



Appendix B

Technical Memoranda and Reports

Disclaimer:

Technical memoranda and reports were prepared as independent documents to support the preparation of the Supplemental Draft Environmental Impact Statement (SDEIS) for the Dallas CBD Second Light Rail Alignment (D2 Subway). Information from these documents was incorporated into the SDEIS to provide information on existing conditions, and in some cases, assess potential impacts to the resources. Information contained in the SDEIS is the most current and supersedes information in the technical memoranda and reports.



B-12

Biological Resources Existing Conditions Technical Memorandum



Technical Memorandum

Date: Friday, August 10, 2018

Project: D2 Subway Project

To: Kay Shelton, Environmental Project Manager, DART Capital Planning

From: James Frye, GPC6 Project Manager

Subject: DART GPC VI; Contract Number: C-2012668; Biological Resources Existing Conditions Technical Memorandum; HDR PN: 10024656

Introduction

This technical memorandum describes the vegetative and wildlife communities found within and adjacent to the D2 rail project area which could be impacted by construction of the proposed project. This report was built upon a desktop analysis by project biologists. Due to the high intensity urban use of the project area, no field reconnaissance is necessary.

The biological resource study area used for the assessment of impacts includes the project study area. Although typically a larger search radius may be used in the examination of threatened or endangered species occurrence data, due to the high intensity urban use of the project area and surrounding region, a one-mile search radius was used for an assessment of the potential for threatened or endangered species to occur in the project area. Existing literature and mapping were reviewed for the project study area to identify potential vegetative communities, potential wildlife assemblages, and threatened or endangered species of potential occurrence. Maps examined include aerial imagery for the project study area, United States Geological Survey (USGS) topographic maps for the *Dallas, Texas* quadrangle (USGS, 1973; USGS, 1981), and Geographic Information Shapefiles (GIS) obtained from the Texas Parks and Wildlife Department's (TPWD) Ecological Systems Classification and Mapping Project (EMST), and the Environmental Protection Agency's (EPA) Ecoregions of Texas.

Description of Existing Conditions

This section describes the existing natural vegetation types, ecoregion and Biotic Province areas found within the project study area, and provides information regarding rare, threatened, or endangered species of potential occurrence in Dallas County.

Ecoregion and Biotic Province

The project study area occurs within the Northern Blackland Prairie Ecoregion (Griffith et al, 2007). This ecoregion includes rolling to nearly level plains which stretch from Sherman in the north to San Antonio in the south. Historically this area was distinguished by a vast expanse of tallgrass prairie vegetation. This vegetation was supported by frequent fire events which suppressed invading woody species and stimulated the growth of grass and forbs. In addition, the grazing of bison within this area resulted in the production of organic matter and the spreading of seeds within the disturbed soil of the area, helping to sustain it.



Historical vegetation of this ecoregion was originally dominated by little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), yellow Indiangrass (*Sorghastrum nutans*), and tall dropseed (*Sporobolus compositus*). In lowlands areas the dominant grasses included eastern gamagrass (*Tripsacum dactyloides*), switchgrass (*Panicum virgatum*), and Silveus dropseed (*Sporobolus silveanus*). Common forb species consisted of Mead's sedge (*Carex meadii*), prairie bluets (*Stenaria nigricans*), and black-eyed susan (*Rudbeckia hirta*). Woody species which are often found on stream bottoms include bur oak (*Quercus macrocarpa*), Shumard oak (*Quercus shumardii*), sugar hackberry (*Celtis laevigata*), elm (*Ulmus* spp.), ash (*Fraxinus* spp.), eastern cottonwood (*Populus deltoides*), and pecan (*Carya illinoensis*) (Diamond and Smeins 1993). The majority of the Northern Blackland Prairie has since been converted to agricultural or urban uses.

The study area is also located within the Texan Biotic Province (Blair, 1950). The Texan Biotic Province is a variable region which trends from north to south, extending from the Red River to the Gulf Coast. This province includes sandy soils which support the growth of post oak-blackjack oak-hickory savannahs scattered among tallgrass prairies (Werler and Dixon, 2000). This biotic province also contains numerous interior wetland areas including freshwater marshes, peat bogs, and major river systems.

Vegetation

A desktop vegetation analysis was performed within the project study area using Ecological Mapping Systems of Texas (EMST) spatial data. The EMST data set provides an updated ecological system classification for Texas which includes more land cover classes than were previously identified for the state (TPWD, 2016). The spatial resolution of this data was developed by first classifying the existing vegetation, and then modeling the resulting ecological systems by overlaying data such as land position, slope, aspect, and soil type. The entire project study area is contained within areas defined by the EMST criteria as urban (High- and low-intensity) (**Figure 2**). In addition, most of the alignment for the project is underground and would not impact surface vegetation.

At-grade vegetation communities within the project study area are found in urban parks and commercial developments and are generally comprised of turf grasses, such as bermudagrass (*Cynodon dactylon*) or St. Augustine grass (*Stenotaphrum secundatum*), and ornamental plantings which can include a variety of types of trees, shrubs, or herbaceous plants. Any tree removals associated with project activities would be done in accordance with city ordinances, and permits would be obtained, if necessary.

Wildlife

Approximately 49 species of mammals, 57 species of reptiles, and 23 species of amphibians occur in the Texan Biotic Province (Blair, 1950). In addition, approximately 471 avian species, including both residents and migrants, have been reported in the Oaks and Prairies of Texas (Freeman, 2003), an area that is roughly analogous to the Texan Biotic Province. The surface of the project area is high and low intensity urban habitats and the wildlife species inhabiting this area would be anticipated to be those which are generally adapted to high intensity urban land use. The project crosses underneath four urban parks/plazas in the downtown area, Belo Garden, Browder Street Mall, Main Street Garden, and



John Carpenter Plaza. Since the project is a segment of underground rail, no surface impacts are anticipated.

Threatened and Endangered Species

The Endangered Species Act of 1972, as amended, provides protection for federally listed species and their habitats. Texas state law includes provisions which prohibit direct harm to state-listed species. USFWS’ endangered species list for Dallas County and TPWD’s Annotated County List of Rare Species for Dallas County were examined along with project area information to determine whether the project is likely to have an effect on listed species or their habitats. In addition, TPWD’s Texas Natural Diversity Database (TXNDD) was reviewed to determine previously recorded occurrences of any of the listed species within or near the project area.

Six federally listed endangered species, two federally listed threatened species, six state-listed endangered species, 14 state-listed threatened species, and 20 state species of concern (which are tracked by TPWD for monitoring purposes, but do not currently receive regulatory protection) are listed as having potential to occur in Dallas County (TPWD, 2018; USFWS, 2018). **Table 1** contains a listing of all of these species, along with their habitat descriptions, information about recorded occurrences of the species, and a determination of whether habitat exists within the project area.

Table 1. Rare, Threatened, and Endangered Species of Potential Occurrence in Dallas County, Texas

Species	Federal Status	State Status	Species/ Habitat Description	Element Occurrence Records ¹	Habitat Present?	Other Pertinent Information ²
Birds						
American Peregrine Falcon <i>Falco peregrinus anatum</i>	DL	T	Resident in west Texas; migrant across the rest of the state from more northern breeding areas; winters along coast and farther south; occupies wide range of habitats during migration, including urban; stopovers at leading landscape edges.	-	No	No impact. Potential migrant through the project area.
Arctic Peregrine Falcon <i>Falco peregrinus tundrius</i>	DL	SOC	Migrant throughout state; winters along coast and farther south; occupies wide range of habitats during migration, including urban; stopovers at leading landscape edges; similar in appearance to the American subspecies.	-	No	No impact.
Bald Eagle <i>Haliaeetus leucocephalus</i>	DL	T	Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts.	-	No	No impact.



Table 1. Rare, Threatened, and Endangered Species of Potential Occurrence in Dallas County, Texas

Species	Federal Status	State Status	Species/ Habitat Description	Element Occurrence Records ¹	Habitat Present?	Other Pertinent Information ²
Black-capped Vireo <i>Vireo atricapilla</i>	DL	E	Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; foliage reaching to ground level for nesting cover; broad-leaved shrubs and trees provide insects for feeding; nesting March-late summer.	-	No	No impact.
Golden-cheeked Warbler <i>Setophaga chrysoparia</i>	LE	E	Juniper-oak woodlands; dependent on Ashe Juniper (<i>Juniperus ashei</i>) for long, fine bark strips from mature trees, used in nest construction; nests placed in various trees; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer.	-	No	No effect.
Henslow's Sparrow <i>Ammodramus henslowii</i>	NL	SOC	Wintering individuals found in weedy fields or cut-over areas where bunch grasses occur along with vines and brambles; a key component is bare ground for running/ walking.	-	No	No impact.
Interior Least Tern <i>Sterna antillarum athalassos</i>	LE	E	Subspecies listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also known to nest on man-made structures.	-	No	No effect.
Peregrine Falcon <i>Falco peregrinus</i>	DL	T	Both subspecies migrate across the state from more northern breeding areas to winter along coast and farther south.	--	No	No impact.
Piping Plover <i>Charadrius melodus</i>	LT	T	Wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats.	-	No	No effect.
Red Knot <i>Calidris canutus rufa</i>	LT	SOC	Red Knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters.	-	No	No effect.



Table 1. Rare, Threatened, and Endangered Species of Potential Occurrence in Dallas County, Texas

Species	Federal Status	State Status	Species/ Habitat Description	Element Occurrence Records ¹	Habitat Present?	Other Pertinent Information ²
Sprague's Pipit <i>Anthus spragueii</i>	NL	SOC	Only in Texas mid-September to early April; strongly tied to native upland prairie, can be locally common in coastal grasslands; sensitive to patch size and avoids edges.	-	No	No impact.
Western Burrowing Owl <i>Athene cunicularia hypugaea</i>	NL	SOC	Open grasslands, especially prairie, plains, and savannah; vacant lots near human habitation or airports; nests and roosts in abandoned burrows.	-	No	No impact.
White-faced Ibis <i>Plegadis chihi</i>	NL	T	Prefers freshwater marshes, sloughs, and irrigated rice fields; nests in marshes.	-	Yes	No impact.
Whooping Crane <i>Grus americana</i>	LE	E	Potential migrant via plains throughout most of state to coast; winters in coastal marshes.	-	No	No effect.
Wood Stork <i>Mycteria americana</i>	NL	T	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water; usually roosts communally in tall snags; breeds in Mexico; formerly nested in Texas, but no breeding records since 1960.	-	No	No impact.
Insects						
Black Lordithon rove beetle <i>Lordithon niger</i>	NL	SOC	Historically known from Texas; very little known.	-	No	No impact. The species is extirpated from Texas.
Mammals						
Cave myotis bat <i>Myotis velifer</i>	NL	SOC	Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, or in abandoned Cliff Swallow (<i>Hirundo pyrrhonota</i>) nests; roosts in large groups.	-	No	No impact.
Gray wolf <i>Canis lupus</i>	LE	E	Extirpated; formerly known throughout western 2/3 of state in forests, brushlands, or grasslands.	-	No	No effect.
Plains spotted skunk <i>Spilogale putorius interrupta</i>	NL	SOC	Catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie.	-	No	No impact.



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Species	Federal Status	State Status	Species/ Habitat Description	Element Occurrence Records ¹	Habitat Present?	Other Pertinent Information ²
Red wolf <i>Canis rufus</i>	LE	E	Extirpated; formerly known throughout eastern half of Texas in brushy and forested areas and coastal prairies.	-	No	No effect.
Mollusks						
Louisiana pigtoe <i>Pleurobema riddellii</i>	NL	T	Streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel; not generally known from impoundments; historically known from Trinity River basin.	Two live specimens and one recently dead shell was collected from the Trinity River in 2013	No	No impact.
Sandbank pocketbook <i>Lampsilis satura</i>	NL	T	Small to large rivers with moderate flows and swift current on gravel, gravel-sand, and sand bottoms. Found in east Texas from Sulfur south through San Jacinto River basins and Neches River.	One unconfirmed live specimen collected in the Trinity River in 2013	No	No impact.
Texas heelsplitter <i>Potamilus amphichaenus</i>	NL	T	Quiet waters in mud or sand and also in reservoirs. Sabine, Neches, and Trinity River basins.	-	No	No impact
Texas pigtoe <i>Fusconaia askewi</i>	NL	T	Rivers with mixed mud, sand, and fine gravel in protected areas associated with fallen trees or other structures.	--	No	No impact.
Plants						
Glass Mountains coral-root <i>Hexalectris nitida</i>	NL	SOC	Rare in canyons in Brewster County, encountered more commonly under <i>Juniperus ashei</i> in woodlands over limestone on the Edwards Plateau, Callahan Divide, and Lampasas Cutplain. Flowering June-September; fruiting July-September.	--	No	No impact.
Glen Rose yucca <i>Yucca necopina</i>	NL	SOC	Texas endemic; grasslands on sandy soils and limestone outcrops; flowering April-June.	--	No	No impact.
Hall's prairie clover <i>Dalea hallii</i>	NL	SOC	In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides; perennial; flowers May-September, fruiting June-September.	--	No	No impact.



Table 1. Rare, Threatened, and Endangered Species of Potential Occurrence in Dallas County, Texas

Species	Federal Status	State Status	Species/ Habitat Description	Element Occurrence Records ¹	Habitat Present?	Other Pertinent Information ²
Osage Plains false foxglove <i>Agalinis densiflora</i>	NL	SOC	Mostly grasslands on shallow, gravelly, well-drained, calcareous soils; prairies, dry limestone soils. Annual; flowering August-October.	--	No	No impact.
Plateau milkvine <i>Matelea edwardsensis</i>	NL	SOC	Occurs in various types of juniper-oak and oak-juniper woodlands; Perennial; flowering March-October; fruiting August-October.	--	No	No impact.
Reverchon's curfpea <i>Pediomelum reverchonii</i>	NL	SOC	Mostly in prairies on shallow rocky calcareous substrate and limestone outcrops. Perennial; flowering June-September; fruiting June-July.	--	No	No impact.
Texas milk vetch <i>Astragalus reflexus</i>	NL	SOC	Grasslands, prairies, and roadsides on calcareous and clay substrates; Annual; flowering February-June; fruiting April-June.	3 records, all records >70 years old	No	No impact.
Topeka purple-coneflower <i>Echinacea atrorubens</i>	NL	SOC	Occurring in mostly tallgrass prairie.	--	No	No impact.
Tree dodder <i>Cuscuta exaltata</i>	NL	SOC	Parasitic on various <i>Quercus</i> , <i>Juglans</i> , <i>Rhus</i> , <i>Vitis</i> , <i>Ulmus</i> , and <i>Diospyros</i> species as well as <i>Acacia berlandieri</i> and other woody plants; Annual; Flowering May-October; Fruiting July-October.	--	No	No impact.
Warnock's coral-root <i>Hexalectris warnockii</i>	NL	SOC	In leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creek beds in canyons; flowering June-September; individual plants do not usually bloom in successive years.	-	No	No impact.
Reptiles						
Alligator snapping turtle <i>Macrochelys temminckii</i>	NL	T	Perennial water bodies; deep water of rivers, canals, lakes, oxbows; swamps, bayous, ponds near deep running water; prefers mud substrate and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October.	-	No	No impact.



Table 1. Rare, Threatened, and Endangered Species of Potential Occurrence in Dallas County, Texas

Species	Federal Status	State Status	Species/ Habitat Description	Element Occurrence Records ¹	Habitat Present?	Other Pertinent Information ²
Texas garter snake <i>Thamnophis sirtalis annectens</i>	NL	SOC	Wet or moist microhabitats are conducive to species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August.	-	No	No impact.
Texas horned lizard <i>Phrynosoma cornutum</i>	NL	T	Open, arid and semi-arid regions with sparse vegetation; soil varies in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September.	-	No	No impact.
Timber rattlesnake <i>Crotalus horridus</i>	NL	T	Swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover.	-	No	No impact.
LE = Federally Endangered DL = Delisted LT = Federally Threatened SOC = Species of concern NL = Not Federally Listed E = State Endangered T = State Threatened						

¹Includes all TXNDD Element of Occurrence Records within a 1-mile radius of the project area.

²Federally listed species are discussed in terms of “effects”, while state-listed species and species of concern are discussed in terms of “impacts”. Species could be affected/impacted by the project if individuals of the species or habitat for the species occurs within the project study area.

Federally listed species and their habitats are protected under the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended. No designated critical habitat or preferred habitat for any federally listed species was identified within or near the project study area; therefore, the proposed project will have **no effect** on federally listed species for Dallas County. Due to the high intensity urban use of the project study area, no suitable habitat for any state or federally listed species is present.

A discussion of the habitat requirements for each listed species listed in **Table 1** is found in the following paragraphs.

Federally Listed Endangered

Black-Capped Vireo (*Vireo atricapilla*)

The Black-capped Vireo is a small songbird that once ranged from Kansas south into Mexico but is now found primarily in Texas and Mexico with a restricted range in Oklahoma (Campbell, 1995). Habitat for the species consists of oak-juniper woodlands that have a distinct structure with tree and shrub layers occurring in a patchy mosaic with grasslands. Dense shrub vegetation reaching to ground level is required for nesting cover (Campbell, 1995). Black-capped Vireos arrive in Texas in mid-March and nesting takes place through late summer; the birds tend to return to the same nesting territory or one



nearby each year. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Golden-Cheeked Warbler (*Setophaga chrysoparia*)

The Golden-cheeked Warbler is a small songbird that breeds in central Texas and winters in Central America (Campbell, 1995). It inhabits woodlands comprised of mature Ashe juniper (*Juniperus ashei*) mixed with oaks and a variety of other hardwood species, preferring steep-sided canyons and slopes above drainages. The long, fine bark strips from mature, shredding Ashe juniper trees are used for nest construction and cemented in place with spider webs (Campbell, 1995). Nesting takes place from March to early summer. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Interior Least Tern (*Sterna antillarum athalassos*)

The Interior Least Tern is a shorebird that is considered listed only when inland (i.e., more than 50 miles from the coastline where it breeds) (Campbell, 1995). The species nests on sand and gravel bars within braided streams and rivers and is also known to nest on man-made structures, such as sand and gravel mines, water treatment plants, ash disposal areas at power plants, and inland beaches such as those at reservoirs (Campbell, 1995). They prefer open areas, and tend to avoid habitats with thick vegetation or narrow beaches. Breeding takes place from early April to late August (Campbell, 1995). No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Whooping Crane (*Grus americana*)

The Whooping Crane breeds in the wetlands of northern Canada and spends the winter on the Texas coast near Rockport (TPWD, 2017c). Whooping cranes migrate to Texas' coastal plains from November through March, passing through the central portion of the state from the eastern panhandle to the Dallas area and south through the Austin area. During migration, whooping cranes utilize a variety of habitats, including wetland mosaics, riverine complexes, prairies, and croplands. Croplands are utilized for feeding, while open wetland areas are preferred for roosting (Campbell, 1995). Isolated areas away from human disturbance are generally preferred. The nearest known major migration stops to Whooping Crane wintering grounds in the Aransas National Wildlife Refuge are at the Salt Plains National Wildlife Refuge in northern Oklahoma (ICF, 2017). As of February 2015, the total wild population of the species was estimated to be 442 individuals, and the combined wild and captive population was estimated to be 603 individuals (USFWS, 2017b). No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Gray wolf (*Canis lupus*)

This species was formerly known throughout the western two-thirds of Texas in forests, brushlands, and grasslands; however, the last documented gray wolves in Texas were killed in 1970 and the species is considered extinct in the state (Schmidly, 2004).

Red wolf (*Canis rufus*)



The red wolf was formerly known throughout the eastern half of Texas in brushy and forested areas and in coastal prairies (Schmidly, 2004); however, this species has been extinct in the wild in Texas since the early to mid-1970s, having succumbed to hunting pressure and genetic suppression due to hybridization with coyotes.

Federally Listed Threatened Species

Piping Plover (*Charadrius melodus*)

The Piping Plover is a small shorebird that nests in the Great Plains and Great Lakes regions of the U.S. and winters along the Texas Gulf Coast (Campbell, 1995). Wintering Piping Plovers prefer sparsely-vegetated tidal mudflats, sandflats, and algal flats; however, they also feed and roost on beaches. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Red Knot (*Calidris canutus rufa*)

The Red Knot is a medium-sized shorebird that migrates annually between its breeding grounds in the Canadian Arctic to the southeast U.S. and Gulf of Mexico, and places further south including Brazil (USFWS, 2014). Wintering Red Knots prefer intertidal, marine habitats, especially near coastal inlets, estuaries and bays (AAB, 2017a). No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Federal Candidate Species

No federal candidate species are listed for Dallas County.

State Listed Endangered Species

All state-listed endangered species listed within Dallas County are also federally listed and have been discussed previously.

State Listed Threatened Species

American Peregrine Falcon (*Falco peregrinus anatum*)

The American peregrine falcon nests in the northern U.S. and Canada and in the Trans-Pecos region of west Texas. Elsewhere in Texas, the species is considered a migrant (Campbell, 1995). Migrating falcons winter along the Texas Gulf Coast, with stopovers in various habitat types at leading landscape edges. Formerly federally listed as endangered, the species was delisted by the USFWS on August 25, 1999 (USFWS, 1999). No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Bald Eagle (*Haliaeetus leucocephalus*)

The Bald Eagle was formerly federally listed as threatened but was delisted on August 9, 2007 (USFWS, 20117c). The species is a large bird of prey that migrates through, breeds, and winters in various parts of Texas. In Texas, nesting habitat consists of undisturbed coastal regions or along rivers and lake shores with large, tall trees, in which the birds nest and roost (Campbell, 1995). Wintering eagles are generally found near large lakes and reservoirs, and roosting often takes place communally in large trees. No



habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Peregrine Falcon (*Falco peregrinus*)

The peregrine falcon includes two subspecies which migrate across the state from more northern breeding areas in the U.S. and Canada to winter along the coast and farther south (USFWS, 2017d). The American peregrine falcon (*Falco peregrinus anatum*) is a resident breeder in west Texas. Because the two subspecies are not easily distinguishable at a distance, reference is generally made only to the species level.

Piping plover (*Charadrius melodus*)

The piping plover is also listed as federally threatened and has been previously discussed in the previous section.

White-faced Ibis (*Plegadis chihi*)

The White-faced Ibis is a wading bird that breeds and winters along the Texas Gulf Coast; in west and northwest Texas. The species may occur as a migrant (TPWD, 2011e). Freshwater marshes are the preferred habitat type (TPWD, 2017d), although they will also utilize sloughs, irrigated rice fields, and brackish or saltwater habitats. They nest colonially, constructing nests in marshes with shallow water in low trees, on the ground in bulrushes or reeds, or on floating mats (TPWD, 2017d). No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Wood Stork (*Mycteria americana*)

The Wood Stork forages in shallow standing water of various types, including saltwater (TPWD, 2011c). This species roosts in active heronries. At one time, Wood Storks were reported to have nested in Texas, but there have not been any breeding records from Texas since 1960. Currently, it is assumed the species breeds in Mexico (USFWS, 2017e). No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Shovelnose sturgeon (*Scaphirhynchus platyrhynchus*)

The shovelnose sturgeon is a long, slender fish with rows of spiny scales along its back (Klym and Garrett, 2002). The species generally weighs less than five pounds, is a bottom feeder that inhabits open, flowing channels with a sand or gravel substrate, and spawns over gravel or rocks in areas with fast current (USFWS, 2017f). In Texas, the shovelnose sturgeon is known only from the Red River below the Lake Texoma reservoir and from uncommon occurrences in the Rio Grande. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Louisiana pigtoe (*Pleurobema riddellii*)

The Louisiana pigtoe, a freshwater mussel, is endemic to the San Jacinto, Trinity, Neches-Angelina, Sabine, Big Cypress and Sulphur River basins in Texas (TPWD, 2017e). This species occurs in streams and moderate-sized rivers with low to moderate flow. They occur on substrates of sand, silty sand, sand and



gravel, and sand and clay. (TPWD, 2017e). No habitat is present within the project study area; however, three occurrences of this species are reported within one mile of the project study area in the Trinity River.

Sandbank pocketbook (*Lampsilis satura*)

The sandbank pocketbook is a freshwater mussel that lives in creeks, medium, and large-sized rivers with moderate flows (NatureServe, 2017a). This mussel is typically found on gravel, gravel-sand and sandy bottoms (NatureServe, 2017a). The sandbank pocketbook has been found within Arkansas, Louisiana, Mississippi, and Texas, and has been recorded in Dallas County. No habitat is present within the project study area and no confirmed occurrences of this species are reported within one mile of the project study area.

Texas heelsplitter (*Potamilus amphichaenus*)

The Texas heelsplitter is a unionid bivalve mussel. Although currently listed as threatened at the state level, the species is under review by USFWS for possible federal listing (USFWS, 2009). The Texas heelsplitter is restricted to the Neches, Trinity, and Sabine Rivers in Texas (TPWD, 2009). In small to medium rivers, the species inhabits flowing waters over mud or sand substrates (USFWS, 2009). It may also be found in reservoirs. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Texas pigtoe (*Fusconaia askewi*)

The Texas pigtoe is a freshwater mollusk normally found in rivers with mixed mud, sand, and fine gravel in protected areas associated with fallen trees or other structures (TPWD, 2009). They are found in east Texas River basins, the Sulphur River, Cypress Creek, and Sabine through Trinity Rivers as well as the San Jacinto River. A regional endemic limited to a relatively small area in Texas and Louisiana that includes the Trinity River above Lake Livingston, a tributary of the West Branch San Jacinto River, and the Sabine River above Toledo Bend Reservoir. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Alligator snapping turtle (*Macrochelys temmincki*)

The alligator snapping turtle is normally found in perennial water bodies, such as the deep waters of rivers, canals, lakes, and oxbows, but may also inhabit swamps, bayous, and ponds near deep running water (NWF, 2017). Sometimes this turtle may also be found in brackish coastal waters. The species prefers water bodies with mud substrates and abundant aquatic vegetation and is capable of migrating for several miles along rivers. The alligator snapping turtle breeds from April to October. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Texas Horned Lizard (*Phrynosoma cornutum*)

The Texas horned lizard prefers open, arid and semi-arid habitats with sparse vegetation, including grass and cactus (TPWD, 2017f). This species is commonly found on loose soils which may vary in texture from sandy to rocky, and they are known to burrow, enter rodent burrows or hide under rocks. The breeding season for the species is March through September (TPWD, 2017f). No habitat is present within the



project study area and no occurrences of this species are reported within one mile of the project study area.

Timber rattlesnake (*Crotalus horridus*)

Timber rattlesnakes are found throughout east Texas (TPWD, 2011g) in swamps, floodplains, upland pine and deciduous woodlands, riparian zones, and abandoned farmland. They prefer moist areas with thickets, tree stumps, logs and branches that can provide hiding places (TPWD, 2011g). Timber rattlesnakes may be found on limestone bluffs, sandy soils, or black clay soils. They are diurnal during spring and fall, but tend to become nocturnal in the summer in order to avoid the heat. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

State Species of Concern

Auriculate False Foxglove (*Agalinis auriculata*)

Only known in Texas from one late nineteenth century specimen (Poole et. al., 2007). More commonly found in Oklahoma and Arkansas on blackland prairie. Anecdotal evidence suggests that periodic fire, pocket gopher activity, or other natural disturbance may be required to maintain habitat in an appropriate successional state (Poole et. al., 2007). No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Glass Mountains Coral-Root (*Hexalectris nitida*)

The Glass Mountain coral-root is a leafless orchid with a relatively short inflorescence that is widely scattered across Texas. Glass Mountain coral-root is self-pollinating and grows on rocky canyon side and bottoms in moderate to heavily shaded areas (NAOCC, 2017). No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Glen Rose Yucca (*Yucca necopina*)

The Glen Rose yucca is an endemic stemless, colony-forming shrub with white flowers which are suspended from a single, tall stalk that grows from the center of the plant (Poole, et al., 2007). The species grows in grasslands on sandy soils and limestone outcrops and flowers from April to June (Poole, et al., 2007). The Glen Rose yucca is known only from north-central Texas. Historically, the species was known from Dallas, Denton, and Young Counties, but it is currently known to occur in Hood, Parker, Somervell, and Tarrant Counties. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Hall's Prairie Clover (*Dalea hallii*)

Hall's prairie clover is endemic to 18 counties in central and north-central Texas. The species is rare and many of the sightings of this prairie clover are historical (the plants have not been seen in 50 years or more) and may be known from only one location in each county. Prairie clovers are indicators of healthy grasslands and savannahs. Hall's prairie clover, and others in this genus, are threatened by invasion of woody species due to fire suppression (Singhurst, 2015). No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.



Osage Plains False Foxglove (*Aqalinis densiflora*)

Osage Plains false foxglove is an herbaceous perennial ranging from Kansas through Oklahoma and north-central Texas (NatureServe, 2017b). This species primarily occurs on shallow, well-drained, gravelly calcareous soils over limestone, in upland tallgrass prairies. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Plateau Milkvine (*Matelea edwardsensis*)

The plateau milkvine is unusual as it does not demonstrate fidelity to any habitat in which it is locally common (NatureServe, 2017c). It seems to occur in small numbers over a variety of habitats. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Reverchon's Scurfpea (*Pediomelum reverchonii*)

Reverchon's scurfpea is a regional plant endemic to the limestone outcrops in Texas and Oklahoma (NatureServe, 2017d). No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Texas Milk Vetch (*Astragalus reflexus*)

Texas milk vetch is a small annual herbaceous plant with tiny flowers. This species is endemic to the eastern half of Texas, primarily within the blackland prairie (NatureServe, 2017e). Most commonly, Texas milk vetch occurs in early-successional habitat on calcareous clay substrates. This species is represented by fewer than 30 collections, of which none are more recent than 1965 (NatureServe, 2017e). Three records are located within one mile of the project study area, but these records are all over 70 years old. No habitat is present within the project study area.

Topeka Purple-Coneflower (*Echinacea atrorubens*)

The Topeka purple-coneflower is an herbaceous perennial, which blooms from April to June (LBJ, 2017). Range for this species includes Kansas, Oklahoma and Texas. This aster prefers sunny, dry sites and occurs on rocky prairies and tall grass hay fields. The Topeka purple-coneflower also occurs on prairie remnants along roadsides. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Tree Dodder (*Cuscuta exaltata*)

Tree dodder is an herbaceous annual, which is found in Texas and Florida (NatureServe, 2017f). This species is a twining parasitic vine, with long, orange, thick stems. In Texas, this species is usually found in riverside thickets and woodlands, usually in limestone soil. *Cuscuta exaltata* can form dense tangles in trees. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Warnock's Coral-Root (*Hexalectris warnockii*)

Warnock's coral root is a species of orchid that grows in leaf litter and humus on shaded slopes within oak-juniper woodlands and also may grow in intermittent, rocky creekbeds in canyons (Poole, et al.,



2007). On the White Rock Escarpment of Dallas County, Warnock's coral-root generally occurs in woodlands on limestone slopes, often in association with Texas oak (*Quercus buckleyi*) and Ashe juniper (Poole, et al., 2007). The plant grows to a height of 5 to 15 inches and has a few short tubular sheaths rather than leaves. The flowers are maroon to reddish or brownish-purple in color (Poole, et al., 2007). The species flowers from June to September and individual plants usually do not bloom in successive years (Poole, et al., 2007). No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Black Lordithon Rove Beetle (*Lordithon niger*)

In the past, the Black Lordithon rove beetle was considered historically global, although currently its known or suspected range includes only 16 states in the U.S. and one Canadian province (NatureServe, 2017g). The status for this species is based upon the fact that very little is known about the species or its habitat requirements. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Texas Garter Snake (*Thamnophis sirtalis annectens*)

The Texas garter snake is fairly common in a few locales, throughout most of its East Central Texas range, although it is seldom encountered (Tennant, 1985). An active diurnal forager, this snake will attempt to eat prey of a much larger size. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Arctic Peregrine Falcon (*Falco peregrinus tundrius*)

The Arctic Peregrine Falcon nests in the northern U.S. and Canada and in South America (Campbell, 1995). Migrating falcons stop along the Texas Gulf Coast to feed and prepare for flight to South America. The species is a low-altitude migrant that tends to stopover at leading landscape edges. Formerly federally listed as endangered, the species was delisted on October 5, 1994 (USFWS, 1994). Due to its similarity to the American Peregrine Falcon when viewed at a distance, the Arctic Peregrine Falcon should be treated as state-listed threatened if any question about identity exists. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Henslow's Sparrow (*Ammodramus henslowii*)

The Henslow's Sparrow is normally found in weedy fields, although it is often absent from seemingly suitable habitat (Audubon, 2017). It breeds in fields and meadows, often in low-lying or damp areas, with tall grass, standing dead weeds, and scattered shrubs. Thought to breed in small colonies which change in location from year to year. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Red Knot (*Calidris canutus*)

The Red Knot is also a federally threatened species and has been previously discussed in that section.

Sprague's Pipit (*Anthus spragueii*)



The Sprague's pipit is a rare songbird of the northern prairie (AAB, 2017b). Found in open grasslands, it feeds and nests exclusively on the ground. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Western Burrowing Owl (*Athene cunicularia hypugaea*)

The Western Burrowing Owl is found in open grasslands, and may be found near human habitation (AAB, 2017c). It nests and roosts in burrows they've dug themselves or taken over from a prairie dog, ground squirrel, or tortoise. No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Cave Myotis Bat (*Myotis velifer*)

The cave myotis is a small bat that is found throughout the southwestern U.S. and portions of Mexico. It occurs in central, south, and west Texas during the summer months (TPWD, 2017d). The species is colonial and cave-dwelling, although it is also known to utilize mines, rock crevices, buildings, bridges, culverts, and even abandoned swallow nests for roosting (TPWD, 2017h). No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.

Plains spotted skunk (*Spilogale putorius interrupta*)

Although it prefers wooded, brushy areas and tallgrass prairie, the plains spotted skunk utilizes a wide variety of habitat types, including open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodland (USFWS, 2017g). No habitat is present within the project study area and no occurrences of this species are reported within one mile of the project study area.



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