous pipeline networks within the counties and the study area. Over 1,000 pipelines in Denton County and over 700 pipelines in Wise County are within the study area. Numerous pipelines of varying diameter and transported product are within the study area.

3.7.5 Aesthetics

Aesthetics is included as a factor for consideration in the evaluation of transmission facilities in Section 37.056(c)(4)(A)-(D) of the Texas Utilities Code. For the purposes of this study, the term aesthetics is utilized by Halff to address the subjective perception of natural beauty in a landscape. This evaluation attempts to define and evaluate the scenic qualities of an area.

Consideration of the visual environment includes a determination of aesthetic values (where the major potential effect of an action on the resource is considered visual) and recreational values (where the location of a transmission line could potentially affect the scenic enjoyment of the area). Halff considered the following aesthetic values in this study, which combine to give an area its aesthetic identity:

- topographical variation (hills and valleys);
- prominence of water in the landscape (rivers and lakes);
- vegetation variety (woodlands, meadows);
- diversity of scenic elements;
- degree of human development or alteration; and
- overall uniqueness of the scenic environment compared to the larger region.

Each of these listed values apply to the study area as a variety of aesthetic qualities are present as rural landscapes from this former fringe of the Dallas-Fort Worth Metroplex contrast with the increasing amount of development. Several towns and cities are included within the study area. However, unlike some urban fringes where a wave of development rapidly transitions to rural areas, the development pattern of the study area is better described as patchwork in its progress, as multi-phased planned communities are incorporated into areas that have maintained the feel of an agricultural setting.

The eastern portion of the study area includes pockets of Cross Timbers vegetation characterized by gently rolling hills intermixed with areas of pastureland and urban development. The undulating topography of Cross Timbers has a relatively high degree of aesthetic quality with its pattern of post oak wooded mottes within these communities, and its ultimate transition to valleys associated with Denton Creek and its tributaries. As Grapevine Lake is located near several larger cities, people come from local urban communities to enjoy the scenic views and natural setting offered at the lake. Although

the open water lake element is mostly absent from the study area, many areas within the eastern portion of the study area have been designated as wildlife management areas or environmentally sensitive areas to preserve specific animal, plant, or environmental features that add to the scenic qualities of the area. Nearby parks have been designed to access the lake, allow access to hiking trails, and take advantage of scenic qualities offered by these management areas. The incorporation of these habitats into USACE-owned and designated wildlife management areas and environmentally sensitive areas imply a sense of aesthetic permanence often desired by adjacent landowners and prospective developers.

The south-central portion is perhaps the most developed portion of the study area, where the primary aesthetic is undoubtedly urban with a mix of residential, commercial, institutional (ISD campuses), entertainment (e.g., Texas Motor Speedway; golf courses), light industrial (e.g., warehouses), and heavy industrial (e.g., intermodal; airport). Most of this is concentrated in proximity to the major transportation corridors of IH 35W, SH 114, and FM 156. The north-central portions of the study area retain a rural aesthetic with a patchwork of residential communities of different sizes and age intermixed with expanses of open pasture, oil and gas pads, and pipeline corridors. Woody vegetation is usually associated with the riparian corridors of the larger stream networks that cross the study area, or in isolated pockets and along fencerows.

Halff conducted a review of Texas scenic drive locations that are identified as having particularly strong aesthetic views or settings and found that none of the seventeen scenic drives were located within the study area (TripAdvisor, 2023). In 1997, the THC designated Heritage Trail Regions throughout the state of Texas to create a statewide heritage tourism program centered on the original ten scenic driving routes identified in the 1968 Texas Heritage Trails Program. These Heritage Trail Regions incorporate the historic highways, historic sites, hiking and biking paths, natural beauty, and cultural attractions unique to the ten regions (THC, 2023a). The study area is within the Texas Lakes Trail Region. The suggested driving trail for this region does not incorporate any of the main roads within the study area (THC, 2023b). The nearest suggested attraction within the Texas Lakes Trail Region is in the City of Arlington, which is approximately eighteen miles southeast of the study area. A review of the USNPS website identified no

wild and scenic rivers, historic trails, national parks, national monuments, or national battlefields within the study area (USNPS, 2023a; 2023b).

3.7.6 Transportation/Aviation

An extensive network of federal and state highways, FM, CR, and public and private residential roads facilitate transportation throughout the study area (TxDOT, 2022a). As Denton County is within the TxDOT Dallas District, Halff reviewed TxDOT's Keep It Moving Dallas website which is maintained by the district to provide information related to different transportation related projects in the study area. Halff also contacted the TxDOT Dallas District during agency notification. **Table 3-17** summarizes the existing facilities along with proposed improvements. Some transportation corridors may have multiple improvements proposed or may be in different phases of evaluation.

TABLE 3-17. PROPOSED AND EXISTING TRANSPORTATION NETWORKS THROUGHOUT THE STUDY AREA

FACILITY NAME	DESCRIPTION
FM 1171	FM 1171 crosses the eastern half of the study area in an east to west direction to its terminus at IH 35W, through Flower Mound and Northlake. TxDOT and Denton County are proposing construction of a new location non-freeway roadway of FM 1171 from IH 35W to west of FM 156 in Denton County. Construction within the project limits would be proposed as an urban and rural section, both of which would have a typical ROW width of 200 feet. The road project would include one bridge crossing at Denton Creek and another at the FM 156 intersection. The road project has an anticipated let date of Winter 2026 (CSJ 1311-01-055; TxDOT, 2021).
FM 407 (East)	FM 407 crosses the northern half of the study area in a circuitous east to west direction, through Argyle, Northlake, and Justin. TxDOT has completed a feasibility study for the portion of FM 407 from Crawford Road in Argyle to a point west of Justin. The study analyzed potential roadway options to improve FM 407, including improving the existing alignment or utilizing new alignments. Per the feasibility study, the recommended alternative typical section would include an approximately 138-foot wide ROW. From the eastern extents to Northlake, the recommended alternative would be an expansion of the existing 80-foot wide ROW. For the western portion, the recommended alignment would be on new location north of downtown Justin and overpass the Denton Creek floodplain, FM 156, and adjacent rail (CSJ 1310-01-045; TxDOT, 2019a).
FM 407 (West)	A feasibility study is being conducted to analyze potential roadway options to improve FM 407 west from Justin to the US 81/287 intersection, including improving the existing alignment or utilizing new alignments. The most recent public meeting was held May 19, 2022. No other information was available for this road project (CSJs 1568-02-013, 1568-01-016; TxDOT, 2022b).
IH 35W (Frontage)	IH 35W crosses the eastern half of the study area in a northeasterly to southwesterly direction, through Argyle, Northlake, and Fort Worth. The proposed improvements involve the construction of northbound and southbound frontage roads for IH 35W from Dale Earnhardt Way in Fort Worth to south of the IH 35E/IH 35W interchange in the City of Denton. The proposed improvements would be approximately 12.3 miles long and require additional ROW (CSJ 0081-13-065; TxDOT, 2019b).

FACILITY NAME	DESCRIPTION
IH 35W (Main)	Additional proposed improvements would consist of widening IH 35W from four main lanes (two lanes in each direction) to six main lanes (three lanes in each direction) separated by a median within the existing alignment, from the Tarrant County Line to the IH 35E/IH 35W interchange in the City of Denton, for approximately 17 miles. The existing bridge deck would be elevated slightly above the existing grade to maintain design clearance above future SH 114 main lane and frontage road improvements (see below). No direct frontage interconnectors are proposed. No additional ROW would be required (CSJs 0081-13-050, 0081-13-058; TxDOT, 2018a).
SH 114 (US 377 to IH 35W)	SH 114 crosses the southern half of the study area in a generally east to west direction, through Trophy Club, Northlake, Roanoke, and Fort Worth. The proposed improvements include constructing a new 6-lane rural freeway with 2- to 3-lane frontage roads in each direction and ramps. The existing ROW width along SH 114 varies from 420- to 500-feet in width and along Dale Earnhardt Way the width is 80 feet. Approximately 0.13 acres of ROW would be required to widen Dale Earnhardt Way (CSJs 0353-02-037, 0353-09-003; TxDOT, 2020).
SH 114 (FM 156 to IH 35W)	The proposed typical cross-section for SH 114 along this route would be a six-lane, divided highway with 12-foot wide travel lanes, ten-foot wide outside shoulders, and 12-foot wide inside shoulders. The frontage roads would consist of three 12-foot wide one-way lanes following the existing centerline of SH 114 (CSJs 0353-02-062; TxDOT 2007).
US 377	Located east of IH 35W, US 377 crosses the eastern half of the study area, including the Grapevine Lake management areas, in a northeasterly to southwesterly direction, through Argyle, Flower Mound, Roanoke, and Fort Worth. The proposed improvements involve the full reconstruction of the existing 2-lane rural roadway to a 4-lane divided highway with sidewalk from approximately 2,100 feet south of FM 1171 to approximately 2,900 feet north of Crawford Road in Argyle. The proposed improvements would potentially require approximately 36.3 acres of new ROW and 0.6-acre for permanent easement. The improvements also consist of dedicated left-turn lanes, signalized intersections, and 6-foot wide sidewalks on the east side of the roadway for the entire length of the improvements. The existing ROW varies and is typically 120 feet wide. The proposed ROW varies from 100 to 140 feet wide (CSJ 0081-03-047; TxDOT, 2018b).
US 81/287	Crosses the southwestern portion of the study area in a northwesterly to southeasterly direction, east of the proposed Ramhorn Hill Switch, through Rhome and New Fairview. Based on materials provided by the TxDOT Fort Worth District at a November 7, 2019 public meeting, these improvements include a bridge at Robertson Road, two-way frontage roads in both directions, and an overpass at Ramhorn Hill Road to the south (CSJs 0013-08-111, 0014-15-076).
* - CSJ is TxDOT nomenclature used for referencing project numbers.	

Rail facilities feature prominently within the study area, most of which are closely associated with these major road corridors. The Union Pacific Railroad Company line parallels the west side of US 377. A BNSF Railway Company line parallels the east side of FM 156 until it branches off to the west side of Perot Field/Fort Worth Alliance Airport along the southern limits of the study area. Another BNSF Railway Company line is located near the Ramhorn Hill Switch, generally paralleling the east side of US 81/287 on either side of the City of Rhome.

A review of the FAA Southwest Region Airport Directory (FAA, 2023), TxDOT Airport Directory (TxDOT, 2022c), AirNav (2023), and USGS topographic maps (USGS, 1955-1992) identified 35 aircraft facilities within 20,000 feet of the study area, 11 of which are

within the study area. **Table 3-18** lists aircraft facilities either within or near the study area. The following summarizes the types of aircraft facilities described in **Table 3-18**:

- FAA registered airports with a runway greater than 3,200 feet: four total (public), three within the study area, one outside the study area;
- FAA registered airports with a runway less than 3,200 feet: 22 total, seven airports within the study area (five private, two public), 15 airports outside of the study area (twelve private and three public);
- Non-registered aircraft landing strips with all runways less than 3,200 feet: no non-registered landing strips were identified near or within the study area; and
- FAA registered heliports: nine total, three heliports within the study area (private) and six heliports located outside of the study area (private).

TABLE 3-18. AIRCRAFT LANDING FACILITIES IN OR NEAR THE STUDY AREA

Facility Name [1]	FAA ID [2]	Facility Use	County	Relative Location
FAA Registered Airport with Runway Greater than 3,200 Feet				
Kenneth Copeland	4T2	Public	Tarrant	Southwest of the study area.
Perot Field/Fort Worth Alliance	AFW	Public	Tarrant	Along the south-central study area boundary.
Northwest Regional	52F	Public	Denton	Southeast of IH 35W and FM 1171 within the study area.
Rhome Meadows	T76	Public	Wise	In the City of New Fairview northwest of the study area.
FAA Registered Airport with Runway Less than 3,200 Feet				
Leroux	TX22	Private	Denton	In the City of Argyle east of the study area.
Carter-Norman	TA87	Private	Wise	West of the City of Rhome west of the study area.
Heritage Creek Airstrip	58T	Public	Wise	North of the City of New Fairview north of the study area.
Shiloh	0TX5	Private	Denton	In the City of Flower Mound east of the study area.
JW Airport	2TX7	Private	Wise	Near the City of New Fairview within the study area.
Dooley	0TS1	Private	Denton	West of the City of Northlake within the study area.
Prose Field	XA0	Public	Denton	West of the City of Denton north of the study area.
Dew Drop	05TS	Private	Denton	Northeast of the City of New Fairview north of the study area.
Flying S Farm	3TX2	Private	Denton	East of the City of New Fairview within the study area.
Sitton Field	3TX3	Private	Denton	Southeast of the City of Dish immediately north of the study area.
Propwash	16X	Public	Denton	East of the City of New Fairview within the study area.
Sagebrush	7XA2	Private	Denton	Northeast of the City of New Fairview north of the study area.
Clark	3T6	Public	Denton	In the City of Dish north of the study area.

Facility Name [1]	FAA ID [2]	Facility Use	County	Relative Location
Flying P	3TX7	Private	Denton	Northeast of the City of New Fairview north of the study area.
Stage Coach Hills	4TX2	Private	Tarrant	In the City of Keller south of the study area.
Hillcrest	7TX4	Private	Tarrant	Near the City of Forth Worth south of the study area.
Windmill Hill	TA21	Private	Denton	In the City of Flower Mound east of the study area.
Howard Field	TA02	Private	Denton	In the City of New Fairview within the study area.
Fairview	70T	Public	Wise	Immediately east of the City of New Fairview within the study area.
Blue Jay Airfield	XA49	Private	Denton	West of the City of Northlake within the study area.
Flack Field	62TS	Private	Wise	Northwest of the City of Rhome west of the study area.
Ultralight International	0TS2	Private	Tarrant	Within the City of Haslet south of the study area.
Heliports				
Solana North	26XA	Private	Tarrant	In the City of Westlake southeast of the study area.
Rolling V Ranch	3TE7	Private	Wise	South of the City of Rhome within the study area.
Flying A	46XA	Private	Wise	Southwest of the City of Aurora west of the study area.
Bell Training Facility	3XS7	Private	Denton	North of the City of Fort Worth within the study area.
Hillwood	XS96	Private	Tarrant	In the City of Fort Worth south of the study area.
Beechwood	TX65	Private	Denton	In the City of Fort Worth within the study area.
Carrington	TX06	Private	Denton	In the City of Bartonville east of the study area.
Barbaro North	94TE	Private	Denton	North of the City of Bartonville east of the study area.
Hawk Nest	TA48	Private	Denton	Northeast of the City of Argyle northeast of the study area.

SOURCES: AirNav, 2023; FAA, 2023; TxDOT, 2022c; USGS, 1955-1992.
NOTES:
1. Aircraft support facilities are grouped by type of facility, whether the facility is registered with the FAA and length of runway. Aircraft facilities are within 20,000 feet of the study area.
2. Identification code assigned to facilities registered with the FAA.

3.7.7 Communication Towers

Several communication towers were located within the study area as shown in **Figures 3-1B** and **3-1C**. Communication towers may include a mix of cellular phone communications, microwave towers, and other similar electronic installations located throughout the study area. No AM or FM radio transmitters were identified within the study area. No AM radio transmitters were located within 10,000 feet of the study area. No FM radio transmitters were located within 2,000 feet of the study area. Numerous microwave and cellular

transmitters were identified within the study area (Federal Communications Commission [FCC], 2018a; 2018b; 2021; 2022).

3.8 Cultural Resources

A records review of previously recorded archeological historic properties was conducted to determine the likelihood of impacts to cultural resources within the study area. The research was conducted using the THC Texas Archeological Sites Atlas (TASA) database, which contains published and unpublished data on prior cultural resources surveys, districts and properties listed in or eligible for the National Register of Historic Places (NRHP), State Antiquities Landmarks (SALs), Official Texas Historical Markers (OTHMs), cemeteries, and previously recorded archeological historic properties, including those listed in or eligible for listing in the NRHP or SAL designation (THC, 2023c).

3.8.1 Cultural History

The project area is situated in the north-central Texas Archeological Region of Texas (Perttula, 2004). Although excavations at stratified and intact sites are lacking in north-central Texas, the region's cultural chronology spans from when humans first spread throughout North America to the time of first contact with European explorers. Within this framework, and for the purpose of this study, seven generalized time periods established for north-central Texas by Prikryl (1990), Lintz et al. (2008) and other sources are synthesized below to characterize the cultural chronology of the study area region. To more accurately depict the complexities resulting from European contact with indigenous societies and ultimately colonization in Texas more accurately, the cultural time period formerly referred to as "prehistoric" is referred to hereafter as Pre-Contact.

TABLE 3-19. NORTH CENTRAL TEXAS CULTURAL CHRONOLOGY

Time Period	Years Before Present (BP)	Interval (BC / AD)[1]
Historic	150 BP – 50 BP	AD 1800 – 1970
European Contact	350 – 150 BP	AD 1600 – 1800
Late Pre-Contact	1250 – 350 BP	AD 750 – 1600
Late Archaic	3500 – 1250 BP	1550 BC – AD 750
Middle Archaic	6000 – 3500 BP	4050 – 1550 BC
Early Archaic	8500 – 6000 BP	6550 – 4050 BC
Paleoindian	pre-8500 BP	pre-6550 BC

NOTE:
1. Intervals represent time measured by "Before Christ" (BC) and "*anno Domini*" (AD), which is Latin for "in the year of our Lord."

3.8.1.1 Paleoindian Period

Although there is a growing body of evidence that challenges the previously held notions on the earliest human inhabitation of North America, the first undisputed evidence of an initial presence on the continent is the Paleoindian period, which dates from around 11,500-8500 BP (9550-6550 BC). Given that intact Paleoindian deposits are uncommon in north-central Texas, the regional Paleoindian period sequence has been developed primarily from investigations at well-stratified sites in central Texas (Collins, 1995) and the Southern High Plains (Holliday, 1997).

The Paleoindian period is marked by the waning of the Pleistocene epoch approximately 11,700 years ago and is characterized by small nomadic bands who hunted now-extinct megafauna (e.g., mammoth, mastodon, bison, camel and horse) using lanceolate-shaped and fluted projectile points hafted to wooden spears thrown with atlatls. Paleoindian projectile point technologies include Clovis, Folsom, Dalton, Scottsbluff, Golondrina and Plainview. In addition to distinct projectile point types, Paleoindian hunter-gatherers produced a variety of other stone tools, including prismatic blades, flake tools, end scrapers and gravers. Although widely characterized as "big game hunters," Paleoindian hunters also relied on smaller game such as deer, turtle, mice, raccoons and frogs (Collins, 1995). The reliance on small game and plant foraging likely increased over time as the large megafauna died out due to the drier and warmer climate conditions of the Late Pleistocene and Early Holocene (Bousman, 1998).

Paleoindian site types in Texas include kill sites, quarries, caches, open campsites, and burials (Collins, 1995; Hester, 1995). Although they occur in higher densities in the central Texas and the Southern High Plains regions, sites dating to the Paleoindian period are found deeply buried in floodplains of the Upper Trinity River basin. At the Aubrey Clovis Site in Dallas County, lithic material was observed beneath some eight meters of alluvium on the Elm Fork Trinity River floodplain (Ferring, 2001).

3.8.1.2 Archaic Period

The Archaic period in north-central Texas spans over seven millennia and comprises three intervals -- the Early, Middle and Late Archaic (Prikryl, 1990). The Early Archaic has been dated from 8500-6000 BP (6550- 4050 BC), the Middle Archaic from 6000-3500 BP (4050-1550 BC), and the Late Archaic from 3500-1250 BP (1550 BC-AD 750). Archaic remains

are usually found in upland settings and are frequently mixed with later material. Archeological sites are most common on the Upper Trinity River basin during the latter part of the Late Archaic period. These sites are usually found in upland settings and occasionally mixed with material from previous intervals. The underrepresentation of sites from the Early and Middle Archaic in the region is poorly understood and may be attributed to a substantial occupation of the area during the Late Archaic period due to improved environmental conditions.

The initial assessment of the Archaic period in north-central Texas that defined the Carrollton and Elam foci was based upon materials from such mixed terrace contexts (Crook and Harris, 1952). Consequently, these time-space constructs are no longer recognized as being acceptable for this area of Texas (Ferring and Yates, 1997; Peter and McGregor, 1988; Prikryl, 1990). General trends that have been proposed as characterizing the Archaic period in north-central Texas include an increasing complexity of settlement systems, increasing population size and density, decreasing mobility, and the development of distinct group territories (Prikryl, 1990). In general, the Archaic period archeological record reflects an increase over time in projectile point type varieties, more intensive reliance on local resources and food processing, and a wider variety of site functions.

Early Archaic

The Early Archaic dates from approximately 8500-6000 BP (6550-4050 BC) and is poorly understood due to a scarcity of Early Archaic components in the region. Although Early Archaic hunter-gatherer subsistence data is scarce, it is believed that deteriorating megafauna populations led to an intensive reliance on smaller game such as deer, fish and plant materials (Ferring and Yates, 1997). In central Texas, lanceolate-shaped projectile points transition to stemmed varieties such as Martindale and Uvalde, with split-stemmed varieties and possibly Angostura points in north-central Texas (Prikryl, 1990).

Middle Archaic

The Middle Archaic dates from approximately 6000-3500 BP (4050-1550 BC) and is characterized by settlement patterns and lithic technologies that were likely influenced by the continuance of the warmer and drier climate that began during the Early Archaic. Prikryl's (1990) synthesis of the lower Elm Fork Trinity River archeological data showed

that Middle Archaic sites were exclusively settled on first terraces above floodplains, occurring primarily along major waterways. The differential development of subsistence economies and lithic technologies between central and north-central Texas may reflect distinct adaptations to local environmental conditions and/or local cultural customs. For example, burned rock middens are widespread in central Texas and commonly found associated with Nolan, Travis and Bulverde projectile points. Conversely, these point types and burned rock middens are noticeably absent from the Elm Fork region, which instead contains Carrollton, Wells, Calf Creek, Bell and Andice points associated with smaller features such as rock-lined hearths. Important sites in north-central Texas that contain a Middle Archaic component include R.W. Watts Site Number 2 (41CP14) in Camp County and the Wild Bull site (41HE61) in Henderson County (McKay et al., 2003) and the Calvert site (41DN103) in Denton County (Ferring and Yates, 1997).

Late Archaic

The Late Archaic dates from around 3500-1250 BP (1550 BC-AD 750) and in north-central Texas is marked by peak population density and evidence of decreased mobility, which may reflect increasing use of locally available faunal and floral resources (Lintz et al., 2008) and/or the development of group territories (Prikryl, 1990). Investigations at Joe Pool Lake (Peter and McGregor, 1988) and Lake Ray Roberts (Ferring and Yates, 1997) indicate that Late Archaic site assemblages were left by small bands of foraging hunter-gatherers who occupied different localities on a seasonal basis. Human settlement and subsistence patterns during the Late Archaic are manifested in discrete burned rock concentrations (e.g., rock-lined hearths), the use of local tool stone, and faunal assemblages that suggest deer, rabbit, turtle, and freshwater mussel shells were primary food resources (Ferring and Yates, 1997). Late Archaic encampments are typically small, reflecting ephemeral occupations, and are commonly found shallow buried below floodplains on the Trinity River basin. Stratigraphic preservation of features and biotic remains is common in this area along with anthropogenic deposits (e.g., midden deposits and shell lenses) occasionally exposed along stream cut banks.

3.8.1.3 Late Pre-Contact Period

This period in north-central Texas dates from around 1250-350 BP (AD 750-1600) and is marked by a continuation of Late Archaic lifeways, alongside a transition towards new technologies and settlement patterns perhaps brought about through increased interaction

with distant neighboring groups. The transitionary nature of the early part of this period is reflected in the overlap between dart and arrow points and increased varieties of ceramic tempering (Skinner, 1982). Cook and Hughston (2015) proposed a Woodland period from AD 200-800 to differentiate the material culture at sites along the East Fork Trinity River during the Late Archaic to first interval of this period.

In general, the early portion of this period (1250-750 BP [AD 750-1200]) is characterized by increased sedentism, which is reflected in house ruins and maize horticulture, and artifact assemblages with grog- and sand-tempered pottery and Scallorn, Alba, Steiner, and Catahoula arrow points (Lynott, 1977; Prikryl, 1990). Research at Lake Ray Roberts suggests that regional exchange of technological information, rather than environmental change, likely explains the shift from Late Archaic lifeways (Ferring and Yates, 1997). The advent of the bow and arrow during this interval undoubtedly enabled hunters to harvest prey from safer distances and improved cover.

This late interval of the period in north-central Texas dates from 750-350 BP (AD 1200-1600) and is marked by direct influences from villager groups from the Southern High Plains region. This influence is indicated archeologically by the presence of distinctive end scrapers, arrow points such as Washita, Fresno and Harrell, and Nocona Plain ceramics of the Henrietta focus. Settlement patterns appear concentrated on sandy terraces above floodplains, which Prikryl (1990) attributes to the importance of horticulture, the evidence of which is limited to the presence of bison scapulae posited to be gardening tools.

Like the Southern Plains villager groups concentrated along the Canadian River and its tributaries, lithic, and faunal assemblages during this interval on the Upper Trinity River reflect an increasing importance on hunting bison. Investigations during the Joe Pool Lake project at the Cobb-Pool site (41DL148), revealed house structures, roasting pits, Alba points, burned corn, and grog-tempered ceramics, all of which are characteristic elements of the indigenous lifeway during this period, consisting of regional trade networks, and extensive hunting of bison supplemented with smaller game, plant gathering, and marginal horticulture. The period ends with the influx of European explorers around the mid-16th century; permanent Euro-American settlements in Texas by the mid- to late-17th century mark the onset of the European Contact period.

3.8.1.4 European Contact Period

In north-central Texas, the time from AD 1600 to 1800 (350-150 BP) is designated the European Contact period, representing the first physical appearance of Europeans into the region and their contact with indigenous societies. Prior to the founding of New Mexico in 1598, European presence in the Southwest and neighboring Southern High Plains region had been sporadic (e.g., Coronado in 1540-1541, the Rodriguez-Chamuscado party in 1581, Espejo in 1582-1583); however, around the turn of the 17th century, Spanish influence was never absent from the Southern Plains, although actual contact with Europeans continued to be limited and there are only brief records of journeys into or through the area (Lintz et al., 2008). Prior to around 1725-1750, Apachean groups appear to have dominated the western portion of the Southern High Plains, but after this time the area was increasingly controlled by the Comanche and Kiowa. On the eastern portion of the Southern Plains, within north-central Texas, the Wichita tribes became dominant (Bell et al., 1967; Hofman, 1989). Unfortunately, good historical documentation is sparse for the upper Trinity River basin during the Contact period, and thus it is not clear which specific indigenous groups were residing in the Dallas/Fort Worth region at the beginning of this period.

This period in north-central Texas was one of population fluctuation, movement, and amalgamation (Newcomb, 1993). Available data suggest that many aboriginal occupants of north-central Texas were Caddoan language speakers from the Arikara in the north to the Wichita and Kichai in the south. It has also been suggested that the Socoatino, who were encountered by the survivors of the De Soto expedition in the 16th century, were Caddoan speakers and the same group as the Canohatino identified by the French in the latter part of the 17th century. The latter group was apparently located at that time "on the Blackland Prairies between the Guadalupe and Trinity rivers to the east of present-day San Antonio, Austin, and Waco" (Newcomb, 1993). If the indigenous occupants of the eastern plains margin in Texas were indeed Caddoan speakers, then it would explain how these groups were absorbed very early into other Caddoan-speaking groups (such as the Yojuane, Kichai, Tawakoni, Taovayas, Iscani, and Wichita proper) who arrived in north-central Texas in the late-17th and early-18th centuries (Lintz et al., 2008). Most groups amalgamated to form the Wichita Tribe, with some absorbed by the united Caddo tribes and the Tonkawa during the late-18th and early-19th centuries. Along with the Comanche,

many of these groups were called the Norteños by the Spanish, and the archeological remains of these peoples postdating approximately 1750 are designated the Norteño Focus for the region.

3.8.1.5 Historic Background

This section contains excerpts from the Handbook of Texas Online search for "Denton County" (Odom, 2019) and "Wise County" (England, 2021) to characterize the historic context of the study area and surrounding region.

Denton County

Anglo settlement began after William S. Peters, of Louisville, Kentucky, and several others, obtained a land grant from the Texas Congress in 1841. The land settled by their company, the Texian Land and Immigration Company, became known as the Peters colony. Their grant included all of the future Denton County, as well as parts or all of several other future counties. The earliest settlement in what became Denton County was in the southeastern section, near the site of present Hebron, and most of the early residents took up land in the Cross Timbers.

In 1846, the Texas legislature formed Denton County out of what had been a much larger Fannin County. It was named for John Bunyan Denton, an eastern Fannin County Methodist preacher and lawyer, who was killed in a raid against Indians in northern Tarrant County on May 22, 1841. A county seat, named Pinckneyville, was located near the center of the county, at a spot about a mile southeast of the present center of Denton. Although county officials were elected in 1846, no courthouse was built, and less than two years later a site named Alton, three or four miles to the southeast, was made county seat. Because water was not readily available, in 1850 the legislature allowed Alton to be moved about two miles south to Alexander Cannon's homestead near Hickory Creek. A log courthouse, the first in the county, was built there. Alton soon had stores, residences, and a hotel and was a regular stage stop. In the summer of 1856, however, county residents voted to establish a new county seat near the center of the county on a 100-acre tract donated by Hiram Cisco, William Loving, and William Woodruff. The new town, named Denton, was established the next year, but was not incorporated as a city until 1866.

Denton County grew slowly until after the Civil War. In 1860 it had 4,780 residents, slightly more than 10,000 acres of improved land, and a few more than 20,000 cattle, 6,000 of which belonged to John S. Chisum, who began ranching in the northwestern part of the county in 1854. Almost all residents were still engaged in subsistence agriculture. Cotton ginned that year totaled only two bales. Growth was rapid, however, in the decade of the 1870s, when the population grew from 7,251 to 18,143. Many new residents began farms, and in 1880 almost 50 percent of the county was in cultivation.

Railroads entered the county in the 1880s and had a great economic and demographic effect. Production of such subsistence crops as corn and vegetables declined, acreage in cotton and wheat increased rapidly, and the number of cattle grazing the prairies shrank substantially. Railroads also determined town location up to the 1970s, when only one town of any size was not on one of the railroad lines built in the 1880s.

Although Denton County's railroads made the county a significant agricultural producer, they did not make it an important commercial or manufacturing center. Consequently, population expansion in the 20th century, slow in response to agriculture after 1900, depended to a great extent on other forms of transportation and on higher education. The county's population growth and its economic and cultural life were much influenced by the location in Denton of two large state-supported universities. The University of North Texas, established as Texas Normal College in 1890, had an enrollment of more than 20,000 in 1993. At the same time, Texas Woman's University, which originated in 1903 as Girls' Industrial College, had an enrollment of about 5,000 at the Denton campus.

Automotive transportation and, perhaps to a lesser extent, the location of Dallas-Fort Worth International Airport, played a large part in the growth of Denton County after 1940. Completion of Interstate Highway 35 in the 1950s increased commuting, and in the 1980s interstate highways 35E and 35W forked in Denton. All towns and cities of the county had a significant commuter element, but the southeastern portion, growing most rapidly, was virtually an extension of Dallas–Fort Worth. Lewisville, The Colony, and the part of Carrollton in Denton County

were all population centers because they were suburbs of Dallas. The population of Denton had also grown because of the city's proximity to Dallas and because of the growth of the University of North Texas and Texas Woman's University.

The county population grew from 47,432 in 1960 to 143,126 in 1980. Many new rural residents owned small spreads, and mobile homes vied with expensive, sprawling ranch houses for space. Large horse ranches were scattered through the county. Newcomers and many older residents returned much of Denton County's rich cropland to pasture, and by the 1980s rural areas, almost depopulated by the rural-to-urban shift after World War II, had probably returned to their 1920s level in density of population.

Wise County

At the time that the first White settlers came to the area, one village of approximately sixty-five Delaware Indians led by Jim Ned remained in Wise County. Jim Ned and his peaceful band befriended the Whites, and various hills, streams, and communities were named after the Indian leader. Hostile groups of Kichai Indians also lived in the area near Bridgeport during the period, and they raided White communities in Fannin County. Generals Edward H. Tarrant and James Smith led expeditions against them during the 1840s and early 1850s. By 1855 the permanent indigenous settlements had moved to reservations in West Texas. The history of White settlement in Wise County began with Sam Woody, who moved to Deep Creek (then in Cooke County) in 1854. His original log cabin remains as a historic site. Many other settlers, eager to take advantage of the state preemption grants of 160 acres of land, followed Woody into the area. District surveyors from Cooke County in the north and Denton County to the east mapped out the area, most of which was drawn from Cooke County.

Wise County was officially established by legislative act on January 23, 1856, and was named in honor of Henry A. Wise, a United States Congressman from Virginia, who, during the 1840s, supported the annexation of Texas. The county seat, Decatur (originally named Taylorsville), was selected by a countywide election and, though challenged after the courthouse burned in 1895, has remained the seat of government to the present. Most residents engaged in open-range ranching

through the 1880s; the two most prominent ranches, owned by W. H. Hunt and Daniel Waggoner, were in western Wise County. The predominantly southern populace supported secession in 1861 and raised five Confederate companies that fought in the Civil War. The removal of federal troops from the frontier left outlying settlements at the mercy of hostile Comanches and other plains Indians. Texas militia units, formed to patrol from the Red River to the Rio Grande, set up a post in Decatur. Local volunteer groups also defended the frontier communities. Nevertheless, many farms were abandoned, as fearful residents moved into towns for protection against Indian attack.

Decatur was a stop on the Butterfield Overland Mail route from St. Louis, Missouri, to San Francisco, California. A government telegraph line also connected the county with larger population centers. Between 1866 and 1886 the Eastern Cattle Trail to Abilene, Kansas, crossed Wise County east of Decatur. The coming of the railroads eventually provided a more convenient and cheaper means of transportation for crops and livestock. In the 1880s and 1890s two railroads were built through the county-the Fort Worth and Denver City, which passed through Decatur, and the Rock Island, which crossed the western section of the county through Bridgeport. The railroads stimulated the economy and made the production of coal in Bridgeport and of cotton, wheat, and beef in eastern Wise County more profitable.

The population increased steadily and reached the highest point in county history in 1900 at a total of 27,116. A community of Hispanics was brought in to work in the coal mines, and thus another ethnic dimension was added to the population. Bridgeport's large lignite coal reserves supplied fuel for most of the region until 1910, when the Lone Star Gas Company offered residents an alternative energy source with the completion of a natural gas pipeline. Telephone service was provided by both Southwestern Bell Telephone Company and by various private telephone services. Eventually, Texas Power and Light Company bought the electric properties of the city of Decatur and expanded its services to Rhome and other smaller communities. The rural areas, however, did not receive electricity until the 1930s, when the Wise County Electric Co-Op was organized.

During this forty-year period the introduction of the automobile and the construction of U.S. Highway 81 increased the mobility of local inhabitants. From 1892 to 1965, Decatur Baptist College offered the opportunity for a higher education. Throughout the era Wise County maintained a predominantly agricultural economy with a rural population. The economy depended on stock raising and wheat, corn, and cotton production. Overproduction of cotton depleted the soil and contributed to serious erosion problems in the area; crop yields diminished steadily after 1910. During the 1920s both beef and cotton declined in importance, as the economy shifted to dairying and truck farming. By 1949, on the other hand, Wise County was one of the major milk-producing areas in Texas. Oil and gas production also increased during the era.

The Great Depression and World War II accelerated the decline of the population and the economy, a trend that did not halt until the 1960s. Low prices for livestock and crops led to widespread unemployment; in 1930 only 4 percent of the labor force was out of work, but by 1940 the percentage had increased to 18.8. The Relief Administration of Wise County was located in the county courthouse in Decatur; there were 1,200 people on relief in 1935. The Civil Works Administration and the Civilian Conservation Corps employees built the Decatur High School and participated in erosion control, road repairs, and other projects. During the postwar years the economy stabilized, but the county population decrease continued.

It was not until the 1960s that a reversal of earlier trends began. The number of industries in the county grew correspondingly during this period, while the farm statistics remained fairly stable. In the early 1980s most of the inhabitants still lived in rural communities where much of the land was devoted to farming and ranching. Many were engaged in manufacturing, wholesale and retail businesses, and agriculture and agribusinesses; many also commuted to the Dallas-Fort Worth area. The most important products were grains, peanuts, dairy products, poultry, and beef. Local factories manufactured glass, clothing, carbon and graphite products, oil and gas, limestone, and gravel.

3.8.2 Records Review

3.8.2.1 Previous Archeological Investigations

According to a review of the TASA database on October 4, 2022, a total of 19 archeological historic properties, 14 of which have an undetermined NRHP eligibility status, and 5 that are ineligible for listing on the NRHP, are documented in the study area. In addition, the TASA records search revealed that approximately 3 percent of the study area has undergone previous archeological investigations. A list and description of each archeological historic property documented in the study area is provided below in **Table 3-20** followed by the historic-age resources and cemeteries in **Table 3-21**.

TABLE 3-20. ARCHEOLOGICAL HISTORIC PROPERTIES DOCUMENTED WITHIN THE STUDY AREA

Resource ID	Resource Type	Chronology	Resource Description	NRHP/ SAL Eligibility	Year Recorded
41DN249	Rural House Site	1870-1900s	Abundant glass, whiteware, and stoneware	Undetermined	1988
41DN358	Historic dairy operation	Late 19th – early 20th century	Many historic structures including houses and barns	Undetermined	1981
41DN359	Historic dairy operation	Late 19th – early 20th century	Part of the Mahaffey Dairy	Undetermined	1981
41DN360	Historic structure	Historic	Two sheds, now bulldozed	Undetermined	1981
41DN361	Historic structure	1930s or 1940s	House, garage, and guest house	Undetermined	1981
41DN362	Historic complex	1920s or 1930s	Large ranch complex	Undetermined	1981
41DN363	Historic structure	Early 20th century	House and outbuildings	Undetermined	1981
41DN364	Historic structure	1875-1880	Large barn	Undetermined	1981
41DN365	Historic development	Historic	Two houses and several sheds	Undetermined	1981
41DN503	Historic artifact scatter	Early Statehood	Glassware, crockery, and metal	Undetermined	1993
41DN538	Historic farmstead	Early 20th century	Limestone foundation slabs	Ineligible	2005
41DN552	Historic schoolhouse	Late 19th to early 20th century	Remains of a schoolhouse made up of concrete foundations and glass debris	Undetermined	2008
41DN553	Historic house	Early 20th century	Cumberland plan dwelling	Undetermined	2008

Resource ID	Resource Type	Chronology	Resource Description	NRHP/ SAL Eligibility	Year Recorded
41DN583	Historic brick scatter	Early 20th century	Fire bricks from a steam engine	Ineligible within ROW	2012
41DN590	Historic artifact scatter	20th century	Misc. glass debris including milk glass and whiteware	Undetermined	2015
41DN607	Historic farmstead	20th century	House and cellar surrounded by historic debris	Ineligible	2018
41DN612	Historic dump and pre-contact encampment	Historic / Transitional Archaic	Hardeman Midden Site. Burned rock features with faunal bone and mussel shell. Historic refuse deposits	Undetermined	2019
41DN616	Historic farmstead	Late 19th to early 20th century	Concrete water tank, shed, and historic debris scatter	Ineligible	2017
41WS48	Historic house	20th century	Foundation stones, root cellar depression, windmill, and watering areas	Ineligible	1999
SOURCE: THC, 2023c					

Historic Period Sites

The TASA records show a total of eleven OTHMs, ten cemeteries, one NRHP property and one NRHP district documented within the study area. No state historical sites are mapped in the study area. A list and description of the historic resources documented in the study area is provided in **Table 3-21**.

TABLE 3-21. NRHP PROPERTIES/DISTRICTS, OTHMS AND CEMETERIES DOCUMENTED WITHIN THE STUDY AREA

Resource ID	Resource Type	Chronology	Resource Description	Year Recorded
Old Continental State Bank	NRHP Property	1900-1924	Historic building eligible under criteria A and C	1986
Central Roanoke Historic District	NRHP District	1875-1974	Historic district with Romanesque and Early Commercial building types	2007
Roanoke Lodge	OTHM	1908	Roanoke Lodge No. 668 A.F. & A.M.	1990
United Methodist Church of Rhome	OTHM	1940	Historic building	1982
Silver Spur Saloon	OTHM	1886	Built using local sandstone, this building was used as a saloon, then hardware store, then a cafe	2009
Roanoke Water Tower	OTHM	1936	A water tower built with Public Works Administration funding. It is no longer in use	2010

Resource ID	Resource Type	Chronology	Resource Description	Year Recorded
Roanoke	OTHM	1881	A township platted in 1881 that drew settlers from nearby Elizabethtown and Medlin	2008
Justin	OTHM	1841-1946	Established as an important stop of the Gulf, Colorado & Santa Fe Railway	2014
First National Bank in Rhome	OTHM	1904-present	The first bank in Rhome and was national chartered in 1914. At its present location since 1975	1984
Elizabeth Cemetery	OTHM / Cemetery	1867-1978	Cemetery for Elizabethtown	1978
Medlin Cemetery	OTHM / Cemetery	1850-1977	Cemetery servicing settlements that would later become Roanoke	1977
Prairie Mound Cemetery	OTHM / Cemetery	1878-1961	Cemetery associated with Prairie Mound Episcopal Church	1981
Thurmond-Fairview Cemetery	OTHM / Cemetery	1883-1979	Cemetery servicing the community of Fairview	1979
Justin Cemetery Dunham Cemetery	Cemetery Cemetery	Information unavailable 1879 to early 20th century	Information unavailable 12 graves	Information unavailable 2007
Kelsay Cemetery	Cemetery	1867-1900	12 graves	2008
Wolfe-Foster Cemetery	Cemetery	1862-1958	60 graves	2011
Bethel-Rhome Cemetery	Cemetery	Information unavailable	Information unavailable	Information unavailable
Isabelle Cemetery	Cemetery	1859-	Information unavailable	Information unavailable
SOURCE: THC, 2023c				

A review of the Family Land Heritage Program listed several century farms (Texas Department of Agriculture, 2023) within Wise and Denton Counties. However, the publicly available database provides non-specific descriptions for listed properties (e.g., eight miles north of Decatur) and the exact locations are difficult to discern. A review of the data suggests two century farms may exist in the western portion of the study area.

The earliest available historic USGS topographic maps, the 1960 Argyle, Justin and Rhome, Texas Topographic Quadrangles were examined for historic structures and farm/ranching features. These historic topographic maps depict the study area as largely undeveloped rural land with sparse concentrations of residential areas mapped in and around the small communities of Justin, Rhome and Roanoke, Texas. The remainder of the study area shows intermittent residential and outbuilding structures located mostly along major roadways. Historic aerial photography available from the Nationwide Environmental Title Research (NETR) website depicts a similar rural setting throughout

much of the study area with small population centers visible intermittently across a predominately rural landscape during the mid-20th century (NETR, 2023).

Known and perceived disturbances within the study area include those associated with agricultural processes such as clearing, plowing, and terracing, roadway construction and maintenance, installation of overhead and underground utilities, clear cutting of vegetation, and residential and commercial development practices.

4.0 IDENTIFICATION OF PRELIMINARY ALTERNATIVE ROUTE LINKS

Upon completion of the various data collection activities and constraints mapping process, the next step for the proposed project was to identify preliminary alternative routes to connect the proposed Ramhorn Hill Switch and Dunham Switch endpoints. Potential alternative routes were plotted on recent aerial photography (NearMap, 2023) based on the findings of the reconnaissance surveys, information from local, state, and federal officials, property boundary maps, and other environmental and land use constraints data. The initial property boundary maps utilized to locate apparent property boundaries consisted of GIS county appraisal district data. Digital gas and petroleum pipeline data obtained from the RRC (2022) were used to identify pipeline corridors and other oil and gas facilities (e.g., natural gas pads, individual well sites).

In the development of preliminary alternatives, Halff considered existing corridors (e.g., existing transmission lines, public roadways) and apparent property and land use boundaries, in accordance with the provisions of PUCT Substantive Rules Section 25.101. Pipelines were not considered as existing compatible corridors. Ultimately, Halff identified numerous preliminary alternative route links that, when combined, form an assortment of preliminary alternative routes to connect the different project endpoints.

Oncor defined a specific point of origin at each station to which the terminal link would connect. The layout of the station defines each point of origin (e.g., all preliminary links would connect to the east side of the proposed Ramhorn Hill Switch). A link is defined as a route segment that progresses in a generally forward progressing direction, prior to diverging, or branching, in at least two different directions, or new links. Each branch location is defined as a node.

Oncor presented the preliminary links at the in-person public participation meetings, as further discussed in **Section 5.0**. The public meeting notice in **Appendix B** depicts the preliminary links that were presented at the public participation meetings. **Appendix H** provides the route links as presented at the public meetings in relation to city limit boundaries on **Figure 3-0**. After the public participation meetings, Halff made modifications to the preliminary route links after considering updated property data, guidance from Oncor, additional field investigations, and comments received from the

public participation meetings. **Figures 3-1A** to **3-1C** in **Appendix H** show the final route links. Each of these maps may be used for reference for the following sections.

4.1 Federal Non-Recreational Outgrant Policy

Early in the routing study process, the extent of USACE-owned land in proximity to the Dunham Switch was recognized as a constraint for any link progression to/from the Dunham Switch. As documented in **Section 3.7.2**, much of the land associated with Grapevine Lake is owned and managed by the USACE as wildlife management or environmentally sensitive areas defined in the Grapevine Lake Master Plan.

Statutory authority allowing USACE to authorize other entities the right to use its lands and waters is listed in the USACE Non-Recreation Outgrant Development Policy (USACE, 2013). That policy outlines the policies and process for approving licenses, easements, leases, or other real estate instruments authorizing use (i.e., outgrant) of USACE fee-owned property. As stated in the policy, the primary rationale for authorizing any request will be one of two reasons: (1) there is no viable alternative to the activity or structure being located on [USACE] land or waters; (2) or there is a direct benefit to the federal government. The policy notes that cross-country utilities are types of activities, or projects, that may have 'no viable alternative.' Nonetheless, outgrant requests for these types of projects must still demonstrate the lack of viable alternatives in any outgrant request for the utilization of public land and waters. Viability in the outgrant policy is defined as:

> "Other lands and/or waters (not under Corps management) that can meet the intended objective of the request. Factors such as cost impacts (e.g., escalation) to the request or the perceived availability [of] underutilized or unused Corps lands or waters will not have bearing on the determination of viability."

The 'no viable alternative' evaluation criterion is further directly addressed in application submission requirements which instruct an applicant to:

> "Justify placement of structure or facility on government property. The justification should include a description of all alternative locations and routes that were investigated, including routes and locations off project lands. The description will also include rationale for why the other alternatives were not selected. Cost factors alone will not affect the determination of viability."

In addition to these definitions and instructions, it is recommended in the policy applicability statement that designated corridors be established in Project Master Plans (e.g., Grapevine Lake Master Plan) where feasible and that any new proposals should utilize these corridors where they exist. As part of the agency consultation process, Halff coordinated directly with the USACE Grapevine Lake Office to verify utility corridor information in the Grapevine Lake Master Plan and USACE's application of the outgrant policy. During this coordination, Halff found a document filed in Docket No. 38597, which appears to contain PUCT guidelines for crossing USACE property that were developed in coordination with the USACE in or around 2009. Although Halff was unable to locate an original source for this document, the guidelines align with Halff's understanding of the outgrant policy and with the process Halff employed to determine the feasibility of crossing USACE property for this project. This includes early outreach to the USACE Grapevine Lake Office, an examination of viable alternatives to a USACE crossing, and a joint examination with USACE officials of potential crossings, including potential crossings using, and outside of, the designated utility corridors. A copy of the guidelines document filed in Docket No. 38597 is included in **Appendix G**. Electronic mail correspondence provided in **Appendix A** validated both the information regarding the designated utility corridors as defined in **Section 3.7.4** and Halff's interpretation of the outgrant policy as it applies to the Grapevine Lake Master Plan.

In consideration of federal policy and local lake office guidance on the implementation of that policy, Halff's development of preliminary route links first sought viable alternatives that did not cross USACE lands. If crossing USACE land was necessary, or otherwise desirable in relation to other constraints or limited opportunities, transmission line routing considered the utility corridors identified in the Grapevine Lake Master Plan. As discussed in **Section 4.2**, Halff determined that it would be necessary for one link (Link G2) to cross USACE lands at one of these corridors.

4.2 Preliminary Alternative Route Links

As shown in **Figures 3-1A** to **3-1C**, routing constraints become more prevalent as one moves from the Ramhorn Hill Switch east to the Dunham Switch. Although some active developments were noted in the western portion of the study area, the landscape provided much more open space, within which a variety of routing possibilities were evident. Eastward progression toward the FM 156 corridor showed active growth around the City

of Justin and a densely developed SH 114 corridor. Opportunities to approach the IH 35W corridor were available through the Denton Creek floodplain. However, existing development between IH 35W and US 377, and the location of the Dunham Switch relative to USACE lands, narrowed the scope of opportunities relative to the rest of the study area. Therefore, the routing approach and link assignments described below started from the region of more constraints (i.e., Dunham Switch) and progressed to regions of fewer constraints (i.e., Ramhorn Hill Switch).

Dunham Switch and IH 35W Approach

Progression from the Dunham Switch was northward as the FM 1171 corridor provided viable alternatives rather than a direct westward progression across USACE land. Multiple links combine to utilize both sides of FM 1171 as development, either established or in progress, precluded the use of a continuous corridor along either the north or south side of the road. Northwest Regional Airport limits opportunities further south of the road. Other westward progressing routes were developed north of FM 1171, including links that parallel an existing 345 kV transmission line to navigate between the residential communities along either side of Graham Branch. To increase geographic diversity from these two general corridors, Halff reviewed additional northward progressing routes. The density of residential neighborhoods along the west side of US 377 directed routing alternatives further north into older residential communities, established between 1981 and 1996 (NETR, 2023), that had larger lots that could potentially accommodate the proposed project. These northern alternatives along with the other two corridors developed six potential crossings of the IH 35W corridor.

Consistent with the USACE Outgrant policy and PUCT guidance, Halff examined the possibilities of routing around USACE lands and determined that viable alternatives as discussed above (*Dunham Switch and IH 35W Approach*) were available. In the one location where crossing USACE lands would be required (Link G2), the routing approach utilized a location identified in the Grapevine Lake Master Plan as Utility Corridor 15.

IH 35W to FM 156

West of IH 35W, most of the preliminary route links progress in an east-to-west fashion with several north-to-south interconnecting links to provide more routing options. The exceptions are Links D0 and G9 which relied on a narrow corridor along the south side of

FM 407 through the Town of Northlake. Halff obtained the future FM 1171 configuration which extends from the existing IH 35W corridor to a point near the City of Justin's downtown area. All preliminary route links accommodate the future FM 1171 alignment. From the Denton Creek floodplain, preliminary route links cross what is currently open pastureland as they approach select locations that cross FM 156.

The northernmost crossing of FM 156 (Link J8) near the Oliver Creek and Denton Creek confluence parallels the north side of Denton Creek which is mostly vacant property. By contrast, Link J4 crosses through the narrow floodplain of Trail Creek south of the downtown area of the City of Justin. This alignment also crosses near a cemetery east of FM 156 and through designated park space west of FM 156. Additional crossings of the FM 156 corridor include an area where each side of FM 156 contains relatively few existing constraints (Links I7 and I8), and a southern alternative which must route along either side of a rail corridor (Link J2), both sides of which include residences and/or outbuildings (e.g., detached garages, sheds). The southernmost link (Link I1) navigates industrial development near SH 114 prior to progressing west using the floodplain of Harriet Creek between residential development.

West to Ramhorn Hill Switch

The approach to the Ramhorn Hill Switch consisted of considerably more open space. An existing electric transmission line corridor along SH 114 frontage provided little opportunity as a parallel corridor based on the amount of development along either side of the highway, and the only other transmission line corridor in the region was not aligned in the needed direction. In the absence of any obvious constraints, the routing approach was as direct as possible, either following apparent property boundaries where feasible or navigating a straight-line path between ranchland oil and gas facilities. This portion of the study area also includes many north-to-south interconnections between westward progressing links to increase routing options.

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5.0 PUBLIC INVOLVEMENT PROGRAM

The various data collection activities utilized in the development of a constraints map and in the ultimate selection of preliminary alternative routes were presented at the in-person public participation meetings as described in **Section 2.5**. The two public participation meetings were held on December 7 and December 8, 2022, from 4:00 P.M. to 7:00 P.M. at the Marriott Hotel & Golf Club Champions Circle in Fort Worth, Texas. The figures found in **Appendix B** depict the location of the preliminary alternative route links that were presented at the public participation meetings.

At the public participation meeting held on December 7, 2022, 77 people signed in and 27 questionnaires were received. At the public participation meeting held on December 8, 2022, 95 people signed in and 44 questionnaires were received. In addition to the questionnaires that were turned in at the meetings, numerous questionnaires and/or letters were submitted by electronic mail at a later date to Oncor, which were ultimately provided to Halff for review. Many questionnaires received at a later date came from individuals who attended one or more of the meetings. Other questionnaires were submitted by individuals or groups who did not attend any of the meetings.

The questionnaire requested input concerning transmission line routing issues regarding land use, paralleling existing corridors, and community values/resources. Respondents were asked to rank different factors as the most important consideration in terms of land use, their preference for paralleling existing corridors when considering potential routes for the proposed project, and to rank a list of habitable structures, community values, and other resources in order of importance as it pertains to maximizing the distance from the proposed project. The respondents indicated an overwhelming preference for maximizing the distances relative to residences, schools, churches, and recreational areas. The effect on the residential aesthetic was also a common theme. The questionnaire also provided space for respondents to include any general comments or remarks. A variety of general comments were received in the questionnaires and are summarized in **Section 5.1**.

5.1 Public Participation Meeting Comments

As noted, comments were received both during and after the public participation meetings. Those received after the meetings were received in a variety of formats, including:

- hard copy or electronic questionnaires from those who may have attended the public participation meetings;
- electronic questionnaires from those who obtained a copy of the questionnaire after the public participation meetings; and
- electronic mail providing a statement or opinion summary regarding the project, with or without the questionnaire attached.

Representative comments, remarks, and concerns submitted in either questionnaire or electronic mail format are grouped by topic in **Section 5.1.1**. Other noticed parties provided, in lieu of or as a supplement to the questionnaire, letters containing maps of the preliminary links overlain on proposed developments for a given tract or tracts, providing recommendations for alternative routes. These comments are summarized in **Section 5.1.2**.

5.1.1 Questionnaires and General Comments

Due to the high volume of comments received, and because many submittals adopted identical form language focused on a particular subject or location, sample comments or general summaries are presented to reflect the overall public response for a particular theme or topic. Comments usually covered many subjects in one response, and any statement excerpted from a comment to represent a particular subject does not reflect dismissal or a lack of regard for any other language or subject addressed in the comment. The approximate number of comments are provided for each theme or topic. Please refer to **Figure 5-1** (**Appendix H**) which contains route links as presented at the public participation meetings along with labels related to the following communities or topics.

Liberty Christian School (~1,000 comments)

The Liberty Christian School campus, a portion of which is crossed by Link D2, was a subject to which respondents participated in a petition-style comment process, providing a questionnaire with the same adopted language as follows:

I oppose the Northern Route, specifically line D1-D4, because of its impact on Liberty Christian School. The impact to Liberty Christian School includes but is not limited to: Multiple transmission lines across the campus, including near playgrounds, classrooms, and recreational areas that are also used by the public; easements on either side of the transmission line and the impact on future development and growth opportunities and the potential impact on current assets; relocation and construction of traffic flow and parking availability; and daily construction impact during installation for traffic flow and student, staff, visitor and public attendance and parking availability.

In addition to this petition-style collection, which represented one of the larger groups responding to a subject, the school campus was reflected across a broader range of respondents from the Town of Argyle, with other comments regarding the proximity of the proposed project to a school.

- "Please strike routes D1-D4 from consideration as the damage to the environment of Liberty Christian School and surrounding neighborhood of Liberty Crossing would be too grave."
- "I feel very strongly that it would be extremely unethical and irresponsible to put the transmission line on any school campus."
- "This line would eliminate the ability of children to walk to school in the adjacent neighborhood that was built specifically for that purpose."
- "It is unethical to put lines on a school campus near where young children play."

<u>Cross Timbers Church (~450 comments)</u>

Another large collection of comments included questionnaires received on behalf of Cross Timbers Church. Rather than an adopted statement at the end of the general comments section, identical notes were provided in multiple locations throughout the questionnaire:

- "Do not run transmission lines near or through a church. For example, proposed Route D directly impacts Cross Timbers Church and I strongly oppose that route."
- "Proposed Line D would negatively impact Cross Timbers Church. I am associated with the church and opposed Route D."
- "I oppose the northern route, specifically Line D1-D4 because of its impact on Cross Timbers Church due to the easements required."

Town of Argyle (~550 comments)

Residents of the Town of Argyle similarly provided petition-style comments with adopted language as follows:

> *The Northern Route D1-4 is highly opposed by the residents of Argyle, members of Cross Timbers Church and parents, staff, students of Liberty Christian School. There is NO PRUDENT AVOIDANCE of homes, school, church, and parks with line D1-4. Forced division of multi-million dollar homes. Argyle is a tree canopy and the proposed route through Argyle will kill thousands of trees. All utility lines in Argyle are currently buried and this would be an eye sore directly in our back yard, taking out our permanent structures in our back yard. This line would ELIMINATE the ability of children to walk to school in the adjacent neighborhood that was built specifically for that purpose.*

In addition to these petition-style comments, numerous other Argyle residents from neighborhoods identified as the Settlement, Forest Trail, and Tuscany Hills provided questionnaires that had shared language about the urban tree canopy within the town, citing statistics from a formal urban tree canopy study conducted for the Town of Argyle. A notable theme was the concern of the potential loss of old growth post oak trees, the clearing of which would be counter to the town initiative to increase urban tree canopy. Respondents also expressed their concern for the expected loss of wildlife and potential land value that would be associated with the removal of the vegetation.

Town of Northlake (~300 comments)

Some residents of the Town of Northlake provided petition-style electronic mail statements that followed the general outline below:

> *I oppose the proposed Oncor route running along 407 and especially the route that would run along Stone Ridge Drive. Mayor Rettig and the Northlake City Council members have proposed an alternate southern route that I support. It would have the least amount of impact to residents in established neighborhoods.*

Some of the respondents modified the statement to include the proximity to Valley Ridge Drive or specified the neighborhood of North Ridge Estates, or included their own personal concerns regarding health, aesthetics, or land value.

Canyon Falls (~60 comments)

Residents of Canyon Falls, a master planned community within the municipalities of the Town of Flower Mound and Town of Argyle as well as the Town of Northlake, returned questionnaires at the meeting and provided several comments by electronic mail, tending to provide original content rather than to adopt a community-wide statement. Common themes expressed concern for the overall health of families and the neighborhood, the effect on the aesthetic of the neighborhood, and the effect on property values. The effects of Link E5 along Graham Branch were specifically noted. Several cited preferences for their town leaders' proposal to utilize USACE land in the southern portions of the study area. Other residents of neighborhoods in the Town of Northlake (e.g., Harvest by Hillwood, Pecan Square) also expressed similar concerns.

Trailwood Subdivision (~10 comments)

Much of the representation from the Town of Flower Mound residents was from this subdivision located between FM 1171 and USACE lands west of US 377. Several questionnaires were returned at the public meetings. As with the other previously mentioned neighborhoods, proximity to homes along with the concerns of the project effects on human health and the overall aesthetic of the neighborhood was a consistent theme. There was also an emphasis on the youth of the residents, citing that it was a community with new families and younger children. In addition to questionnaires, other statements were submitted to Oncor via electronic mail expressing similar concerns. Alternative location suggestions were provided, albeit mixed. Some recommended a Links C1-C2-C5-C7 progression, whereas others supported alternatives "to the south" or specifically across USACE land.

Legacy Ranch (~10 comments)

Comments were provided by this subdivision south of the City of Justin expressing similar concerns of other neighborhoods.

- "This route is labeled J3 and would put the high-powered voltage poles 50 yards from my backyard! I believe there are other routes that would go through open spaces as opposed to this one that would greatly impact our small neighborhood."
- "It will destroy the habitat of many animals living in the greenspace and pond."
- "Why would you choose to disrupt happy homeowners when you have the option to choose an open space area?"
- "To my understanding, there are several different route options that would not negatively impact my family and neighbors, or anyone's family for that matter. Why a route through a neighborhood would be chosen over one through vacant land is beyond me. Please do not select the J3 route, or whichever route would go through Legacy Ranch in Justin, TX."

Avery Ranch (~20 comments)

A collection of residents in the Avery Ranch community near Propwash Airport provided comments either as addressed letters to Oncor, electronic mail to Oncor, or either of these in combination with the questionnaire. Sample shared statements by the community included the following:

- "Electromagnetic fields generated from the overhead lines are unsafe and negatively impact those in close proximity."
- "This community is very active and many ride bikes and walk in the areas designated for Ramhorn Hill Dunham."
- "We have many evening and weekend pilots flying in and out of Propwash Airport and to add an obstacle to the departure/landing/traffic pattern area is dangerous. An obstacle of any height when there are students training, and novice pilots flying in the area is unconscionable."
- "As a private pilot, the proposed location is not responsible and could lead to serious consequences."
- "The proposed project will no doubt adversely [a]ffect property values with zero reimbursement to the adjacent homeowners."

Northwest Regional Airport (~60 comments)

Northwest Regional Airport is generally west of the proposed Dunham Switch located between FM 1171 to the north and USACE lands to the south. Oncor received comments from airport users summarizing their concern regarding project proximity, effect on airport

operations and safety, and land value. Sample statements by the community included the following:

- "Transmission lines located in close proximity to airports create an unreasonable and foreseeable risk of harm to aircraft operators."
- "I am opposed to the proposed route of this transmission line along [FM] 1171 as it will be less than 2500 feet from the north end of our runway. This is an obstacle that I believe adds a risk to me and all of us safely departing and arriving at our airport, especially if I have mechanical issues or experience a wind shear event."
- "The aviation community will take notice of such a compromise in safety and avoid this airport."
- "This power line may or may not affect aircraft making a normal approach and landing to the south but it will definitely be a factor for an airplane with an engine problem, especially one taking off to the north."
- "The installation of these transmission power lines will impact the safe operation at our airport and undoubtedly lead to lower property values and destroy my investment."

Other Landowners

Not all landowners were associated with neighborhoods or incorporated areas of the study area. They still expressed similar concerns regarding proximity to homes, but also provided some different context as shown below.

- "I personally would be greatly impacted by the proposed lines F2, F3, and E8 as they would run across two sides of my property. I oppose any route that runs along the north side of [FM] 1171 and anywhere along Cleveland Gibbs Road and 1171."
- "I already deal with railroad, the airport traffic, and a grease plant. But they were there before I moved in. What can I do to keep it from being put in behind my house."
- "Since Oncor owns that property and A0 and A4 route goes north up the side of that property, I do hope that if a route is chosen that A0 and A4 will be that route and it will extend north."
- "This land has been in family for over 100 years. It is my wife's parents' legacy to her, sister, and brother. We plan to develop in the near future."
- "Minimize the length across future planned developments. Proposed routes I oppose: M5, M4, R1, R2, R3, R6, R5."

- "Minimize the length across future planned developments. Proposed routes I oppose: T5, T4, T3, T2."
- "The proposed route links Q5, Q2, and Q1 all interfere with my private airport submitted on FAA Form 7480-1 notice for construction, alteration, and deactivation of airports."
- "Our property is on a corner of a county road and state highway which makes it a very valuable corner. You will destroy any value our land has by running huge high lines and poles across that corner."
- "No to Route O7. In flood zone prone to flash flooding."
- "The location of proposed G9 makes a significant portion of my property useless for future development."
- "We have cattle and cannot afford to shut off a pasture for a whole year. We are on the Q2 line."
- "Are you aware the Graham-Nelson cemetery is just to the West of Tuscany Hill?"
- "We live on a century farm. The land has been in the family for 123 years. The farmhouse was built in 1926 and is lived in currently by Barry and Kelly Eaton."

Topic: USACE Land (~40 comments)

- "There is a huge tract of Army Corps of Engineers land that could be used for this project that would limit the impact to families that live along the proposed routes."
- "The federal government land is a better alternative than going through private property."
- "Undeveloped land - should be used if you cannot use Corp of Eng land."
- "Route lines through Army Corps of Engineers Land."
- "I am in support of the proposed route by Mayor Rettig (Northlake) and Mayor Livingston (Argyle) which moves the route south to unpopulated areas. Please support their alternate proposed route along the Army Corp property South of 1171."
- "I have a hard time seeing how placing line[s] in multiple establish[ed] neighborhood(s) could be cost effective, when there is open land in the tail water of the lake that already has multiple power line[s]."

- "I am well aware of both Argyle's and Northlake's coordinated efforts to propose an alternative route that cuts through the Corps of Engineers property, unfortunately this route also has a direct impact to my residential property."

Topic: Project Length/Efficiency (~220 comments)

- "Why go miles to the north from Ramhorn then miles to the south to Dunham when Oncor could use the existing transmission line route along [SH] 114."
- "We emphatically demand that Oncor, and the PUC consider more direct routes in accordance and proximity with the southern location of the switches."
- "Money wise it makes sense to connect the two substations by shortest route."
- "My house is north of both switch gear locations, so I need to understand why the line needs to travel north to connect both stations. It seems to me that it would be inefficient and more costly."
- "Argyle, Northlake, Justin, are not reasonable locations for this project as the route is not cost effective, necessary, nor in reasonable proximity to the Ramhorn-Dunham switches."
- "Argyle is not in reasonable proximity to the Ramhorn-Dunham switches."

Topic: Property Value (~170 comments)

- "What are you going to do to compensate my property value?"
- "My house will depreciate. When you're older and count on your home as a(n) asset then have the value reduced because of these lines, it's not right."
- "With one of the locations behind our homes property values may decline."

Topic: Aesthetics/Quality of Life (~50 comments)

- "The northern routes impact thousands of existing homes. Please route through current and future industrial zones where these lines are far less aesthetically impacting."
- "This proposed route would damage that aesthetic appeal of our community and also resulting the demolition of much of our wooded area that surrounds streams and walking trails."
- "Destruction to the beautiful appearance of (the) neighborhood."
- "We moved to the country for the peace and view, a power line would effect both."

- "The towers would be the tallest structure in Argyle."
- "The ugly towers used by these transmission lines are incompatible with the current community."
- "My wife and I chose this home 34 years ago because of the peace and quiet, the trees, the view, and the seclusion. But to have my front yard become the site for a 345 kV power tower would destroy what little joy I have left here in my "forever" home."
- "Unsightly 'landmarks' to look at as we are in the backyard."
- "I'm genuinely worried about the impact this will have on the aesthetic of our entire community along with the negative impact personally for my home."

Topic: Wildlife/Habitat/Natural Resources (~70 comments)

- "Destruction of post oaks would be devastating to community!"
- "We also have mature trees and a small lake with nesting water birds and the environmental impact of this proposal is tremendous."
- "Removal of too many trees."
- "My main concern is birds. If once the post is placed the birds might not come because of the radiation."
- "If this line is constructed the impact on our tree canopy will be catastrophic."
- "Thousands of trees will be killed by construction and one of the most forested cities in North Texas will be forever environmentally impacted."
- "We've had endangered species on our property. It is our duty to keep them safe from harm."
- "Your proposal route D3 would destroy over 250 oak trees."
- "Thousands of trees, including historic, majestic, rare and unique species will have to be removed along these routes."

Topic: Farming/Ranching (~10 comments)

- "People have horses, cattle, bees, cats, dogs, goats, sheep and donkeys here. Why do this when you can run it on open land where people and animals won't be in danger from the byproducts emitted from the line."
- "Do not disturb multiple livestock areas."

- "As horse owners we know the devastating harm this can cause. Many horse owners, have had healthy horses diagnosed with cancer because their pastures are underneath these lines."

Topic: Health/Safety (~650 comments)

- "We keep property gates locked for security reasons. Do not want strangers showing up on my property."
- "I have children and take care of my elderly mother - these high voltage lines will affect their health."
- "I am very concerned about the health problems that this could cause."
- "I am personally concerned about health and safety issues regarding these large transmission lines near populated areas."
- "What are the health impacts? The studies are scary!"
- "It is unethical/unfair to put new lines near neighborhoods/ residences that will suffer health effects to residents."
- "This is behind my house and I am concerned about long term health issues impacting this area as a result of this project."

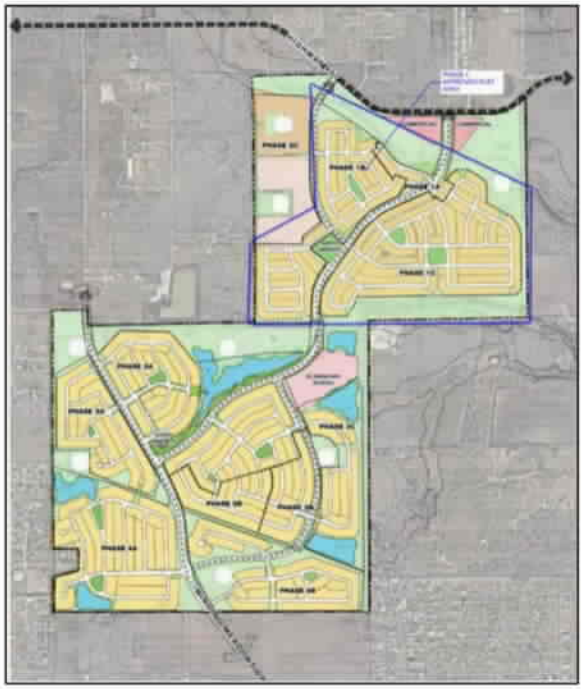
5.1.2 Site Specific Data

As discussed in **Section 5.1.1**, several statements were provided regarding the impacts of the proposed project to prospective developments, where vacant land seemingly contains few existing constraints. The following presents a summary of development interests that provided specific information regarding planned development. For some commenters, graphics have been included to better communicate the content or recommendations. Any provided graphics were excerpted directly from provided commenter material and are presented without modification. The accompanying commenter narrative provided with each graphic has been slightly edited for context within this report.

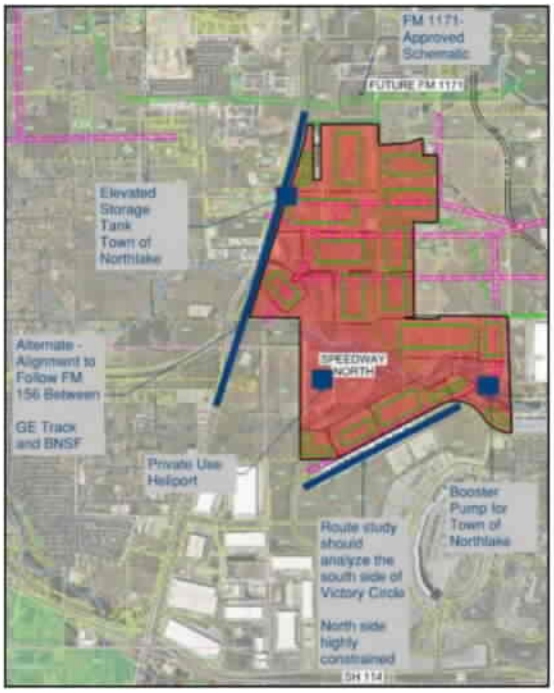
Hillwood

Hillwood Property and Hillwood Communities provided a joint letter to Oncor to inform Oncor of their imminent development plans, construction projects underway, and regional transportation projects within the planning corridor, and to provide input on potential alignments not currently considered within the routing study to date. Hillwood provided information on seven different projects, each of which are summarized on the following pages.

1 – Treeline



2 – Speedway North

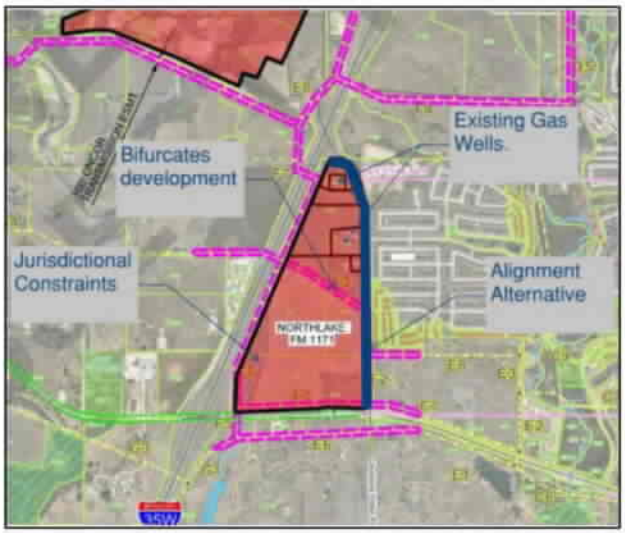


Note: Provided notes for each area are summaries excerpted from landowner feedback.

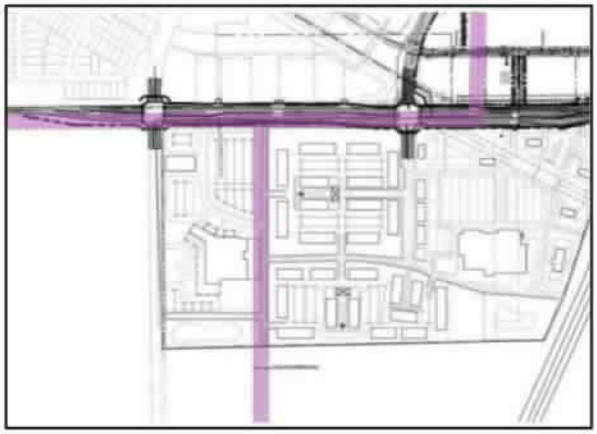
1: Links K5, K6, L5, and M8 cross a master planned community for which Hillwood recently received plat approval from the City of Justin for the northern half. Hillwood recommended alternatives that are located around the project perimeter.

2: Link I1 would cause development issues with the proximity of floodplain, leaving a very small strip of developable land along Victory Circle. Municipal water facilities critical for the Town of Northlake to operate its water system will be impacted by the current alignment options through the development. Alignments cross cutting the entitled development cause loss of development yield. Hillwood recommended alternatives on Texas Motor Speedway land, paralleling the Denton Creek channel, or existing roadway alignments, sharing transmission line overhangs within existing ROW.

3 – Northlake 1171



4 – Corral City



Note: Provided notes for each area are summaries excerpted from landowner feedback.

3: Link F3 would bifurcate land zoned for commercial and multifamily use and create significant loss of acreage. Link F6 along frontage will be further compounded with IH 35W ROW expansion. Hillwood recommended routes should follow property lines and utilize areas adjacent to gas wells that have setback requirements for development.

4: FM 407 is in the process of ROW acquisition for the widening of the corridor. Hillwood is in an active land sale for a site user, and Links F9 and G9 will affect any future development. Hillwood recommended general avoidance of this area.

5 – Harvest Commercial / Residential

6 – Pecan Square (Phase 5B)

Note: Provided notes for each area are summaries excerpted from landowner feedback.

5: The western limits of Link D0 currently cross through the Harvest Town Center project. This will consist of a grocery anchor, retail pad sites and multifamily residential development. Construction for the public infrastructure on this site is currently underway. Hillwood recommended general avoidance of this area.

6: The western portion of Link G5 crosses platted lots in Phase 5B for Pecan Square. Hillwood recommended relocating Link G5 along property boundaries to the south, thereby avoiding most of the development in this area.

DHL Supply Chain

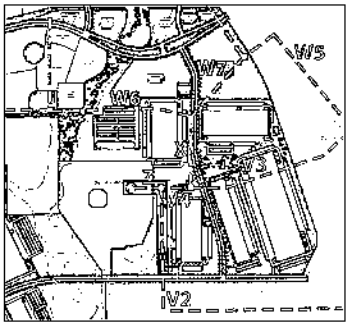
DHL Supply Chain provided a letter and the following route overlay of a planned development for which zoning, preliminary plat approval, site plan approval, development agreement approval, water and sewer study approval, and traffic impact analysis approval have all been obtained, as well as other steps necessary to develop the property. The anticipated date for starting mass grading is either the second or third quarter 2023.

Description: DHL Supply Chain development overlain on Oncor constraints map presented at the public participation meetings on December 7 and 8, 2022.

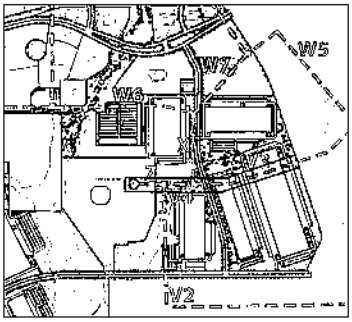
PMB Capital Investments

Rolling V Ranch is an approximately 3,700-acre planned development that will be located southwest of SH 114/US 287 near the City of Rhome. The first two phases of the development have recently been completed. Ultimate build-out will include residential, industrial, retail, and office space. As shown in graphics prepared by PMB Capital Investments shown below, the proposed Ramhorn Hill Switch was integrated into the original ranch master plan. The following progressions to the Link Z terminus were identified as the preferred options for the landowner, along with supporting reasons provided in the correspondence.

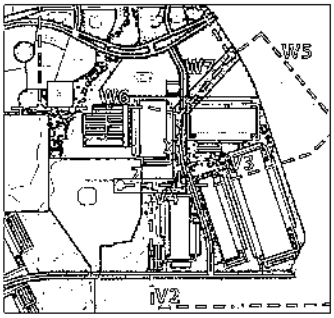
Links Z-V2



Links Z-V4-V3



Links Z-V4-X-W7-W5

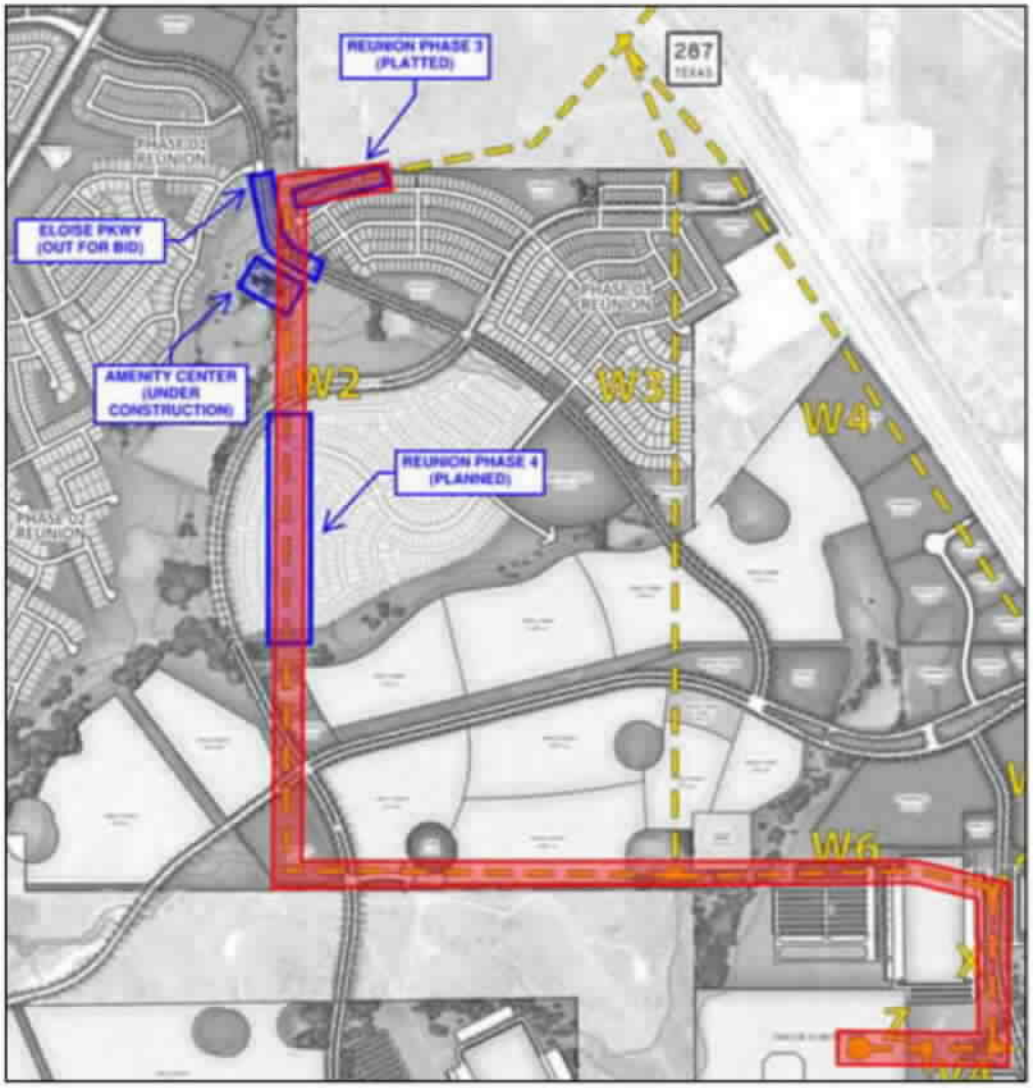


Note: Provided notes for each area are summaries excerpted from landowner feedback.

- They will cause the least amount of disturbance since they are the furthest from existing development activity and new homeowners.
- Oncor's contractors can easily access these areas from US 287 and Ramhorn Hill Road during construction.
- The specific building footprints of the industrial structures depicted in this area are still somewhat fluid at this juncture. The Owner feels it can reconfigure these buildings around one of the three preferred Transmission Line routes without much loss of rentable square footage.

The correspondence also provided similar detail and notes for other links that conflicted with areas either under construction, out to bid for construction, platted, or planned. The excerpts below show these areas along with supporting reasons for the conflict.

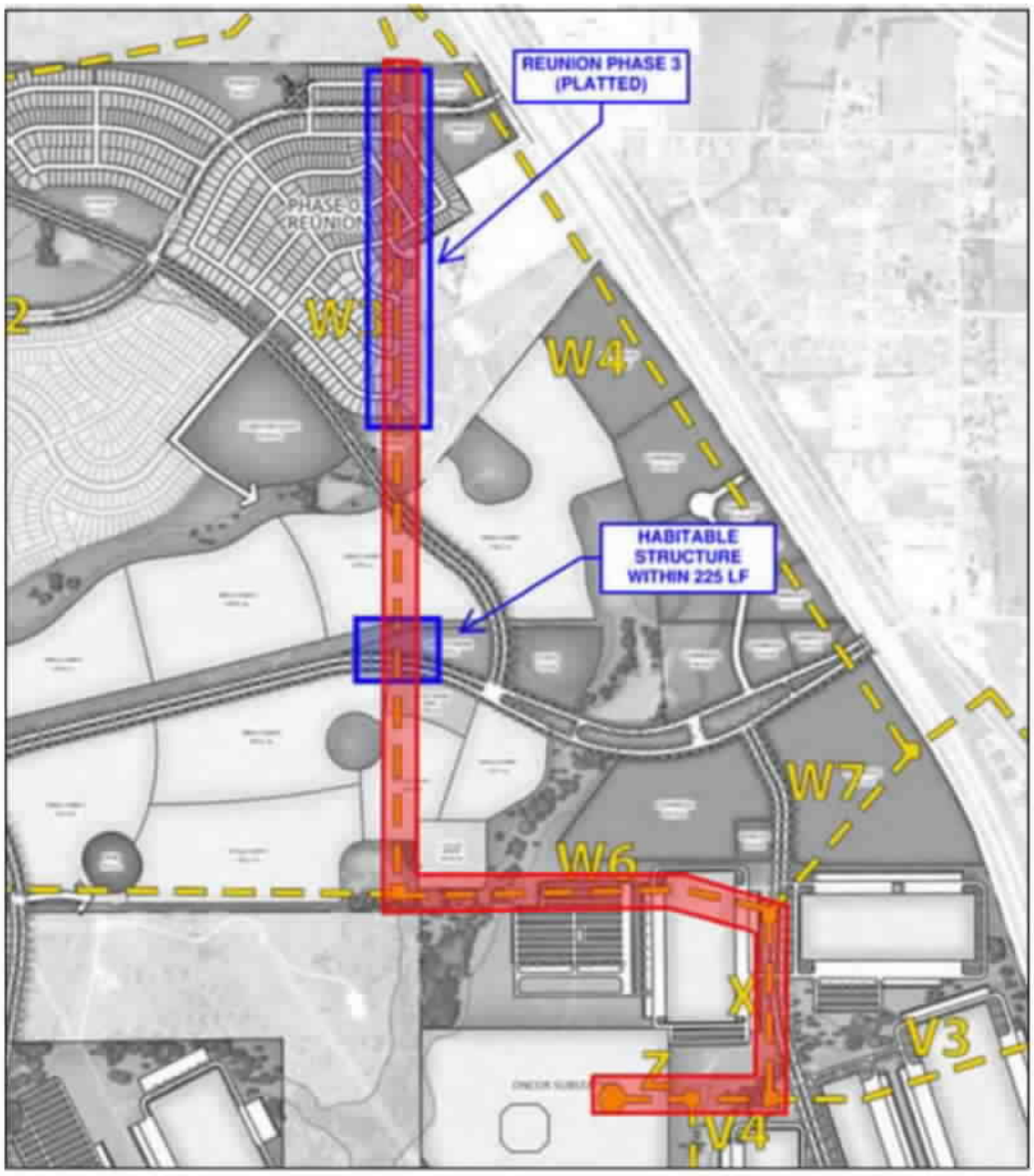
1 – Links Z-V4-X-W6-W2



Note: Provided notes for each area are summaries excerpted from landowner feedback.

1: This proposed route directly intersects an amenity center site that is currently under construction that would also include an open-air pavilion and pool. Construction of this area will be completed in the 1st quarter of 2024. Reunion Phase 3 single family lots that have been preliminary platted and fully designed from a civil engineering standpoint.

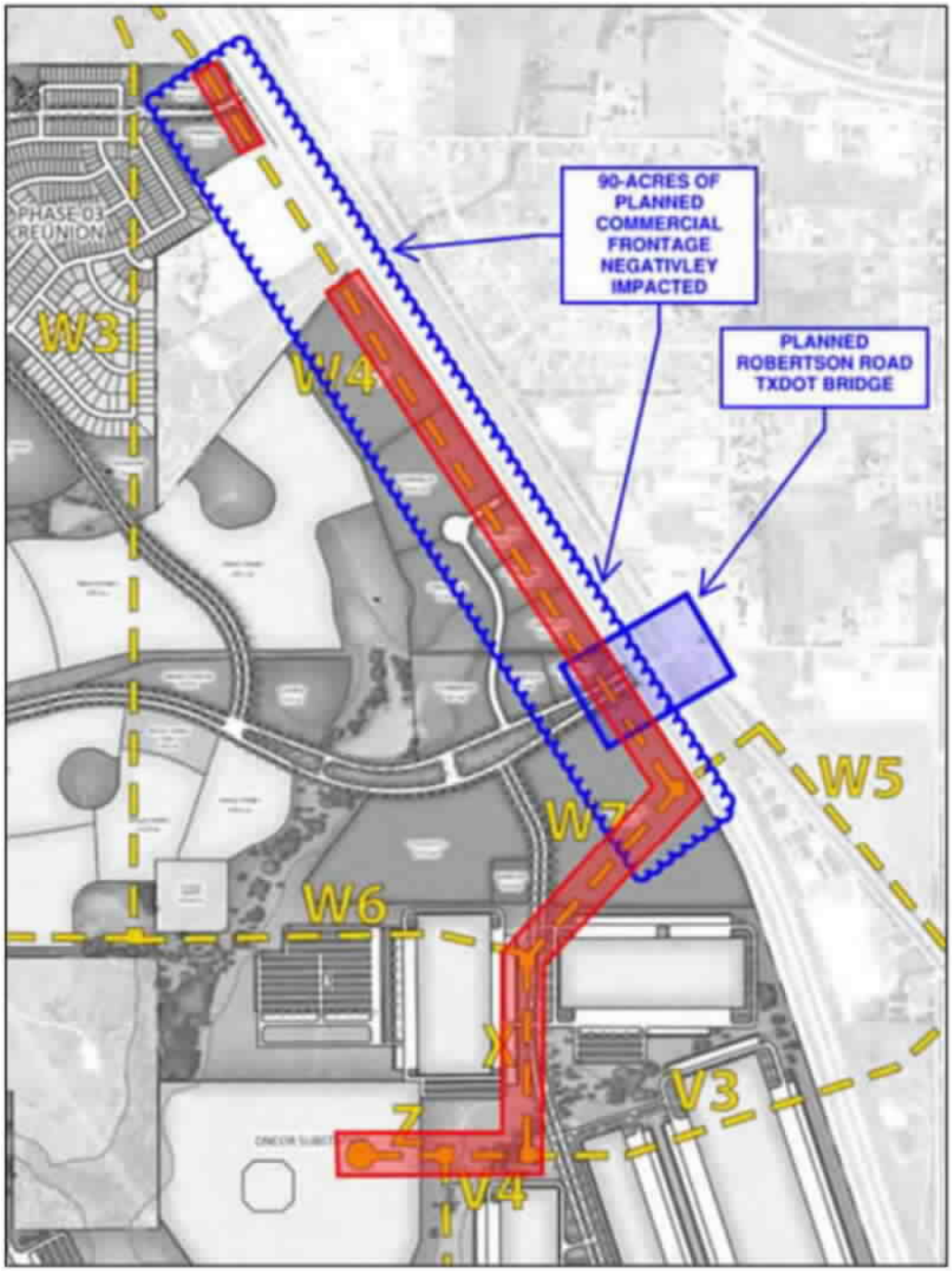
2 – Links Z-V4-X-W6-W3



Note: Provided notes for each area are summaries excerpted from landowner feedback.

2: This proposed route crosses over the eastern portion of Reunion Phase 3. These lots have been preliminary platted and fully designed from a civil engineering standpoint. The owner anticipates these lots will be delivered to homebuilders in early-2025, with construction starting over a year prior. There are existing habitable structures that would be close to the proposed transmission line.

3 – Links Z-V4-X-W7-W4



Note: Provided notes for each area are summaries excerpted from landowner feedback.

3: An overhead transmission line along the Highway 287 frontage road would negatively impact the quality of retailers and employers the owner could attract. There would be less useable land to develop. The aesthetics of the project would dissuade groups during site selection, and restrictions on driveway/access road alignments would limit users from an engineering standpoint.

City of Rhome

The City of Rhome provided a letter along with an attached map showing the proposed Oncor route network on an aerial, and several notes regarding future development. The City of Rhome deferred specific comments to PMB Capital regarding the Rolling V Ranch community, but otherwise expressed its concerns of the negative financial aspects of the transmission line links that bisected the property. The City of Rhome expressed an objection to Link T4 which is located within an area that has been dedicated to the city as a public park/open space. The City of Rhome believes the transmission line project would preclude it from developing the site and limit access for the City's stakeholders. Its preference would be to develop routes along the south side of SH 114 or along the southwest side of US 287.

Green Brick Partners

Electronic files showing residential lot layouts on behalf of GRBK Edgewood LLC and GBTM Sendera LLC were provided to show the planned developments' location relative to Link M3 in the south-central portion of the study area. According to the City of Fort Worth subdivision data, these developments appear to be the extension of the Sendera Ranch residential community. As shown in **Figure 3-1B** south of Link M3, earth disturbance is visible on aerial imagery, and lot and street layouts appear to conform with the provided electronic data.

City of Justin

In addition to responses provided during the agency coordination phase, the City of Justin also provided information after the public meeting, including the location of its proposed west side sewer which will closely follow an existing sanitary sewer line that parallels a tributary of Denton Creek. This existing line and proposed line are in proximity to Link J4. The City recommended the use of northern or southern route alternatives from a land use and development perspective.

114 Industrial Park

Representatives for this business park provided a site plan for several buildings, some of which were in the vicinity of Link U1. Additional comments indicated a preference for the far west border of the property if planned buildings were to be affected. The recommended

best-case alternative would be the east property line where the adjacent property does not currently have any development plans (as suggested by the commenter).

5.2 Post-meeting Agency Coordination

After the public participation meetings, Oncor representatives attended several meetings with local, state, and federal government officials to further discuss the project, topics of which included the CCN application process, the need for the project, the routing process, and the project timeline as it relates to the CCN application process, easement acquisition, and construction. The following provides a general summary of these communication efforts:

- Town of Argyle – meetings with mayor and council members; town council meeting;
- Town of Flower Mound – meetings with mayor, council members, city manager, and engineer; town council meeting;
- Town of Northlake – town council meeting, meeting with mayor;
- City of Justin – meeting with mayor and development director; city council meeting;
- Congressman Dr. Michael Burgess – Congressman and staff; and
- Texas Senator Tan Parker – Senator, staff, and meetings with city and town representatives.

As documented in **Section 4.0**, none of the preliminary route links presented at the public participation meetings crossed USACE lands associated with Grapevine Lake. After the public participation meetings, at the request and initiation of local government officials, the office of United States Representative Dr. Michael Burgess contacted the USACE Fort Worth District Operations Division to engage discussions for locating route links across USACE lands associated with Grapevine Lake, specifically those portions within the study area between US 377 and IH 35W. **Table 5-1** provides a summary of formal meetings with the USACE in which Oncor and/or Halff were in attendance. Meeting minutes and any other follow-up communications from these meetings are found in **Appendix A**, following the initial electronic mail correspondence with the USACE Grapevine Lake Office.

TABLE 5-1. SUMMARY OF MEETINGS WITH THE USACE FOLLOWING THE PUBLIC PARTICIPATION MEETINGS

Meeting Date	Meeting Location	Represented Parties	Meeting Summary
January 19, 2023	Office of U.S. Rep. Burgess	USACE Fort Worth District U.S. Rep. Burgess District Office Town of Argyle Town of Northlake Town of Flower Mound Oncor	• Oncor explained in detail the need for the Roanoke area projects, project criticality and timeline, and correspondence with the USACE. • USACE detailed responsibilities pursuant to the National Environmental Policy Act (NEPA) and their approach to minimizing impacts to protected lands. • USACE addressed possibility of expanding or modifying existing utility corridors defined in the lake master plan. • Cities expressed the preference for utilizing USACE land for alternative routes. • USACE was open to further investigation of potential non-corridor crossing along Graham Branch.
February 6, 2023	On-site	USACE Fort Worth District State Rep. Parker Office Oncor Halff	• Attendees reviewed the general character of the habitat along Graham Branch, south of Trailwood neighborhood. • No fixed route was determined. • USACE summarized the Non-recreational Outgrant process and typical timelines for reviewing and processing requests.
February 14, 2023	Lewisville Lake Office	USACE Fort Worth District U.S. Rep. Burgess District Office State Rep. Parker Office Town of Argyle Town of Northlake Town of Flower Mound Town of Bartonville Oncor Halff	• USACE stated that an aerial crossing in the vicinity of the field visit will not be approved. • Minor impacts such as spanning Utility Corridor 15 could be approved by a CATEX. • USACE outlined the NEPA review process and projected best-case timeline. • Town representatives inquired about further studies regarding feasibility for an underground construction alternative. • Oncor explained that undergrounding a project of this size was in-feasible. • Other options that could be explored either through a CATEX or EA approval were suggested for Oncor's consideration.

6.0 FINALIZATION OF ALTERNATIVE ROUTE LINKS

Based on input, comments, and information received by Halff at and following the public participation meetings, Halff considered modifications to preliminary alternative route links, removal of preliminary route links, and the addition of new alternative route links. The decision to address a comment by modification or addition of a link considered several factors. The study area is rapidly changing with real-time conditions outpacing what may be observed on aerial photography. Halff conducted site visits of the study area after the public participation meetings to verify the status of potential developments that were researched at the early stages of the routing study and to adjust the route network as necessary. As documented in **Section 5.0**, Oncor met with city officials, state and federal officials, and several developer representatives whose recommendations factored into whether to add, modify, or delete an alternative route link. Halff conducted additional reconnaissance surveys after the public participation meetings to evaluate and field verify some of the input, comments, and information received at and following the public participation meetings. After considering new information and conducting further constraints analyses, modifications to the set of preliminary alternative route links were adopted and finalized, the results of which are described in detail below. All referenced figures are provided in **Appendix C**.

6.1 Route Link Removal

Route link removal is defined for purposes of this section as the removal of an entire link or links independent of any other adjacent link modifications that might otherwise relocate an entire link or make a link obsolete. **Figure 6-1** provides a map of all the preliminary route links presented at the public participation meetings that were removed in consideration of public comments and further constraints analysis. The following identifies these individual links or link groups and a summary supporting the removal.

- **Links A2, A5, and B3** – Link A2 was removed because Links A1 and A4 provided more reasonable forward progressions to the north from the Dunham Switch. Link A2 would also have abutted two sides of the small Dunham Cemetery near the Dunham Switch. Links A5 and B3 unnecessarily bisected properties, whereas Links A4, A7, and B2 achieved the same destination while more closely paralleling existing corridors.

- **Link P2** – It was determined that the Link O and Link P Groups provided sufficient alternatives around a newly developing residential community. Given the availability of these alternatives and this link's proximity to aquatic resources, existing utilities, and numerous homes, Link P2 was removed.

- **Link W2** – Much of Links W2, W3, and W4 cross the actively developing Rolling V Ranch, which includes the Ramhorn Hill Switch. As documented in **Section 5.2**, the owner of the property demonstrated the impacts that Link W2 would have on existing construction. Because Links W3 and W4 still provide multiple alternatives to access the Ramhorn Hill Switch from northern link progressions, Link W2 was removed.

- **Links B9, D Group, F9, G9, J7, J8, K3, K4, K5, K6, K7, K9, N Group, O4, and Q3 (Northern Link Group)** – These links were originally developed to provide routing alternatives to the Link C Group. Given the dense residential development surrounding Argyle High School, routing of the Northern Link Group extended further into the northeastern portion of the study area, which in turn extended the length (by approximately 30%) of any potential alternative routes using these northern links. In addition to this added length, several of these links were in close proximity to multiple homes, had potential conflicts with existing utilities and other facilities, and presented other engineering constraints. The Link C Group along the FM 1171 corridor maintained sufficient geographic diversity of alternative route possibilities and were shorter compared to these northern links. The removal of these links addresses many comments received after the public meetings as documented in **Section 5.1**.

The removal of these links in several instances would eliminate the need for a node between two remaining links (e.g., Links H6 and J6 by removal of Link J7). However, in these instances nodes and link segments were retained to reflect what was presented at the public meetings, unless modifications discussed in **Section 6.2** warranted splitting of the remaining links.

6.2 Route Link Modifications

A route link modification is defined for purposes of this section as the reconfiguration of a portion of a link, the relocation of an entire link, or the addition or renaming of a link necessitated by other nearby modifications. Modifications included those in direct response to information documented in **Section 5.0** or after additional field investigations identified routing constraints that necessitated a change. Larger scale modifications are discussed in more detail below, moving east to west, supported by individual exhibits in **Appendix C**.

Link B2

- **Figure 6-2** – After the removal of Links A2, A5, and B3 near the proposed Dunham Switch, Link B2 was adjusted to better parallel property boundaries and navigate utility infrastructure near the Link B4 node. This modification necessitated adjustments to each of Links A6, A7, and B4 at the corresponding link nodes.

Link C2

- **Figure 6-3** – It was determined that Link C2 had reduced functionality after the removal of the Northern Link Group (including Link D1) discussed in **Section 6.1**. Link C23 was added (splitting Link C2 into Links C21 and C22) to increase the potential link combinations from the former Link C2 corridor. This link addition necessitated adjustments to each of Links C4, C5, and C7 at the corresponding nodes.

Link I Group

- **Figure 6-4** – This series of revisions includes the Link I Group as well as a few neighboring links from the Link H and J groups (Links H3, H41, H42, H8, J1, J21, and J22). Given the routing constraints north and south of this group as well as along FM 156, it was not feasible to abandon this entire link group to facilitate planned development in the area. Utilizing information provided by DHL Supply Chain and Hillwood, Halff attempted to route around planned building complexes or better align with proposed building layouts within the proposed industrial parks. Given the limited opportunities to cross FM 156 to other corridors to the west, no modifications were made to Links I7 or I8.

Links L5 and K6

- **Figure 6-5** – Upon removal of the Northern Link Group, the remaining link network in this area was modified in consideration of the proposed Treeline development by Hillwood. All recommended alternatives by Hillwood could not be directly implemented based on the presence of oil and gas facilities. However, the former Link K6 (split into Links K61 and K62) was reintroduced and modified along with Links K21, K22, and L5 to provide an alternative along the property perimeter to remove the former Links L4, L5, and M8 intersection that would otherwise have been in the middle of the planned development. Link M8 was modified to provide a more direct path from Link K2 (split into Links K21 and K22). This alternative functionally replaced the Links K3 and K5 progression, allowing those links to be removed in conjunction with removal of the Northern Link Group and a portion of Link K6. In addition to partially addressing Hillwood's comments, these modifications also addressed comments from several individual landowners regarding the effects of the Link K Group on potential development.

Link S2

- **Figure 6-6** – Updated aerial photography depicted the expansion of a pond associated with a nearby oil and gas facility. Link S2 was shifted to the north to avoid the pond and parallel a property boundary.

Links T1, T2, and T3

- **Figure 6-7** – The former Link T1 alignment conflicted with the entrance to a planned residential subdivision (Tract 2821) which was presented at the public meeting. The alignment was shifted to the east to parallel an interior fencerow, maintaining the connection from links to the north and the south. This new alignment also provided a more favorable crossing of an existing transmission line and Elizabeth Creek. Connecting links at the north (Links T1 and Q5) and south end (Links S5 and T3) of Link T1 were adjusted accordingly for this shift. An additional modification was made for Link T3 to route around an above ground oil and gas facility.

Link U1

- **Figure 6-8** – The landowner who is actively developing this business park requested either a move to the western edge of the property or to the property to the east for which no development was currently proposed. Either of these alternatives would require notice to additional habitable structures and require several angle structures to navigate around oil and gas facilities while maintaining the TxDOT-required 90-degree crossing of SH 114. Halff utilized the provided site plan to adjust Link U1 so that it could utilize planned parking areas, thereby providing sufficient space between planned buildings.

Numerous other minor link adjustments were made to account for minor constraints or better conform to existing corridors identified based on updated information from additional field investigations. These include Links C3, C7, E5, E6, F6, G2, I12, J22, J4, L3, M1, M4, O6, O7, and O8. Because of the narrow scope and scale of these modifications, individual graphics are not provided.

6.3 USACE Land Considerations

As documented in **Section 5.2**, after the public participation meetings, collaborative meetings with Oncor, Halff, city, state, and federal representatives were hosted to determine whether routes across USACE land were feasible and, if so, to verify the federal review processes necessary to approve such a route, or routes. As documented in **Section 3.0**, the USACE property in the study area consists primarily of land designated as Environmentally Sensitive Areas and includes five designated utility corridors that cross these areas. All but one of these utility corridors are occupied by existing infrastructure. Restrictions on the use of utility corridors include maximum corridor widths ranging from 50-140 feet, a requirement that new facilities be installed underground, and a prohibition on bore pits on USACE property. As verified in these meetings, any potential deviations from these restrictions would require Oncor to request a categorical exclusion (CATEX) from the USACE to approve such an action. The USACE could grant or deny a CATEX at its discretion, although USACE representatives indicated in these additional meetings that they may be able to grant a CATEX for crossings using certain utility corridors for this project. Any crossing outside an existing utility corridor would require federal review through an environmental assessment. The expected timeline for this review would be a

minimum of 6-8 months. However, the environmental assessment process could take a year or longer, after which the USACE could still deny Oncor's requested crossing.

Following an initial meeting, at the request of the Town of Argyle, Oncor specifically investigated a non-utility corridor crossing along Graham Branch downstream of the FM 1171 crossing and south of a new residential subdivision (Trailwood). After a field inspection in the general area of potential crossing, USACE representatives indicated that an aerial crossing with a cleared ROW in that area would not be approved (**Appendix A**, Page A-242). Besides the fact that the area was an Environmentally Sensitive Area, this reach included old growth Cross Timbers habitat, a vegetation community which several public commenters within the study area stressed the importance of protecting. Consistent with those comments, the USACE noted that the Cross Timbers habitat along Graham Branch was of particular significance to the Grapevine Lake Master Plan designation. The USACE did not believe that they could support the loss of these resources, nor could the loss of these resources be approved following a complete federal review through an environmental assessment.

In subsequent meetings, the USACE suggested that a crossing outside the designated utility corridors might be approved in the southern reaches of USACE land between Denton Creek and SH 114 southwest of the Dunham Switch. Therefore, Halff and Oncor evaluated existing legal/regulatory, routing, engineering, and planning constraints that could impact Oncor's ability to route the project across USACE property in these locations. The analysis indicated that the dense urban development in the areas to the south and west of the USACE property would render any crossing infeasible. These areas are significantly more congested than the area to the north, including the presence of two major highways (IH 35W and SH 114); numerous existing residential communities; existing commercial, industrial, and recreational facilities; existing oil & gas pipelines and other utility infrastructure; the Texas Motor Speedway; and Alliance Airport. As a result, Oncor could not identify a feasible route across USACE property south of the proposed Dunham Switch. Please refer to **Appendix G** for corresponding maps of each evaluated alternative and a corresponding summary documenting environmental, engineering, and planning constraints for each of these alternatives.

To complete the review of potential alternatives, at the request of the Town of Argyle, Oncor evaluated the feasibility of routing a portion of the project underground through the Environmentally Sensitive Area associated with Graham Branch. Oncor's evaluation has found no evidence that an underground project of this capacity and length would be feasible. To Oncor's knowledge, no 345 kV transmission line of this ampacity (5,000 A) has ever been built underground in the United States. Assuming that it could be built, doing so would drastically increase project costs, extend design and construction timelines, raise reliability concerns, increase the environmental impact of the project, and even then, would very likely reduce the project's overall capacity. Therefore, Halff did not include any such alternative in its evaluation. Please refer to Oncor's direct testimony for additional discussion of these issues.

6.4 Alternative Route Development

Upon completion of all route link modifications, it was Halff and Oncor's intent to provide alternative route links that when combined, would form an adequate number of reasonable and geographically diverse alternative routes. Of the 140 adopted route links, several hundred thousand alternative routes were possible. Through an iterative process that considered route length, constraints data, input from public meetings, information from local, state, and federal officials, and other data, Halff and Oncor reduced the total number of route combinations to a smaller subset of geographically diverse and forward progressing alternative routes, as defined in **Table 7-1** (**Appendix D**), for a more detailed evaluation. A total of 221 alternative routes were selected for further analysis as provided in **Table 7-2** (**Appendix E**). The subset of alternative routes uses each of the 140 alternative links in at least one route.

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7.0 EVALUATION OF THE ALTERNATIVE ROUTES

The environmental evaluation presented in this section addresses impacts to the environment in consideration of the requirements of Section 37.056(c)(4)(A)-(D) of the Texas Utilities Code, the PUCT's Substantive Rules Section 25.101 including the PUCT's policy of prudent avoidance, comments from the public participation meetings, reconnaissance surveys, and the information and responses obtained from local officials and state and federal agencies. Measurements for many of the environmental criteria were obtained from mosaics of ortho-rectified images (NearMap, 2023), whose capture process utilizes global positioning system and precise point positioning technologies to achieve sub-meter (or approximately 7.8 inches) horizontal accuracy to true ground location.

Halff professionals with expertise in different environmental disciplines (e.g., geology/soils, hydrology, terrestrial ecology, wetland ecology, and land use/aesthetics) evaluated the proposed transmission line routes based upon environmental conditions present along each route and the general routing criteria developed by Oncor and Halff. In addition, Halff evaluated potential impacts to archeological and other historical sites. Each researcher independently analyzed the routes defined in **Table 7-1** and the environmental and land use data presented in **Table 7-2** for the researcher's technical discipline. Environmental data presented in **Table 7-2** are also provided by link in **Table 7-3** (**Appendix E**). Evaluations by Halff for different data categories are discussed below.

7.1 Impacts on Physiography and Geology

Construction of the proposed project would have no significant effect on the physiographic or geologic features/resources of the area. The erection of the structures would require the removal and/or minor disturbance of small amounts of surface and near-surface materials but would have no measurable impact on the geologic resources or features along any of the alternative routes, and no geologic hazards are anticipated.

7.2 Impacts on Soils

7.2.1 Soil Associations

The construction and operation of transmission lines normally create very few long-term adverse impacts on soils. The major potential impact upon soils from transmission line

construction would be erosion and soil compaction. The potential for soil erosion is generally greatest during the initial clearing of the ROW until vegetation cover reestablishes.

To provide adequate space for construction activities, improve reliability, and minimize corridor maintenance problems, most woody vegetation would be removed from the ROW of the proposed project. In these areas, only the leaf litter and a small amount of herbaceous vegetation would remain, and both would be disturbed by the movement of heavy equipment during construction, service, and maintenance activities. The most important factor in controlling soil erosion associated with construction activity is to revegetate areas as soon as practical following construction. Natural succession should revegetate most of the ROW. Critical areas, such as steep slopes and areas of shallow topsoil, may similarly require erosion control blankets and additional seeding to maintain soil stability.

The ROW will be inspected both during and after construction to ensure that problem erosion areas are identified. In addition, Oncor will develop a Storm Water Pollution Prevention Plan (SWPPP), if required, which will detail measures to minimize impacts associated with potential soil erosion and downstream sedimentation, as well as measures to be taken following construction to revegetate disturbed areas.

7.2.2 Prime Farmland

All alternative routes cross areas that are designated by the NRCS as either prime farmland or farmland of statewide importance soils. Other than potential construction-related erosion (mitigated per SWPPP), impacts to prime farmland soils are anticipated to be insignificant and limited to the physical occupation of small areas at the base of support structures.

The NRCS does not normally consider transmission lines to be a conversion of farmland because the site can still be used for agriculture after construction. The construction of the project would be considered exempt from the Farmland Protection Policy Act. Construction of the transmission line will not result in loss of prime farmland, and no significant impact to prime farmland is anticipated. The NRCS generally recommends that approved erosion control methods be used during construction.

7.3 Impacts on Water Resources

7.3.1 Surface Water and Floodplains

The construction of the proposed project is unlikely to have substantial impacts to surface water resources (e.g., streams, open water lakes, wetlands) in the study area. Any stream that would be crossed by the proposed project would be spanned by the proposed transmission line, and no supporting structures would be placed in any streambed. The main potential impacts to surface waters and floodplains resulting from any major construction project are siltation resulting from erosion and pollution resulting from spillage of petroleum products (e.g., fuel or lubricants) or other chemicals. Vegetation removal could result in increased erosion potential of the affected areas, so that slightly higher than normal sediment yields may be delivered to area streams following a heavy rainfall. However, these short-term effects should be minor given the relatively small area to be disturbed at any particular time; the short duration of the construction activities; preservation of stream side vegetation where practical; Oncor's efforts to manage runoff from construction areas through the use of best management practices (BMPs); and implementation of the SWPPP, if required. TPWD recommends that erosion control measures should be implemented prior to construction and maintained until disturbed areas are permanently revegetated with site-specific native vegetation (TPWD, 2022c). Oncor will re-vegetate disturbed areas after construction is completed as specified in the TCEQ SWPPP permit, if required.

All alternative routes cross a stream feature. Many are larger streams that have intermittent if not perennial (year-round) flow and numerous tributaries. The larger streams and some tributaries have mapped floodplains. Along these routes, some transmission line structures would be located within FEMA-designated 100-year floodplains. If it becomes necessary to locate transmission line structures within a floodplain, the structures would be designed and constructed so as not to impede the flow of water or create any hazards during flooding. Also, if structures are to be located within floodplains, then Oncor would coordinate in advance with the county floodplain administrators. Construction of the proposed project should not have significant impacts on the function of floodplains, nor adversely affect adjacent or downstream properties. By contrast, stream crossings associated with smaller unnamed tributaries have narrower floodplains which could be spanned by transmission line structures.

The USACE regulates the discharge of dredged and fill material into waters of the U.S., including wetlands, under Section 404 of the Clean Water Act (Section 404). USACE regulations implementing Section 404 include specific authorization under Nationwide Permit (NWP) 57 - *Electric Utility Line and Telecommunications Activities*. NWP 57 authorizes the construction, maintenance, or repair of utility lines (including overhead transmission lines), associated foundations, access roads, and substations, in all jurisdictional water features. An overhead transmission line must not result in a loss greater than 0.5-acre of waters of the U.S. Generally, transmission lines are designed to span stream or wetland crossings in most instances, thereby minimizing impacts to waters of the U.S. The USACE Fort Worth District responded to the solicitation for information (see **Section 2.2.1**) and assigned the project with project number SWF-2022-00451. Further correspondence, if necessary, will be directed to the regulatory division (see **Appendix A**). NWP 57 specifies certain conditions which necessitate filing a pre-construction notification (PCN) to the USACE and written approval before construction activities may begin. NWP 57 requires the submittal of a PCN to the USACE if either a Section 10 permit is required or the discharge will result in the loss of greater than 0.1 acre of waters of the U.S.

As previously mentioned, transmission lines are designed to span stream or wetland crossings in most instances. Of the 140 links, 81 cross streams or creeks within the study area. As discussed in **Section 3.4.1**, no stream within the study area has been classified as an ecologically significant stream segment (TPWD, 2002). No streams within the study area are considered Section 10 streams. One stream within the study area is listed by the Texas Commission on Environmental Quality (TCEQ) under Section 303(d) of the Clean Water Act as being monitored for impairment or having other water quality concerns. Derrett Creek was listed in 2020 as a category 5b with bacteria in water (recreation use). Category 5b indicates that before a management strategy is selected, a review of standards for the water body will be conducted (TCEQ, 2020; 2023). None of the proposed links cross Derrett Creek. Where links were located proximal to streams, crossings attempted to avoid multiple meanders, to be aligned perpendicular to the channel, and to allow sufficient space between the top of bank and any proposed structure locations. Consistent with TPWD guidance (TPWD, 2022c), proposed links attempt to minimize paralleling stream corridors.